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This guide provides an overview of OnApp's cloud deployment and management software and explains in detail how to configure and manage your cloud using the OnApp Control Panel interface.
1 Key to interface and icons

This guide refers to various elements of the OnApp interface, including Menu items, Tabs, Icons, and Buttons. These are illustrated below. The specific functions available depend on the permissions assigned to the user currently logged in.

This guide is aimed at Administrators and Users with limited permissions will not be able to access all functionality, or may be denied access to functions they can see.

The following icons are referred to in this guide:

- **Add**
- **Edit**
- **Delete**
- **Statistics**
- **Actions**
- **Power status**
- **Hide menu**
- **Full screen**
- **Build**
- **Tools menu**
- **Switch on/off**
2 OnApp 6.4

Added:

- TOTP Authentication

Updated:

- **Create and Manage Roles**: added information about the *Based on default role* slider available during a role creation.
- **Authentication, Edit System Configuration, User Profile, Create and Manage User Accounts, Login Screen**: added information about TOTP Authentication option.
- **List of All OnApp Permissions**: added the *Disable TOTP authentication* permission
- **Create Load Balancers**: added infobox about IPv4 support
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4 What's New in OnApp Cloud 6.3

The OnApp Cloud 6.3 Stable provides new features and improvements. You can find the list of all key enhancements at Release Notes.

4.1 Migration from Xen to KVM (Windows)

Previously it was possible to migrate only Linux-based VSs from Xen to KVM. In 6.3 Edge 1, OnApp introduces the possibility to migrate Windows-based virtual servers from Xen to KVM compute resource. The most time-consuming operations are performed with the virtual server being online, so the required downtime period is as short as possible.

4.2 Edge Accelerator Operator Dashboard

Now you can learn more about your accelerator performance and track the amount of bandwidth used by accelerated websites in the Operator Dashboard menu. The Dashboard also allows you to view bandwidth statistics generated for the last 24 hours or more.

4.3 Sub-allocated IP Pools

Now you can manage your vCloud Edge Gateways easier with the ability to view sub-allocated IP pools. Therefore, your configurations on vCloud side are now better rendered on OnApp side.

4.4 Passthrough Host CPU Configuration Model

Passthrough host CPU is one of the CPU model configurations, that allows to group compute resources with similar CPU performance characteristics into compute zones. Passthrough host CPU model configuration passes the host CPU model and features directly to the guest VS. This mode provides the maximum available capabilities of the host's CPU to VS's virtual CPU. VS hot migration is possible only to a host with identical hardware.
4.5 Updated UI

In OnApp 6.3, we updated the user interface with the new look and feel for all UI components. Among others, now the following UI components match the new layout design: tables, pop-up windows, instance packages card view, steps in wizards, labels, action buttons, and group form components.

4.6 Virtual Network Interface support and custom network configuration for Integrated Storage

Added support for virtual network interfaces and the ability to view, create, and edit advanced network interfaces for Integrated Storage compute resources and smart servers. Also, if you have complex network configuration, you can now configure networks manually to make them compatible with OnApp Integrated Storage. Manual configuration may be performed for network interfaces bonding or one network interface, depending on your environment.
# 5 Document Conventions

The following document conventions are used in this guide.

<table>
<thead>
<tr>
<th><strong>Bold</strong></th>
<th>Label or button names in the Control Panel, often clickable. For example: On the VS's screen, click the <strong>Tools</strong> button, then select <strong>Delete Virtual Server</strong>.</th>
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<tr>
<td><strong>Italic</strong></td>
<td>Parameters and field labels in the UI. For example: <em>Password</em> - set password for remote Vyatta management.</td>
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| **Code block** | Source code. For example:  

```plaintext
alter if not: eth0 = public interface  
eth1 = CP Communication interface  
eth2 = VLAN communication interface
```

In some cases, code examples can be preformatted. For example:

Run the following commands:

```bash
echo "cp <LOCATION OF vnc.xml> /etc/vmware/firewall/vnc.xml" >> /etc/rc.local
```

A menu selection

For example:

Go to **Settings -> Networks -> Add New Network**

We use the following formatting elements to draw your attention to certain pieces of information:

**Info**

An info message emphasizes or explains the information within the chapter.

> Clicking the OFF button performs graceful shutdown and then powers off the VS after the timeout set in the **Configuration** settings.

**Note**

A Note message contains information essential for the task completion.

> The maximum length of a Mount Point is 256 characters.

**Warning**

A warning message informs you of something you should not do or be cautious.
You won't be able to restore a VS after deleting it.
6 OnApp Cloud Overview

OnApp Cloud software enables service providers to turn their existing infrastructure (or any commodity hardware) into a single pool of resources - "a cloud" which can then be sold to end users on a utility basis. It's a complete cloud deployment and management platform that's designed to make it easy for service providers to sell a wide range of cloud services.

OnApp Cloud can also be used by enterprise IT departments and MSPs to deliver cloud services to end users. For more information, see http://onapp.com/platform/.

OnApp UI complies with Web Content Accessibility Guidelines (WCAG) 2.0 AA and AAA (highest) levels of conformance to make content more accessible to a wider audience. OnApp provides full compatibility of Control Panel UI with desktop Google Chrome and Firefox web browsers where JavaScript is enabled. Currently, mobile and tablet browsers are not supported.

This guide explains how to configure and use OnApp Cloud through the OnApp Control Panel management user interface. Depending on your OnApp Cloud license type (free or full), and how your cloud is configured, you can use the Control Panel to set up your own distributed SAN and DNS services, using OnApp's companion products and OnApp Storage. All of these functions are covered in this guide.

6.1 Main Components & Features

OnApp Cloud handles cloud deployment, VS deployment, VS management & resource allocation, Compute resource and SAN management, failover, user management, billing, self-provisioning, CDN and DNS, and other associated functions. Here's a brief description of the main components and features of the OnApp installation.

6.1.1 Servers

There are two required server types in an OnApp configuration – Compute resource servers and the Control Panel server. OnApp also requires storage devices for templates, virtual servers, and backups.

6.1.1.1 Control Panel Server

The Control Panel server hosts the OnApp user interface and manages all the processes controlled by OnApp.

The Control Panel server:
- Provides a web-based user interface
- Assigns a virtual server to a Compute resource
- Creates/starts/stops/deletes virtual servers
- Resizes CPU and storage
- Manages virtual servers through a console session
- Creates backups of virtual servers
- Allows virtual servers to be restored from a backup
- Allows the creation of custom templates from virtual server backups, for future deployment of new virtual servers
- Displays your CPU usage and network utilization
6.1.1.2 Compute Resources

Compute resources are Xen, KVM, or VMware-powered servers running on bare metal, with CentOS Linux as the management operating system. This ensures highly efficient use of available hardware and complete isolation of virtual server processes. The management OS controls virtual servers as well as handling network/disk connectivity, monitoring, IP address anti-spoofing and more.

Compute resources:

- Provide system resources such as CPU, memory, and network
- Control the virtual differentiation of entities such as virtual servers and application data being delivered to cloud-hosted applications
- Take care of secure virtualization and channeling of storage, data communications and server processing
- Can be located at different geographical zones
- Can have different CPU and RAM
- Can be of Virtual, Baremetal, Smart and VPC types. The VPC type indicates the vCloud Director compute resources
- Can be associated with the data stores, networks and backup servers of the same type

OnApp Cloud supports the following Compute resource virtualization platforms:

- Xen - OnApp supports Xen 3 and Xen 4
- KVM
- VMware
- vCloud Director

VMware Compute resources operate in a slightly different way. With Xen/KVM OnApp controls Compute resources directly. With VMware, OnApp controls the VMware vCenter. This allows vCenter to control the VSs with the full range of VMware functionality including DRS and vMotion to ensure that the operation is optimal.
6.1.1.3 CloudBoot Compute Resources

CloudBoot functionality is a method of Compute resource installation without the presence of a local disk or other local storage, utilizing the PXE and DHCP servers. To start using CloudBoot, you must have Integrated Storage configured and the CloudBoot enabled in the system configuration first. See CloudBoot Compute Resources section for details. CloudBoot Compute resources are used for smart and baremetal server provisioning.

6.1.1.4 Virtual Servers

OnApp gives you complete control of your virtual servers (VSs), and all files and processes running on those servers. You can start, stop, reboot and delete virtual servers. You can move VSs between Compute resources with no downtime. OnApp also lets you perform automatic and manual backups, and restore VSs in case of failure.

When creating a virtual server, you can choose a Compute resource server with data store attached if you wish. If not, the system will search for Compute resources available that have sufficient RAM and storage for that virtual server, and choose the one with the lowest (but sufficient) amount of RAM available.

You can monitor the CPU usage of each virtual server and the network utilization of each network interface. This helps you decide if and when to change the resources available to each VS. OnApp also provides detailed logs of all tasks which are running, pending, have failed or have been completed.

6.1.1.5 Smart Servers

Smart servers are dedicated entities based on CloudBoot Compute resources with passthrough enabled. Smart servers are created and managed exactly the same as virtual servers, except only one smart server can be deployed per Compute resource. Smart servers can be organized into zones to create different tiers of service - for example, by setting up different zones for smart appliances, with limits and prices specified per zone. Smart appliance zones can also be used to create private clouds for specific users.

6.1.1.6 Baremetal Servers

Baremetal servers are physical servers that reside directly on the hardware without the virtualization layer. Namely, a baremetal server is a Compute resource that runs on the OS installed. Baremetal Compute resources cannot have more than one baremetal server located on it.

6.1.2 Storage Devices

For VS template and backup storage we recommend that you set up a separate server with SSH (preferred) or NFS (for high-end NAS). However, in a CloudBoot environment or for a small scale installation you can use the Control Panel server to host the templates and backups. You will also need a storage platform for virtual server disk storage. OnApp provides an integrated storage platform that enables you to expose local storage drives across Compute resources as a distributed block SAN with full redundancy and failover properties. Additionally, you can use any block based storage platform, such as local disks in Compute resources, an Ethernet SAN such as iSCSI or AoE, or hardware (fiber) SAN. Storage Area Networks are core segments of the cloud system, and OnApp can control their physical and virtual routing. This control enables seamless SAN failover management, including SAN testing, emergency migration and data backup.
6.1.3 Networks

With OnApp you can create complex networks between virtual servers residing on a single host, or across multiple installations of OnApp. You can configure each virtual server with one or more virtual NICs, each with its own IP and MAC address, to make them act like physical servers. OnApp ensures that each customer has their own dedicated virtual network, isolated and secure. They can only see their traffic, even if they share the same physical server as another customer. OnApp enables you to modify network configurations without changing actual cabling and switch setups. Networks in OnApp can be of Virtual, Baremetal, Smart, and VPC types and can be associated with compute resources and compute zones of the same type. The VPC type indicates the vCloud Director networks.

6.1.4 Templates

An OnApp template is a pre-configured OS image that is used to build virtual servers. There are two types of templates for virtual server deployment in OnApp: downloadable templates provided by OnApp, and custom templates you create from existing virtual servers. The OnApp template library includes a wide range of VS templates for various distributions of Windows and Linux, both 32- and 64-bit.

At present OnApp does not support VSs/templates with Active Directory Domain Controllers.

6.1.5 Scalability

OnApp is a highly scalable cloud deployment and management tool that allows you to add and remove compute resources, data stores and resources at any time to meet your changing needs. You can add more CPUs and memory to a specific virtual server to increase its capacity, and increase the total available RAM and CPU by adding new compute resources.

6.1.6 High Availability

OnApp provides high reliability and availability in a number of ways:

- **Compute resource failover management system** — If a Compute resource fails, OnApp’s self-healing architecture automatically moves virtual servers to another box. Compute resources regularly update the control panel with their status. If they do not return valid data for a period of time, they are marked as offline, and an appropriate new Compute resource is selected for a virtual server to boot there. This process is fully automatic but may take several minutes. When the crashed Compute resource comes online, it will be again available, but virtual servers previously migrated from it will not be migrated back.

- **Virtual servers** — OnApp keeps virtual servers running even if the Control Panel server goes offline. In such an event, you won’t be able to perform any actions on virtual servers until access to the Control Panel server has been restored.

- **Backup mechanisms** — There is storage security provided by the backup mechanisms on both virtual and physical storage. Both automatic and manual backups provide the ability to capture the current state of a virtual server. You can always restore the virtual server from a backup if needed. There are also emergency MySQL backups as part of the disaster recovery system.
• **High Availability Control Panel** — OnApp High Availability feature brings new opportunity to deploy more than one Control Panel within one cloud. This allows to improve cloud load balancing, minimize server downtime in case of CP issues and enhances scalability of the whole infrastructure. At this stage OnApp introduces high availability for the following components:
  - UI
  - Background services
  - CloudBoot
  - Load Balancer
  - Redis
  - Message Queue
  - Database

### 6.1.7 Security

OnApp provides multiple layers of security:

- **Compute resource** — OnApp is a multi-Compute resource cloud system that currently supports Xen, KVM and VMware (Hyper-V and other Compute resources will be added in future releases). The first layer of security is provided by the Compute resource itself. For example, Xen provides full isolation between virtual servers and allows each virtual server to access its own disk only. When a virtual server makes a request for data, it gets redirected to its correct disk. Xen dictates which virtual servers and resources are allowed to run or be accessed at any given time.

- **Firewall** — In addition to the Compute resource security mechanism, there is also an anti-spoof firewall which resides on the server where you store virtual servers. The firewall enables the management operating system of the Compute resource to examine packets entering and leaving the virtual server. It blocks packets that do not belong to the virtual server and accepts those meeting the rules. The firewall prevents IP spoofing and packet sniffing.

- **Control Panel** — Virtual servers in OnApp are completely controlled by the administrator. Administrators have full root (Linux) or Administrator (Windows) access to accounts and servers. The Control Panel also lets you assign different levels of user access to virtual servers, Compute resources, consoles and disks.

- **Network Security** is provided by completely isolating virtual servers from each other using VLANs. Each customer can be assigned their own VLAN, so using their private IP they can only access addresses within that VLAN. Using a public IP, they can only access those boxes which are manually specified, using the Integrated Console.

### 6.2 API and Integrations

Our comprehensive RESTful XML and JSON API enables full integration of OnApp with third-party applications.

OnApp integrates with popular billing applications like HostBill, Ubersmith and WHMCS, and with PHP applications via a wrapper (integration modules are available from the OnApp website: Downloads).

The API makes integration straightforward for other applications too, including other control panels, CRM, support and billing systems.

For a detailed API guide with code samples, see OnApp API Guide.
6.3 Hardware & Software Requirements

An OnApp installation requires at least two physical machines – one for the Control Panel server, and the other for the compute resource server. You can have as many compute resource servers as you need. You will also need storage for your virtual servers (a data store), and we recommend that you set up a separate server for storing backups and templates.

6.3.1 Suggested Specifications

<table>
<thead>
<tr>
<th>OnApp License</th>
<th>Professional Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Control Panel (CP) Servers</td>
<td>1</td>
</tr>
<tr>
<td>Separate Database Server/Cluster</td>
<td>No</td>
</tr>
<tr>
<td>Dedicated Backup Servers</td>
<td>1</td>
</tr>
<tr>
<td>Number of Compute Resources (XEN/KVM)</td>
<td>8</td>
</tr>
<tr>
<td>Compute Resource Type (Static / CloudBoot)</td>
<td>CloudBoot</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CP Server</th>
<th>Processor</th>
<th>Memory</th>
<th>Disks</th>
<th>RAID Configuration</th>
<th>Network Adapters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 x 8 Core CPUs eg. Xeon e5-2640 v3</td>
<td>32GB RAM</td>
<td>4 x 100GB SSD</td>
<td>RAID 10</td>
<td>Dual port 1Gbps + Dual Port 10Gbps eg. Intel I350 + X520</td>
</tr>
</tbody>
</table>
### Backup Server

| Processor       | 2 x 8 Core CPUs  
eg. Intel Xeon e5-2620 v3 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>32GB RAM</td>
</tr>
<tr>
<td>HDDs</td>
<td>12x2TB SAS</td>
</tr>
<tr>
<td>RAID</td>
<td>RAID10</td>
</tr>
</tbody>
</table>
| Network Interfaces | Dual port 1Gbp Intel NIC +  
                          Dual port 10Gbps Intel NIC |

### Compute Resource

| Processor       | 2 x 8 Core CPUs  
eg. Xeon e5-2640 v3 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>256GB</td>
</tr>
<tr>
<td>HDDs</td>
<td>8 x 400GB SSD</td>
</tr>
</tbody>
</table>
| RAID Controller | PCIe gen3  
eg. PERC H730, 1GB cache                      |
| RAID Configuration | JBOD                     |
| Network Interfaces | 4 x 10Gbps  
eg.                                     |

### iSCSI SAN

<table>
<thead>
<tr>
<th>Type</th>
<th>Optional Dual-Controller Hardware SAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDDs</td>
<td>12+ x SSD</td>
</tr>
<tr>
<td>RAID Configuration</td>
<td>RAID10</td>
</tr>
</tbody>
</table>

### Network Hardware

| 2 x High performances switch with: 48 x 10GbE ports, 4 x 40 GbE ports |

### 6.3.2 Storage Hardware Requirements

If you are going to use OnApp Integrated Storage, make sure to meet the following requirements:

<table>
<thead>
<tr>
<th>Integrated Storage Platform</th>
<th>Local Storage Only</th>
<th>Enterprise SAN</th>
</tr>
</thead>
</table>
| OnApp Integrated Storage   | minimum 1 dedicated partition in each compute resource  
                            | separate disk from the primary OS drive  
                            | recommended |
|                             |                     | centralisedBlockStorage SAN  
                            |           | (iSCSI, ATA over Ethernet or Fibre Channel) accessible to every compute resource |
|                             |                     | at least 1 dedicated 1GBit/s NIC assigned per compute resource for the SAN |
|                             |                     | multiple NICs bonded or 10GBit/s ethernet recommended |
6.3.3 Hardware Requirements for HA

For information about hardware requirements for HA refer to the Suggested Specifications section of Get Started for Clouds with High Availability guide.

6.4 Architecture

OnApp software transforms your server and storage hardware into a virtual network system that employs a Xen Compute resource virtualization architecture to control virtual protocols and security. With this infrastructure in place, OnApp users can host a multitude of secure cloud servers with more fluidity and control. A schematic of the OnApp architecture is shown below.

6.5 Network Configurations

There are several supported network configurations:

6.5.1 Cloud Only (Xen & KVM)
Basic Backup Scheme Advanced Backup Scheme
6.5.1.1 Cloud only Network Diagram (BBS)
6.5.2 Cloud & Storage

This allows you to use OnApp Integrated Storage. Data Protection is restricted to Basic Backup Scheme
6.5.2.1 Cloud and Storage Network Diagram (BBS)
6.5.3 Cloud Only (VMware)

6.5.3.1 Cloud only Network Diagram (VMware)

See also:
- Manage Virtual Server Networks
- vCenter Virtual Servers Networks
- Networking
6.6 Zone Types

Starting from version 5.3, OnApp reinforces the role of the types for compute, data store, network and backup server zones. The following norms apply to existing and new zones and resources:

- All individual resources (compute resources, data stores, backup servers and networks) should be assigned to zones. Unassigned resources cannot be used for virtual server creation.
- All compute, data store, network and backup server zones have their type which cannot be changed. The zone's type also defines the type of the resources assigned to it. All VMware Cloud Director related resources have the VPC type.
- Resources can be moved from one zone to another, but the zones should be of the same type. For example, you can move a data store from a data store zone of the Virtual type to another zone of the Virtual type. However, such a data store cannot be moved to a zone of the VPC type.
- Networks, data stores and backup servers can only be assigned to compute zones and compute resources of the same type. For example, a network from the Virtual type network zone can be assigned only to a compute zone of the Virtual type.

See also:
- Data Stores Settings
- Data Store Zones Settings
- Compute Zones Settings
- Compute Resource Settings
- Backup Server Zones Settings
- Network Zones Settings

Below you can find tables that demonstrate the available zone types depending on the resource type:

- **Compute Resources and Zones**

<table>
<thead>
<tr>
<th>Compute Resource Type</th>
<th>Compute Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xen</td>
<td>Virtual/Baremetal</td>
</tr>
<tr>
<td>KVM</td>
<td>Virtual/Smart</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
<tr>
<td>VMware Cloud Director</td>
<td>VPC</td>
</tr>
</tbody>
</table>

- **Data Stores and Data Store Zones**

<table>
<thead>
<tr>
<th>Data Store Type</th>
<th>Data Store Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVM</td>
<td>Virtual/Smart</td>
</tr>
<tr>
<td>Integrated Storage</td>
<td>Virtual/Smart</td>
</tr>
<tr>
<td>SolidFire</td>
<td>Virtual/Smart</td>
</tr>
<tr>
<td>VMware Cloud Director</td>
<td>VPC</td>
</tr>
</tbody>
</table>
### Data Store Type

<table>
<thead>
<tr>
<th>Data Store Type</th>
<th>Data Store Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
</tbody>
</table>

### Networks and Network Zones

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Network Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware Cloud Director</td>
<td>VPC</td>
</tr>
<tr>
<td>Other</td>
<td>Virtual/Smart/Baremetal</td>
</tr>
</tbody>
</table>

### Backup Servers and Backup Server Zones

The backups server zones are available for the Virtual and the Smart server type. Any backup server can be added to a zone of either type. Once the backup server is added to a zone of a certain type it can be assigned to a backup server zone, compute resource or compute zone of that type only.

### Backup Resources and Backup Resource Zones

The backup resource zones are available for the Virtual server type. The backup resource uses a plugin that enables to integrate OnApp with a third-party backup system. Once the backup resource is added to the backup resource zone, the later should be assigned to a compute zone that includes a compute resource on which run virtual servers that should be backed up.
7 Dashboard

After you log in to the system, you can see the OnApp dashboard. The dashboard provides resource usage statistics, activity log, and your cloud summary. The sidebar menu consists of the following tabs:

- **Cloud** that includes **Dashboard**, **Service Catalog**, **Appliances**, and **Components** such as templates, service add-ons, recipes, etc.
- **CDN** that contains **CDN** related resources and server instances.
- **Metrics** that provides statistics on the usage of Cloud, Storage, CDN, and other available resources.
- **Admin** that allows administrators to manage compute resources, users, billing, notifications, settings, etc.

7.1 Statistics

You can choose the time period (24 hours, 7 or 30 days), for which the statistics will be shown. Resource statistics are represented in the form of bars and charts, which show the following:

**On this page:**
- **Statistics**
- **Your Summary**
- **Activity Log**
- **Additional Navigation**

**See also:**
- **API Key**
• **Login Screen**

• **User Profile**

• **Cloud Search Tool**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Used</th>
<th>Total</th>
<th>Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Total virtual cores assigned to running VSs (may be higher than active cores if overselling)</td>
<td>Total physical cores on all compute resources which are configured in OnApp</td>
<td>The points on the graph show daily peaks of used CPU (in cores) for a particular time period. Hover over a particular point, to view the peak of used CPU that will appear below the chart.</td>
</tr>
<tr>
<td>Memory</td>
<td>Total amount of memory used currently.</td>
<td>Sum total of RAM allocated to VSs + RAM allocated to orphaned VSs</td>
<td>The points on the graph show daily peaks of used memory (in MB) for a particular time period. Hover over a particular point, to view the peak of used memory that will appear below the chart.</td>
</tr>
<tr>
<td>Storage</td>
<td>Total amount of storage currently used.</td>
<td>Sum total of all VS disks unused capacities + orphan disks capacities</td>
<td>The points on the graph show daily peaks of used storage space (in GB) for a particular time period. Hover over a particular point, to view the peak of used storage space that will appear below the chart.</td>
</tr>
<tr>
<td>IOPS /h usage</td>
<td>The amount of input/output requests for the entire cloud (blue part of the bar - data read, dark blue - data written) for the last hour.</td>
<td></td>
<td>The points on the graph show the total amount of input/output requests for a particular time period. Hover over a particular point, to view the peak of input/output requests that will appear below the chart.</td>
</tr>
<tr>
<td>Baremetal servers</td>
<td>The amount of running baremetal servers in the cloud</td>
<td>The amount of baremetal servers created in the cloud</td>
<td>The points on the graph show daily peaks of amount of created baremetal servers. Hover over a particular point, to view the peak of amount of created baremetal servers that will appear below the chart.</td>
</tr>
<tr>
<td>Smart servers</td>
<td>The amount of running smart servers in the cloud</td>
<td>The amount of smart servers created in the cloud</td>
<td>The points on the graph show daily peaks of amount of created smart servers. Hover over a particular point, to view the peak of amount of created smart servers that will appear below the chart.</td>
</tr>
</tbody>
</table>

Click the **Admin** tab and go to **Settings > Configuration > Interface > Dashboard Statistics** to choose which statistics will be shown on the dashboard.

Ensure that **Dashboard permissions** are enabled before viewing dashboard statistics. For more information about permissions, refer to the **Permissions** section of this guide.

If there are no **baremetal** servers or **smart** servers in the cloud, the statistics on them are not shown.

For Integrated Storage, the Storage usage is displayed in the following way:

- **Used** - sum of all created vdisks in all Data Stores in the cloud
- **Total** - sum of all disk capacities on Data Stores in the cloud
7.2 Your Summary

This section shows details of the entire cloud:

• For users, it shows the total number of virtual servers, RAM, data stores, backups, and disk space they're using.

• For administrators, it shows the total number of virtual servers, compute resources, data stores, and backups on the entire cloud.

7.3 Activity Log

At the bottom of the screen is a record of recent transactions. To view details of a transaction, click a Ref number.

• Users see recent transactions for their virtual servers.

• Administrators see recent transactions for the entire cloud.

7.4 Additional Navigation

From the top pane, you can run the following actions:

• Click the Arrow button to hide the sidebar menu.

• Use Search to run a global search across the cloud.

• Click your login to view My Profile or to log out.

• Click the Create Server button to create a new virtual server, application server, load balancer, edge server, or storage server.

• To hide the infobox on a particular page, click the Close button in the upper-right corner of the infobox. For more infobox settings, refer to User Profile section.

7.5 API Key

The API Key is used instead of the user credentials during API operations.

To generate a key for a user, go to the user's profile page at Control Panel > Admin > Users > Full Name and click the Generate Key button in the API info section.

To change the key, go to the user's profile page at Control Panel > Admin > Users > Full Name and click the Regenerate Key button in the API info section.

7.6 Login Screen

To access your Control Panel, you must first provide a username and password. Optionally, you can set up two factor authentication for your cloud using a Yubikey. Authentication means identifying a user and verifying that this user is allowed to access the OnApp Control Panel.
You can also implement SAML authentication for your cloud so that your users can input their credentials from third-party systems to access OnApp services, without the need to be previously registered in OnApp Cloud. For more information refer to SAML Authentication.

Check the Remember me box to have the CP remember your login details for one month. You will have to enter your login credentials again after you log out or clear your browser cookies.

After two failed attempts at logging into the OnApp account the system will show the number of login attempts that the user has left. After the login attempts limit is exhausted the account will be locked and unlock instructions will be sent to the user's email. You can set the number of login attempts at Control Panel > Admin > Settings > Configuration > Defaults by configuring the Lockout attempts parameter.

If you have forgotten your password, press the Forgot your password? link and specify the email to which your reset password instructions will be sent.

You may face issues with logging in to your Control Panel in the following scenarios:

- If you enter invalid credentials that are your login and/or password.
- If an IP address from which you try to access your CP is not added to a White List.

To successfully log in to CP, make sure that you enter valid credentials and your IP is in the White List.

See also:

- Configuration Settings
- Authentication
- Tools
- Localization and Customization
- User Profile
- Users
- Appliances

7.6.1 Two Factor Authentication

To set up two factor authentication for your cloud you need to perform the following steps:

1. Enable the Use Yubico login option at Dashboard > Admin > Settings > Configuration > System tab. For more information on OnApp configuration, refer to the OnApp Configuration chapter.

2. Enable the Use Yubikey option for your user and set your Yubikey at Dashboard > Admin > Users > User name. For more information on user profiles, refer to the User Profile section.

Then you will be prompted to provide your OnApp login and password, and afterwards you will be forwarded to a page where you need to enter your Yubikey:

1. Insert the Yubikey into your computer's USB port. If the Yubikey is connected correctly, its status light will turn green.
2. Click in the Enter your Yubikey field.
3. Press your finger to the gold Yubikey button. A long line of characters will appear in the field. You will be automatically forwarded to your Dashboard page.

If a user has TOTP Authentication enabled, after entering login and password, one-time password must be entered as well to log in successfully.

7.7 User Profile

Click your account name at the top of the Control Panel screen to view tabs with the details of the user account you're currently logged in with. It also includes infobox options and API Key information. Administrators can view details of all account profiles at Admin > Users menu. For details, refer to the Users chapter.

7.7.1 Overview

This tab contains information on the user's login, user roles, bucket, prices and other.

User Details

These are the settings which are specified during the user creation process.

- User's avatar (this feature is available if the Use gravatar option is enabled - Create User).
- User's name and surname.
- User's email.
- Last Access Log - click to see information on the IP addresses that logged in to your account directly from the OnApp login page using your login and password, and the time and date of access.
- Drop Other Sessions - click if you want all other IPs that are logged in to your account to be logged out. The only IP address that will still be logged in to the account will be the one you are currently using.
- Login - user's screen name.
- User Roles - the roles assigned to the user. The roles are set at user creation process.
- User Group - the group to which this user is assigned. The user groups are set at user creation process.
- Time Zone - time zone set for this user.
- Locale - locales set for this user.
- System Theme - the color scheme: light or dark.
- Display infoboxes – whether infoboxes are displayed or not for this user.
- Restore infoboxes - click this button to display infoboxes for the user (this option may be disabled depending on the user's permissions).
- Send Password Reminder - click this button to send the password reminder to the user. The user will receive an email with a link for change password action.

On this page:

- Overview
OnApp 6.4 Administration Guide

- User Details
- Amazon Web Services
- Additional Info
- Oauth Authentication
- 2-factor Authentication
- Billing Details
- Prices
- Servers
- Backups
- Edit Profile
- Payments
- Bucket
- White List
- Backups

- Service Insertion Framework

See also:
- API Key
- Login Screen
- Cloud Search Tool
- Dashboard

Amazon Web Services

Shows the status of the Amazon Web Services: disconnected or connected. For more information, see Enable/Disable AWS.

Here you can also connect Amazon Web Services:

1. Click the 🔄 (Connect) icon.
2. On the following page provide your AWS credentials: AWS access key ID and AWS secret access key.

3. Click Submit to connect AWS to your account.

**Additional Info**

User Additional Fields allow administrators to create custom fields and use them with the API or a third party system. These fields will vary for different users, depending on the information the administrator wants them to fill in.

For more information, see [User Additional Fields](#).

**Oauth Authentication**

OAuth - open standard for authorization - enables users to log into OnApp using their Google and Facebook accounts. For users to access this feature, it should be enabled by the Cloud Administrator.

- **Facebook** - click Connect to set up this option. If it is configured correctly, you will be able to log in to your account by entering your Facebook login details.
- **Google** - click Connect to set up this option. If it is configured correctly, you will be able to log in to your account by entering your Google login details.

For more information, see [OAuth](#).

**2-factor Authentication**

- This section appears in the profile if you have either the Update Yubikey or the Update own Yubikey permission enabled or TOTP authentication is enabled for the cloud at Control Panel > Settings > Configuration.
- You can use only one two-factor authentication option per user profile (Yubikey or TOTP). Once the TOTP authentication is enabled successfully, the Yubikey switch becomes disabled.

Here you can enable/disable logging into OnApp using a YubiKey, add/delete YubiKeys, and enable/disable TOTP authentication. It is required to add at least one YubiKey to the user profile at Manage YubiKeys before you can enable the Use YubiKey option.

- **TOTP Authentication** - move the slider to the right to enable logging in by using time-based two-factor authentication. In the pop-up window that appears, scan the QR code with your mobile application (Google Authenticator or any other TOTP authentication app that complies with the RFC). Enter the generated one-time password to validate that the application works properly. If the password is correct, the TOTP Authentication will become enabled. This slider will be displayed only if TOTP authentication is enabled for the cloud.
- **Use Yubikey** - move the slider to the right to enable logging in by using a YubiKey for this user. You can enable this option only if you have added at least one YubiKey to your profile. If you delete all your Yubikeys, this option will be disabled automatically.
- **Manage YubiKeys** - click this button to add or delete YubiKey to your profile. The pop up window shows the list of your YubiKeys and the time of last usage for each of them. You can add up to five YubiKeys.
To add a new YubiKey:

1. Enter a label for your YubiKey in the *Enter label* field.
2. Click the *Touch your yubikey* field.
3. Press your finger to the gold Yubikey button. A long line of characters will appear in the field and the new Yubikey will be added to your profile.

To delete a YubiKey click the button next to the YubiKey you want to delete.

Be careful when deleting a YubiKey as it will no longer be possible to log in using that Yubikey unless you add it again to your profile.

Billing Details

- *Price per last hour* - shows the price for VVs, Load Balancers, and other resources charged for the previous hour.
- *Price per last hour (including discount)* - shows the price for VVs, Load Balancers, and other resources charged for the previous hour with the discount included (if any).
- *Bucket* - the bucket this user is assigned to. Click the bucket label to see its details.
- *Outstanding amount* - the total amount of money owned by this user since it has been created, for all resources, minus the amount of Payments. The sum is displayed for the period since a user has been created until the last 24hrs.
- *Monthly fee* - a set monthly price for a bucket.
- *Total cost* - the sum of all used resources cost and virtual servers cost. This sum does not take into consideration the free limits for resources set in the bucket. The cost that takes into account the bucket's free limits is displayed in the *Total cost with discount* field.
- *Payments* - the total amount of payments made.
- *Discount due to free* - the price of the resources that were created within the bucket's free limits. This sum will be subtracted from the *Total cost*.
- *Total cost with discount* - the price of used resources that excludes the cost of the resources that were created within the bucket's free limits.
- *Virtual Server Hourly Statistic* - clicking this link will generate billing statistics for all virtual servers owned by this user. For more information, see Virtual Server Billing Statistics.
- *User Statistic* - clicking this link will generate user's resource usage statistics. For more information, see User Billing Statistics.
- *Monthly Bills* - clicking this link will generate the bills list that shows the total due per each month of the year. To view billing statistics, select a year from the drop-down list and click *Apply*. The list that appears displays a particular month of the selected year and the cost of used resources for that month. At the bottom of the list there is the total amount of money which was to be paid for the selected period.
- *System Service Add-ons Report* - report for the system service add-ons usage of all operating systems.

Prices
The list of all used resources and their price per hour for two states: server powered ON and server powered OFF. The prices in this section do not take into consideration the free limits for resources set in the bucket.

**Servers**

Shows the list of all virtual servers, load balancers, edge servers, smart servers, application servers in the cloud with their prices for server on and off. The prices in this section do not take into consideration the free limits for resources set in the bucket.

**Backups**

The prices in this section do not take into consideration the free limits for resources set in the bucket.

- **Backups Count** - the price per hour for the quantity of the user's backups.
- **Templates Count** - the price per hour for the quantity of the user's templates.
- **ISOs Count** - the price per hour for the quantity of the user's ISOs.
- **OVAs Count** - the price per hour for the quantity of the user's OVAs.
- **Templates, ISOs & Backups Disk Size** - the price per hour for the disk space user's ISOs/OVAs/backups/templates occupy.
- **Recovery Points Count** - the price per hour for recovery points created on the backup resource.
- **Autoscaling Monitor Fee** - the price per hour for autoscaling monitors.
- **Backup Server Groups** - the price per hour for the resources consumed by backup server groups.

**Edit Profile**

To edit the details of the user profile, click the edit button in the upper right corner. You will then be redirected to a page where you can change the details of your profile. Besides the details described above, you can also change the password and auto suspending settings.

**7.7.2 Payments**

This tab contains the list of your paid invoices. Once you have paid an invoice, you can add it to the system:

1. Clicking **Create Payment** or +.
2. On the following page indicate the invoice number and the amount of money paid.
3. Click **Save** and the invoice will be added to the list of payments.
7.7.3 Bucket

This tab contains the details of the bucket assigned to the user, it is subdivided into two tabs:

- **Access Control** - in this section you configure the resources allocation for the users under this bucket. If you assign a bucket to a user, that user will have access only to those resources which you have added to the bucket. If no resources are added to a section of the Access Control, e.g. compute zones, the user under the bucket will not have access to any of the compute zones in the cloud.

- **Rate Card** - in this section you set up prices for the resources and the amount of resources users can request for free. Users under the bucket will be billed according to the prices you configure in the Rate Card.

For more information, see [Configure Resource Allocation And Prices](#).

7.7.4 White List

This tab includes the list of IPs from which this user can log in to the Control Panel. For each of the IPs, the following details are displayed:

- **IP** - the IP you want to add to the white list.
- **Description** - the description of that IP.
- **Actions** - you can edit or delete the chosen IP address.

To add a white list IP:

1. Click **Create White List IP** or +.
2. On the following page fill in the IP and description of the new IP.
3. Click **Save IP** and the new IP address will be added to the White List.

You can also delete all IPs from the White List by clicking **Clear White List IPs**.

For more information, see [User Whitelist IPs](#).

7.7.5 Backups

This tab contains the list of the user's backups. For each backup the following details are displayed:

- **Date** - the date when the backup was made.
- **Target** - target for which the backup was taken - either a disk (for normal backups) or a virtual server (for incremental backups).
- **Status** - the status of the backup, whether it was built or not.
- **Backup Size** - the size of the backup in MB.
- **Initiated** - how the backup was launched - either manually or automatically on a periodic basis - annual, monthly, weekly or daily.
- **Backup Server** - the backup server where the backup is stored.
- **Note** - an arbitrary note to the backup.
- **VS** - the virtual server for which the backup was taken.
- **Customer** - the customer this backup refers to.
- **Actions** - you can perform the following actions:
  - convert the backup to template
- restore the system from the chosen backup
- view Virtual Server backups for this particular VS
- delete the backup
- add or edit the backup’s note

### 7.7.6 Service Insertion Framework

This tab is service insertion framework show page. The title of this tab is set by the user when configuring this option, by default its More. If required you can integrate a service insertion framework into OnApp which will display a web page within the user profile in the OnApp Control Panel. By default, the possibility to configure a service insertion framework is disabled.

For more information, see [Service Insertion Framework Configuration](#).

### 7.8 Cloud Search Tool

The search tool in the upper right corner allows you to search your cloud for:

- IP addresses
- Usernames
- Users full names (first or last name, in any order)
- VS labels
- VS identifiers
- Disk identifiers
- Log IDs
- Backups
- Template labels
- Permission labels/identifiers
- OnApp page URLs/titles
- Any word from locale texts (yellow help box texts), if other search results are not successful

Type what you want to search for into the search box and confirm. The results are organized according to the menu item they refer to, e.g., Pages, Virtual Servers, Users, Locales, etc. Click a search result to open the relevant details page.
8 Service Catalog

- You need to have the *Any action related to service catalog* permission enabled to access the service catalog.
- You need to have the corresponding permissions to create new entities.

The service catalog page gives you a quick access to the creation wizards of most common OnApp entities at **Control Panel > Cloud > Service Catalog**. You can create the following components using the service catalog:

- Virtual Server
- Application Server
- Container Server
- Load Balancer
- Smart Server
- Baremetal Server
- EC2 Instance
- Edge Accelerator

See also:

- OnApp Cloud Overview
- Appliances
- AWS
9 Appliances

Appliances is a collective name for all virtual and physical devices that can be provisioned in the cloud. The term appliance seizes the following cloud components:

- Virtual Servers
- VMware vCenter Virtual Servers (of vCenter Implementation guide)
- Smart Servers
- Baremetal Servers
- Load Balancers
- Compute Resources
- Assets

OnApp Cloud gives you high-end cloud management features for the following appliances including:

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<th>Application Servers</th>
<th>Baremetal Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Rebuild manually</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Migrate</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Segregate</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set VIP status</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoscale</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**Power Options**

- Reboot          | ✓               | ✓             | ✓                   |
- Reboot in recovery | ✓               | ✓             | ✓                   |
- Boot from ISO    | ✓               |               |                     |
- Suspend          | ✓               | ✓             | ✓                   |
- Shut down        | ✓               | ✓             | ✓                   |
- Startup          | ✓               | ✓             | ✓                   |
- Startup on Recovery | ✓               | ✓             | ✓                   |

**Administrative Options**

- Reset Root Password | ✓               |               |
- Change owner       | ✓               | ✓             |                     |
- Set SSH keys       | ✓               |               |
- Edit Administrator's note | ✓               | ✓             |                     |
- Integrated console | ✓               |               |
<table>
<thead>
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<th>Baremetal Servers</th>
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<tbody>
<tr>
<td>Transactions and logs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Networks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configure network interface</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Rebuild network</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Set firewall rules</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual server IP addresses</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Display network speed for</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>network interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edit network speed</td>
<td>✓</td>
<td></td>
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<tr>
<td>Disks</td>
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<td></td>
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<tr>
<td>Create disks</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Edit disks</td>
<td>✓</td>
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<tr>
<td>Migrate disks</td>
<td>✓</td>
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<tr>
<td>Delete disks</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Backups</td>
<td></td>
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<tr>
<td>View</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Convert to template</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restore backup</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Delete backup</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Edit backup note</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Backup Schedules</td>
<td></td>
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</tr>
<tr>
<td>View schedules</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Create schedule</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Edit schedule</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Delete schedule</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Statistics</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CPU utilization</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Billing statistics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Network interface statistics</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk IOPS statistics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Recipes</td>
<td></td>
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<tr>
<td>Recipes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
### Server Options

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Custom variables</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**See also:**
- [Virtual Servers](#)
- [VMware vCenter Virtual Servers](#)
- [Smart Servers](#)
- [Application Servers](#)
- [Baremetal Servers](#)
- [Manage Virtual Server Power Options](#)
- [Manage Virtual Server Administrative Options](#)
- [Manage Virtual Server Networks](#)
- [Manage Virtual Server Disks](#)
- [Manage Virtual Server Backups](#)
- [Manage Virtual Server Backup Schedules](#)
- [Statistics](#)
- [Recipes](#)

### 9.1 Virtual Servers

Virtual servers are based on templates and are deployed on compute resources. Compute resources give them access to CPU, disk and network resources. OnApp Cloud gives you high-end cloud management features including:

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<th>Recipes</th>
<th>Service Add-ons</th>
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</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot</td>
<td>Reset Root Password</td>
<td>Configur e network interface</td>
<td>Create disks</td>
<td>View</td>
<td>View schedule s</td>
<td>CPU utilization</td>
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<td>Service Add-ons</td>
</tr>
<tr>
<td>Rebuild manually</td>
<td>Reboot in recover y</td>
<td>Change owner</td>
<td>Rebuild network</td>
<td>Edit disks</td>
<td>Convert to template</td>
<td>Create schedule</td>
<td>Billing statistics</td>
<td>Custom variables</td>
<td></td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspen d</td>
<td>Set SSH keys</td>
<td>Set firewall rules</td>
<td>Migrat e disks</td>
<td>Restore backup</td>
<td>Edit schedule</td>
<td>Network interface statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Shut down</td>
<td>Edit Administrator's note</td>
<td>Virtual server IP addresses</td>
<td>Delete disks</td>
<td>Delete backup</td>
<td>Delete schedule</td>
<td>Disk IOPS statistics</td>
<td></td>
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</tr>
</tbody>
</table>
OnApp supports two kinds of storage for virtual servers: traditional centralized SANs, and the new distributed block storage functionality introduced with OnApp Storage, in which local disks in Compute resources provide the physical storage space allocated to virtual servers. In each case, the OnApp platform creates virtual data stores from the physical resources and uses these to provide virtual servers with virtual disks.

Administrators in OnApp have full control over the lifecycle of virtual servers. Virtual servers can be in the following states:

- **Created** - A server is created when you successfully Create Virtual Server from the Virtual servers menu, having selected its template and set its properties, resources and network requirements.
- **Build** - A virtual server must be built after it is created. Building is the process of actually allocating the physical resources specified during its creation. This can be done manually or automatically if you check the Build Virtual Server Automatically box during the creation process.
- **Powered on** - A power on starts the virtual server, its operating system and processes.
- **Powered off** - If the operating system cannot be stopped, it will be forcefully terminated.
- **Shut down** - A shut down will attempt to gracefully stop a virtual server and its operating system, which typically involves terminating all running applications.
- **Rebooted** - Rebooted means a virtual server has been shut down, and then powered on again.
- **Deleted** - When a virtual server is deleted, its backups are still stored on the server and can be restored if required.
- **Re-built** - To rebuild a virtual server means to reinstall the template and reconfigure the resources and network. All data will be lost.

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<thead>
<tr>
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<th>Recipe Services</th>
<th>Service Add-ons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segregate Startup</td>
<td>Integrated console</td>
<td>Display network speed for network interfaces</td>
<td>Add backup note</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Set VIP status</td>
<td>Startup on Recovery</td>
<td>Transactions and logs</td>
<td>Edit network speed</td>
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<tr>
<td>Autoscale Boot from ISO</td>
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<tr>
<td>Clone Enable Disaster Recovery</td>
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</tbody>
</table>

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• **Failed** - A failed virtual server is one that is down, for example, because of hardware or network problems. You will have to start the server manually when those problems have been solved.

### 9.1.1 Create Virtual Server

Virtual servers are created from templates and are deployed on compute resources that provide them with CPU, disk, network, and other necessary resources. To create a virtual server, you need to launch a wizard. The wizard walks you through several steps to get your virtual server up and running. In this document, you can find a detailed guidance on how to create a virtual server but first take a look at the following section.

#### 9.1.1.1 Before You Begin

Before you begin to create a virtual server, take into consideration the following:

- You should have at least one compute resource configured and attached to a compute zone, a data store – to a data store zone and compute resource or zone, a network – to a network zone and compute resource or zone, a backup server – to a backup server zone and compute resource or zone, and a bucket – to a user who creates a virtual server.

- The selected template should reside on a backup server attached to a compute resource or zone on which you want to build a virtual server.

- Learn more about limitations of OnApp templates at the Templates guide.

- **An Estimated Price per Hour** in the wizard might be inaccurate if you don’t have necessary permissions enabled, such as Show Compute Zones/Compute Resources on Virtual Server Creation; and if you select the Any option for network resources.

To create a virtual server, follow the next procedure:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click the + or Create Virtual Server button to launch the wizard.
3. Follow the step-by-step instructions below to complete the wizard.
4. After you are finished, click the Create Virtual Server button.

9.1.1.2 Cloud Locations

The Cloud Locations step is available for users whose bucket includes compute zones assigned to location groups. If Cloud Locations are not available, the wizard starts from the Templates step. The Cloud Locations step is present in the wizard if the following requirements are satisfied:

- All compute zones that are added to a user's bucket are assigned to location groups.
- Compute zones that are added to a user's bucket are not assigned to the same location group.

When you are the Cloud Locations step, select a location for your virtual server:

- Country - select a country where the cloud is located
- City - select a city from the country where the cloud is located

Click Next to proceed to the following step of the wizard.

9.1.1.3 Templates

The Templates step allows you to select a template from which to build your virtual server. The template is extracted when a virtual server is provisioned or when a backup is taken, using this template. While a template is being extracted, it is locked so that it can't be used simultaneously in other transactions. After the extraction is finished, the template is unlocked. If another transaction requires the locked template, the transaction will fail after five minutes of standby. If a transaction that locked a template eventually failed, it means that the extracted template is broken. The templates are stored at /onapp/templates/your_template.tgz, extracted templates — at /onapp/backups/templates/your_template, and locked templates – at /onapp/backups/templates/your_template.lock.

To select a template, follow the next procedure:
1. Click a Template Store icon on the left to see templates that are available in this store. You can see the following details for each template:
   - Label
   - Min memory size that is required to create a VS from this template
   - Min disk size that is required to create a VS from this template
   - Virtualization type that is XEN or KVM
   - Estimated Price per Hour that is calculated for a VS in Mode ON and Mode OFF
2. Click a template to select it.
3. Click Next to proceed.

Additional Information for Windows Templates
The **Windows Licensing Type** box appears for Windows templates and includes license options that you configure for a corresponding template store. You can select one of the following license types:

- **MAK** - the default licensing type applicable to all Windows-based virtual servers. If you don't select the licensing type, **MAK** is set by default.
- **KMS** - the licensing type applicable to every virtual server since Windows 7, Windows Server 2008, and the following Windows versions. Click **KMS** and then select a licensing **Server**.
- **User license** - type your license key

When you create a virtual server from a Windows template, consider the following:

- You can create Windows-based virtual servers without running Sysprep. Disable the **Run Sysprep** option while creating or editing a destination compute zone.
- If multiple virtual servers are deployed from the same template without running Sysprep, they will have identical security identifiers (SIDs) that can result in the system conflict.
- You can't select KMS or your own license when you create a Windows virtual server from a custom template. As a workaround, you can create a virtual server from a template used for **custom template creation**.

### 9.1.1.4 Properties

There are some obligatory and optional properties that you can provide for your virtual server. The obligatory properties are marked with an asterisk on the list and the optional properties you can edit after creating a virtual server.

Enter the following properties for your virtual server:

- **Label** - enter a label of the virtual server
- **Hostname** - enter a hostname of the virtual server. The hostname can consist of letters [A-Z a-z], digits [0-9], and dash [-]. For more info on hostname validation, refer to [RFC documentation](https://tools.ietf.org/html/rfc1123).

#### Additional Consideration for Windows

- The hostname length should be between 1 and 15 characters.
- The following symbols are not allowed:
  - percent sign [%]
  - double quotation marks ['"]
  - brackets [,<,>]
  - vertical bar [||]
  - caret [^]
  - ampersand [&]
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- parentheses [(),]

- Domain - enter a domain of the virtual server. For example, in test.onapp.com the test is a hostname and onapp.com is a domain. If you don't enter a domain, the default value localdomain is used as follows test.localdomain. This parameter is not applicable to Windows virtual servers.

- Time zone (Windows) - select a time zone for a Windows virtual server. Most operating systems implies that the hardware clock is in UTC, however, Windows implies a localtime. Therefore, you need to select a time zone for it to be properly handled on a compute resource level.

- Password - enter a secure password for the virtual server. It can consist of 6-99 symbols, including letters [A-Z a-z], digits [0-9], dash [-], underscore [_], and the following special characters: ~ ! # $ * _ - + = ` \ { } [ ] : ; ' , . ? /. You can use both lower and uppercase letters. If you don't enter a password, it will be generated automatically.

- Password confirmation - repeat the password to confirm it

- Encrypt password - move the slider to the right to encrypt your password

- Encryption passphrase - enter a passphrase for encryption

- Encryption passphrase confirmation - repeat the passphrase for encryption

For more information on the password encryption, see FAQ.

Click Next to proceed to the following step of the wizard.

9.1.1.5 Resources
You can create a virtual server from a ready-made instance package or select all the necessary resources manually. The availability of instance packages depends on your permissions and bucket settings. Therefore, the Resources step can provide two options: Instance Packages or Create Your Own. If you select an instance package, then click the Create Your Own tab and proceed to the next step, the system applies resources from Create Your Own even if you don't select any resources.

9.1.1.5.1 Instance Packages
Before you create a virtual server from an instance package, consider the following:

- If an instance package applies only to certain compute zones in a bucket, a virtual server is created on one of the compute resources within one of those zones. If an instance package is not limited to certain zones, the compute zone and compute resource are selected automatically from the ones available to a user.

- Instance package virtual servers can be created only in compute zones where all compute resources are assigned the same number of CPU units. If there are compute resources with different number of CPU units, it's not possible to create instance package virtual servers in such zones. The reason is that CPU priority for instance package virtual servers in this configuration cannot be set to 100%, which is the default value for such virtual servers.

- If there are no available IP addresses, all instance packages are dimmed in the wizard.

- Autoscaling is not supported for virtual servers created from instance packages.

- Instance packages that have resources incompatible with the available compute zones are dimmed in the wizard.

To create a virtual server from an instance package, click a box for a corresponding package. The instance package box includes the following details:
- **Memory** - the number of RAM in MB or GB available in the instance package
- **CPUs** - the number of CPU cores available in this instance package
- **Disk Size** - the number of disk size in MB or GB available in this instance package
- **Bandwidth** - the number of bandwidth in MB or GB available in this instance package

**Price per Hour:**
- **Mode ON** - an estimated hourly price if the virtual server is powered on
- **Mode OFF** - an estimated hourly price if the virtual server is powered off

**Price per Month:**
- **Mode ON** - an estimated monthly price if the virtual server is powered on
- **Mode OFF** - an estimated monthly price if the virtual server is powered off

After you click an instance package box, it becomes highlighted in green. Click **Next** to proceed to the following step of the wizard.

### 9.1.1.5.2 Create Your Own

You can define the following resources for your virtual server:

#### 9.1.1.5.2.1 Compute Resources
- **Compute Zone** - a compute zone where to build the virtual server
- **Compute Resource** - a compute resource from the compute zone. The compute resource may be selected automatically according to the Virtual Server Provisioning.

If the Show Compute Zones/Compute Resources on Virtual Server Creation permissions are disabled, users cannot select compute resources for a virtual server. The compute zone and resource are set automatically according to a virtualization type and other selected resources. The data store is set automatically according to the selected compute zone.

#### 9.1.1.5.2.2 Resources

Select the following RAM and CPU resources for a virtual server:

- **RAM** - enter the number of RAM. The maximum number depends on your bucket settings and virtualization type.

If you create a FreeBSD virtual server, set RAM to 512 MB. You can increase RAM later while [editing the VS](#).

- **CPU Cores** - enter the number of CPU cores. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU Topology is enabled. When CPU Topology is enabled, this number specifies how many virtual cores the virtual server will have.

- **CPU Priority (or CPU Units)** - enter the number of CPU Priority in %. If CPU Units are enabled on a user's bucket, the CPU Priority is replaced with CPU Units. Refer to [Billing Calculation](#) for details on CPU Units and CPU Priority.

The following options are available only for virtual servers based on KVM, providing that a user has the Enable CPU Topology permission:

- **Use CPU Topology** - move the slider to the right to enable CPU Topology
- **CPU Sockets** - enter the number of how many sockets the CPU cores should be arranged into. This value will affect the number of cores_per_socket.
How to determine a correct number of CPU Sockets.

If CPU Topology is enabled, the CPU cores indicate a number of vCPUs - the maximum value that can be arranged into CPU sockets and cores per socket. If CPU Topology is disabled, the CPU cores indicate the CPU sockets value with one core per socket. When you enable CPU Topology, the following logic is applied to calculate CPU capacity:

- You enter the total number of CPU cores and CPU sockets.
- The value of cores_per_socket is calculated automatically by the formula $vCPUs = cpu\_sockets \times cores\_per\_socket$.
- As a result, if you set eight CPU cores and two CPU sockets, the cores_per_socket value will be set to four.

Primary Disk

Select the following properties for a primary disk:

- Primary data store - select a data store for a primary disk
- Primary disk size - enter a size for a primary disk

Swap Disk

Select the following properties for a swap disk:

- Swap data store - select a data store for a swap disk
- Swap disk size - enter a size for a swap disk
- Disable - select the checkbox to disable a swap disk

You cannot add a swap disk to a Windows-based virtual server.

Network Configuration

Before you apply network configuration, consider the following:

- When you create a virtual server in Federation, you cannot set a network port speed to a value greater than indicated by a seller while adding a zone to Federation.
- Since not every application supports IPv6, at least one IPv4 address must be allocated to a primary network interface.
- The Show only my IP addresses checkbox appears only if you select a specific network, not Any network.
- The Selected IP address option is available in the wizard if it is enabled via Admin > Settings > Configuration > System > Show IP address selection for new VS.

Network Interface 1

- Network - select a network from which the VS should get the IP address
• **IP net** - select an IP net from which the IP address should be assigned

• **IP range** - select an IP range from which the IP address should be assigned

• **IP address** - select an IP address to be assigned to the VS

• **Show only my IP addresses** - select the checkbox to view only your own IP addresses

• **Selected IP address** - if the option is available, you can also assign an IP address for the VS from the drop-down menu. Indicate Compute resource and network to have the list of available IPs.

• **Port Speed** - set the port speed for the VS

Click **Next** to proceed to the following step of the wizard where you can add recipes or service add-ons.

9.1.1.6 Add-ons

During this step, you can assign **service add-ons** or **recipes** to your virtual server using **Service Addons** or **Recipes** sub-tabs.

You can create a virtual server either with Service Addons or Recipes, not with both at the same time. From which sub-tab you click **Next**, that option is applied. For example, if you select some recipes, then go to the **Service Addons** sub-tab and select some service add-ons and then click **Next**, service add-ons will be applied not recipes.

9.1.1.6.1 Service Addons

Service add-ons are available if **Manage Service Add-ons for all virtual servers** permission or **Manage Service Add-ons for own virtual servers** permission is enabled.

You can create a virtual server without service add-ons and add them afterwards. To assign a service add-on to your virtual server in the wizard, follow the next steps:

1. Click a service add-on group on the left to expand the list of service add-ons on the right. You can see the following details about each service add-on:
   - **Label**
   - **Description**
   - **Price per hour**
   - **Compatible with**, for example, Unix, Windows, etc

2. Click the service add-on to select it. You can select several add-ons from different service add-on groups. Click **View Selected Add-ons** to see the list of selected service add-ons.

   To remove the selected service add-on from the list, click the **×** button.

3. Click **Next** to proceed to the final step of the wizard.

9.1.1.6.2 Recipes

The **Recipes** step is available in the wizard if **Manage recipes joins for all virtual servers** permission or **Manage recipes joins for own virtual servers** permission is enabled. To assign a recipe to your virtual server in the wizard, click **Recipe** under **Add-ons** and then follow the next steps:

1. Drag and drop a recipe from the **Available recipes** to **Assigned for provisioning** box.
2. To add a custom variable, click the "+" button next to **Custom Recipe Variables** and provide the following details:
   - **Name & Value** - enter a name and value for the custom variable
   - **Enabled** - move the slider to the right to allow use of this variable

3. Click **Next** to proceed to the final step of the wizard.

9.1.1.7 Confirmation

Before you select settings from the final step, consider the following:

- **The Enable Autoscale** slider can be dimmed in the wizard if you reached the autoscaling limit in your bucket.
- For autoscaling to work properly, you need to enable autoscaling in the wizard and add auto-scaling rules.
- You can **Enable Acceleration** if the following requirements are satisfied:
  - Accelerator is enabled on the network attached to a virtual server.
  - The **Show IP address selection for new VS** option is enabled in **Admin > Settings > Configuration**.
  - The IP address assigned to a virtual server is in the same network as Accelerator.
  - Only HTTP is supported. Other protocols, including HTTPS, will be passed through to the virtual server directly.

The **Confirmation** step allows you to apply the following settings:

- **Enable Automated Backup** - move the slider to the right to create automatic backups of the virtual server based on the settings from **Auto-Backup Presets**.
- **Build Virtual Server** - move the slider to the right to automatically build the virtual server. If you don't select this checkbox, you have to build your server manually after it is created.
- **Boot Virtual Server** - move the slider to the right for the virtual server to be started up automatically.
- **Enable Autoscale** - move the slider to the right to use autoscaling for the virtual server.
- **Acceleration Allowed** - move the slider to the right to enable acceleration for the virtual server.

The **Confirmation** step also provides the configuration summary of the virtual server, including information about the template, CPU cores, RAM, disks size, and network. When you are finished, click the **Create Virtual Server** button to start the creation process. After you click the button, several transactions are run to complete the process. You can check a status of each transaction in **Activity Log** of the virtual server.

9.1.2 Virtual Server Wizard Beta

OnApp 6.1 introduces a new beta version of the virtual server wizard. You can access the beta version of the wizard from the top bar on your Control Panel. To launch the wizard, click **Create Virtual Server > Add Virtual Server Beta**.

Note that a new beta version of the virtual server wizard is disabled by default. If you want to enable this version of the wizard, go to **on_app.yml** file and set the **show_new_wizard** parameter to **true**.
In this section you can find the procedures to create virtual servers in the new wizard, using one of the following methods:

- From Custom Set of Resources
- From Instance Package

9.1.2.1 Create Custom Virtual Server Beta

Virtual servers are created from templates and are deployed on compute, storage, and networking resources. To create a virtual server, you need to launch a wizard. The wizard walks you through several steps to get your virtual server up and running. You can create virtual servers from instance packages or custom set of resources. In this document, you can find a detailed guidance on how to create a custom virtual server but first take a look at the following section.

9.1.2.1.1 Before You Begin

Before you begin to create a virtual server, take into consideration the following:

- You should have at least one compute resource configured and attached to a compute zone, a data store – to a data store zone and compute resource or zone, a network – to a network zone and compute resource or zone, a backup server – to a backup server zone and compute resource or zone, and a bucket – to a user who creates a virtual server.
- The selected template should reside on a backup server attached to a compute resource or zone on which you want to built a virtual server.
- You can create a custom virtual server only if you have the Select resources manually on virtual server creation permission enabled.
- An Estimated Price per Hour in the wizard might be inaccurate if you don't have necessary permissions enabled, such as Show Compute Zones/Compute Resources on Virtual Server Creation; and if you don't select specific options for all resources.

On this page:

- Before You Begin
- Cloud Locations
- Templates
To create a virtual server, follow the next procedure:

1. Go to your Control Panel and click **Create Server** on the top bar.
2. Click **Create Virtual Server Beta** to launch the wizard.
3. Follow the step-by-step instructions below to complete the wizard.
4. After you are finished, click the **Create Virtual Server** button.

### 9.1.2.1.2 Cloud Locations

The **Cloud Locations** step is available for users whose bucket includes compute zones assigned to location groups. If Cloud Locations are not available, the wizard starts from the **Templates** step. The **Cloud Locations** step is present in the wizard if the following requirements are satisfied:

- All compute zones that are added to a user's bucket are assigned to location groups.
- Compute zones that are added to a user's bucket are not assigned to the same location group.

When you are at the **Cloud Locations** step, select a location for your virtual server:

- **Country** - select a country where the cloud is located
- **City** - select a city from the country where the cloud is located

Click **Next** to proceed to the following step of the wizard.

### 9.1.2.1.3 Templates

The **Templates** step allows you to select a template from which to build your virtual server. The template is extracted when a virtual server is provisioned or when a **backup** is taken, using this template. While a template is being extracted, it is locked so that it can't be used simultaneously in other transactions. After the extraction is finished, the template is unlocked. If another transaction requires the locked template, the transaction will fail after five minutes of standby. If a transaction that locked a template eventually failed, it means that the extracted template is...

To select a template, follow the next procedure:

1. Click a Template Store icon on the left to see templates that are available in this store. You can see the following details for each template:
   - Label
   - Min memory size that is required to create a VS from this template
   - Min disk size that is required to create a VS from this template
   - Virtualization type that is XEN or KVM
   - Estimated Price per Hour that is calculated for a VS in Mode ON and Mode OFF

2. Click a template to select it.

3. Click Next to proceed.

### Additional Information for Windows Templates

The Windows Licensing Type box appears for Windows templates and includes license options that you configure for a corresponding template store. You can select one of the following license types:

- **MAK** - the default licensing type applicable to all Windows-based virtual servers. If you don't select the licensing type, MAK is set by default.
- **KMS** - the licensing type applicable to every virtual server since Windows 7, Windows Server 2008, and the following Windows versions. Click KMS and then select a licensing Server.
- **User license** - type your license key

When you create a virtual server from a Windows template, consider the following:

- You can create Windows-based virtual servers without running Sysprep. Disable the Run Sysprep option while creating or editing a destination compute zone.
- If multiple virtual servers are deployed from the same template without running Sysprep, they will have identical security identifiers (SIDs) that can result in the system conflict.
- You can't select KMS or your own license when you create a Windows virtual server from a custom template. As a workaround, you can create a virtual server from a template used for custom template creation.
There are some obligatory and optional properties that you can provide for your virtual server. The obligatory properties are marked with an asterisk on the list and the optional properties you can edit after creating a virtual server.

Enter the following properties for your virtual server:

- **Label** - enter a label of the virtual server
- **Hostname** - enter a hostname of the virtual server. The hostname can consist of letters [A-Z a-z], digits [0-9], and dash [-]. For more info on hostname validation, refer to RFC documentation.

**Additional Consideration for Windows**
The following symbols are not allowed for Windows-based virtual servers:
- percent sign [%]
- double quotation marks [“]
- brackets [<,>]
- vertical bar [|]
- caret[^]
- ampersand [&]
- parentheses [(,)]

- **Domain** - enter a domain of the virtual server. For example, in test.onapp.com the test is a hostname and onapp.com is a domain. If you don’t enter a domain, the default value localdomain is used as follows test.localdomain. This parameter is not applicable to Windows virtual servers.

- **Time zone** (Windows) - select a time zone for a Windows virtual server. Most operating systems implies that the hardware clock is in UTC, however, Windows implies a localtime. Therefore, you need to select a time zone for it to be properly handled on a compute resource level.

- **Password** - enter a secure password for the virtual server. It can consist of 6-99 symbols, including letters [A-Z a-z], digits [0-9], dash [-], underscore [_], and the following special characters: ~ ! @ $# * _ - + = ` \ { } [ ] : ; ' , . ? / . You can use both lower and uppercase letters. If you don’t enter a password, it will be generated automatically.

- **Password confirmation** - repeat the password to confirm it

- **Encrypt password** - move the slider to the right to encrypt your password. For more information on the password encryption, see FAQ.

- **Encryption passphrase** - enter a passphrase for encryption

- **Encryption passphrase confirmation** - repeat the passphrase for encryption

- **I want to create a VS with custom resources** - move the slider to the right to create a virtual server based on a set of custom resources. If you don’t select the checkbox, you can create a virtual server from instance packages.

- **Replace recipes** - move the slider to the right to create a virtual server with service add-ons instead of recipes.

Click **Next** to proceed to the following step of the wizard where you select a custom set of resources.

**9.1.2.1.5 Compute Resources**

Before you apply compute configuration, consider the following:
- If the Show Compute Zones/Compute Resources on Virtual Server Creation permissions are disabled, you cannot select a compute resource and zone for a virtual server. The compute resource and zone are set automatically according to a virtualization type and other selected resources. The data store is set automatically according to the selected compute zone.

- The CPU Topology and CPU Sockets options are available only for virtual servers based on KVM, providing that a user has the Enable CPU Topology permission.

You can define the following compute resources for your virtual server:

- **RAM** - enter the number of RAM. The maximum RAM that can be assigned to a virtual server depends on the virtualization type, operating system, and bucket settings. If you create a FreeBSD virtual server, set RAM to 512 MB. You can increase RAM later while editing the VS.

- **CPU Cores** - enter the number of CPU cores. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU Topology is enabled. When CPU Topology is enabled, this number specifies how many virtual cores the virtual server will have.

- **CPU Priority (or CPU Units)** - enter the number of CPU Priority in %. If CPU Units are enabled on a user's bucket, the CPU Priority is replaced with CPU Units. Refer to Billing Calculation for details on CPU Units and CPU Priority.

- **Compute Zone** - a compute zone where to build the virtual server

- **Compute Resource** - a compute resource from the compute zone. The compute resource may be selected automatically according to the Virtual Server Provisioning.

The following options are available only for virtual servers based on KVM:

- **Use CPU Topology** - move the slider to the right to enable CPU Topology

- **CPU Sockets** - enter the number of how many sockets the CPU cores should be arranged into. This value will affect the number of cores_per_socket.

**How to determine a correct number of CPU Sockets.**

If CPU Topology is enabled, the CPU cores indicate a number of vCPUs - the maximum value that can be arranged into CPU sockets and cores per socket. If CPU Topology is disabled, the CPU cores indicate the CPU sockets value with one core per socket.

Click Next to proceed to the following step of the wizard.

### 9.1.2.1.6 Storage Resources

You can see the resources only if you have the Show Data Stores on Virtual Server creation and Show Data Store Zones on Virtual Server creation permissions enabled.

You can specify a data store and disk size for a primary and swap virtual disks. You cannot add a swap disk to a Windows-based virtual server.
9.1.2.1.6.1 Primary Disk
Enter the following properties for a primary disk:

- **Size** - enter a size for a primary disk
- **Data Store Zone** - select a data store zone for a primary disk
- **Data Store** - select a data store for a primary disk

9.1.2.1.6.2 Swap Disk
Select the following properties for a swap disk:

- **Size** - enter a size for a swap disk
- **Data Store Zone** - select a data store zone for a swap disk
- **Disable** - select the checkbox to disable a swap disk
- **Data Store** - select a data store for a swap disk

Only enabled data stores will be available for selection at this step. You can enable or disable a data store at Control Panel > Admin > Settings menu by clicking the Actions button next to the data store you want to change, and then clicking Edit. Move the Enabled slider to the right to enable a data store.

9.1.2.1.7 Network Resources

Before you apply network configuration, consider the following:

- You can see the resources only if you have the Show Networks on Virtual Server creation and Show Network Zones on Virtual Server creation permissions enabled.
- When you create a virtual server in Federation, you cannot set a network port speed to a value greater than indicated by a seller while adding a zone to Federation.
- Since not every application supports IPv6, at least one IPv4 address must be allocated to a primary network interface.
- The Show only my IP addresses checkbox appears only if you select a specific network, not Any network.
- The Selected IP address option is available in the wizard if it is enabled via Admin > Settings > Configuration > System > Show IP address selection for new VS.

Enter the following properties for a network interface:

- **Network group** - select a network zone for the VS
- **Network** - select a network from which the VS should get the IP address
- **IP net** - select an IP net from which the IP address should be assigned
- **IP range** - select an IP range from which the IP address should be assigned
- **IP address** - select an IP address to be assigned to the VS
- **Port Speed** - set the port speed for the VS or select the Unlimited checkbox

Click Next to proceed to the following step of the wizard where you can add recipes or service add-ons.
9.1.2.1.8 Service Add-ons or Recipes

During this step, you can assign service add-ons or recipes to your virtual server. The availability of service add-ons or recipes depends on the corresponding permissions, Manage Service Add-ons for all virtual servers permission or Manage Service Add-ons for own virtual servers permission. If you have only one of these permissions enabled, you will see only a corresponding tab in the wizard.

9.1.2.1.8.1 Service Add ons
To create a virtual server with service add-ons instead of recipes, you should move the slider Replace recipes in the Properties step. If you do not move the slider, you will be able to create a virtual server with recipes.

Replace recipes slider is visible if Use recipes on VS creation and Use service add-ons on VS creation permissions are enabled.

Service add-ons are available under the following conditions:

- Manage Service Add-ons for all/own virtual servers permission is enabled
- Service add-on groups are available in a bucket
- The On Provisioning option is enabled for all or some of the service add-ons available to you within a bucket.

You can create a virtual server without service add-ons and add them afterwards. To assign a service add-on to your virtual server in the wizard, follow the next steps:

1. Click a service add-on group on the left to expand the list of service add-ons on the right. You can see the following details about each service add-on:
   - Label
   - Description
   - Price per hour
   - Compatible with, for example, Unix, Windows, etc

2. Click the service add-on to select it. You can select several add-ons from different service add-on groups. Click View Selected Add-ons to see the list of selected service add-ons.

   To remove the selected service add-on from the list, click the button.

3. Click Next to proceed to the final step of the wizard.

9.1.2.1.8.2 Recipes

Recipes step is available only if you did not move the Replace recipes slider to the right in the Properties step.

The Recipes step is available in the wizard if there are some recipes created in the cloud. You can create a virtual server without a recipe and add them afterwards. To assign a recipe to your virtual server in the wizard, follow the next steps:

1. Drag and drop a recipe from the Available recipes to Assigned for provisioning box.

2. To add a custom variable, click the "+" button next to Custom Recipe Variables and provide the following details:
   - Name & Value - enter a name and value for the custom variable
3. Click **Next** to proceed to the final step of the wizard.

### 9.1.2.1.9 Confirmation

Before you select settings from the final step, consider the following:

- **The Enable Autoscale slider can be dimmed in the wizard if you reached the autoscaling limit in your bucket.**
- For autoscaling to work properly, you need to enable autoscaling in the wizard and add auto-scaling rules.
- You can **Enable Acceleration** if the following requirements are satisfied:
  - Accelerator is enabled on the network attached to a virtual server.
  - The Show IP address selection for new VS option is enabled in Admin > Settings > Configuration.
  - The IP address assigned to a virtual server is in the same network as Accelerator.
  - Only HTTP is supported. Other protocols, including HTTPS, will be passed through to the virtual server directly.

The **Confirmation** step allows you to apply the following settings:

- **Enable Automated Backup** - move the slider to the right to create automatic backups of the virtual server based on the settings from Auto-Backup Presets.
- **Build Virtual Server** - move the slider to the right to automatically build the virtual server. If you don't select this checkbox, you have to build your server manually after it is created.
- **Boot Virtual Server** - move the slider to the right for the virtual server to be started up automatically.
- **Enable Autoscale** - move the slider to the right to use autoscaling for the virtual server.
- **Acceleration Allowed** - move the slider to the right to enable acceleration for the virtual server.

The **Confirmation** step also provides the configuration summary of the virtual server, including information about the template, CPU cores, RAM, disks size, and network. When you are finished, click the **Create Virtual Server** button to start the creation process. After you click the button, several transactions are run to complete the process. You can check a status of each transaction in **Activity Log** of the virtual server.

### 9.1.2.2 Create Instance Package Virtual Server Beta

You can create a virtual server from a ready-made instance package. The instance package is a preconfigured environment with a specific compute, storage, and network capacity. For instance packages to be available in the wizard, you need to follow the next procedures:

- **Enable Permissions**
- **Add Instance Packages to CP**
- **Add Instance Packages to Bucket**

After you complete these steps, you can create virtual servers from instance packages in the wizard. The wizard walks you through several steps to get your virtual server up and running. In this document, you can find a detailed guidance on how to create a virtual server but first take a look at the following section.
Before you begin to create a virtual server from an instance package, take into consideration the following:

- You should have at least one compute resource configured and attached to a compute zone, a data store – to a data store zone and compute resource or zone, a network – to a network zone and compute resource or zone, a backup server – to a backup server zone and compute resource or zone, and a bucket – to a user who creates a virtual server.

- If an instance package applies only to certain compute zones in a bucket, a virtual server is created on one of the compute resources within one of those zones. If an instance package is not limited to certain zones, the compute zone and compute resource are selected automatically from the ones available to a user.

- Instance package virtual servers can be created only in compute zones where all compute resources are assigned the same number of CPU units. If there are compute resources with different number of CPU units, it's not possible to create instance package virtual servers in such zones. The reason is that CPU priority for instance package virtual servers in this configuration cannot be set to 100%, which is the default value for such virtual servers.

- If there are no available IP addresses, all instance packages are dimmed in the wizard.

- Instance packages that have resources incompatible with the available compute zones are dimmed in the wizard.

- Auto-scaling and Accelerator are not supported for virtual servers created from instance packages.

To create a virtual server, follow the next procedure:

1. Go to your Control Panel and click Create Server on the top bar.
2. Click Create Virtual Server Beta to launch the wizard.
3. Follow the step-by-step instructions below to complete the wizard.
4. After you are finished, click the Create Virtual Server button.
9.1.2.2 Cloud Locations

The Cloud Locations step is available for users whose bucket includes compute zones assigned to location groups. If Cloud Locations are not available, the wizard starts from the Templates step. The Cloud Locations step is present in the wizard if the following requirements are satisfied:

- All compute zones that are added to a user's bucket are assigned to location groups.
- Compute zones that are added to a user's bucket are not assigned to the same location group.

When you are at the Cloud Locations step, select a location for your virtual server:

- Country - select a country where the cloud is located
- City - select a city from the country where the cloud is located

Click Next to proceed to the following step of the wizard.

9.1.2.2.3 Templates

The Templates step allows you to select a template from which to build your virtual server. The template is extracted when a virtual server is provisioned or when a backup is taken, using this template. While a template is being extracted, it is locked so that it can't be used simultaneously in other transactions. After the extraction is finished, the template is unlocked. If another transaction requires the locked template, the transaction will fail after five minutes of standby. If a transaction that locked a template eventually failed, it means that the extracted template is broken. The templates are stored at /onapp/templates/your_template.tgz, extracted templates – at /onapp/backups/templates/your_template, and locked templates – at /onapp/backups/templates/your_template.lock.

To select a template, follow the next procedure:

1. Click a Template Store icon on the left to see templates that are available in this store. You can see the following details for each template:
   - Label
   - Min memory size that is required to create a VS from this template
   - Min disk size that is required to create a VS from this template
   - Virtualization type that is XEN or KVM
   - Estimated Price per Hour that is calculated for a VS in Mode ON and Mode OFF
2. Click a template to select it.
3. Click Next to proceed.

**Additional Information for Windows Templates**

The Windows Licensing Type box appears for Windows templates and includes license options that you configure for a corresponding template store. You can select one of the following license types:

- MAK - the default licensing type applicable to all Windows-based virtual servers. If you don't select the licensing type, MAK is set by default.
• **KMS** - the licensing type applicable to every virtual server since Windows 7, Windows Server 2008, and the following Windows versions. Click **KMS** and then select a licensing **Server**.

• **User license** - type your license key

When you create a virtual server from a Windows template, consider the following:

• You can create Windows-based virtual servers without running Sysprep. Disable the **Run Sysprep** option while creating or editing a destination **compute zone**.

• If multiple virtual servers are deployed from the same template without running Sysprep, they will have identical security identifiers (SIDs) that can result in the system conflict.

• You can't select KMS or your own license when you create a Windows virtual server from a custom template. As a workaround, you can create a virtual server from a template used for **custom template creation**.

• You can build a **Windows 10/Windows Server 2016** virtual server on **KVM CentOS 6** and **CentOS 7** compute resources that run at least on the following processor:
  o Ivy Bridge Intel® Xeon® Processor E Series v2 Family
  o AMD Opteron G2, G3, G4, G5, and G6
  o The **fsgsbase** CPU flag is required for a destination compute zone. For more information on CPU flags, see [Manage Extended CPU Configuration for Compute Zone](#).

### 9.1.2.2.4 Properties

There are some obligatory and optional properties that you can provide for your virtual server. The obligatory properties are marked with an asterisk on the list and the optional properties you can edit after creating a virtual server.

Enter the following properties for your virtual server:

• **Label** - enter a label of the virtual server

• **Hostname** - enter a hostname of the virtual server. The hostname can consist of letters [A-Z a-z], digits [0-9], and dash [-]. For more info on hostname validation, refer to [RFC documentation](#).

**Additional Consideration for Windows**

- The hostname length should be between 1 and 15 characters.
- The following symbols are not allowed for Windows-based virtual servers:
  - percent sign [%]
  - double quotation marks [“]
• **Domain** - enter a domain of the virtual server. For example, in `test.onapp.com` the `test` is a hostname and `onapp.com` is a domain. If you don't enter a domain, the default value `localdomain` is used as follows `test.localdomain`. This parameter is not applicable to Windows virtual servers.

• **Time zone** (Windows) - select a time zone for a Windows virtual server. Most operating systems imply that the hardware clock is in UTC, however, Windows implies a `localtime`. Therefore, you need to select a time zone for it to be properly handled on a compute resource level.

• **Password** - enter a secure password for the virtual server. It can consist of 6-99 symbols, including letters `[A-Z a-z]`, digits `[0-9]`, dash `[ - ]`, underscore `[ _ ]`, and the following special characters: `~ ! @ # $ * _ - + = `\` { } [ ] : ; ' , . ? /`. You can use both lower and uppercase letters. If you don't enter a password, it will be generated automatically.

• **Password confirmation** - repeat the password to confirm it

• **Encrypt password** - move the slider to the right to encrypt your password. For more information on password encryption, see [FAQ](#).

• **Encryption passphrase** - enter a passphrase for encryption

• **Encryption passphrase confirmation** - repeat the passphrase for encryption

• **I want to create a VS with custom resources** - move the slider to the right to create a virtual server based on a set of custom resources. The checkbox is displayed only if the `Select resources manually on virtual server creation` permission is enabled. See [Create Custom Virtual Server](#) for details.

• **Replace recipes** - move the slider to the right to create a virtual server with service add-ons instead of recipes.

Click **Next** to proceed to the following step of the wizard.

### 9.1.2.2.5 Instance Packages

To create a virtual server from an instance package, click a box for a corresponding package. The instance package box includes the following details:

• **CPUs** - the number of CPU cores available in this instance package

• **Memory** - the number of RAM in MB or GB available in the instance package

• **Disk Size** - the number of disk size in MB or GB available in this instance package

• **Bandwidth** - the number of bandwidth in MB or GB available in this instance package

• **Price per Hour:**
  - **Mode ON** - an estimated hourly price if the virtual server is powered on
  - **Mode OFF** - an estimated hourly price if the virtual server is powered off

• **Price per Month:**
  - **Mode ON** - an estimated monthly price if the virtual server is powered on
  - **Mode OFF** - an estimated monthly price if the virtual server is powered off
After you click an instance package box, it becomes highlighted in green. Click **Next** to proceed to the following step of the wizard.

### 9.1.2.2.6 Service Add-Ons or Recipes

During this step, you can assign service add-ons or recipes to your virtual server. The availability of service add-ons or recipes depends on your cloud configuration.

#### 9.1.2.2.6.1 Service Add-ons

To create a virtual server with service add-ons instead of recipes, you should move the slider **Replace recipes** in the **Properties** step. If you do not move the slider, you will be able to create a virtual server with recipes.

*Replace recipes* slider is visible if **Use recipes on VS creation** and **Use service add-ons on VS creation** permissions are enabled.

Service add-ons are available under the following conditions:

- The **Replace Recipes with Service Add-ons on VS Creation** permission is enabled.
- Service add-on groups are available in a bucket.
- The **On Provisioning** option is enabled for all or some of the service add-ons available to you within a bucket.

If these conditions are not satisfied, you will see the **Recipes** step instead.

You can create a virtual server without service add-ons and add them afterwards. To assign a service add-on to your virtual server in the wizard, follow the next steps:

1. Click a service add-on group on the left to expand the list of service add-ons on the right. You can see the following details about each service add-on:
   - *Label*
   - *Description*
   - *Price per hour*
   - *Compatible with*, for example, Unix, Windows, etc

2. Click the service add-on to select it. You can select several add-ons from different service add-on groups. Click **View Selected Add-ons** to see the list of selected service add-ons. To remove the selected service add-on from the list, click the **button.

3. Click **Next** to proceed to the final step of the wizard.

**Recipes**

*Recipes* step is available only if you did not move the **Replace recipes** slider to the right in the **Properties** step.

The **Recipes** step is available in the wizard if there are some recipes created in the cloud. You can create a virtual server without a recipe and add them afterwards. To assign a recipe to your virtual server in the wizard, follow the next steps:

1. Drag and drop a recipe from the **Available recipes** to **Assigned for provisioning** box.
2. To add a custom variable, click the "+" button next to **Custom Recipe Variables** and provide the following details:
   - **Name & Value** - enter a name and value for the custom variable
   - **Enabled** - move the slider to the right to allow use of this variable

3. Click **Next** to proceed to the final step of the wizard.

---

#### 9.1.2.2.7 Confirmation

The **Confirmation** step provides the configuration summary of the virtual server, including information about CPU, memory, and disk size. Here you can also apply the following settings:

- **Enable Automated Backup** - move the slider to the right to create automatic backups of the virtual server based on the settings from **Auto-Backup Presets**.
- **Build Virtual Server** - move the slider to the right if you want the system to automatically build the virtual server. If you don't select this checkbox, you have to build your server manually after it is created.
- **Boot Virtual Server** - move the slider to the right if you want the virtual server to be started up automatically.

When you are finished, click the **Create Virtual Server** button to start the creation process. After you click the button, several transactions are run to complete the process. You can check a status of each transaction in **Activity Log** of the virtual server.

---

#### 9.1.3 Virtual Server Creation Workflow

The following scheme describes the steps required to create a virtual server:
User wants to create a virtual server

User fills in the VS creation form

Step 1: Cloud Locations
- Choose the country, where the cloud is located
  - Specify the city where the cloud is located

Step 2: Templates
- Choose the required OS
  - For Windows-based templates, specify the licensing details

Step 3: VS Properties
- Specify the VS label and hostname
  - Set the password

Step 4: Resources
- Choose a compute zone and a compute resource
  - Configure RAM, CPU cores, CPU priority or CPU units
  - Set the disk space
  - Specify network configuration
  OR
- Choose one of the predefined instance types

Step 5: Add-ons
Assign service add-ons or recipes to your virtual server

Step 6: Confirmation
If required:
- Enable Automated Backup
- Build Virtual Server
- Startup Virtual Server Automatically
- Enable Auto-scale

Click the Create Virtual Server button to start the creation process
9.1.4 Manage Virtual Servers

Virtual servers are based on templates and are deployed on compute resources. Compute resources give them access to CPU, disk and network resources. OnApp supports two kinds of storage for virtual servers: traditional centralized SANs, and the new distributed block storage functionality introduced with OnApp Storage, in which local disks in compute resources provide the physical storage space allocated to virtual servers. In each case, the OnApp platform creates virtual data stores from the physical resources and uses these to provide virtual servers with virtual disks. This document provides information on how you can manage virtual servers in your OnApp cloud.

9.1.4.1 View Virtual Servers

To view all virtual servers deployed in the cloud:

1. Go to your Control Panel > Cloud > Virtual Servers menu to see an overview of all virtual servers in the cloud.

2. The page that loads will show the list of VSs together with their:
   - operating system
   - label. Click the label to see the VS details.
   - VIP status (enabled or disabled). Click the icon to enable/disable VIP status of a particular VS.
   - IP addresses
   - allocated disk size
   - RAM
   - backups - the number of backups and the space these backups take.
   - compute resource - the label of compute resource with which VS is associated
   - user - the owner of this VS. Click the user name to see the owner details.
   - CPU(s) - the number of CPU(s) included
   - power status. Click the on/off buttons to change the status.

3. Click the Actions button next to the VS for the quick access to the list of VS actions (the list of actions displayed depends on the VS status):

On this page:

- View Virtual Servers
- View Virtual Server Details
- Rebuild/Build Virtual Server Manually
- Edit Virtual Server
- Clone Virtual Server
- Migrate Virtual Server
- Autoscale Virtual Server
• **Set VIP Status for Virtual Server**
• **Segregate Virtual Server**
• **Enable Virsh Console**
• **Delete Virtual Server**

**See also:**
• **Compute Resources**
• **Permissions**
• **Service Add-ons**
• **Create Virtual Server**
• **Virtual Server Disks**

• Recovery reboot
• Power off a VS
• CPU usage
• Backups
• Shutdown
• Start up
• Recovery start up
• Unlock

If you are viewing the VSs list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click **Apply**. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the VSs list. You can always alter your column selection later. Note that by default the VIP and Backups columns are not visible in the table on narrow screens.

**Column selection is currently set for one browser. If you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.**

To search for a particular virtual server, click the **Search** icon at the top of the VS list. When the search box appears, type the text you want to search for and click the **Search** button.
9.1.4.2 View Virtual Server Details

To view details of a specific virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. The screen that appears loads the VS properties, notes, activity log and tools for managing your VS.

9.1.4.2.1 VS Properties

VS properties page gives a general overview of the VS details:

- Template this VS is built on
- Power status & On/Off/Reboot buttons.

**Clicking the OFF button performs a graceful shutdown and then powers off the virtual server after the timeout set in configuration settings.**

- Segregated VS. This field appears if the VS is segregated from another virtual server. Click the label of the virtual server to view the details of the VS from which the current server is segregated.
- FQDN (fully qualified domain name)
- Compute resource. Click the compute resource name to see its details
- Location group. Click the location to view the details of the location group with which the VS is associated.
- Login credentials
- Owner. Click the owner name to see its details.
- VIP status (on/off). Click the icon to change the status.
- Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.
- Memory
- CPU(s)
- Sockets
- Cores per socket
- CPU priority or CPU units
- Disk Size
- Disk backups
- Network usage (data sent and data received in GB per hour)
- IP Addresses. Only the first five IP addresses are displayed on the virtual server properties page. To view the list of all virtual server IP addresses, mouse over IP addresses area or go to the Networking > IP addresses tab. To view external IP addresses, you have to add them via API call first. To add an external IP address, refer to Add/Edit External IP Address section of API Guide. Once you've added an IP address, you can view it after the - > sign. E.g. 7.7.0.17 -> 8.8.8.7
- **Autoscale** - move the slider to enable/disable the autoscaling rules set for this VS.

- Until the **autoscaling rules** are configured the autoscaling itself will not start working.
- If the **Autoscale** slider is greyed out that means that you have reached the autoscaling limit in bucket (or the max is set as 0).

- **Auto-backups** - move the slider to enable/disable automatic backups for this VS. If the incremental backups are enabled in your cloud, you can set auto-backups per VS rather than per disk.

  If the automation options weren’t enabled during this virtual server creation, you’ll be redirected to the form where you can configure them.

- **Acceleration allowed** - move the **Acceleration allowed** slider to the right to allow acceleration for this VS or move this slider to the left to prohibit acceleration for this VS. Acceleration status of the VS will be changed on the next CDN Sync Runner run (default value 20 minutes). To edit CDN Sync Runner delay, refer to **Edit Infrastructure Configuration** section of this guide. If VS is accelerated, you can also view the actual **Acceleration Status** - active or inactive.

  Ensure that **Accelerate any Virtual Server/Accelerate own Virtual Servers** permissions are on before enabling acceleration for the VS. For more information about permissions refer to the **List of all OnApp Permissions** section of this guide.

### 9.1.4.2.2 Notes

The Notes section lists brief comments or reminders for a VS. You can add either Admin's or User's notes. The Admin's note will be available to cloud administrators. Click the **Actions** button in the Notes section of the page to add admin's or user's note.

### 9.1.4.2.3 Service Add-ons

If you have the **service add-on** functionality enabled and service add-on is assigned to the VS, you can view it at the VS overview page together with the following details:

- **Label** - the service add-on name (by clicking on it you can **edit the service add-on**)
- **Price** - the service add-on price, set for this service add-on in the **Service Add-on Store**
- **Type** - select user or system
• **Status** - whether the service add-on is active or not
• **Delete icon** - you can unassign the Service Add-on from this Virtual Server by clicking the Delete icon.

To assign more service add-ons to the VS, click the "+" button at the upper right corner of the section. You will be redirected to the **VS Overview > Service Add-ons** section of the VS options.

### 9.1.4.2.4 VS Management
- Click the **Tools** button to expand the Tools menu with the VS management options.
- Use the top menu to manage your virtual servers' **statistics/networking/storage** options.

### 9.1.4.3 Rebuild/Build Virtual Server Manually

To build/rebuild virtual server **Build/rebuild virtual server and Manage public templates permissions** must be enabled.

If you haven't checked the **Build Virtual Server** option during the VS creation process, you will have to do this manually after the VS has been created. Building a virtual server is the process of allocating physical resources to that VS.

To build a virtual server manually or rebuild the VS on the same (or another) template:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. On the screen that appears, click the **Tools** button and then click **Rebuild Virtual Server**.
4. On the screen that pops up, use the drop-down menu to choose a template with which to build the VS.
   
   It is not possible to rebuild a Linux-based virtual server to FreeBSD templates.
   It is not possible to rebuild a Windows-based virtual server to Linux/FreeBSD template and vice versa.

5. Move the **Start VS after rebuild** slider to the right if you want to have your VS started automatically after it is built.
6. Select the following options if you selected Windows **Windows**
   - **Windows Licensing type** - KMS, MAK, or OWN
   - **Licensing key** - input license if you selected OWN licensing type
   - Select **Server** for KMS licensing type
7. Click the **Rebuild Virtual Server** button to finish.
9.1.4.4 Edit Virtual Server

You can edit resources for all VSs. Depending on the template it is built on, some VSs can have their CPU or RAM or both resized without needing to be powered off ("resize without reboot"). If the VS template allows resizing of the required resource without the reboot, the resize should be completed automatically: you will be returned to the VS details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to confirm that the VS will need rebooting so that the resize can take place. On how to determine whether the template you are interested in supports resizing without the reboot of RAM or CPU, refer to the Hot resize document.

- Windows virtual servers cannot be resized without the reboot.
- It is not possible to increase the VSs RAM beyond its max_memory value without rebooting the server. For more information refer to Hot resize.
- If the template on which the VS is built on has the value 'YES' for the resize without reboot option, it might denote that either CPU or RAM can be changed without rebooting the server. Some templates support the resize without reboot only for either CPU or RAM while in other templates both CPU and RAM can be changed without rebooting the server. The virtualization type also influences the resize without reboot option. For more information refer to Hot resize.

The Edit Virtual Server screen will differ depending on the way the VS resources were selected: either manually or using an instance package. To adjust VS resources:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you want to resize, to show its details screen.
3. Click the Tools button and select the Edit Virtual Server link.

For virtual servers built by selecting resources manually:
- Change CPU cores, CPU priority/units and RAM values.

If you are editing a VS in Federation, there are the following resources ratios for VSs built on public federated zones:
• a 4:1 ratio for CPU cores and RAM. For example, if you are building a VS with 8 CPU cores, you need to allocate at least 2 GB of RAM to it.
• a 20:1 ratio for storage and RAM. For example, if you are building a VS with 5 GB of storage, you need to allocate at least 256 MB of RAM to it.

For VSs based on KVM Compute resources only, providing the Enable CPU topology permission is switched on for the user:

• Change the number of CPU sockets.

### Setting the correct amount of CPU sockets

• Set the total amount of virtualized CPUs and the number of sockets.
• The value of cores_per_socket will be calculated automatically by the formula vCPUs = cpu_sockets x cores_per_socket.
• Thus, if you set the vCPU value 8, and the CPU sockets 2, this means that the cores_per_socket value will be set 4.

For virtual servers built using instance packages:

• Choose the new instance package for your virtual server. Click the instance package to select it. After that, the instance package you have chosen will be highlighted in green.
• Those instance packages that have resources incompatible with the compute zone, on which the VS is built, will be greyed out. Greyed out instance packages cannot be selected.
• You can only choose from those instance packages that offer more disk size than the VS currently uses.
• After you select a new instance package you can use the extra disk size to create a new disk for the VS or make the existing VS disk larger.

You can also edit the Time Zone parameter for all Windows KVM and Xen virtual servers. After you edit the server’s time zone, you need to stop and then start up the VS. Currently, the time zone is set at the compute resource side only. Therefore, users need to set the target time zone inside a Windows VS manually. Setting correct time zone at the compute resource side helps to keep correct time inside a VS after starting it if time synchronization is not completed for some reason.

After changing VS resources you can see two prices per this VS per hour, depending on VS power status (on/off).

• Click the Save button.

### 9.1.4.5 Clone Virtual Server

You can create a clone based on the same resources as the origin virtual server. The cloned virtual server inherits resources from the origin as follows.
### Resource

<table>
<thead>
<tr>
<th>Resource</th>
<th>Cloned Virtual Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties - owner, hostname, password, and label.</td>
<td>The same as the origin virtual server with <strong>Clone</strong> in the label, for example, <strong>Clone Origin Label</strong>.</td>
</tr>
<tr>
<td>• Compute, data store, and network resources &amp; zones</td>
<td>The same as the origin virtual server. If there are no available resources on the same data store, network, and compute resource, you cannot clone a virtual server.</td>
</tr>
<tr>
<td>• Recipes, recipe variables, and service add-ons</td>
<td></td>
</tr>
<tr>
<td>• Firewall rules</td>
<td></td>
</tr>
<tr>
<td>IP address</td>
<td>A random IP address is assigned from an IP range in the origin network. If a virtual server is built from an <strong>OVA</strong> template with the Other OS type or any <strong>ISO</strong> template, an IP address from the origin virtual server is assigned. After a virtual server is cloned and before you start it, you should <strong>assign a new IP address</strong>.</td>
</tr>
<tr>
<td>Swap disk</td>
<td>A new swap disk is created on the cloned virtual server.</td>
</tr>
<tr>
<td>Backups</td>
<td>The backups of the origin virtual server are not cloned.</td>
</tr>
</tbody>
</table>

To clone a virtual server, follow the next procedure:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click a label of the virtual server that you want to clone.
3. Click **Tools** and then click **Clone Virtual Server**.
4. In the pop-up box, click **Clone Virtual Server** to confirm the action.

After you confirm the action, several transactions are run to complete the cloning process. You can check a status of each transaction in **Activity Log** of the virtual server. After the virtual server is cloned, it is powered off until you **start it**.

### 9.1.4.6 Migrate Virtual Server

You can migrate virtual servers using a **hot** or **cold** migration method:

- **Hot migration** is a live migration of a virtual server with or without disks and NICs between compute resources that share common data stores or data store zones.
- **Cold migration** is a migration of virtual servers with disks between compute resources with local storage or across compute zones.

As an Admin, you can control user access to virtual server migration. Using **OnApp permissions**, you can allow/forbid users to perform migration of all virtual servers or their own servers. This is handled via the Control Panel > **Roles** menu.
9.1.4.6.1 Hot Migration

You can migrate an online virtual server from one compute resource to another compute resource that are both utilizing local/shared/IS storage or across zones. There are two types of hot migration:

- **Compute Resource** - a migration of a virtual server from one compute resource to another.
- **Full Migrate** - a migration of a virtual server with or without disks and NICs between compute resources, data stores, and networks.

9.1.4.6.1.1 Hot Migration Between Compute Resources

Before you begin, take into consideration the following:

- Check if your Windows template supports hot migration at the [Windows Templates](#).
- The source and destination compute resources and data stores should be in the same location. Migration between different locations is not possible.
- Migrating a virtual server to a compute resource with *Any* operating system type has the next implications. It won’t be possible to set the *Windows Only* type for a compute resource, if there are any Linux or FreeBSD VSs residing on it. Likewise, it won’t be possible to set the *Non Windows* type for a compute resource, if there are Windows-based VSs residing on it.
- If both source and destination compute resources have backup IP addresses, VS migration will be performed using those backup IP addresses as an alternative network for traffic. If migration fails for any reason, it will be retried using destination compute resource IP address in management network.

9.1.4.6.1.1.1 Migrate One Virtual Server

To hot migrate a virtual server:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click a label of a virtual server that you want to migrate.
3. Click the **Tools** button and click the **Migrate Virtual Server** button.
4. In the **Migration Type** box, select **Compute Resource** and click **Next**.
5. Select a **Target compute resource** from the box and click **Next**.
6. At the final step of the wizard, you can see the migration summary and select the following checkbox:
   - **Cold-migrate when hot-migration fails** - select the check box to apply cold migration in case of the hot migration failure
7. When you are finished, click the **Submit** button.

9.1.4.6.1.1.2 Migrate Multiple Virtual Servers

You can also migrate multiple virtual servers at once from one compute resource to another compute resource of the same type (KVM to KVM or Xen to Xen). The mass migration is available within compute resources that belong to the same compute zone. To migrate virtual servers, follow the next steps:

1. In the **Admin** > **Compute Resources** section, click a compute zone label to see the list of compute resources.
2. Click a label of a destination compute resource. On the screen that appears, you will see a list of all virtual servers hosted on the compute resource.
3. Select checkboxes next to the virtual servers that you want to migrate and click the **Migrate** button. To select all virtual servers residing on the compute resource, click the first checkbox. To cancel the selection of all virtual servers, click this checkbox again.
4. In the pop-up box, select the following options:
   
   - **Target compute resource** - select a destination compute resource to migrate the virtual servers to
   - **Cold-migrate when hot-migration fails** - select the checkbox if you want to apply cold migration in case of the hot migration failure

   If some of the selected virtual servers have disks that run as a local storage on this compute resource, these virtual servers could not be migrated. After the migration, these virtual servers remain on the previous compute resource, while other VSs are migrated to the destination compute resource.

5. When you are finished, click the **Submit** button.

   After migration, the power status of your virtual server remains the same as before the migration. If you migrate a virtual server that is running, the whole process is almost unnoticeable.

9.1.4.6.1.2 Full Hot Migration

Before you begin, take into consideration the following:

- The hot migration is applicable only to virtual servers running on CentOS 7 KVM compute resources and virtual servers can be migrated only to CentOS 7 KVM compute resources.
- You can hot migrate a virtual server NIC to a VXLAN/VLAN management network that is not shared by the source and destination compute resources. When you migrate a NIC to another network, only one IP address assigned to this NIC is migrated.
- You cannot migrate the VS if its primary IP address is in the same network with Control Panel IP address.
- Before VS migration to the same network, increase the ssh timeout to at least 60 seconds at the **Edit Defaults Configuration** page to avoid migration failure.
- Note that only Windows-based and Linux-based VSs can be migrated with both Migrate Storage and Migrate Networks options enabled.
- The bandwidth from compute resource to compute resource should be sufficient enough to allow transferring of virtual servers.
- Hot migration is applicable to virtual servers with local storage. Be aware that migration will take much more time if you want to perform it between shared data stores.
- If both source and destination compute resources have backup IP addresses, VS migration will be performed using those backup IP addresses as an alternative network for traffic. If migration fails for any reason, it will be retried using destination compute resource IP address in management network.
- Be aware that disk migration is better than full VS migration in case you want to migrate disks within the same compute zone and if the advanced backup scheme is used. Such scenario is applicable only to shared data stores within the same compute zone.
- The hot migration is available only if a virtual server is online and your Quick Emulator (QEMU) version is later than 2.6.

To run a full hot migration of a virtual server:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click a label of a virtual server that you want to migrate.
3. Click the **Tools** button and click the **Migrate Virtual Server** button.

4. In the **Migration Type** box, select **Full Migrate (Hot)**.

5. Select **Migrate Storage** and/or **Migrate Networks** and click **Next**.

6. Select the destinations to which to migrate a virtual server:

   **Compute Resources**
   
   - **Target compute zone** - select a destination compute zone
   - **Target compute resource** - select a destination compute resource
     Click **Next** to proceed to the following step.

   **Storage Resources**
   
   - **Target data store for disk** - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.
     Click **Next** to proceed to the following step.

   **Network Resources**
   
   - **Target network** - select a destination network for each network interface
   - **Target IP net** - select an IP net in a destination network
   - **Target IP range** - select an IP range in a destination network
   - **Select and assign IP address** - select an IP address to assign to a virtual server. You can click **Free IPs** or **My IPs** to select from all free IP addresses or your own IP addresses.
     Click **Next** to proceed to the following step.

7. At the final step of the wizard, you can see the migration summary. Click **Submit** to start the migration.

- Hot migration is not performed if a virtual server has temporary disks (attached to or from other virtual server).
- Hot migration is not performed for Integrated Storage data stores if any of the disks has snapshots.
- Hot migration is not applicable for federated virtual servers that are built in compute zones submitted to the Marketplace.
- If you have local backups on the source compute resource, please move them manually to a target compute resource or backup server.
- If both source and destination compute resources have backup IP addresses, VS migration will be performed using those backup IP addresses as an alternative network for traffic. If migration fails for any reason, it will be retried using destination compute resource IP address in management network.
- If you change the compute resource or data store zone, the billing will be changed according to the prices set for that new zone in the **bucket**.
• Go to Admin > Settings > Configuration > Defaults > Migration options, if you want to set migration rate limit and limit of transactions which can be run simultaneously on the target compute resource when migrating a VS.

• The following disk migration scenarios are applicable:
  o From LVM data store to LVM data store
  o From Integrated Storage data store to Integrated Storage data store
  o From LVM data store to Integrated Storage data store
  o From Integrated Storage data store to LVM data store

Hot migration is not applicable for SolidFire storage.

• Disks that are migrated from one LVM data store to another are renamed in the source data store. In case of Integrated Storage, disks remain with the same name at source data store and are marked as offline zombie disks. You need to delete them manually, otherwise, you will get an error during backward migration.

9.1.4.6.2 Cold Migration

Cold migration enables you to migrate virtual servers with or without disks and NICs between compute resources with local storage or across compute zones. There are several prerequisites for the cold migration:

• You should shut down a virtual server before performing migration.

• You can cold migrate a virtual server NIC to a VXLAN/VLAN management network that is not shared by the source and destination compute resources. When you migrate a NIC to another network, only one IP address assigned to a virtual server is migrated.

• If you perform cold migration without disks or NICs, the source and destination compute resources and data stores should be in the same location. In case of full cold migration (virtual server with disks and NICs), locations of source and destination compute resources and data stores can be different.

• The bandwidth from compute resource to compute resource should be sufficient enough to allow transferring of virtual servers.

• Cold migration is applicable to virtual servers with local storage. Be aware that migration will take more time if you want to perform it between shared data stores.

• Be aware that disk migration is better than full VS migration in case you want to migrate the disks within the same compute zone and if the advanced backup scheme is used. Such scenario is applicable only to the shared data stores within the same compute zone.

To cold migrate a virtual server with disks:

1. Go to your Control Panel > Cloud > Virtual Servers.
2. Click a label of a virtual server that you want to migrate.
3. Click the Tools button and click the Migrate Virtual Server button.
4. In the **Migration Type** box, select **Full Migrate (Cold)**.
5. Select **Migrate Storage** and/or **Migrate Networks** and click **Next**.
6. Select the destinations to which to migrate a virtual server:
   **Compute Resources**
   - Target compute zone - select a destination compute zone
   - Target compute resource - select a destination compute resource
     Click **Next** to proceed to the following step.
   **Storage Resources**
   - Target data store for disk - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.
     Click **Next** to proceed to the following step.
   **Network Resources**
   - Target network - select a destination network for each network interface
   - Target IP net - select an IP net in a destination network
   - Target IP range - select an IP range in a destination network
   - Select and assign IP address - select an IP address to assign to a virtual server. You can click **Free IPs** or **My IPs** to select from all free IP addresses or your own IP addresses.
     Click **Next** to proceed to the following step.
7. At the final step of the wizard, you can see the migration summary. Click **Submit** to start the migration.

- Cold migration is not applicable for federated virtual servers that are built in compute zones submitted to the Marketplace.
- You cannot migrate a virtual server from a compute resource that is offline.
- If you have local backups on source compute resource, please move them manually to a destination compute resource or backup server.
- If you change the compute resource or data store zone, the billing will be changed according to the prices set for that new zone in the bucket. The new estimated price per hour for a VS is displayed at the bottom of the VS migration screen.
- Go to **Admin > Settings > Configuration > Defaults > Migration options**, if you want to set migration rate limit and limit of transactions which can be run simultaneously on the target compute resource when migrating a VS.
- The following disk migration scenarios are applicable:
From LVM data store to LVM data store
- From Integrated Storage data store to Integrated Storage data store
- From LVM data store to Integrated Storage data store
- From Integrated Storage data store to LVM data store

Cold migration is not applicable for SolidFire data stores.

Disks that are migrated from one LVM data store to another will be renamed in the source data store. In case of Integrated Storage, disks will remain with the same name in the source data store and will be marked as offline zombie disks. You need to check if the transaction is completed and delete them manually, otherwise, you will get an error during the backward migration.

9.1.4.7 Autoscale Virtual Server

VS autoscaling allows you to change the RAM, CPU and disk size settings of a virtual server automatically. VS resources scaling is based on rules you specify. For example, you can set up a rule that will add 1000MB of memory to a VS if RAM usage has been above 90% for the last 10 minutes - but add no more than 5000MB in total in 24 hours. You can set autoscaling down settings alongside with autoscaling up.

- For Linux-based VSs and VS primary disks only.
- Disk usage autoscaling is applicable for VS primary disk only.
- Autoscaling for CPU cores is currently not implemented, it is implemented only for CPU units and CPU shares.
- If the VS is based on a template that allows resizing without the reboot - see the Edit Virtual Server section – then the VSs RAM or CPU or both can be increased without rebooting the VS. The resources that can be resized without reboot depend on the template and the virtualization type. Some templates support the resize without reboot only for either CPU or RAM. Disk space autoscaling requires a VS reboot.
- If you autoscale a VS's memory to a value greater than current VS RAM x 16 (which is a max_memory parameter in a configuration file and database), the VS will be rebooted anyway, regardless of the template it is built on.
- Make sure a VS can be reached via SSH. Otherwise, the autoscaling client installation will fail.
- Starting with version 4.2, OnApp uses Zabbix for autoscaling. Monitis will be used for autoscaling of servers built using OnApp versions previous to 4.2 until you switch autoscaling off for such server(s). If you decide to
switch autoscaling back on, autoscaling will be implemented using Zabbix. Zabbix also will be used for autoscaling of newly created VSSs.

- Note that Monitis support for OnApp autoscaling will come to its end of life on June 30th, 2019 and will be unavailable for use. If you are still using Monitis, please switch to Zabbix for autoscaling. If you need more information or help with Monitis, please contact our support team to get assistance.

- When autoscaling down is enabled, it will reduce the VS memory and disk size to the minimum, indicated in a template, on which this VS is built. CPU usage can be reduced to the minimum CPU priority allowed by the system(1%).

To configure autoscaling settings:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the appropriate VS.
3. On the page that follows, click the Overview tab, and then click Autoscaling.
4. Press the required tab - Memory Usage, Disk Usage or CPU Usage - to see the statistics for each type of resources.
5. Below you will see UP and DOWN autoscaling options. Move the slider to the right to add the autoscaling rule or move it to the left to remove the rule.
6. Add autoscaling rules as explained below:

   Set autoscale up options:
   - Time - select a specific time period in which scaling will be executed.
   - If RAM usage is above \( X \)% for a specific time period, add \( Y \) MB – but no more than \( Z \) MB in a 24 hour period.
   - If CPU usage is above \( X \)% for a specific time period, add \( Y \)% - but no more than \( Z \)% in a 24 hour period.
   - If disk usage is above \( X \)% for a specific time period, add \( Y \) GB - but no more than \( Z \) GB in a 24 hour period.

   Set autoscale down options:
   - Time - select a specific time period in which scaling will be executed
   - If RAM usage is below \( X \)% for a specific time period, remove \( Y \) MB.
   - If CPU usage is below \( X \)% for a specific time period, remove \( Y \)%.
   - If disk usage is below \( X \)% for a specific time period, remove \( Y \) GB.

7. Click Apply.

Clicking the Apply button does not activate autoscaling if the Autoscale slider at VS overview page is disabled. You can configure autoscaling rules, press the Apply button, these rules will be saved and will start
working only after the Autoscale slider at VS overview page is enabled. Also, you can disable the Autoscale slider, autoscaling will stop working, but the configuration of rules will be saved in case you want to activate them in future.

9.1.4.8 Set VIP Status for Virtual Server

If a compute resource fails or reboots, the system migrates virtual servers to another compute resource, one VS at a time. The order VSS are migrated in is random. However, you can give a virtual server "VIP" status, and this will give that VS priority in the migration queue.

To set or remove VIP status for a VS:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Use the icon in the VIP column next to a required virtual server to change switch on/off the VIP status.

9.1.4.9 Segregate Virtual Server

If required, you can instruct OnApp to make sure a VS is never booted on the same compute resource as another specific VS. This may be important if, for example, you have two name servers or a load balanced web server, and you need to keep VSs on separate physical servers. You can also remove segregation if required.

- Virtual servers can only be segregated from other VSs built by its owner.
- Virtual servers can only be segregated from VSs within the same compute zone.
- Virtual servers cannot be segregated from VSs running on the same compute resource.
- The segregated VS is not automatically migrated to another compute resource.

To isolate one VS from another:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to segregate.
3. On the screen that appears, click the Tools button, then click Segregate Virtual Server.
4. In the dialogue box that pops up, use the drop-down menu to choose a VS you want to keep away from.
5. Click the Segregate Virtual Server button to finish.

To remove segregation:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to segregate.
3. On the screen that appears, click the **Tools** button, then click **Desegregate Virtual Server**.
4. In the dialogue box that pops up, click the **OK** button to finish.

### 9.1.4.10 Enable Virsh Console

You can use Virsh console to access a virtual server from a compute resource secure shell and perform various administrative tasks. You can enable Virsh console for the following instances:

- Virtual servers that run on Xen and KVM compute resources.
- Virtual servers that are built on Linux templates.
- Virtual servers that are not built from ISO.

You can enable **Default Virsh Console Policy** via **Settings** for all newly created virtual servers to have Virsh console by default. For virtual servers that are created before you edit the settings, you can enable the console as follows:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click a label of a destination virtual server.
3. Click **Tools** and then click **Enable Virsh Console**.
4. In the dialogue box, click **OK** to confirm.

After you confirm the action, the virtual server is rebooted and you can access it via Virsh console.

To access the virtual server via Virsh console, follow the next steps:

1. Connect via SSH to the destination compute resource.
2. Run the following command to list guest VSs using Virsh:

   ```
   virsh list
   
   Id    Name       State
   -----------------------
   1     freebsd    running
   2     ubuntu     running
   3     centos     running
   
   virsh list
   
   Id    Name       State
   -----------------------
   1     freebsd    running
   2     ubuntu     running
   3     centos     running
   
   virsh console ubuntu
   
   To exit the console, press **CTRL + 5**.
   
### 9.1.4.11 Delete Virtual Server

Shut down the virtual server before destroying it. If you are deleting a VS that is running, the VS will be deleted after the time set in **Timeout Before Shutting Down VSs** configuration parameter.

To remove the virtual server from the cloud:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. On the screen that appears, you'll see the list of all virtual servers in the cloud. Click the label of the virtual server you want to delete.
3. On the virtual server’s screen, click the **Tools** button, then select **Delete Virtual Server**.
4. Move the **Move Last Backup to My Templates if it is present** slider to the right if you want to save the last VS's backup as a template.

5. Move the **Destroy All Existing Backups** slider to the right if you want to remove all existing backups of this virtual server.

**IMPORTANT:**
- You won't be able to restore a virtual server after deleting it.
- Deleting a virtual server removes all data stored on that virtual server. To save the data stored on the virtual server, back up your virtual server and select the **Move Last Backup to My Templates if it is present** box when following the instructions described in this section.
- To delete a virtual server together with its backups, the user needs to have the *Destroy any backup or Destroy own backup* permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.

9.1.5 Migrate VS from Xen to KVM

KVM virtualization becomes more and more popular nowadays due to the number of reasons. With KVM, you get faster and more reliable technology together with more functionality in cloud operation. Because of that, OnApp has chosen to move forward with KVM, migrating current virtual servers running on Xen to KVM compute resources.

This feature allows to perform migration of virtual servers hosted on Xen compute resources to KVM compute resources. Migration to KVM is easy and requires few steps before converting Xen virtual servers to KVM. During the migration process, you only need to choose a target compute resource and data store. Additionally, you can enable a backup before or after the migration. You can initiate the migration using the procedure described in this document.

**On this page:**
- **Before You Begin**
- **Migrate Virtual Server to KVM**
- **Compute Resources**
- **Storage Resources**
- **Backups**
- **Confirmation**

9.1.5.1 Before You Begin

Before you proceed further, please note that:
- The migration process is straightforward and should succeed on most virtual servers. However, in some cases something might go wrong. OnApp provides several measures to prevent data loss. You can Clone the VS before migration or you can enable the additional backup option in the migration wizard that would allow to convert the backup to a template.
- Migration is irreversible and you cannot migrate from KVM to Xen compute resources.
• Make sure that limits for disk size are 1 GB higher per each disk (except swap), both in source and destination data store zones.

During the migration, the billing will be changed due to the increase of disk size (all disks except swap disks increase in size by 1 GB). The new estimated price per hour for a VS is displayed at the bottom of the VS migration screen.

• Migration is not performed if a virtual server has temporary disks (attached to or from other virtual server).

• Migration is not performed for Integrated Storage data stores if any of the disks has active backups running or zombie snapshots. Also, migration is not supported on SolidFire data stores.

• Migration is not applicable for federated virtual servers that are built in compute zones submitted to the Marketplace.

• This option available for both Linux and Windows based VSs running on Xen compute resources.

• Depending on your OS, check if your template supports hot migration at Linux Templates or Windows Templates.

• Destination compute resources should be running Centos 7. You must migrate or update your Centos 6 compute resources first.

• If both source and destination compute resources have backup IP addresses, VS migration will be performed using those backup IP addresses as an alternative network for traffic. It is recommended to use alternative network not to load management network.

• Networks attached to a VS running on Xen compute resource should be attached to KVM compute resources too.

• Make sure your target data stores have enough space and are added to the target data store zone in your bucket.

• If you have TRIM enabled for at least one target data store before the migration, it can be enabled after the migration with the next VS reboot.

9.1.5.2 Migrate Virtual Server to KVM

Go to Admin > Settings > Configuration > Defaults > Migration options, if you want to set limit of transactions number which can be run simultaneously on the target compute resource when migrating a VS.

To migrate your VS from Xen to KVM, do the following:

1. Go to your Control Panel > Cloud > Virtual Servers.
2. Click a label of a virtual server that you want to migrate.
3. Click the Tools button and click the Migrate Virtual Server button.
4. In the Migration Type box, select Xen to KVM Migrate and click Next.
9.1.5.3 Compute Resources
The first step enables you to select a compute zone and a resource to migrate your virtual server to.

- **Target compute zone** - select a destination compute zone
- **Target compute resource** - select a destination compute resource

Click **Next** to select storage resources for the migration.

9.1.5.4 Storage Resources
At this step, you can specify target data stores running on the compute resource that you indicated previously:

- **Target data store for disk** - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.

Click **Next** to select additional backup settings before or after migration.

9.1.5.5 Backups
Backups created while the VSs were running on Xen compute resources are incompatible with KVM. You may choose to keep them after migration, but they will not be available for recovery. However, such backups might be used to convert to templates.

Select the backups you will need before or after the migration from Xen to KVM is completed:

- **Schedule a backup before the migration** - leave this slider enabled to schedule a backup before the migration. Otherwise, move the slider to the left to disable the option.
• **Schedule a backup after successful migration** - leave this slider enabled to schedule backups in case of successful migration. If you do not need these backups, disable the slider.

• **Delete old backups after successful migration** - leave the slider enabled to remove old backups incompatible with KVM after the migration is completed. If you need these backups, disable the slider.

If enabled, this option deletes all the old backups besides the one that is taken right before the migration provided that you also enabled scheduling a backup before the migration.

Click **Next** to view the migration summary of your configuration.

---

### 9.1.5.6 Confirmation

At the final step of the wizard, you can see the migration summary. Click **Submit** to start the migration.

**IMPORTANT:**

- Note that manually added/edited disks in fstab will require to be reconfigured after migration.

- If you migrate a Windows-based VS, consider the following. After migration, your VS will not be attached to an actual Xen template but to its duplicate with 'migrated from Xen' added to its name. This new template will have *kvm* or *kvm virtio* virtualization type and be attached to the same Template Group. All templates associations with recipes and service add-ons will be duplicated, as well. As this template is just a KVM duplicate of Xen template, the VSs can’t be built or rebuilt using it and it will not appear in any of related template lists. All migrated VSs created from the same Windows template will be attached to the same new KVM template.
9.1.6 Manage Virtual Server Power Options

Virtual Server power options include the list of actions that you can run to change a VS power status. You can manage power options for a specific virtual server or power on/off multiple VSs that reside on the same compute resource.

To manage power options for a specific virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on VSs (the exact list shown depends on the VS status):

9.1.6.1 Reboot Virtual Server

To reboot a virtual server:
1. Click the Reboot Virtual Server button.
2. Click the OK button in the pop-up box to confirm the reboot.

On this page:
- Reboot Virtual Server
- Reboot in Recovery
- Suspend/Unsuspend Virtual Server
- Shut Down Virtual Server
- Startup Virtual Server
- Startup on Recovery
- Boot from ISO
- Power On/Off Multiple VSs

See also:
- Virtual Server Administrative Options
- Permissions
- Manage Virtual Server
- Manage Suspended Virtual Server
- Virtual Server Provisioning

9.1.6.2 Reboot in Recovery

To reboot a virtual server in the recovery mode:
1. Click the Reboot in Recovery button.
2. Click the Yes button in the pop-up box to confirm the reboot in the recovery mode.

For VSs with a password encryption enabled, the temporary login is "root" and password is "recovery".

For VSs with a password encryption disabled, the "root" password will be used to reboot the VS in recovery.
Windows virtual servers boot from the Linux-based recovery template in the recovery mode. You need to log in as admin via SSH or VNC console and mount a Windows system disk manually.

You cannot work with the "whole" disk (like `mount -t ntfs-3g /dev/sdb1`) while mounting and checking block devices inside the recovery image as Windows disk is split into partitions.

9.1.6.3 Suspend/Unsuspend Virtual Server

To suspend/unsuspend a virtual server:
1. Click the **Suspend** button to stop a VS, change its status to suspended and disable all the major actions on VS, unless unsuspended.

   The virtual server is suspended immediately after clicking the **Suspend** button without an additional confirmation.

2. Click the **Unsuspend** button to activate the suspended VS and enable all the major actions.

   For more information on actions available on a suspended VS, refer to the **Manage Suspended Virtual Server** section.

9.1.6.4 Shut Down Virtual Server

You can shut down a specific virtual server or multiple VSs that reside on the same compute resource. For information on shutting down multiple VSs, refer to the **Power On/Off Multiple Virtual Servers** section below.

To shut down a particular virtual server:
1. Click the **Shut Down Virtual Server** button.
2. In the pop-up box, select either the **Shut Down VS** option to terminate the VS gracefully or the **Power Off VS** option to terminate the VS forcefully.

   If you select the **Shut Down VS** option and the system fails to shut down the VS gracefully in the time period indicated in the **Timeout Before Shutting Down VSs (30-600 sec)** parameter at **Admin > Settings > Configuration > System**, the VS will be shut down forcefully.

3. Click the **Apply** button to shut down the VS.
9.1.6.5  Startup Virtual Server

You can start up a specific virtual server or multiple VSs that reside on the same compute resource. For information on starting multiple VSs, refer to the [Power On/Off Multiple Virtual Servers](#) section below.

To queue a start-up action for a VS that is currently powered-off, click the **Startup Virtual Server** button.

> When you start up a VS, it might be implicitly cold migrated if the current compute resource does not have sufficient resources. For more information, refer to [Virtual Server Provisioning](#).

9.1.6.6  Startup on Recovery

To start a VS in the recovery mode:

1. Click the **Startup on Recovery** button to start up a VS in the recovery mode.
2. In the pop-up box, click the **Yes** button to confirm the startup.

For VSs with a password encryption enabled, the temporary login is "root" and password is "recovery".

For VSs with a password encryption disabled, the "root" password will be used to start up the VS.

9.1.6.7  Boot from ISO

You can boot virtual servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. If you boot a VS from an ISO with the RAM requirement larger than the VS's RAM, the transaction will fail. Make sure that you have enabled the Any power action on own virtual servers and Allow own virtual servers to boot from ISO permissions for the user to have access to this feature.

To boot a VS from an ISO:

1. Click the **Boot from ISO** button.
2. Select the ISO image from which the VS will be booted.
3. Click the **Boot** button.

As soon as you boot a VS from the installation ISO, OnApp may lose control of any components (backups, networks, disks). The migration option is not available for VSs booted from ISO. The only available actions will be to start and stop a VS. Be aware that all the contents of the disk may be also deleted.
9.1.6.8 Power On/Off Multiple Virtual Servers

To power on and power off virtual servers that are run on the same compute resource, follow the next steps:

1. In the Appliances section, expand the Compute Resources menu and click a label of a compute zone where a target compute resource runs.

2. Click a label of a compute resource. On the screen that appears, you will see a list of all virtual servers hosted on the compute resource.

3. Choose virtual servers that you want to power on or power off by selecting the required checkboxes in the first column of the table.

- To select all virtual servers residing on the compute resource, click the first checkbox. To cancel the selection of all virtual servers, click this checkbox again.

- If you select all virtual servers, only the powered-off VSs will be powered on, while the already powered-on VSs will be skipped and vice versa.

Depending on the current power status of the selected VSs, one of the following options will become available.

**Power On**

To power on the selected VSs:

- Click the **Power On** button.
- In the pop-up box, click the **YES** button to confirm your action.
- As a result, the multiple transactions will be scheduled to start up all the selected virtual servers one by one.

**Power Off**

To power off the selected VSs:

- Click the **Power Off** button.
- In the pop-up box, select one of the following methods:
  - Gracefully shutdown - to run a graceful shutdown of VSs
  - Power Off - to run a forceful shutdown of VSs
- Click the **Submit** button to confirm your action.
- As a result, the multiple transactions will be scheduled to power off all the selected virtual servers one by one.

The bulk power on/off actions are available only to virtual servers that are run on KVM and Xen compute resources.
9.1.7 Manage Virtual Server Administrative Options

Virtual Server administrative options include the list of actions that you can run as a VS administrator.

To manage a virtual server administrative options:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS’s screen to expand the VS Tools menu.
4. The Tools menu enables you to perform the following administrative actions on VSs:

9.1.7.1 Reset Root Password

To reset a virtual server root password:

1. Click the Reset Root Password button.
2. Turn the Set password switcher to the right and type your new password twice into the corresponding boxes.

On this page:

- Reset Root Password
- Set Max Memory
- Set Custom CPU Quota
- Change Owner
- Set SSH Keys
- Edit FQDN

See also:

- Virtual Server Power Options
- Permissions
- Defaults Configuration
- Instance Packages
- Recipes

3. To enable the password encryption, turn the Encrypt password switcher to the right and type an encryption passphrase twice into the corresponding boxes.
4. Click the Set Password button to save your new password.

- The virtual server will be rebooted after resetting the password.
- Particular characters are not allowed for Windows-based virtual servers:
  - percent sign [%]
  - double quotation marks [“]
  - brackets [<,>]
  - vertical bar [||]
  - caret [*]
  - ampersand [&]
9.1.7.2  Set Max Memory

You can set a limit on RAM that can be allocated to virtual servers built on KVM compute resources. Setting the custom max memory limit is available for:

- Virtual servers from KVM compute zones with the Ballooning release resource type and the Set max memory option enabled
- Virtual servers that are built on templates that support Hot Resize
- Users who have the Set Max Memory permission enabled in the Virtual Servers permissions set

To set a max memory limit for a virtual server:
1. Click the Set Max Memory button.
2. Move the Max Memory override slider to the right.
3. Enter the Max Memory limit in MB.
4. Click the Save button.

After you save a max memory limit, reboot a virtual server to apply changes.

If you do not set the max memory limit for a virtual server but enable the Ballooning release resource type and the Set max memory option for a compute zone, the limit for VSs is calculated as follows:

Max Memory Limit = Memory × Compute Resource Max Memory Rate

Where:
- Memory - the amount of RAM currently allocated to a virtual server
- Compute Resource Max Memory Rate - the default max memory rate is eight (8)

You can modify the default max memory rate (8) that is used to calculate a max memory limit. Change a value of the kvm_max_memory_rate parameter in the on_app.yml file.

The max memory limit for a virtual server is handled as follows:

- If the calculated max memory limit is more than 90% of free RAM available on a compute resource, then the limit is equal to 90% of free RAM available on the compute resource.
- If the calculated max memory limit is less than 90% of free RAM available on a compute resource, then the limit is equal to the calculated value.
You can modify the default percentage (90%) that is used to calculate a max memory limit. Change a value of the `kvm_available_free_memory_percentage` parameter in the `on_app.yml` file.

### 9.1.7.3 Set Custom CPU Quota

- To edit CPU Quota for a virtual server, you need to enable the default value for the compute resource first.
- This feature is available only for KVM compute resources.

The default value of CPU quota can be customized according to your needs. You can overwrite the default value set for the compute resource for any particular virtual server you need. For example, if the default CPU quota for the compute resource is set to 50%, you can increase it to 90% depending on the priority of your virtual server.

To set custom value for the particular virtual server:

1. Click the **Set custom CPU Quota** button.
2. Move the **CPU Quota enabled** slider to the right to enable CPU quota to override the default value.
3. Set CPU quota. The maximum value is 99%. Also, you can select the $\infty$ checkbox to set an unlimited amount of CPU quota.
4. Click the **Save** button.

Custom CPU quota change can be done live without virtual server restart.

CPU Quota value can be changed automatically during migrating virtual server to another compute resource.

- If migrating to the compute resource that does not have CPU Quota enabled, then CPU Quota value will be set to unlimited.
- If migrating to the compute resource that has CPU Quota enabled, check the custom value for virtual server. Custom CPU quota will remain unchanged after the migration, while unspecified custom value will change into the default value.

### 9.1.7.4 Change Owner

To change an owner of a virtual server:

1. Click the **Change Owner** button.
2. In the pop-up dialogue box, select a target user from a drop-down menu that lists all users on the system.
If you have any recipes or backups for this VS, you will be also prompted to confirm if the recipe/backup should be moved to another user.

3. Click the Change Owner button to grant ownership to the selected user.

- If you want to change an owner of the VS, which was built using an instance package, ensure that the new owner has permission to create VS using instance package and appropriate instance package in the bucket. Otherwise, you will not be able to change the ownership of this VS.
- Note that you cannot change the ownership of a recipe which you do not own, even if it is assigned to your virtual server.

9.1.7.5 Set SSH Keys

- This functionality is applicable to Linux-based VSs only.
- The virtual server will be rebooted after setting SSH keys.
- If a VS owner does not have any SSH keys, the system will only assign admin keys.
- Note that if you have some customly added keys, they will be lost after setting SSH keys.

To set SSH keys for a virtual server:
1. Click the Set SSH keys button to assign SSH keys of the admin and a VS owner to the VS.
2. In the pop-up dialog box, click the Set SSH keys button to confirm the action.

9.1.7.6 Edit FQDN

To edit FQDN (fully qualified domain name):
1. Click the Edit FQDN button.
2. In the pop-up dialog box, edit the hostname and the domain name.
3. Move the Force reboot slider to the right to enable FQDN update in case the transaction fails with a running virtual server.
If the Force reboot is disabled, the FQDN will be changed on the fly if possible. If it is not possible, the transaction will fail and the FQDN won't be changed.

• If the Force option is enabled, you will see two more options, Shutdown type and Required startup.

4. Select the shutdown type from the dropdown list (Gracefully shutdown or power off).
   o Gracefully shutdown - to run a graceful shutdown of VSs
   o Power Off - to run a forceful shutdown of VSs

5. Tick the Required startup checkbox to start up the virtual server automatically after the FQDN is updated.

6. Click the Submit button.

9.1.8 Manage Virtual Server Advanced Configuration

You can manage your virtual servers at a raw configuration level by editing the XML configuration file available for each VS in your Control Panel. The functionality is available for virtual servers that are built on Xen and KVM compute resources.

IMPORTANT
Virtual servers with modified XML configuration are not supported by the OnApp support team.

On this page:
• Enable Advanced Configuration
• Edit XML Configuration
• Important Considerations

See also:
• Manage Virtual Server Power Options
• Manage Virtual Server Administrative Options

9.1.8.1 Enable Advanced Configuration

To enable managing the advanced configuration for virtual servers in your Control Panel:

1. Go to the Control Panel > Admin > Settings > Configuration menu.
2. Open the Defaults tab.
3. Move the Allow advanced VS management slider to the right.
4. Click the Save Configuration button.

Please note that the system will restart OnApp services automatically after you save new configuration.
9.1.8.2 Edit XML Configuration

To edit the XML config file of a virtual server, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu and click a label of a specific virtual server.
2. Expand the Tools menu and click the Edit XML Config button.
3. Click the Unlock button to be able to edit the XML file. In the pop-up box, click Yes to confirm your action.
4. Edit configuration and click the Save button to apply changes. In the pop-up box, select whether you want to save changes with or without a reboot.
   - To revert changes that you made before saving configuration, click the Cancel button.
   - To enable failover and migration functionality for the VS with modified XML config, move the Enable failover and migration slider to the right.
5. If you want to discard all changes, click the Reset to default button at the Edit XML Config page. In the pop-up box, select whether you want to reset configuration with or without a reboot.
   This action initiates deletion of all changes you have applied in the XML configuration except for RAM and CPU related modifications. As a result, the XML configuration file will be reset to default and locked.

9.1.8.3 Important Considerations

If you edit RAM or CPU Cores for virtual server:

- After clicking the Save button, the RAM and CPU cores are validated according to the bucket settings and the price for the resources can be changed. If the bucket does not allow the changes you applied, the appropriate message will be displayed.
- The Reset to default button will not restore the RAM and CPU values to the previous state.

You can not perform the following actions after you save changes in the VS XML configuration file:

- Edit VS
- Create/edit/migrate/delete VS disks and set disk IOPS limits
- Create/edit/delete network interfaces

The failover and migration for the VS with modified XML config is available only if you select the Enable failover and migration checkbox while editing the config file.
9.1.9 Manage Acceleration Settings

If you have accelerated virtual servers, the Acceleration tab is available to you. At this tab, you can view accelerated virtual server statistics, blacklist domains and remove cache content. The functionality is available for accelerated virtual servers and smart servers.

9.1.9.1 Accelerated Virtual Server Statistics

On this page:

- Accelerated Virtual Server Statistics
- Blacklist Domains
- Purge Content

See also:

- Virtual Servers
- OnApp CDN
- List of all OnApp Permissions

This section provides the information on how you can view bandwidth statistics and cache utilization statistics of accelerate-enabled virtual server.

Ensure that Accelerate any Virtual Server/Accelerate own Virtual Servers permissions are on before managing accelerated VS statistics. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

To see the bandwidth and cache utilization statistics:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the Acceleration tab > Reporting.
4. On the screen that appears, specify the period in the From and To fields and click the Apply button. The default period is the last week.
5. The first chart shows bandwidth statistics: the total/cached/non-cached statistics. The second chart shows cache utilization statistics: the number of pages cached on the Edge (hits) as well as the number of misses - the pages which are not cached.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.

9.1.9.2 Blacklist Domains

Blacklisting domains allows you to block a number of websites from being accelerated. This feature enables blacklisted websites to load from Origin again, while other websites hosted on the same VS remain accelerated.

To blacklist a domain, do the following:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the Acceleration tab > Blacklist domains.
4. Fill in the domains you want to blacklist.
5. Click the **Save** button.

Now when domains of choice are blacklisted, all the requests will be forwarded to origin directly and the response header will bypass Accelerator without any additional optimization.

---

### 9.1.9.3 Purge Content

This tool allows instant removal of cache content for the accelerated virtual servers. You can purge all content or one/several files. In cases when you want to purge one or several files, the system will compare the checksum of the cached file and the new one. The cached file will only be purged if the checksums vary, that is, the files are different. If the checksum of the two files is the same, the cached file will not be purged. When you purge all content, the checksums of the cached and new files are not taken into account.

**Limitations and prerequisites:**

- This tool applies only to virtual servers with acceleration enabled.
- You need to have **CDN** enabled for the cloud to use the purge feature.
- You need to have the **Allow to purge content of all Virtual Servers** or the **Allow to purge content of Own Virtual Servers** permission enabled to use this feature. For more information refer to [List of all OnApp Permissions](#).
- If several customers accelerate their VSs using one Accelerator, they can purge each other's files, provided that they enter the correct URL.

To purge a single file:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the **Acceleration** tab > **Purge**.
4. In the input field, specify the path(s). You may indicate only one path per line. You can fill in either the original URL, the one prior to acceleration or the accelerated URL.
5. Click the **Submit** button to finish.

To purge all content:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the **Acceleration** tab > **Purge**.
4. Click the **Purge All Contents of this Site** button to purge all content.

---

### 9.1.10 Manage Virtual Server Networks

The Networking menu in the Virtual Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers. In this document you can find information on how to manage Virtual Server networks.

- To run the VS, at least one network interface with an assigned IP address (or addresses) is required!
- To allocate another physical network, add a new network interface.
In case of network interface replacement for Windows VSs running on Xen Compute resources, the user has to add new network interface, rebuild network, then remove the old network interface and perform network rebuild again.

9.1.10.1 Configure Virtual Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this VS. Network interfaces join the physical network to the VS. When you create a VS a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default.

On this page:

- Configure Virtual Server Network Interface
- Rebuild Virtual Server Network
- Set Virtual Server Firewall Rules
- Virtual Server IP Addresses
- Display Network Speed
- Edit Virtual Server Network Speed
- Virtual Server as a Gateway

See also:

- Virtual Servers
- Create Virtual Server
- Manage Virtual Server
- Virtual Server Disks
- Virtual Server Backups

OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS's primary network interface.

To see the list of all network interfaces allocated to the VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. On the page that follows you will see the following fields:
   - Interface – optional label of the network interface.
   - Network join – name of the network and a Compute resource or Compute zone this network is joined to.
   - Port speed – the speed set to the interface.
   - Primary interface – indication whether the interface is primary or not.
Here you can also view Interface Usage, Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

To add a network interface:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. Click the New Network Interface button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   - Label – a human-friendly name for the new interface.
   - Physical Network – choose a network join from the drop-down menu, which lists network joins assigned to the Compute resource/Compute zone on which the VS runs).
   - Port speed – set port speed in Mbps, or make it unlimited.
6. Click the Submit button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click Edit icon next to the appropriate network interface. After editing the port speed, the virtual server should be power cycled for the change to take effect.

To delete a network interface, click the Delete icon next to the interface you want to delete.

9.1.10.2 Rebuild Virtual Server Network

To rebuild a network join, added to the virtual server (required after allocating new IP addresses):
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of a required VS.
3. On the screen that appears, click the Tools button, then click Rebuild Network.
4. In the pop-up window, move the Force Reboot slider to the right, then select the VS shutdown type.

   During the network rebuild, the system tries to reach a VS's network interface without rebooting a virtual server. Then, if it is not possible, the transaction will quit. The force reboot action allows to rebuild a VS network with the reboot action if live rebuild is impossible. In case the force reboot option is disabled and system cannot enter the virtual server, the network rebuild operation will fail.

5. Move the Required Startup slider to the right to start up a VS when you're rebuilding network of a powered off VS.
6. Click the Rebuild Network button.

   In case of network interface replacement for Windows VSs running on Xen Compute resources, the user has to add new network interface, rebuild network, then remove the old network interface and perform network rebuild again.
9.1.10.3 Set Virtual Server Firewall Rules

With OnApp you can set firewall rules for the network interfaces of virtual servers. There are two types of firewall rule:

- **ACCEPT** – defines the packets that will be accepted by the firewall
- **DROP** – defines the packets that will be rejected by the firewall

Ensure that the following permissions are enabled before setting firewall rules for your virtual server:

- Create own firewall rules
- Destroy own firewall rules
- Read own firewall rules
- Update own firewall rules

You cannot apply firewall rules to virtual servers which are parts of a blueprint.

You can set the following:

- [add a specific firewall rule](#) - you can configure a firewall rule with specific parameters (source, destination port, protocol type etc.)
- [set default firewall rules](#) - you can set default firewall rules for an entire network interface

9.1.10.3.1 Add a specific firewall rule

To configure a specific firewall rule:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the VS for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, set the following:
   a. **Interface** - choose the network interface.
   b. **Command** - specify if the rule defines requests that should be accepted or dropped.
   c. **Source** - set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. **Destination Port** - set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
- Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
  e. **Protocol Type** (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
  f. **Protocol** - choose the protocol (TCP, UDP, DCCP, SCTP or ICMP).
  g. **Comment** - enter the comment to the firewall rule.

5. Save the rule by clicking the **Add Rule** button. The rule will be saved in the UI, but the transaction won't be started until you click the **Apply Firewall Rules** button.

6. To start the transaction which runs firewall rules for a VS, click **Apply firewall rules** button.

7. Use **Up** and **Down** arrow buttons in the left column to change firewall rule position.

8. To edit or delete a firewall rule click the appropriate icon in the last column.

9.1.10.3.2 Default firewall rules
To set default firewall rules for a network interface:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.

2. Click the label of the VS for which you want to configure a firewall rule.

3. Click the **Networking** tab, then click **Firewall**.

4. On the page that appears, go to **Default firewall rules** section.

5. Choose ACCEPT or DROP command next to the network interface and click **Save Default Firewall Rules**. The rule will be saved in the UI, but the transaction won't be started until you click the **Apply Firewall Rules** button.

**Example:**
The Int1 ACCEPT 122.158.111.21 22 TCP firewall rule means that the Int1 network interface will accept all requests and packets addressed from 122.158.111.21 using the TCP protocol on port 22.
The Int2 DROP 122.158.111.21 22 UDP firewall rule means that the Int2 network interface will reject all requests and packets from 122.158.111.21 using the UDP protocol on port 22.

---

**If you reboot a Xen-based VS from the console, the firewall rules for this VS will be lost, and you will need to update the firewall rules again.**

**Protocols:**
For IPv4, only the ICMP, IPV6-ICMP, TCP, UDP, DCCP, SCTP protocols are available by default. However, if required, you can enable other protocols for IPv4.

1. Go to the `/onapp/interface/config/network_protocols.yml` file.

2. The list contains all protocols available (IPv4). Set 'true' for the required protocols.

3. Restart httpd by running one of the following commands:

```bash
service httpd restart
```

or
4. The protocols you have enabled are now available at Control Panel > Cloud > Virtual Servers > Label > Networking tab > Firewall while adding new firewall rules.

The following protocols can be enabled in the /onapp/interface/config/network_protocols.yml file:

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<td>TP</td>
<td>WSN</td>
<td>QNX</td>
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<td>WB-MON</td>
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OnApp 6.4 Administration Guide
9.1.10.4 Virtual Server IP Addresses

In the Networking > IP Addresses tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab > IP Addresses.
4. Click the Allocate New IP Address button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the VS will be available). The IP Address will be allocated automatically.
6. (Not available for federated VSs) As an alternative, you can manually select an IP address from the IP Pool associated with the network interface. To enable this option, move the Specify IP Address slider to the right and choose IP Address from the drop-down list. You may select an IP address that's already assigned to a VS, but only one VS should be online at a time. Use Please show me used IP Pool, Show only my IPs and Show only IPv6 checkboxes to narrow the list of IP in the drop-down list.
7. Click the Add IP Address button.
8. Click the Rebuild Network button to rebuild the network.

- You must rebuild the network after making changes to IP address allocations.
- Currently, it is possible to assign only up to 320 IPs to an Ubuntu virtual server.
- The external IP address can be managed by API only. If you want to add external IP address, refer to Add/Edit External IP Address section of API Guide.
- Currently, it is not possible to assign IPv6 addresses of the following ranges:

  ::/128   fec0::/10
  ::1/128  fc00::/7
  2001:db8::/32  ff00::/8
  fe80::/10

To remove an IP address from a VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking > IP Addresses tab.
4. Click the Delete icon next to the IP address you want to delete.
5. In the pop-up window that appears:
   - Choose the Delete with Reboot option if you want to reboot a VS and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the VS's Overview page.
Choose the **Delete without Reboot** option if you don't want to reboot a VS. In this case to apply the changes, you will have to the reboot the VS additionally.

You can't delete an IP address that is in use.

---

9.1.10.5 Display Network Speed for Network Interfaces on Virtual Server Page

The main **Virtual Servers** screen displays the network speed of each VS's primary network interface. To see the speed of all interfaces assigned to a VS:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you are interested in.
3. Click the **Networking** > **Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.

9.1.10.6 Edit Virtual Server Network Speed

To edit a virtual server's network speed:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you want to change.
3. Go to the **Network** tab > **Network Interfaces**.
4. In the last column click the **Edit** button.
5. Change the port speed.
6. Click the **Submit** button to save changes.

9.1.10.7 Virtual Server as a Gateway

You can set up your virtual server configuration so that it can function as a gateway for the network interface. Such a configuration overrides firewall rules and accepts all traffic to the VS from the selected network interface. This functionality provides the ability for third party gateways and load balancers to be used as OnApp virtual server.

For the VS to function as a gateway at least two IPs are required: one private and one public. A VS cannot be used as a gateway for a network interface if the network interface does not contain IPs or if it contains only public IPs.

To use a virtual server as a gateway for a network interface:
1. Go to **Control Panel > Cloud > Virtual Servers > Label > Networking > Firewall**. On the page that loads the **Default firewall rules** section displays the list of network interfaces for which this VS can function as a gateway.

2. Select the command for the network interface, it can be either **ACCEPT** or **DROP**. If you select the DROP option, the **Use as Gateway** slider will become inactive, but you can save the configuration and all the traffic from the network interface will be dropped.

3. Move the **Use as Gateway** slider to the right if you want the VS to function as a gateway for the network interface.

4. Click the **Save Default Firewall Rules** button to apply changes.

The configurations in steps 5 and 6 are only examples that were tested on CentOS 6. You can use them at your own risk. You may require different configurations for other operating systems.

5. Add the following commands in the console of the gateway VS:

```
echo 1 > /proc/sys/net/ipv4/ip_forward
iptables -t nat -A POSTROUTING -s IP_range ! -d IP_range -o
        public_network_interface_name -j MASQUERADE
iptables -I FORWARD -i private_network_interface_name -o
        public_network_interface_name -j ACCEPT
iptables -I FORWARD -i public_network_interface_name -o
        private_network_interface_name -j ACCEPT
```

The changes added in step 5 are not preserved after a reboot. The corresponding changes should be performed again after the reboot.

Where you need to indicate the range of IPs for which the VS will serve as a gateway and the name of the public and private network interfaces for the gateway VS. The IP range should contain only the IPv4 IPs (e.g. 10.10.10.0/24).

6. Add the following commands in the console of the VS that is to send traffic through the gateway VS:

```
route delete -net default
route add -net default gw gateway_VS_IP
```

Where you need to indicate the IP of the gateway VS for this server.

You can view the list of virtual servers that are used as gateways on a compute resource by going to **Control Panel > Admin > Settings > Compute Resources > Label > Tools > Gateway Servers**. The page that loads shows the list of gateway servers on a compute resource with their details.

When you set default firewall rules for a VS two additional iptables rules are added on the compute resource on which the VS is built. The iptables
rules will contain the range of IPs for which the VS will serve as a gateway and the identifier of the network interface (NIC) of VS:

```
iptables -A FORWARD -s IP_range ! -d IP_range -m physdev --physdev-out
          gateway_VS_identifier -j gateway_VS_identifier
iptables -A FORWARD ! -s IP_range -d IP_range -m physdev --physdev-in
          gateway_VS_identifier -j ACCEPT
```

9.1.11 Manage Virtual Server Disks

Virtual server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific virtual server. Disks can be assigned as standard or swap disks (there are no swap disks for Windows-based templates). They can also be set as primary (that is, the disk from which an OS will boot).

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual virtual servers are managed through the Control Panel > Cloud > Virtual Servers menu, where you can:

- Add Disks to Virtual Servers
- Edit Virtual Server Disks
- Migrate Virtual Server Disks
- Assign Disk to VS
- Delete Virtual Server Disks

Do not create multiple partitions on one disk for virtual servers. OnApp Control Panel supports only one partition per disk. In cases when you change disk partition, the CP might lose control of such a disk and the VS associated with it. If required, create additional disks instead.

9.1.11.1 Add Disks to Virtual Servers

On this page:

- Add Disks to Virtual Servers
- Edit Virtual Server Disks
- Migrate Virtual Server Disks
- Assign Disk to VS
- Delete Virtual Server Disks
- Clean Virtual Server Disk

See also:
Adding a disk to a virtual server will require that VS should be rebooted. If a VS is running when you try to add a new disk to it, you'll be asked to confirm the reboot.

To add a disk to a virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a VS's label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the '+' button or the Create Disk button.
5. Fill in the details:
   - Specify disk label.
   - Choose the data store to create a disk on from the drop-down list.
   - Move the slider to the right to specify the desired disk size.

Please note that support of secondary disks larger than 2 TB is limited. Certain operations might fail. This will be improved in future releases.

Click here to see the details of adding a disk 2 TB+
- If you add a disk larger than 2 TB, you will not be able to mount or create a backup of such disk via OnApp Control Panel. These operations may be performed only manually inside a virtual server. Also, resize will not be possible for such disks.
- You can perform the following operations with a secondary disk that is larger than 2 TB:
  - Migrate
  - Delete / Wipe
  - Edit IO limits
  - Rebalance (for VSs with Integrated Storage feature enabled)
- OnApp provides a RAW device available inside a VS that you may use. For example, you may create a GPT partition and format it using any available file system which can be mounted inside VS.
  - Move the Hot Attach slider to the right if you want to enable the hot adding of a disk. In this case, a virtual server is not stopped when the disk is added.
To run hot attach, a virtual server template should support VirtIO virtualization. The hot attach option is available only on KVM compute resources based on CentOS 6.x/7.x for virtual servers with VirtIO support.

- Move the **Swap Space** slider to the right if this disk is swap space.
- Move the **Require Format Disk** slider to the right if this disk requires formatting.
- Move the **Mounted** slider to the right if the disk should be added to Linux or FreeBSD FSTAB (for Linux/FreeBSD virtual servers).
- Specify its mount point. The maximum length of a Mount Point is 256 characters. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

  /mnt/onapp-disk-#{disk.identifier}

- Indicate the **file system** - ext3, ext4 or xfs - for Linux based VS.

6. Click the **Add Disk** button to finish.

**Restrictions:**
- If you choose a Solidfire data store, the minimum disk size will be regulated by Solidfire Data Store Zone settings.
- If virtual server and the Control Panel server belong to different networks, the hot attach transaction will fail.
- If an additional disk has been created without the **Require format disk** option and formatted/partitioned in another way, resize disk action may work incorrectly. Use the **Require format disk** option when creating an additional disk, otherwise, use disk resize option at your own risk.
- Make sure to enable **Require format disk** option when you add a new VS disk. Otherwise taking normal backups for your additional disk might fail.
- To be able to take incremental backups for virtual server’s disk, you must mount this disk to FSTAB (either Linux or FreeBSD) and specify the proper mount point manually.
- You cannot back up Swap disks.
- When you add a new disk to a virtual server, it automatically becomes available to that server.
9.1.11.2.1 Primary and Swap disks
For primary and swap (Linux, FreeBSD) disks you can only change the label and size. You can resize the disks when you need. The resize will fail if your current usage is greater than the new size you request. Note that any changes to the disk size will lead to a reboot of your VS.

To change the disk size:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off and click the VS label.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the target disk and then click Edit.
5. You can edit the disk label and size in GB.
6. Click the Save Disk button.

- It is recommended to take a backup of a virtual server before editing the VS disk. In case of any issues during the VS disk editing, you will be able to restore the VS from the backup.
- You cannot resize a disk that uses GUID Partition Table (GPT).
- You cannot decrease the size of the Integrated Storage data store disks.
- You cannot decrease the disk size for Windows-based and FreeBSD-based virtual servers. Only the increase disk size option is available.
- You cannot resize the primary disk for FreeBSD-based virtual servers.
- Decreasing disk size for Linux-based virtual servers may lead to filesystem inconsistencies. Make sure you have current backups before proceeding.
- If the disk file system can not be detected (disk has more than one partition or some special partition table/file system), you can only increase disk physical volume size.
- If you start the disk resize and then decide to cancel it, there may be complications such as the file system corruption.
- Size of a primary disk cannot exceed 2 TB.

9.1.11.2.2 New disks
For new disks - those which were added after the virtual server was created - you can edit the following:

<table>
<thead>
<tr>
<th>Linux</th>
<th>Windows</th>
<th>FreeBSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Label</td>
<td>• Label</td>
<td>• Label</td>
</tr>
<tr>
<td>• Size</td>
<td>• Size</td>
<td>• Size</td>
</tr>
<tr>
<td>• Require format</td>
<td>• Require format</td>
<td>• Require format</td>
</tr>
<tr>
<td>• Mounted</td>
<td></td>
<td>• Mounted</td>
</tr>
<tr>
<td>• Mount point</td>
<td></td>
<td>• Mount point</td>
</tr>
</tbody>
</table>

OnApp 6.4 Administration Guide
9.1.11.3 Migrate Virtual Server Disks

OnApp allows hot and cold migration of virtual server disks:

- **Hot migration** - the migration of disks between compute resources that share common data stores (or data store zones)
- **Cold migration** - the migration of disks between compute resources with local storage or across compute zones

You can migrate disks of your virtual servers to other data stores, which are allocated to the same Compute resource. Unlike VS migration – disk migration requires the reboot of the VS (despite the template it is based on).

- The hot migration will work only when the VS is running on CentOs 7 KVM compute resources, and they can be migrated only to CentOs 7 KVM compute resources.
- The hot migration option appears only if the VS is online and your Quick Emulator (QEMU) version is later than 2.6

To migrate a disk:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of your virtual server to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to move to another data store, then click the Migrate button.
5. On the screen that appears, select the following options:
   - **Type** - select the cold or hot migration type
   - **Data store** - select the target data store to migrate the disk
6. Click the Start Migrate button.

- It is recommended to take a backup of a virtual server before migrating the VS disk. In case of any issues during VS disk migration, you will be able to restore the VS from the backup.
- You can only migrate disks to data stores in data store zones assigned to your bucket.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- Integrated Storage disks cannot be migrated if they have snapshots.
• If you move an 850GB disk between aggregates with 10GB actual usage, the 'dd' image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero "dspace which may not be able to be recovered.

• If required, you can change the block size which is used during disk migration at Control Panel > Admin > Settings > Configuration by editing the Block Size (MB) parameter.

9.1.11.4 Assign Disk to VS

You can temporarily assign a disk to another virtual server that has the same data store in use. The disk will be attached to the target VS, but it is necessary to reboot the target VS and mount the disk manually to make it available. Later you can re-assign the disk back to the primary VS at any appropriate moment.

• Ensure that the Assign any disk to VS/Assign own disk to VS permissions are on before assigning disk to another VS. For more information refer to the List of all OnApp Permissions section of this guide.

• Assigning disk functionality is not applicable for swap disks.

• The target VS owner should be the same as for the source VS.

• Both target and source VSs cannot be deleted as soon as the disk is assigned to a new VS. To delete target and source VSs, as well as the disk, it is required to re-assign a disk to a source VS.

• Note that source VS cannot be started when any of its disk is being attached to another VS.

To assign a disk to another VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of a virtual server to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to assign to another VS, then click the Assign to VS button.
5. On the screen that appears, select a target VS from a drop-down box.
6. Click Assign.

Be aware, that the source VS will be automatically powered off after assigning a disk to another VS.

To re-assign the disk back to the primary VS:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of a virtual server to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to reassign to source VS, then click the Assign back button. Confirm the action.

If the target VS is running on XEN compute resource, it will be automatically powered off after re-assigning a disk back to the source VS.

9.1.11.5 Delete Virtual Server Disks

To delete a disk:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the disk you want to delete, then click Delete.
5. In the pop-up window, move the Force Reboot slider to the right, then select the VS shutdown type.
6. Move the Required Startup slider to the right to start up the VS automatically after the network is rebuilt.

Steps 5 and 6 apply to disks of VSs that are on.

7. Click the Destroy Disk button.

This will schedule the "destroy disk" transaction.

9.1.11.6 Clean Virtual Server Disks

OnApp Cloud provides two ways to clean VS data when deleting or migrating a VS's disk. By default, OnApp Cloud will format the physical disk space used by a virtual server when that VS's virtual disk is deleted, or when the VS disk is migrated to another data store.

You can also choose to zero out a VS's disk (filling it with zeroes) with the change detailed below which will then take effect for operations queued both via the UI as well as the API. This method will likely have a noticeable impact on deletion times and the load placed on the data store, whilst disks are being filled with zeros as it is a far more IO intensive operation.

We recommend enabling zeroing out disks in your cloud.

To enable this behaviour:
1. Log in via SSH to your Control Panel server.
2. Open the following configuration file for editing:
3. Set the `wipe_out_disk_on_destroy` parameter from `false` to `true`:

   ```yaml
   wipe_out_disk_on_destroy: true
   ```

   If this option is not enabled, it may be possible to use data recovery techniques to restore files from a previously deleted disk.

4. Restart the OnApp service:

   ```shell
   service onapp restart
   ```

5. Now when deleting disks you would see something along the lines of the following in the logs:

   ```
   Running: dd if=/dev/zero of=/dev/onapp -cmd7y65etpxii8/hkct05vbu21fma bs=4M count=256 conv=notrunc oflag=direct
   ```

9.1.12 Manage Virtual Server Backups

This document provides the information how backups are implemented and managed in OnApp and aims at helping to design and manage the backup strategy for your cloud.

If required, you can change the block size which is used during backup creation at Control Panel > Admin > Settings > Configuration by editing the Block Size (MB) parameter.

9.1.12.1 Types of Backups

OnApp allows you to create two backup types: normal and incremental.

<table>
<thead>
<tr>
<th>Normal</th>
<th>Incremental</th>
</tr>
</thead>
<tbody>
<tr>
<td>The full copy of target data that is stored in an archive, whether it has changed or not.</td>
<td>Only the changes made after the last backup are archived instead of backing up the whole target.</td>
</tr>
<tr>
<td>Auto-backups are created per disk.</td>
<td>Auto-backups are created per virtual server.</td>
</tr>
</tbody>
</table>

The backup type is configured at Admin > Settings > Configuration > Backups/Templates menu. If you tick the Allow incremental backups checkbox, the incremental backups will be enabled for your cloud. Otherwise, if this box is disabled, normal backups will be created for your cloud.
On this page:

- Types of Backups
- How Do Incremental Backups Work?
- Backup Support by VS / Virtualization / OS
- Manual / Auto-Backups
- Where Backups Are Stored?
- Backup Server Balancing
- Backup Limits in Buckets
- View Virtual Server Backups
- Take Virtual Server Backup
- Take Virtual Server Disk Backup
- Convert Virtual Server Backup to Template
- Restore Virtual Server Backup
- Add Virtual Server Backup Note
- Delete Virtual Server Backup

See also:

- Schedules Settings
- Auto-Backup Presets Settings
- CloudBoot Backup Server
- Edit Backups/Templates Configuration
- Resource Allocation And Prices
- View User Backups

9.1.12.2 How Do Incremental Backups Work?

Incremental backups only copy files that have changed since the last backup. The benefit is that incremental copies take less space than full backups. Be aware that when you want to perform a complete restore, the most recent full backup and all of the subsequent incremental copies must be restored.
For example, we have a disk with three files: File1 - 3Gb, File2 - 2Gb, File3 - 4Gb

- The first backup will be a full backup of 9 GB (sum of all files). If you decide to take another incremental backup soon thereafter, the backup size will 0, as the files have not been changed since the first backup. However if your backup has complicated directory structure, it could be more than 0, as file system could store some system data.

- If you delete File2, the target size will now be 7Gb. The subsequent incremental backup size will be 0, as new data has not been added.

- If you add File4 of 4 GB size, the subsequent incremental backup ours, will equal 4 GB (the size of new data added).

- If you increase File3 disk size to 6 GB, the subsequent incremental backup size will equal 6 GB, although the target is increased by 3 GB. This happens because the incremental system takes the update of the existing file as the deletion of the existing file and adding the new file with the same name (the first version of File3 has been deleted and the new one with 6GB size has been added).

### 9.1.12.3 Backup Support by VS / Virtualization / OS

The following table shows what backups are supported by a VS depending on its type, virtualization or OS:

<table>
<thead>
<tr>
<th></th>
<th>Normal backup</th>
<th>Incremental backup</th>
<th>Convert to template</th>
</tr>
</thead>
<tbody>
<tr>
<td>BaremetalServer</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>EdgeServer</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>StorageServer</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>LoadBalancer</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>SmartServer</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>KVM, XEN</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>VMware</td>
<td>snapshot</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Windows</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>*nix</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>CloudBoot / IS</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SolidFire</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### 9.1.12.4 Manual / Auto-Backups

You can take backups manually or automatically.

- **Manually** - the user logs into OnApp CP and clicks the “Take backup” button when required.

- **Automatically** - the user enables backup schedule (daily, weekly, monthly, yearly). There are two types of auto-backups that supplement each other: auto-backup presets and schedules.
Auto-backup presets are a simple way to set up an automatic backup schedule when virtual servers are created. Once configured globally for the cloud, they can be applied to a VS automatically when the Automatic Backups Required box is checked during VS creation. A number of preset backup time periods are available (daily, weekly, monthly and annual backups) which are configured further by specifying how often each backup is taken. So, for example, you can set up automatic backups every 2 days, every 1 month, or even every 12 months (the same as every 1 year). Each type of backup can be enabled or disabled.

Schedules are created either per virtual server or per disk depending on the backup type set in your cloud settings:

- If you are using normal backups, the schedules are created per disk.

  Despite the auto-backup presets configuration, for normal backups (when disk is the target) the rotation period is always 1.

- If you are using incremental backups, the schedules are created per virtual server.

Schedules allow configuring that auto-backups run for specific VSs only, at a particular date and time.

You can also configure the re-run period for auto-backup in case of auto-backup transaction failure. By default, it is set to 3 hours, but you may change the time value in the info_hub.yaml configuration file.

The combination of Auto-backup Presets and Scheduled VS backups provides a great deal of flexibility in the way backups are handled for the cloud, and for individual VSs. Auto-backup Presets can be applied to all new VSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSs, outside of the auto-backup pattern.

For the instructions on setting up auto-backups, refer to the following docs:

- Schedules Settings
- Auto-Backup Presets Settings

9.1.12.5 Where Backups Are Stored?

Depending on the cloud configuration and the backup scheme, the backups are stored at different locations. See the illustration below for the explanation.
Figure 1 Where backups are stored.

*- make sure to share the location on compute resources where backups are stored between all compute resources in a zone.

Normal:
- If you have an SSH File transfer server configured in Admin > Settings > Configuration menu, the backups are stored on this SSH file transfer server.
- If you have added one or more backup servers, all backups will be stored on these servers.
- If there is more than one backup server, backups are stored on the server according to the balancing scheme.
- If you have no backup servers in the cloud, the backups are stored on compute resources.

Incremental:
- If you have added one or more backup servers, all backups will be stored on these servers.
- If there is more than one backup server, backups are stored on the server according to the balancing scheme.
- If you have no backup servers in the cloud, the backups are stored on compute resources.

You can also use dedicated CloudBoot backup servers in your cloud. Please refer to the Create CloudBoot Backup Server for details.

9.1.12.6 Backup Server Balancing

Backups can be saved either to a Compute resource or to a dedicated backup server. When saving a backup, the system calculates if user has enough physical/ bucket resources to save a backup in the selected destination.

When saving a backup to a Compute resource, the system does not check if Compute resource has enough disk space to save a backup and only checks if user has enough bucket limits. When saving a backup to a dedicated backup server, the system checks both disk space and bucket limits.

The choice of a specific backup server on which a backup will be performed is called backup server balancing. When you send a command to take a backup, the system schedules a corresponding transaction and when the transaction is launched, the system will reassign it to the most appropriate backup server.
OnApp supports two backup types: **normal** and **incremental**, each of them having its own procedure of selecting the most appropriate server to take a backup:

For **Normal Backups** the system will follow the sequence below to take a backup:

1. Check which backup servers are assigned to this location group
2. Which of them are available to the user
3. Which of those have enough space and bucket limits. Free disk size on a target must be at least equal to the disk’s size for which the backup is taken.
4. From those remaining, the most appropriate backup server will be the one with the smallest count of "take backup" transactions at the moment of the check
5. If for several backup servers this quantity is equal (0, 1, 2, ...n), the backup server with the lowest load (highest cpu_idle parameter) will be selected as the most appropriate

In case of **Incremental Backups**, the server for the first full backup will be selected the same as for **normal** backups:

1. Check which backup servers are assigned to this location group
2. Which of them are available to the user
3. Which of those have enough space and bucket limits. Free disk size on a target must be at least equal to all VS disk size.
4. From those remaining, the most appropriate backup server will be the one with the smallest count of "take backup" transactions at the moment of the check
5. If for several backup servers this quantity is equal (0, 1, 2, ...n), the backup server with the lowest load (highest cpu_idle parameter) will be selected as the most appropriate

All consequent backups will be performed at the same backup server as long as it is available and has enough storage space. If not - the alternative backup server will be selected following the principle described above.

For the instructions on setting up backup servers, refer to the following docs:

- [Backup Servers Settings](#)
- [Edit Backups/Templates Configuration](#)

---

### 9.1.12.7 Backup Limits in Buckets

Buckets allow you to set limits for backups for a user who is signed up with this plan. If the backups are stored on compute resources or an SSH file transfer server, the **Templates, ISOs & Backups Storage** and **Backups** User VS Limits can be applied:

- free disk space for backups
- the total amount of disk space
- the number of backups users can create for free
- the maximum number of backups
If the backups are stored on backup servers, you can set the **Backups** and **Backup Disk Size Backup** Server Zones limits:

For auto-backups
- free disk space for backups
- total amount of backup server space

For manual backups
- free disk space for backups
- total amount of backup server space
- the amount of backups users get for free
- the total amount of backups

Please also set the Backups max limit to 0 in the **User VS limits** if you store the backups on backup servers.

For the instructions on setting up backup limits, refer to **Configure Resource Allocation And Prices**.

---

**9.1.12.8 View Virtual Server Backups**

To view the list of virtual server's backups:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, you'll see a list of virtual server backups sorted by category.
5. Click the label of the required virtual server backup to see the following tools - restore backup, delete backup, convert it to template and add/edit note.

---

**9.1.12.9 Take Virtual Server Backup**

To take an incremental backup:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the server you want to back up.
3. Click the **Backups** tab, then select **Files**.
4. To take a backup, click the **Take a Backup** button.
Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a virtual server. To view the list of user backups, refer to View User Backups section.

Template extraction is performed during server provisioning or taking a backup when using a particular template. To prevent the template from being used in other transactions during extraction, the template is locked during the extraction and unlocked on accomplishment. If other transaction tries to use the locked template, it will fail after 5 minutes of standby. The transaction, which locked template and failed, means that extracted template is broken.

Storing scheme:
- template /onapp/templates/your_template.tgz
- extracted template /onapp/backups/templates/your_template
- locked template /onapp/backups/templates/your_template.lock

9.1.12.10 Take Virtual Server Disk Backup

To back up a virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you want to back up.
3. Click the Storage tab > Disks. You'll see a list of the disks allocated to that virtual server.
4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.
   - To make a backup, click the Take a Backup button at the end of the list. You may add a note and also Force Windows Backup

   This option for Windows virtual servers is designed as a last resort, when the backup cannot be taken due to NTFS file system problems.
   Switching this option will bring up a dialog box with the following message: "If you enable this option there is no guarantee that backup will be consistent."
   Select "Yes" to proceed

   - To restore a backup, click the Restore link next to the backup you want to revert to.
To convert a backup into the custom template, click **Convert to Template** link next to the backup (see **Create custom templates**).

- For Windows VSs: make sure that disk filesystem (NTFS) is consistent (not corrupted) before backup conversion to a custom template. It is highly recommended to take a backup after VS shutdown, otherwise, proper template provisioning is not guaranteed.
- Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a virtual server. To view the list of user backups, refer to **View User Backups** section.

### 9.1.12.11 Convert Virtual Server Backup to Template

To convert virtual server backup to template:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup and choose the **Convert to Template** (see **Create custom templates**).

For Windows VSs: make sure that disk filesystem (NTFS) is consistent (not corrupted) before backup conversion to custom template. It is highly recommended to take backup after VS shutdown. Otherwise proper template provisioning is not guaranteed.

### 9.1.12.12 Restore Virtual Server Backup

To restore a backup:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup you want to revert to and choose **Restore**.
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- If the file system on the disk is corrupted, it won't be possible to restore the files from incremental backup. In that case, you can force a backup restore and rebuild a file system on a disk. To do this, move the **Force Restore** slider to the right.
- Note that Force Restore option is unavailable for incremental backups of FreeBSD virtual servers.

5. Click the **Restore Backup** button.

9.1.12.13 Add Virtual Server Backup Note

To edit virtual server backup's note:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the required backup and choose **Add Note**. Make necessary changes and click **Submit**.

9.1.12.14 Delete Virtual Server Backup

To delete a backup:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup you want to remove and choose **Delete**.

9.1.13 Manage Virtual Server Backup Schedules

The schedules screen lists virtual servers' scheduled backups. Depending on the backup type set in your cloud settings, schedules are created either per virtual server or per disk. To view all backup schedules in the cloud, see **Schedules Settings**. In this document, you can find information on how to manage Virtual Server backup schedules.

9.1.13.1 View Virtual Server Backup Schedules

To view the list of backup schedules for a particular virtual server:

9.1.13.1.1 If normal backup options is selected for the cloud:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Storage** tab, then select **Disks**.

4. On the screen that appears, click the **Actions** button next to the disk you want to back up, then select **Schedule for Backups**.

5. On the screen that appears, you will see the list of backup schedules along with their details:

**On this page:**
- View Virtual Server Backup Schedules
- Create Virtual Server Backup Schedule
- Edit Virtual Server Backup Schedule
- Delete Virtual Server Backup Schedule

**See also:**
- Auto-Backup Presets
- Schedules Settings
- View User Backups
- Virtual Server Statistics
- Virtual Server Integrated Console

- **Date** - the time when the schedule was created
- **Target** - the server or disk for which the schedule was created (depending on the backup type)
- **Action** - the scheduled action
- **Period** - how frequently the backup will occur according to a period type set in the next step.

  For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this filed is set 1.

- **Period type** - the backup period: days, weeks, months, or years
- **Rotation period** - the number of backups, after which the first backup will be deleted.

  By default, in this filed is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this filed, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.

- **Next Start** - the date and the hour of the next backup
- **User** - the user who created the backup schedule
• **Status** - schedule status

9.1.13.1.2 If incremental backup option is selected for the cloud
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Select **Backups > Schedules** tab, or click **Auto-backups** under the **Options** section to view incremental backups schedules only.
4. On the screen that appears, you will see the list of backup schedules along with their details:
   - **Date** - the time when the schedule was created
   - **Target** - the server or disk for which the schedule was created (depending on the backup type)
   - **Action** - the scheduled action
   - **Period** - how frequently the backup will occur according to a period type set in the next step.

   For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this filed is set 1.

   - **Period type** - the backup period: days, weeks, months, or years
   - **Rotation period** - the number of backups, after which the first backup will be deleted.

   By default, in this filed is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this filed, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.

   - **Next Start** - the date and the hour of the next backup
   - **User** - the user who created the backup schedule
   - **Status** - schedule status

9.1.13.2 Create Virtual Server Backup Schedule

In addition to the system auto-backup presets, you can schedule backups of virtual servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of Scheduled VS backups and **Auto-backup Presets** provide a great deal of flexibility in the way backups are handled for the cloud and for individual VSSs. Auto-backup Presets can be applied to all new VSSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSSs, outside of the auto-backup pattern.

Depending on your cloud settings, you can schedule either normal or incremental backup schedules:

- **Adding normal backup schedule**
- **Adding incremental backup schedule**
9.1.13.2.1 Adding a normal backup schedule
To add a normal backup schedule:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.

4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that follows, click the New Schedule button.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted. For example, if the rotation period is 5 then the last 5 backups would be stored on the backup server. If you create one more backup (the sixth one), it will replace the first backup on the backup server.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

7. Click the Save button to finish.

9.1.13.2.2 Adding an incremental backup schedule
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to schedule a backup for.
3. Click the Backups tab, then choose Schedules, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the New Schedule button.
5. On the screen that appears, specify new schedule’s details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

6. Click the Save button to finish.

You can also configure the re-run period for auto-backup in case of auto-backup transaction failure. By default, it is set to 3 hours, but you may change the time value in the info_hub.yaml configuration file. You will receive an event notification whenever any backup is postponed.
9.1.13.3 Edit Virtual Server Backup Schedule

9.1.13.3.1 To edit a normal backup schedule:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. Click the Edit icon next to a schedule to change its details.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted. For example, if the rotation period is 5 then the last 5 backups would be stored on the backup server. If you create one more backup (the sixth one), it will replace the first backup on the backup server.
   - **Enabled** - move the slider to enable or disable the schedule.

For a schedule with the Failed status, you can move the Enabled slider to the right to run the schedule once again.

7. Click the Save button to finish.

9.1.13.3.2 To edit an incremental backup schedule:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the Edit icon next to a schedule to change its details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted. This parameter is for incremental backup schedules only.
   - **Enabled** - move the slider to enable or disable the schedule

For a schedule with the Failed status, you can move the Enabled slider to the right to run the schedule once again.

5. Click the Save button to save your changes.
9.1.13.4 Delete Virtual Server Backup Schedule

9.1.13.4.1 To delete a normal backup schedule:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.1.13.4.2 To delete an incremental backup schedule:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options section to view incremental backups schedules only.
4. On the screen that appears, you will see the list of backup schedules.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.1.14 Manage Virtual Server Backup Resources
Backup resources are based on plugins that enable running virtual server backups on third-party systems. Backup resources become available for your virtual servers if you complete the following procedures:

- Install Backup Plugin
- Create Backup Resource
- Create Backup Resource Zone
- Attach Backup Resource to Backup Resource Zone
- Attach Backup Resource Zone to Compute Zone
- Add Auto Backup Presets

When all the procedures are completed, you can add a backup resource to virtual servers from a compute zone to which you attached a backup resource zone. In this document, you can find information on how to manage backup resources for your virtual servers.

- Auto installation of R1Soft backup agent on a virtual server might fail on some versions of Windows templates. If you face any issues with using R1Soft on Windows virtual servers, please contact OnApp Support.
- If you want to delete a virtual server that has an attached backup resource, first detach the resource. If you delete a VS with the attached backup resource, synchronization between OnApp and your third-party backup system fails. It can affect other virtual servers that use this backup resource since the list of available recovery points will not be updated in OnApp CP.
9.1.14.1 View Backup Resources

You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter.

On this page:

- View Backup Resources
- Attach Backup Resource to VS
- Remove Backup Resource from VS

See also:

- Install Plugins
- Recovery Points
- Create and Manage Backup Resources
- Create and Manage Backup Resource Zones
- Create and Manage Auto Backup Presets

To view the list of backup resources available for your virtual server, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the Backups menu and click the Backup resources button.
4. On the page that appears, you will see the list of backup resources and the following details:
   - Label - the name of the backup resource
   - Enabled - the status that indicates whether the backup resource is enabled (YES) or not (NO)
   - Plugin - the name of the backup plugin
5. Click a label of a required backup resource to view the following details:
   - Label - the name of the backup resource
   - Backup resource zone - the backup resource zone to which the backup resource is assigned
   - Enabled - the status that indicates whether the backup resource is enabled (YES) or not (NO)
   - Plugin - the name of the backup plugin
   - Primary host - the primary address (either hostname or IP address) used to connect to the third-party backup system
   - Secondary host - the secondary address (either hostname or IP address) used to connect to the third-party backup system
   - Username - the username used to connect to the third-party backup system

To enable or disable a backup resource for a virtual server, refer to the sections below.
9.1.14.2 Attach Backup Resource to Virtual Server

To attach a backup resource to a virtual server, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the Backups menu and click the Backup resources button.
4. Click the "+" button next to the backup resource that you want to enable for this virtual server.

- When the backup resource is attached to VS, backups of the virtual server are run according to the Auto Backup Presets configured for the backup resource. To view the list of available recovery points and restore the virtual server from a recovery point, refer to the Recovery Points section.
- You can view a log of all backup plugin related operations in the Activity Log section of a destination virtual server.

9.1.14.3 Remove Backup Resource from Virtual Server

To remove a backup resource from a virtual server, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the Backups menu and click the Backup resources button.
4. Click the "-" button next to the backup resource that you want to disable for this virtual server.

After you remove a Veeam-based backup resource from a virtual server, a corresponding backup schedule remains on the Veeam side. You can disable the schedule via Veeam Backup & Replication UI.

9.1.15 Manage Virtual Server Recovery Points

Recovery points are created as a result of the virtual server data replication on a third-party backup service. Integration with the backup service is handled by means of a plugin that you can install to your Control Panel.

The recovery point represents a point-in-time full backup from which you can restore a virtual server. In OnApp CP, recovery points become available after you:

- Attach a backup resource to a virtual server
- Create an auto backup preset and the preset runs according to a schedule

You can also create a recovery point manually after you complete the preceding steps. In this document, you can find information on how to create and manage recovery points for a virtual server.
• For the R1Soft backup plugin, you can set the total amount of recovery points that will be created for a VS by the *Max recovery points* option while creating an auto backup preset. After the maximum limit is reached, new recovery points overwrite the existing ones.

• For the Veeam backup plugin, you use *Retention Policy* in Veeam Backup & Replication UI to control the number of recovery points that are retained on a disk. After the specified number of recovery points is exceeded, the earliest recovery points are automatically deleted to retain the new ones.

• The *Recovery Points* related permissions are disabled by default for the *User* role. To enable users to access and manage recovery points, edit the corresponding permissions set for the *User* role.

9.1.15.1 View Recovery Points

You can use the Veeam plugin only for VMware resources such as *vCloud Director* and *vCenter*.

On this page:

• View Recovery Points

• Create Recovery Point

• Restore Virtual Server from Recovery Point

• Browse Through Recovery Point

• Restore Files from Recovery Point

See also:

• Install Plugins

• Manage Virtual Server Backup Resources

• Create and Manage Backup Resources

• Create and Manage Auto Backup Presets

To view the list of recovery points available for a virtual server, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the *Backups* menu and click the *Recovery points* button.
4. On the page that appears, you will see the list of recovery points and the following details:
To create a recovery point or restore a virtual server from a recovery point, refer to the following sections.

### 9.1.15.2 Create Recovery Point

To create a recovery point, follow the next steps:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click a label of a required virtual server.
3. Expand the **Backups** menu and click the **Recovery points** button.
4. Click the **Backup now** button.
5. In the pop-up box, select a backup resource and click the **Backup now** button.

After you complete the procedure, the **ImmediateVirtualServerBackup** action is initiated to create a new recovery point. The log of the action is available in the **Activity Log** section of a virtual server.

### 9.1.15.3 Restore Virtual Server from Recovery Point

To restore a virtual server from a recovery point, follow the next steps:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click a label of a required virtual server.
3. Expand the **Backups** menu and click the **Recovery points** button.
4. Click the **Restore** button next to the recovery point from which you want to restore the virtual server.
5. Click the **Ok** button to confirm your action.

The action for restoring the virtual server from the recovery point will be scheduled. The log of the action is available in the **Activity Log** section of a virtual server.

- For the R1Soft backup plugin, virtual servers that are based on KVM and Xen compute resources are rebooted in **recovery mode** before restoration. To configure your plugin to apply the same logic, refer to [Create Backup Plugin](#).
For the Veem backup plugin, you can set advanced options to automatically power on virtual servers after restoring or to perform an incremental restore. For more information, see Manage Advanced Options.

9.1.15.4 Browse Through Recovery Point

You can browse through files and directories available within a recovery point. To browse through a recovery point, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the Backups menu and click the Recovery points button.
4. Click the Browse button next to the recovery point you are interested in.
5. On the page that appears, you will see the list of files and directories. You can expand and collapse directories to see more or fewer subentries. You will also see the following details:
   - Size - a size that is available only for files
   - Last modified - a date when a file or directory was last modified

At the Browse recovery point page, you can restore particular files and directories from a recovery point. For more information on restoring files and directories, see the following section.

9.1.15.5 Restore Files from Recovery Point

Restoring particular files from recovery point is not possible with Veeam backup plugin.

With R1Soft backup plugin, you can restore particular files and directories from a recovery point. To select and restore the required entries, follow the next steps:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click a label of a required virtual server.
3. Expand the Backups menu and click the Recovery points button.
4. Click the Browse button next to the recovery point you are interested in.
5. Select checkboxes next to the files and directories that you want to restore.
6. Click the Restore selected files button.
7. Click the Ok button to confirm your action.
After you click the button, the *RestoreFileEntries* action is scheduled to restore the selected files from the recovery point. The log of the action is available in the *Activity Log* section of a virtual server.

### 9.1.16 Manage Virtual Server Statistics

For your convenience, the system tracks VS performance and generates statistics on CPU utilization, billing, network interface usage, disk IOPS and *accelerated* virtual servers. In this document you can find information on how to view Virtual Server statistics.

#### 9.1.16.1 Virtual Server CPU Utilization

OnApp tracks CPU usage for virtual servers and generates charts that help analyze VS performance. The charts show the total CPU usage for all the cores of this particular VS for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

**On this page:**

- [Virtual Server CPU Utilization](#)
- [Virtual Server Billing Statistics](#)
- [Virtual Server Network Interface Statistics](#)
- [Virtual Server Disk IOPS Statistics](#)

**See also:**

- [Resource Allocation And Prices](#)
- [Accelerator](#)
- [Permissions](#)
- [User Billing Statistics](#)

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Overview** tab > **CPU Usage**.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the **Show in My Timezone** slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button.

To see what percentage of Compute resource CPU resource a VS takes, go to your Control Panel's **Virtual Servers** menu and click the label of the VS you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this VS.

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**9.1.16.2 Virtual Server Billing Statistics**

OnApp has a record of all the charges applied to your VSs for the last three month period. If a virtual server was created less than three months ago, statistics are recorded for the VS's existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

- The price parameters on this page do not take into consideration the free limits for resources set in the bucket.
- When generating billing statistics, OnApp takes the last state of the VS during the hour. For example, if a VS was turned on at 6.15 and turned off at 6.59 it will be considered as being off for the whole hour and its resources will be billed according to the OFF prices set in the bucket. However, the VS's disk and network interface usage can still be billed in case the VS was on during that hour.

To view billing statistics for a virtual server:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Overview** > **Billing Statistics** tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button. By default the statistics are generated for the last three months or the actual VS existence period.
5. Move the **Show in my Timezone** slider to the right if you want to view billing statistics according to your profile's timezone settings. By default, billing statistics is shown in UTC.
6. On the page that appears you will see the report with the following details:
   - **Date** – particular date and time for the generated statistics
   - **Users** – the virtual server owner. Click the owner name to see the User Profile (user details)
   - **Virtual Servers** – the virtual server name with the total due for VS resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
   - **Network Interfaces Usage** – the total due for the network interfaces used by this VS for the point of time specified in the Date column. Click the network interface name to see its details.
Disks Usage – the list of disks assigned to this VS with the total due for the "data_read", "data_written", "reads_completed", "writes_completed" resources for particular disk. The charges for the disk size resource are included into the Costs column.

Costs – the total due for the Virtual Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

9.1.16.2.1 Save as CSV
You can save your billing statistics to a file in a CSV format. To download a CSV file with billing statistics for a selected period of time, click the Save as CSV button. The download will start automatically after you click the button.

The CSV file includes the following information:
- stat_time - a particular hour for which the statistics were generated
- vs_id - an ID of a virtual server
- resource_category - a resource for which the statistics were generated. The resource category can be a disk, network_interface, compute, template, instance_package, and service_add_on.
- resource_id - an ID of a resource
- metric_name - a name of a metric for which the statistics were generated. The metric can be a disk_size, data_read, data_written, reads_completed, writes_completed, ip_addresses, rate, data_received, data_sent, cpu_shares, cpus, memory, cpu_usage, template, count (for instance packages, templates, and service add-ons), etc.
- usage - the amount of used resources that can be the following:
  - GBs of disk size, Kbs of data read/written, the number of reads/writes.
  - The number of IPs, the port speed in Mb per second, the data sent and received in KBs.
  - The count for the instance package, template, and service add-on categories.
- cost - the total due for the VS usage for a particular hour specified in the stat_time field

For virtual servers created from instance packages, the resource category is instance_package, the metric name is count and the usage is "1".

9.1.16.3 Virtual Server Network Interface Statistics
OnApp tracks network usage for virtual servers and generates charts that help to analyze network performance. To see statistics on network utilization for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking > Network Interfaces tab.
4. Click the Interface usage icon next to the network you're interested in.
5. On the screen that appears, the following charts are available:
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- **Instant Bandwidth** - the chart shows the average inbound and outbound speed in Megabits per second (Mbps) of data received and sent over the network respectively. The average speed is shown on a per-minute basis for the last 24 hours.

- **Hourly Data Transfer** - the chart shows how much data in Gigabytes (GB) is received and sent over the network per hour. The amount of received and sent data is shown on a per-hour basis for a period of time up to three months.

6. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.

7. To filter the statistics by date and time, select the time period from the drop-down menu above the charts and click the Apply button.

9.1.16.4 Virtual Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for virtual servers and generates charts that help analyze VS disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.

5. There are four charts on the screen that appears:
   - IOPS for the last hour
   - IOPS for the last 24 hours
   - Data written/read (in Kb) for the last 24 hours
   - Data written/read (in Kb) for the last hour

6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.

7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.1.17 Virtual Server Integrated Console

OnApp provides an integrated VNC console that gives users direct access to their virtual servers through the Control Panel UI. The noVNC console is provided for virtual servers that are built on KVM CentOS 7 based on WebSockets. Users with the Administrator role can access all virtual server consoles for support and troubleshooting purposes. The console connects a user browser to a VNC port or VNC WebSocket port available via a compute resource for the guest console.

To access the virtual server VNC console via the Control Panel:
1. Go to the **Cloud > Virtual Servers** menu.
2. Click a label of a destination virtual server.
3. Click the **Console** button.

For the HTML5 console, click the **Re-connect** button if the connection is lost. The re-connection to the console runs as follows:

- If the console runs as expected, clicking the **Re-connect** button causes disconnection and the console is re-connected automatically after 1.5 seconds.
- If the console gets stuck, clicking the **Re-connect** button runs your request once again and re-connects the console without reloading.
- If the console gets disconnected with a status code and an error message, the console is re-connected automatically after 1.5 seconds.

To use the Java console instead of HTML5, go to **Admin > Settings > Configuration** and edit settings in the **System** tab. For more information, refer to **System Configuration**.

See also:
- [Virtual Server Transactions and Logs](#)
- [Virtual Server Recipes](#)
- [Virtual Server Recipe Custom Variables](#)
- [Virtual Server Service Add-ons](#)

### 9.1.18 Virtual Server Transactions and Logs

The system records a detailed log of all the transactions happening to your virtual servers. The list of transactions logged by the system includes:

- Provision virtual server
- Startup virtual server
- Stop virtual server
- Resize virtual server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Take backup
- Convert backup
- Restore backup
- Destroy backups
- Destroy virtual server
- Destroy template
- Download template
- Update firewall

To view transactions for a virtual server:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. The details screen for that virtual server shows recent transactions in the **Activity Log** section.

**See also:**
- [Virtual Server Integrated Console](#)
- [Virtual Server Recipes](#)
- [Virtual Server Recipe Custom Variables](#)
- [Virtual Server Service Add-ons](#)

To cancel pending tasks, click the **Cancel All Pending Tasks for this virtual server** button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- **date** - time in the [YYYY][MM][DD][T][hh][mm][ss][Z] format
- **action** - the action name
- **status** - the action status (Complete, Warn, Pending, or Failed)
- **ref** - the log item's Ref number
- **target** - the action target
- **started at** - the time when the action was started
- **completed at** - the time when the action was completed
- **template** - template of the server the action refers to
- **compute resource** - the label of compute resource
- **initiator** - the user who initiated the action

If you want to see only the detailed output, you can hide login with the arrow button in the upper right corner.

### 9.1.19 Virtual Server Recipes

In this document, you can find information on how to manage Virtual Server recipes.

#### 9.1.19.1 View Virtual Server Recipes

To view virtual server recipes:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Overview** tab and click **Recipes**.
4. The screen that follows shows details of all the recipes in the cloud:
   - The left pane shows the list of available recipes organized into recipe groups.
   - The right pane displays the list of events to which the recipes can be assigned. Click the arrow button next to an event to expand the list of recipes assigned to it.

**On this page:**

- [View Virtual Server Recipes](#)
- [Assign Recipe](#)
9.1.19.2 Assign Recipe

Drag and drop a recipe to assign it to the required event.

You can assign virtual server recipes to the following events:

- **VS provisioning** - run the recipe during the virtual server provisioning
- **VS network rebuild** - run the recipe while rebuilding a network
- **VS disk added** - run the recipe while adding a disk to the virtual server
- **IP address allocated for VS** - run the recipe when adding an IP address to the VS network interface
- **IP address revoked from VS** - run the recipe when removing an IP address from the VS network interface
- **VS network interface added** - run the recipe while adding a network interface to the virtual server
- **VS network interface removed** - run the recipe while deleting a network interface from the virtual server
- **VS disk resized** - run the recipe while resizing a virtual server disk
- **VS resize** - run the recipe while resizing the virtual server
- **VS IP address add** - run the recipe while adding an IP address the virtual server
- **VS IP address remove** - run the recipe while removing an IP address from the virtual server
- **VS start** - run the recipe while starting the virtual server
- **VS reboot** - run the recipe while rebooting the virtual server
- **VS hot migrate** - run the recipe during the hot migration of the virtual server
- **VS hot full migrate** - run the recipe during the hot migration of the virtual server with disk
- **VS failover** - run the recipe during the failover process

9.1.19.3 Remove Recipe

To remove recipe:

1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the **Delete** button next to the recipe you want to remove.

9.1.20 Virtual Server Recipe Custom Variables

You can define custom variables for particular virtual servers. Each custom variable is a name-value set that can be used during the virtual server recipe implementation. Custom variables are set on a per server basis. You can create custom variables during the virtual server creation or via the virtual server **Overview** menu.
To create a new custom variable:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. You'll see a list of all virtual servers in your cloud. Click the name of a virtual server for which you want to create a variable.
3. On the virtual server details screen, click the Overview tab, then choose Recipes Variables.
4. On the screen that appears, click the "+" button.
5. Specify the recipe name and its value.
6. Move the Enabled slider to the right to allow use of this recipe.
7. Click Save.

To edit a custom variable, click the Edit icon next to the required variable and change its details.

To delete a custom variable, click the Delete icon next to the variable you want to remove. You will be asked to confirm the deletion.

It is possible to set custom variables for image templates, as well as for virtual servers. Note: virtual server custom variables will always overlay template custom variables.

See also:
- Virtual Server Integrated Console
- Virtual Server Transactions and Logs
- Virtual Server Recipes
- Virtual Server Service Add-ons

9.1.21 Virtual Server Service Add-ons

Service add-ons can be added to VS during its creation or later.

Ensure that the following requirements are met to be able to assign service add-on to VS during its creation:

- Replace Recipes with Service Add-ons on VS creation permission is enabled
- Service add-on groups are available in your bucket
- The On Provisioning option is enabled for all or some of the service add-ons available to you within the bucket.

If you have the service add-on functionality enabled and properly configured, you can assign additional services to your VS.

To manage user service add-ons for a VS, ensure that Manage Service Add-ons for all virtual servers and/or Manage Service Add-ons for own virtual servers permissions are on before managing VS service add-ons.

To manage system service add-ons for a VS, you need the Manage System Service Add-ons and/or Manage own System Service Add-
Below you can find information on how to assign service add-on to already created VS.

**On this page:**
- View VS service add-ons
- Assign service add-on to a VS
- Unassign service add-on from a VS

**See also:**
- Service Add-ons
- Manage Service Add-ons
- Service Add-on Store

### 9.1.21.1 View VS Service Add-Ons

To view virtual server service add-ons:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you're interested in.
3. Click the Overview tab, then choose Service Add-ons.
4. The screen that follows shows details of all the service add-ons assigned to the VS, if there are any:
   - **Label** - the service add-on name
   - **Price** - the service add-on price, set for this service add-on in the bucket
   - **Type** - select user or system
   - **Status** - whether the service add-on is active or not
   - **Actions icon** - you can unassign the Service Add-on from this Virtual Server by clicking the Delete icon. This action won’t delete the service add-on itself but only remove the assignment.

Also, if any service add-on is already assigned to the VS, you can view it at the VS's details page.

### 9.1.21.2 Assign Service Add-on to a VS

To assign service add-on to a VS:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you're interested in.
3. Click the Overview tab, then choose Service Add-ons.
4. Click the "+" button at the upper right corner. You will get the list of service add-on groups (availability is configured in the bucket).
5. Click the label of the necessary user or system service add-on to see its details:
6. Click Assign. The transaction to execute the On add event(s) will be scheduled for running. If you rebuild VS, the On VS Rebuild event(s) will be scheduled for running and in case of VS deletion - the On VS Destroy event(s) will be scheduled for running.

Alternatively, if any service add-on is already assigned to the VS, you can assign another one at the VS’s details page.

9.1.21.3 Unassign Service Add-on from a VS
To unassign service add-on from a VS:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you’re interested in.
3. Click the Overview tab, then choose Service Add-ons.
4. Click the "Delete" icon next to the service add-on you want to unassign. Confirm the deletion. The transaction to execute the On remove event(s) will be scheduled.

Alternatively, you can unassign the service add-on at the VS’s details page.

9.1.22 Manage Suspended Virtual Server

For information on how to suspend a virtual server, refer to the Virtual Server Power Options section.

Suspending a virtual server makes it inactive but still present on the system. All the major actions on the suspended VS are disabled except for some actions related to:

- Properties
- CPU Usage
- Billing Statistics
- Recipes
- Service Add-ons
- Network Interfaces
- Firewall Rules
- Disks
- Backups

To run all the available VS-related actions on a suspended instance, you should unsuspend it.
9.1.22.1 Properties
You can view general properties of the suspended VS in the Control Panel > Cloud > Virtual Servers menu, including such details as hostname, compute resource, location group, owner, IP addresses, and others. You can also view the Notes section that lists brief comments or reminders for the suspended VS but you cannot create new notes.

For more information on the VS properties, refer to the Virtual Server Details section.

9.1.22.2 CPU Usage
You can view charts on CPU usage of the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Overview > CPU Usage tab. The charts show the total CPU usage statistics for all the cores of the particular VS for a specified time period. The vertical axis indicates the CPU usage percentage (CPU percentage is the core-independent quantity) and the horizontal axis defines a time period.

For more information on CPU usage, refer to the Virtual Server CPU Utilization section.

9.1.22.3 Billing Statistics
You can view billing statistics of the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Overview > Billing Statistics tab. The Billing Statistics page contains a record of billing operations relevant to the last three-month period. If a virtual server
was created less than three months ago, statistics are recorded starting from the VS's creation date. You can view all available statistics or those for a shorter period by setting a Start and End time.

For more information on how to view billing statistics, refer to the Virtual Server Billing Statistics page.

9.1.22.4 Recipes
You can view recipes assigned to the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Overview > Recipes tab. If you have some custom recipe variables attached to the suspended VS, you can view them in the Control Panel > Cloud > Virtual Servers > Label > Overview > Recipe Variables tab. For other operations related to recipes, you need to unsuspend your virtual server.

For more information on recipes and custom recipe variables, refer to the linked pages.

9.1.22.5 Service Add-Ons
You can view service add-ons assigned to the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Overview > Service add-ons tab. You can also unassign a service add-on from the suspended VS. For other operations related to service add-ons, you need to unsuspend your virtual server.

For more information on service add-ons, refer to the Service Add-ons section.

9.1.22.6 Network Interfaces
You can view the virtual network interfaces allocated to the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Networking > Network Interfaces tab, including details about the network join, port speed, and primary network interface. For other operations related to managing network interfaces, you need to unsuspend your virtual server.

For more information on managing network interfaces, refer to the Virtual Server Network Interface section.

9.1.22.7 Firewall Rules
You can view firewall rules that were added to VS before its suspension in the Control Panel > Cloud > Virtual Servers > Label > Networking > Firewall tab. You can also remove a firewall rule from the suspended VS. For other operations related to firewall settings, you need to unsuspend your virtual server.

For more information on firewall rules, refer to the Set Virtual Server Firewall Rules page.
9.1.22.8 Disks
You can view the list of disks allocated to the suspended VS in the Control Panel > Cloud > Virtual Servers > Label > Storage > Disks tab. In the same tab, you can also access the disk IOPS (Input/Output Operations per Second) statistics. For other operations related to disks settings, you need to unsuspend your virtual server.

For more information on how to manage disks, refer to the Virtual Server Disks and Virtual Server Disk IOPS Statistics sections.

9.1.22.9 Backups
You can view the suspended VS backups that have already been taken and that are scheduled to be taken in the Control Panel > Cloud > Virtual Servers > Label > Backups tab. Take the backup and convert it to a template. For other operations related to managing backups, you need to unsuspend your virtual server.

For more information on the VS backups, refer to the Virtual Server Backups page.

9.2 ISO Virtual Servers
OnApp introduces ability to build a virtual server from ISO. Such virtual servers are based on specific ISO templates which you upload to the cloud.

- It is required that you perform additional network configuration during ISO installation. For more information refer to Confirmation step of ISO VS creation wizard.
- Creating a server from ISO is applicable for virtual and smart servers only.
- Upload the required ISO first to the cloud before creating a server based on it.

9.2.1 View ISO Virtual Servers
To view all virtual servers deployed in the cloud:

1. Go to your Control Panel > Cloud > Virtual Servers menu to see an overview of all virtual servers in the cloud.
2. The page that loads will show the list of VSs together with their details on OS, Disk size, RAM as well as the following:

   On this page:
   - View ISO Virtual Servers
   - View ISO Virtual Server Details
3. Click the **Actions** button next to the VS for the quick access to the list of VS actions (the list of actions displayed depends on the VS status):

- **Reboot a VS**
- **Recovery reboot**
- **Power off a VS**
- **CPU usage**
- **Shutdown**
- **Start up**
- **Recovery start up**
- **Unlock**

To search for a particular virtual server, type the text you want to find in the search box and click the **Search** button.

### 9.2.2 View ISO Virtual Server Details

To view details of a specific virtual server:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you’re interested in.
3. The screen that appears loads the VS properties, notes, activity log and tools for managing your VS.

VS properties page gives general overview of the VS details:

- Template this VS is built on
- VIP status (on/off). Click the icon to change the status.
- Power status & On/Off/Reboot buttons.

  Clicking the OFF button performs graceful shutdown and then powers off the virtual server after the timeout set in Configuration settings.

- Built from ISO. Green tick indicates that this VS is built from ISO.
- Compute resource. Click the Compute resource name to see its details.
- Location group. Click the location to view the details of the location group with which the VS is associated.
- Owner. Click the owner name to see its details.
- IP Addresses. Only the first five IP addresses are displayed on the virtual server properties page. To view the list of all virtual server IP addresses, mouse over IP addresses area or go to the Networking > IP addresses tab.

- Boot from CD - move the slider to the right to boot a VS from the location where ISOs are stored. If this slider is disabled, then VS will be booted from the disk where VS is provisioned.

- Auto-backups - move the slider to enable or disable auto-backups for this server. For more information refer to ISO Virtual Server Backup Schedules.

### 9.2.3 View ISO Virtual Server Transactions and Logs

The system records a detailed log of all the transactions happening to your virtual servers. The list of transactions logged by the system includes:

- Provision virtual server
- Startup virtual server
- Stop virtual server
- Resize virtual server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Destroy virtual server
- Destroy template
- Download template
- Update firewall
To view transactions for a virtual server:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. The details screen for that virtual server shows recent transactions in the **Activity Log** section.

To cancel pending tasks, click the **Cancel All Pending Tasks for this virtual server** button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- **date** - time in the [YYYY][MM][DD][T][hh][mm][ss]Z format
- **action** - the action name
- **status** - the action status (Complete, Warn, Pending, or Failed)
- **ref** - the log item's Ref number
- **target** - the action target
- **started at** - the time when the action was started
- **completed at** - the time when the action was completed
- **template** - template of the server the action refers to
- **compute resource** - the label of compute resource
- **initiator** - the user who initiated the action

If you want to see only the detailed output, you can hide log info with the arrow button in the upper right corner.

### 9.2.4 Create ISO Virtual Server

ISO virtual servers are created from the ISOs uploaded to the Control Panel and saved as specific ISO templates. The ISOs are uploaded at the **Control Panel > Templates** menu. For more information, refer to the **Upload ISOs** section of this guide.

To create a virtual server from the ISO:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu and click the "+" button, or click the **Create Virtual Server** button at the bottom of the screen. This will start a VS creation wizard.
2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
3. Click the **Create Virtual Server** button to start the creation process. You will be taken to the virtual server details screen.

It is required that you perform additional network configuration during ISO installation. For more information refer to **Confirmation** step below.

---

**On this page:**
- [Step 1 of 4. Templates](#)
- [Step 2 of 4. Virtual Server Properties](#)
- [Step 3 of 4. Resources](#)
- [Step 4 of 4. Confirmation](#)
See also:

- ISOs
- Manage ISO Virtual Servers
- ISO Virtual Server Networks
- ISO Virtual Server Disks
- ISO Virtual Server Statistics

9.2.4.1 Step 1 of 4. Templates

At this step, choose a specific ISO template from which your virtual server will be built. To choose a template:

1. Click the ISO template group.
2. Select the template.
3. Click Next.

Proceed to the following step of the wizard and specify the virtual server properties.

9.2.4.2 Step 2 of 4. Virtual Server Properties

At this step you need to indicate your virtual server’s properties.

Specify the following virtual server properties:

- **Label** - the label of the virtual server. The required parameter.
- **Hostname** - the hostname of the virtual server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [-]. For more info on hostname validation, refer to [RFC standard documentation](https://tools.ietf.org/html/rfc1123).

**Additional Consideration for Windows**

- The hostname length should be between 1 and 15 characters.
- The following symbols are not allowed:
  - percent sign [%]
  - double quotation marks ['"]
  - brackets [<,>]
  - vertical bar [I]
  - caret (^)
  - ampersand [&]
  - parentheses [(,)]

- **Domain** - specify the domain for this VS. The default value is localdomain. This parameter is not applicable to Windows virtual servers.

For example:

`test.onapp.com` - specify 'test' as hostname, 'onapp.com' as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - `test.onapp.com.localdomain`.
• **Time zone** - set the time zone for the virtual server. This parameter is applicable only to Windows XEN and KVM virtual servers.

• **Password** - a secure password for the VS. It can consist of 6-99 characters, letters \[A-Za-z\], digits \[0-9\], dash \[-\] and lower dash \[ _ \], and the following special characters: ~ ! @ # $ * _ - + = ` \ { } [ ] : ; ' , . ? /. You can use both lower- and uppercase letters. If you leave password field blank, it will be generated automatically.

• **Password confirmation** - repeat the password to confirm it.

• **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.

Click **Next** to proceed to the following step of the wizard to specify the virtual server resources.

### 9.2.4.3 Step 3 of 4. Resources

At this step, you can choose to create the virtual server either by selecting a predefined instance package or by setting your virtual server's resources, such as disk size, network configuration and other manually.

• A VS created using instance packages is called an Instance package VS.

• A VS created by setting resources manually is called a custom virtual server.

**Depending on the permissions, this step will display either Instance packages or Create your own tabs, or both of them.**

You are forwarded to the next step from the tab you are currently on. If you select an instance package and then click on the Create Your Own tab and proceed to the next step, the system will set the resources from the Create Your Own tab even if you did not configure any resources there.

### 9.2.4.3.1 Resources

**Instance packages**

Note that Instance package VSs can only be created on compute resources within compute zones where all compute resources are assigned the same amount of CPU units. If there are compute resources with different amount of CPU units set in a zone, it will not be possible to create Instance package VSs in such zones. The reason is that CPU priority for Instance package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.

If there are no available IP addresses during VS creation, all instance packages will be grayed out in the wizard.

From this tab, you can choose one of the predefined **Instance Packages** for your virtual server. If you select a compute zone that does not have enough resources during virtual server creation, you will see all instance packages available to you, but those that have resources incompatible with the chosen compute zone will be grayed out. Grayed out instance packages cannot be selected.
For each of the instance packages the following details are displayed:

- **Memory** - the RAM size (GB) available in the instance package
- **CPUs** - the number of CPU cores available in this instance package
- **Disk Size** - the disk size available in this instance package
- **Bandwidth** - the bandwidth available in this instance package
- **Price per Hour:**
  - **Mode ON** - hourly instance package price for the VS powered on
  - **Mode OFF** - hourly instance package price for the VS powered off
- **Price per Month:**
  - **Mode ON** - monthly instance package price for the VS powered on
  - **Mode OFF** - monthly instance package price for the VS powered on

Click the instance package to select it. After that, the instance package you have chosen will be highlighted in green.

Virtual servers created using instance packages do not support autoscaling.

**Create Your Own**

Using this tab you can define the resources for your virtual server manually:

**Compute Resources**

- **Compute Zone** - the Compute zone to build the VS on
- **Compute Resource** - the specific Compute resource to build the VS on. Compute resource may be selected automatically according to the set provisioning type.

**Resources**

- **RAM** - set the amount of virtual server's RAM. The maximum RAM depends on your bucket's settings. The maximum RAM that can be assigned to a VS is 168 GB regardless of the Max RAM value set in the bucket. The maximum RAM that can be assigned to a VS built on a XEN 32bit (x86) template is 16 GB.
- **CPU Cores** - set the amount of virtual server's CPU cores. For KVM Compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.
- **CPU Priority (or CPU Units)** - set virtual server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

The following options are available for VSs based on KVM Compute resources only, providing the Enable CPU topology permission is switched on for the user.

- **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the number of sockets.
  - **CPU Threads** - set the number of threads per core.

CPU topology (CPU sockets and CPU threads) is the Labs feature preview. Pay attention that setting CPU sockets and CPU threads are at your own risk only!
You may face the following problems when setting CPU topology:

- Currently, you cannot set CPU sockets and threads parameters for existing VSs.
- After setting, the new parameters won't be shown at the VS details screen.
- Some Linux VSs fail to boot up.

**Primary Disk**
- *Primary data store* - choose a data store for VS’s primary disk.
- *Primary disk size* - set the primary disk size.

**Swap Disk**
- *Swap data store* - choose a data store for VS’s swap disk.
- *Swap disk size* - set the swap disk size. There is no swap disk for Windows-based VSs. In all other cases, swap disk size must be greater than zero.
- *Disable* - select the checkbox to disable swap disk creation

**Network Configuration**

**Network Interface 1**
- *Network* - choose the network from which the VS should get the IP address
- *IP net* - select from the drop-down list the IP net from which the IP address should be assigned
- *IP range* - select from the drop-down list the IP range from which the IP address should be assigned
- *IP address* - select an IP address to be assigned from the drop-down box
- *Selected IP address* - if the option is available, you can also assign an IP address for the VS from the drop-down menu. Indicate Compute resource and network to have the list of available IPs.
- *Port Speed* - set the port speed for this VS

- *Selected IP address* option is enabled via the "Show IP address selection for new VS" slider on the Admin > Settings > Configuration settings screen (under the System tab).
- You can't select unlimited port speed if the Network Zone is not selected. In this case the port speed will be 1 by default. It's possible to create virtual server with unlimited network speed without selecting a network zone only if you have only one Network Zone assigned to your bucket.

Click **Next** to proceed to the last step of the wizard.
9.2.4.4 Step 4 of 4. Confirmation

At this step, configure the automation settings. This is the final step of the virtual server creation wizard.

- Move the Boot Virtual Server slider to the right if you want the virtual server to be started up automatically.

At the Confirmation step you can find the configuration summary of VS, which will be created. You can view template's name, RAM size, number of networks, primary disk and swap disk size, number of cores.

After you set up all parameters, click the Create Virtual Server button to start the creation process.

When virtual server is created, you will be redirected to VS details page. Take the following steps to finish ISO installation process:

1. Go to VS Networking tab > IP Addresses.
2. Copy the following data: IP Address, netmask, gateway, resolver (DNS).
3. Go to console, where ISO installation process is running and enter copied IP Address, netmask, gateway and resolver (DNS).

9.2.5 Manage ISO Virtual Servers

OnApp Cloud gives you high-end cloud management features for virtual servers that are built from ISOs including:

<table>
<thead>
<tr>
<th>Virtual Server Options</th>
<th>Power Options</th>
<th>Administrative Options</th>
<th>Networks</th>
<th>Disks</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot / Reboot in recovery</td>
<td>Change owner</td>
<td>Configure network interface</td>
<td>Edit disks</td>
<td>CPU utilization</td>
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<tr>
<td>Migrate</td>
<td>Suspend</td>
<td></td>
<td>Set firewall rules</td>
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<tr>
<td>Delete</td>
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<td></td>
<td>Virtual server IP addresses</td>
<td>Delete disks</td>
<td>Network interface statistics</td>
</tr>
<tr>
<td>Segregate</td>
<td>Startup / Startup on Recovery</td>
<td></td>
<td>Display network speed for network interfaces</td>
<td>Disk IOPS statistics</td>
<td></td>
</tr>
<tr>
<td>Clone</td>
<td>Boot from ISO</td>
<td></td>
<td>Edit network speed</td>
<td>Accelerated ISO VS Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Ensure that ISO permissions are on before managing ISO virtual servers. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

This document provides the information on how you can manage the virtual servers built from ISO.

On this page:
9.2.5.1 Edit ISO Virtual Server

You can edit resources for all VSs. Depending on the OS it is built on, some VSs can have their CPU and RAM resized without needing to be powered off ("resize without reboot"). If the VS template allows resize without reboot, the resize should be completed automatically: you will be returned to the VS details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to confirm that the VS will need rebooting so that the resize can take place.

Windows virtual servers cannot be resized without reboot.

The Edit Virtual Server screen will differ depending on the way the VS resources were selected: either manually or using an instance package. To adjust VS resources:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you want to resize, to show its details screen.
3. Click the Tools button and select the Edit Virtual Server link.

   For virtual servers built by selecting resources manually:
   - Change CPU cores, CPU priority/units and RAM values.

   For virtual servers built using instance packages:
   - Choose the new instance package for your virtual server. Click the instance package to select it. After that, the instance package you have chosen will be highlighted in green.
     Those instance packages that have resources incompatible with the compute zone, on which the VS is built, will be greyed out. Greyed out instance packages cannot be selected.
You can only choose from those instance packages that offer more disk size than the VS currently uses.

After you select a new instance package you can use the extra disk size to create a new disk for the VS or make the existing VS disk larger.

You can also edit the Time Zone parameter for all Windows KVM and Xen virtual servers. After you edit the server's time zone, you need to stop and then start up the VS. Currently, the time zone is set at the Compute resource side only. Therefore, users need to set the target time zone inside a Windows VS manually. Setting correct time zone at the Compute resource side helps to keep correct time inside a VS after starting it if time synchronization is not completed for some reason.

4. Click the Save button.

9.2.5.2 Segregate ISO Virtual Server

If required, you can instruct OnApp to make sure a VS is never booted on the same Compute resource as another specific VS. This may be important if, for example, you have two name servers or a load balanced web server, and you need to keep VSs on separate physical servers.

To isolate one VS from another:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to segregate.
3. On the screen that appears, click the Tools button, then click Segregate Virtual Server.
4. In the dialogue box that pops up, use the drop-down menu to choose a VS you want to keep away from.
5. Click the Segregate Virtual server button to finish.

9.2.5.3 Clone ISO Virtual Server

You can create a clone based on the same resources as the origin ISO virtual server. The cloned virtual server inherits resources from the origin as follows.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Cloned Virtual Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties - owner, hostname, password, and label.</td>
<td>The same as the origin virtual server with Clone in the label, for example, Clone Origin Label.</td>
</tr>
<tr>
<td>• Compute, data store, and network resources &amp; zones</td>
<td>The same as the origin virtual server. If there are no available resources on the same data store, network, and compute resource, you cannot clone a virtual server.</td>
</tr>
<tr>
<td>• Recipes, recipe variables, and service add-ons</td>
<td></td>
</tr>
<tr>
<td>• Firewall rules</td>
<td></td>
</tr>
<tr>
<td>IP address</td>
<td>The same as the origin virtual server. After a virtual server is cloned and before you start it, you should assign a new IP address.</td>
</tr>
<tr>
<td>Swap disk</td>
<td>A new swap disk is created on the cloned virtual server.</td>
</tr>
</tbody>
</table>
To clone a virtual server, follow the next procedure:

1. Go to your Control Panel > **Cloud** > **Virtual Servers**.
2. Click a label of the virtual server that you want to clone.
3. Click **Tools** and then click **Clone Virtual Server**.
4. In the pop-up box, click **Clone Virtual Server** to confirm the action.

After you confirm the action, several transactions are run to complete the cloning process. You can check a status of each transaction in **Activity Log** of the virtual server. After the virtual server is cloned, it is powered off until you start it.

9.2.5.4 Migrate ISO Virtual Server

**Hot migration** is available for VSs created from ISO if **Allowed hot migrate** slider was enabled during **ISO upload** or during **ISO editing**.

OnApp allows migration of ISO virtual servers between compute resources that share common data stores (or data store zones).

To migrate a virtual server:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you want to migrate.
3. Click the **Tools** button and press the **Migrate Virtual Server** link.
4. In the window that appears, choose the target compute resource from the drop-down menu.
5. Click the **Start Migration** button.

After migration, the power status of your virtual server remains the same as before the migration. OnApp administrators can control user access over virtual server migration. Using OnApp permissions, you can allow/forbid users to perform migration of all virtual servers, or their own servers only. This is handled via the Control Panel's **Roles and Sets** menu.

9.2.5.5 Delete ISO Virtual Server

Shut down the virtual server before destroying it. If you are deleting a VS that is running, the VS will be deleted after the time set in Timeout Before Shutting Down VSs configuration parameter.

To remove the virtual server from the cloud:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. On the screen that appears, you'll see the list of all virtual servers in the cloud. Click the label of the virtual server you want to delete.
3. On the virtual server's screen, click the **Tools** button, then select **Delete Virtual Server**.
4. Confirm by clicking the **Destroy** button.
IMPORTANT:
- You won't be able to restore a virtual server after deleting it.
- Deleting a virtual server removes all data stored on that virtual server.

9.2.5.6 ISO Virtual Server Power Options

To manage a virtual server power options:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on VSs (the exact list shown depends on the VS status):
   - **Reboot Virtual Server** - powers off and then restarts the VS.
   - **Reboot in Recovery** - powers off and then restarts the VS in the recovery mode.
   - **Suspend** - stops a VS, changes its status to suspended and disables all the other actions on VS, unless unsuspended.
   - **Shut Down Virtual Server** – pops up a dialogue box, where you can either Shut Down VS (terminates the VS gracefully), or Power Off VS (terminates the VS forcefully).
   - **Startup Virtual Server** - queues a start-up action for a VS that's currently powered off.

   When you start up a VS, it might be implicitly cold migrated if the current compute resource does not have sufficient resources. For more information, refer to Virtual Server Provisioning.

   - **Startup on Recovery** - starts the VS in recovery mode.
   - **Boot from ISO** - boots the VS from an ISO. You can boot virtual servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. If you boot a VS from an ISO with the RAM requirement larger than the VS's RAM, the transaction will fail. Make sure that you have enabled the **Any power action on own virtual servers** and **Allow own virtual servers to boot from ISO** permissions for the user to have access to this feature.

As soon as you boot a VS from the installation ISO, OnApp may lose control of any components (networks, disks etc.) !!! The only available actions will be start and stop a VS. Be aware, that all the contents of the disk may be also deleted.

9.2.5.7 Change Owner of ISO Virtual Server

To change owner of ISO virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the **Tools** button on the VS's screen to expand the VS Tools menu.
4. Click the **Change Owner** link.
5. Choose a user to whom you want to pass ownership of the VS from the drop-down list.
6. Click the **Change Owner** button.

If you want to change an owner of the VS, which was built using an instance package, ensure that the new owner has permission to create VS using instance package and appropriate instance package in the bucket. Otherwise you will not be able to change the ownership of this VS.

### 9.2.6 ISO Virtual Server Networks

The Networking menu in the Virtual Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers.

#### 9.2.6.1 Configure ISO Virtual Server Network Interface

The **Networking > Network Interfaces** menu shows the virtual network interfaces allocated to this VS. Network interfaces join the physical network to the VS. When you create a VS a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default.

OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS's primary network interface.

To see the list of all network interfaces allocated to the VS:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. On the page that follows you will see the following fields:
   - **Interface** – optional label of the network interface.
   - **Network join** – name of the network and a Compute resource or Compute zone this network is joined to.
   - **Port speed** – the speed set to the interface.
   - **Primary interface** – indication whether the interface is primary or not.

Here you can also view **Interface Usage**, Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

**On this page:**

- Configure ISO Virtual Server Network Interface
- Set ISO Virtual Server Firewall Rules
- ISO Virtual Server IP Addresses
- ISO Virtual Server Network Speed

**See also:**

- ISOs
- Create ISO Virtual Server
To add a network interface:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. Click the Add New Network Interface button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   o Label – a human-friendly name for the new interface.
   o Physical Network – choose a network join from the drop-down menu, which lists network joins assigned to the Compute resource/Compute zone on which the VS runs).
   o Port speed – set port speed in Mbps, or make it unlimited.
6. Click the Submit button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click Edit icon next to the appropriate network interface. After editing the port speed, the virtual server should be power cycled for the change to take effect.

To delete a network interface, click the Delete icon next to the interface you want to delete.

- To run the VS, at least one network interface with an assigned IP address (or addresses) is required!
- To allocate another physical network, add a new network interface.
- When managing Network Interfaces in OnApp, make sure to reflect all the changes in the ISO VS configuration manually.

9.2.6.2 Set ISO Virtual Server Firewall Rules

With OnApp you can set firewall rules for the network interfaces of virtual servers. There are two types of firewall rule:
- ACCEPT – defines the packets that will be accepted by the firewall
- DROP – defines the packets that will be rejected by the firewall

Ensure that the following permissions are enabled before setting firewall rules for your virtual server:
- Create own firewall rules
- Destroy own firewall rules
Read own firewall rules
Update own firewall rules

You cannot apply firewall rules to virtual servers which are parts of a blueprint.

You can set the following:

- **add a specific firewall rule** - you can configure a firewall rule with specific parameters (source, destination port, protocol type etc.)
- **set default firewall rules** - you can set default firewall rules for an entire network interface

### 9.2.6.2.1 Add a specific firewall rule

To configure a firewall rule:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the VS for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, set the following:
   a. Choose the network interface.
   b. Specify if the rule defines requests that should be accepted or dropped.
   c. Set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. Set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      - Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
   e. Protocol type (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
   f. Choose the protocol (TCP, UDP, DCCP, SCTP or ICMP).
   g. Enter a comment to the firewall rule.
5. Save the rule by clicking the **Add Rule** button. The rule will be saved in the UI, but the transaction won't be started until you click the Apply Firewall Rules button.
6. To start the transaction which runs firewall rules for a VS, click **Apply firewall rules** button.
7. Use **Up** and **Down** arrow buttons in the left column to change firewall rule position.
8. To edit or delete a firewall rule click the appropriate icon in the last column.
9.2.6.2.2 Default firewall rules

To set default firewall rules for a network interface:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the ISO VS for which you want to configure a firewall rule.
3. Click the Networking tab, then click Firewall.
4. On the page that appears, go to Default firewall rules section.
5. Choose ACCEPT or DROP command next to the network interface and click Save Default Firewall Rules. The rule will be saved in the UI, but the transaction won't be started until you click the Apply Firewall Rules button.

Example:
The Int1 ACCEPT 122.158.111.21 22 TCP firewall rule means that the Int1 network interface will accept all requests and packets addressed from 122.158.111.21 using the TCP protocol on port 22.
The Int2 DROP 122.158.111.21 22 UDP firewall rule means that the Int2 network interface will reject all requests and packets from 122.158.111.21 using the UDP protocol on port 22.

If you reboot a Xen-based VS from the console, the firewall rules for this VS will be lost, and you will need to update the firewall rules again.

9.2.6.3 ISO Virtual Server IP Addresses

In the Networking > IP Addresses tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab > IP Addresses.
4. Click the Allocate New IP Address button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the VS will be available). The IP Address will be allocated automatically.
6. (Not available for federated VSs) As an alternative you can manually select an IP address from the IP Pool associated with the network interface. To enable this option move the Specify IP Address slider to the right and choose IP Address from the drop-down list. You may select an IP address that's already assigned to a VS, but only one VS should be online at a time. Use Please show me used IP Pool, Show only my IPs and Show only IPv6 checkboxes to narrow the list of IP in the drop-down list.
7. Click the Add IP Address button.

After Allocating New IP address(es) for ISO virtual server, configure this IP Address manually for ISO in console.
To remove an IP address from a VS:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you’re interested in.
3. Click the **Networking** > **IP Addresses** tab.
4. Click the **Delete** icon next to the IP address you want to delete.
5. In the pop up window that appears:
   - Choose **Delete with Reboot** option if you want to reboot a VS and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the VS's Overview page.
   - Choose **Delete without Reboot** option if you don’t want to reboot a VS. In this case to apply the changes, you will have to the reboot the VS additionally.

You can't delete an IP address that is in use.

9.2.6.4 ISO Virtual Server Network Speed

The main **Virtual Servers** screen displays the network speed of each VS's primary network interface. To see the speed of all interfaces assigned to a VS:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you are interested in.
3. Click the **Networking** > **Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.

To edit a virtual server’s network speed:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you want to change .
3. Go to the **Network** tab > **Network Interfaces**.
4. In the last column click the **Edit** button.
5. Change the port speed.
6. Click the **Submit** button to save changes.

9.2.7 ISO Virtual Server Disks

Virtual server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific virtual server. Disks can be assigned as standard or swap disks (there are no swap disks for Windows based templates). They can also be set as primary (that is, the disk from which an OS will boot).

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual virtual servers are managed through the Control Panel's **Virtual Servers** menu.
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On this page:

- **Edit ISO Virtual Server Disks**
- **Migrate ISO Virtual Server Disks**
- **Delete ISO Virtual Server Disks**

**See also:**

- **ISOs**
- **Create ISO Virtual Server**
- **Manage ISO Virtual Servers**
- **ISO Virtual Server Networks**
- **ISO Virtual Server Statistics**

### 9.2.7.1 Edit ISO Virtual Server Disks

For primary and swap (Linux, FreeBSD) disks you may only change the label and the size. You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your VS.

To change disk size:

1. Go to your Control Pane > **Cloud** > **Virtual Servers** menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab > **Disks**.
4. Click the **Actions** button next to the disk you want to change, then click the **Edit** link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the **Save Disk** button.

- You cannot decrease disk size. Only the increase disk size option is available.
- You cannot resize the primary disk for FreeBSD-based virtual servers.
- Size of a primary disk cannot exceed 2 TB.

### 9.2.7.2 Migrate ISO Virtual Server Disks

You can migrate disks of your virtual servers to other data stores, which are allocated to the same Compute resource. Unlike **VS migration** – disk migration requires reboot of the VS

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To migrate a disk:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to move to another data store, then click the Migrate button.
5. On the screen that appears, select a target data store from a drop-down box.
6. Click Start Migrate.

- You can only migrate disks to data stores in data store zones assigned to your bucket.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- If you move a 850GB disk between aggregates with 10GB actual usage, the 'dd' image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero 'd' space which may not be able to be recovered.

9.2.7.3 Delete ISO Virtual Server Disks

To delete a disk:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the disk you want to delete, then click Delete.
5. In the pop-up window, move the Force Reboot slider to the right, then select the VS shutdown type.
6. Move the Required Startup slider to the right to start up the VS automatically.

Steps 5 and 6 apply to disks of VSs that are on.

7. Click the Destroy Disk button.

This will schedule the "destroy disk" transaction.

9.2.8 ISO Virtual Server Statistics

9.2.8.1 ISO Virtual Server CPU Utilization

OnApp tracks CPU usage for virtual servers and generates charts that help analyze VS performance. The charts show the total CPU usage for all the cores of this particular VS for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

**On this page:**
- ISO Virtual Server CPU Utilization
- ISO Virtual Server Billing Statistics
- ISO Virtual Server Network Interface Statistics
- ISO Virtual Server Disk IOPS Statistics
- Accelerated ISO Virtual Server Statistics

**See also:**
- ISOs
- Create ISO Virtual Server
- Manage ISO Virtual Servers
- ISO Virtual Server Networks
- ISO Virtual Server Disks

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Overview tab > CPU Usage.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the Show in My Timezone slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

To see what percentage of Compute resource CPU resource a VS takes, go to your Control Panel's Virtual Servers menu and click the label of the VS you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this VS.
9.2.8.2 ISO Virtual Server Billing Statistics

OnApp has a record of all the charges applied to your VSs for the last three month period. If a virtual server was created less than three months ago, statistics are recorded for the VS’s existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Overview > Billing Statistics tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button. By default the statistics are generated for the last three months or the actual VS existence period.
5. Move the Show in my Timezone slider to the right if you want to view billing statistics according to your profile's timezone settings. By default, billing statistics is shown in UTC.
6. On the page that appears:

   The price parameters on this page do not take into consideration the free limits for resources set in the bucket.

- **Date** – particular date and time for the generated statistics
- **Users** – the virtual server owner. Click the owner name to see the User Profile (user details)
- **Virtual Servers** – the virtual server name with the total due for VS resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
- **Network Interfaces Usage** – the total due for the network interfaces used by this VS for the point of time specified in the Date column. Click the network interface name to see its details.
- **Disks Usage** – the list of disks assigned to this VS with the total due for the disk space resources (disk size, data read/written, reads/writes completed) for the point of time specified in the Date column. Click the disk name to see its details.
- **Costs** – the total due for the Virtual Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

9.2.8.3 ISO Virtual Server Network Interface Statistics

OnApp tracks network usage for virtual servers and generates charts that help analyze network performance. To see network utilization statistics for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking > Network Interfaces tab.
4. Click the Statistics (chart) icon next to the network you're interested in.
5. On the screen that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.

6. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.

7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

9.2.8.4 ISO Virtual Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for virtual servers and generates charts that help analyze VS disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.

5. There are four charts on the screen that appears:
   - IOPS for the last hour
   - IOPS for the last 24 hours
   - Data written/read (in Kb) for the last 24 hours
   - Data written/read (in Kb) for the last hour

6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.

7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.2.8.5 Accelerated ISO Virtual Server Statistics

This page provides the information on how you can view bandwidth statistics and cache utilization statistics of accelerate-enabled virtual server.

Ensure that Accelerate any Virtual Server/Accelerate own Virtual Servers permissions are on before managing accelerated VS statistics. For more information about permissions refer to the List of all OnApp Permissions section of this guide.
To see the bandwidth and cache utilization statistics:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the Acceleration tab > Reporting.
4. On the screen that appears, specify the period in the From and To fields and click the Apply button. The default period is the last week.
5. The first chart shows bandwidth statistics: the total/cached/non-cached statistics. The second chart shows cache utilization statistics: the number of pages cached on the Edge (hits) as well as the number of misses - the pages which are not cached.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.

9.2.9 ISO Virtual Server Backups

OnApp supports normal backups for ISO virtual servers. Normal backups contain all the information stored on a server's disk. If you have switched on incremental backups for the cloud, normal backups will still be made for ISO virtual servers. For detailed information on backups refer to Virtual Server Backups.

- Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a virtual server. To view the list of user backups, refer to View User Backups section.
- ISO virtual server backups cannot be converted into templates.
- If required, you can change the block size which is used during backup creation at Control Panel > Settings > Configuration by editing the Block Size (MB) parameter.

9.2.9.1 View ISO Virtual Server Backups

On this page:
- View ISO Virtual Server Backups
- Take ISO Virtual Server Disk Backups
- Restore ISO Virtual Server Backup
- Delete ISO Virtual Server Backup
- Add ISO Virtual Server Backup Note

See also:
- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates Configuration
To view the list of ISO virtual server's backups:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required ISO virtual server.
3. Click the Backups tab, then select Images. Images are full backups of ISO virtual server disks.
4. On the screen that appears, you'll see a list of ISO virtual server backups.
5. Click the label of the required ISO virtual server backup to see the following tools - restore backup, delete backup and add/edit note.

9.2.9.2 Take ISO Virtual Server Disk Backups
To back up an ISO virtual server disk:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you want to back up.
3. Click the Storage tab and select Disks. You'll see a list of the disks allocated to that ISO virtual server.
4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups and delete them.
   - To make a backup, click the Take a Backup button at the end of the list. If required, you can add a note to a new backup. You can also select Force Windows Backup.

   This option for Windows virtual servers is designed as a last resort, when the backup cannot be taken due to NTFS file system problems. Switching on this option will bring up a dialog box with the following message: "If you enable this option there is no guarantee that backup will be consistent."
   Select "Yes" to proceed.

9.2.9.3 Restore ISO Virtual Server Backup
To restore a backup:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required ISO virtual server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the backup you want to revert to and choose Restore.

9.2.9.4 Delete ISO Virtual Server Backup
To delete a backup:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required ISO virtual server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the **Actions** icon next to the backup you want to remove and choose **Delete**.

9.2.9.5 Add ISO Virtual Server Backup Note

To add/edit virtual server backup's note:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the required ISO virtual server.
3. Click the **Backups** tab, then select **Images**.
4. On the screen that appears, click the **Actions** icon next to the required backup and choose **Add Note**. Make necessary changes and click **Submit**.

9.2.10 ISO Virtual Server Backup Schedules

In addition to the system auto-backup presets, you can schedule backups of virtual servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week. The combination of scheduled ISO VS backups and **Auto-Backup Presets** provides a great deal of flexibility in the way backups are handled for the cloud, and for individual VSSs. Auto-backup Presets can be applied to all new VSSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSSs, outside of the auto-backup pattern.

OnApp supports only normal backups for ISO virtual servers, which include all the data from the server's disk.

9.2.10.1 View ISO Virtual Server Backup Schedules

To view the list of backup schedules for an ISO virtual server:

**On this page:**

- View ISO Virtual Server Backup Schedules
- Create ISO Virtual Server Backup Schedule
- Edit ISO Virtual server Backup Schedule
- Delete ISO Virtual Server Backup Schedule

**See also:**

- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates Configuration

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the ISO virtual server you're interested in.
3. Click the **Storage** tab, then select **Disks**.
4. On the screen that appears, click the **Actions** button next to the disk you want to back up, then select **Schedule for Backups**.
5. On the screen that appears, you will see the list of backup schedules along with their details:
   - **Date** - the time when the schedule was created
9.2.10.2 Create ISO Virtual Server Backup Schedule

To add a backup schedule:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the ISO virtual server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that follows, click the New Schedule button.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years
   - **Rotation period** - the number of backups after which the first backup will be deleted
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
7. Click the **Save** button to finish.
9.2.10.3 Edit ISO Virtual Server Backup Schedule

To edit a backup schedule:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the ISO virtual server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.

4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. Click the Edit icon next to a schedule to change its details.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   - **Enabled** - move the slider to enable or disable the schedule. For a schedule with the Failed status, you can move the Enabled slider to the right to run the schedule once again.

7. Click the Save button to finish.

9.2.10.4 Delete ISO Virtual Server Backup Schedule

To delete a backup schedule:

1. Go to your Control Pane > Cloud > Virtual Servers menu.
2. Click the label of the ISO virtual server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.3 OVA Virtual Servers

OnApp introduces ability to build a virtual server from OVA. Such virtual servers are based on specific OVA templates which are created after you upload OVA file to the cloud.

- OVA virtual server backups cannot be converted into templates.
- Be aware, that at the moment, OnApp provides only limited functionality to import from OVA with no actual VS management after import (only
The following options are not available for OVA virtual servers:

- Recipes
- Rebuild network
- Autoscaling
- Rebuild VS

On this page:

- View OVA Virtual Servers
- View OVA Virtual Server Details
- View OVA Virtual Server Transactions and Logs

See also:

- Create OVA Virtual Server
- Manage OVA Virtual Servers
- OVA Virtual Server Networks
- OVA Virtual Server Disks
- OVA Virtual Server Statistics

### 9.3.1 View OVA Virtual Servers

To view all virtual servers deployed in the cloud:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu to see an overview of all virtual servers in the cloud.

2. The page that loads will show the list of VSs together with their details on OS, Disk size, RAM as well as the following:
   - **label**. Click the label to see the VS details.
   - **VIP status** (enabled or disabled). If a compute resource fails or reboots, the system migrates virtual servers to another compute resource, one VS at a time. The order VSs are migrated in is random. However, you can give a virtual server "VIP" status, and this will give that VS priority in the migration queue. Click the icon to enable/disable VIP status of a particular VS.
   - **IP addresses**. If more than one IP address is assigned to this VS, mouse over the information icon to see the list of IP addresses.
   - **Backups**. The number of backups and the space these backups take.
   - **compute resource**. The label of compute resource with which VS is associated. Click a compute resource label to see its details.
3. Click the **Actions** button next to the VS for the quick access to the list of VS actions (the list of actions displayed depends on the VS status):

- Reboot a VS
- Recovery reboot
- Power off a VS
- CPU usage
- Shutdown
- Start up
- Recovery start up
- Unlock

To search for a particular virtual server, type the text you want to find in the search box and click the **Search** button.

### 9.3.2 View OVA Virtual Server Details

To view details of a specific virtual server:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. The screen that appears loads the VS properties, notes, activity log and tools for managing your VS.

VS properties page gives general overview of the VS details:

- Template this VS is built on
- **VIP status** (on/off). Click the icon to change the status.
- **Power status** & On/Off/Reboot buttons.

Clicking the OFF button performs graceful shutdown and then powers off the virtual server after the timeout set in Configuration settings.

- **FQDN** (fully qualified domain name).
- **Compute resource**. Click the Compute resource name to see its details.
- **Location**. Click the location to view the details of the location group with which the VS is associated.
- **Login credentials**
- **Owner**. Click the owner name to see its details.
- **IP Addresses**. Only the first five IP addresses are displayed on the virtual server properties page. To view the list of all virtual server IP addresses, mouse over IP addresses area or go to the **Networking** > **IP addresses** tab.
- **Auto-backups** - move the slider to enable or disable auto-backups for this server. For more information refer to **OVA Virtual Server Backup Schedules**.
- **Estimated Price per hour**. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the
9.3.3 View OVA Virtual Server Transactions and Logs

The system records a detailed log of all the transactions happening to your virtual servers. The list of transactions logged by the system includes:

- Provision virtual server
- Startup virtual server
- Stop virtual server
- Resize virtual server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Destroy virtual server
- Destroy template
- Download template
- Update firewall

To view transactions for a virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. The details screen for that virtual server shows recent transactions in the Activity Log section.

To cancel pending tasks, click the Cancel All Pending Tasks for this virtual server button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- date - time in the [YYYY][MM][DD][hh][mm][ss]Z format
- action - the action name
- status - the action status (Complete, Warn, Pending, or Failed)
- ref - the log item's Ref number
- target - the action target
- started at - the time when the action was started
- completed at - the time when the action was completed
- template - template of the server the action refers to
- compute resource - the label of compute resource
- initiator - the user who initiated the action

If you want to see only the detailed output, you can hide log info with the arrow button in the upper right corner.
9.3.4 Create OVA Virtual Server

OVA virtual servers are created from the OVAs uploaded to the Control Panel and saved as specific OVA templates. The OVAs are uploaded at the Control Panel > Cloud > Templates menu. For more information, refer to the Upload OVAs section of this guide.

To create a virtual server from the OVA:

1. Go to your Control Panel > Cloud > Virtual Servers menu and click the "+" button, or click the Create Virtual Server button at the bottom of the screen. This will start a VS creation wizard.
2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
3. Click the Create Virtual Server button to start the creation process. You will be taken to the virtual server details screen.

9.3.4.1 Step 1 of 4. Templates

At this step, choose a specific OVA template from which your virtual server will be built.

To choose a template:

On this page:
- Step 1 of 4. Templates
- Step 2 of 4. Virtual Server Properties
- Step 3 of 4. Resources
- Step 4 of 4. Confirmation

See also:
- Manage OVA Virtual Servers
- OVA Virtual Server Networks
- OVA Virtual Server Disks
- OVA Virtual Server Statistics

1. Click the OVA template group.
   
   If you do not see OVA template group in the Template store, go to your Profile > Bucket tab and check Limits for template store section. If OVA template group is missing, add it by clicking the "+" button in the upper right corner of this section.

2. Select the template.
3. Click Next.

Licensing Type for Windows VSs

Choose the license type you require:
- For the KMS type, choose the licensing server
For your own license, type your license key
If you don't specify the licensing type, MAK licensing will be set by default.

Consider the following when creating a VS on Windows templates:

- It is possible to deploy Windows virtual servers without running sysprep. To do so, you need to disable the Run Sysprep option for the Compute zone the virtual server will be built on. See Create Compute Zone section for details.
- If there are several virtual servers simply deployed from the same template in the cloud, they will have identical SIDS. This will result in the system conflict.

### Windows 10/Windows Server 2016 Virtual Servers

If you want to build Windows 10/Windows Server 2016 VSs, the following limitations apply to KVM compute resources:

- Windows 10/Windows Server 2016 VSs can be built on the CentOS 6/CentOS 7 compute resources with the following CPU models:
  - at least Ivy-Bridge-based Intel Xeon E series v2
  - Opteron G2, G3, G4, G5, and G6
- CPU flag 'fsgsbase' is required. For more information on CPU flags refer to Manage Extended CPU Configuration for Compute Zone.

The above limitations do not apply to XEN compute resources.

Proceed to the following step of the wizard and specify the virtual server properties.

9.3.4.2 Step 2 of 4. Virtual Server Properties

At this step you need to indicate your virtual server's properties.

Specify the following virtual server properties:

- **Label** - the label of the virtual server. The required parameter.
- **Hostname** - the hostname of the virtual server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [-]. For more info on hostname validation, refer to RFC standard documentation.

**Additional Consideration for Windows**

- The hostname length should be between 1 and 15 characters.
- The following symbols are not allowed:
  - percent sign [%]
  - double quotation marks ['"]
  - brackets [<,>]
  - vertical bar [\[]
  - caret [\^]
  - ampersand [\&]
- parentheses 

- **Domain** - specify the domain for this VS. The default value is *localdomain*. This parameter is not applicable to Windows virtual servers.

For example:

```
test.onapp.com - specify 'test' as hostname, 'onapp.com' - as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - test.onapp.com.localdomain.
```

- **Password** - a secure password for the VS. It can consist of 6-99 characters, letters [A-Za-z], digits [0-9], dash [-] and lower dash [-], and the following special characters: ~ ! @ # $ * _ - + = ` \ { } [ ] : ; ' , . ? /. You can use both lower- and uppercase letters. If you leave password field blank, it will be generated automatically.

The password, set at this step, will overwrite the password specified in OVA file.

- **Password confirmation** - repeat the password to confirm it.

- **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.

Click Next to proceed to the following step of the wizard to specify the virtual server resources.

### 9.3.4.3 Step 3 of 4. Resources

At this step, you get two tabs - Instance Packages and Create Your Own. You can not use instance package (it will be grayed out), as it is already preconfigured package which can differ from OVA configurations. OVA template already includes resource configurations, which are imported to the Create Your Own tab. You can change these resource configurations (except primary disk size).

#### Compute Resources

- **Compute Zone** - the compute zone where the VS should be imported

- **Compute Resource** - the specific compute resource where the VS from OVA will be imported. Compute resource may be selected automatically according to the set provisioning type.

- **RAM** - set the amount of virtual server's RAM. The minimum value is the RAM value taken from OVA file. The maximum RAM depends on your bucket's settings. The maximum RAM that can be assigned to a VS is 168 GB regardless of the Max RAM value set in the bucket.

- **CPU Cores** - set the amount of virtual server's CPU cores. The minimum value is the amount of CPU cores specified in OVA file. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.

- **CPU Priority (or CPU Units)** - set virtual server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

- **Use CPU Topology** - move the slider to the right, to set the following parameters:
**CPU Sockets** - set the amount of sockets.

### Storage Resources
When you create a VS from the OVA template, you can select different data stores to put disks on them. During the creation process, all disks are imported from the OVA configuration and their size cannot be changed. The first disk becomes primary and the next disks will be numbered in the subsequent order starting from 2 (Disk 2, Disk 3, etc.). When you select a data store for each of your VS’s disks, pay attention to its price and the total free disk capacity.

**How the data store free space is calculated**
Case A. There are no limits in the bucket, so the available space is “unlimited”. In this case, the actual free disk space for each data store is displayed. When you select a data store, the free space for this data store will decrease by the number of GB of the disk selected.

Case B. There are some limits in the bucket, and only one data store zone is available. In this case, two options are possible:
- If the maximum space allowed by bucket is less than the actual available space on the data store, then the total free disk space for all data stores for this user is displayed. When a data store is selected for a disk, the available disk size will decrease per each data store.
- If the data store disk space is less than the bucket limit, then the actual free disk space is displayed. When a data store is selected for a disk, the available disk size will not decrease.

Case C. There are some limits in the bucket, and several data stores are available. In this case, the data stores from different zones in the wizard are displayed. The data store free space will be displayed and calculated similarly to Case B with one exception. When a data store is selected for a disk from zone A, but there are also data stores in the wizard from zone B, the available disk size will not decrease for data stores from zone B.

**Primary Disk**
- **Data Store** - choose a data store for VS's primary disk. Each data store free space is indicated in brackets.
- **Size** - fixed primary disk size imported from OVA configuration

**Disk 2**
- **Data Store** - choose a data store for VS's disk. Each data store free space is indicated in brackets.
- **Size** - fixed disk size imported from OVA configuration

### Network Configuration
Network Interface 1
When you create a VS from the OVA template, you can select in which network the VS will be created. The first network becomes Network Interface 1 and the next networks will be numbered in the subsequent order starting from 2 (Network Interface 2, Network Interface 3, etc.). The amount of network interfaces will be taken from the OVA configuration. If the OVA has several network interfaces, you can change the following parameters for each of them.

- **Network** - choose the network from which the VS should get the IP address
- **IP net** - select from the drop-down list the IP net from which the IP address should be assigned
- **IP range** - select from the drop-down list the IP range from which the IP address should be assigned
- **IP address** - assign an IP address for the VS from the drop-down menu. Indicate compute resource and network to have the list of available IPs.
Be aware, that you should choose only public IP address. Otherwise VS, built from OVA, will not work properly.

- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropbox.
- **Selected IP address** - if the option is available, you can also assign an IP address for the VS from the drop-down menu. Indicate Compute resource and network to have the list of available IPs.
- **Port Speed** - set the port speed for this VS

- **Selected IP address** option is enabled via the "Show IP address selection for new VS" slider on the **Settings > Configuration** screen (under the **System** tab).
- You can't select unlimited port speed if the Network Zone is not selected. In this case the port speed will be 1 by default.
  It's possible to create virtual server with unlimited network speed without selecting a network zone only if you have only one Network Zone assigned to your bucket.

Click **Next** to proceed to the last step of the wizard.

9.3.4.4 Step 4 of 4. Confirmation
At this step, configure the automation settings. This is the final step of the virtual server creation wizard.

- Move the **Build Virtual Server** slider to the right if you want the system to automatically build the VS. If you leave this box blank, you will have to build your server manually after it is created.
- Move the **Boot Virtual Server** slider to the right if you want the virtual server to be started up automatically.

At the Confirmation step you can find the configuration summary of VS, which will be created. You can view template's name, RAM size, number of networks, primary disk size, number of cores.

After you set up all parameters, click the **Create Virtual Server** button to start the creation process.

When virtual server is created, you will be redirected to VS details page.

You can view VS creation logs at VS details page (activity log section). If ProvisionGRUB log fails during VS creation, take the following steps:

1. Go to VS console.
2. Log in with credentials, created at step 2 of the VS creation wizard.
3. Run the following command:
9.3.5 OVA Virtual Server Wizard Beta

OVA virtual servers are created from the OVAs uploaded to the Control Panel and saved as specific OVA templates. The OVAs are uploaded at the Control Panel > Cloud > Templates menu. For more information, refer to the Upload OVAs section of this guide.

9.3.5.1 Before You Begin

If you do not see OVA template group in the Template store, go to your Profile > Bucket tab and check Limits for template store section. If OVA template group is missing, add it by clicking the "+" button in the upper right corner of this section.

To create a virtual server from the OVA:

1. Go to your Control Panel > Cloud > Virtual Servers menu and click the "+" button, or click the Create Virtual Server button at the bottom of the screen. This will start a VS creation wizard.
2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
3. Click the Create Virtual Server button to start the creation process. You will be taken to the virtual server details screen.

On this page:

- Step 1 of 6. Templates
- Step 2 of 6. Virtual Server Properties
- Step 3 of 6. Compute Resources
- Step 4 of 6. Storage Resources
- Step 5 of 6. Network Resources
- Step 4 of 6. Confirmation

See also:

- Manage OVA Virtual Servers
- OVA Virtual Server Networks
9.3.5.2  Step 1 of 6. Templates

At this step, choose a specific OVA template from which your virtual server will be built.

To choose a template:
1. Click the OVA template group.
2. Select the template.
3. Click Next.

Additional information for Windows templates

The Windows Licensing Type box appears for Windows templates and includes license options that you configure for a corresponding template store. You can select one of the following license types:

- **MAK** - the default licensing type applicable to all Windows-based virtual servers. If you don't select the licensing type, MAK is set by default.
- **KMS** - the licensing type applicable to every virtual server since Windows 7, Windows Server 2008, and the following Windows versions. Click KMS and then select a licensing Server.
- **User license** - type your license key

When you create a virtual server from a Windows template, consider the following:

- You can create Windows-based virtual servers without running Sysprep. Disable the Run Sysprep option while creating or editing a destination compute zone.
- If multiple virtual servers are deployed from the same template without running Sysprep, they will have identical security identifiers (SIDs) that can result in the system conflict.
- You can't select KMS or your own license when you create a Windows virtual server from a custom template. As a workaround, you can create a virtual server from a template used for custom template creation.
- You can build a Windows 10/Windows Server 2016 virtual server on KVM CentOS 6 and CentOS 7 compute resources that run at least on the following processor:
  - Ivy Bridge Intel® Xeon® Processor E Series v2 Family
  - AMD Opteron G2, G3, G4, G5, and G6
  - The fsgsbase CPU flag is required for a destination compute zone. For more information on CPU flags, see Manage Extended CPU Configuration for Compute Zone.
9.3.5.3 Step 2 of 6. Virtual Server Properties

At this step you need to indicate your virtual server’s properties.

Specify the following virtual server properties:

- **Label** - the label of the virtual server. The required parameter.
- **Hostname** - the hostname of the virtual server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [-]. For more info on hostname validation, refer to [RFC standard documentation](https://tools.ietf.org/html/rfc1123).

**Additional Considerations for Windows**

The following symbols are not allowed for Windows-based virtual servers:

- percent sign [%]
- double quotation marks [“]
- brackets [<,>]
- vertical bar [|]
- caret [^]
- ampersand [&]
- parentheses [(,)]

- **Domain** - specify the domain for this VS. For example, in test.onapp.com the test is a hostname and onapp.com is a domain. If you don’t enter a domain, the default value localdomain is used as follows test.localdomain. This parameter is not applicable to Windows virtual servers.

- **Password** - a secure password for the VS. It can consist of 6-99 characters, letters [A-Za-z], digits [0-9], dash [-] and lower dash [ _ ], and the following special characters: ~ ! @ # $ * _ - + = ` \ { } [ ] : ; ' , . ? / . You can use both lower- and uppercase letters. If you leave password field blank, it will be generated automatically.

  The password, set at this step, will overwrite the password specified in OVA file.

  - **Password confirmation** - repeat the password to confirm it.
  - **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.
  - **Encryption passphrase** - enter a passphrase for encryption
  - **Encryption passphrase confirmation** - repeat the passphrase for encryption

Click **Next** to proceed to the following step of the wizard to specify the virtual server resources.

9.3.5.4 Step 3 of 6. Compute Resources

At this step, you can configure the following compute resources for your OVA VS:
• **RAM** - set the amount of virtual server's RAM. The minimum value is the RAM value taken from OVA file. The maximum RAM depends on your bucket's settings. The maximum RAM that can be assigned to a VS is 168 GB regardless of the Max RAM value set in the bucket.

• **CPU Cores** - set the amount of virtual server's CPU cores. The minimum value is the amount of CPU cores specified in OVA file. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.

• **CPU Priority (or CPU Units)** - set virtual server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to **Billing Calculation** section for details on CPU units and CPU priority.

• **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the amount of sockets.

• **Compute Zone** - the compute zone where the VS should be imported

• **Compute Resource** - the specific compute resource where the VS from OVA will be imported. Compute resource may be selected automatically according to the set **provisioning type**.

---

### 9.3.5.5 Step 4 of 6. Storage Resources

**Storage Resources**

When you create a VS from the OVA template, you can select different data stores to put disks on them. During the creation process, all disks are imported from the OVA configuration and their size cannot be changed. The first disk becomes primary and the next disks will be numbered in the subsequent order starting from 2 (Disk 2, Disk 3, etc.). When you select a data store for each of your VS’s disks, pay attention to its price and the total free disk capacity.

**Primary Disk**

- **Data Store** - choose a data store for VS’s primary disk. Each data store free space is indicated in brackets.
- **Size** - fixed primary disk size imported from OVA configuration

**Disk 2**

- **Data Store** - choose a data store for VS’s disk. Each data store free space is indicated in brackets.
- **Size** - fixed disk size imported from OVA configuration

### 9.3.5.6 Step 5 of 6. Network Resources

Before you apply network configuration, consider the following: (check this out for OVA virtual server)

- You can see the resources only if you have the **Show Networks on Virtual Server creation** and **Show Network Zones on Virtual Server creation** permissions enabled.

- When you create a virtual server in Federation, you cannot set a network port speed to a value greater than indicated by a seller while adding a zone to Federation.

- Since not every application supports IPv6, at least one IPv4 address must be allocated to a primary network interface.

- The **Show only my IP addresses** checkbox appears only if you select a specific network, not Any network.

- The **Selected IP address** option is available in the wizard if it is enabled via **Admin > Settings > Configuration > System > Show IP address selection for new VS**.

When you create a VS from the OVA template, you can select in which network the VS will be created. The first network becomes Network Interface 1 and the next networks will be numbered in the subsequent order starting from 2 (Network Interface 2, Network Interface 3, etc.). The
amount of network interfaces will be taken from the OVA configuration. If the OVA has several
network interfaces, you can change the following parameters for each of them.

- **Network** - choose the network from which the VS should get the IP address
- **IP net** - select from the drop-down list the IP net from which the IP address should be
  assigned
- **IP range** - select from the drop-down list the IP range from which the IP address should be
  assigned
- **IP address** - assign an IP address for the VS from the drop-down menu. Indicate compute
  resource and network to have the list of available IPs.

Be aware, that you should choose only public IP address. Otherwise VS, built from OVA, will not work properly.

- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP
  addresses dropdown.
- **Selected IP address** - if the option is available, you can also assign an IP address for the
  VS from the drop-down menu. Indicate Compute resource and network to have the list of
  available IPs.
- **Port Speed** - set the port speed for this VS

Selected IP address option is enabled via the "Show IP address
selection for new VS” slider on the Settings > Configuration screen
(under the System tab).

You can't select unlimited port speed if the Network Zone is not selected. In
this case the port speed will be 1 by default. It's possible to create virtual server with unlimited network speed without
selecting a network zone only if you have only one Network Zone
assigned to your bucket.

Click **Next** to proceed to the last step of the wizard.

9.3.5.7  Step 6 of 6. Confirmation
At this step, configure the automation settings. This is the final step of the virtual server creation
wizard.

- Move the **Build Virtual Server** slider to the right if you want the system to automatically
  build the VS. If you leave this box blank, you will have to build your server manually after it
  is created.
- Move the **Boot Virtual Server** slider to the right if you want the virtual server to be started
  up automatically.

At the Confirmation step you can find the configuration summary of VS, which will be
created. You can view template's name, RAM size, number of networks, primary disk size,
number of cores.

After you set up all parameters, click the **Create Virtual Server** button to start the creation
process.

When virtual server is created, you will be redirected to VS details page.
You can view VS creation logs at VS details page (activity log section). If ProvisionGRUB log fails during VS creation, take the following steps:

1. Go to VS console.
2. Log in with credentials, created at step 2 of the VS creation wizard.
3. Run the following command:

   ```
   grub2-install /dev/sda || grub-install /dev/sda
   ```

   After running the command, reboot the VS.

9.3.6 Manage OVA Virtual Servers

OnApp Cloud gives you high-end cloud management features for virtual servers that are built from OVAs including:

<table>
<thead>
<tr>
<th>Virtual Server Options</th>
<th>Power Options</th>
<th>Administrative Options</th>
<th>Networks</th>
<th>Disks</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot / Reboot in recovery</td>
<td>Change owner</td>
<td>Configure network interface</td>
<td>Edit disks</td>
<td>CPU utilization</td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspend</td>
<td>Reset Root Password</td>
<td>Set firewall rules</td>
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</tr>
<tr>
<td>Delete</td>
<td>Shut down</td>
<td>Set SSH keys</td>
<td>Virtual server IP addresses</td>
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</tr>
<tr>
<td>Segregate</td>
<td>Startup / Startup on Recovery</td>
<td>Display network speed for network interfaces</td>
<td>Disk IOPS statistics</td>
<td></td>
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</tr>
<tr>
<td>Clone</td>
<td></td>
<td></td>
<td>Edit network speed</td>
<td>Accelerated OVA VS Statistics</td>
<td></td>
</tr>
<tr>
<td>Set VIP status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ensure that OVA permissions are on before managing OVA virtual servers. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

This document provides the information on how you can manage the virtual servers built from OVA.
9.3.6.1 Edit OVA Virtual Server

You can edit resources for all VSs. Depending on the OS it is built on, some VSs can have their CPU and RAM resized without needing to be powered off ("resize without reboot"). If the OVA template allows resize without reboot, the resize should be completed automatically: you will be returned to the VS details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to confirm that the VS will need rebooting so that the resize can take place.

Windows virtual servers cannot be resized without reboot.

To adjust VS resources:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the server you want to resize, to show its details screen.
3. Click the Tools button and select the Edit Virtual Server link.
4. Change CPU cores, CPU priority/units and RAM values.
5. Click the Save button.

9.3.6.2 Segregate OVA Virtual Server
If required, you can instruct OnApp to make sure a VS is never booted on the same compute resource as another specific VS. This may be important if, for example, you have two name servers or a load balanced web server, and you need to keep VSs on separate physical servers.

To segregate one VS from another:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you want to segregate.
3. On the screen that appears, click the Tools button, then click Segregate Virtual Server.
4. In the dialogue box that pops up, use the drop-down menu to choose a VS you want to keep away from.
5. Click the Segregate Virtual server button to finish.

### 9.3.6.3 Clone OVA Virtual Server

You can create a clone based on the same resources as the origin OVA virtual server. The cloned virtual server inherits resources from the origin as follows.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Cloned Virtual Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties - owner, hostname, password, and label</td>
<td>The same as the origin virtual server with Clone in the label, for example, Clone Origin Label.</td>
</tr>
<tr>
<td>Compute, data store, and network resources &amp; zones</td>
<td>The same as the origin virtual server. If there are no available resources on the same data store, network, and compute resource, you cannot clone a virtual server.</td>
</tr>
<tr>
<td>Recipes, recipe variables, and service add-ons</td>
<td></td>
</tr>
<tr>
<td>Firewall rules</td>
<td></td>
</tr>
<tr>
<td>IP address</td>
<td>• Virtual servers built from Windows or Linux OVA templates - a random IP address is assigned from an IP range in the origin network.</td>
</tr>
<tr>
<td></td>
<td>• Virtual servers built from OVA templates with Other OS type - an IP address from the origin virtual server is assigned. After a virtual server is cloned and before you start it, you should assign a new IP address.</td>
</tr>
<tr>
<td>Swap disk</td>
<td>A new swap disk is created on the cloned virtual server.</td>
</tr>
<tr>
<td>Backups</td>
<td>The backups of the origin virtual server are not cloned.</td>
</tr>
</tbody>
</table>

To clone a virtual server, follow the next procedure:

1. Go to your Control Panel > Cloud > Virtual Servers.
2. Click a label of the virtual server that you want to clone.
3. Click Tools and then click Clone Virtual Server.
4. In the pop-up box, click **Clone Virtual Server** to confirm the action.

After you confirm the action, several transactions are run to complete the cloning process. You can check a status of each transaction in **Activity Log** of the virtual server. After the virtual server is cloned, it is powered off until you **start it**.

9.3.6.4 Migrate OVA Virtual Server

Hot migration is available for VSs created from OVA if **Allowed hot migrate** slider was enabled during **OVA upload** or during **OVA editing**.

OnApp allows migration of OVA virtual servers between compute resources that share common data stores (or data store zones).

To migrate a virtual server:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you want to migrate.
3. Click the **Tools** button and press the **Migrate Virtual Server** link.
4. In the window that appears, choose the target compute resource from the drop-down menu.
5. Click the **Start Migration** button.

After migration, the power status of your virtual server remains the same as before the migration.

OnApp administrators can control user access over virtual server migration. Using OnApp permissions, you can allow/forbid users to perform migration of all virtual servers, or their own servers only. This is handled via the Control Panel's **Roles** menu.

9.3.6.5 Delete OVA Virtual Server

Shut down the virtual server before destroying it. If you are deleting a VS that is running, the VS will be deleted after the time set in Timeout Before Shutting Down VSs configuration parameter.

To remove the virtual server from the cloud:
1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. On the screen that appears, you'll see the list of all virtual servers in the cloud. Click the label of the virtual server you want to delete.
3. On the virtual server's screen, click the **Tools** button, then select **Delete Virtual Server**.
4. Confirm by clicking the **Destroy** button.

**IMPORTANT:**
- You won't be able to restore a virtual server after deleting it.
- Deleting a virtual server removes all data stored on that virtual server.

9.3.6.6 OVA Virtual Server Power Options
To manage a virtual server power options:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on VSs (the exact list shown depends on the VS status):
   - Reboot Virtual Server - powers off and then restarts the VS.
   - Reboot in Recovery - powers off and then restarts the VS in the recovery mode.
   - Suspend - stops a VS, changes its status to suspended and disables all the other actions on VS, unless unsuspended.
   - Shut Down Virtual Server – pops up a dialogue box, where you can either Shut Down VS (terminates the VS gracefully), or Power Off VS (terminates the VS forcefully).
   - Startup Virtual Server - queues a start-up action for a VS that's currently powered off.

When you start up a VS, it might be implicitly cold migrated if the current compute resource does not have sufficient resources. For more information, refer to Virtual Server Provisioning.

- Startup on Recovery - starts the VS in recovery mode.

9.3.6.7 Change Owner of OVA Virtual Server

To change owner of OVA virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS's screen to expand the VS Tools menu.
4. Click the Change Owner link.
5. Choose a user to whom you want to pass ownership of the VS from the drop-down list.
6. Click the Change Owner button.

9.3.6.8 Set SSH Keys for OVA Virtual Server

To set SSH keys for OVA virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS's screen to expand the VS Tools menu.
4. Click the Set SSH keys link. SSH keys of the administrator and a VS owner will be assigned to the VS. If a VS owner does not have any SSH keys, the system will only assign admin keys.
5. Click the Set SSH-keys button.

9.3.6.9 Reset Root Password for OVA Virtual Server

To reset root password of OVA virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the **Tools** button on the VS's screen to expand the VS Tools menu.
4. Click the **Reset Root Password** link.
5. Move the **Set password** slider to the right to enter and confirm new password. Move the **Encrypt password** slider to the right to encrypt your password.
6. Click the **Set Password** button.

### 9.3.6.10 Set VIP Status for OVA Virtual Server

If a compute resource fails or reboots, the system migrates virtual servers to another compute resource, one VS at a time. The order VSSs are migrated in is random. However, you can give a virtual server "VIP" status, and this will give that VS priority in the migration queue.

To set or remove VIP status for a VS:
1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Use the icon in the **VIP** column next to a required virtual server to change switch on/off the VIP status.

### 9.3.7 Manage OVA Virtual Server Advanced Configuration

You can manage your OVA virtual servers at a raw configuration level by editing the configuration file available for each VS in your Control Panel.

- This functionality is available only for virtual servers created from the OVAs with the Network Appliance operating system.
- You can only edit configuration file for OVA virtual servers that are built on CentOS 7 KVM compute resources.

### 9.3.7.1 Upload OVA VS Configuration

To edit the config file of an OVA virtual server, follow the next steps:

1. Go to Control Panel > **Cloud** > **Virtual Servers** menu and click a label of a specific virtual server.
2. Click the **Configuration** tab > **Network Appliance Config**.
3. On the page that loads you can add-edit the network appliance config for the OVA server:
   - You can insert a network appliance config file from your local computer at the **File** tab by clicking the **Choose File** button. After the file is uploaded, network appliance config will appear in the corresponding field.
   - You can add a URL to your network appliance config file in the **File url** field at the **File url** tab.
4. Click **Submit** to save changes.
5. After you edit the network appliance config, you need to reboot the OVA server at **Control Panel** > **Cloud** > **Virtual Servers** > **Label** > **Tools** > **Reboot Virtual Server**. Changes to
the network appliance config will not take effect if the server is not rebooted. The reboot should be done via OnApp Control Panel. If the reboot command is issued inside the OVA server, the changes to the network appliance config will not take effect.

9.3.7.2 Upload OVA VS License

To edit the config license file of an OVA virtual server, follow the next steps:

1. Go to Control Panel > Cloud > Virtual Servers menu and click a label of a specific virtual server.

2. Click the Configuration tab > Network Appliance License.

3. On the page that loads you can add-edit the network appliance license for the OVA server:
   - You can insert a license file from your local computer at the File tab by clicking the Choose File button. After the file is uploaded, network appliance config will appear in the corresponding field.
   - You can add a URL to your license file in the File url field at the File url tab.

4. Click Submit to save changes.

5. After you edit the network appliance config, you need to reboot the OVA server at Control Panel > Cloud > Virtual Servers > Label > Tools > Reboot Virtual Server. Changes to the network appliance config will not take effect if the server is not rebooted. The reboot should be done via OnApp Control Panel. If the reboot command is issued inside the OVA virtual server, the changes to the network appliance config will not take effect.

9.3.8 OVA Virtual Server Networks

The Networking menu in the Virtual Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers.

9.3.8.1 Configure OVA Virtual Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this VS. Network interfaces join the physical network to the VS. When you create a VS a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default. OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS’s primary network interface.

To see the list of all network interfaces allocated to the VS:

On this page:

- Configure OVA Virtual Server Network Interface
- Set OVA Virtual Server Firewall Rules
- OVA Virtual Server IP Addresses
- OVA Virtual Server Network Speed

See also:
• Create OVA Virtual Server

• Manage OVA Virtual Servers

• OVA Virtual Server Disks

• OVA Virtual Server Statistics

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. On the page that follows you will see the following fields:
   • Interface – optional label of the network interface.
   • Network join – name of the network and a Compute resource or Compute zone this network is joined to.
   • Port speed – the speed set to the interface.
   • Primary interface – indication whether the interface is primary or not.

Here you can also view Interface Usage, Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

To add a network interface:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. Click the Add New Network Interface button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   o Label – a human-friendly name for the new interface.
   o Physical Network – choose a network join from the drop-down menu, which lists network joins assigned to the compute resource/compute zone on which the VS runs).
   o Port speed – set port speed in Mbps, or make it unlimited.
6. Click the Submit button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click Edit icon next to the appropriate network interface. After editing the port speed, the virtual server should be power cycled for the change to take effect.

To delete a network interface, click the Delete icon next to the interface you want to delete.

• To run the VS, at least one network interface with an assigned IP address (or addresses) is required!
• To allocate another physical network, add a new network interface.
9.3.8.2 Set OVA Virtual Server Firewall Rules

With OnApp you can set firewall rules for the network interfaces of virtual servers. There are two types of firewall rule:

- **ACCEPT** – defines the packets that will be accepted by the firewall
- **DROP** – defines the packets that will be rejected by the firewall

Ensure that the following permissions are enabled before setting firewall rules for your virtual server:

- Create own firewall rules
- Destroy own firewall rules
- Read own firewall rules
- Update own firewall rules

You cannot apply firewall rules to virtual servers which are parts of a blueprint.

You can set the following:

- **add a specific firewall rule** - you can configure a firewall rule with specific parameters (source, destination port, protocol type etc.)
- **set default firewall rules** - you can set default firewall rules for an entire network interface

9.3.8.2.1 Add a specific firewall rule

To configure a firewall rule:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the VS for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, set the following:
   a. Choose the network interface.
   b. Specify if the rule defines requests that should be accepted or dropped.
   c. Set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. Set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      - Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
   e. Protocol type (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
f. Choose the protocol (TCP, UDP, DCCP, SCTP or ICMP).

g. Enter a comment to the firewall rule.

5. Save the rule by clicking the Add Rule button. The rule will be saved in the UI, but the transaction won't be started until you click the Apply Firewall Rules button.

6. To start the transaction which runs firewall rules for a VS, click Apply firewall rules button.

7. Use Up and Down arrow buttons in the left column to change firewall rule position.

8. To edit or delete a firewall rule click the appropriate icon in the last column.

9.3.8.2.2 Default firewall rules
To set default firewall rules for a network interface:

1. Go to your Control Panel > Cloud > Virtual Servers menu.

2. Click the label of the OVA VS for which you want to configure a firewall rule.

3. Click the Networking tab, then click Firewall.

4. On the page that appears, go to Default firewall rules section.

5. Choose ACCEPT or DROP command next to the network interface and click Save Default Firewall Rules. The rule will be saved in the UI, but the transaction won't be started until you click the Apply Firewall Rules button.

Example:
The Int1 ACCEPT 122.158.111.21 22 TCP firewall rule means that the Int1 network interface will accept all requests and packets addressed from 122.158.111.21 using the TCP protocol on port 22.
The Int2 DROP 122.158.111.21 22 UDP firewall rule means that the Int2 network interface will reject all requests and packets from 122.158.111.21 using the UDP protocol on port 22.

9.3.8.3 OVA Virtual Server IP Addresses

In the Networking -> IP Addresses tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.

2. Click the label of the virtual server you're interested in.

3. Click the Networking tab > IP Addresses.

4. Click the Allocate New IP Address button.

5. Select a network interface from the drop-down menu (only the network interfaces you added to the VS will be available). The IP Address will be allocated automatically.

6. (Not available for federated VSs) As an alternative you can manually select an IP address from the IP Pool associated with the network interface. To enable this option move the Specify IP Address slider to the right and choose IP Address from the drop-down list. You may select an IP address that's already assigned to a VS, but only one VS should be online at a time. Use Show only used IPs, my IPs and IPv6 buttons to narrow the list of IP in the drop-down list.

7. Click the Add IP Address button.

To remove an IP address from a VS:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you’re interested in.
3. Click the **Networking > IP Addresses** tab.
4. Click the **Delete** icon next to the IP address you want to delete.
5. In the pop up window that appears:
   - Choose **Delete with Reboot** option if you want to reboot a VS and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the VS's Overview page.
   - Choose **Delete without Reboot** option if you don't want to reboot a VS. In this case to apply the changes, you will have to the reboot the VS additionally.

You can't delete an IP address that is in use.

### 9.3.8.4 OVA Virtual Server Network Speed

The main **Virtual Servers** screen displays the network speed of each VS's primary network interface. To see the speed of all interfaces assigned to a VS:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you are interested in.
3. Click the **Networking > Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.

To edit a virtual server's network speed:

1. Go to your Control Panel > **Cloud > Virtual Servers** menu.
2. Click the label of the virtual server you want to change.
3. Go to the **Network** tab > **Network Interfaces**.
4. In the last column click the **Edit** button.
5. Change the port speed.
6. Click the **Submit** button to save changes.

### 9.3.9 OVA Virtual Server Disks

Virtual server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific virtual server.

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual virtual servers are managed through the Control Panel > **Cloud > Virtual Servers** menu.

Starting from OnApp 6.3, it is not possible to assign disks to OVA virtual servers.
The primary disk is imported from OVA configuration during OVA VS creation. You can add new disks after the VS is created and built. That will be totally new disks without the information from OVA.

On this page:

Edit OVA Virtual Server Disks
Migrate OVA Virtual Server Disks
Delete OVA Virtual Server Disks

See also:

Create OVA Virtual Server
Manage OVA Virtual Servers
OVA Virtual Server Networks
OVA Virtual Server Statistics

9.3.9.1 Edit OVA Virtual Server Disks

You can resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your VS.

To change disk size:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to change, then click the Edit link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the Save Disk button.

- You cannot decrease disk size. Only the increase disk size option is available. Be aware, that increasing of disk size will not increase the disk partitions.
- Size of a primary disk cannot exceed 2 TB.
- If you resize a disk to a Linux-based OVA VS, it will be necessary to rescan or reboot the VS after increasing the disk size.

9.3.9.2 Migrate OVA Virtual Server Disks

You can migrate disks of your virtual servers to other data stores, which are allocated to the same compute resource. Unlike VS migration – disk migration requires reboot of the VS (despite the template it is based on).

To migrate a disk:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab > **Disks**.

4. Click the **Actions** button next to the disk you want to move to another data store, then click the **Migrate** button.

5. On the screen that appears, select a target data store from a drop-down box.

6. Click **Start Migrate**.

- You can only migrate disks to data stores in data store zones assigned to your bucket.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- If you move a 850GB disk between aggregates with 10GB actual usage, the 'dd' image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero 'd space which may not be able to be recovered.

9.3.9.3 Delete OVA Virtual Server Disks

To delete a disk:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.

2. Click VS label to open its details screen.

3. Click the **Storage** > **Disks** tab.

4. Click the **Actions** button next to the disk you want to delete, then click **Delete**.
   - If you wish to reboot a VS after removing a disk, in the pop-up window, move the **Force Reboot** slider to the right, then select the VS shutdown type.
   - Move the **Required Startup** slider to the right if you wish to start up the VS automatically.

   These steps apply to disks of VSs that are powered on.

5. Click the **Destroy Disk** button.

   This will schedule the "destroy disk" transaction.

9.3.10 OVA Virtual Server Statistics

For your convenience, the system tracks VS performance and generates statistics on: Virtual Server CPU Utilization, Interface Usage, VS Billing statistics and Virtual Server Disk IOPS Statistics.
9.3.10.1 OVA Virtual Server CPU Utilization

OnApp tracks CPU usage for virtual servers and generates charts that help analyze VS performance.

The charts show the total CPU usage for all the cores of this particular VS for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

On this page:

- OVA Virtual Server CPU Utilization
- OVA Virtual Server Billing Statistics
- OVA Virtual Server Network Interface Statistics
- OVA Virtual Server Disk IOPS Statistics

See also:

- Create OVA Virtual Server
- Manage OVA Virtual Servers
- OVA Virtual Server Networks
- OVA Virtual Server Disks

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Overview tab > CPU Usage.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the Show in My Timezone slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

To see what percentage of compute resource CPU resource a VS takes, go to your Control Panel's Virtual Servers menu and click the label of the VS you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this VS.

9.3.10.2 OVA Virtual Server Billing Statistics

OnApp has a record of all the charges applied to your VSs for the last three month period. If a virtual server was created less than three months ago, statistics are recorded for the VS's
existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for a virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Overview > Billing Statistics tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button. By default the statistics are generated for the last three months or the actual VS existence period.
5. Move the Show in my Timezone slider to the right if you want to view billing statistics according to your profile's timezone settings. By default, billing statistics is shown in UTC.
6. On the page that appears:

   The price parameters on this page do not take into consideration the free limits for resources set in the bucket.

   • Date – particular date and time for the generated statistics
   • Users – the virtual server owner. Click the owner name to see the User Profile (user details)
   • Virtual Servers – the virtual server name with the total due for VS resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
   • Network Interfaces Usage – the total due for the network interfaces used by this VS for the point of time specified in the Date column. Click the network interface name to see its details.
   • Disks Usage – the list of disks assigned to this VS with the total due for the disk space resources (disk size, data read/written, reads/writes completed) for the point of time specified in the Date column. Click the disk name to see its details.
   • Costs – the total due for the Virtual Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

9.3.10.3 OVA Virtual Server Network Interface Statistics

OnApp tracks network usage for virtual servers and generates charts that help analyze network performance. To see network utilization statistics for a virtual server:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking > Network Interfaces tab.
4. Click the Statistics (chart) icon next to the network you're interested in.
5. On the screen that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.
6. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.
9.3.10.4 OVA Virtual Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for virtual servers and generates charts that help analyze VS disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for a virtual server:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.
5. There are four charts on the screen that appears:
   - IOPS for the last hour
   - IOPS for the last 24 hours
   - Data written/read for the last 24 hours
   - Data written/read for the last hour
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.3.11 OVA Virtual Server Backups

OnApp supports normal backups for OVA virtual servers. Normal backups contain all the information stored on a server's disk. If you have switched on incremental backups for the cloud, normal backups will still be made for OVA virtual servers. For detailed information on backups refer to Virtual Server Backups.

- Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a virtual server. To view the list of user backups, refer to View User Backups section.
- If required, you can change the block size which is used during backup creation at Control Panel > Admin > Settings > Configuration by editing the Block Size (MB) parameter.

9.3.11.1 View OVA Virtual Server Backups

To view the list of OVA virtual server's backups:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required OVA virtual server.
3. Click the **Backups** tab, then select **Images**. Images are full backups of OVA virtual server disks.

4. On the screen that appears, you'll see a list of OVA virtual server backups.

5. Click the label of the required OVA virtual server backup to see the following tools - restore backup, delete backup and add/edit note.

**On this page:**

- View OVA Virtual Server Backups
- Take OVA Virtual Server Disk Backups
- Restore OVA Virtual Server Backup
- Delete OVA Virtual Server Backup
- Add OVA Virtual Server Backup Note

**See also:**

- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates Configuration

---

### 9.3.11.2 Take OVA Virtual Server Disk Backups

To back up an OVA virtual server disk:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the server you want to back up.
3. Click the **Storage tab** and select **Disks**. You'll see a list of the disks allocated to that OVA virtual server.
4. Click the **Actions** icon next to a disk you want to take a backup of, then click **Backup**. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups and delete them.
   - To make a backup, click the **Take a Backup** button at the end of the list. If required, you can add a note to a new backup. You can also select **Force Windows Backup**.

   This option for Windows virtual servers is designed as a last resort, when the backup cannot be taken due to NTFS file system problems. Switching on this option will bring up a dialog box with the following message: "If you enable this option there is no guarantee that backup will be consistent."

   Select "Yes" to proceed.
9.3.11.3 Restore OVA Virtual Server Backup

To restore a backup:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required OVA virtual server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the backup you want to revert to and choose Restore.

9.3.11.4 Delete OVA Virtual Server Backup

To delete a backup:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required OVA virtual server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the backup you want to remove and choose Delete.

9.3.11.5 Add OVA Virtual Server Backup Note

To add/edit virtual server backup's note:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the required OVA virtual server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the required backup and choose Add Note. Make necessary changes and click Submit.

9.3.12 OVA Virtual Server Backup Schedules

In addition to the system auto-backup presets, you can schedule backups of virtual servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of scheduled OVA VS backups and Auto-Backup Presets provides a great deal of flexibility in the way backups are handled for the cloud, and for individual VSs. Auto-backup Presets can be applied to all new VSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSs, outside of the auto-backup pattern.

OnApp supports only normal backups for OVA virtual servers, which include all the data from the server's disk.

9.3.12.1 View OVA Virtual Server Backup Schedules

To view the list of backup schedules for an OVA virtual server:

On this page:
- View OVA Virtual Server Backup Schedules
- Create OVA Virtual Server Backup Schedule
- Edit OVA Virtual Server Backup Schedule
- Delete OVA Virtual Server Backup Schedule

See also:
- Virtual Servers
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the OVA virtual server you’re interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that appears, you will see the list of backup schedules along with their details:
   - **Date** - the time when the schedule was created
   - **Target** - the server or disk for which the schedule was created (depending on the backup type)
   - **Action** - the scheduled action
   - **Period** - how frequently the backup will occur according to a period type set in the next step.

   For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this filed is set 1.
   - **Period type** - the backup period: days, weeks, months, or years
   - **Rotation period** - the number of backups, after which the first backup will be deleted.

   By default, in this filed is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this filed, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.
   - **Next Start** - the date and the hour of the next backup
   - **User** - the user who created the backup schedule
   - **Status** - schedule status
   - **Actions** - click the Actions icon to edit or delete the backup schedule

9.3.12.2 Create OVA Virtual Server Backup Schedule

To add a backup schedule:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the OVA virtual server you want to schedule a backup for.
3. Click the **Storage** tab, then select **Disks**.

4. On the screen that appears, click the **Actions** button next to the disk you want to back up, then select **Schedule for Backups**.

5. On the screen that follows, click the **New Schedule** button.

6. Specify schedule details:
   
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   
   - **Rotation period** - the number of backups after which the first backup will be deleted
   
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   
   - **Enabled** - move the slider to enable or disable the schedule

7. Click the **Save** button to finish.

---

**9.3.12.3 Edit OVA Virtual Server Backup Schedule**

**To edit a backup schedule:**

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.

2. Click the label of the OVA virtual server you want to schedule a backup for.

3. Click the **Storage** tab, then select **Disks**.

4. On the screen that appears, click the **Actions** button next to the disk you want to back up, then select **Schedule for Backups**.

5. Click the **Edit** icon next to a schedule to change its details.

6. Specify schedule details:
   
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   
   - **Rotation period** - the number of backups after which the first backup will be deleted
   
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   
   - **Enabled** - move the slider to enable or disable the schedule

    For a schedule with the **Failed** status, you can move the **Enabled** slider to the right to run the shedule once again.

7. Click the **Save** button to finish.
9.3.12.4 Delete OVA Virtual Server Backup Schedule

To delete a backup schedule:

1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the label of the OVA virtual server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.4 Smart Servers

Smart servers are dedicated entities based on KVM CloudBoot Compute resources with passthrough enabled. Smart servers are created and managed exactly the same as virtual servers, the only difference is that only one smart server can be created per Compute resource. Using a smart server feature, you can create and manage servers on smart appliances with passthrough enabled. You can set the minimum specifications for the smart servers (minimum size, resource price, etc.) in the same way as for virtual servers.

Smart servers can be organized into zones to create different tiers of service - for example, by setting up different zones for smart appliances, with limits and prices specified per zone. Smart compute zones can also be used to create private clouds for specific users.

Smart servers required IOMMU support:
- Intel-based Servers => Vt-d
- AMD-based servers => AMD-Vi

Smart servers are based on templates and are deployed on Compute resources. Compute resources give them access to CPU, disk and network resources. OnApp Cloud gives you high-end cloud management features including:

See also:
- CloudBoot Compute Resources
- Create Smart Server
- Manage Smart Servers
- Manage Smart Server Networks
- Manage Smart Server Disks
- Manage Smart Server Backups
- Manage Smart Server Backup Schedules
- Manage Smart Server Statistics
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</table>

The following options are not available for smart servers:

- hot migration
- segregation
- VIP status
- firewall rules
- Network interface statistics
- Edit network speed

Also, VLANs are not configured automatically on smart servers. You need to configure them manually in accordance with your OS and hardware settings.

- smart servers support LVM and integrated storage types.
- the Passthrough to Guest must be enabled for one of the smart server's network interfaces.
• all conventional PCI devices behind a PCIe-to-PCI/PCI-X bridge or conventional PCI bridge can only be collectively assigned to the same guest. PCIe devices do not have this restriction.

• limits and prices are specified individually for each smart appliance zone assigned to the bucket.

If the smart Compute resource (where the smart server will be deployed) has a NIC device that features multiple ports, make sure the appliance NIC can perform a FLR reset:

1. Log in as root to a Compute resource where it is deployed
2. Run the following command:
   
   # lspci -vv|grep "Ethernet|FLR" --color=always

   If it returns the FLReset- you need to install another NIC if possible. If not - the smart server cannot be deployed on this Compute resource.

9.4.1 Create Smart Server

You need to add and configure a smart CloudBoot compute resource before you can create a smart server. See the Create CloudBoot Compute Resource section for details.

To create a smart server:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. On the screen that appears, press "+" button or click the Add New Smart Server button underneath the list of servers on the screen.
3. Complete the smart server creation form.

It is possible to deploy Windows smart servers without running sysprep. To do so, you need to disable the Run Sysprep option for the Compute zone where the smart server will be built. See Create Compute Zone section for details. When provisioning smart server with simple deploy option, make sure that the template you use has all the necessary drivers inside it, otherwise the smart server network settings will not be configured.

9.4.1.1 Step 1 of 5. Templates

Choose a template to build a smart server on, then click Next. You can use any KVM templates for smart server creation.
Before creating a Windows-based smart server, make sure that the appropriate drivers were added to the /data folder on CP.

On this page:
- Step 1 of 5. Templates
- Step 2 of 5. Properties
- Step 3 of 5. Resources
- Step 4 of 5. Recipes
- Step 5. Confirmation

See also:
- Smart Server Creation Workflow
- Manage Smart Server
- Smart Server Disks
- Smart Server Backups
- Create Virtual Server
- Set User Billing Plan Prices And Resource Limits
- Smart Servers (API guide)

9.4.1.2 Step 2 of 5. Properties

- Label - choose a label for the Smart Server.
- Hostname - choose a hostname for the Smart Server. The hostname may consist of letters [A-Z a-z], digits [0-9] and dash [-].
- Domain - specify the domain for this VS. The default value is localdomain. This parameter is not applicable to Windows virtual servers.

For example:
- test.onapp.com - specify 'test' as hostname, 'onapp.com' as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - test.onapp.com.localdomain.
• **Time zone** - set the time zone set for the smart server. This parameter is applicable only to Windows smart servers.

• **Password** - Give your smart server a secure password. If you leave password field blank, it will be generated automatically.

• **Password confirmation** - repeat the password to confirm it.

• **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.

• Click **Next**.

Currently, the time zone is set at the Compute resource side only. Therefore, users need to set the target time zone inside a Windows smart server manually. Setting correct time zone at the Compute resource side helps to keep correct time inside a smart server after starting it if time synchronization is not completed for some reason.

9.4.1.3 Step 3 of 5. Resources

Set the resources needed for this smart server:

**Compute Resources**

• **Compute Zone** - choose a smart Compute zone to build the smart server on.

• **Compute resource** - choose a specific smart Compute resource to reside the smart server on. Please note: you can only reside your smart server on cloud booted KVM Compute resources.

**Resources**

• **RAM** - set the amount of virtual server's RAM. The maximum RAM depends on your bucket settings. The maximum RAM that can be assigned to a smart server is 168 GB regardless of the Max RAM value set in the bucket. The maximum RAM that can be assigned to a smart server built on a XEN 32bit (x86) template is 16 GB.

• **CPU Cores** - set the amount of virtual server's CPU cores. This parameter sets CPU sockets by default, unless CPU topology is enabled.

• The following options are available for smart servers providing the **Enable CPU topology permission** is switched on for the user.
  - **Use CPU Topology** - move the slider to the right, to set the following parameters:
    - **CPU Sockets** - set the amount of sockets.

**Primary Disk**

• **Data Store** - choose a data store for the smart server’s primary disk.

• **Primary disk size** - set the primary disk size.

**Swap Disk**

• **Data Store** - choose a data store for this server’s swap disk.

• **Swap disk size** - set the swap disk size.

• **Disable** - select the checkbox to disable swap disk creation

**Network Configuration**
Network Interface 1

- **Network** - the network from which the IP address for the smart server will be allocated
- **IP net** - select from the drop-down list the IP net from which the IP address should be assigned
- **IP range** - select from the drop-down list the IP range from which the IP address should be assigned
- **IP address** - select an IP address to be assigned from the drop-down box
- **Show only my IP addresses** - if the option is available, you can also assign an IP address for the smart server.
- **Selected IP address** - IP address for this smart server.
- **Port Speed** - set the port speed for this smart server

Click Next.

9.4.1.4 Step 4 of 5. Recipes

1. Choose a recipe you want to assign to this smart server by dragging the required recipe from the **Available recipes** pane to the **Assigned for provisioning** pane.
2. To add a custom variable, click the "+" button next to the **Custom recipe variables** title bar, then specify the variable details:
   - Specify the recipe name and its value.
   - Move the **Enabled** slider to the right to allow the use of this variable.
3. Click Next.

9.4.1.5 Step 5. Confirmation

- Move the **Enable Automated Backup** slider to the right if you want this server to be backed up automatically (according to the backup settings configured in the Settings/Auto-backup Presets menu)
- Move the **Build Smart Server** slider to the right if you want the system to automatically build the server. If you leave this box blank, you will have to build your server manually after it is created.
- Move the **Boot Smart Server** slider to the right if you want the server to be started up automatically.
- Move the **Enable Autoscale** slider to the right to set autoscaling for this smart server.

- Until the **autoscaling rules** are configured the autoscaling itself will not start working.
- If the **Enable Autoscale** slider is grayed out that means that you have reached the autoscaling limit in the bucket (or the max is set as 0).

- Move the **Acceleration allowed** slider to the right to enable **accelerator** to allow acceleration for this VS or move this slider to the left to prohibit acceleration for this VS.
The **Acceleration allowed** slider is available if the following conditions are met:

- Accelerator is available in the network
- IP Address, selected during VS creation, is in the same network as Accelerator
- VS is created by setting own virtual server's resources, not by selecting a predefined instance package
- The *Show IP address selection for new VS* slider is activated in the Control Panel **Settings** menu > **Configuration**
- Only HTTP is supported. Other protocols, including HTTPS, will be passed through to the VS directly.
- In order to route the VS’s traffic, the VS must be on the same network with the Accelerator.

At the Confirmation step you can find the configuration summary of the smart server, which will be created. You can view template’s name, RAM size, number of networks, primary disk and swap disk size, number of cores.

Click **Submit** button. The smart server will be added to the system. You can view it under the **Smart Servers** menu.

### 9.4.2 Smart Server Creation Workflow

The following scheme describes the steps required to create a smart server:
User wants to create a smart server

User completes the smart server creation form

Step 1: Templates
- Choose any KVM template

Step 2: VS Properties
- Specify the smart server label and hostname
- Choose a compute zone and a compute resource
- Set the password

Step 3: Resources
- Set RAM, CPU cores, and CPU priority
- Set the disk space
- Choose a data store and network zones
- Set the port speed

Step 4: Recipes
- Choose a recipe
- Assign a custom variable

If required:
- Enable Automated Backup
- Build Smart Server
- Boot Smart Server
- Primary disk file system
- Enable Autoscale

Step 5: Confirmation

Click the Submit button to start the creation process
9.4.3 Manage Smart Servers

Smart servers are dedicated entities based on KVM CloudBoot compute resources with the passthrough enabled. Smart servers are created and managed exactly the same as virtual servers, the only difference is that only one smart server can be created per compute resource.

Using a smart server feature, you can create and manage servers on smart appliances with pass through enabled. You can set the minimum specifications for the smart servers (minimum size, resource price, etc) in the same way as for virtual servers.

Smart servers can be organized into zones to create different tiers of service - for example, by setting up different zones for smart appliances, with limits and prices specified per zone. Smart compute zones can also be used to create private clouds for specific users.

In this document you can find information on how to manage Smart Servers in your OnApp cloud.

9.4.3.1 View Smart Servers

To view the list of smart servers deployed in the cloud:

1. Go to your Control Panel > Cloud > Smart Servers menu to see an overview of all smart servers in the cloud with their details:
   - OS
   - Label
   - IP addresses
   - Disk size
   - RAM
   - CPU cores
   - CPU priority
   - Backups
   - Power status

On this page:

- View Smart Servers
- View Smart Server Details
- Rebuild/Build Smart Server Manually
- Edit Smart Server
- Edit XML Config
- Migrate Smart Server
- Smart Server Power Options
• **Smart Server Administrative Options**

• **Delete Smart Server**

See also:

• **Compute Resources**

• **Compute Zones**

• **Create Smart Server**

• **Smart Server Networks**

• **Permissions**

2. Click the **Actions** button next to the server for the quick access to the list of available actions (the list of actions displayed depends on the server status).

3. To change the smart server power status, click the required status icon.

4. To view particular smart server details, click the label of a required server.

5. To add a new smart server, press "+" or click the **Add New Smart Server** button.

### 9.4.3.2 View Smart Server Details

To view details of a specific smart server:

1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.

2. Click the label of the smart server you're interested in.

3. The screen that appears loads the **Smart server properties**, **notes**, activity log and **tools for managing** your smart server.

#### 9.4.3.2.1 Smart Server Properties

Smart server properties page gives a general overview of the smart server details:

• Template this smart server is built on

• Power status & On/Off/Reboot buttons.

> Clicking the OFF button performs a graceful shutdown and then powers off the virtual server after the timeout set in Configuration settings.

• FQDN (fully qualified domain name)

• Smart compute resource

• Login credentials

• Owner

• Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.

• Memory

• CPU(s)
- CPU priority
- Disk Size
- Disk backups
- Network Speed
- IP Addresses
- Auto-backups
- Notes
- Activity log

Autoscaling and VIP status options are not available for smart servers.

- Acceleration allowed - move the Acceleration allowed slider to the right to allow acceleration for this VS or move this slider to the left to prohibit acceleration for this VS. Acceleration status of the VS will be changed on the next CDN Sync Runner run (default value 20 minutes). To edit CDN Sync Runner delay, refer to Edit Infrastructure Configuration section of this guide. If VS is accelerated, you can also view the actual Acceleration Status - active or inactive.

Ensure that Accelerate any Virtual Server/Accelerate own Virtual Servers permissions are on before enabling acceleration for the VS. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

- Boot from CD - move the slider to the right to boot a smart server from the location where ISOs are stored. If this slider is disabled, then smart server will be booted from the disk where smart server is provisioned.

9.4.3.2.2 Notes
The Notes section lists brief comments or reminders for a Smart server. You can add either Admin's or User's notes. The Admin's note will be available to cloud administrators. Click the Actions button in the Notes section of the page to add admin's or user's note.

9.4.3.2.3 Smart Server Management
- Click the Tools button to expand the Tools menu with the Smart Server management options.
- Use the top menu to manage your smart servers' networking/storage options.

9.4.3.3 Rebuild/Build Smart Server Manually

To build/rebuild virtual server build/rebuild virtual server must be enabled. This is a new permission which manages build/rebuild functionality independently from update virtual server permission which used to regulate the build/rebuild options in the previous versions.
If you haven’t checked the **Build Smart Server** option during the smart server creation process, you will have to do this manually after the SS has been created. Building a smart server is the process of allocating physical resources to that smart server.

To build a smart server manually or rebuild the server on the same (or another) template:

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the server you’re interested in.
3. On the screen that appears, click the **Tools** button and then click **Rebuild Smart Server**.
4. On the screen that pops up, use the drop-down menu to choose a template with which to build the server.
5. Move the **Start VS after rebuild** slider to the right if you want to have your server started automatically after it is built.
6. Click the **Rebuild Virtual Server** button to finish.

> After you rebuild your template all data will be lost!

---

**9.4.3.4 Edit Smart Server**

To edit smart compute resource settings:

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the server you want to edit.
3. Click the **Tools** button and select the **Edit smart server** link. You can edit the label, pricing, CPU, RAM, CPU priority resources for all smart servers. You can also edit the time zone for Windows smart servers.

> After you edit the server’s time zone, you need to stop and then start up the smart server.

Currently, the time zone is set at the compute resource side only. Therefore, users need to set the target time zone inside a Windows smart server manually. Setting correct time zone at the compute resource side helps to keep correct time inside a smart server after starting it if time synchronization is not completed for some reason.

Depending on the OS it is built on, some smart servers can have their CPU and RAM resized without needing to be powered off ("resize without reboot").

4. Click the **Save** button to save your changes.

> If the smart server template allows resize without reboot, the resize should be completed automatically: you will be returned to the server details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to
confirm that the smart server will need rebooting so that the resize can take place.

9.4.3.5 Edit XML Configuration

You can manage your smart servers at a raw configuration level by editing the XML configuration file available for each smart server in your Control Panel.

**Important**

Smart servers with modified XML configuration are not supported by the OnApp support team.

To edit the XML config file of a smart server, follow the next steps:

1. Go to your Control Panel > Cloud > Smart Servers menu and click a label of a specific smart server.
2. Expand the Tools menu and click the Edit XML Config button in the Smart Server Options.
3. Click the Unlock button to be able to edit the XML file. In the pop-up box, click Yes to confirm your action.
4. Edit configuration and click the Save button. In the pop-up box, select whether you want to save changes with or without a reboot. Changes will be applied only after the VS reboot, so if you select the Save without reboot option, the update will be postponed until the next VS reboot.

To revert changes that you made before saving configuration, click the Cancel button.

If you want to discard all changes, click the Reset to default button at the Edit XML Config page. In the pop-up box, select whether you want to reset configuration with or without a reboot. Changes will be applied only after the VS reboot, so if you select the Reset without reboot option, the update will be postponed until the next VS reboot.

This action initiates deletion of all changes you have applied in the XML configuration except for RAM and CPU related modifications. As a result, the XML configuration file will be reset to default and locked.

If you edit RAM or CPU Cores for smart server:

- After clicking the Save button, the RAM and CPU cores are validated according to the bucket settings and the price for the resources can be changed. If the bucket does not allow the changes you applied, the appropriate message will be displayed.
- The Reset to default button will not restore the RAM and CPU values to the previous state.

You can not perform the following actions after you save changes in the smart server XML configuration file:

- Edit smart server
- Create/edit/migrate/delete smart server disks and set disk IOPS limits
- Create/edit/delete network interfaces
9.4.3.6 Migrate Smart Server

To migrate Smart Servers between different compute resources the network interface configuration of those compute resources should be identical.

OnApp allows cold migration of smart servers between hosts that share common data stores (or data store zones). Cold migration means moving smart servers that are shut down.

To migrate a smart server:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Shut down the smart server you want to migrate.
3. Click the Tools button and press the Migrate Smart Server link.
4. In the window that appears, choose the target smart server from the drop-down menu.
5. Click the Start Migration button.

OnApp administrators can control user access over smart server migration. Using OnApp permissions, you can allow/forbid users to perform migration of all smart servers, or their own servers only. This is handled in the Control Panel's Roles and Sets menu.

9.4.3.7 Smart Server Power Options

To manage a smart server power options:
1. Go to your Control Panel > Cloud > Smart Server menu.
2. Click the label of the smart server in question.
3. Click the Tools button on the Smart server's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on smart servers (the exact list shown depends on the smart server status):
   - Reboot Smart Server - powers off and then restarts the smart server.
   - Reboot in Recovery - powers off and then restarts the Smart Server Recovery mode with a temporary login ("root") and password ("recovery") for servers where password encryption is enabled. For servers with password encryption disabled, the root password will be used to reboot in recovery.
   - Windows smart servers boot from the Linux-based recovery template in a recovery mode. You need to log in as admin via SSH or VNC console, then mount a Windows system disk manually.
   - Note that smart servers can be rebooted only from Control Panel > Tools menu. If you try to restart smart server from VNC console, the reboot will fail.
   - You cannot work with the "whole" disk (like mount -t ntfs-3g /dev/sdb1) while mounting and checking block devices inside the recovery image, as Windows disk is split into partitions.
• **Suspend Smart Server** - stops a smart server, changes its status to suspended and disables all the other actions on SS, unless unsuspended.

• **Shut Down Smart Server** – pops up a dialog box, where you can either Shut Down SS (terminates the SS gracefully), or Power Off SS (terminates the SS forcefully).

• **Startup Smart Server** - queues a start-up action for an SS that's currently powered off.

> When you start up a smart server, it might be implicitly cold migrated if the current compute resource does not have sufficient resources. For more information, refer to [Server Provisioning](#).

• **Startup on Recovery** - starts the SS in recovery mode with a temporary login ("root") and password ("recovery").

• **Boot from ISO** - boots the smart server from an ISO. You can boot smart servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. If you boot a smart server from an ISO with the RAM requirement larger than the smart server’s RAM, the transaction will fail. Make sure that you have enabled the Any power action on own virtual servers and Allow own virtual servers to boot from ISO permissions for the user to have access to this feature.

To boot a smart server from an ISO:

a. Click the **Boot from ISO** button.

b. Select the ISO image from which the VS will be booted.

c. Click the **Boot** button.

> As soon as you boot a smart server from the ISO, OnApp cannot control any components (backups, networks, disks). The migration option is not available for smart servers booted from ISO. The only available actions will be start and stop a smart server. Be aware, that all the contents of the disk will be deleted.

### 9.4.3.8 Smart Server Administrative Options

To manage a smart server administrative options:

1. Go to your Control Panel > **Cloud** > **Smart Server** menu.

2. Click the label of the smart server in question.

3. Click the **Tools** button on the smart server's screen to expand the Tools menu.

4. The **Tools** menu enables you to perform the following administrative actions on smart servers:

   • **Reset Root Password** - resets the root password for this SS (the password is displayed in SS Information).

   • **Change Owner** - pops up a dialogue box with a drop-down of all users on the system, enabling you to pass ownership of the SS to the user selected from the list.

   • **Set SSH keys** – assigns SSH keys of the admin and an SS owner to the SS. If an SS owner does not have any SSH keys, the system will only assign admin keys.
9.4.3.9 Delete Smart Server

Shut down the smart server before destroying it. If you are deleting a smart server that is running, the server will be deleted after the time set in Timeout Before Shutting Down configuration parameter.

To remove the smart server from the cloud:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. On the screen that appears, you'll see the list of all servers in the cloud. Click the label of the smart server you want to delete.
3. On the server screen, click the Tools button, then select Delete Smart Server.
4. Confirm the deletion.

9.4.4 Manage Smart Server Networks

The Networking menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for smart servers. In this document you can find information on how to manage Smart Server networks.

- To run the smart server, at least one network interface with an assigned IP address (or addresses) is required!
- To allocate another physical network, add a new network interface.

9.4.4.1 Configure Smart Server Network Interfaces

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to the smart server. Network interfaces join the physical network to the smart server.

When you create a smart server, a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default.

OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a smart server primary network interface.

On this page:

- Configure Smart Server Network Interfaces
- Rebuild Smart Server Network
- Allocate/Remove Smart Server IP Addresses
- Display Network Speed for Network Interfaces on Smart Server Page
- Advanced Network Interfaces
- Recommended Network Configuration

See also:

- Smart Server Disks
- Smart Server Backups

- Smart Server Backup Schedules
To see the list of all network interfaces allocated to the smart server:
1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. Click the label of the smart server you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. On the page that follows you will see the following fields:
   - **Interface** – optional label of the network interface.
   - **Network join** – name of the network and a Compute resource or Compute zone this network is joined to.
   - **Port speed** – the speed set to the interface.
   - **Primary interface** – indication whether the interface is primary or not.

Here you can edit and delete network interfaces (using icon controls) and add a new network interface using the button at the bottom of the screen.

To add a network interface:
1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. Click the label of the smart server you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. Click the **Add New Network Interface** button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   - **Label** – a human-friendly name for the new interface.
   - **Physical Network** – choose a network join from the drop-down menu, which lists network joins assigned to the Compute resource/Compute zone on which the smart server runs).
   - Click the **Submit** button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click the **Edit** icon next to the appropriate network interface. After editing the port speed, the smart server should be power cycled for the change to take effect.

To delete a network interface, click the **Delete** icon next to the interface you want to delete.

### 9.4.4.2 Rebuild Smart Server Network

To rebuild a network join, added to the smart server (required after allocating new IP addresses):
1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. Click the label of the required smart server.
3. On the screen that appears, click the **Tools** button, then click **Rebuild Network**.
4. In the pop-up window, move the **Force Reboot** slider to the right, then select the smart server shutdown type:
   - Power OFF smart server
   - Shutdown smart server
   - Gracefully shutdown smart server
Smart servers are rebooted by default after rebuilding the network.

5. Move the **Required Startup** slider to the right to start up the smart server automatically after the network is rebuilt.

6. Click the **Rebuild Network** button.

### 9.4.4.3 Allocate/Remove Smart Server IP Addresses

In the **Networking > IP Addresses** tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the smart server:

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Networking** tab, then click **IP Addresses**.
4. Click the **Allocate New IP Address** button.
5. Select a network interface from the drop-down menu (only the **network interfaces** you added to the smart server will be available)
6. Select an IP address from the IP Pool associated with the network interface.
7. Click the **Add IP Address** button.
8. Click the **Rebuild Network** button to rebuild the network.

You must rebuild the network after making changes to IP address allocations.

To remove an IP address from a smart server:

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Networking > IP Addresses** tab.
4. Click the **Delete** icon next to the IP address you want to delete.
5. In the pop-up window that appears:
   - Choose **Delete and rebuild the network** option if you want to reboot a smart server and rebuild the network immediately after deleting the IP address. After choosing the **Delete and rebuild the network** option you will be redirected to the smart server **Overview** page.
   - Choose **Delete without rebuilding the network** option if you don't want to reboot a smart server. In this case to apply the changes, you will have to the reboot the smart server additionally.

You can't delete an IP address that is in use.
9.4.4.4 Display Network Speed for Network Interfaces on Smart Server Page

The main Smart Servers screen displays the network speed of each smart server primary network interface. To see the speed of all interfaces assigned to a smart server:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the smart server you are interested in.
3. Click the Networking > Network Interfaces tab.
4. On the screen that appears, the Port Speed column shows the network speed of the network interface.

9.4.4.5 Advanced Network Interfaces

You can also manage the advanced configuration of network interface devices at Control Panel > Cloud > Smart Servers > label of the necessary smart server > Tools > Hardware Devices page. The Advanced Network Interfaces slider becomes visible in the top right corner of the page once the smart server starts speaking VIF Storage API. For this, the smart server should be properly connected to the Control Panel and have network interfaces available. Move the slider to the right to show the advanced network interfaces for a smart server.

9.4.4.5.1 Add Advanced Network Interface Device

If required, you can manually create an advanced network interface with custom parameters. To do so:

1. Go to your Control Panel > Cloud > Smart Servers > label of the necessary smart server.
2. Click the Tools button and select the Hardware Devices option.
3. On the page that appears, click the Create new custom network interface device button.
4. Specify the following details:
   - Name
   - PCI
   - MAC address
5. Click Save.

To edit the network interface label, PCI or MAC address, click the Edit icon next to the appropriate network interface.

To delete a network interface, click the Delete icon next to the interface you want to delete.

9.4.4.6 Recommended Network Configuration

The recommended network configurations for smart server cloud is the following:
The recommended network configurations for mixed smart/baremetal server cloud is the following:
9.4.5 Manage Smart Server Disks

Smart server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific smart server. Disks can be assigned as standard or swap disks (there are no swap disks for Windows-based templates). They can also be set as primary (that is, the disk from which an OS will boot).

It is possible to use incremental backups. For details, see Smart Server Backups section of this guide.

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual smart servers are managed through the Control Panel's Smart Servers menu, where you can:

Please note: Creating multiple partitions on one disk is forbidden for Windows-based virtual servers.

9.4.5.1 Add Disks to Smart Server

Adding a disk to a smart server will require that server to be rebooted. If a smart server is running when you try to add a new disk to it, you'll be asked to confirm the reboot. To add a disk to a smart server:

On this page:

- Add Disks to Smart Server
- Edit Smart Server Disks
- Migrate Smart Server Disks
- Delete Smart Server Disks

See also:

- Smart Server Backups
- Smart Server Backup Schedules
- Smart Server Statistics
- Smart Server Integrated Console

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click a smart server label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the "+" button or the Create Disk button.
5. Fill in the details:
   - Specify disk's label
   - Choose the data store to create a disk on from the drop-down menu.
   - Set the desired disk size.
Please note that support of secondary disks larger than 2 TB is limited. Certain operations might fail. This will be improved in future releases.

**Click here to see the details of adding a disk 2 TB+**

- If you add a disk larger than 2 TB, you will not be able to mount or create a backup of such disk via OnApp Control Panel. These operations may be performed only manually inside a virtual server. Also, resize will not be possible for such disks.

- You can perform the following operations with a secondary disk that is larger than 2 TB:
  - **Migrate**
  - **Delete / Wipe**
  - **Edit IO limits**
  - **Rebalance** (for VSs with Integrated Storage feature enabled)

- OnApp provides a RAW device available inside a VS that you may use. For example, you may create a GPT partition and format it using any available file system which can be mounted inside VS.
  - Specify if this disk is swap space, and requires formatting.
  - Specify whether the disk should be added to Linux FSTAB, and its mount point. The maximum length of a **Mount Point** is 256 characters. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

    `/mnt/onapp-disk=#{disk.identifier}`

- To be able to take incremental backups for virtual server’s disk, you must mount this disk to FSTAB (either Linux or FreeBSD) and specify the proper mount point manually. Swap disks are not backed up.

6. Click the **Add Disk** button to finish.

When you add a new disk to a smart Compute resource it will automatically become available to that Compute resource.
You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your smart server.

To change disk size:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Make sure your smart server is powered off, then click its label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to change, then click the Edit link.
5. Enter a new disk label and size in GB in the fields provided.

Size of a primary disk cannot exceed 2 TB.

6. Click the Save Disk button.

9.4.5.3 Migrate Smart Server Disks

You can migrate disks of your smart servers to other data stores, which are allocated to the same smart Compute resource or smart Compute zone. Disk migration requires reboot of the smart server (despite the template it is based on).

To migrate a disk:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Make sure your smart server is powered off, then click its label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to move to another data store, then click the Migrate button.
5. On the screen that appears, select a target data store from a drop-down box.
6. Click Start Migrate.

- You can only migrate disks to data stores in data store zones assigned to your bucket.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- If you move a 850GB disk between aggregates with 10GB actual usage, the 'dd' image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero 'dspace which may not be able to be recovered.

9.4.5.4 Delete Smart Server Disks

To delete a disk:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Make sure your smart server is powered off, then click its label to open its details screen.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the disk you want to delete, then click Delete.

9.4.6 Manage Smart Server Backups

Backups are used for copying and archiving target data (target is either a disk or a smart server as a single whole of all disks used).

OnApp supports two backup types: normal and incremental:

- **Normal backup** - simple method of taking backups by making a full copy of target data and storing it in an archive.
- **Incremental** - advanced method of taking backups. During the incremental backup, only the changes made after the last backup are archived instead of backing up the whole target. You must have dedicated backup servers configured in your cloud to be able to utilize the incremental backups functionality. Incremental backups are enabled via Admin > Settings > Configuration > Backups/Templates menu.

It is not possible to take incremental backups if you are using location group functionality without a backup server added to the group - the following error message will appear:

"Backup cannot be made at this time: This disk cannot be backed up, check Location Group settings."

This issue will be fixed in next releases. As a workaround, add an empty backup server zone to your location group.

If required, you can change the block size which is used during backup creation at Control Panel > Admin > Settings > Configuration by editing the Block Size (MB) parameter.

Each backup type can be taken in two ways:

- Manually - the user logs into OnApp CP and clicks the “Take backup” button.
- Automatically - the user enables automatic backup option (daily, weekly, monthly, yearly). To enable auto-backups for virtual servers that support incremental backups which used auto-backups option before the upgrade, re-enable automatic backups by switching them off and on again.

If you are using incremental backups option, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your Compute resources. SSH file transfer option will be skipped for virtual servers using incremental backups. Existing full backups will be still accessible via Backups > Images menu.
9.4.6.1 How Do Incremental Backups Work?

For example, we have a disk with three files:

- File1 - 4Gb
- File2 - 2Gb
- File3 - 3Gb

The first incremental backup will be 9 GB (sum of all files). If you decide to take another incremental backup soon thereafter, the backup size will be equal to 0, as the files have not been changed since the first backup (if your backup has complicated directory structure, it could be more than 0, as file system could store some system data).

Then:

- If the user decides to delete File2, the target size will now be 7Gb. The subsequent incremental backup size will be 0, as new data has not been added.
- If the user adds File4 of 4 GB size, the subsequent incremental backup will equal 4 GB (the size of new data added).
• If the user increases File3 disk size to 6 GB, the subsequent incremental backup size will equal 6 GB, although the target is increased by 3 GB. This happens because the incremental system takes the update of the existing file as the deletion of the existing file and adding the new file with the same name (the first version of File3 has been deleted and the new one with 6GB size has been added).

Backups can be saved either to a Compute resource or to a dedicated backup server. When saving a backup, the system calculates if a user has enough physical/bucket resources to save a backup in the selected destination.

When saving a backup to a Compute resource, the system does not check if Compute resource has enough disk space to save a backup and only checks if a user has enough bucket limits.

When saving a backup to a dedicated backup server, the system checks both disk space and bucket limits.

Free disk size on a target must be at least equal to the disk’s size for which the backup is taken (or to a size of all VS disk for incremental backup). In some cases (for example, if a user has scheduled several disk backups simultaneously but there are only free space/billing limits for the first one) the system may allow taking all the backups but will not be able to save them. This will result in a system error and over-billing.

### 9.4.6.2 Backup Support by VM / Virtualization / OS

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<th>Incremental backup</th>
<th>Convert to template</th>
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</table>

### 9.4.6.3 View Smart Server Backups

To view the list of smart server's backups:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the required smart server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, you’ll see a list of smart server backups sorted by category.
5. Click the label of the required smart server backup to see the following tools - restore backup, delete backup, convert it to template and add note:

9.4.6.4 Take Smart Server Backup

To take an incremental backup:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the server you want to back up.
3. Click the Backups tab, then select Files. You’ll see a list of the disks allocated to that smart server.
4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You’ll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.
5. To take a backup, click the Take a Backup button at the end of the list.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a smart server. To view the list of user backups, refer to View User Backups section.

Template extraction is performed during serverprovisioning or taking a backup when using a particular template. To prevent template from being used in other transactions during extraction, template is locked during the extraction and unlocked on accomplishment. If other transaction tries to use the locked template, it will fail after 5 minutes of standby.

Transaction which locked template and failed, means that extracted template is broken.

Storing scheme:
- template /onapp/templates/your_template.tgz
- extracted template /onapp/backups/templates/your_template
- locked template /onapp/backups/templates/your_template.lock

9.4.6.5 Take Smart Server Disk Backup

To back up a smart server:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the appliance you want to back up.
3. Click the Storage tab > Disks. You’ll see a list of the disks allocated to that smart server.
4. Click the **Actions** icon next to a disk you want to take a backup of, then click **Backup**. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.

5. To take a backup, click the **Take a Backup** button at the end of the list.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a smart server. To view the list of user backups, refer to **View User Backups** section.

---

**9.4.6.6 Convert Smart Server Backup to Template**

To convert smart server backup to template:

1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. Click the label of the required smart server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup and choose the **Convert to Template**.

---

**9.4.6.7 Restore Smart Server Backup**

To restore a backup:

1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. Click the label of the required smart server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup you want to revert to and choose **Restore**.
   - If the file system on the disk is corrupted, it won't be possible to restore the files from incremental backup. In that case, you can force a backup restore and rebuild a file system on a disk. To do this, move the **Force Restore** slider to the right.
   - Note that Force Restore option is unavailable for incremental backups of FreeBSD virtual servers.
5. Click the **Restore Backup** button.
9.4.6.8 Edit Smart Server Backup Note

To edit smart server backup's note:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the required smart server.
3. Click the Backups tab, then select the appropriate backup type:
   o Images - full backups
   o Files - incremental backups
4. On the screen that appears, click the Actions icon next to the required backup and choose Add Note. Make necessary changes and click Submit.

9.4.6.9 Delete Smart Server Backup

To delete a backup:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the required smart server.
3. Click the Backups tab, then select the appropriate backup type:
   o Images - full backups
   o Files - incremental backups
4. On the screen that appears, click the Actions icon next to the backup you want to remove and choose Delete.

9.4.7 Manage Smart Server Backup Schedules

Schedules screen lists smart servers' scheduled backups. Depending on the backup type set in your cloud settings, schedules are created either per smart server or per disk. To view all backup schedules in the cloud, see Schedules Settings. In this document you can find information on how to manage Smart Server backup schedules.

9.4.7.1 View Smart Server Backup Schedules

To view the list of backup schedules for a particular Smart Server:

9.4.7.1.1 If normal backup options is selected for the cloud:

On this page:

- View Smart Server Backup Schedules
- Create Smart Server Backups Schedule
- Edit Smart Server Backup Schedule
- Delete Smart Server Backup Schedule

See also:

- Schedules Settings
- Auto-Backup Presets
• **Smart Server Statistics**

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the Smart Server you’re interested in.
3. Click the **Storage** tab, then select **Disks**.
4. On the screen that appears, click the **Actions** button next to the disk you want to back up, then select **Schedule for Backups**.
5. On the screen that appears, you will see the list of backup schedules along with their details:
   - **Date** - the time when the schedule was created
   - **Target** - the server or disk for which the schedule was created (depending on the backup type)
   - **Action** - the scheduled action
   - **Period** - how frequently the backup will occur according to a period type set in the next step.

   For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this field is set 1.

   - **Period type** - the backup period: days, weeks, months, or years
   - **Rotation period** - the number of backups, after which the first backup will be deleted.

   By default, in this field is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this field, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.

   - **Next Start** - the date and the hour of the next backup
   - **User** - the user who created the backup schedule
   - **Status** - schedule status

9.4.7.1.2 If incremental backup option is selected for the cloud

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the Smart Server you’re interested in.
3. Select **Backups > Schedules** tab, or click **Auto-backups** under the **Options** section to view incremental backups schedules only.
4. On the screen that appears, you will see the list of backup schedules along with their details:
   - **Date** - the time when the schedule was created
   - **Target** - the server or disk for which the schedule was created (depending on the backup type)
   - **Action** - the scheduled action
9.4.7.2 Create Smart Server Backups Schedule

In addition to the system auto-backup presets, you can schedule backups of Smart Servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of Scheduled VS backups and Auto-backup Presets provide a great deal of flexibility in the way backups are handled for the cloud, and for individual VSs. Auto-backup Presets can be applied to all new VSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSs, outside of the auto-backup pattern.

Depending on your cloud settings, you can schedule either normal or incremental backup schedules:
• Adding normal backup schedule
• Adding incremental backup schedule

9.4.7.2.1 Adding a normal backup schedule
To add a normal backup schedule:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.

4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that follows, click the New Schedule button.
6. Specify schedule details:
   o Period - how frequently the backup will take place according to a period type set.
     For example, the period of 2 and the period type of days will take a backup every two days.
   o Period type - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   o Rotation period - the number of backups after which the first backup will be deleted.
   o Start time - set the exact time of creating the transaction for backups scheduling.
     The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

7. Click the Save button to finish.

9.4.7.2.2 Adding an incremental backup schedule
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you want to schedule a backup for.
3. Click the Backups tab, then choose Schedules, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the New Schedule button.
5. On the screen that appears, specify new schedule's details:
   o Period - how frequently the backup will take place according to a period type set.
     For example, the period of 2 and the period type of days will take a backup every two days.
   o Period type - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   o Rotation period - the number of backups after which the first backup will be deleted.
   o Start time - set the exact time of creating the transaction for backups scheduling.
     The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

6. Click the Save button to finish.

9.4.7.3 Edit Smart Server Backup Schedule

9.4.7.3.1 To edit a normal backup schedule:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.

4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. Click the Edit icon next to a schedule to change its details.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   - **Enabled** - move the slider to enable or disable the schedule

   For a schedule with the *Failed* status, you can move the **Enabled** slider to the right to run the schedule once again.

7. Click the Save button to finish.

9.4.7.3.2 To edit an incremental backup schedule:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you’re interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the Edit icon next to a schedule to change its details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   - **Enabled** - move the slider to enable or disable the schedule

   For a schedule with the *Failed* status, you can move the **Enabled** slider to the right to run the schedule once again.

5. Click the Save button to save your changes.

9.4.7.4 Delete Smart Server Backup Schedule
9.4.7.4.1 To delete a normal backup schedule:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.4.7.4.2 To delete an incremental backup schedule:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the Smart Server you're interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options section to view incremental backups schedules only.
4. On the screen that appears, you will see the list of backup schedules.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.4.8 Manage Smart Server Statistics

For your convenience, the system tracks VS performance and generates statistics on CPU utilization, billing and Disk IOPS usage. In this document you can find information on how to view Smart Server statistics.

9.4.8.1 Smart Server CPU Utilization

OnApp tracks CPU usage for smart servers and generates charts that help analyze smart server performance.

The charts show the total CPU usage for all the cores of this particular smart server for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

On this page:
- Smart Server CPU Utilization
- Smart Server Billing Statistics
- Smart Server Disk IOPS Statistics

See also:
- User Billing Statistics
- Resource Allocation And Prices
- Permissions
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Overview tab > CPU Usage.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.

5. Move the *Show in My Timezone* slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.

6. To zoom into a time period, click and drag in a chart. Click the *Reset Zoom* button to zoom out again.

7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the *Apply* button.

To see what percentage of compute resource CPU resource a smart server takes, go to your Control Panel's *Smart Servers* menu and click the label of the smart server you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this smart server.

9.4.8.2 Smart Server Billing Statistics

OnApp has a record of all the charges applied to your smart servers for the last three month period. If a smart server was created less than three months ago, statistics are recorded for the smart server's existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for a smart server:
1. Go to your Control Panel > *Cloud* > *Smart Servers* menu.
2. Click the label of the smart server you're interested in.
3. Click the *Overview* > *Billing Statistics* tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the *Apply* button. By default the statistics are generated for the last three months or the actual smart server existence period.
5. Move the *Show in my Timezone* box to slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. On the page that appears:

   The price parameters on this page do not take into consideration the free limits for resources set in the bucket.

- **Date** – particular date and time for the generated statistics
- **Users** – the server owner. Click the owner name to see the User Profile (user details)
- **Virtual Servers** – the server name with the total due for smart server resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
- **Disks Usage** – the list of disks assigned to this smart server with the total due for the disk space resources (disk size, data read/written, reads/writes completed) for the point of time specified in the Date column. Click the disk name to see its details.
• Costs – the total due for the smart server, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

9.4.8.3 Smart Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for smart servers and generates charts that help analyze smart server disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for a smart server:

1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the server you're interested in.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.
5. There are four charts on the screen that appears:
   o IOPS for the last hour
   o IOPS for the last 24 hours
   o Data written/read (in Kb) for the last 24 hours
   o Data written/read (in Kb) for the last hour
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.4.9 Smart Server Integrated Console

OnApp provides an integrated VNC console that gives users direct access to their smart servers through the Control Panel UI. The noVNC console is provided for smart servers that are built on KVM CentOS 7 based on WebSockets. Users with the Administrator role can access all smart server consoles for support and troubleshooting purposes. The console connects a user browser to a VNC port or VNC WebSocket port available via a compute resource for the guest console.

To access the smart server VNC console via the Control Panel:
1. Go to the Cloud > Smart Servers menu.
2. Click a label of a destination smart server.
3. Click the Console button.
For the HTML5 console, click the **Re-connect** button if the connection is lost. The re-connection to the console runs as follows:

- If the console runs as expected, clicking the **Re-connect** button causes disconnection and the console is re-connected automatically after 1.5 seconds.
- If the console gets stuck, clicking the **Re-connect** button runs your request once again and re-connects the console without reloading.
- If the console gets disconnected with a status code and an error message, the console is re-connected automatically after 1.5 seconds.

To use the Java console instead of HTML5, go to **Admin > Settings > Configuration** and edit settings in the **System** tab. For more information, refer to **System Configuration**.

**See also:**

- [Smart Server Transactions and Logs](#)
- [Smart Server Recipes](#)
- [Smart Server Recipe Custom Variables](#)
- [Smart Server Billing](#)

### 9.4.10 Smart Server Transactions and Logs

The system records a detailed log of all the transactions happening to your smart servers. The list of transactions logged by the system includes:

- Provision smart server
- Startup smart server
- Stop smart server
- Resize smart server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Take backup
- Convert backup
- Restore backup
- Destroy backups
- Destroy virtual server
- Destroy template
- Download template
- Update firewall

To view transactions for a smartserver:

1. Go to your Control Panel > **Cloud > Smart Servers** menu.
2. Click the label of the server you're interested in.
3. The details screen for that server shows recent transactions in the **Activity Log** section.

To cancel pending tasks, click the **Cancel All Pending Tasks for this Smart Server** button.
See also:
- Smart Server Recipes
- Smart Server Recipe Custom Variables
- Smart Server Billing

9.4.11 Smart Server Recipes

In this document, you can find information on how to manage Smart Server recipes.

9.4.11.1 View Smart Server Recipes

To view smart server recipes:
1. Go to your Control Panel > Cloud > Smart Servers menu.
2. Click the label of the server you’re interested in.
3. Click the Overview tab, then choose Recipes.
4. The screen that follows shows details of all the recipes in the cloud:
   - The left pane shows the list of available recipes organized into recipe groups.
   - The right pane displays the list of events to which the recipes can be assigned to. Click the arrow button next to event to expand the list of recipes assigned to it.

On this page:
- View Smart Server Recipes
- Assign Recipe
- Remove Recipe

See also:
- Smart Server Integrated Console
- Smart Server Transactions and Logs
- Smart Server Recipe Custom Variables
- Smart Server Billing

9.4.11.2 Assign Recipe

Drag and drop recipe to assign it to the desired event.

You can assign virtual server recipes to the following events:
- VS provisioning - run the recipe during the virtual server provisioning
- VS network rebuild - run the recipe while rebuilding a network
- VS disk added - run the recipe while adding a disk to the virtual server
• **IP address allocated for VS** - run the recipe when adding an IP address to the VS network interface
• **IP address revoked from VS** - run the recipe when removing an IP address from the VS network interface
• **VS network interface added** - run the recipe while adding a network interface to the virtual server
• **VS network interface removed** - run the recipe while deleting a network interface from the virtual server
• **VS disk resized** - run the recipe while resizing a virtual server disk
• **VS resize** - run the recipe while resizing the virtual server
• **VS IP address add** - run the recipe while adding an IP address to the virtual server
• **VS IP address remove** - run the recipe while removing an IP address from the virtual server
• **VS start** - run the recipe while starting the virtual server
• **VS reboot** - run the recipe while rebooting the virtual server
• **VS hot migrate** - run the recipe during the hot migration of the virtual server
• **VS hot full migrate** - run the recipe during the hot migration of the virtual server with disk
• **VS failover** - run the recipe during the failover process

**To use drag and drop:**
1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

9.4.11.3 Remove Recipe

To remove recipe:

1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the **Delete** icon next to the recipe you want to remove.

9.4.12 Smart Server Recipe Custom Variables

You can define custom variables for particular smart servers. Each custom variable is a name-value set that can be used during the smart server recipe implementation. Custom variables are set on a per server basis. You can create custom variables during the smart server creation or via the smart server **Overview** menu.

To create a new custom variable:

1. Go to your Control Panel > **Cloud** > **Smart Servers** menu.
2. You'll see a list of all smart servers in your cloud. Click the name of a smart server for which you want to create a variable.
3. On the smart server details screen, click the **Overview** tab, then choose **Recipes Variables**.
4. On the screen that appears, click the "*" button.
5. Specify the recipe name and its value.
6. Move the **Enabled** slider to the right to allow the use of this recipe.

7. Click **Save**.

To edit a custom variable, click the **Edit** icon next to the required variable and change its details.

To delete a custom variable, click the **Delete** icon next to the variable you want to remove. You will be asked to confirm the deletion.

It is possible to set custom variables for image templates, as well as for smart servers. Note: smart server custom variables will always overlay template custom variables.

See also:
- [Smart Server Integrated Console](#)
- [Smart Server Transactions and Logs](#)
- [Smart Server Recipes](#)
- [Smart Server Billing](#)

### 9.4.13 Smart Server Billing

Smart servers are billed the same way as virtual servers. You can set limits and prices for CPU/CPU share/memory.

To charge for smart server resources:

1. Create a smart Compute zone.
2. Attach smart Compute resources to this zone.
3. Add this compute zone (smart server type) to a bucket and set the CPU/CPU share/memory limits.
4. Assign a user to this bucket.
5. Create a smart server under this user's account, and allocate the required smart server on a Compute zone that you've just added to the bucket.

Smart servers are also charged for IP addresses and the maximum port speed value (set in **Admin > Settings > Defaults** configuration).

See also:
- [Buckets](#)
- [Smart Server Integrated Console](#)
- [Smart Server Transactions and Logs](#)
- [Smart Server Recipe Custom Variables](#)

### 9.4.14 Smart Server Acceleration Settings

If you have accelerated smart servers, the Acceleration tab is available to you. At this tab, you can view accelerated smart server statistics, blacklist domains and remove cache content. The functionality is available for accelerated virtual servers and smart servers.
9.4.14.1 Accelerated Smart Server Statistics
This section provides the information on how you can view bandwidth statistics and cache utilization statistics of an accelerate-enabled smart server.

Ensure that Accelerate any Virtual Server/Accelerate own Virtual Servers permissions are on before managing accelerated VS statistics. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

To see the bandwidth and cache utilization statistics:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the accelerate-enabled smart server you're interested in.
3. Click the **Acceleration** tab > **Reporting**.
4. On the screen that appears, specify the period in the From and To fields and click the **Apply** button. The default period is the last week.
5. The first chart shows bandwidth statistics: the total/cached/non-cached statistics. The second chart shows cache utilization statistics: the number of pages cached on the Edge (hits) as well as the number of misses - the pages which are not cached.
6. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

9.4.14.2 Blacklist Domains
Blacklisting domains allows you to block a number of websites from being accelerated. This feature enables blacklisted websites to load from Origin again, while other websites hosted on the same smart server remain accelerated.

To blacklist a domain, do the following:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the accelerate-enabled smart server you're interested in.
3. Click the **Acceleration** tab > **Blacklist domains**.
4. Fill in the domains you want to blacklist.
5. Click the **Save** button.

Now when domains of choice are blacklisted, all the requests will be forwarded to origin directly and the response header will bypass Accelerator without any additional optimization.

9.4.14.3 Purge Content
This tool allows instant removal of cache content for the accelerated smart servers. You can purge all content or one/several files. In cases when you want to purge one or several files, the
system will compare the checksum of the cached file and the new one. The cached file will only be purged if the checksums vary, that is, the files are different. If the checksum of the two files is the same, the cached file will not be purged. When you purge all content, the checksums of the cached and new files are not taken into account.

**Limitations and prerequisites:**

- This tool applies only to accelerated smart servers.
- You need to have CDN enabled for the cloud to use the purge feature.
- You need have the Allow to purge content of all Virtual Servers or the Allow to purge content of Own Virtual Servers permission enabled to use this feature. For more information refer to [List of all OnApp Permissions](#).
- If several customers accelerate their smart servers using one Accelerator, they can purge each other's files, provided that they enter the correct URL.

To purge one/several files:

1. Go to [Control Panel > Smart Servers](#).
2. Click the label of the required smart server.
3. Click the [Acceleration tab > Purge](#).
4. In the input field, specify the path(s). You may indicate only one path per line. You can fill in either the original URL, the one prior to acceleration or the accelerated URL.
5. Click the [Submit](#) button to finish.

To purge all content:

1. Go to [Control Panel > Smart Servers](#).
2. Click the label of the required smart server.
3. Click the [Acceleration tab > Purge](#).
4. Click the [Purge All Contents of this Site](#) button to purge all content.

### 9.5 Baremetal Servers

Baremetal servers are physical servers that reside directly on the hardware without the virtualization layer. Baremetal servers are hosted on the dedicated baremetal compute resources, deployed for a single user. Utilization of baremetal servers allows locating customer's servers on a single piece of hardware. Use of baremetal servers in the cloud makes hardware resource utilization more efficient.

The advantages of baremetal servers:
- full access to the entire server
- tight security

Baremetal servers are provisioned via Xen and KVM CloudBoot compute resources that can be then organized into zones to create different tiers of service - for example, by setting up different zones for baremetal servers, with limits and prices specified per zone. Baremetal compute zones can also be used to create private clouds for specific users. Limits and prices are specified individually for each baremetal compute zone assigned to the bucket.

**See also:**

- [Create Baremetal Server](#)
- [Manage Baremetal Servers](#)
Baremetal Servers (API)

You can enable recovery mode for baremetal servers. For details, see Enable Recovery Mode for Baremetal Servers.

- Autoscale, Segregate and VIP status options are not available for baremetal servers. Also, it's not possible to wipe disks, as OnApp cloud administrators do not have access to baremetal server disks.
- VLANs are not configured automatically on baremetal servers. You need to configure them manually in accordance with your OS and hardware settings.

9.5.1 Create Baremetal Server

Baremetal servers are provisioned via Xen and KVM CloudBoot compute resources. You need to add and configure a baremetal CloudBoot compute resource before you can create a baremetal server. See the Create CloudBoot Compute Resource section for details.

To create a baremetal server:

1. Go to your Control Panel > Cloud > Baremetal Servers menu.
2. On the screen that appears, press "+" button or click the Add New Baremetal Server button underneath the list of servers on the screen.
3. Complete the baremetal server creation form:

   9.5.1.1 Step 1 of 5. Cloud Locations (Optional)

   The Cloud Locations step is available for users whose bucket includes compute zones assigned to 2 or more location groups. If Cloud Locations are not available or there are less than 2 location groups, the wizard starts from the Templates step. The Cloud Locations step is present in the wizard if the following requirements are satisfied:
   - All compute zones that are added to a user's bucket are assigned to location groups.
   - Compute zones that are added to a user's bucket are not assigned to the same location group.

   When you are the Cloud Locations step, select a location for your virtual server:
   - Country - select a country where the cloud is located
   - City - select a city from the country where the cloud is located

   Click Next to proceed to the following step of the wizard.

On this page:
- Step 1 of 5. Cloud Locations
- Step 2 of 5. Templates
9.5.1.2 Step 2 of 4. Templates

Choose a template to build a baremetal server on, then click Next.

The management network should be disconnected during the baremetal server deployment.

The image templates for provisioning the baremetal servers are stored in the following locations depending on the configuration:

1. If Use SSH File transfer CP configuration option is enabled in Control Panel Admin > Settings > Configuration menu, then the image template will be fetched from the specified server.

2. If Use SSH File transfer option is disabled, the image templates are located at onapp/templates, which is mounted from server specified in Static Config target CP configuration option (Control Panel > Admin > Settings > Configuration menu). Usually this is set to Control Panel server IP, but you can change it to be any other server.

You can find the list of templates for baremetal server creation under the following links (marked by “Yes” in column “Baremetal”):

http://templates.repo.onapp.com/Linux_templates.html

9.5.1.3 Step 3 of 4. Properties
• **Label** - the label of the virtual server.

• **Hostname** - the hostname of the virtual server. The hostname may consist of letters [A-Z a-z], digits [0-9] and dash [-].

• **Domain** - specify the domain for this VS. The default value is `localdomain`. This parameter is not applicable to Windows virtual servers.

For example:
`test.onapp.com` - specify 'test' as hostname, 'onapp.com' as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - `test.onapp.com.localdomain`.

• **Time zone** - set the time zone for the virtual server. This parameter is applicable only to Windows XEN and KVM virtual servers. Currently, the time zone is set at the Compute resource side only. Therefore, users need to set the target time zone inside a Windows VS manually. Setting correct time zone at the Compute resource side helps to keep correct time inside a VS after starting it if time synchronization is not completed for some reason.

• **Password** - a secure password for the Baremetal Server. If you leave password field blank, it will be generated automatically.

• **Password confirmation** - repeat the password to confirm it.

• **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.

• **Click Next**.

9.5.1.4 Step 4. Resources

For baremetal server creation, all disks in the Control Panel are used in their full size.

**Compute Resources**

- **Compute Zone** - choose a baremetal Compute zone to build the baremetal server on.

- **Compute resource** - Choose a specific baremetal Compute resource to reside the baremetal server on.

**Network Configuration**

Network Interface 1

- **Network** - select the network from which the baremetal server should get the IP address

- **IP net** - select from the drop-down list the IP net from which the IP address should be assigned

- **IP range** - select from the drop-down list the IP range from which the IP address should be assigned

- **IP address** - select an IP address to be assigned from the drop-down box
• Show only my IP address - tick this checkbox to view only own IP addresses in the IP addresses dropbox.

Click Next.

9.5.1.5 Step 5. Recipes (Optional)

The Recipes step is available only if there are any recipes and recipe groups in the cloud. Otherwise, the Submit button will appear at the Resources step.

Recipes
1. Select the required recipe in the left Available recipes pane and hold it down with the left mouse button.
2. Drag the recipe up to the right Assigned for provisioning pane and release the mouse button to drop and assign the recipe to the required baremetal server.

Custom recipes variables
Click the “+” button to add a custom variable.
• Name - specify the recipe name.
• Value - specify the recipe value.
• Enabled - move the slider to the right next to the necessary recipe to allow its use.

Click the Submit button. The baremetal server will be added to the system. You can view it under the Baremetal Servers menu.

9.5.2 Baremetal Server Creation Workflow

The following scheme describes the steps required to create a baremetal server:
User wants to create a baremetal server

User completes the baremetal server creation form

Step 1: Templates
- Choose a template

Step 2: Properties
- Specify the baremetal server label and hostname
- Choose a compute zone and a compute resource
- Set the password

Step 3: Resources
- Select a network zone

Step 4: Recipes
- Choose a recipe
- Assign a custom variable

Click the Submit button to start the creation process

See also:
- Baremetal Servers
- Create Baremetal Server
- Manage Baremetal Servers
9.5.3 Manage Baremetal Servers

Baremetal servers are physical servers that reside directly on the hardware without the virtualization layer. Baremetal servers are hosted on dedicated baremetal compute resources, deployed for a single user. Utilization of baremetal servers allows locating customer's servers on a single piece of hardware. Use of baremetal servers in the cloud makes hardware resource utilization more efficient. In this document, you can find information on how to manage baremetal servers.

9.5.3.1 View List of Baremetal Servers

To view the list of all baremetal servers deployed in the cloud:

1. Go to your Control Panel > Cloud > Baremetal servers menu to see an overview of all baremetal servers in the cloud with their details:
   - OS
   - label
   - IP addresses
2. Click the Actions button next to the server for the quick access to the list of available actions (the list of actions displayed depends on the server status).
3. To view the particular baremetal server details, click the label of a required server.
4. To add a new baremetal server, press "+" or click the Add New Baremetal Server button.

On this page:

- View the List of Baremetal Servers
- View Baremetal Server Details
- Baremetal Server Recovery Mode
- Delete Baremetal Server
- Recommended Network Configuration

See also:

- Compute Resources
- Virtual Servers
- ISO Virtual Servers
- OVA Virtual Servers
- Smart Servers

9.5.3.2 View Baremetal Server Details

To view details of a specific baremetal server:
1. Click the label of the server you're interested in.
2. On the screen that appears, you'll see the baremetal server properties and activity log:
   - FQDN (fully qualified domain name)
   - Baremetal Compute resource group the server belongs to.
   - Login credentials
   - Owner
   - Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.
   - IP Addresses
   - Admin Notes
   - User Notes
   - Activity log
3. To remove all pending tasks from the log, click the **Cancel all pending tasks for this Baremetal Server** button at the bottom of the screen.

9.5.3.3 Baremetal Server Recovery Mode

To reboot a baremetal server in the recovery mode:
1. Go to your Control Panel's **Baremetal Servers** menu.
2. On the screen that appears, click the label of the baremetal server you want to reboot in the recovery mode.
3. On the baremetal server screen, click the **Tools** button, then choose **Enable Recovery Mode**.

To disable recovery mode for a baremetal server:
1. Go to your Control Panel's **Baremetal Servers** menu.
2. On the screen that appears, click the label of the required baremetal server.
3. On the baremetal server screen, click the **Tools** button, then choose **Disable Recovery Mode**.

9.5.3.3.1 Enable Recovery Mode
To enable recovery mode for baremetal servers, perform the following steps:
1. Download the following files:
   - [http://templates.repo.onapp.com/Linux/recovery-baremetal.kernel](http://templates.repo.onapp.com/Linux/recovery-baremetal.kernel)
   - [http://templates.repo.onapp.com/Linux/recovery-baremetal.initrd](http://templates.repo.onapp.com/Linux/recovery-baremetal.initrd)
2. Place the files into the `/tftpboot/images/ramdisk-recovery/` directory.
3. Create template file `/tftpboot/pxelinux.cfg/template-baremetal-recovery` with following contents:
   ```
   default baremetal-recovery
   label baremetal-recovery
   kernel images/ramdisk-recovery/recovery-baremetal.kernel
   append initrd=images/ramdisk-recovery/recovery-baremetal.initrd
   root=/recovery-centos-3.2.iso rootfstype=auto ro liveimg
   rd.luks=0 rd.md=0 rd.dm=0
   ```
4. Restart the OnApp services:
Once done, recovery mode option will appear in the bare metal server's **Tools** menu.

### 9.5.3.4 Delete Baremetal Server

To remove a baremetal server from the cloud:

1. Go to your Control Panel > **Cloud** > **Baremetal Servers** menu.
2. On the screen that appears, you'll see the list of all baremetal servers in the cloud. Click the label of the server you want to delete.
3. On the baremetal server screen, click the **Tools** button, then choose **Delete Baremetal Server**.

After a user has been deleted a baremetal server, OnApp administrator receives an email notification. After that, administrator must reclaim a baremetal Compute resource by manually rebooting it, to make it available for new baremetal server creation.

### 9.5.3.5 Recommended Network Configuration

Recommended network configuration for baremetal server cloud is the following:
Recommended network configuration for mixed smart/baremetal server cloud is the following:
9.5.4 Manage Baremetal Server Recipes

In this document, you can find information on how to manage Baremetal Server recipes.

9.5.4.1 View Recipes

To manage baremetal server recipes:
1. Go to your Control Panel > Cloud > Baremetal Servers menu.
2. Click the label of the server you're interested in.
3. Click the Tools tab, then choose Recipes.
4. The screen that follows shows details of the available recipes the cloud:
   - The left pane shows the list of available recipes organized into recipe groups.
   - The right pane displays the list of events to which the recipes can be assigned to. Click the arrow button next to the event to expand the list of recipes assigned to it.

On this page:
- View Recipes
- Assign Recipe
- Remove Recipe

See also:
- Recipes
- Baremetal Server Recipe Custom Variables
- Baremetal Server Billing
- Manage Baremetal Servers

9.5.4.2 Assign Recipe

Drag and drop recipe to assign it to the desired event.

You can assign baremetal server recipes to the following events:
- VS provisioning - run the recipe during baremetal server provisioning

To use drag and drop:
1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

9.5.4.3 Remove Recipe

To remove recipe:
1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the **Delete** button next to the recipe you want to remove.

### 9.5.5 Manage Baremetal Server Recipe Custom Variables

You can define custom variables for particular baremetal servers. Each custom variable is a name-value set that can be used during the recipe implementation. Custom variables are set on a per server basis. You can create custom variables during the baremetal server creation or via the baremetal server **Tools** menu.

To create a new custom variable:

1. Go to your Control Panel > **Cloud** > **Baremetal Servers** menu.
2. You'll see a list of all baremetal servers in your cloud. Click the name of a server for which you want to create a variable.
3. On the baremetal server details screen, click the **Tools** tab, then choose **Custom Recipe Variables**.
4. On the screen that appears, click the "+" button.
5. Specify the recipe name and its value.
6. Move the **Enabled** slider to the right to allow use of this recipe.
7. Click **Save**.

To edit a custom variable, click the **Edit** icon next to the required variable and change its details.

To delete a custom variable, click the **Delete** icon next to the variable you want to remove. You will be asked to confirm the deletion.

---

It is possible to set custom variables for image templates, as well as for baremetal servers.

Baremetal server custom variables will always overlay template custom variables.

---

**See also:**

- **Recipes**
- **Baremetal Server Recipes**
- **Baremetal Server Billing**
- **Manage Baremetal Servers**

### 9.5.6 Baremetal Server Billing

Baremetal servers are billed in a slightly different way than other server types. You can only set IP address and template limits and prices for your baremetal servers.

To charge for baremetal server resources:

1. Create a baremetal server Compute zone and attach baremetal Compute resources to this zone.
2. Create a bucket.
3. Add the compute zone (baremetal server type) to the bucket and set the limits and prices in the bucket's Access Control and Rate Card for this zone.

4. Add a network zone to the bucket's Access Control.

5. Set the IP address limits for VSs powered off in the bucket's Access Control and set the price in the Rate Card. Each server deployed will take an IP from the network zone added to the bucket, and will be billed for each IP address taken. For more information, see Configure Resource Allocation And Prices.

6. Go to Template Store section of the bucket menu, add the required store to the Access Control. In the bucket's Rate Card set the add the required template store and set the price for each of the templates. Each time a baremetal server is built on the specific template, the user will be charged the amount set. For more details, see Template Store.

7. Assign a user to this bucket.

8. Create a baremetal server under this user's account based on the baremetal Compute resource in a Compute zone that you've just added to the bucket.

Do not set any other limits except the ones described above.

See also:
- Buckets
- Baremetal Server Recipes
- Baremetal Server Recipe Custom Variables
- Manage Baremetal Servers

9.6 Application Servers

Application Server is a regular VS based on default CentOS template with pre-installed additional software. This software allows you to install and have up & running various PHP/Perl/Python frameworks (like Drupal, Joomla, Wordpress etc.) on a server using web interface.

- To activate Application Server functionality you need to activate appropriate license at OnApp dashboard.
- Application servers allow you to deploy different applications on your cloud. For more info refer to Applications.
- The following field in OnApp configuration should be necessarily filled in, as system_email is used for proper configuration of application server: Control Panel > Admin > Settings > Configuration > System > Email > From.

Application Server gives you high-end cloud management features including:
### Application Server Options

<table>
<thead>
<tr>
<th>Edit</th>
<th>Reboot</th>
<th>Change owner</th>
<th>Configure network interface</th>
<th>Creat e disks</th>
<th>View disks</th>
<th>View schedules</th>
<th>View Applicatio ns</th>
<th>View Application Backups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebuild manually</td>
<td>Startup</td>
<td>Edit Administra tor's note</td>
<td>Rebuild network interface</td>
<td>Edit disks</td>
<td>Edit backup note</td>
<td>Create schedule</td>
<td>Billing statistics</td>
<td>Create Application</td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspend</td>
<td>Transaction s and logs</td>
<td>Set firewall rules</td>
<td>Migrate disks</td>
<td>Restore backup</td>
<td>Edit schedule</td>
<td>Network interface statistics</td>
<td>Delete Application</td>
</tr>
<tr>
<td>Delete</td>
<td>Shutdown</td>
<td>IP addresses</td>
<td>Delete disks</td>
<td>Delete backup</td>
<td>Delete schedule</td>
<td>Disk IOPS statistics</td>
<td>Restore Application Backup</td>
<td>De let Application Backup</td>
</tr>
<tr>
<td>Segregat e</td>
<td>Recovery Reboot</td>
<td>Display network speed for network interfaces</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Set VIP status</td>
<td>Recovery Startup</td>
<td>Edit network speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| Autoscale | |

The following options are not available for application servers:

- Reset Root Password
- Set SSH keys
- Integrated console
- Convert backup to template
- Recipes
- Recipe Custom Variables

### 9.6.1 Create Application Server

Application server creation process is similar to virtual server creation. The difference is that a specific default template is used automatically during application server creation. For more information refer to the Application Server Billing section of this guide.
Before creating an Application server make sure that you specified at least two resolvers for the network on which this server will run. This can be done at Admin > Settings > Resolvers.

Before creating an Application server you need to configure notifications for your cloud. This can be done at Control Panel > Admin > Notifications > Configuration. For information on how to set up notifications for your cloud refer to Notifications Setup.

Before creating an Application server you need to fill in the system_email parameter in the on_app.yml file.

To create an Application Server:

1. Go to your Control Panel > Admin > Application Servers menu.
2. On the screen that appears, press "+" button or click the Create Application Server button underneath the list of servers on the screen.
3. Complete the application server creation form:

On this page:

- Step 1 of 4. Cloud Locations
- Step 2 of 4. Properties
- Step 3 of 4. Resources
- Step 4. Confirmation

See also:

- Manage Application Server
- Application Server Billing
- Application Server Disks
- Application Server Backups

9.6.1.1 Step 1 of 4. Cloud Locations

The Cloud Locations step applies to those users who have compute zones assigned to location groups in their bucket.

If the user's bucket has several compute zones, some of which are assigned to location groups, whereas others are not - the cloud locations screen will not be available in the wizard. Also if there is only one location this step will be skipped. In this case the wizard will start with the Properties step.

Indicate your application server's cloud location:

- Country - choose the country, where the cloud is located, from the drop-down menu.
- City - specify the city, where the cloud is located, from the drop-down menu.

Click Next to proceed to the following step of the wizard to specify the application server properties.
9.6.1.2 Step 2 of 4. Properties

Specify the following application server properties:

- **Label** - the label of the application server. The required parameter.
- **Hostname** - the hostname of the application server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [-].

**Additional Consideration for Windows**

- The hostname length should be between 1 and 15 characters.
- The following symbols are not allowed:
  - percent sign [%]
  - double quotation marks ["]
  - brackets [<,>]
  - vertical bar [|]
  - caret [^]
  - ampersand [&]
  - parentheses [()]
- **Domain** - specify the domain for this VS. The default value is *localdomain*. This parameter is not applicable to Windows virtual servers.

For example:

```
test.onapp.com - specify 'test' as hostname, 'onapp.com' as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - test.onapp.com.localdomain.
```

Click **Next**.

9.6.1.3 Step 3 of 4. Resources

At this step, you can set your application server's resources, such as disk size, network configuration and other.

**Compute Resources**

- **Compute Zone** - the compute zone to build the application server on.
- **Compute resource** - the specific compute resource to build the application server on. Compute resource may be selected automatically according to the set provisioning type.

**Resources**

- **RAM** - set the amount of application server's RAM. The recommended RAM amount is at least 512 MB.
- **CPU Cores** - set the amount of application server's CPU cores. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.
• **CPU Priority (or CPU Units)** - set application server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

The following options are available for application servers based on KVM compute resources only, providing the **Enable CPU topology permission** is switched on for the user.

• **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the amount of sockets.

**Primary Disk**

• **Data Store** - choose a data store for application server's primary disk.

• **Primary disk size** - set the primary disk size.

**Swap Disk**

• **Data Store** - choose a data store for application server's swap disk.

• **Swap disk size** - set the swap disk size. There is no swap disk for Windows-based application servers. In all other cases, swap disk size must be greater than zero.

• **Disable** - select the checkbox to disable swap disk creation

**Network Configuration**

Network Interface 1

• **Network** - choose the network from which the application server should get the IP address

• **IP net** - select from the drop-down list the IP net from which the IP address should be assigned

• **IP range** - select from the drop-down list the IP range from which the IP address should be assigned

• **IP address** - select an IP address to be assigned from the drop-down box

• **Selected IP address** - assign an IP address for the application server from the drop-down menu. Only public IP Address can be chosen. Indicate compute resource and network to have the list of available IPs.

• **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropbox.

• **Port Speed** - set the port speed for this application server

Click **Next** to proceed to the following step of the wizard that completes the application server creation process.

---

*Show IP address selection for new application server* option is enabled via the "Show IP address selection for new VS" slider on the **Admin > Settings > Configuration** screen (under the **System** tab).

You can't select unlimited port speed if the Network Zone is not selected. In this case the port speed will be 1 by default.

It's possible to create application server with unlimited network speed.
without selecting a network zone only if you have only one Network Zone assigned to your bucket.

9.6.1.4 Step 4. Confirmation
At this step, configure the automation settings. This is the final step of the application server creation wizard.

- Move the Build Virtual Server slider to the right if you want the system to automatically build the application server. If you leave this box blank, you will have to build your server manually after it is created.

At the Confirmation step you can find the configuration summary of the application server, which will be created. You can view template’s name, RAM size, number of networks, primary disk and swap disk size, number of cores.

After you set up all parameters, click the Create Application Server button to start the creation process.

9.6.2 Manage Application Servers
Application Server is a regular VS based on default CentOS template with pre-installed additional software. This software allows you to install and have up & running various PHP/Perl/Python frameworks (like Drupal, Joomla, Wordpress etc.) on a server using web interface. In this document you can find information on how to manage Application Servers in your cloud.

- To activate Application Server functionality you need to activate appropriate license at OnApp dashboard.
- Application servers allow you to deploy different applications on your cloud. For more info refer to Applications.
- The following field in OnApp configuration should be necessarily filled in, as system_email is used for proper configuration of application server: Control Panel > Admin > Settings > Configuration > System > Email > From.

9.6.2.1 View Application Servers

To view an application:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. The page that loads will show the list of application servers together with their:

On this page:
- View Application Servers
- View Application Server Details
• **Edit Application Server**

• **Rebuild/Build Application Server Manually**

• **Migrate Application Server**

• **Autoscale Application Server**

• **Set VIP Status for Application Server**

• **Segregate Application Server**

• **Application Server Power Options**

• **Application Server Administrative Options**

• **Delete Application Server**

**See also:**

• **License**

• **Applications**

• **OnApp Configuration**

• **Create Application Server**

• **Application Server Networks**

3. Click the **Actions** button next to the application server for the quick access to the list of application server actions (the list of actions displayed depends on the application server status):

• Reboot

• Recovery reboot

• Shutdown
• Startup
• Recovery startup
• Unlock

If you are viewing the application servers list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click **Apply**. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the application servers list. You can always alter your column selection later. Note that by default the VIP and Backups columns are not visible in the table on narrow screens.

Column selection is currently set for one browser. If you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.

To search for a particular application server, click the Search icon at the top of the application server list. When the search box appears, type the text you want to search for and click the **Search** button:

To view details of a specific application server:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the application server you’re interested in.
3. The screen that appears loads the application server properties, application list, notes, activity log and tools for managing your application server.

**9.6.2.2 Application Server Properties**

Application server properties page gives a general overview of the server details:

- Template this server is built on
- Power status & On/Off/Reboot buttons.

Clicking the OFF button performs a graceful shutdown and then powers off the application server after the timeout set in **Configuration Settings**.

- FQDN (fully qualified domain name)
- Compute resource. Click the compute resource name to see its details
- Login credentials
- Owner. Click the owner name to see its details.
- Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.
• Memory
• CPU(s)
• CPU priority or CPU units
• Disk Size
• Disk backups
• Network Speed
• IP Addresses. Only the first five IP addresses are displayed on the application server properties page. To view the list of all application server IP addresses, mouse over IP addresses area or go to the Networking > IP addresses tab.
• Auto-backups - move the slider to enable/disable automatic backups for this application server. If the incremental backups are enabled in your cloud, you can set auto-backups per application server rather than per disk.

If the automation options weren’t enabled during this application server creation, you’ll be redirected to the form where you can configure them.

• Autoscale - move the slider to enable/disable the autoscaling rules set for this AS.

  • Until the **autoscaling rules** are configured the autoscaling itself will not start working.
  • If the **Autoscale** slider is greyed out that means that you have reached the autoscaling limit in a bucket (or the max is set as 0).

9.6.2.2.2 Applications
In this section, you can see the list of all applications deployed on this server.

9.6.2.2.3 Notes
The Notes section lists brief comments or reminders for an application server. You can add either Admin's or User's notes. The Admin's note will be available to cloud administrators. Click the **Actions** button in the Notes section of the page to add admin's or user's note.

9.6.2.2.4 Application Server Management
• Click the **Tools** button to expand the Tools menu with the application server management options.
• Use the top menu to manage your application servers’ statistics/networking/storage options.

9.6.2.3 Edit Application Server
You can edit CPU and RAM resources for application servers. To adjust CPU & RAM resources:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you want to resize, to show its details screen.
3. Click the **Tools** button and select the **Edit Application Server** link.
4. Change label, CPU cores, CPU priority/units and RAM values, and click the **Save** button.
9.6.2.4 Rebuild/Build Application Server Manually

If you haven’t checked the **Build Application Server** option during the application server creation process, you will have to do this manually after the application server has been created. Building an application server is the process of allocating physical resources to that application server.

To build an application server manually or rebuild the application server on the same (or another) template:

1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you’re interested in.
3. On the screen that appears, click the **Tools** button and then click **Rebuild Application Server**.
4. On the screen that pops up, use the drop-down menu to choose a template with which to build the application server.
5. Move the **Start AS after rebuild** slider to the right if you want to have your application server started automatically after it is built.
6. Click the **Rebuild Application Server** button to finish.

**After you rebuild your template all data will be lost!**

---

9.6.2.5 Migrate Application Server

You can migrate application servers using a **hot** or **cold** migration method:

- **Hot migration** is the migration of application servers with or without disks between compute resources that share common data stores or data store zones.
- **Cold migration** is the migration of application servers with disks between compute resources with local storage or across compute zones.

9.6.2.5.1 Hot Migration

Check if your Windows template supports hot migration at the [Windows Templates](#).

You can migrate an online application server from one compute resource to another compute resource that are both utilizing local/shared/IS storage or across zones. There are two types of hot migration:

- **Compute Resource** - migration of an application server from one compute resource to another
- **Compute Resource and Storage** - migration of an application server with disk from one compute resource and data store to another

**Compute Resource**

To hot migrate an application server:
1. Go to your Control Panel > **Cloud > Application Servers**.
2. Click a label of an application server that you want to migrate.
3. Click the **Tools** button and click the **Migrate Application Server** button.
4. In the **Migration Type** box, select **Compute Resource** and click **Next**.
5. Select a **Target compute resource** from the box and click **Next**.
6. At the final step of the wizard, you can see the migration summary and select the following check boxes:
   - **Cold-migrate when hot-migration fails** - select the check box to apply cold migration in case of the hot migration failure
   - **Are you sure you want to migrate?** - select the check box to confirm the hot migration
7. When you are finished, click the **Submit** button.

### Compute Resource and Storage

To hot migrate an application server:

1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you want to migrate.
3. Click the **Tools** button and click the **Migrate Application Server** button.
4. In the **Migration Type** box, select **Compute Resource and Storage (Hot)** and click **Next**.
5. Select the following destination resources:
   - **Target compute zone** - select a destination compute zone. The list includes compute zones that you have access to within the same network (i.e. KVM to KVM but not KVM to Xen).
   - **Target compute resource** - select a destination compute resource
   - **Target data store for disk** - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.
6. At the final step of the wizard, you can see the migration summary and select the following check boxes:
   - **Cold-migrate when hot-migration fails** - select the check box to apply cold migration in case of the hot migration failure
   - **Are you sure you want to migrate?** - select the check box to confirm the hot migration
7. When you are finished, click the **Submit** button.

After migration, the power status of your application server remains the same as before the migration. If you migrate an application server that's running, the whole process is almost unnoticeable.

#### 9.6.2.5.2 Cold Migration

Cold migration enables you to migrate application servers with disks between compute resources with local storage or across compute zones. To cold migrate an application server:

1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you want to migrate.
3. Click the **Tools** button and click the **Migrate Application Server** link.
4. In the **Migration Type** box, select **Compute Resource and Storage (Cold)** and click **Next**.
5. Select the following destination resources:
6. At the final step of the wizard, you can see the migration summary and select the Are you sure you want to migrate? check box to confirm the migration.

7. When you are finished, click the Submit button.

---

If you change the compute resource or data store zone, the billing will be changed according to the prices set for that new zone in the bucket. The new estimated price per hour for a VS is displayed at the bottom of the VS migration screen.

---

9.6.2.6 Autoscale Application Server

Application server autoscaling allows you to change the RAM, CPU, and disk size settings of an application server automatically. Application server resources scaling is based on rules you specify. For example, you can set up a rule that will add 1000MB of memory to an application server if RAM usage has been above 90% for the last 10 minutes - but add no more than 5000MB in total in 24 hours. You can set autoscaling down settings alongside with autoscaling up.

- For Linux-based application servers only.
- If you autoscale an application server's memory to a value greater than current application server RAM x 16 (which is a max_memory parameter in a configuration file and database), the application server will be rebooted anyway, regardless of the template it is built on.
- Make sure an application server can be reached via SSH. Otherwise, the autoscaling client installation will fail.
- Starting with version 4.2, OnApp uses Zabbix for autoscaling. Monitis will be used for autoscaling of servers built using OnApp versions previous to 4.2 until you switch autoscaling off for such server(s). If you decide to switch autoscaling back on, autoscaling will be implemented using Zabbix. Zabbix also will be used for autoscaling of newly created VVs.

To configure autoscaling settings:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the appropriate application server.
3. On the page that follows, click the Overview tab, and then click Autoscaling.
4. Press the required tab - Memory Usage, Disk Usage or CPU Usage - to see the statistics for each type of resources.
5. Below you will see UP and DOWN autoscaling options. Move the slider to the right to add the autoscaling rule or move it to the left to remove the rule.

6. Add autoscaling rules as explained below:

Set autoscale up options:
- If RAM usage is above \( X \)% for a specific time period, add \( Y \) MB – but no more than \( Z \) MB in a 24 hour period.
- If CPU usage is above \( X \)% for a specific time period, add \( Y \)% - but no more than \( Z \)% in a 24 hour period.
- If disk usage is above \( X \)% for a specific time period, add \( Y \) GB - but no more than \( Z \) GB in a 24 hour period.

Set autoscale down options:
- If RAM usage is below \( X \)% for a specific time period, remove \( Y \) MB.
- If CPU usage is below \( X \)% for a specific time period, remove \( Y \)%.
- If disk usage is below \( X \)% for a specific time period, remove \( Y \) GB.

7. Click **Apply**.

Clicking the **Apply** button does not activate autoscaling if the **Autoscale** slider at the AS overview page is disabled. You can configure autoscaling rules, press the **Apply** button, these rules will be saved and will start working only after the **Autoscale** slider at VS overview page is enabled. Also, you can disable the **Autoscale** slider, autoscaling will stop working, but the configuration of rules will be saved in case you will want to activate them in future.

9.6.2.7 Set VIP Status for Application Server

If a Compute resource fails or reboots, the system migrates application servers to another Compute resource, one server at a time. The order servers are migrated in is random. However, you can give an application server "VIP" status, and this will give that server priority in the migration queue.

To set or remove VIP status for an application server:
1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Use the **VIP** button next to a required application server to change its VIP status.

9.6.2.8 Segregate Application Server

To isolate one application server from another:
1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you want to segregate.
3. On the screen that appears, click the **Tools** button, then click **Segregate Application Server**.
4. In the dialogue box that pops up, use the drop-down menu to choose an application server you want to keep away from.
5. Click the **Segregate VS** button to finish.

### 9.6.2.9 Application Server Power Options

To manage an application server power options:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the required application server.
3. Click the **Tools** button on the application server's screen to expand the **Tools** menu.
4. The **Tools** menu enables you to perform the following power actions on application servers (the exact list shown depends on the application server status):
   - **Reboot Application Server** - powers off and then restarts the application server.
   - **Suspend** - stops an application server, changes its status to suspended and disables all the other actions on application server, unless unsuspended.
   - **Shut Down Application Server** – pops up a dialogue box, where you can either Shut Down application server (terminates the application server gracefully), or Power Off application server (terminates the application server forcefully).
   - **Startup Application Server** - queues a start-up action for a application server that's currently powered off.

### 9.6.2.10 Application Server Administrative Options

To manage an application server power options:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the required application server.
3. Click the **Tools** button on the application server's screen to expand the application server **Tools** menu.
4. The **Tools** menu enables you to perform the following administrative actions on application servers:
   - **Change Owner** - pops up a dialogue box with a drop-down of all users on the system, enabling you to pass ownership of the application server to the user selected from the list. If you have any backups for this application server, you will be also prompted to confirm if the backup should be moved to another user.

### 9.6.2.11 Delete Application Server
Shut down the application server before destroying it. If you are deleting an application server that is running, the application server will be deleted after the time set in Timeout Before Shutting Down application servers configuration parameter. To remove the application server from the cloud:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. On the screen that appears, you’ll see the list of all application servers in the cloud. Click the label of the application server you want to delete.
3. On the application server's screen, click the Tools button, then select Delete Application Server.
4. Move the Move Last Backup to My Templates if it is present slider to the right if you want to save the last application server's backup as a template.
5. Move the Destroy All Existing Backups slider to the right if you want to remove all existing backups of this application server.

**IMPORTANT:**
- You won’t be able to restore a deleted application server.
- Deleting an application server removes all data stored on that server. To save the data stored on the application server, back up your application server and tick the Destroy All Existing Backups box when following the instructions described in this section.

6. Press the Destroy button.

### 9.6.3 Manage Application Server Networks

The Networking menu in the Application Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for application servers. In this document you can find information on how to manage Application Server networks.

- To run the application server, at least one network interface with an assigned IP address (or addresses) is required!
- To allocate another physical network, add a new network interface.
- In case of network interface replacement for Windows application servers running on Xen compute resources, the user has to add new network interface, rebuild network, then remove the old network interface and perform network rebuild again.

#### 9.6.3.1 Configure Application Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this application server. Network interfaces join the physical network to the application server. When you create an application server a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default.

OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4
address must be allocated to a application server's primary network interface. To see the list of all network interfaces allocated to the application server:

On this page:

- Configure Application Server Network Interface
- Rebuild Application Server Network
- Set Application Server Firewall Rules
- Application Server IP Addresses
- Display Network Speed
- Edit Application Server Network Speed

See also:

- Create Application Server
- Application Server Disks
- Application Server Backups
- Application Server Backup Schedules
- Application Server Statistics

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. On the page that follows you will see the following fields:
   - Interface – optional label of the network interface.
   - Network join – name of the network and a compute resource or compute zone this network is joined to.
   - Port speed – the speed set to the interface.
   - Primary interface – indication whether the interface is primary or not.

Here you can also view Interface Usage, Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

To add a network interface:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Networking tab, then click Network Interfaces.
4. Click the Add New Network Interface button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   - Label – a human-friendly name for the new interface.
Physical Network – choose a network join from the drop-down menu, which lists network joins assigned to the compute resource/compute zone on which the application server runs.

Port speed – set port speed in Mbps, or make it unlimited.

6. Click the Submit button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click Edit icon next to the appropriate network interface. After editing the port speed, the application server should be power cycled for the change to take effect.

To delete a network interface, click the Delete icon next to the interface you want to delete.

9.6.3.2 Rebuild Application Server Network

To rebuild a network join, added to the application server (required after allocating new IP addresses):

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of a required application server.
3. On the screen that appears, click the Tools button, then click Rebuild Network.
4. In the pop-up window, move the Force Reboot slider to the right, then select the application server shutdown type.

During rebuild network, the system tries to reach application server's network interface without rebooting application server. Then, if it is not possible, transaction will quit. Force reboot action allows to rebuild application server network with reboot action if live rebuild is impossible. In case the force reboot option is disabled and system can not enter the application server, the network rebuild operation will fail.

5. Move the Required Startup slider to the right to start up an application server when you're rebuilding network of a powered off application server.
6. Click the Rebuild Network button.

In case of network interface replacement for Windows application servers running on Xen compute resources, the user has to add new network interface, rebuild network, then remove the old network interface and perform network rebuild again.

9.6.3.3 Set Application Server Firewall Rules

With OnApp you can set firewall rules for the network interfaces of application servers. There are two types of firewall rule:

- **ACCEPT** – defines the packets that will be accepted by the firewall
- **DROP** – defines the packets that will be rejected by the firewall
You cannot apply firewall rules to application servers which are parts of a blueprint.

You can set the following:
- **add a specific firewall rule** - you can configure a firewall rule with specific parameters (source, destination port, protocol type etc.)
- **set default firewall rules** - you can set default firewall rules for an entire network interface

### 9.6.3.3.1 Add a specific firewall rule

**To configure a firewall rule:**
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the application server for which you want to configure a firewall rule.
3. On the screen that appears, click the **Tools** button, then click **Edit Firewall Rules**.
4. On the page that appears, set the following:
   a. Choose the network interface.
   b. Specify if the rule defines requests that should be accepted or dropped.
   c. Set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. Set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      - Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
   e. Choose the protocol (TCP, UDP or ICMP).
   f. Enter a comment to the firewall rule.
5. Save the rule by clicking the **Add Rule** button. The rule will be saved in the UI, but the transaction won't be started until you click the **Apply Firewall Rules** button.
6. To start the transaction which runs firewall rules for an application server, click **Apply Firewall Rules** button.
7. Use **Up** and **Down** arrow buttons in the left column to change firewall rule position.

### 9.6.3.3.2 Default firewall rules

**To set default firewall rules for a network interface:**
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the application server for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, go to Default firewall rules section.
5. Choose ACCEPT or DROP command next to the network interface and click **Save Default Firewall Rules**. The rule will be saved in the UI, but the transaction won't be started until you click the **Apply Firewall Rules** button.

**Example:**
The Int1 ACCEPT 122.158.111.21 22 TCP firewall rule means that the Int1 network interface will accept all requests and packets addressed from 122.158.111.21 using the TCP protocol on port 22.
The Int2 DROP 122.158.111.21 22 UDP firewall rule means that the Int2 network interface will reject all requests and packets from 122.158.111.21 using the UDP protocol on port 22.

---

**9.6.3.4 Application Server IP Addresses**

In the **Networking > IP Addresses** tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the application server:

1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you're interested in.
3. Click the **Networking** tab, then click **IP Addresses**.
4. Click the **Allocate New IP Address** button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the application server will be available)
6. Select an IP address from the IP Pool associated with the network interface. You may select an IP address that's already assigned to an application server, but only one application server should be online at a time. Use **Please show me used IP Pool, Show only my IPs and Show only IPv6** checkboxes to narrow the list of IP in the drop-down list.
7. Click the **Add IP Address** button.
8. Click the **Rebuild Network** button to rebuild the network.

| You must rebuild the network after making changes to IP address allocations. |

To remove an IP address from an application server:

1. Go to your Control Panel > **Cloud > Application Servers** menu.
2. Click the label of the application server you're interested in.
3. Click the **Networking > IP Addresses** tab.
4. Click the **Delete** icon next to the IP address you want to delete.
5. In the pop up window that appears:
   - Choose **Delete with Reboot** option if you want to reboot an application server and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the application server's Overview page.
   - Choose **Delete without Reboot** option if you don't want to reboot an application server. In this case to apply the changes, you will have to the reboot the application server additionally.
You can't delete an IP address that is in use.

9.6.3.5 Display Network Speed for Network Interfaces on Application Server Page

The main Application Servers screen displays the network speed of each application server's primary network interface. To see the speed of all interfaces assigned to an application server:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you are interested in.
3. Click the Networking > Network Interfaces tab.
4. On the screen that appears, the Port Speed column shows the network speed of the network interface.

9.6.3.6 Edit Application Server Network Speed

To edit an application server's network speed:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you want to change.
3. Go to the Network tab > Network Interfaces.
4. In the last column click the Edit button.
5. Change the port speed.
6. Click the Submit button to save changes.

9.6.4 Manage Application Server Disks

Application server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific application server. Disks can be assigned as standard or swap disks (there are no swap disks for Windows-based templates). They can also be set as primary (that is, the disk from which an OS will boot).

You can also utilize incremental backups. For details, see Application Server Backups section of this guide.

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual application servers are managed through the Control Panel's Application Servers menu, where you can:

Creating multiple partitions on one disk is forbidden for all application servers.

9.6.4.1 Add Disks to Application Servers

Adding a disk to an application server will require that application server should be rebooted. If an application server is running when you try to add a new disk to it, you'll be asked to confirm the reboot. To add a disk to an application server:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click an application server’s label to open its details screen.
3. Click the **Storage** tab > **Disks**.
4. Click the "+" button or the **Create Disk** button.
5. Fill in the details:
   - Specify disk label.
   - Choose the data store to create a disk on from the drop-down list.
   - Move the slider to the right to specify the desired disk size.

Please note that support of secondary disks larger than 2 TB is limited. Certain operations might fail. This will be improved in future releases.

**Click here to see the details of adding a disk 2 TB+**

- If you add a disk larger than 2 TB, you will not be able to mount or create a backup of such disk via OnApp Control Panel. These operations may be performed only manually inside a virtual server. Also, resize will not be possible for such disks.

- You can perform the following operations with a secondary disk that is larger than 2 TB:
  - **Migrate**
  - **Delete / Wipe**
  - **Edit IO limits**
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- **Rebalance** (for VSs with Integrated Storage feature enabled)

  - OnApp provides a RAW device available inside a VS that you may use. For example, you may create a GPT partition and format it using any available file system which can be mounted inside VS.

- Move the **Hot Attach** slider to the right if you want to enable disk hot attaching. In this case application server will not be stopped when adding a disk. Prerequisite: virtual server template should support virtio virtualization and Linux OS. Hot attach option is only available for KVM 6/ CentOS 6 application servers.

- Move the **Swap Space** slider to the right if this disk is swap space.

- Move the **Require Format Disk** slider to the right if this disk requires formatting.

- Move the **Mounted** slider to the right if the disk should be added to Linux FSTAB (for Linux application servers).

- Specify its mount point. The maximum length of a Mount Point is 256 characters. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

  ```
  /mnt/onapp-disk-#{disk.identifier}
  ```

- Indicate the **file system** - ext3 or ext4 - for Linux based application server.

6. Click the **Add Disk** button to finish.

**Restrictions:**

- If you choose a Solidfire data store, the minimum disk size will be regulated by Solidfire Data Store Zone settings.

- If application server and the control panel server belong to different networks, the hot attach transaction will fail.

- If an additional disk has been created without the **require format disk** option and formatted/partitioned in another way, resize disk action may work incorrectly. Use the **require format disk** option when creating an additional disk, otherwise use disk resize option at your own risk.

- To be able to take incremental backups for application server’s disk, you must mount this disk to FSTAB (either Linux or FreeBSD) and specify the proper mount point manually.

- You cannot back up Swap disks.

- When you add a new disk to an application server, it automatically becomes available to that server.
9.6.4.2.1 Primary and Swap disks
For primary and swap (Linux, FreeBSD) disks you may only change the label and the size. You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your application server.

To change disk size:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Make sure your application server is powered off, then click its label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the Actions button next to the disk you want to change, then click the Edit link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the Save Disk button.

- You cannot decrease size of Integrated Storage data stored disks.
- You cannot decrease disk size for Windows-based and FreeBSD-based application servers. Only the increase disk size option is available.
- You cannot resize the primary disk for FreeBSD-based application servers.
- Decreasing disk size for Linux-based application servers may lead to filesystem inconsistencies. Make sure you have current backups before proceeding.
- Size of a primary disk cannot exceed 2 TB.

9.6.4.2.2 New disks
For new disks - those which were added after the application server was created - you can edit the following:

<table>
<thead>
<tr>
<th>Linux</th>
<th>Windows</th>
<th>FreeBSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>Label</td>
<td>Label</td>
</tr>
<tr>
<td>Size</td>
<td>Size</td>
<td>Size</td>
</tr>
<tr>
<td>Require format</td>
<td>Require format</td>
<td>Require format</td>
</tr>
<tr>
<td>Mounted</td>
<td>Mounted</td>
<td></td>
</tr>
<tr>
<td>Mount point</td>
<td>Mount point</td>
<td></td>
</tr>
<tr>
<td>File system</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.6.4.3 Migrate Application Server Disks
You can migrate disks of your application servers to other data stores, which are allocated to the same compute resource. Unlike application server migration – disk migration requires reboot of the application server (despite the template it is based on).

To migrate a disk:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Make sure your application server is powered off, then click its label to open its details screen.

3. Click the **Storage** tab > **Disks**.

4. Click the **Actions** button next to the disk you want to move to another data store, then click the **Migrate** button.

5. On the screen that appears, select a target data store from a drop-down box.

6. Click **Start Migrate**.

   - You can only migrate disks to data stores in data store zones assigned to your bucket.
   - You cannot migrate a disk to a data store with less capacity than the disk size.
   - If you move a 850GB disk between aggregates with 10GB actual usage, the ‘dd’ image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero 'dspace which may not be able to be recovered.

---

### 9.6.4.4 Delete Application Server Disks

To delete a disk:

1. Go to your Control Panel > **Cloud** > **Application Servers** menu.

2. Make sure your application server is powered off, then click its label to open its details screen.

3. Click the **Storage** > **Disks** tab.

4. Click the **Actions** button next to the disk you want to delete, then click **Delete**.

5. In the pop-up window, move the **Force Reboot** slider to the right, then select the application server shutdown type.

6. Move the **Required Startup** slider to the right to start up the application server automatically after the network is rebuilt.

   **Steps 5 and 6 apply to disks of application servers that are on.**

7. Click the **Destroy Disk** button.

---

### 9.6.5 Manage Application Server Backups

It is strongly recommended that you take backups while an application server is not running. Make sure that your application server is stopped before taking any backups.

Backups are used for copying and archiving target data (target is either a disk or an application server as a single whole of all disks used).
OnApp supports two backup types: normal and incremental:

- **Normal** - simple method of taking backups by making a full copy of target data and storing it in an archive.

Ensure that you do not use XFS or other filesystems not supported by OnApp for Linux backups as OnApp will address them as ext3/4 filesystems.

- **Incremental** - advanced method of taking backups. During the incremental backup, only the changes made after the last backup are archived instead of backing up the whole target. You must have dedicated backup servers configured in your cloud to be able to utilize the incremental backups functionality. Incremental backups are enabled via **Admin > Settings > Configuration > Backups/Templates** menu.

It is not possible to take incremental backups if you are using location group functionality without a backup server added to the group - the following error message will appear:

"Backup cannot be made at this time: This disk cannot be backed up, check Location Group settings."

This issue will be fixed in next releases. As a workaround, add an empty backup server zone to your location group.

Each backup type can be taken in two ways:

- **Manually** - the user logs into OnApp CP and clicks the “Take backup” button.
- **Automatically** - the user enables backup schedule (daily, weekly, monthly, yearly). To enable auto-backups for application servers that support incremental backups which used auto-backups option before the upgrade, re-enable automatic backups by switching them off and on again.

If you are using incremental backups option, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your compute resources. SSH file transfer option will be skipped for application servers using incremental backups. Existing full backups will be still accessible via **Backups > Images** menu.

If required, you can change the block size which is used during backup creation at **Control Panel > Admin > Settings > Configuration** by editing the **Block Size (MB)** parameter.

On this page:

- [How Do Incremental Backups Work?](#)
9.6.5.1 How Do Incremental Backups Work?

For example, we have a disk with three files:

- File1 - 4Gb
- File2 - 2Gb
- File3 - 3Gb

The first incremental backup will be 9 GB (sum of all files). If you decide to take another incremental backup soon thereafter, the backup size will be equal to 0, as the files have not been changed since the first backup (if your backup has complicated directory structure, it could be more than 0, as file system could store some system data).

Then:

- If the user decides to delete File2, the target size will now be 7Gb. The subsequent incremental backup size will be 0, as new data has not been added.
- If the user adds File4 of 4 GB size, the subsequent incremental backup will equal 4 GB (the size of new data added).
- If the user increases File3 disk size to 6 GB, the subsequent incremental backup size will equal 6 GB, although the target is increased by 3 GB. This happens because the incremental system takes the update of the existing file as the deletion of the existing file and adding the new file with the same name (the first version of File3 has been deleted and the new one with 6GB size has been added).

Backups can be saved either to a compute resource or to a dedicated backup server. When saving a backup, the system calculates if user has enough physical/ bucket resources to save a backup in the selected destination.

When saving a backup to a compute resource, the system does not check if compute resource has enough disk space to save a backup and only checks if a user has enough bucket limits.

When saving a backup to a dedicated backup server, the system checks both disk space and bucket limits.
Free disk size on a target must be at least equal to the disk’s size for which the backup is taken (or to a size of all application server disk for incremental backup). In some cases (for example, if a user has scheduled several disk backups simultaneously but there are only free space/billing limits for the first one) the system may allow taking all the backups but will not be able to save them. This will result in a system error and over-billing.

9.6.5.2 View Application Server Backups

To view the list of application server's backups:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the required application server.
3. Click the Backups tab, then select the appropriate backup type:
   - Images - full backups
   - Files - incremental backups
4. On the screen that appears, you'll see a list of application server backups sorted by category.
5. Click the label of the required application server backup to see the following tools - restore backup, delete backup and add/edit note.

9.6.5.3 Take Application Server Backup

To take an incremental backup:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you want to back up.
3. Click the Backups tab, then select Files.
4. To take a backup, click the Take a Backup button at the end of the list.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with an application server. To view the list of user backups, refer to View User Backups section.

Template extraction is performed during server provisioning or taking a backup when using a particular template. To prevent the template from being used in other transactions during extraction, the template is locked during the extraction and unlocked on accomplishment. If other transaction tries to use the locked template, it will fail after 5 minutes of standby. The transaction which locked template and failed means that extracted template is broken.

Storing scheme:
- template /onapp/templates/your_template.tgz
9.6.5.4 Take Application Server Disk Backup

To back up an application server:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you want to back up.
3. Click the Storage tab > Disks. You'll see a list of the disks allocated to that application server.
4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.
   - To make a backup, click the Take a Backup button at the end of the list. You may add a note and also Force Windows Backup.

   This option for Windows application servers is designed as a last resort, when the backup cannot be taken due to NTFS file system problems. Switching this option will bring up a dialog box with the following message: "If you enable this option there is no guarantee that backup will be consistent."

   Select "Yes" to proceed

   - To restore a backup, click the Restore link next to the backup you want to revert to.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with an application server. To view the list of user backups, refer to View User Backups section.

9.6.5.5 Restore Application Server Backup

To restore a backup:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the required application server.
3. Click the Backups tab, then select the appropriate backup type:
   - Images - full backups
   - Files - incremental backups
4. On the screen that appears, click the Actions icon next to the backup you want to revert to and choose Restore.
9.6.5.6 Add Application Server Backup Note

To edit application server backup's note:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the required application server.
3. Click the Backups tab, then select the appropriate backup type:
   - Images - full backups
   - Files - incremental backups
4. On the screen that appears, click the Actions icon next to the required backup and choose Add Note. Make necessary changes and click Submit.

9.6.5.7 Delete Application Server Backup

To delete a backup:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the required Application server.
3. Click the Backups tab, then select the appropriate backup type:
   - Images - full backups
   - Files - incremental backups
4. On the screen that appears, click the Actions icon next to the backup you want to remove and choose Delete.

9.6.6 Manage Application Server Backup Schedules

Schedules screen lists application servers' scheduled backups. Depending on the backup type set in your cloud settings, schedules are created either per application server or per disk. To view all backup schedules in the cloud, see Schedules Settings. In this document you can find information on how to manage Application Server backup schedules.

9.6.6.1 View Application Server Backup Schedules

To view the list of backup schedules for a particular application server:

If normal backup option is selected for the cloud:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that appears, you will see the list of backup schedules along with their details:

On this page:
- View Application Server Backup Schedules
- Create Application Server Backup Schedule
• **Edit Application Server Backup Schedule**

• **Delete Application Server Backup Schedule**

See also:

• **Schedules Settings**

• **Auto-Backup Presets**

• **Application Server Disks**

• **Application Server Statistics**

• **Application Server Transactions and Logs**

• **Date** - the time when the schedule was created

• **Target** - the server or disk for which the schedule was created (depending on the backup type)

• **Action** - the scheduled action

• **Period** - how frequently the backup will occur according to a period type set in the next step.

    For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this filed is set 1.

• **Period type** - the backup period: days, weeks, months, or years

• **Rotation period** - the number of backups, after which the first backup will be deleted.

    By default, in this filed is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this filed, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.

• **Next Start** - the date and the hour of the next backup

• **User** - the user who created the backup schedule

• **Status** - schedule status

9.6.6.1.1  If incremental backup option is selected for the cloud

1. Go to your Control Panel > **Cloud** > **Application Servers** menu.

2. Click the label of the application server you're interested in.

3. Select **Backups** > **Schedules** tab, or click **Auto-backups** under the **Options** section to view incremental backups schedules only.

4. On the screen that appears, you will see the list of backup schedules along with their details:

    o **Date** - the time when the schedule was created
9.6.6.2 Create Application Server Backup Schedule

In addition to the system auto-backup presets, you can schedule backups of application servers (application server disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of Scheduled application server backups and Auto-backup Presets provide a great deal of flexibility in the way backups are handled for the cloud, and for individual application servers. Auto-backup Presets can be applied to all new application servers added to the cloud. Scheduled application server backups enable specific backups to be scheduled for individual application servers, outside of the auto-backup pattern.

Depending on your cloud settings, you can schedule either normal or incremental backup schedules:

- Adding normal backup schedule
- Adding incremental backup schedule

9.6.6.2.1 Adding a normal backup schedule
To add a normal backup schedule:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that follows, click the New Schedule button.
6. Specify schedule details:
   - Period - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - Period type - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - Rotation period - the number of backups after which the first backup will be deleted.
   - Start time - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

7. Click the Save button to finish.

9.6.6.2.2 Adding an incremental backup schedule
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you want to schedule a backup for.
3. Click the Backups tab, then choose Schedules, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the New Schedule button.
5. On the screen that appears, specify new schedule's details:
   - Period - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - Period type - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - Rotation period - the number of backups after which the first backup will be deleted.
   - Start time - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
6. Click the Save button to finish.

9.6.6.3 Edit Application Server Backup Schedule

9.6.6.3.1 To edit a normal backup schedule:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. Click the Edit icon next to a schedule to change its details.
6. Specify schedule details:
   - Period - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - Period type - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
7. Click the Save button to finish.

9.6.6.3.2 To edit an incremental backup schedule:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options menu to view incremental backup schedules only.
4. Click the Edit icon next to a schedule to change its details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Enabled** - move the slider to enable or disable the schedule

For a schedule with the Failed status, you can move the Enabled slider to the right to run the shedule once again.

5. Click the Save button to save your changes.

9.6.6.4 Delete Application Server Backup Schedule

9.6.6.4.1 To delete a normal backup schedule:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.6.6.4.2 To delete an incremental backup schedule:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Select Backups > Schedules tab, or click Auto-backups under the Options section to view incremental backups schedules only.
4. On the screen that appears, you will see the list of backup schedules.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.
9.6.7 Manage Application Server Statistics

For your convenience, the system tracks application server performance and generates statistics on CPU utilization, billing, network interface and Disk IOPS usage. In this document you can find information on how to manage Application Server statistics.

9.6.7.1 Application Server CPU Utilization

OnApp tracks CPU usage for application servers and generates charts that help analyze application server performance. The charts show the total CPU usage for all the cores of this particular application server for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

On this page:
- Application Server CPU Utilization
- Application Server Billing Statistics
- Application Server Network Interface Statistics
- Application Server Disk IOPS Statistics

See also:
- Resource Allocation And Prices
- Permissions
- User Billing Statistics

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Overview tab > CPU Usage.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the Show in My Timezone slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

To see what percentage of compute resource CPU resource an application server takes, go to your Control Panel's Application Servers
menu and click the label of the application server you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this application server.

9.6.7.2 Application Server Billing Statistics

OnApp has a record of all the charges applied to your application servers for the last three month period. If an application server was created less than three months ago, statistics are recorded for the application server's existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for an application server:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Overview > Billing Statistics tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button. By default the statistics are generated for the last three months or the actual application server existence period.
5. Move the Show in my Timezone slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. On the page that appears:

   The price parameters on this page do not take into consideration the free limits for resources set in the bucket.

   • **Date** – particular date and time for the generated statistics
   • **Users** – the application server owner. Click the owner name to see the User Profile (user details)
   • **Virtual Servers** – the application server name with the total due for application server resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
   • **Network Interfaces Usage** – the total due for the network interfaces used by this application server for the point of time specified in the Date column. Click the network interface name to see its details.
   • **Disks Usage** – the list of disks assigned to this application server with the total due for the disk space resources (disk size, data read/written, reads/writes completed) for the point of time specified in the Date column. Click the disk name to see its details.
   • **Costs** – the total due for the Application Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

9.6.7.3 Application Server Network Interface Statistics

OnApp tracks network usage for application servers and generates charts that help analyze network performance. To see network utilization statistics for an application server:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Networking > Network Interfaces tab.
4. Click the Statistics (chart) icon next to the network you're interested in.
5. On the screen that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.
6. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

9.6.7.4 Application Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for application servers and generates charts that help analyze application server disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for an application server:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.
5. There are four charts on the screen that appears:
   o IOPS for the last hour
   o IOPS for the last 24 hours
   o Data written/read (in Kb) for the last 24 hours
   o Data written/read (in Kb) for the last hour
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.6.8 Application Server Transactions and Logs

The system records a detailed log of all the transactions happening to your application servers. The list of transactions logged by the system includes:
- Provision application server
- Startup application server
- Stop application server
- Resize application server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Take backup
- Convert backup
- Restore backup
- Destroy backups
- Destroy application server
- Destroy template
- Download template
- Update firewall

To view transactions for an application server:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the application server you're interested in.
3. The details screen for that application server shows recent transactions in the Activity Log section.

To cancel pending tasks, click the Cancel Pending button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

1. 
   - date - time in the [YYYY][MM][DD][T][hh][mm][ss]Z format
   - action - the action name
   - status - the action status (Complete, Warn, Pending, or Failed)
   - ref - the log item's Ref number
   - target - the action target
   - started at - the time when the action was started
   - completed at - the time when the action was completed
   - compute resource - the label of compute resource
   - initiator - the user who initiated the action

2. If you want to see only the detailed output, you can hide log info with the arrow button in the upper right corner.

See also:
- Create Application Server
- Manage Application Servers
- Application Server Disks
9.6.9 Application Server Billing

Applications are deployed on application servers, which are created based on the default Application Server template. This Application Server template is provided as a system template. Based on this, you can arrange applications as a paid resource for your end-users. For this, set the price per Application Server template per hour in Template store. So each server deployed on this template will be billed according to the price set.

To charge for the application server:

1. Add Application Server template to required template group.
2. Add the template group to the Access Control of the bucket at Control Panel > Admin > Buckets > Label > Access Control > Other, so that users assigned to the bucket have access to the required templates.
3. Specify the maximum number of application servers users can create in the Miscellaneous section of the bucket's Access Control.
4. Add the template store to the Rate Card of the bucket at Control Panel > Admin > Buckets > Label > Rate Card > Other to set the price for using the required template.
   As a single template can be included in multiple template stores, the same template will have the same price in all the template stores added to the rate card of a single bucket. If you add/edit the price of a template in one template store, the price of the same template will change to the new value in all the template stores in the rate card. Once you add a template to the Rate Card, all the template stores that contain that template will be added to that Rate Card with a price set only for that template.
5. When the relevant template group is added to the bucket, a user can deploy an application server.

See also:

- Create Application Server
- Manage Application Servers
- Application Server Disks
- Application Server Transactions and Logs

9.6.10 Application Server OS Components Update

The procedure below describes how to update your application server OS components. This procedure is also applicable to any KVM-based server instance.

1. Connect to the Control Panel server as a root user via SSH.
2. Switch from the root to onapp user by running the following command:
   
   ```
   #su onapp
   ```
3. Log in to the required application server:

   ```
   #ssh root@<ApplicationServerIP>
   ```
4. Update the OS components of the application server using the following command:

   ```
   #yum -y update
   ```
5. Restart the application server by issuing the command below:
#shutdown -r now

## 9.7 Container Servers

On May 26, 2020, according to [CoreOS reaching End of Life](#), container servers in OnApp also reached End of Life. Please contact [support](#) or your account manager on [amteam@onapp.com](mailto:amteam@onapp.com) for more details and further assistance.

Container Server is a regular VS based on default CoreOS template. This type of server allows the user to customize the server to implement integration with Docker or other container services.

If a new version of the CoreOS template is available, you can update the template in your cloud at **Control Panel > Cloud > Templates > Template List > System Templates > Upgrades**.

Container Server gives you high-end cloud management features including:

<table>
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<tr>
<th>Container Server Options</th>
<th>Power Options</th>
<th>Administrative Options</th>
<th>Networks</th>
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</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot</td>
<td>Change owner</td>
<td>Configure network interface</td>
<td>Create disks</td>
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<td>View</td>
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<tr>
<td>Rebuild manually</td>
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<td>Migrate</td>
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<tr>
<td>Set VIP status</td>
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<td></td>
<td>Edit network speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following options are not available for container servers:

- Convert backup to template
- Auto-scaling
- Setting SSH keys
9.7.1 Create Container Server

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

Currently, instance packages are not available for container servers.

Container server creation process is similar to virtual server creation. The difference is that a specific default template is used automatically during container server creation. You also need to set the cloud-config for your container server. To create a container server:

1. Go to your Control Panel > Cloud > Container Servers menu and click the "+" button, or click the Create Container Server button at the bottom of the screen. This will start a container server creation wizard.
2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
3. Click the Create Container Server button to start the creation process. You will be taken to the container server details screen.

On this page:
- Step 1 of 6. Cloud Locations
- Step 2 of 6. Properties
- Step 3 of 6. Resources
- Step 4 of 6. Recipes
- Step 5 of 6. Cloud Config
- Step 6 of 6. Confirmation

See also:
- Container Servers
- Manage Container Servers
- Location Groups

9.7.1.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the 2020-07-13_11-43-05_Add Google Map API Key section of this guide.

The Cloud Locations step applies to those users who have Compute zones assigned to location groups in their bucket. This step will be present in the wizard if both of the following requirements are met:
all compute resources available to the user are assigned to location groups
compute resources are assigned to different locations

If the user's bucket has several Compute zones, some of which are assigned to location groups, whereas others are not - the cloud locations screen will not be available in the wizard. Also if all compute zones are assigned to the same location this step will be skipped. In this case the wizard will start with the Properties step.

Indicate your container server's cloud location:
- **Country** - choose the country, where the cloud is located, from the drop-down menu.
- **City** - specify the city, where the cloud is located, from the drop-down menu.

Click **Next** to proceed to the following step of the wizard to specify the container server properties.

9.7.1.2  Step 2 of 6. Properties

At this step you need to indicate your container server's properties, such as label, password and other. You can create a container server having specified only the required parameters and configure it later.

Specify the following container server properties:
- **Label** - the label of the container server. The required parameter.
- **Hostname** - the hostname of the container server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [-]. For more info on hostname validation, refer to [RFC standard documentation](https://tools.ietf.org/html/rfc1123).
- **Domain** - specify the domain for this VS. The default value is `localdomain`. This parameter is not applicable to Windows virtual servers.

For example:
- `test.onapp.com` - specify 'test' as hostname, 'onapp.com' as domain. If you leave the domain field blank, the default value 'localdomain' will be used and you will get the following - `test.onapp.com.localdomain`.
- **Password** - a secure password for the VS. It can consist of 6-99 characters, letters [A-Z a-z], digits [0-9], dash [-] and lower dash [ _ ], and the following special characters: ~ ! @ # $ * _ + = ` \ { } [ ] : ; ' , . ? /. You can use both lower- and uppercase letters. If you leave password field blank, it will be generated automatically.
- **Password confirmation** - repeat the password to confirm it.
- **Encrypt password** - move the Encrypt Password slider to the right, to encrypt your password, then enter an encryption key in the field that appears.

Click **Next** to proceed to the following step of the wizard to specify the container server resources.

9.7.1.3  Step 3 of 6. Resources

**Compute Resources**
- **Compute Zone** - the Compute zone to build the container server on
- **Compute Resource** - the specific Compute resource to build the container server on. Compute resource may be selected automatically according to the set [provisioning type](https://onapp.com/docs/provisioning-manual).
Resources

- **RAM** - set the amount of container server's RAM. The maximum RAM depends on your bucket settings. The maximum RAM that can be assigned to a container server is 168 GB regardless of the Max RAM value set in the bucket. The maximum RAM that can be assigned to a container server built on a XEN 32bit (x86) template is 16 GB.

- **CPU Cores** - set the amount of container server's CPU cores. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.

- **CPU Priority (or CPU Units)** - set container server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

The following options are available for container servers based on KVM Compute resources only, providing the Enable CPU topology permission is switched on for the user.

- **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the amount of sockets.

Primary Disk

- **Data Store** - choose a data store for container server's primary disk.
- **Primary disk size** - set the primary disk size.

Swap Disk

- **Data Store** - choose a data store for container server's swap disk.
- **Swap disk size** - set the swap disk size. Swap disk size must be greater than zero.
- **Disable** - select the checkbox to disable swap disk creation.

Network Configuration

Network Interface 1

- **Network** - select the network from which the container server should get the IP address
- **IP net** - select from the drop-down list the IP net from which the IP address should be assigned
- **IP range** - select from the drop-down list the IP range from which the IP address should be assigned
- **IP address** - select an IP address to be assigned from the drop-down box
- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropbox.
- **Selected IP address** - if the option is available, you can also assign an IP address for the container server from the drop-down menu. Indicate Compute resource and network to have the list of available IPs.
- **Port Speed** - set the port speed for this container server

- Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS's primary network interface.
- You can't select unlimited port speed if the Network Zone is not selected. In this case the port speed will be 1 by default. It's possible to create a container server with unlimited network speed
without selecting a network zone only if you have only one Network Zone assigned to your bucket.

Click **Next** to proceed to the following step of the wizard where you can specify the container server recipes.

### 9.7.1.4 Step 4 of 6. Recipes

At this step you need to indicate the recipes you want to assign to your container server. This step is optional. You can create a container server without choosing recipes and add them later if required.

1. Choose a recipe you want to assign to this container server by dragging the required recipe to the **Assigned recipes** pane.

2. To add a custom variable, click the "+" button next to the **Custom recipe variables** title bar, then specify variable details:
   - Specify the recipe name and its value.
   - Move the **Enabled** slider to the right to allow use of this variable.

3. Click **Next** to proceed to the next step of the wizard where you will set the cloud-config file.

The recipes step can be missing in the wizard if there are no recipes created in the cloud.

### 9.7.1.5 Step 5 of 6. Cloud Config

The cloud-config enables you to customize different OS elements, such as network configuration, user accounts, etc. This file uses the YAML format and is processed after each reboot. Adding a cloud-config at this step is optional, you can later add or edit the cloud-config via OnApp API or UI. However, you should not change the cloud-config file inside the container server as changes will be lost after the server is rebooted. For the full list of items that can be configured in the cloud-config file, refer to [CoreOS documentation](https://coreos.com/docs/Documentation/).

To set the cloud-config for your container server:

- You can fill in the cloud-config in the **Cloud-Config** field
- You can insert a cloud-config file from your local computer at the **File** tab by clicking the **Choose File** button. After the file is uploaded, cloud-config will appear in the **Cloud-Config** field.
- You can add an URL to your cloud-Config file in the **File url** field at the **File url** tab

### 9.7.1.6 Step 6 of 6. Confirmation

At this step, configure the automation settings. This is the final step of the container server creation wizard.

- Move the **Build Container Server** slider to the right if you want the system to automatically build the container server. If you leave this box blank, you will have to build your server manually after it is created.
- Move the **Boot Container Server** slider to the right if you want the container server to be started up automatically.

At the Confirmation step you can find the configuration summary of the container server, which will be created. You can view RAM size, primary disk and swap disk size, number of cores.
After you set up all parameters, click the **Create Container Server** button to start the creation process.

### 9.7.2 Container Server Cloud Config

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

The cloud-config enables you to customize different OS elements, such as network configuration, user accounts, etc. This file uses the YAML format and is processed after each reboot. Adding a cloud-config when creating a container server is optional, you can later edit or add the cloud-config via OnApp API or UI.

- You should not change the cloud-config file inside the container server as such changes will be lost after the server is rebooted.
- For the full list of items that can be configured in the cloud-config file, refer to CoreOS documentation.

To add/edit the could-config for your container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you want to edit, to show its details screen.
3. Click the **Configuration** tab, then click **Cloud-Config**.
4. On the page that loads you can add-edit the cloud-config for the container server:
   - You can fill in the cloud-config in the **Cloud-Config** field
   - You can insert a cloud-config file from your local computer at the **File** tab by clicking the **Choose File** button. After the file is uploaded, cloud-config will appear in the **Cloud-Config** field.
   - You can add a URL to your cloud-config file in the **File url** field at the **File url** tab
5. Click **Submit** to save changes.
6. After you edit the cloud config, you need to reboot the container server at Control Panel > Cloud > Container Servers > Label > Tools > Reboot Container Server. Changes to the cloud config will not take effect if the server is not rebooted. The reboot should be done via OnApp Control Panel. If the reboot command is issued inside the container server, the changes to the cloud config will not take effect.

Below you can find a cloud config example. This cloud config is added to two container servers and configures communication between these servers by implementing the fleet cluster manager. Users can then create containers with apps on one of the container servers and get tables of those containers on the other container server in the cluster. For more information, refer to CoreOS documentation.

**Cloud config example:**
See also:

- [Create Container Server](#)
- [Manage Container Servers](#)
- [Container Server Billing](#)
- [Manage Container Server Backups](#)
- [Manage Container Server Backup Schedules](#)

### 9.7.3 Manage Container Servers

On May 26, 2020, according to [CoreOS reaching End of Life](#), container servers in OnApp also reached End of Life. Please contact [support](#) or your account manager on [amteam@onapp.com](mailto:amteam@onapp.com) for more details and further assistance.

Container Server is a regular VS based on default CoreOS template. This type of server allows the user to customize the server to implement integration with Docker or other container services. In this document you can find information on how to manage Container Servers.

#### 9.7.3.1 View Container Servers

To view all container servers deployed in the cloud:

```yaml
#cloud-config
write-files:
  - path: /etc/hosts
    permissions: '0644'
    content: |
      master1_IP master1 coreos00
      master2_IP master2 coreos01

coresos:
  etcd2:
    name: master1
    initial-cluster:
      master1=http://master1_IP:2380,master2=http://master2_IP:2380
      initial-advertise-peer-urls: http://$public_ipv4:2380
      listen-client-urls: http://0.0.0.0:2379,http://0.0.0.0:4001
    fleet:
      public-ip: $public_ipv4
      metadata: "role=master"
    flannel:
      interface: $public_ipv4
  units:
    - name: etcd2.service
      command: start
    - name: fleet.service
      command: start
    - name: flanneld.service
      command: start
```
1. Go to your Control Panel > **Cloud** > **Container Servers** menu to see an overview of all container servers in the cloud.

2. The page that loads will show the list of container servers together with their:
   - operating system
   - label. Click the label to see the container server details.
   - VIP status (enabled or disabled). Click the icon to enable/disable VIP status of a particular container server.
   - IP addresses
   - allocated disk size
   - RAM
   - user - the owner of this container server. Click the user name to see the owner details.
   - CPU(s) - the number of CPU(s) included
   - power status. Click the on/off buttons to change the status.

3. Click the **Actions** button next to the container server for the quick access to the list of container server actions (the list of actions displayed depends on the container server status):

   **On this page:**
   - **View Container Servers**
   - **View Container Server Details**
   - **Edit Container Server**
   - **Rebuild/Build Container Server Manually**
   - **Migrate Container Server**
   - **Set VIP Status for Container Server**
   - **Segregate Container Server**
   - **Container Server Power Options**
   - **Container Server Administrative Options**
   - **Delete Container Server**

   **See also:**
   - **Create Container Server**
   - **Container Server Cloud Config**
   - **Container Server Billing**
• **Container Server Backups**

• **Manage Container Server Backup Schedules**

Reboot
- Recovery reboot
- Shutdown
- Startup
- Recovery startup
- Unlock

To search for a particular container server, click the Search icon at the top of the container server list. When the search box appears, type the text you want to search for and click the **Search** button.

9.7.3.2 **View Container Server Details**

To view details of a specific container server:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the container server you’re interested in.
3. The screen that appears loads the container server properties, notes, activity log and tools for managing your container server.

9.7.3.2.1 **Container Server Properties**

Container server properties page gives a general overview of the container server details:

- VIP status (on/off). Click the icon to change the status.
- Template the container server is built on
- Power status & On/Off/Reboot buttons.

**Clicking the OFF button performs a graceful shutdown and then powers off the container server after the timeout set in Configuration settings.**

- Segregated Container Server. This field appears if the container server is segregated from another container server. Click the label of the container server to view the details of the container server from which the current server is segregated.
- FQDN (fully qualified domain name)
- Compute resource. Click the Compute resource name to see its details
- Login credentials. To log in, use the following credentials:
  - `user` - ‘core’
  - `password` - password from the container server details’ page
- Owner. Click the owner name to see its details.
• IP Addresses. Only the first five IP addresses are displayed on the container server properties page. To view the list of all container server IP addresses, mouse over IP addresses area or go to the Networking tab > IP Addresses tab.

• Auto-backups - move the slider to enable or disable auto-backups for this server. For more information refer to Manage Container Server Backup Schedules.

• Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.

• CPU(s)
• CPU priority or CPU units
• Disk Size
• Memory
• CPU Usage (%)
• Data Sent
• Data Received

9.7.3.2.2 Notes
The Notes section lists brief comments or reminders for a container server. You can add either Admin's or User's notes. The Admin's note will be available to cloud administrators. Click the Actions icon in the Notes section of the page to add admin's or user's note.

9.7.3.2.3 Container Server Management
• Click the Tools button to expand the Tools menu with the container server management options.
• Use the top menu to manage your container servers' statistics/networking/storage options.

9.7.3.3 Edit Container Server

You can edit label, CPU and RAM resources for container servers. To edit the a container server:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you want to edit, to show its details screen.
3. Click the Tools button and select the Edit Container Server link.
4. Change label, CPU cores, CPU priority/units and RAM values, and click the Save button.

9.7.3.4 Rebuild/Build Container Server Manually

If you haven't checked the Build Container Server option during the container server creation process, you will have to do this manually after the container server has been created. Building a container server is the process of allocating physical resources to that container server.

To build a container server manually or rebuild the container server on the same (or another) template:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. On the screen that appears, click the Tools button and then click Rebuild Container Server.
4. On the screen that pops up, enter the encryption passphrase.
5. Move the **Start CS after rebuild** slider to the right if you want to have your container server started automatically after it is built.

6. Click the **Rebuild Container Server** button to finish.

After you rebuild your container server all data will be lost.

### 9.7.3.5 Migrate Container Server

You can migrate container servers using a *hot* or *cold* migration method:

- **Hot migration** is the migration of container servers with or without disks between compute resources that share common data stores or data store zones.
- **Cold migration** is the migration of container servers with disks between compute resources with local storage or across compute zones.

#### 9.7.3.5.1 Hot Migration

You can migrate an online container server from one compute resource to another compute resource that are both utilizing local/shared/IS storage or across zones. There are two types of hot migration:

- **Compute Resource** - migration of a container server from one compute resource to another
- **Compute Resource and Storage** - migration of a container server with disk from one compute resource and data store to another

**Compute Resource**

To hot migrate a container server:

1. Go to your Control Panel > **Cloud > Container Servers**.
2. Click a label of a container server that you want to migrate.
3. Click the **Tools** button and click the **Migrate Container Server** button.
4. In the **Migration Type** box, select **Compute Resource** and click **Next**.
5. Select a **Target compute resource** from the box and click **Next**.
6. At the final step of the wizard, you can see the migration summary and select the following check boxes:
   - **Cold-migrate when hot-migration fails** - select the check box to apply cold migration in case of the hot migration failure
   - **Are you sure you want to migrate?** - select the check box to confirm the hot migration
7. When you are finished, click the **Submit** button.

**Compute Resource and Storage**

To hot migrate a container server:

1. Go to your Control Panel > **Cloud > Container Servers** menu.
2. Click the label of a container server you want to migrate.
3. Click the **Tools** button and click the **Migrate Container Server** button.
4. In the **Migration Type** box, select **Compute Resource and Storage (Hot)** and click **Next**.
5. Select the following destination resources:
o **Target compute zone** - select a destination compute zone. The list includes compute zones that you have access to within the same network (i.e. KVM to KVM but not KVM to Xen).

o **Target compute resource** - select a destination compute resource

o **Target data store for disk** - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.

6. At the final step of the wizard, you can see the migration summary and select the following check boxes:

   o **Cold-migrate when hot-migration fails** - select the check box to apply cold migration in case of the hot migration failure

   o **Are you sure you want to migrate?** - select the check box to confirm the hot migration

7. When you are finished, click the Submit button.

After migration, the power status of your container server remains the same as before the migration. If you migrate a container server that's running, the whole process is almost unnoticeable.

9.7.3.5.2 Cold Migration

Cold migration enables you to migrate container servers with disks between compute resources with local storage or across compute zones. To cold migrate a container server:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.

2. Click the label of a container server you want to migrate.

3. Click the Tools button and click the **Migrate Container Server** link.

4. In the **Migration Type** box, select **Compute Resource and Storage (Cold)** and click Next. 

5. Select the following destination resources:

   o **Target compute zone** - select a destination compute zone. The list includes compute zones that you have access to within the same network (i.e. KVM to KVM but not KVM to Xen).

   o **Target compute resource** - select a destination compute resource

   o **Target data store for disk** - select a destination data store for each disk. The list includes available data stores associated with the compute zone and compute resource that you selected earlier.

6. At the final step of the wizard, you can see the migration summary and select the **Are you sure you want to migrate?** check box to confirm the migration.

7. When you are finished, click the Submit button.

**If you change the compute resource or data store zone, the billing will be changed according to the prices set for that new zone in the bucket. The new estimated price per hour for a VS is displayed at the bottom of the VS migration screen.**

After migration, the power status of your container server remains the same as before the migration. If you migrate a container server that's running, the whole process is almost unnoticeable.

OnApp administrators can control user access over container server migration. Using OnApp permissions, you can allow/forbid users to perform migration of all container servers, or their own servers only. This is handled via the Control Panel's **Roles** menu.
9.7.3.6  Set VIP Status for Container Server

If a compute resource fails or reboots, the system migrates container servers to another compute resource, one container server at a time. The order container servers are migrated in is random. However, you can give a server "VIP" status, and this will give that server priority in the migration queue.

To set or remove VIP status for a container server:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Use the icon in the VIP column next to a required server to change switch on/off the VIP status.

9.7.3.7  Segregate Container Server

If required, you can instruct OnApp to make sure a container server is never booted on the same compute resource as another specific container server. You can also remove segregation if required.

- Container servers can only be segregated from other container servers built by its owner.
- Container servers can only be segregated from container servers within the same compute zone.
- Container servers cannot be segregated from container servers running on the same compute resource.
- The segregated container server is not automatically migrated to another compute resource.

To isolate one container server from another:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you want to segregate.
3. On the screen that appears, click the Tools button, then click Segregate Container Server.
4. In the dialogue box that pops up, use the drop-down menu to choose a server you want to keep away from.
5. Click the Segregate Container Server button to finish.

To remove segregation:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you want to segregate.
3. On the screen that appears, click the Tools button, then click Desegregate Container Server.
4. In the dialogue box that pops up, click the OK button to finish.
9.7.3.8 Container Server Power Options

To manage container server power options:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the required server.
3. Click the Tools button on the container server's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on container servers (the exact list shown depends on the container server status):
   - Reboot Container Server - powers off and then restarts the container server.
   - Reboot in Recovery - powers off and then restarts the container server in the recovery mode.
     For container servers with enabled encryption the temporary login is "root" and password is "recovery".
     For container servers with password encryption disabled, the server root password will be used to reboot in recovery.
   - Suspend - stops a container server, changes its status to suspended and disables all the other actions on container server, unless unsuspended.
   - Shut Down Container Server – pops up a dialogue box, where you can either Shut Down container server (terminates the container server gracefully), or Power Off container server (terminates the container server forcefully).
   - Startup Container Server - queues a start-up action for a container server that's currently powered off.
   - Startup on Recovery - starts the container server in recovery mode with a temporary login ("root") and password ("recovery").
   - Boot from ISO - boots the container server from an ISO. You can boot container servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. If you boot a server from an ISO with the RAM requirement larger than the container server's RAM, the transaction will fail. Make sure that you have enabled the Any power action on own container servers permission for the user to have access to this feature.

As soon as you boot a container server from the installation ISO, OnApp may lose control of any components (networks, disks) !!! The only available actions will be start and stop a container server. Be aware, that all the contents of the disk may be also deleted.

9.7.3.9 Container Server Administrative Options

To manage a container server power options:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the required container server.
3. Click the Tools button on the container server's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following administrative actions on container servers:
   - Reset Root Password - resets the root password for this container server (the password is displayed in container server information).
• **Change Owner** - pops up a dialogue box with a drop-down of all users on the system, enabling you to pass ownership of the container server to the user selected from the list. If you have any recipes for this container server, you will be also prompted to confirm if the recipe should be moved to another user.

Note that you cannot change the ownership of a recipe which you do not own, even if it is assigned to your container server.

9.7.3.10 Delete Container Server

Shut down the container server before destroying it. If you are deleting a container server that is running, the server will be deleted after the time set in **Timeout Before Shutting Down** VSS configuration parameter.

To remove the container server from the cloud:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. On the screen that appears, you'll see the list of all container servers in the cloud. Click the label of the server you want to delete.
3. On the container server's screen, click the Tools button, then select **Delete Container Server**.

**IMPORTANT:**

• You won't be able to restore a container server after deleting it.
• Deleting a container server removes all data stored on that container server.

9.7.4 Manage Container Server Networks

On May 26, 2020, according to **CoreOS reaching End of Life**, container servers in OnApp also reached End of Life. Please contact **support** or your account manager on **amteam@onapp.com** for more details and further assistance.

The Networking menu in the Container Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers. In this document you can find information on how to manage Container Server networks.

• To run the container server, at least one network interface with an assigned IP address (or addresses) is required!
• To allocate another physical network, add a new network interface.
9.7.4.1 Configure Container Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this container server. Network interfaces join the physical network to the container server.

When you create a container server a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default.

OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a container server’s primary network interface.

To see the list of all network interfaces allocated to the container server:

On this page:

- Configure Container Server Network Interface
- Rebuild Container Server Network
- Set Container Server Firewall Rules
- Container Server IP Addresses
- Display Network Speed
- Edit Container Server Network Speed

See also:

- Create Container Server
- Container Server Cloud Config
- Container Server Billing
- Container Server Backups
- Manage Container Server Backup Schedules

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you’re interested in.
3. Click the Networking tab, then click Network Interfaces.
4. On the page that follows you will see the following fields:
   - Interface – optional label of the network interface.
   - Network join – name of the network and a Compute resource or Compute zone this network is joined to.
   - Port speed – the speed set to the interface.
   - Primary interface – indication whether the interface is primary or not.

Here you can also view Interface Usage. Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

To add a network interface:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.

4. Click the **Add New Network Interface** button at the bottom of the screen.

5. On the screen that appears, input values for the following parameters:
   - **Label** – a human-friendly name for the new interface.
   - **Physical Network** – choose a network join from the drop-down menu, which lists network joins assigned to the Compute resource/Compute zone on which the container server runs).
   - **Port speed** – set port speed in Mbps, or make it unlimited.

6. Click the **Submit** button.

To edit network interface label, port speed or set it as primary (if none is marked as primary), click **Edit** icon next to the appropriate network interface. After editing the port speed, the container server should be power cycled for the change to take effect.

To delete a network interface, click the **Delete** icon next to the interface you want to delete.

### 9.7.4.2 Rebuild Container Server Network

To rebuild a network join, added to the container server (required after allocating new IP addresses):

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of a required server.
3. On the screen that appears, click the **Tools** button, then click **Rebuild Network**.
4. In the pop-up window, move the **Force Reboot** slider to the right, then select the container server shutdown type.

   During rebuild network, the system tries to reach container server's network interface without rebooting server. Then, if it is not possible, transaction will quit. Force reboot action allows to rebuild container server network with reboot action if live rebuild is impossible. In case the force reboot option is disabled and system cannot enter the container server, the network rebuild operation will fail.

5. Move the **Required Startup** slider to the right to start up a container server when you’re rebuilding network of a powered off server.
6. Click the **Rebuild Network** button.

### 9.7.4.3 Set Container Server Firewall Rules

With OnApp you can set firewall rules for the network interfaces of container servers. There are two types of firewall rule:

- **ACCEPT** – defines the packets that will be accepted by the firewall
- **DROP** – defines the packets that will be rejected by the firewall

Ensure that the following permissions are enabled before setting firewall rules for your container server:
- Create own firewall rules
- Destroy own firewall rules
- Read own firewall rules
- Update own firewall rules
- Update own container server
- Read own container server

You cannot apply firewall rules to container servers which are parts of a blueprint.

You can set the following:

- **add a specific firewall rule** - you can configure a firewall rule with specific parameters (source, destination port, protocol type etc.)
- **set default firewall rules** - you can set default firewall rules for an entire network interface

### 9.7.4.3.1 Add a specific firewall rule

To configure a firewall rule:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the servers for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, set the following:
   a. Choose the network interface.
   b. Specify if the rule defines requests that should be accepted or dropped.
   c. Set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. Set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      - Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
   e. Protocol type (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
   f. Choose the protocol (TCP, UDP, DCCP, SCTP or ICMP).
   g. Enter a comment to the firewall rule.
5. Save the rule by clicking the **Add Rule** button. The rule will be saved in the UI, but the transaction won’t be started until you click the **Apply Firewall Rules** button.
6. To start the transaction which runs firewall rules for a container server, click **Apply firewall rules** button.
7. Use **Up** and **Down** arrow buttons in the left column to change firewall rule position.

8. To edit or delete a firewall rule click the appropriate icon in the last column.

9.7.4.3.2 Default firewall rules

**To set default firewall rules for a network interface:**

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the container server for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, go to Default firewall rules section.
5. Choose **ACCEPT** or **DROP** command next to the network interface and click **Save Default Firewall Rules**. The rule will be saved in the UI, but the transaction won't be started until you click the **Apply Firewall Rules** button.

**Example:**
The Int1 ACCEPT 122.158.111.21 22 TCP firewall rule means that the Int1 network interface will accept all requests and packets addressed from 122.158.111.21 using the TCP protocol on port 22.
The Int2 DROP 122.158.111.21 22 UDP firewall rule means that the Int2 network interface will reject all requests and packets from 122.158.111.21 using the UDP protocol on port 22.

If you reboot a Xen-based container server from the console, the firewall rules for this container server will be lost, and you will need to update the firewall rules again.

**Protocols:**

For IPv4, only the ICMP, IPV6-ICMP, TCP, UDP, DCCP, SCTP protocols are available by default. However, if required, you can enable other protocols for IPv4.

1. Go to the `/onapp/interface/config/network_protocols.yml` file.
2. The list contains all protocols available (IPv4). Set 'true' for the required protocols.
3. Restart httpd by running one of the following commands:

```
service httpd restart
```

or

```
/etc/init.d/httpd restart
```

4. The protocols you have enabled are now available at Control Panel > **Container Servers** > **Label** > **Networking** tab > **Firewall** while adding new firewall rules.

The following protocols can be enabled in the `/onapp/interface/config/network_protocols.yml` file:

- IP
- HOPOPT
- RDP
- IRTP
- TLSP
- SKIP
- AX.25
- IPIP
In the Networking > IP Addresses tab you can find the list of assigned IP addresses, allocate new IP addresses and rebuild a network.

To allocate a new IP Address to the container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you're interested in.
3. Click the **Networking** tab > **IP Addresses**.
4. Click the **Allocate New IP Address** button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the container server will be available). The IP Address will be allocated automatically.
6. As an alternative you can manually select an IP address from the IP Pool associated with the network interface. To enable this option move the **Specify IP Address** slider to the right and choose IP Address from the drop-down list. You may select an IP address that's already assigned to a container server, but only one container server should be online at a time. Use **Please show me used IP Pool**, **Show only my IPs** and **Show only IPv6** checkboxes to narrow the list of IP in the drop-down list.
7. Click the **Add IP Address** button.
8. Click the **Rebuild Network** button to rebuild the network.

You must rebuild the network after making changes to IP address allocations.

To remove an IP address from a container server:
1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Networking** > **IP Addresses** tab.
4. Click the **Delete** icon next to the IP address you want to delete.
5. In the pop up window that appears:
   - Choose **Delete with Reboot** option if you want to reboot a container server and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the container server's Overview page.
   - Choose **Delete without Reboot** option if you don't want to reboot a container server. In this case to apply the changes, you will have to the reboot the container server additionally.

You can't delete an IP address that is in use.

**9.7.4.5 Display Network Speed for Network Interfaces on Container Server Page**

The main **Container Servers** screen displays the network speed of each container server's primary network interface. To see the speed of all interfaces assigned to a container server:
1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the server you are interested in.
3. Click the **Networking** tab > **Network Interfaces**.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.
9.7.4.6 Edit Container Server Network Speed

To edit a container server's network speed:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you want to change.
3. Go to the Network tab > Network Interfaces.
4. In the last column click the Edit button.
5. Change the port speed.
6. Click the Submit button to save changes.

9.7.5 Manage Container Server Disks

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

Container server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific container server. Disks can be assigned as standard or swap disks. They can also be set as primary (that is, the disk from which an OS will boot).

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual container servers are managed through the Control Panel's Container Servers menu. In this document you can find information on how to manage Container Server disks.

Do not create multiple partitions on one disk for container servers. OnApp Control Panel supports only one partition per disk. In cases when you change disk partition, the CP might lose control of such a disk and the container server associated with it. If required, create additional disks instead.

9.7.5.1 Add Disks to Container Servers

On this page:
- Add Disks to Container Servers
- Edit Container Server Disks
- Migrate Container Server Disks
- Delete Container Server Disks
Adding a disk to a container server will require that server should be rebooted. If a container server is running when you try to add a new disk to it, you'll be asked to confirm the reboot. To add a disk to a container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click a container server’s label to open its details screen.
3. Click the Storage tab > Disks.
4. Click the + button or the Create Disk button.
5. Fill in the details:
   - Specify disk label.
   - Choose the data store to create a disk on from the drop-down list.
   - Move the slider to the right to specify the desired disk size.

Please note that support of secondary disks larger than 2 TB is limited. Certain operations might fail. This will be improved in future releases.

**Click here to see the details of adding a disk 2 TB+**

- If you add a disk larger than 2 TB, you will not be able to mount or create a backup of such disk via OnApp Control Panel. These operations may be performed only manually inside a virtual server. Also, resize will not be possible for such disks.

- You can perform the following operations with a secondary disk that is larger than 2 TB:
  - Migrate
  - Delete / Wipe
  - Edit IO limits
  - Rebalance (for VSs with Integrated Storage feature enabled)

- OnApp provides a RAW device available inside a VS that you may use. For example, you may create a GPT partition and format it using any available file system which can be mounted inside VS.
6. Click the **Add Disk** button to finish.

**Restrictions:**
- If you choose a Solidfire data store, the minimum disk size will be regulated by Solidfire Data Store Zone settings.
- If container server and the Control Panel server belong to different networks, the hot attach transaction will fail.
- If an additional disk has been created without the **require format disk** option and formatted/partitioned in another way, resize disk action may work incorrectly. Use the **require format disk** option when creating an additional disk, otherwise use disk resize option at your own risk.
- When you add a new disk to a container server, it automatically becomes available to that server.

### 9.7.5.2.1 Primary and Swap disks
For primary and swap (Linux, FreeBSD) disks you may only change the label and the size. You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your container server.

You can only increase the size of container server primary disks.

To change disk size:
1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Make sure your container server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab > **Disks**.
4. Click the **Actions** button next to the disk you want to change, then click the **Edit** link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the **Save Disk** button.

   If you start Disk Resize transaction and then decide to cancel it, you will get the warning message. Click Proceed if you are sure that the resize is no longer in progress. Otherwise stopping Disk Resize transaction can be a dangerous operation and side effects can include file system corruption.

### 9.7.5.2.2 New disks
For new disks - those which were added after the container server was created - you can edit the following:

- Label
- Size
- Require Format
- Mounted
- Mount Point
- File System

### 9.7.5.3 Migrate Container Server Disks

You can migrate disks of your container servers to other data stores, which are allocated to the same Compute resource. Unlike **Container Server migration** – disk migration requires the reboot of the container server.

To migrate a disk:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Make sure your container server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab > **Disks**.
4. Click the **Actions** button next to the disk you want to move to another data store, then click the **Migrate** button.
5. On the screen that appears, select a target data store from a drop-down box.
6. Click **Start Migrate**.

- You can only migrate disks to data stores in data store zones assigned to your bucket.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- If you move an 850GB disk between aggregates with 10GB actual usage, the 'dd' image of the local volume manager will take 850GB space, because the entire local volume manager is copied, including zero 'dspace which may not be able to be recovered.
9.7.5.4 Delete Container Server Disks

To delete a disk:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Make sure your container server is powered off, then click its label to open its details screen.
3. Click the Storage > Disks tab.
4. Click the Actions button next to the disk you want to delete, then click Delete.
5. In the pop-up window, move the Force Reboot slider to the right, then select the container server shutdown type.
6. Move the Required Startup slider to the right to start up the container server automatically after the network is rebuilt.

Steps 5 and 6 apply to disks of container servers that are on.

7. Click the Destroy Disk button.

This will schedule the Transaction Server.

9.7.6 Manage Container Server Backups

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

OnApp supports normal backups for Container Servers. Normal backups contain all the information stored on a server's disk. If you have switched on incremental backups for the cloud, normal backups will still be made for container servers. For detailed information on backups refer to Virtual Server Backups.

- Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a server. To view the list of user backups, refer to View User Backups section.
- If required, you can change the block size which is used during backup creation at Control Panel > Admin > Settings > Configuration by editing the Block Size (MB) parameter.

9.7.6.1 View Container Server Backups

On this page:
• **View Container Server Backups**

• **Take Container Server Disk Backups**

• **Restore Container Server Backup**

• **Delete Container Server Backup**

• **Add Container Server Backup Note**

**See also:**

• **Virtual Servers**

• **Smart Servers**

• **Application Servers**

• **Backup Settings**

• **Edit Backups/Templates Configuration**

To view the list of container server's backups:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the required container server.
3. Click the **Backups** tab, then select **Images**. Images are full backups of container server disks.
4. On the screen that appears, you'll see a list of container server backups.
5. Click the label of the required container server backup to see the following tools - restore backup, delete backup and add/edit note.

9.7.6.2 Take Container Server Disk Backups

To back up an container server disk:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the required container server.
3. Click the **Storage tab** and select **Disks**. You'll see a list of the disks allocated to that container server.
4. Click the **Actions** icon next to a disk you want to take a backup of, then click **Backup**. You'll see a list of all the backups taken and pending for that disk, along with the tools to restore backups and delete them.
   - To make a backup, click the **Take a Backup** button at the end of the list. If required, you can add a note to a new backup. You can also select **Force Windows Backup**.

   **This option for Windows servers is designed as a last resort, when the backup cannot be taken due to NTFS file system problems.**
   **Switching on this option will bring up a dialog box with the**
following message: "If you enable this option there is no guarantee that backup will be consistent."
Select "Yes" to proceed.

9.7.6.3 Restore Container Server Backup
To restore a backup:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the required container server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the backup you want to revert to and choose Restore.

9.7.6.4 Delete Container Server Backup
To delete a backup:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the required container server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the backup you want to remove and choose Delete.

9.7.6.5 Add Container Server Backup Note
To add/edit container server backup’s note:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the required container server.
3. Click the Backups tab, then select Images.
4. On the screen that appears, click the Actions icon next to the required backup and choose Add Note. Make necessary changes and click Submit.

9.7.7 Manage Container Server Backup Schedules
On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

In addition to the system auto-backup presets, you can schedule backups of container servers (server disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of scheduled container server backups and Auto-backup Presets provides a great deal of flexibility in the way backups are handled for the cloud, and for individual servers. Auto-backup Presets can be applied to all new servers added to the cloud. Scheduled container server backups enable specific backups to be scheduled for individual servers, outside of the auto-backup pattern.
OnApp supports only normal backups for container servers, which include all the data from the server’s disk.

9.7.7.1 View Container Server Backup Schedules

To view the list of backup schedules for a container server:

On this page:

- View Container Server Backup Schedules
- Create Container Server Backup Schedule
- Edit Container Server Backup Schedule
- Delete Container Server Backup Schedule

See also:

- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates Configuration

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you’re interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that appears, you will see the list of backup schedules along with their details:
   - Date - time when the schedule was created
   - Target - the disk for which the schedule was created
   - Action - scheduled action
   - Period - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - Period type - the backup period: days, weeks, months or years
   - Rotation period - the number of backups after which the first backup will be deleted
   - Next Start - the date and the hour of the next backup
   - User - user who created the backup schedule
   - Status - schedule status
   - Actions - click the Actions icon to edit or delete the backup schedule
9.7.7.2 Create Container Server Backup Schedule

To add a backup schedule:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. On the screen that follows, click the New Schedule button.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   - **Enabled** - whether this backup schedule should be enabled or not
7. Click the Save button to finish.

9.7.7.3 Edit Container Server Backup Schedule

To edit a backup schedule:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk you want to back up, then select Schedule for Backups.
5. Click the Edit icon next to a schedule to change its details.
6. Specify schedule details:
   - **Period** - how frequently the backup will take place according to a period type set. For example, the period of 2 and the period type of days will take a backup every two days.
   - **Period type** - the backup period: days, weeks, months or years. The period type must be unique for each backup target (disk or server).
   - **Rotation period** - the number of backups after which the first backup will be deleted.
   - **Start time** - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).
   - **Enabled** - move the slider to enable or disable the schedule
For a schedule with the Failed status, you can move the Enabled slider to the right to run the schedule once again.

7. Click the Save button to finish.

9.7.7.4 Delete Container Server Backup Schedule

To delete a backup schedule:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. Click the Storage tab, then select Disks.
4. On the screen that appears, click the Actions button next to the disk with a backup schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

9.7.8 Manage Container Server Statistics

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

For your convenience, the system tracks container server performance and generates statistics on CPU utilization, billing, network interface and Disk IOPS usage. In this document you can find information on how to manage Container Server statistics.

9.7.8.1 Container Server CPU Utilization

OnApp tracks CPU usage for container servers and generates charts that help analyze container server performance. The charts show the total CPU usage for all the cores of this particular container server for a specified time period.

The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:

On this page:
- Container Server CPU Utilization
- Container Server Billing Statistics
- Container Server Network Interface Statistics
- Container Server Disk IOPS Statistics
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. Click the Overview tab > CPU Usage.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the Show in My Timezone slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

To see what percentage of Compute resource CPU resource a container server takes, go to your Control Panel's Container Servers menu and click the label of the container server you're interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this container server.

9.7.8.2 Container Server Billing Statistics

OnApp has a record of all the charges applied to your container servers for the last three month period. If a container server was created less than three months ago, statistics are recorded for the container server's existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

- The price parameters on this page do not take into consideration the free limits for resources set in the bucket.
- When generating billing statistics, OnApp takes the last state of the container server during the hour. For example, if a container server was turned on at 6.15 and turned off at 6.59 it will be considered as being off for the whole hour and its resources will be billed according to the OFF prices set in the bucket. However, the container server's disk and network interface usage can still be billed in case the container server was on during that hour.
To view billing statistics for a container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the server you're interested in.
3. Click the Overview tab > Billing Statistics tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button. By default the statistics are generated for the last three months or the actual container server existence period.
5. Move the Show in my Timezone slider to the right if you want to view billing statistics according to your profile's timezone settings. By default, billing statistics is shown in UTC.
6. On the page that appears:
   - **Date** – particular date and time for the generated statistics
   - **Users** – the container server owner. Click the owner name to see the User Profile (user details)
   - **Virtual Servers** – the container server name with the total due for container server resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column.
   - **Network Interfaces Usage** – the total due for the network interfaces used by this container server for the point of time specified in the Date column. Click the network interface name to see its details.
   - **Disks Usage** – the list of disks assigned to this container server with the total due for the "data_read", "data_written", "reads_completed", "writes_completed" resources for particular disk. The charges for the disk size resource are included into the Costs column.
   - **Costs** – the total due for the Container Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

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### 9.7.8.3 Container Server Network Interface Statistics

OnApp tracks network usage for container servers and generates charts that help analyze network performance. To see network utilization statistics for a container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. Click the Networking tab > Network Interfaces tab.
4. Click the Statistics (chart) icon next to the network you're interested in.
5. On the screen that appears, the top chart shows bandwidth usage in megabits per second (Mbps) for the last 24 hours. The bottom chart shows usage for the last three months.
6. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

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### 9.7.8.4 Container Server Disk IOPS Statistics
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The system tracks IOPS (Input/Output Operations per Second) for container servers and generates charts that help analyze container server disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for a container server:

1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. Click the Storage tab > Disks tab.
4. Click the Actions button next to the required disk, and then choose IOPS.
5. There are four charts on the screen that appears:
   - IOPS for the last hour
   - IOPS for the last 24 hours
   - Data written/read (in Kb) for the last 24 hours
   - Data written/read (in Kb) for the last hour
6. To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the Apply button.

The OnApp API allows you to limit the Hourly IOPS and Hourly data by setting the limit=N parameter, where the N variable is the number of hours for which the charts will display the info.

9.7.9 Container Server Integrated Console

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

OnApp provides an integrated VNC console that gives users direct access to their container servers through the Control Panel UI. The noVNC console is provided for container servers that are built on KVM CentOS 7 based on WebSockets. Users with the Administrator role can access all container server consoles for support and troubleshooting purposes. The console connects a user browser to a VNC port or VNC WebSocket port available via a compute resource for the guest console.

To access the container server VNC console via the Control Panel:
1. Go to the Cloud > Container Servers menu.
2. Click a label of a destination container server.
3. Click the Console button.

For the HTML5 console, click the Re-connect button if the connection is lost. The re-connection to the console runs as follows:
• If the console runs as expected, clicking the Re-connect button causes disconnection and the console is re-connected automatically after 1.5 seconds.

• If the console gets stuck, clicking the Re-connect button runs your request once again and re-connects the console without reloading.

• If the console gets disconnected with a status code and an error message, the console is re-connected automatically after 1.5 seconds.

To use the Java console instead of HTML5, go to Admin > Settings > Configuration and edit settings in the System tab. For more information, refer to System Configuration.

See also:
• Create Container Server
• Manage Container Servers
• Container Server Cloud Config
• Container Server Billing
• Manage Container Server Backups

9.7.10 Container Server Transactions and Logs

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

The system records a detailed log of all the transactions happening to your container servers. The list of transactions logged by the system includes:

• Provision container server
• Startup container server
• Stop container server
• Resize container server without reboot
• Configure Operating System
• Build disk
• Resize disk
• Format disk
• Destroy disk
• Destroy container server
• Destroy template
• Download template
• Update firewall

To view transactions for a container server:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. Click the label of the container server you're interested in.
3. The details screen for that container server shows recent transactions in the **Activity Log** section.

To cancel pending tasks, click the **Cancel Pending** button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- **date** - time in the [YYYY][MM][DD][hh][mm][ss]Z format
- **action** - the action name
- **status** - the action status (Complete, Warn, Pending, or Failed)
- **ref** - the log item's Ref number
- **target** - the action target
- **started at** - the time when the action was started
- **completed at** - the time when the action was completed
- **template** - template of the server the action refers to
- **compute resource** - the label of compute resource
- **initiator** - the user who initiated the action

If you want to see only the detailed output, you can hide log info with the arrow button in the upper right corner.

**See also:**

- Create Container Server
- Manage Container Servers
- Container Server Cloud Config
- Container Server Billing
- Manage Container Server Backups

## 9.7.11 Container Server Recipes

On May 26, 2020, according to [CoreOS reaching End of Life](#), container servers in OnApp also reached End of Life. Please contact [support](mailto:support@onapp.com) or your account manager on [amteam@onapp.com](mailto:amteam@onapp.com) for more details and further assistance.

In this document, you can find information on how to manage Container Server recipes.

### 9.7.11.1 View Container Server Recipes

To manage container server recipes:

1. Go to your Control Panel > **Cloud** > **Container Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Overview** tab, then choose **Recipes**.
4. The screen that follows shows details of all the recipes in the cloud:
   - The left pane shows the list of available recipes organized into recipe groups.
• The right pane displays the list of events to which the recipes can be assigned to. Click the arrow button next to event to expand the list of recipes assigned to it.

On this page:
• View Container Server Recipes
• Assign Recipe
• Delete Recipe

See also:
• Container Server Recipe Custom Variables
• Create Container Server
• Manage Container Server
• Container Server Cloud Config
• Manage Container Server Backups

9.7.11.2 Assign Recipe

Use drag and drop feature to assign a recipe to the desired event. You can assign container server recipes to the following events:
• VS provisioning - run the recipe during the virtual server provisioning
• VS network rebuild - run the recipe while rebuilding a network
• VS disk added - run the recipe while adding a disk to the virtual server
• IP address allocated for VS - run the recipe when adding an IP address to the VS network interface
• IP address revoked from VS - run the recipe when removing an IP address from the VS network interface
• VS network interface added - run the recipe while adding a network interface to the virtual server
• VS network interface removed - run the recipe while deleting a network interface from the virtual server
• VS disk resized - run the recipe while resizing a virtual server disk
• VS resize - run the recipe while resizing the virtual server
• VS IP address add - run the recipe while adding an IP address the virtual server
• VS IP address remove - run the recipe while removing an IP address from the virtual server
• VS start - run the recipe while starting the virtual server
• VS reboot - run the recipe while rebooting the virtual server
• VS hot migrate - run the recipe during the hot migration of the virtual server
• VS hot full migrate - run the recipe during the hot migration of the virtual server with disk
• **VS failover** - run the recipe during the failover process

**To use drag and drop:**
1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

9.7.11.3 Delete Recipe

To remove recipe:
1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the **Delete** button next to the recipe you want to remove.

9.7.12 Container Server Recipe Custom Variables

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

You can define custom variables for particular container servers. Each custom variable is a name-value set that can be used during the container server recipe implementation. Custom variables are set on a per server basis. You can create custom variables during the container server creation or via the container server **Overview** menu.

To create a new custom variable:
1. Go to your Control Panel > Cloud > Container Servers menu.
2. You'll see a list of all container servers in your cloud. Click the name of a server for which you want to create a variable.
3. On the container server details screen, click the **Overview** tab, then choose **Recipes Variables**.
4. On the screen that appears, click the + button.
5. Specify the recipe name and its value.
6. Move the **Enabled** slider to the right to allow use of this recipe.
7. Click **Save**.

To edit a custom variable, click the Edit icon next to the required variable and change its details.

To delete a custom variable, click the **Delete** icon next to the variable you want to remove. You will be asked to confirm the deletion.

It is possible to set custom variables for image templates, as well as for container servers.
Note: container server custom variables will always overlay template custom variables.

See also:
- Create Container Server
- Manage Container Servers
- Container Server Cloud Config
- Container Server Billing
- Manage Container Server Backups

9.7.13 Container Server Billing

On May 26, 2020, according to CoreOS reaching End of Life, container servers in OnApp also reached End of Life. Please contact support or your account manager on amteam@onapp.com for more details and further assistance.

Currently, instance packages are not available for container servers.

Container servers are created based on the default Container Server template. This Container Server template is provided as a system template. Based on this, you can arrange container servers as a paid resource for your end-users. For this, set the price per Container Server template per hour in the bucket. So each server deployed on this template will be billed according to the set price.

To charge for container server:
1. Add Container Server template to required template group.
2. Add the template store to the Access Control of the bucket at Control Panel > Admin > Buckets > Label > Access Control > Other, so that users assigned to the bucket have access to the required templates.
3. Specify the maximum number of container servers users can create in the Miscellaneous section of the bucket's Access Control.
4. Add the template store to the Rate Card of the bucket at Control Panel > Admin > Buckets > Label > Rate Card > Other to set the price for using the required template.
   As a single template can be included in multiple template stores, the same template will have the same price in all the template stores added to the rate card of a single bucket. If you add/edit the price of a template in one template store, the price of the same template will change to the new value in all the template stores in the rate card. Once you add a template to the Rate Card, all the template stores that contain that template will be added to that Rate Card with a price set only for that template.
5. When the relevant template group is added to the bucket, a user can deploy a container server.
Other resources for the container server, such as CPU, RAM, and priority, will be billed the same way as for usual virtual servers.

See also:
- Buckets
- Create Container Server
- Manage Container Servers
- Container Server Cloud Config
- Manage Container Server Backups

9.8 Load Balancers

Load Balancers, both autoscaling clusters and load balancer clusters, can only be created on the basis of Virtual Servers, and are not available for Smart Servers, Baremetal Servers, or VMware Virtual Servers.

Load balancing aids application availability and scalability. There are two load balancing options in OnApp:

- **Load balancer clusters**
  With this option, you specify which VSs (nodes) will participate in a load balancer cluster. Incoming traffic is distributed evenly between all the VSs added to a cluster – you still present a single host name to end users, but they actually access the cluster of VSs rather than a single end point. This helps application availability: if one VS fails, traffic is automatically routed to another in the cluster. You can add and remove cluster VSs as required.

  See also:
  - Create Load Balancers
  - Manage Load Balancers
  - Virtual Servers

- **Autoscaling clusters**
  VS Autoscaling increases or decreases your VS capacity by automatically adding or removing nodes to a cluster. The cluster is scaled in (decreased) or out (increased) based on rules you specify in the Control panel. This aids application performance and scalability.

  For instance, you can create a rule that will add 3 more nodes to a cluster if CPU usage has been more than 90% for the last 5 minutes; or rules that remove a node if there has been more than 256 MB RAM free for the last 20 minutes.
9.8.1 Create Load Balancers

In this document you can find information on how to create Load Balancer or Auto-Scaling cluster in your cloud.

With the Load Balancer clusters option, you specify which VSs (nodes) will participate in a load balancer cluster. Incoming traffic is distributed evenly between all the VSs added to a cluster – you still present a single host name to end users, but they actually access the cluster of VSs rather than a single end point. This helps application availability: if one VS fails, traffic is automatically routed to another in the cluster. You can add and remove cluster VSs as required.

VS Auto-Scaling clusters increase or decrease your VS capacity by automatically adding or removing nodes to a cluster. The cluster is scaled in (decreased) or out (increased) based on rules you specify in the Control panel. This aids application performance and scalability.

Please note that OnApp Load Balancer supports only IPv4.

Load Balancers, both autoscaling clusters and load balancer clusters, can only be created on the basis of Virtual Servers, and are not available for Smart Servers, Baremetal Servers, or VMware Virtual Servers.

On this page:

- Create Load Balancer Cluster
- Create Auto-Scaling Cluster

See also:

- Manage Load Balancers
- Virtual Servers
- Autoscale Virtual Server
- Autoscale Smart Server
- Autoscale Application Server

9.8.1.1 Create Load Balancer Cluster

In this scheme, load balancers manage incoming requests one by one, rotating them between the servers added to a cluster (a round-robin method).

OnApp load balancers are based on Layer 4 load balancing which means that requests are distributed at the transport layer, such as TCP or UDP transport protocols. To add an LB cluster:

1. Go to your Control Panel > Cloud > Load Balancers menu.
2. Click the Add New Balancer button.
3. On the page that follows, fill in the form that appears:
9.8.1.1.1 Configuration

Cluster Configuration

- **Port** - specify the port for this load balancer to run on (e.g. 9090, 8080, 9008 etc.)
  
To add multiple load balancer ports, click the "+" button next to the first port.

Load Balancer Instance

- **Label** – give a name to your load balancer instance.
- **Hostname** – specify a host name that will identify your load balancer.
- **Compute zone** – choose a Compute zone.
- **Compute resource** – select a Compute resource that will be enabled for the cluster.
- **Network zone** – choose a network zone for this load balancer.
- **Port Speed** – use the slider to set a port speed or tick the **Unlimited** box if required.
- **CPU Priority** - set the load balancer’s CPU priority.

Load Balancer Type

- **Load Balancer Type** - choose the **Cluster** option and click **Next**.

9.8.1.1.2 Cluster Nodes

This is where you add and configure the nodes in this load balancing cluster. A node is a combination of a VS and an IP address.

- **Virtual Server** - select a virtual server from the drop-down box and click the **Add Node** button.

Click **Save** to create the load balancer cluster.

The only VSs you can add to a cluster are those which are based on the selected Compute resource/Compute zone, have an IP in the defined network zone and are located in the same IP range.

| Enabled anti-spoofing would prevent adding Windows-based virtual servers as nodes to the load balancer cluster. To disable anti-spoofing reboot Windows-based nodes from Control Panel after they are added to the cluster. |

9.8.1.2 Create Auto-Scaling Cluster

To add an autoscaling cluster to your cloud:

1. Go to your Control Panel > **Cloud** > **Load Balancers** menu.
2. Click the **Add a Balancer** button.
   
   On the page that follows, fill in the form that appears:
9.8.1.2.1 Configuration

Cluster Configuration

- **Port** - specify the port for this load balancer to run on (e.g. 9090, 8080)

Load Balancer Instance

- **Label** – give a name for your load balancer instance.
- **Hostname** – specify a host name which will identify your load balancer.
- **Compute zone** – choose a Compute zone.
- **Compute resource** – select a Compute resource that will be enabled for the cluster.
- **Network zone** – choose a network zone for this load balancer.
- **Port Speed** – use the slider to set a port speed or tick the Unlimited box if required.
- **CPU Priority** - set the load balancer's CPU priority.

Load Balancer Type

- **Load balancer type** - choose the **Autoscaling** option and click **Next**.

9.8.1.2.2 Cluster Nodes

These settings configure the nodes that will be added to your cluster.

Nodes network

- **Nodes network group** - the nodes network group for the cluster nodes.

Cluster Node Template

- **Image template** – choose a template from the drop-down box: nodes will be built on this template.

The only templates you can add to a cluster are those based on the selected Compute resource/Compute zone.

- **Min node amount** – the minimum number of nodes in this cluster.

Example: if you set Min node amount = 2 and Max node amount = 5, then the system will scale out the cluster up to 5 nodes, and scale in to 2 nodes if required.

- **Max node amount** – the maximum number of nodes in this cluster.

Cluster Node Parameters

These are the settings for each node of a cluster. Each node added to a cluster will have the following parameters:

- **Memory** – set the amount of memory allocated per node in MB.
• **CPUs** – the number CPUs which will form each node.

• **Rate Limit** – set the port speed for a node.

**Autoscale Out Parameters**
Set the rules defining when the system should add more nodes to your autoscaling cluster. The system will add nodes until the limit set in the Max node amount field is reached.

**Autoscale In Parameters**
Set the rules defining when the system should remove the nodes from your autoscaling cluster. The system will remove nodes until the limit set in the Min node amount field is reached.

Click **Save** to create the autoscaling cluster.

### 9.8.2 Manage Load Balancers

Load balancing aids application availability and scalability. There are two load balancing options in OnApp - Load Balancer clusters and Auto-Scale clusters. In this document you can find information on how to manage Load Balancer and Auto-Scale clusters in your cloud.

Load Balancers, both autoscaling clusters and load balancer clusters, can only be created on the basis of **Virtual Servers**, and are not available for Smart Servers, Baremetal Servers, or VMware Virtual Servers.

### 9.8.2.1 View Load Balancers

To view the list of load balancers in your cloud go to your Control Panel's Load Balancers menu. The page that loads shows the following details of your load balancers:

**On this page:**

• [View Load Balancers](#)

• [View Load Balancer Details](#)

• [View Load Balancer Billing Statistics](#)

• [View Load Balancer Autoscaling Monitors](#)

• [Edit Load Balancer](#)

• [Delete Load Balancer](#)

**See also:**

• [Create Clusters](#)

• [Virtual Servers](#)

• [Autoscale Virtual Server / Autoscale Smart Server](#)

• [Autoscale Application Server](#)
• OS - the OS on which the load balancer is based
• Label - the name of the load balancer. Click the label to see the load balancer details.
• IP Addresses - IP addresses assigned to the load balancer

Note that you will be given two IP addresses. The first IP address is used by the OnApp CP to access the load balancer. The second IP address is the shared IP for the balanced nodes.

• Disk Size - disk size assigned to the load balancer in GB
• RAM - RAM assigned to the load balancer in GB
• Nodes - the number of nodes in the load balancer
• Compute Resource - the label of compute resource with which load balancer is associated
• Power - whether the load balancer is powered ON or OFF. Click the on/off buttons to change the status.

• Actions icon - click the icon for the quick access to the list of load balancer actions

If you are viewing the load balancers list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click Apply. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the load balancers list. You can always alter your column selection later.

Column selection is currently set for one browser. If the you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.
9.8.2.2 View Load Balancer Details

To view load balancer details:

1. Go to your Control Panel > Cloud > Load Balancers menu.
2. Click the label of the load balancer you are interested in.
3. The screen that appears loads the load balancer properties, billing statistics and tools for managing your load balancer.

Load balancer overview

Load balancer properties page gives general overview of the load balancer details:

- Compute resource
- Owner
- Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.

- Power status & On/Off buttons
- Allocated memory
- CPUs
- Disk size
- IP addresses
- Network speed
- IPs
- Hostname and login
- Administrator’s/user’s notes
- List of cluster nodes
- Activity log

Add admin’s or user’s note to create a brief comment or reminder.

To expand the load balancer Tools menu, click the Tools button on the load balancer’s details screen. Tools menu enables you to perform the following actions on load balancers (the exact list shown depends on the load balancer status):

Tools

The exact list of load balancer tools shown depends on the load balancer status:

Power options:

- Startup Balancer - queues a start-up action for a balancer that's currently powered off.
- Reboot Balancer - powers off and then restarts the balancer.
- Shut Down Balancer - terminates the balancer forcefully.
- Suspend Balancer - stops a balancer, and changes its status to suspended.
LB options:

- **Delete Balancer** - removes the balancer from the system.
- **Edit Balancer** - redirects to the edit load balancer details page.
- **Migrate Balancer** - pops up the balancer migration dialogue, enabling you to move the balancer to a different compute resource.

To migrate a load balancer, you need to have both the **Migrate any/own load balancer** and **See details of any/own load balancing cluster permissions** enabled.

- **Rebuild Balancer** - pops up the balancer rebuild dialogue, where you can rebuild the balancer on the same (or another) template. All data will be lost!

Cluster Nodes:
This is the list of the nodes which form the load balancer. Here you can:

- **Power on/off** the node.
- **Delete** a node from a cluster.

To view load balancer's **billing statistics** or **autoscaling monitors**, click the appropriate tab.

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### 9.8.2.3 View Load Balancer Billing Statistics

To view billing statistics for a load balancer:

1. Go to your Control Panel > **Cloud** > **Load Balancers** menu.
2. Click the label of the balancer you’re interested in.
3. Click the **Billing Statistics** tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button. By default the statistics are generated for the last three months or the actual VS existence period.
5. **Move the Show in my Timezone** slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. On the page that appears:

   | The price parameters on this page do not take into consideration the free limits for resources set in the bucket. |
|---|---|
| **Date** – particular date and time for the generated statistics |
| **Users** – the load balancer owner. Click the owner name to see the User Profile (user details) |
| **Virtual Servers** – the virtual server name with the total due for LB resources (CPU priority, CPUs, memory and template resources) for the point of time specified in the Date column. |
| **Network Interfaces Usage** – the total due for the network interfaces used by this LB for the point of time specified in the Date column. Click the network interface name to see its details. |
| **Disks Usage** – the list of disks assigned to this LB with the total due for the disk space resources (disk size, data read/written, reads/writes completed) for the point of time specified in the Date column. Click the disk name to see its details. |
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- **Costs** – the total due for the Virtual Servers, Network Interfaces and Disks resources at the point of time specified in the Date column.

Scroll down to see Total Amount (the total due for the whole billing statistics period).

### 9.8.2.4 View Load Balancer Autoscaling Monitors

Autoscaling monitors provide information about the cluster load.

To view the load balancer's autoscaling monitors:

1. Go to your Control Panel > **Cloud > Load Balancers** menu.
2. Click the label of the balancer you're interested in.
3. Click the **Autoscaling Monitors** tab.
4. On the screen that appears, you will see the list of autoscaling monitors along with the following details:
   - monitor name
   - virtual server label

Click the label of a monitor you are interested in to view its details:

Depending on the monitor type, the monitor details screen page will show the following info:

- **Memory Monitor**
  - **Memory monitor info:**
    - Name of the memory test - test label
    - IP of the device agent - IP address of the agent running on the server
    - Platform - OS platform
    - The name of the agent - virtual server identifier
    - Free memory limit - free memory limit in MB
    - Free swap limit - free swap limit in MB

  **Memory last results:**
  - Free memory - free virtual server memory in MB
  - Total memory - total virtual server memory in MB
  - Free swap - free swap disk size in MB
  - Total swap (MB)
  - Buffered memory (MB)
  - Cached memory (MB)
  - Status - monitor status: OK, if the monitor is correct or NOK, if the autoscaling configuration does not match. Monitor status is refreshed once in 5 minutes.

- **CPU Monitor**
  - **CPU monitor info**
    - Name of the CPU test - CPU test label
**IP of the device agent** - virtual server IP address

**Max value for kernel** - maximum CPU value for kernel

**Max value for iowait** - maximum CPU value for iowait

**Platform** - virtual server OS

**Max allowed value for user** - maximum CPU value for user processes

**The name of the agent** - virtual server identifier

**Tag of the CPU test** - CPU test tag

**Min allowed value for idle** - minimum CPU value for idle mode

**Max allowed value for nice** - maximum CPU value for nice

Max value is a CPU priority set during the server creation.

**CPU last results**

**CPU index** - CPU number

**User Value** - percentage of CPU used in user mode

**Kernel Value** - percentage of CPU used by kernel

**Nice Value** - percentage of CPU time occupied by processes with positive CPU value

**Idle Value** - percentage of CPU used in idle mode

**IO Wait Value** - percentage of time the CPU was idle during the IO request

**Status** - monitor status: OK, if the monitor is correct or NOK, if the autoscaling configuration does not match. Monitor status is refreshed once in 5 minutes.

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### 9.8.2.5 Edit Load Balancer

To edit a load balancer:
1. Go to your Control Panel > **Cloud** > **Load Balancers** menu.
2. Click the **Actions** icon next to a required load balancer, then choose **Edit Cluster**.
3. When the page loads, edit necessary parameters and click **Save**.

When you increase the RAM of the nodes of a load balancer (autoscaling type) to a value greater than the current node RAMx16 (which is a `max_mem` parameter in a configuration file and database), the load balancer will be cold resized.

When deleting load balancer ports, you can remove all but the first port.

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### 9.8.2.6 Delete Load Balancer

To delete a load balancer:
1. Go to your Control Panel > **Cloud** > **Load Balancers** menu.
2. Click the **Delete** icon next to a required load balancer.
3. Click **OK** to confirm the deletion.

### 9.9 Edge Accelerators

- Starting from OnApp 6.0, CDN accelerator is free of charge. You can enable acceleration for a network and the Edge Accelerator instance is created automatically.
- For details on how to install Accelerator functionality, refer to Edge Accelerator Deployment at [Install Compute Resources](#).

OnApp introduces a new type of virtual server - Edge Accelerator. Edge Accelerator empowers any websites/VS hosted on OnApp Cloud to use CDN with just one single button without any modification. Edge Accelerator gives your customers all the benefits of a global CDN without any of the hassle of configuring and maintaining a CDN platform. Edge Accelerator requires no modifications to the web applications running on virtual servers. All optimization is entirely automatic, and using minification & lossless compression of pages, scripts and images, will not modify or reduce the quality of the source content.

Edge Accelerator is a new type of VS, which is built from a specific template and is aimed to serve as a router for traffic between CDN core and CDN-enabled Virtual Servers.

- Contact your account manager to enable Edge Accelerator on your Cloud Licence.
- Ensure that RabbitMQ is configured for the proper usage of Edge Accelerator.
- Only HTTP (TCP port 80) and HTTPS (TCP port 443) are supported. Other protocols will be passed through to the VS directly.
- In order to route the VS traffic, the VS must be on the same network with the Edge Accelerator.
- CDN Accelerator does not support Internet Protocol version 6 (IPv6).

A schematic of the process architecture is shown below:
9.9.1 View Edge Accelerators

When accelerator is created, you can view it using Control Panel's Edge Accelerators menu. You will get the list of edge accelerators together with their operating system, label, location etc. Click the label of a particular accelerator to view its details.

On this page:

- View Edge Accelerators
- View Edge Accelerator Details
  - Edge Accelerator Properties
  - Notes
  - Edge Accelerator Management

9.9.1.1 View Edge Accelerators

To view all edge accelerators deployed in the cloud:

1. Go to your Control Panel > Cloud > Edge Accelerators menu to see an overview of all accelerators in the cloud.

2. The page that loads will show the list of edge accelerators together with their:
   - operating system
   - label. Click the label to see the accelerator details.
   - VIP status (enabled or disabled). Click the icon to enable/disable VIP status of a particular accelerator.
   - IP addresses (IP address from the network, which was set first, will be used for VS acceleration)
   - Allocated disk size
3. Click the **Actions** button next to the accelerator for the quick access to the list of edge accelerator actions (the list of actions displayed depends on the edge accelerator status):

- Reboot
- Shutdown

You can **Pause all** or **Resume all** accelerators by means of corresponding buttons in the upper right corner of the page.

To search for a particular edge accelerator, click the Search icon at the top of the edge accelerator list. When the search box appears, type the text you want to search for and click the **Search** button.

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### 9.9.1.2 View Edge Accelerator Details

To view details of a specific edge accelerator:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you're interested in.
3. The screen that appears loads the edge accelerator properties, notes, activity log and tools for managing your edge accelerator.

#### 9.9.1.2.1 Edge Accelerator Properties

Edge Accelerator properties page gives general overview of the edge accelerator details:

- Template this edge accelerator is built on
- VIP status (on/off). Click the icon to change the status.
- Power status & On/Off/Reboot buttons.
- Compute resource. Click the Compute resource name to see its details.
- Owner. Click the owner name to see its details.
- IP Addresses
- CDN Server Status
- Price per hour. Please pay attention that when you resize an edge accelerator or change its pricing in the company billing plan, the change is not applied immediately. It takes about 5 minutes to take effect. Meanwhile, a loading spinner is showing next to the price.
- Memory
- CPU(s)
- CPU priority or CPU units
- Disk Size
- Disk backups
- Network Speed
9.9.1.2.2 Notes
The Notes section lists brief comments or reminders for an edge accelerator. You can add either Admin's or User's notes. The Admin's note will be available to cloud administrators. Click the **Actions** button in the Notes section of the page to add admin's or user's note.

9.9.1.2.3 Edge Accelerator Management
- Click the **Tools** button to expand the Tools menu with the edge accelerator management options.
- Use the top menu to manage your edge accelerator statistics/networking/storage options.

9.9.2 Create Edge Accelerator
Edge accelerator is a new type of VS, which is built from specific template and is aimed to serve as a router for traffic between CDN core and CDN-enabled Virtual Servers. You can further enable edge accelerator for a VS to speed up the traffic flow running for this particular server.

To create an edge accelerator:
1. Ensure that edge accelerator permissions are enabled before you create an edge accelerator. For more information refer to the **Permissions** page.
2. Go to your Control Panel > Cloud > Edge Accelerators menu and click the “+” button, or click the **Create Edge Accelerator** button at the bottom of the screen. This will start a creation wizard.
3. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
4. Click the **Create Edge Accelerator** button to start the creation process. You will be taken to the edge accelerator details screen.

Below you can find requirements for edge accelerator creation:
- **Minimum**: 4 cores, 4GB RAM and 100GB disks
- **Recommended**: 8 cores, 16 GB RAM and 1TB disks
- SSD recommended to avoid slowing down access

For information on how to bill your end users for applying acceleration to VSs, refer to **Configure Resource Allocation And Prices**.
9.9.2.1 Step 1 of 3. Properties
Specify the following edge accelerator properties:

- **Label** - the label of the edge accelerator
- **Compute Zone** - the compute zone to build the edge accelerator on.
- **Compute Resource** - the specific compute resource to build the edge accelerator on. Only Xen and KVM compute resources are supported.

Click **Next** to proceed to the following step of the wizard to specify the edge accelerator resources.

9.9.2.2 Step 2 of 3. Resources
Define the resources for your edge accelerator:

- **RAM** - set the amount of edge accelerator's RAM.
- **CPU Cores** - set the amount of edge accelerator's CPU cores. For KVM Compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.

**CPU Priority** (or **CPU Units**) - set edge accelerator's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to [Billing Calculation](#) section for details on CPU units and CPU priority.

The following options are available for VSs based on KVM Compute resources only, providing the **Enable CPU topology permission** is switched on for the user.

- **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the amount of sockets.
  - **CPU Threads** - set the amount of threads per core.

**Primary Disk**

- **Data Store Zone** - choose a data store zone for edge accelerator's primary disk.
- **Primary disk size** - set the primary disk size.
Network Configuration

- **Network Zone** - choose a network zone from the drop-down box. Only one edge accelerator is supported per network.
- **Network** - choose the network from which the VS should get the IP address.
- **Selected IP address** - assign an IP address for the edge accelerator from the drop-down menu. Only public IP Address can be chosen.
- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropbox.
- **Port Speed** - set the port speed for this edge accelerator (or tick the checkbox below to set unlimited port speed).

During edge accelerator creation special ID is created which is allocated to IP Address.

Click **Next** to proceed to the following step of the wizard.

### 9.9.2.3 Step 3 of 3. Confirmation

At this step, configure the automation settings. This is the final step of the edge accelerator creation wizard.

Move the **Build Edge Accelerator** slider to the right if you want the system to automatically build the edge accelerator.

After you set up these parameters, click the **Create Edge Accelerator** button to start the creation process.

After you create an edge accelerator, you can enable acceleration for [new or existing VSs](#).

### 9.9.3 Manage Edge Accelerators

When an edge accelerator is created, you can spread the VS content faster by enabling acceleration for this VS.

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu. Click the label of the edge accelerator to view its details. You can manage the edge accelerator using the **Tools** button and **Overview**/*Networking*/**Storage**/*Console** tabs.

### 9.9.3.1 Edge Accelerator Options

#### 9.9.3.1.1 Rebuild/Build Edge Accelerator

If you haven't checked the **Build Edge Accelerator** option during the edge accelerator creation process, you will have to do this manually after the edge accelerator has been created. Building an edge accelerator is the process of allocating physical resources to that edge accelerator.

**On this page:**

- **Edge Accelerator Options**
- **Power Options**
- **Performance and Administrative Options**

To build an edge accelerator manually or rebuild the edge accelerator on the same template:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the **Tools** button and then click **Rebuild Edge Accelerator**.
4. Move the **Start Edge Accelerator after rebuild** slider to the right if you want to have your edge accelerator started automatically after it is built.

5. Click the **Rebuild Edge Accelerator** button to finish.

### 9.9.3.1.2 Edit Edge Accelerator

To edit edge accelerator's resources:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you want to resize, to show its details screen.
3. Click the **Tools** button and select the **Edit Edge Accelerator** link. Change the following parameters:
   - **Label** - the name of edge accelerator
   - **RAM** - the amount of edge accelerator's RAM
   - **CPU Cores** - the amount of edge accelerator's CPU cores
4. Click **Save**.

### 9.9.3.1.3 Migrate Edge Accelerator

To migrate an edge accelerator:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you want to migrate.
3. Click the **Tools** button and press the **Migrate Edge Accelerator** link.
4. In the window that appears, choose the target Compute resource from the drop-down menu.
5. Click the **Start Migration** button.

Currently, edge accelerators support only cold migration.

### 9.9.3.1.4 Delete Edge Accelerator

To remove the edge accelerator from the cloud:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you want to delete.
3. On the edge accelerator's screen, click the **Tools** button, then select **Delete Edge Accelerator**.
4. Click **Destroy**.

If there are accelerated virtual servers in the cloud, and there're some prices set for the acceleration, these VSs will be still billed for acceleration even if you delete the edge accelerator.

### 9.9.3.2 Power Options

#### 9.9.3.2.1 Reboot Edge Accelerator

To reboot an edge accelerator:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the required edge accelerator.
3. On the screen that appears, click the **Tools** button and then click **Reboot edge accelerator**. Confirm the action. It will power off and then restart the edge accelerator.

### 9.9.3.2.2 Shut down Edge Accelerator
To shut down an edge accelerator:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the required edge accelerator.
3. On the screen that appears, click the **Tools** button and then click **Shut down edge accelerator**. A dialogue box pops up, where you can either Gracefully Shutdown (terminates the edge accelerator gracefully), or Power Off (terminates the edge accelerator forcefully).

### 9.9.3.2.3 Suspend Edge Accelerator
To suspend an edge accelerator:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the required edge accelerator.
3. On the screen that appears, click the **Tools** button and then click **Suspend edge accelerator**. This action stops an edge accelerator, changes its status to suspended and disables all the other actions on the edge accelerator, unless unsuspended.

### 9.9.3.2.4 Startup Edge Accelerator
To startup a powered off edge accelerator:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the required edge accelerator.
3. On the screen that appears, click the **Tools** button and then click **Startup edge accelerator**. This action queues a start-up action for an edge accelerator that is currently powered off.

### 9.9.3.3 Performance and Administrative Options

#### 9.9.3.3.1 Segregate Edge Accelerator
To isolate one edge accelerator from another:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the edge accelerator you want to segregate.
3. On the screen that appears, click the **Tools** button, then click **Segregate edge accelerator**. 
4. In the dialogue box that pops up, use the drop-down menu to choose an edge accelerator you want to keep away from.
5. Click the **Segregate VS** button to finish.

#### 9.9.3.3.2 Change Owner
To change the owner of an edge accelerator:
1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the appropriate edge accelerator.
3. On the screen that appears, click the **Tools** button, then click **Change Owner**. Then a dialogue box with a drop-down of all users on the system pops up, enabling you to pass
ownership of the edge accelerator to the user selected from the list. Choose a user and click Change Owner.

9.9.4 Edge Accelerator Disks

Edge accelerator storage is provided by disks. A disk is a partition of a data store that is allocated to a specific accelerator. You can view/edit/migrate disks and check disk usage statistics (IOPS).

On this page:

- View Disks
- Edit Disk
- Migrate Disk
- Disk Usage Statistics (IOPS)

9.9.4.1 View Disks
To view edge accelerator disks:

1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the Storage tab and then click Disks.
4. On the screen that appears you can see the list of disks allocated to this edge accelerator.

9.9.4.2 Edit Disk
To edit a disk:

1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the Storage tab and then click Disks.
4. Click the Actions button next to the disk you want to change, then click the Edit link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the Save Disk button.

9.9.4.3 Migrate Disk
To migrate a disk:

1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the Storage tab and then click Disks.
4. Click the Actions button next to the disk you want to change, then click the Migrate link.
5. On the screen that appears, select a target data store from a drop-down box.
6. Click Start Migrate.

9.9.4.4 Disk Usage Statistics (IOPS)
The system tracks IOPS (Input/Output Operations per Second) for edge accelerators and generates charts that help analyze edge accelerator disk performance. The data presented in the chart are for the periods during which the statistics was gathered, typically 3 minutes. To see IOPS for an edge accelerator:

1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the **Storage** tab and then click **Disks**.
4. Click the **Actions** button next to the disk you want to change, then click the **IOPS** link.
5. There are four charts on the screen that appears:
   - IOPS for the last hour
   - IOPS for the last 24 hours
   - Data written/read for the last 24 hours
   - Data written/read for the last hour
6. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

### 9.9.5 Edge Accelerator Networks

The Networking menu enables you to manage network interfaces and allocate IP addresses for edge accelerators. The **Networking > Network Interfaces** menu shows the virtual network interfaces allocated to this edge accelerator. Network interfaces join the physical network to the edge accelerator. When you create an edge accelerator a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default. At least one IPv4 address must be allocated to an edge accelerator's primary network interface.

- Two networks cannot be used for one edge accelerator simultaneously. Only one edge accelerator can be created per network.
- Do not use two accelerated networks for one VS.
- CDN edge accelerator does not support the Internet Protocol version 6 (IPv6).

**On this page:**

- View Network Interfaces
- Create Network Interface
- Edit Network Interface
- View Network Interface Usage Statistics

#### 9.9.5.1 View Network Interfaces

To see the list of all network interfaces allocated to the edge accelerator:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you're interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. On the page that follows you will see the following fields:
   - **Interface** – optional label of the network interface.
   - **Network join** – name of the network and a Compute resource or Compute zone this network is joined to.
   - **Port speed** – the speed set to the interface.
• *Primary interface* – indication whether the interface is primary or not.

### 9.9.5.2 Create Network Interface

To add a network interface:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. Click the **Add New Network Interface** button at the bottom of the screen.
5. On the screen that appears, input values for the following parameters:
   - **Label** – a human-friendly name for the new interface.
   - **Physical Network** – choose a network join from the drop-down menu, which lists network joins assigned to the compute resource/compute zone on which the edge accelerator runs.
   - **Port speed** – set port speed in Mbps, or make it unlimited.
6. Click the **Submit** button.

### 9.9.5.3 Edit Network Interface

To edit a network interface:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. On the page that follows click the **Edit** icon next to the network interface you want to change.
5. On the screen that appears, change the following parameters:
   - **Label** – a human-friendly name for the new interface.
   - **Port speed** – set port speed in Mbps, or make it unlimited.
6. Click the **Submit** button.

### 9.9.5.4 View Network Interface Usage Statistics

To view interface usage statistics:

1. Go to your Control Panel > **Cloud** > **Edge Accelerators** menu.
2. Click the label of the edge accelerator you’re interested in.
3. Click the **Networking** tab, then click **Network Interfaces**.
4. Click the **Statistics** (chart) icon next to the network you’re interested in.
5. On the screen that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.
6. To zoom into a time period, click and drag in a chart. Click the **Reset zoom** button to zoom out again.

### 9.9.6 Edge Accelerator IP Addresses

The Networking menu enables you to manage network interfaces and allocate IP addresses for edge accelerators. The **Networking > IP Addresses** menu shows the list of IP addresses.
assigned to the edge accelerator. This menu also lets you rebuild the edge accelerator's network.

CDN edge accelerator does not support the Internet Protocol version 6 (IPv6).

On this page:

- View IP Addresses
- Allocate New IP Address
- Delete IP Address
- Rebuild Network

9.9.6.1 View IP Addresses
To view edge accelerator IP addresses:
1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the Networking tab and then click IP addresses.
4. On the screen that appears you can see the list of IP addresses allocated to this edge accelerator.

9.9.6.2 Allocate New IP Address
To allocate a new IP Address to the edge accelerator:
1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. Click the Networking tab > IP Addresses.
4. Click the Allocate New IP Address button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the edge accelerator will be available).
6. (Not available for federated VSs) Select an IP address manually from the IP Pool associated with the network interface. To enable this option, move the Specify IP Address slider to the right and choose IP Address from the drop-down list.
7. Click the Add IP Address button.
You must rebuild the network after making changes to IP address allocations.

If you change IP Address for edge accelerator, acceleration for VSs will start working in 15-20 minutes.

9.9.6.3 Delete IP Address
To remove an IP address from an edge accelerator:
1. Go to your Control Panel > Cloud > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. Click the **Networking > IP Addresses** tab.

4. Click the **Delete** icon next to the IP address you want to delete.

5. In the pop up window that appears:
   - Choose **Delete and rebuild the network** option if you want to rebuild the network immediately after deleting the IP address. After choosing this option you will be redirected to the edge accelerator's Overview page.
   - Choose **Delete without rebuilding the network** option if you don't want to rebuild a network immediately. In this case to apply the changes, you will have to rebuild the network additionally.

   - **IP address that is used by edge accelerator should not be changed.**

### 9.9.6.4 Rebuild Network

To rebuild a network join, added to the edge accelerator (required after allocating new IP addresses):

1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the edge accelerator you're interested in.
3. On the screen that appears, click the **Tools** button, then click **Rebuild Network**.
4. In the pop-up window, the **Force Reboot** slider is moved to the right by default. Select the edge accelerator shutdown type – gracefully shutdown or power off.
5. Move the **Required Startup** slider to the right to start up an edge accelerator when you're rebuilding a network of a powered off edge accelerator.
6. Click the **Rebuild Network** button.

### 9.9.7 Edge Accelerator Statistics

If you want to track the amount of CPU used by accelerator, you can view edge accelerator CPU usage statistics.

To see CPU usage statistics:

1. Go to your Control Panel > **Cloud > Edge Accelerators** menu.
2. Click the label of the accelerator you're interested in.
3. Click the **Overview** tab > **CPU Usage**.
4. On the screen that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months (if there is enough data). If there is less data available, the chart will show utilization for the time available.
5. Move the **Show in My Timezone** slider to the right if you want to show bandwidth statistics according to your profile's timezone settings.
6. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

### 9.9.8 Edge Accelerator Console Access

The integrated VNC console tab gives users direct access to the accelerators and the possibility to establish the connection through the Control Panel UI.

To establish the connection via the Control Panel:
1. Go to your Control Panel > CDN > Edge Accelerators menu.
2. Click the label of the edge accelerator you're interested in.
3. Click the Console tab.
4. If the connection is lost, click the Re-connect button. The re-connection to the console runs as follows:
   - If the console runs as expected, clicking the Re-connect button causes disconnection and the console is re-connected automatically after 1.5 seconds.
   - If the console gets stuck, clicking the Re-connect button runs your request once again and re-connects the console without reloading.
   - If the console gets disconnected with a status code and an error message, the console is re-connected automatically after 1.5 seconds.
5. Click the OK button to confirm the re-connection request.

9.10 Compute Resources

Compute resources are Xen or KVM platforms running on bare metal with CentOS Linux as the management operating system or VMware ESXi servers. They are used to provide hardware resources for virtual servers, ensuring highly efficient use of available hardware, and complete isolation of virtual server processes. Each virtual server in the cloud is hosted by a specific physical Compute resource server, from which it receives CPU time, RAM and storage capacity from the data stores attached to that Compute resource. OnApp supports multiple Compute resource platforms including Xen, KVM, and VMware.

We strongly recommend that you avoid adding CloudBoot and static Compute resources to one Compute zone.

See also:
- Manage Compute Resources
- Compute Resource Matrix
- CloudBoot Compute Resources
- VMware Compute Resources

Compute resources have types which they inherit from the zone to which they belong. These types also define the type of resources (data stores, networks, and backup servers) that can be associated with a compute zone or compute resource. Compute resources can be later moved from one compute zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available compute zone types for different compute resources:

<table>
<thead>
<tr>
<th>Compute Resource Type</th>
<th>Compute Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xen</td>
<td>Virtual</td>
</tr>
<tr>
<td></td>
<td>Baremetal</td>
</tr>
<tr>
<td>KVM</td>
<td>Virtual</td>
</tr>
<tr>
<td></td>
<td>Smart</td>
</tr>
</tbody>
</table>
9.10.1 Compute resource features

Compute resources:

- Provide system resources such as CPU, memory, and network to virtual servers
- Control the virtual differentiation of entities such as virtual servers and application data being delivered to cloud-based applications
- Take care of secure virtualization and channeling of storage, data communications and server processing
- Can be located in different geographical zones
- Can have different CPU and RAM

Compute resources can also be organized into Compute zones, which make it easy to offer tiered service levels and create private clouds for specific users.

Compute resources can be dynamically booted over the network using the CloudBoot technology, or statically installed from a CentOS base. Note that enabling the OnApp storage platform requires Compute resources to be provisioned using the CloudBoot interface. Refer to the CloudBoot Compute Resources section for details.

When a Compute resource is inaccessible for a period of time, commands queued during that period of time will be marked as failed. This is an expected OnApp behavior.

9.10.2 Compute resource management

The main Compute resources section in the left Control Panel menu provides access to basic tools for viewing, editing and rebooting Compute resources.

Tools for advanced Compute resource management and controlling compute zones are located in the Control Panel's Settings menu (Settings > Compute resources, and Settings > Compute resource Zones). For details, refer to the Compute Resource Settings section of this guide.

- View Compute Resource Details
- Create Compute Resource
- Create VMware Compute Resource
- Create CloudBoot Compute Resource
- Edit Xen/KVM Compute Resource
- Edit VMware Compute Resource
- Edit CloudBoot Compute Resource
- Edit Smart CloudBoot Compute Resource
- Edit Baremetal CloudBoot Compute Resource
- **Manage Compute Resource Data Stores**
- **Manage Compute Resource Networks**
- **Delete Compute Resource**

### 9.10.3 Compute Resource Matrix

<table>
<thead>
<tr>
<th>Feature / Virtualization Software</th>
<th>Xen 3</th>
<th>Xen 4</th>
<th>KVM 5</th>
<th>KVM 6</th>
<th>KVM 7</th>
<th>VMware</th>
<th>AWS</th>
</tr>
</thead>
<tbody>
<tr>
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<td>N</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<td>Y</td>
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<tr>
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<td>see VMware VS Snapshots</td>
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<td>Y</td>
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<td>Linux VSs only</td>
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</tr>
</tbody>
</table>

**Notes:*
- "Linux VSs only" indicates support is limited to Linux virtual servers only.
- "see VMware VS Snapshots" indicates that VMware-specific snapshot capabilities are covered in a separate section.
- "presented with publishing rules" indicates that firewall rules are presented in a separate section.
### Hot RAM resize without reboot**

<table>
<thead>
<tr>
<th></th>
<th>Windows 2008 and Windows 7 VSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 2008 and Windows 7 VSs</td>
<td>Y **</td>
</tr>
</tbody>
</table>

### Hot CPU cores resize without reboot

<table>
<thead>
<tr>
<th></th>
<th>Windows 2008 and Windows 7 VSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 2008 and Windows 7 VSs</td>
<td>Y **</td>
</tr>
</tbody>
</table>

### Hot migration**

<table>
<thead>
<tr>
<th></th>
<th>VMware utilizes vMotion to ensure that the VSs are optimally placed on the Compute resources</th>
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</thead>
<tbody>
<tr>
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### Cold migration

<table>
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<th></th>
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<tr>
<td></td>
<td>N</td>
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</table>

### Disk hot attachment / detachment

<table>
<thead>
<tr>
<th>Disk hot attachment / detachment</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
</tbody>
</table>

### Disk resize (increase/decrease)

| Disk resize (increase/decrease) | Y
|---------------------------------|---
<p>|                                 | Increase only. Reboot is required. |</p>
<table>
<thead>
<tr>
<th>Feature</th>
<th>IPv6 support ***</th>
<th>Reboot in recovery</th>
<th>Segregate</th>
<th>VIP status</th>
<th>Change owner</th>
<th>CPU Topology</th>
<th>Power on/off/reboot vApp</th>
<th>Power on/off/reboot VS</th>
<th>Build vApp from template</th>
<th>Build VS from template</th>
<th>Integrated VS into vApp</th>
<th>Delete vApp</th>
<th>Delete VS</th>
<th>Reset root password</th>
<th>Set SSH Keys</th>
<th>Edit VS Resources</th>
<th>Statistics</th>
<th>Console</th>
<th>Smart Servers</th>
<th>Edge servers</th>
<th>Baremetal servers</th>
<th>Application servers</th>
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<tbody>
<tr>
<td></td>
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<td>Load Balancers</td>
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<td>Ballooning release resource type for Compute zones</td>
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<tr>
<td>CPU Units</td>
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</tbody>
</table>

**It is not possible to exceed the server's max_memory when increasing RAM on KVM Compute resources. Detailed info about RAM resize without reboot and hot-migrate abilities per template is available at:**

- [http://templates.repo.onapp.com/Linux_templates.html](http://templates.repo.onapp.com/Linux_templates.html)
- [http://templates.repo.onapp.com/FreeBSD_templates.html](http://templates.repo.onapp.com/FreeBSD_templates.html)

*** At least one IPv4 address must be allocated to a virtual server's primary network interface, as some applications do not support IPv6.

### 9.10.4 CloudBoot Compute Resources

CloudBoot functionality is a method of Compute resource installation without the presence of a local disk or other local storage, utilizing the PXE and DHCP servers.

This allows users to both lower their hardware requirements on the Compute resources (no local storage is required to boot a Compute resource) as well as make the process of adding new Compute resources to the cloud more efficient:

- No manual admin work required to boot Compute resources
- No local storage needed to boot Compute resources
- Self discovery of new Compute resources added to the cloud
- Ability to move Compute resources quickly between zones
- Ability to move quickly between Compute resource KVM and XEN types

To start using CloudBoot, you must enable CloudBoot and Storage in the system configuration first ([Admin > Settings > Configuration > CloudBoot](#)). Visit [Configuration Settings](#) chapter for more details.

It's recommended that you create a separate network for Compute resources when using the CloudBoot system to prevent errors of other servers (not Compute resources) on the cloud to boot into the CloudBoot network. All Compute resources must reside on the same VLAN (this concerns Compute resources only, not the VS’s themselves).

The following CloudBoot features are not currently available (they will be introduced in future releases):

- Bonded NICs for the management/boot interface
For details how to create a CloudBoot Compute resource, refer to the Create CloudBoot Compute Resource section.

See also:
- Compute Resources
- Manage Compute Resources
- Compute Resource Matrix
- VMware Compute Resources

9.10.5 VMware Compute Resources

VMware Compute resource is a combination of all ESXi Compute resources at the vCenter displayed as a single combined Compute resource with a sum of the CPU, RAM and Disk resources rather than individual Compute resources.

VMware Compute resources behave differently from Xen or KVM: with Xen/KVM the control is made directly upon the Compute resources, while with VMware OnApp directly controls the VMware vCenter. This allows vCenter to control the VSs with the full range of VMware functionality including DRS and vMotion to ensure that the operation is optimal.

For details how to create a VMware Compute resource, refer to the Create VMware Compute resource section of the vCenter Implementation Guide.

See also:
- Compute Resources
- Manage Compute Resources
- Compute Resource Matrix
- CloudBoot Compute Resources

9.10.6 Manage Compute Resources

Compute resources are based on Xen or KVM virtualization and run on bare metal with CentOS Linux as the management operating system or VMware ESXi servers. Compute resources are used to provide hardware resources for virtual servers, ensuring highly-efficient use of available hardware and complete isolation of virtual server processes. Each virtual server in the cloud is hosted on a specific physical compute resource server, from which it receives CPU, RAM and storage capacity from the data stores attached to that compute resource. In this document, you can find information on how to manage compute resources.

For more information on how to manage a specific compute resource, refer to the Compute Resource Settings section.

9.10.6.1 View Compute Resources

On this page:
- View Compute Resources
- View Compute Resource Details
• Power On/Off Virtual Servers

• Migrate Virtual Servers

• Edit Compute Resource Details

• Reboot Compute Resource

See also:

• Compute Resource Settings

• Compute Zones Settings

• Assets

The Control Panel provides a quick way to see a summary of compute resources available in your cloud. In the **Admin** tab, click **All Compute Resources** to see a list of all compute resources and the following details:

• **Status**

• **Label**

• **IP Address**

• **Type (Xen, KVM, etc)**

• **Zone**

• **Location Group**

• **Operating System**

• **Failover**

• **VS** (the number of deployed virtual servers)

• **CPU**
  - **Cores**
  - **Used**
  - **Available**
  - **MHz**

• **RAM** (based on the compute resource type)
  - **Total**
  - **Free**

If you are viewing the compute resources list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, select the columns you want to see and click **Apply**. The narrower your screen is, the more deselected columns will be hidden from the table. If your screen is too narrow to fit all the columns you have selected, a scrollbar will appear at the bottom of the compute resources list. You can always change the selection of columns. Note that by default the **VS**, **Used** and **MHz** columns are not visible in the table on narrow screens.
The selection of columns is currently set for one browser. If you select some columns in one browser and open this page in another browser, the column selection will be the default one for that other browser.

9.10.6.2 View Compute Resource Details

To view detailed information on a particular compute resource, follow the next steps:

1. In the **Admin** tab, click a label of a compute zone where a target compute resource runs.
2. Click a label of a compute resource.
3. On the screen that appears, you will see a list of all virtual servers hosted on the compute resource along with the following details:
   - **OS** - the operating system of the virtual server
   - **Label** - the name of the virtual server
   - **Type** - the type of the virtual instance, for example, VS (virtual server), AS (application server), Fed VS (federated virtual server), Smart Server, etc.
   - **VIP** - the icon that indicates whether the VIP status is enabled for the virtual server. If the icon is dimmed, the VIP status is not enabled. Click the icon to enable the VIP status for the VS.
   - **IP Addresses** - the IP address of the virtual server
   - **Disk size** - the disk size of the virtual server in GB
   - **RAM** - the amount of RAM allocated to the virtual server in MB
   - **Backups** - the number of backups and the space these backups take
   - **Compute Resource** - the compute resource on which the virtual server runs
   - **User** - the user who created the virtual server
   - **Power** - the power status of the virtual server that can be **powered on** or **powered off**
   - **Actions** - the list of actions available for the virtual server that includes:
     - **Startup**
     - **Shutdown**
     - **Reboot**
     - **Recovery Reboot**
     - **Recovery Startup**
     - **CPU Usage**
     - **Backups**
The list of available actions for the virtual server depends on the VS power status. For more information, refer to the Virtual Server Power Options guide.

4. To view details of a specific VS, click its label.

9.10.6.3 Power On/Off Virtual Servers

At the compute resource details page, you can power on and power off virtual servers that are run on this compute resource. To power on/off virtual servers, follow the next steps:

1. In the Admin tab, click a label of a compute zone where a target compute resource runs.
2. Click a label of a compute resource. On the screen that appears, you will see a list of all virtual servers hosted on the compute resource.
3. Choose virtual servers that you want to power on or power off by selecting the required checkboxes in the first column of the table.

- To select all virtual servers residing on the compute resource, click the first checkbox. To cancel the selection of all virtual servers, click this checkbox again.
- If you select all virtual servers, only the powered-off VSs will be powered on, while the already powered-on VSs will be skipped and vice versa.

Depending on the current power status of the selected VSs, one of the following options become available.

**Power On**

To power on the selected VSs:

- Click the Power On button.
- In the pop-up box, click the YES button to confirm your action.

**Power Off**

To power off the selected VSs:

- Click the Power Off button.
- In the pop-up box, select one of the following methods:
  - Gracefully shutdown - to run a graceful shutdown of VSs
  - Power Off - to run a forceful shutdown of VSs
- Click the Submit button to confirm your action.

- The bulk power on/off actions are available only to virtual servers that are run on KVM and Xen compute resources.
- For more information on the VS Power Options, refer to the linked guide.
You can migrate multiple virtual servers at once from one compute resource to another compute resource of the same type (KVM to KVM or Xen to Xen). The mass migration is available within compute resources that belong to the same compute zone. To migrate virtual servers, follow the next steps:

1. In the **Admin** tab, click a label of a compute zone where a target compute resource runs.
2. Click a label of a compute resource. On the screen that appears, you will see a list of all virtual servers hosted on the compute resource.
3. Select checkboxes next to the virtual servers that you want to migrate and click the **Migrate** button.

To select all virtual servers residing on the compute resource, click the first checkbox. To cancel the selection of all virtual servers, click this checkbox again.

4. In the pop-up box, select the following options:
   - **Target compute resource** - select a destination compute resource to migrate the virtual servers to
   - **Cold-migrate when hot-migration fails** - select the checkbox if you want to apply cold migration in case of the hot migration failure

If some of the selected virtual servers have disks that run as a local storage on this compute resource, these virtual servers could not be migrated. After the migration, these virtual servers remain on the previous compute resource, while other VSs are migrated to the destination compute resource.

5. When you are finished, click the **Submit** button.

After the migration, the power status of your virtual servers remains the same as before the migration. If you migrate virtual servers that are running, the whole process is almost unnoticeable.

To check if your Windows template supports hot migration, see the [Windows templates list](#).

Note that migration of virtual servers to a compute resource without a specific **Operating System Type** has the following implications:

- You won't be able to set the **Windows only** type for a compute resource if there are any Linux or FreeBSD virtual servers on it.
- You won't be able to set the non-Windows type for a compute resource if there are Windows-based virtual servers on it.
9.10.6.5 Edit Compute Resource Details

You can edit a compute resource at the compute resource details page or through the Settings > Compute Resources menu (see Compute Resource Settings section for details: the editing functionality is the same whichever method you choose).

To edit compute resource details:
1. In the Admin tab, click a label of a compute zone where a target compute resource runs.
2. Click a label of a compute resource.
3. Click the Tools button and then click Edit Compute Resource.
4. On the screen that follows, change details as required:
   - Label - the name of the compute resource
   - Operating System Type - choose an operating system type (Any OS, Windows only or Non-Windows)
   - IP Address - the IP address of the compute resource
   - Backup IP Address - the provisioning network IP address
   - CPU Units - the amount of CPU units assigned to this compute resource

Mind that setting a different amount of CPU units will affect your cloud configuration. It will not be possible to create Instance Package VSs in the compute zone to which you assign this compute resource.

   - Enabled - enable or disable the ability to install/boot virtual servers on this compute resource
   - Collect Stats - enable or disable the ability to collect statistics for this compute resource
   - Disable Failover - enable or disable the VS migration to another compute resource if this compute resource is marked as offline by the Control Panel server

- When you assign the compute resource to the new compute zone without any compute resources, the disable failover zone’s parameter automatically takes the value of the compute resource.
- When all compute resources within the zone have the same value, the compute zone’s disable failover status will be the same, otherwise, the compute resources zone’s failover status will be set to disabled.
- When you change the compute zone’s disable failover value, this change will be applied to all compute resources within this zone.

   - Failover recipe - select a recipe to run before the failover process
   - Power Cycle Command - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute Resource", which will execute the entered command, will appear in the Tools menu at the Settings > Compute resources > Compute resource page.
Currently, a command or commands should be written in one line separated by semicolon. If the command is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under the onapp user and it can be any bash script.

5. Click the **Save** button to apply changes.

### 9.10.6.6 Reboot Compute Resource

You can reboot a compute resource and set a logic to apply to virtual servers during the reboot. To reboot a compute resource:

1. Go to your Control Panel > **Admin** > **Compute Resources** menu.
2. Click a label of the compute resource that you want to reboot.
3. On the compute resource details page, click **Tools** and then click **Reboot Compute Resource**.
4. In the pop-up box, you can select the following options:
   - **Do not migrate powered off VSs**
     Select this checkbox to prevent the migration of powered off virtual servers to another compute resource while the source compute resource is being rebooted.
   - **Start running virtual servers after reboot?**
     Select this checkbox to initiate the failover process to start running virtual servers after the reboot.
     The failover process will be initiated despite the **Disable Failover** configuration for **Compute resource** or **Compute zone**.
   - **Stop all virtual servers that cannot be migrated to another compute resource?**
     Select this checkbox to power off virtual servers that cannot be migrated. When a compute resource is scheduled for the reboot, OnApp first attempts to hot migrate all virtual servers on a compute resource. If hot migration is not possible for a VS, OnApp attempts to cold migrate the VS. If you select this checkbox and cold migration fails, the VS is stopped so that the reboot may continue. If you don't select this checkbox, OnApp first attempts to hot and then cold migrate all VSs hosted on the compute resource but stops the migration process if any VS cannot be migrated.
     **Are you sure you want to reboot this compute resource?**
     Select this checkbox to confirm that you want to reboot the compute resource.
5. When you are certain that you want to proceed with the reboot, click the **Reboot** button.

The reboot option is not available for VMware compute resources.
If your backups disappear after rebooting the CloudBoot compute resource with LVM storage which is used as a backup server, add mount command to CloudBoot backup server custom config after the reboot. This is a known issue which will be fixed in the future release.

To fix your custom config settings, use one of the following options provided in the examples below (you will have to specify your own device names):

1. If you have a separate partition for backups and templates (/dev/sda1 and /dev/sda2)
   mkdir-p /onapp/backups
   mkdir-p /onapp/template
   mount /dev/sda1 /onapp/backups
   mount /dev/sda2 /onapp/templates

2. If you current array is detected as /dev/sda1 and currently everything is located in /onapp within templates and backup directories within:
   mkdir-p /onapp
   mount /dev/sda1 /onapp

---

### 9.10.7 OpenStack

<table>
<thead>
<tr>
<th><strong>Feature / Virtualization Software</strong></th>
<th><strong>OpenStack</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provisioning</strong></td>
<td></td>
</tr>
<tr>
<td>Self Service via UI</td>
<td>Y</td>
</tr>
<tr>
<td>Cloudboot</td>
<td>Y</td>
</tr>
<tr>
<td>Static</td>
<td>N</td>
</tr>
<tr>
<td>Recipes</td>
<td>N</td>
</tr>
<tr>
<td>Host CDN Edge</td>
<td>N</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td></td>
</tr>
<tr>
<td>OnApp Integrated Storage</td>
<td>Y</td>
</tr>
<tr>
<td>Local Storage</td>
<td>N</td>
</tr>
<tr>
<td>SAN</td>
<td>N</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td></td>
</tr>
<tr>
<td>Automatic Failover</td>
<td></td>
</tr>
<tr>
<td>Integrated Backup</td>
<td>Y</td>
</tr>
<tr>
<td>Incremental Backup</td>
<td>Y</td>
</tr>
<tr>
<td>Snapshot Capability</td>
<td>N</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td></td>
</tr>
<tr>
<td>Load balancing clusters</td>
<td>Y</td>
</tr>
<tr>
<td>Firewall rules</td>
<td>Y</td>
</tr>
<tr>
<td>Feature</td>
<td>Availability</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Manage Network Interfaces</td>
<td>Y</td>
</tr>
<tr>
<td>Virtual server management</td>
<td></td>
</tr>
<tr>
<td>Autoscaling</td>
<td>Y</td>
</tr>
<tr>
<td>Hot RAM resize without reboot**</td>
<td>Y Linux VSs only</td>
</tr>
<tr>
<td>Hot CPU cores resize without reboot</td>
<td>Y</td>
</tr>
<tr>
<td>Hot migration**</td>
<td>Available for some Linux, Windows 2003/2008 VSs</td>
</tr>
<tr>
<td>Cold migration</td>
<td>Y</td>
</tr>
<tr>
<td>Disk hot attachment / detachment</td>
<td>N</td>
</tr>
<tr>
<td>Disk resize (increase/decrease)</td>
<td>Available for Linux VSs. FreeBSD - increase only is available. Disk resize is not available for primary FreeBSD disks. Disk size decrease is not available for Integrated Storage.</td>
</tr>
<tr>
<td>IPv6 support ***</td>
<td>Y</td>
</tr>
<tr>
<td>Reboot in recovery</td>
<td>Y</td>
</tr>
<tr>
<td>Segregate</td>
<td>Y</td>
</tr>
<tr>
<td>VIP status</td>
<td>Y</td>
</tr>
<tr>
<td>Change owner</td>
<td>Y</td>
</tr>
<tr>
<td>CPU Topology</td>
<td>N</td>
</tr>
<tr>
<td>Power on/off/reboot vApp</td>
<td>N</td>
</tr>
<tr>
<td>Power on/off/reboot VS</td>
<td>Y</td>
</tr>
<tr>
<td>Build vApp from template</td>
<td>N</td>
</tr>
<tr>
<td>Build VS from template</td>
<td>Y</td>
</tr>
<tr>
<td>Integrated VS into vApp</td>
<td>N</td>
</tr>
<tr>
<td>Delete vApp</td>
<td>N</td>
</tr>
<tr>
<td>Delete VS</td>
<td>Y</td>
</tr>
<tr>
<td>Reset root password</td>
<td>Y</td>
</tr>
<tr>
<td>Set SSH Keys</td>
<td>Y</td>
</tr>
<tr>
<td>Edit VS Resources</td>
<td>Y</td>
</tr>
<tr>
<td>Statistics</td>
<td></td>
</tr>
<tr>
<td>CPU Stats</td>
<td>Y</td>
</tr>
<tr>
<td>Disk IOPS Stats</td>
<td>Y</td>
</tr>
<tr>
<td>Network Interface Stats</td>
<td>Y</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---</td>
</tr>
<tr>
<td>Console</td>
<td>HTML 5 Console</td>
</tr>
<tr>
<td></td>
<td>VMRC Console</td>
</tr>
<tr>
<td>Smart Servers</td>
<td>N</td>
</tr>
<tr>
<td>Edge servers</td>
<td>Y</td>
</tr>
<tr>
<td>Baremetal servers</td>
<td>Y</td>
</tr>
<tr>
<td>Application servers</td>
<td>Y</td>
</tr>
<tr>
<td>Container servers</td>
<td>Y</td>
</tr>
<tr>
<td>Load Balancers</td>
<td>Y</td>
</tr>
<tr>
<td>Ballooning release resource type for Compute zones</td>
<td>N</td>
</tr>
<tr>
<td>CPU Units</td>
<td>Y</td>
</tr>
</tbody>
</table>

**It is not possible to exceed the server's max_memory when increasing RAM on KVM Compute resources. Detailed info about RAM resize without reboot and hot-migrate abilities per template is available at:**

- [http://templates.repo.onapp.com/Linux_templates.html](http://templates.repo.onapp.com/Linux_templates.html)
- [http://templates.repo.onapp.com/FreeBSD_templates.html](http://templates.repo.onapp.com/FreeBSD_templates.html)

*** At least one IPv4 address must be allocated to a virtual server's primary network interface, as some applications do not support IPv6.

### 9.11 Assets

Assets are the Compute resources that are connected to the Control Panel server, but are either not configured or not assigned to a Compute zone.

Compute resources that are not configured yet are accessed via the **Admin > Settings > Assets** menu.

Compute resources that are already created but not assigned to a compute resource group are managed via the **Control Panel > Admin > Assets** menu. They are managed exactly the same as compute resources.

Click your Control Panel's main **Assets** menu to see the list of all unassigned Compute resources in your cloud, and a quick overview of their details:

- **Label**
- **IP address**
- **Type (Xen, KVM etc)**
- **Zone**
- **Location Group**
- **Failover status**
- **VSs**
- **CPU cores**
• CPU resources used
• CPU resources available
• CPU speed
• Total RAM
• Free RAM

You can drill into a specific asset to add virtual servers to that Compute resource, edit resources, or reboot an asset. To do so:

1. Go to your Control Panel's Assets menu. On the screen that appears you'll see the list of assets.
2. Click an asset's name (label) to see its details screen.
3. On the screen that appears:
   o click the "+" sign to add a VS to this Compute resource. You'll be prompted to a VS Creation Wizard.
   o click Tools > Edit Compute resource to change its details and resources.
   o click Tools > Reboot Compute resource to reboot an asset.

See also:
• Compute Resources
• Manage Compute Resources
• Compute Resource Matrix
• CloudBoot Compute Resources
• VMware Compute Resources

9.12 Virtual Routers

Virtual routers are appliances converted from the virtual servers based on KVM including OVA templates. Once converted, virtual routers preserve all the data and functionality of the virtual servers. Virtual routers provide the users with the possibility to manage their private SDN networks independently from the cloud owner. Virtual routers allow independent IP nets routing management and so save time spent on networking configuration. Also, they provide an additional level of security for private networks as all traffic inside SDN is isolated.

On this page:
• Convert Virtual Server to Virtual Router
• View Virtual Routers
• Assign IP Net to Router
• Unassign IP Net from Router

See also:
• Create and Manage SDN Networks
• Manage OVAs
• Manage OVA Virtual Servers
9.12.1 Convert Virtual Server to Virtual Router

Note that you cannot convert a virtual router to a virtual server.

To convert a virtual server to a router, do the following:
1. Go to your Control Panel > Cloud > Virtual Servers menu.
2. Click the Actions button next to the virtual server you want to convert to a router and select Convert to Virtual Router.
3. Click the Convert button.

After the VS has been converted to a router, it disappears from the VVs list and is present in the routers’ list at Control Panel > Cloud > Virtual Routers menu. Virtual routers preserve all the functionality of the virtual servers.

9.12.2 View Virtual Routers

To view the list of virtual routers:
1. Go to your Control Panel’s Virtual Routers menu.
2. The page that loads will show the list of virtual routers together with their details:
   - **OS** - the operating system of the virtual router
   - **Label** - the name of the virtual router
   - **VIP** - the icon that indicates whether the VIP status is enabled for the virtual router. If the icon is dimmed, the VIP status is not enabled. Click the icon to enable the VIP status for the virtual router
   - **IP addresses** - the IP address of the virtual router
   - **Disk Size** - the disk size of the virtual router in GB
   - **RAM** - the amount of RAM allocated to the virtual router in MB
   - **Backups** - the number of backups and the space these backups take
   - **User** - the owner of this virtual router. Click the username to see the owner details.
   - **CPU(s)** - the number of CPU(s) included
   - **Power** - the power status of the virtual router that can be powered on or powered off

To view a particular virtual router details, click the label of a required virtual router.

9.12.3 Assign IP Net to Router

Users can assign IP nets to virtual routers from their SDN networks.

To assign IP net to a router:
1. Go to your Control Panel’s Virtual Routers menu.
2. Click the label of the virtual router you’re interested in.
3. Click the **Routing** tab. The page that loads will show the list of already assigned IP nets and IP nets that you can assign. One IP net can be associated with one router.

4. Click the "+" button next to the IP net you want to assign to a router.

### 9.12.4 Unassign IP Net from Router

To unassign IP net from a router:

1. Go to your Control Panel's **Virtual Routers** menu.
2. Click the label of the virtual router you're interested in.
3. Click the **Routing** tab. The page that loads will show the list of already assigned IP nets and IP nets that you can assign.
4. Click the "-" button next to the IP net you want to unassign from a router.

### 9.13 Hot resize

Hot resize enables scaling of such resources as RAM and CPU without rebooting the virtual server.

Such ability depends on many factors:

- template properties (whether template itself supports such functionality)
- type of virtualization of the compute resource on which the virtual server is running
- used hardware
- other peculiarities of the overall cloud environment

Below you can find hot resize template matrix and several considerations about max memory.

#### 9.13.1 Hot resize matrix for templates

Hot resize matrix is reflected in `resize_without_reboot_policy` parameter, introduced since OnApp 3.3.1 which can be checked with [API call for templates](#). The API request will return the following parameter:

- `resize_without_reboot_policy` - all specifically tested templates (all newly added templates and some of the most frequently used ones) will have this parameter which indicates the hot resize possibility for a particular template considering its OS version and virtualization type:

```xml
<resize_without_reboot_policy>
    <xen>
        <centos5 type="integer">14</centos5>
        <centos6 type="integer">14</centos6>
        <centos7 type="integer">14</centos5>
    </xen>
    <kvm>
        <centos5 type="integer">12</centos5>
        <centos6 type="integer">0</centos6>
        <centos7 type="integer">0</centos6>
    </kvm>
</resize_without_reboot_policy>
```
The indicated integer is a decimal representation of a 4-bit binary code, which indicates whether CPU or RAM can (1) or cannot (0) be resized without reboot, where:

- 1st bit defines the ability to increase cpu
- 2nd bit defines the ability to decrease cpu
- 3rd bit defines the ability to increase RAM
- 4th bit defines the ability to decrease RAM

Be aware that bits are counted from right to left.

Some of the older and less common templates may not be tested according to Hot Resize Matrix, hence the resize_without_reboot_policy parameter will not be set, and allow_resize_without_reboot parameter will define whether the template supports resize without reboot.

allow_resize_without_reboot defines the template's resize capabilities but does not consider the virtualization type, thus may not be entirely accurate.

For the test results which consider the templates' resize without reboot possibilities under different virtualization types refer to this document.

### 9.13.2 Max memory considerations

When a template and virtualization type supports a resize of RAM, the amount of memory allocated to a VS cannot exceed the max_memory parameter or the virtual server will be rebooted.

The max_memory value depends on the type of a compute resource virtualization and is calculated as follows:

- **XEN**
  
  \[
  \text{max}_\text{memory} = \text{current memory} \times 16
  \]

  For example, if a virtual server is allocated with 2 GB of RAM, the VS may be scaled up to 32 GB without a reboot.

- **KVM**
  
  \[
  \text{max}_\text{memory} = \text{current memory} \text{ (is set after each reboot)}
  \]

Thus, you may scale RAM down and then back to the original value without reboot; value exceeding max_memory will require reboot, and will constitute current memory afterwards.
There are several workarounds to scale up RAM for virtual servers running on KVM:

1) To hot resize KVM CentOS 6.x x64 virtual servers:
   - Enable ballooning release resource type (Control Panel > Settings > Compute zones > Edit Compute Zone)
   - Additional *Set max memory* slider appears automatically. Move the slider to the right to enable max memory parameter for every VS within the compute zone. When you enable the *Set max memory* option, the limit for VSs is calculated as follows:

   \[
   max\_memory = current\ memory \times compute\ resource\ max\ memory\ rate
   \]

   The default compute resource max memory rate is eight (8). To modify the default max memory rate, change a value of the `kvm_max_memory_rate` parameter in the `on_app.yml` file. If the calculated max memory limit is more than 90% of free RAM available on a compute resource, then the limit is equal to 90% of free RAM available on the compute resource. You can also customize a max memory limit for a particular virtual server. For more information, refer to Set Max Memory.

2) If you enable Autoscale Virtual Server and set autoscaling rule for RAM, then the *max_memory* value will be ignored and RAM can be increased within the value set in 24hr limit (up_to parameter) field without reboot. The RAM increase can be either triggered by the set autoscaling rule or manually, using the Edit menu.

   **NOTE:** If you manually increase the RAM over the 24hr limit value - the virtual server will be rebooted.
10 Applications

Application is a piece of software that brings additional features into the basic functionality. OnApp allows you to deploy a wide range of applications by means of additional software. To install different applications on your Cloud you should create an application server first. Application Server is a regular VS based on CentOS Application Server template but with pre-installed software. Then you can install the applications on that server (like Drupal, Joomla, Wordpress etc.) using web interface. As an administrator you can charge for the template (by means of Template store) on which the application server has been built.

You can perform the following actions with the applications:

- view
- create
- backup
- delete

For more details, refer to the appropriate sections.

See also:

- Application Servers
- Create Application Server
- Application Server Billing
- Application Servers (API)

10.1 The List of Available Applications

Below you can find the full list of applications available for deployment using application server.

10.1.1 Forums

- phpBB
- Simple Machines Forum
- MyBB
- Advanced Electron Forums
- Vanilla
- PunBB
- XMB
- FluxBB
- Phorum
- bbPress
- FUDforum
- miniBB
- Beehive
• my little forum
• ElkArte

10.1.2 Blogs

• WordPress
• Open Blog
• Serendipity
• Dotclear
• b2evolution
• Textpattern
• Ghost
• Nibbleblog
• LifeType
• Pixie
• Nucleus
• Chyrp
• eggBlog
• PivoX
• Movable Type
• FlatPress
• HTMLy

10.1.3 CMS

• Joomla 2.5
• Joomla
• Drupal 7
• Drupal
• PHP-Fusion
• Concrete5
• MODX
• CMS Made Simple
• Open Real Estate
• e107
• Xoops
• Zikula
• Drupal 6
• Website Baker
• PHP-Nuke
- ocPortal
- Subrion
- Typo3 45
- Pligg
- PyroCMS
- Typo3 6
- Typo3
- Tiki Wiki CMS Groupware 9
- Contao
- Mambo
- Geeklog
- SilverStripe
- sNews
- jCore
- ImpressPages
- ProcessWire
- Quick.CMS
- Monstra
- Redaxscript
- ImpressCMS
- phpwcms
- Silex
- Sitemagic CMS
- Mahara
- SiteCake
- Fork
- Saurus
- Jamroom
- Pimcore
- Tiki Wiki CMS Groupware
- Bolt
- Microweber
- razorCMS
- SeoToaster CMS
- Pluck
- Kirby
- Croogo
- Hotaru CMS
• Fiyo CMS
• Concrete5 5.6
• Cotonti
• Zenario
• Anchor
• appRain
• ClipperCMS
• CMSimple
• Typesetter
• Bludit
• GRAV
• Open Business Card
• PopojiCMS
• PluXml
• Precurio
• Koken

10.1.4 E-commerce

• AbanteCart
• PrestaShop
• OpenCart 1.5
• Magento
• WHMCS
• CubeCart
• osCommerce
• Open eShop
• Loaded 7
• Zen Cart
• OpenCart
• TheHostingTool
• TomatoCart
• BoxBilling
• Avactis
• LiteCart
• Quick.Cart
• X-Cart
• SimpleInvoices
• ShopSite
• CS-Cart
• Open Source Point of Sale
• AlegroCart
• Axis
• Blesta
• phpCOIN
• PrestaShop 1.4
• SeoToaster Ecommerce
• Thelia 2
• Zeuscart
• Invoice Ninja
• ClientExec
• Shopware
• Arastta
• Magento
• InvoicePlane
• Magento 1.8
• PEEL SHOPPING
• SurfShopCART
• osCmax
• Logic Invoice
• Magento 2

10.1.5 Social networking

• Dolphin
• Oxwall
• Jcaw
• Elgg
• Open Source Social Network
• Beatz
• pH7CMS
• Etano
• PeoplePods
• Family Connections

10.1.6 Educational

• Moodle 2.8
• Chamilo
• Claroline
• eFront
• Moodle 2.0
• Moodle 2.6
• DoceboLMS
• Dokeos
• Moodle
• TCExam
• ATutor
• Omeka
• Gibbon
• Moodle 2.7
• Moodle 2.9

10.1.7 Video
• ClipBucket
• VidiScript
• videoDB
• CumulusClips
• Prismetube Express
• Ampache

10.1.8 Admanager
• OpenClassifieds
• Prosper202
• OSClass
• Revive Adserver
• GPixPixel

10.1.9 Galleries
• Gallery
• Piwigo
• Coppermine
• Zenphoto
• TinyWebGallery
• phpAlbum
• 4images
• Pixelpost
• Plogger
• iGalerie
• Gallery 2
• Lychee

10.1.10 Projectman
• qdPM
• Feng Office
• eyeOS
• Collabtive
• dotProject
• ProjectPier
• Mantis Bug Tracker
• The Bug Genie
• PHPJrkt
• TaskFreak
• todoyu
• Flyspray
• phpCollab
• Traq
• SiteDove
• Admidio
• Eventum
• Trac
• Burden
• Rukovoditel
• WebCollab
• ZenTao
• Bugs
• TestLink

10.1.11 Files
• ownCloud
• ProjectSend
• PHPfileNavigator
• Pydio
• eXtplorer
• Arfooo
• LetoDMS
• OpenDocMan
• eSyndiCat
• MONSTA Box

10.1.12 Wikis
  • MediaWiki
  • DokuWiki
  • PmWiki
  • WikkaWiki
  • MediaWiki 1.19

10.1.13 Frameworks
  • CodeIgniter
  • Laravel
  • yii
  • Bootstrap
  • Zend
  • CakePHP
  • Symfony2
  • Kohana
  • Symfony
  • Smarty
  • PHPDevShell
  • FuelPHP
  • HTML Purifier
  • PRADO
  • UIkit
  • DIY
  • Webasyst
  • WideImage
  • Symfony3

10.1.14 Mail
  • Roundcube
  • phpList
  • WebMail Lite
  • SquirrelMail
  • poMMo
  • Webinsta Maillist
  • OpenNewsletter
  • ccMail
10.1.15 Customer support

- Vision Helpdesk
- osTicket
- HESK
- Mibew Messenger
- Help Center Live
- phpOnline
- Live helper chat
- iQDesk
- Crafty Syntax
- Trellis Desk
- phpMyFAQ
- ExoPHPDesk
- Maian Support
- HelpDeskZ
- HelpDEZk
- Support Incident Tracker
- Faveo Helpdesk

10.1.16 ERP

- Vtiger
- Dolibarr
- SugarCRM
- FrontAccounting
- OrangeHRM
- EPESI
- EGroupware
- X2CRM
- Zurmo
- Group Office
- Tine 2.0
- SuiteCRM
- webERP
- EspoCRM
- OpenBiz Cubi
• YetiForce CRM

10.1.17 DBtools
• SIDU
• phpMyAdmin
• MyWebSQL
• Adminer
• SQLiteManager
• Chive
• phpLiteAdmin
• RockMongo
• Vty

10.1.18 Music
• kPlaylist
• Podcast Generator
• AmpJuke
• Impleo

10.1.19 Polls
• LimeSurvey
• Piwik
• LittlePoll
• phpESP
• Aardvark Topsites
• Advanced Poll
• EasyPoll
• Simple PHP Poll
• Open Web Analytics
• CJ Dynamic Poll
• Logaholic
• Little Software Stats

10.1.20 Guestbook
• Advanced Guestbook
• Lazarus
• BellaBook
• phpBook
• PHPKode Guestbook
• VX Guestbook
• RicarGBooK
• PHP Address Book

### 10.1.21 Calendars
- WebCalendar
- Booked
- phpicalendar
- ExtCalendar
- LuxCal

### 10.1.22 Games
- BlackNova Traders
- Shadows Rising
- Multiplayer Checkers
- Word Search Puzzle

### 10.1.23 RSS
- Gregarius
- Tiny Tiny RSS
- Feed On Feeds
- selfoss
- SimplePie

### 10.1.24 Microblog
- StatusNet
- PageCookery
- Storytlr

### 10.1.25 Others
- Seo Panel
- phpFreeChat
- WeBid
- YOURLS
- SLIMS
- phpLD
- phpFormGenerator
- Form Tools
- SPIP
10.2 Create and Manage Applications

Application is a piece of software that brings additional features into the basic functionality. OnApp allows you to deploy a wide range of applications by means of additional software. To install different applications on your Cloud you should create an application server first. Application Server is a regular VS based on CentOS Application Server template but with pre-installed software. Then you can install the applications on that server (like Drupal, Joomla, Wordpress etc.) using web interface.
As an administrator you can charge for the template (by means of Template store) on which the application server has been built. In this document you can find information on how to create and manage applications.

10.2.1 View Applications

To view an application:

On this page:

- View Applications
- Create Application
- Delete Application

See also:

- Application Servers
- Applications
- The List of Available Applications
- Create and Manage Application Backups
- Application Server Backups

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Applications.
4. The page that loads will show the list of applications together with their:
   - application name - the name of the application installed on this application server
   - software version - the version of the application software
   - software URL - this URL is a link to the application itself
   - Admin URL - this URL is a link for administrator, where he can enter credentials to log into application
   - Actions - click the Actions icon to perform the following procedures with the application:
     - backup application
     - remove application

There is one more possibility to view an application:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. On the screen that appears, under statistic data, you can see the list of all applications, deployed on this application server.
10.2.2 Create Application

Application Servers allow you to install various applications (like Drupal, Joomla, Wordpress etc.) on a server using web interface.

To create an application:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Applications.
4. On the screen that appears, press "+" button.
5. Complete the application creation form:
   - **Application Select**
     - **Popular Applications**
       - In this section you can see the logos of the most popular applications. Choose one of them by clicking the appropriate logo.
       - **Application catalog**
         - **Category** - choose the application category from the drop-down list (cms, blogs, ecommerce, forums etc.)
         - **Application** - choose the application from the drop-down list
       - **Application Description**
         - The following page will provide you with the description of the application, which you have chosen from the catalog, its features and screenshots.
6. Click **Proceed**.
7. On the screen that appears the following application settings will be specified:

   Settings are filled in automatically. In case you want to change automatic settings, fill in the appropriate field with your alternative settings.
   
   Settings vary depending on every application. The field **Directory** will be present in every case, while the field **Database**, for example, is relevant only for those applications, which require databases for their functioning.

   **Software Setup**
   - **Directory** - the name of directory, where the application is stored. Only lowercase letters can be used (for example, "drupal" for Drupal application).
   - **Database** - the name of database, used by application
Site Settings
*Site name* - name of the application site
*Site description* - description of the application site

Database Settings
*Table prefix* - prefix, that is used for database tables
*Import sample data* - choose language type from the drop-down list

Admin account
*Admin username* - username of administrator
*Admin password* - password of administrator
*Real name* - real name of administrator
*Admin email* - email of administrator

Choose language
*Select language* - choose application language from the drop-down list

Advanced Options
*Auto upgrade* - tick the checkbox to enable auto upgrade for the application

8. Click the Install button.

There is one more possibility to create an application:

1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. On the screen that appears, under statistic data, you can see the list of all applications, deployed on this application server. Press "+" button in the upper right corner and complete the application creation form as described above in step 5.

10.2.3 Delete Application

To delete an application:

1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Applications**.
4. The page that loads will show the list of applications. Click the **Actions** button next to a required application and choose the **Remove** button.
5. Move the **Remove directory** slider to the right if you want to remove the directory.
6. Move the **Remove database** slider to the right if you want to remove the database.
7. Move the **Remove database user** slider to the right if you want to remove the database user.
8. Click **Remove**.

10.3 Create and Manage Application Backups

To back up an application means to put it in an archive. Single application could have multiple backups taken. Application backups are used for copying and archiving applications in order not to lose important information. You can view/create/edit/restore or delete application backups.
10.3.1 View Application Backups

To view an application backup:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Backups.
4. The page that loads will show the list of application backups together with their:
   - application name
   - size
   - software version
   - software URL
   - Backup note
   - Actions (restore and remove)

On this page:
- View Application Backups
- Create Application Backup
- Restore Application Backup
- Delete Application Backup

See also:
- Application Server Backups
- Application Servers
- Create and Manage Applications
- The List of Available Applications
- Manage FTP Users

10.3.2 Create Application Backup

To back up an application:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Applications.
4. The page that loads will show the list of applications. Click the Actions button next to a required application and choose the Backup button.
5. Move the **Backup directory** slider to the right if you want to back up the directory.
6. Move the **Backup database** slider to the right if you want to back up the database.
7. Click the **Backup** button.

### 10.3.3 Restore Application Backup

To restore an application backup:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Backups**.
4. The page that loads will show the list of application backups. Click the **Actions** button next to a required backup and choose the **Restore** button.
5. Move the **Restore directory** slider to the right if you want to restore the directory.
6. Move the **Restore database** slider to the right if you want to restore the database.
7. Press the **Restore** button.

### 10.3.4 Delete Application Backup

To delete an application backup:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Backups**.
4. The page that loads will show the list of application backups. Click the **Actions** button next to a required backup and choose the **Remove** button.
5. You will be asked for confirmation before the application backup is deleted. Press the **Remove** button.

### 10.4 Manage FTP Users

Application server users can transfer images and other files to and from an application server by means of FTP. To enable this function you should create FTP user accounts. You can view, create and delete FTP users of an application server.

#### 10.4.1 View FTP Users

To view FTP users:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **FTP Users**.
4. The page that loads will show the list of FTP users together with their:
   - *Login* - the user's login name (name_IP address)
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- **Path** - the route to FTP folder
- **Usage** - the amount of FTP folder space, used by this user (in MB)
- **Actions** - click the Actions icon to perform the following procedures with FTP users:
  - Remove FTP user

**On this page:**
- View FTP users
- Create FTP user
- Delete FTP user

**See also:**
- Applications
- Application Backups
- Application Servers

### 10.4.2 Create FTP User

To create an FTP user:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > FTP Users.
4. On the screen that appears, click "+".
5. Complete the creation form:
   - **Login** - provide user's login name
   - **Password** - create user's password
   - **Password confirmation** - enter user's password one more time
   - **Path** - indicate the route to FTP folder
6. Click Submit.

### 10.4.3 Delete FTP User

To delete a FTP user:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > FTP Users.
4. The page that loads will show the list of FTP users. Click the Actions button next to a required FTP user and choose the Remove button.
5. You will be asked to confirm the deletion. Click Remove.
10.5 Manage Domains

You can add domains to resolve the Application Servers IP address. You can view, create and delete application domains.

10.5.1 View Domains

To view domains:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Domains.
4. The page that loads will show the list of domains together with their:
   o Name - the domain name
   o Path to Application - the route to application
   o Type - whether domain is addon or parked
   o Actions - click the Actions icon to perform the following procedures with domains:
     - Remove domain

On this page:
- View Domains
- Create Domain
- Delete Domain

See also:
- Applications
- Application Backups
- Application Servers

10.5.2 Create Domain

To create a domain:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Domains.
4. On the screen that appears, press "+" button.
5. Complete the creation form:
   o Domain - enter domain name
   o Choose domain path using one of the following tabs:
     - Application - choose application-based path from the drop-down menu
     - Addon - enter domain path manually
- *Parked* - `/home/onapp/public_html` directory is chosen by default

6. Click the **Submit** button.

### 10.5.3 Delete Domain

To delete a domain:

1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Domains**.
4. The page that loads will show the list of domains. Click the **Actions** button next to a required domain and choose the **Remove** button.
5. You will be asked to confirm the deletion. Click **Remove**.

### 10.6 Manage Databases

You can create and manage databases available for your Application Server.

Ensure that *See all application servers* or *See own application servers* permission is on before managing databases. For more information about permissions refer to the **List of all OnApp Permissions** section of this guide.

### 10.6.1 View Databases and Database Users

If you want to see the list of databases available for your Application Server, you can view it at OnApp Control Panel.

To view a database list:

**On this page:**

- View Databases and Database Users
- Create Database
- Create and Manage Database Users
- Assign User and Set Privileges for Database
- Edit Users Assigned to Database
- Remove Database

**See also:**

- Application Servers
• **Applications**
• **Application Backups**

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. On the screen that appears, you will get the list of databases together with their:
   • **Database name** - the name of a database
   • **Users** - the names of users, assigned to the database
   • **Actions icon** - the actions you can perform with the database (Privileges, Remove).

   To view the list of database users:
   1. Go to your Control Panel > Cloud > Application Servers menu.
   2. Click the label of the server you're interested in.
   3. Click the Applications tab > Databases.
   4. Click the Database Users tab.
   5. On the screen that appears, you will get the list of database users together with their:
      • **User name** - the name of a user
      • **Actions icon** - the actions you can perform with the database users (Change password, Remove).

### 10.6.2 Create Database

You can create database available for your Application Server.

To create a database:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. On the screen that appears, press "+" button.
5. Complete the creation form:
   - **Database name** - specify database name
6. Click the Submit button.

### 10.6.3 Create and Manage Database Users

You should create a user, who will be able to manage a database.

To create a database user:

1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. On the screen that appears, click the Database Users tab and press "+" button.
5. Complete the creation form:
   - **Name** - specify database user's name. The length of the name should not exceed 11 characters.
   - **Password** - specify password for the database user

6. Click the **Submit** button.

You can also change database user password or delete database user.

To change database user password:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Databases**.
4. On the screen that appears, click the **Database Users** tab.
5. Click the **Actions** icon next to the specific database user and click **Change password**.
6. Enter new password and click the **Submit** button.

To delete database user:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Databases**.
4. On the screen that appears, click the **Database Users** tab.
5. Click the **Actions** icon next to the specific database user and click **Remove**.
6. Confirm deletion by clicking the **Remove** button.

### 10.6.4 Assign User and Set Privileges for Database

After user creation you should assign the user to a database and set privileges (permissions) for the database. For example, the assigned user can create temporary tables, execute, drop, lock tables in the database.

To assign a user and set privileges for a database:
1. Go to your Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Applications** tab > **Databases**.
4. Click the **Actions** icon > **Privileges** next to the database you're interested in.
5. Click the "+" button to assign a user to the database. On the screen that appears, set the following:
   - **User** - chose the user from the drop-down list.
   - **Privileges** - tick the checkbox next to a privilege which you want to assign to the user. Tick the checkbox "All" if you want to chose all privileges.
   - **Host** - chose a host (local host or any host) from the drop-down list. You can also chose "Use text field" and specify the host name in a blank field.
6. Click the **Submit** button.

### 10.6.5 Edit Users Assigned to Database
If you want to change a set of privileges, given to a specific user, you can edit it.

To change privileges of a user, assigned to a database:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. Click the Actions icon > Privileges next to the database you're interested in. You will get a list of users, assigned to this database.
5. Click the Actions icon > Change Privileges next to the user you're interested in.
6. Tick the checkbox next to a privilege which you want to assign to the user. Tick the checkbox "All" if you want to chose all privileges.
7. Click the Submit button.

If you do not want a specific user to manage a database, you can unassign user from the database.

To unassign user from a database:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. Click the Actions icon > Privileges next to the database you're interested in. You will get a list of users, assigned to this database.
5. Click the Actions icon > Unassign next to the user you're interested in.
6. Confirm unassignment by clicking the Remove button.

10.6.6 Remove Database

If there is no need to use a specific database anymore, you can delete it.

To delete a database:
1. Go to your Control Panel > Cloud > Application Servers menu.
2. Click the label of the server you're interested in.
3. Click the Applications tab > Databases.
4. Click the Actions icon > Remove next to the database you're interested in.
5. Confirm deletion by clicking the Remove button.

10.7 System Application Settings

Applications are created using PHP scripting language. Different applications can require different versions of PHP. There are system applications within an application server. You can install or switch PHP versions within one application server by means of system applications.

Below you can find information on how to manage system applications.

10.7.1 List of System Applications

To see the list of system apps available for an application server:
1. Go to Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you’re interested in.
3. Click the **Applications** tab > **System Apps**.
4. The page that loads will show the list of system applications together with their:
   - **Name** - the name of a system application
   - **Version** - the version number of an application
   - **Actions** - you can download the application or **delete** it by pressing the appropriate button

**On this page:**
- List of System Applications
- PHP Version Switching

**See also:**
- Applications
- Application Backups
- Application Servers

### 10.7.2 PHP Version Switching

You can switch PHP versions in case you have more than one PHP version in the list of system applications.

To switch the PHP version:
1. Go to Control Panel > **Cloud** > **Application Servers** menu.
2. Click the label of the server you’re interested in.
3. Click the **Applications** tab > **Settings**.
4. Choose the appropriate PHP version form the drop-down menu and click **Switch**.

### 10.8 Manage Email Accounts

Now you can create an email account for your **domains**. Also the email server deployment is needed before creating email accounts.

#### 10.8.1 View Email Accounts

To view email accounts for your application servers:
1. Go to your **Cloud** > **Application server** > **Applications** > **Email Accounts**.
2. You will get the list of email accounts with their details.
3. You can filter email accounts for a specific domain by choosing it from the drop-down menu and clicking the **Apply** button.
   - **Space** - the disk space amount (in KB), occupied by email
   - **Count** - the number of email messages
Clicking the Actions icon will show actions which you can perform with the email account (remove)

If email server is not deployed, you will get a warning with the link to System apps, where you can download email services.

On this page:
• View Email Accounts
• Deploy Email Server
• Create Email Account
• Remove Email Account

See also:
• Application Servers
• Manage Domains
• Applications

10.8.2 Deploy Email Server

To install email services:
1. Go to your Cloud > Application server > Applications > System Apps.
2. Click the download button for Dovecot and Exim system apps.

When these system apps are downloaded, you can proceed to email account creation.

10.8.3 Create Email Account

To create an email account:
1. Go to your Cloud > Application server > Applications > Email Accounts.
2. Click the + button and fill in the following:
   o User - add text, which will be the part of the email account before the @ symbol
   o Domain - choose a domain from the drop-down list
   o Password - create a password for this email account
   o Confirm password - repeat the password to confirm it
3. Click the Add new Email Account button.

10.8.4 Remove Email Account

To remove an email account:
1. Go to your Cloud > Application server > Applications > Email Accounts.
2. Click the Actions icon next to the email account you want to delete and press Remove.
3. Confirm the deletion.

### 10.9 Manage Services

Now you can manage pre-installed services, available on your application server. You can view the list of services, start, stop or restart it.

#### 10.9.1 View Services

To view services of your application server:

1. Go to your Cloud > Application server > Applications > Services.
2. You will get the list of services together with their details:
   - **Name** - the name of the service
   - **Service name** - the name of the service in the system
   - **Status** - the service status (running, stop)
   - Clicking the Actions icon will show actions which you can perform with services (start, stop, restart).

**On this page:**

- [View Services](#)
- [Start/Stop/Rerart services](#)

**See also:**

- [Application Servers](#)
- [Applications](#)
- [Manage Application Servers](#)

#### 10.9.2 Start/Stop/Rerart Services

To manage services:

1. Go to your Cloud > Application server > Applications > Services.
2. Click the Actions icon next to the service you want to manage and press Start, Stop, or Restart.
3. The corresponding transaction will be fulfilled.
11 SolidFire Integration

OnApp is integrated with the SolidFire storage management system. With the Solid Fire integration it is possible to utilize the SF SAN directly within the OnApp cloud and manage the SolidFire cluster via the SolidFire API.

You can perform the following options with SolidFire:

- Allocate dedicated LUNs from the SF cluster per virtual server disk, when creating a VS. (LUN is created per each VS disk, with a separate lun per swap disk.)
- Manage SolidFire LUNs automatically via API.
- Create virtual servers without the swap disk.
- Implement backups / snapshots using SF CloneVolume method.

To be able to utilize SolidFire in the cloud, you need to install the SolidFire storage system first. There is a disk dependency between OnApp and SolidFire - when a new disk is created on the OnApp side, a new LUN is created automatically on the SF side, using the CreateVolume API call.

As the SolidFire data store has two interfaces (OnApp and SolidFire) you have to specify two IP addresses when creating a SolidFire Data Store Zone.

To be able to use the SF volume, you have to enable export to this device (Compute resource or a data store). To do that, you need to send an account username and initiator password to the iscsi_ip address. You will be able to use this device after the authorization.

The following options are not available under SolidFire:

- It is not possible to migrate SolidFire disks, as SF virtualises the storage layer.
- SolidFire does not support live disk resize. To resize disk, you need to shut down the virtual server first and use the CloneVolume functionality to increase the disk size. After the disk resize operation is complete, the original volume will be replaced with the new one and deleted, after that the VS will be booted.

On this page:
- SolidFire Management
- SolidFire Quality of Service

See also:
- Configure Resource Allocation And Prices
- SolidFire Data Store Zone
- Create and Manage Data Stores

11.1 SolidFire Management
Gather statistics
Statistics gathering is performed by the OnApp Usage collection system using the GetVolumeStats API call.

Create data store
You can create one SolidFire data store per cloud that will represent the space available at the SolidFire side. Use GetLimits/GetClusterCapacity API calls to view data store size availability.

Activate/deactivate disk
All activation/deactivation operations should include automating the OpenISCSI Initiator on the Compute resource activation/deactivation for the specific Volume.

Remove disk
The Disk/LUN is removed with the DeleteVolume API call.

Backup disk
Using the CloneVolume API call, with readOnly option, a snapshot is created which you can then mount on the backup server for backup processing. The clone is then taken down after the backup using DeleteVolume API call.

Incremental backups
There is a possibility to create incremental backups of VSs associated with SolidFire data store. The procedure is the same as for LVM data stores.

For more details, refer to the SolidFire API documentation.

11.2 SolidFire Quality of Service

SolidFire provides a substantial QoS control for the efficient performance in a cloud environment.

SolidFire data store zone has the following parameters:

- **Minimum IOPS** (SF clusters with lower minimum IOPS will have lower priority when a system is overloaded)
- **Maximum IOPS**
- **Burst IOPS**

It is possible to configure the minimum IOPS resource properties as a minIOPS resource in the bucket. The maximum IOPS and burst IOPS are static values that can differ per zone, thus providing tiered functionality.

For details how to change miniIOPS settings, refer to the Configure Resource Allocation And Prices section of this guide.

For more details on Solid Fire management, refer to SolidFire documentation.

SolidFire data store requires authorization for sending API requests from the CP to the SolidFire cluster (you will need to provide Cluster Admin authorization credentials when creating a SolidFire data store).

A Cluster Admin must be created on the SF side before creating a data store in the OnApp control panel.
12 Integrated Storage

Integrated Storage functionality allows the cloud admin to build a highly scalable and resilient SAN storage target for virtual server storage using local disks in compute resources. Using Integrated Storage, you can create a virtual data store on OnApp Cloud that spans multiple physical drives in compute resources, with RAID-like replication and striping across drives.

The SAN is fully integrated into the compute resource platform, and the platform is completely decentralized: each node is capable of making decisions about data synchronization and load balancing, and communicates directly with other nodes to move content around dynamically without depending on any centralized controller. There is no single point of failure: for example, if a compute resource fails, the SAN reorganizes itself and automatically recovers the data.

See also:
- CloudBoot Compute Resources
- Integrated Storage Data Stores
- Integrated Storage Data Store Disks
- Storage Nodes
- Integrated Storage Drive Devices

12.1 Known Limitations and Restrictions

- You can use integrated storage on the following compute resources:
  - Xen and KVM CloudBoot compute resources
  - CentOS 7 KVM static compute resources
  - VMware compute resources are not supported for IS
- Currently, it is not possible to utilize bonded NICs for the CloudBoot management/boot interface.
- To start using IS, you must have a Manage OnApp Storage permission enabled for your user role. Also, you have to enable IS on the system configuration manually (Admin > Settings > Configuration > OnApp Storage). Visit Configuration Settings chapter for more details.
- Integrated Storage supports PCI devices that have drivers compatible with the Linux kernel versions we use.
- Some customers may experience MAC address flapping across ports because the switch does not support the balance-rr mode. In this case, we recommend to set up separated VLANS per each bond pair for that switch.
- If an IS data store is created with overcommit (overcommit is not equal to none) and a backend node in the data store runs out of space, the storage controller which manages the backend node will become unavailable and vdisk paths will become degraded. Enabling overcommit and running out of physical space is a bad condition and should always be avoided. It is strongly recommended that you create a data store with overcommit = none for production purposes.
For the detailed information on the following topics, refer to the Integrated Storage Guide:

- Integrated Storage Data Stores
- Integrated Storage Data Store Disks
- Storage Nodes
- Integrated Storage Drive Devices
- Performance Benchmarks
- Diagnostics
- Disk Hot Plug
- CloudBoot OS Template
13 Service Add-ons

Service Add-ons functionality allows you to present to your customers additional services on top of your current IaaS Virtual Server offering. You can offer features such as Managed Services, Software Installations and components currently not integrated in OnApp.

13.1 System service add-ons

In OnApp, there are two types of service add-ons: user and system. User service add-on can be optionally assigned or removed by users upon their desire to use or not the specific extra resources you offer. A system service add-on provides the ability for you to add obligatory services to a virtual server, template, or OVA, which cannot be removed by an end user.

Below you can find more details on each step of the workflow.

13.2 Create service add-on

On this page:
- System service add-ons
- Create service add-on
- Add events to service add-on
- Service add-on store
- Pricing and Access control
- Permissions
- Assign service add-on to VS
- Generate statistics for system service add-ons
To create a service add-on:

1. Go to your Control Panel > Cloud > Service Add-ons menu in the left navigation pane.
2. Click the "+" button.
3. On the screen that follows:
   - **Label** – give your service add-on a name
   - **Description** – add the service add-on description
   - **Icon** – upload the service add-on icon (click Choose file to select a necessary image)
   - **Available on VS provisioning** - move the slider to the right to be able to choose this service add-on when creating a VS (providing that the Replace recipes permission is enabled and the billing settings allow).
   - **System service add-on** - move the slider to the right to make the add-on obligatory for a user and impossible to remove.
   - **Compatible with** – choose if the service add-on can be assigned to Unix-based, Windows-based, or both types Virtual servers upon creation.

4. Click **Save**. The service add-on will be created and you will be redirected to the Edit page, where you can manage On Add and On Remove events.

For details on service add-on creation refer to the Manage Service Add-ons section of this guide.

### 13.3 Add events to service add-on

Service add-on events let you configure which actions will be run on the VS, to which the service add-on is assigned. The transactions for running the **On Add** events will be scheduled at the moment when the service add-on is assigned to a VS. The transactions for running the **On Remove** events will be scheduled at the moment when the service add-on is re-assigned from a VS. The transactions for running the **On VS Destroy** events will be executed before 'Destroy VS' transaction. The transactions for running the **On VS Rebuild** events will be executed after VS rebuild.

Currently the following events are available:

1. Run Recipe actions are available for service add-on configuration, in particular the recipes that run on Virtual Servers.
Prerequisite

The recipes should be created beforehand, properly configured and tested.

The list of recipes that can be assigned to a service add-on depends on the user plan settings - it is possible to choose only from those recipe groups which are added to the bucket. Also it is required to have the View recipes permission to be able to attach a recipe event to a service add-on. Make sure that the recipe Compatible with parameter and the service add-on Compatible With parameter are consistent. Otherwise running the event will fail for a VS.

2) Raise Event actions become available starting with OnApp 5.5 version. This is an action type that sends notification to all subscribed recipients. The subscriptions and the messages are configured at Notifications Setup.

For more information on how to manage On add events and On remove events for service add-on, refer to the Manage Service Add-ons section of this guide.

13.4 Service add-on store

After you have created the service add-ons and properly configured events for them, proceed to arranging the service add-ons into a groups of services. A Service add-on store enables you to organize individual service add-ons into groups that can be further added to a plan to control user access. Only those groups which are added to a bucket will be available to a user. You can arrange the service add-ons into groups depending on their type, price, or whatever other attribute.

The prices for the individual service add-ons are also set in the Service add-ons store per service add-on per hour. This is the additional price that will be calculated for the VS besides the resources cost.

For detailed instructions, refer to Manage Service Add-on Store section of this guide.

13.5 Pricing and Access control

To make service add-on available to users, go to the bucket's Access Control section and add the required service add-on groups. The users under the bucket will have access only to the service add-on groups which were added to their Access Control.

To set the pricing for the individual service add-ons, go to the bucket's Rate Card section menu and indicate the price for required service add-ons per service add-on per hour as well as the additional cost for VS CPU, RAM and disk size. These prices will be charged additionally to the VS price.

For more info, refer to Manage Service Add-on Store and Configure Resource Allocation And Prices sections of this guide.
13.6 Permissions

The following permissions regulate service add-on functionality:

**Service Add-ons**
- *Any actions on Service Add-ons* - the user can perform any operations on Service Add-ons - view, create, edit and delete service add-ons
- *Create new Service Add-ons* - the user can create new Service Add-ons (Control Panel's Service Add-ons menu > the "+" button)
- *Delete Service Add-ons and Delete own Service Add-ons* - the user can delete Service Add-ons (Control Panel's Service Add-ons menu > the "Actions" icon > Delete)
- *Edit any Service Add-on and Edit own Service Add-ons* - the user can update Service Add-ons (Control Panel's Service Add-ons menu > the "Actions" icon > Edit)
- *Read all Service Add-ons and Read own Service Add-ons* - the user can view Service Add-ons (Control Panel's Service Add-ons menu)

**Service Add-on Groups**
- *Any action on Service Add-on Groups* - the user can take any action on Service Add-on Groups - view, create, edit and delete service add-on groups
- *Create a new Service Add-on group* - the user can create a new Service Add-on group and add child service add-on groups (Control Panel's Service Add-ons menu > Store > the "+" button and Add Child button)
- *Destroy any Service Add-on group and Destroy own Service Add-on group* - the user can delete Service Add-on groups (Control Panel's Service Add-ons menu > Store > the "Delete" button next to the service add-on group you want to delete)
- *See all Service Add-on groups* - the user can see all Service Add-on groups (Control Panel's Service Add-ons menu > Store)
- *Manage any Service Add-on group* - the user can manage a Service Add-on group (the user can edit a service add-on group, assign a particular service add-on to a service add-on group, remove service add-on from the service add-on group, edit service add-on price).

**Virtual Servers**
- *Manage Service Add-ons for all virtual servers and Manage Service Add-ons for own virtual servers* - the user can manage Service Add-ons for virtual servers (Control Panel's Virtual Servers menu > VS label > Overview > Service Add-ons)
- *Manage System Service Add-ons* - the user can manage the system service add-ons of all VSs in the cloud
- *Manage own System Service Add-ons* - the user can manage system service add-ons assigned to one's own virtual servers

**Virtual Machine Statistics**
- *See Virtual Machine Statistics* - the user can see the system service add-ons usage report

**Replace Recipes**
- *Replace recipes* - the user can replace Recipes with Service Add-ons in VS creation wizard. The Service Add-ons step will appear in wizard if the other conditions are met (such as availability in buckets, etc.). This permission is disabled by default.

**OVAs**
- *Manage System Service Add-ons* - the user can manage the system service add-ons assigned to all OVAs in the cloud
- **Manage own System Service Add-ons** - the user can manage system service add-ons assigned to the OVAs uploaded by the user

**Templates**
- **Manage System Service Add-ons** - the user can manage the system service add-ons assigned to all templates in the cloud
- **Manage own System Service Add-ons** - the user can manage system service add-ons assigned to the templates uploaded by this user

For more information about permissions, refer to the Permissions List chapter of this guide.

### 13.7 Assign service add-on to VS

Service add-ons can be assigned to the VS during its creation or later.

**Service add-ons in VS creation wizard**

Ensure that the following requirements are met to be able to assign service add-on to VS during its creation:

- **Replace Recipes with Service Add-ons on VS creation** permission is enabled
- Service add-on groups are available in your bucket
- The On Provisioning option is enabled for all or some of the service add-ons available to you within the bucket.

If the requirements are met, you will get Service Add-ons step in VS creation wizard, where you should fulfill the following steps:

1. Click the service add-on group icon on the left to expand the list of service add-ons on the right. Every service add-on contains the following info:
   - Label
   - VS's types, with which this service add-on is compatible
   - Description of the service add-on
   - Price per hour

2. Select the service add-on by clicking on it. You can select several add-ons from different service add-on groups. Click **View Selected Add-ons** to see the list of selected service add-ons. You can remove the selected service add-on from the list by clicking the button near the add-on.

3. Click **Next** to proceed to the next step of the wizard that completes the virtual server creation process.

**Service add-on assignment to already created VS**

When the events and the prices are configured for service add-ons, you can assign a service add-on to any of their VSs.

To assign service add-on to a VS:

1. Go to your Control Panel > **Cloud** > **Virtual Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Overview** tab, then choose **Service Add-ons**.
4. Click the "+" button at the upper right corner. You will get the list of service add-on groups (availability is configured in the bucket).

5. Click the label of the necessary user or system service add-on to see its details:
   - **Label**
   - **Type** - user or system
   - **Description**
   - **Price**

6. Choose the necessary service add-on and click **Assign**. The transaction to execute the add-on event(s) will be scheduled for running. If you rebuild VS, the On VS Rebuild event(s) will be scheduled for running and in case of VS deletion - the On VS Destroy event(s) will be scheduled for running.

For more information refer to the [Virtual Server Service Add-ons](#) section of this guide.

Also you can view the list of VSs, assigned to the service add-on. For details, refer to the [Manage Service Add-ons](#) section of this guide.

### 13.8 Generate statistics for system service add-ons

For your convenience, the system tracks the system service add-ons' usage and generates statistics on it. It is possible to generate it for a specific period.

To generate the statistics:

1. Go to your Control Panel > **Admin > Users**.
2. Click the Full Name of the cloud admin to get to the **User Profile**.
3. In the Billing Details section, click the **System Service Add-ons Report** button.
4. Select the time period from the drop-down menu and click the **Apply** button to generate the report.
5. On the page that appears you will see the report with the following details:
   - **From** - the beginning of the specified time period for the statistics generation
   - **Till** - the end of the specified time period for the statistics generation
   - **Virtual server** - the VS the system service add-on in question is assigned to
     - **Cores (peak usage)** - the number of CPU cores used
     - **Memory (peak usage)** - RAM usage, GB
     - **Disk size (peak usage)** - disk usage, GB

You can save your billing statistics to a file in a CSV format. To download a CSV file with billing statistics for a selected period of time, click the **Save as CSV** button. The download will start automatically after you click the button.

The CSV file includes the following information:
• **from** - the beginning of the specified time period for the statistics generation
• **till** - the end of the specified time period for the statistics generation
• **user_id** - the ID of the user
• **virtual_machine_id** - the ID of the VS the system service add-on in question is assigned to
• **service_addon_id** - the ID of the system service add-on
• **cpus** - the number of CPU cores used
• **memory** - RAM usage, GB
• **disk_size** - disk usage, GB

The generated reports will be stored at the System Service Add-ons Report page. However, if you have statistics archiving enabled for your cloud, the reports will be stored according to the period, specified for the archiving.

For Windows-based VSs, you may also generate an SPLA report on the system service add-ons usage. For more information, refer to the SPLA Report section of this guide.

### 13.9 Manage Service Add-ons

This chapter provides an overview on how to manage user and system service add-ons in OnApp. You can view, create, edit, delete service add-ons and manage their On add, On remove, On VS Destroy and On VS Rebuild events.

• To manage user service add-ons, ensure that **Service Add-ons** permissions are on.
• To manage system service add-ons, ensure that **Manage System Service Add-ons** permissions are on. For more information about permissions refer to the Permissions section of this guide.

On this page:

• **View service add-ons**
• **Create service add-on**
• **Service add-on events management**
• **Edit service add-on**
• **View service add-on applied to VSs**
• **Assign system service add-ons to template**
• **Delete service add-on**

See also:
13.9.1 View service add-ons

The Control Panel's Service Add-ons menu lists all of the service add-ons available on your system.

To view the list of service add-ons:

1. Go to your Control Panel > Cloud > Service Add-ons menu in the left navigation pane. You'll see a list of service add-ons on your system together with their details:
   - **Label** - the service add-on name (if you click the service add-on label, you will be redirected to the Edit page)
   - **Type** - select user or system
   - **Compatible with** – choose if the service add-on can be assigned to Unix-based, Windows-based, or both types Virtual servers upon creation.
   - **Number of Add events** - the amount of Add events in the service add-on
   - **Number of Remove events** - the amount of Remove events in the service add-on
   - **Number of On VS Rebuild events** - the amount of On VS Rebuild events in the service add-on
   - **Number of ON VS Destroy events** - the amount of On VS Destroy events in the service add-on
   - **Actions column** - click the Actions button to view the actions, which you can perform with the service add-on (edit, delete, applied to VS)

The service add-ons are organized into four tabs:

- **All service add-ons** - the list of all the service add-ons created in the cloud.
- **Unix service add-ons** - the service add-ons that have been created as compatible with Unix virtual servers only.
- **Windows service add-ons** - the service add-ons that can be assigned to Windows VSs only.
- **Unix/Windows service add-ons** - the service add-ons that are compatible with both Unix and Windows-based virtual servers.

13.9.2 Create service add-on
When creating a service add-on, at first you specify its properties, and then attach On add, On remove, On VS Destroy and On VS Rebuild events.

To create a service add-on:

1. Go to your Control Panel > Cloud > Service Add-ons menu.
2. Click the "+" button.
3. On the screen that follows:
   - **Label** – give your service add-on a name
   - **Description** – add the service add-on description
   - **Icon** – upload the service add-on icon (click Choose file to select a necessary image)
   - The icon should have width less than or equal to 200px and should have height less than or equal to 200px.
   - **Available on VS provisioning** - move the slider to the right to be able to choose this service add-on when creating a VS (providing that the billing settings allow)
   - **System service add-on** - move the slider to the right to make the add-on obligatory for a user and impossible to remove
   - **Compatible with** – choose the OS system, with which the service add-on is compatible (Windows, Unix or both)
4. Click Save. The service add-on will be created and you will be redirected to the Edit page, where you can manage On Add, On Remove, On VS Destroy and On VS Rebuild events. For more details refer to the section below.

### 13.9.3 Service add-on events management

Service add-on events let you configure which actions will be run on the VS, to which the service add-on is assigned.

- The transactions for running the **On Add** events will be scheduled at the moment when the service add-on is assigned to a VS.
- The transactions for running the **On Remove** events will be scheduled at the moment when the service add-on is re-assigned from a VS.
- The transactions for running the **On VS Destroy** events will be executed before 'Destroy VS' transaction.
- The transactions for running the **On VS Rebuild** events will be executed after VS rebuild. Currently the following events are available:

#### 13.9.3.1 Run Recipe Actions

**Recipes** are available for service add-on configuration. The recipes will run on Virtual servers and vCloud director virtual servers.
**Prerequisite**

The recipes should be created beforehand, properly configured and tested.

The list of recipes that can be assigned to a service add-on depends on the user plan settings - it is possible to choose only from those recipe groups which are added to the bucket. Also it is required to have the View recipes permission to be able to attach a recipe event to a service add-on. The recipes are not filtered according to compatible with type. Make sure that the recipe Compatible with parameter and the service add-on Compatible With parameter are consistent. Otherwise running the event will fail for a VS.

Be aware, that if you add several recipes to the event, they will be fulfilled in the top-down order.

To create a Run Recipe action:

1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu. You'll see a list of service add-ons on your system.
2. Click the **Actions** icon next to the service add-on you want to change, then choose **Edit**.
3. On the screen that follows, click the "+" button > **Add Recipe Action** at On add, On remove, On VS Destroy or On VS Rebuild event menu.
4. Choose recipe from the drop-down list.
5. Choose destination:
   - **Run on Virtual Server** - choose it if you want to run this recipe action only on VS, to which this service add-on will be assigned.
   - **Run on Control Panel** - choose it if you want to run this recipe action on the whole Control Panel. For more information refer to the [Control Panel Recipes Settings](#).
6. Click **Add**.

To edit a Run Recipe action:

1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu. You'll see a list of service add-ons on your system.
2. Click the **Actions** icon next to the service add-on you want to change, then choose **Edit**.
3. On the screen that follows, click the **pencil** button next to the Run Recipe action you want to edit.
4. Choose recipe from the drop-down list and click **Update Action**.

To delete a Run Recipe action:

1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu. You'll see a list of service add-ons on your system.
2. Click the **Actions** icon next to the service add-on you want to change, then choose **Edit**.
3. On the screen that follows, click the **trash can** button next to the recipe you want to delete. Confirm the deletion.
13.9.3.2 Raise Event Actions
Raise event actions become available starting with OnApp 5.5 version. This is an action type that sends notification to all subscribed recipients.

Notification Configuration
To configure a notification, which will be sent when adding a “Raise Event” action, fulfill the following steps:

1. Ensure that notifications are enabled for your cloud.
2. Go to Control Panel > Admin > Notifications > Recipients Lists and create a new recipient list of users whom you want to notify about certain event.
3. Go to Control Panel > Admin > Notifications > Notification Templates and create message text that will be sent to your users.

   If you add a '%{message}' text to the template, the notification will contain the information about the service add-on name, VS name and identifier. For example: "The Test Service Add-on has been added to a Test Virtual Server with the ID abcdefghijk."

   If you add a '%{name}' text to the template, the notification will contain the user's name.

4. Go to Control Panel > Admin > Notifications > Gateways and determine in what way users will be contacted: via email or internal notifications in CP.
5. A subscription is the final step of a notifications configuration which ties together a recipients list, a gateway and a notification template. Go to Control Panel > Notifications > Subscriptions > New Subscription and fill in the following details:
   - Name - the label for the subscription
   - Event - select the Service addon event from the drop-down list.
   - Recipients list - select the recipients list which you have configured in the second step on this instruction.
   - Notification template - select the notifications template which you have configured in the third step on this instruction.
   - Gateway - select the gateway which you have configured in the fourth step on this instruction.

6. Click Save.

For more information about subscriptions and messages configuration refer to the Notifications Setup.

Then you have to create a Raise Event action. For this:

1. Go to your Control Panel > Cloud > Service Add-ons menu. You'll see a list of service add-ons on your system.
2. Click the Actions icon next to the service add-on you want to change, then choose Edit.
3. On the screen that follows, click the “+” button > Raise Event at On add, On remove, On VS Destroy or On VS Rebuild event menu.
4. Click Add.

To delete a Raise Event action:
1. Go to your Control Panel > Cloud > Service Add-ons menu. You’ll see a list of service add-ons on your system.
2. Click the Actions icon next to the service add-on you want to change, then choose Edit.
3. On the screen that follows, click the button next to the Raise Event action you want to delete. Confirm the deletion.

13.9.4 Edit service add-on

To edit a service add-on:
1. Go to your Control Panel > Cloud > Service Add-ons menu. You’ll see a list of service add-ons on your system.
2. Click the Actions icon next to the service add-on you want to change, then choose Edit.
3. On the screen that follows, enter service add-on details as required:
   - Label – change the service add-on name
   - Description – edit the service add-on description
   - Icon – change the service add-on icon (click Choose file to select a necessary image)
   - Available on VS provisioning - move the slider to the right to be able to choose this service add-on when creating a VS (providing that the billing settings allow)
   - Compatible with – choose the OS system, with which the service add-on is compatible (Windows, Unix or both)
4. Click the Save button to finish.

Also you can manage On add, On remove, On VS Destroy and On VS Rebuild events at the Edit page.

13.9.5 View service add-on applied to VSs

You can view the list of VSs, to which the service add-on is assigned. For this:
1. Go to your Control Panel > Cloud > Service Add-ons menu. You’ll see a list of service add-ons on your system.
2. Click the Actions icon next to the service add-on you are interested in, then choose Applied to VS.
3. On the screen that follows, you will get:
   - Label - the service add-on name
   - Description – the service add-on description
   - The list of virtual servers, to which the service add-on is assigned, if there are any

For more information on how to assign service add-on to VS, refer to the Virtual Server Service Add-ons section of this guide.
13.9.6 Assign system service add-ons to template

If you assign a system service add-on to a template, the system service add-on will be assigned to the virtual servers later built from this template.

To assign system service add-ons to a template:

1. Go to your Control Panel > Cloud > Template list. You'll see a list of templates, available on your cloud.
2. Next to the template in question click the Actions button and select the Manage Service Add-ons option.
3. Click the '+' button.
4. The screen that follows shows the list of the available system service add-ons organized into groups. Click the arrow button next to a group to expand the list of add-ons assigned to it.
5. Click the label of the necessary system service add-on to see its details:
   o Label
   o Type - user or system
   o Description
   o Price
   o Apply to existing Virtual Servers - move the slider to the right to assign the system service add-on to all the VSs in your cloud built from this template
6. Click the Assign button to finish.

Please note if you rebuild a virtual server from a different OS template, all added system service add-ons will be removed from it.

13.9.7 Delete service add-on

To delete a service add-on:
1. Go to the Control Panel > Cloud > Service Add-ons menu.

2. Click the Actions icon next to the service add-on you wish to delete, then choose Delete. Confirm the deletion. The transaction to execute the On remove event(s) will be scheduled.

### 13.10 Manage Service Add-on Store

Service add-on store enables you to organize individual service add-ons into groups that can be used as a paid resource for the buckets. This allows you to easily create groups which can be added to the bucket to limit the amount or types of service add-ons that are available to a user.

Ensure that Service Add-on Groups permissions are on before managing service add-on Store. For more information about permissions refer to the Permissions section of this guide.

### 13.10.1 Service Add-On Group Management

**On this page:**
- Add Service Add-On Groups
- Assign Service Add-ons to Service Add-on Groups
- Remove Service from Service Add-on Group
- View/Edit/Delete a Service Add-on Group

**See also:**
- Service Add-ons
- Manage Service Add-ons
- Virtual Server Service Add-ons

The service add-on groups have hierarchical (tree) structure:

- service add-on group
- child group
- service add-ons

Click the service add-on group's label to expand the list of child groups, then click the service add-on group's label to view the list of service add-ons, respectively.
13.10.2 Add Service Add-On Groups

To add a service add-on group:
1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu > **Store**.
2. Click the "+" button in the upper right corner of the page.
3. Give a name to your group.
4. Upload the service add-on group icon (click **Choose File** to select a necessary image).
5. Click **Save**.
6. You can add child service add-on groups to your service add-on group by clicking the "+" button > **Add Child** next to your service add-on group.

13.10.3 Assign Service Add-ons to Service Add-on Groups

To assign a service add-on to a service add-on group:
1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu > **Store**.
2. Click the "+" button next to the required child group's label, then select **Add Service Add-on**.
3. Choose the service add-on from the drop-down box at the **Service add-on** section.
4. Click **Save**.

13.10.4 Remove Service from Service Add-on Group

To remove a service add-on from a service add-on group:
1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu > **Store**.
2. Click the service add-on group's label, then click the name of the service add-on group from which you wish to remove a service add-on.
3. Click the **Delete** icon next to a service add-on you want to remove.
4. Confirm the deletion.

13.10.5 View/Edit/Delete a Service Add-on Group

To view/edit/delete a service add-on group:
1. Go to your Control Panel > **Cloud** > **Service Add-ons** menu > **Store**.
2. On the page that follows, you'll see the list of all service add-on groups created within your cloud:
   - Click the group's label, then click the child group label to see the list of service add-ons assigned to this group.
   - Click the **Edit** icon next to a group to edit its name or upload a service add-on group icon.
   - Click **Delete** icon to delete a group.
13.11 SPLA Report

SPLA report gives possibility to track licenses usage, which is required according to Microsoft Per Core licensing model. Having generated the report, you will see how many CPU cores have been used by the system service add-ons in your cloud for a specified time period, and how many Microsoft licenses are required to cover its usage. Hence, you can add the necessary amount of licenses either to the template or the virtual server, based on the report data.

For service providers with Windows-based VSs, it is required to report their usage to Microsoft by sending an SPLA report monthly. Following the new Microsoft requirement, OnApp is implementing a possibility to generate an SPLA (Services Provider License Agreement) report for Windows-based VSs.

See also:
- Service Add-ons
- Manage Service Add-ons
- Manage Service Add-on Store

You can generate an SPLA Report for system service add-ons the following way:

1. Go to your Control Panel > Dashboard > Admin > Users.
2. Click the Full Name of the required user to get to the User Profile.
3. In the Billing Details section, click the SPLA Report button.
4. Select the time period from the drop-down menu and click the Apply button to generate the report.
5. On the page that appears:
   - Label - the label of the system service add-on the statistics is generated for
   - From - the beginning of the specified time period for the statistics generation
   - Till - the end of the specified time period for the statistics generation
   - Virtual server - the VS the system service add-on in question is assigned to
   - Cores (peak usage) - the number of CPU cores used
   - Required Cores Licenses - the number of licenses required
   - Total - the general number of licenses required for the system service add-on

You can save your billing statistics to a file in a CSV format. To download a CSV file with billing statistics for a selected period of time, click the Save as CSV button. The download will start automatically after you click the button.

The CSV file includes the following information:
- from - the beginning of the specified time period for the statistics generation
- `till` - the end of the specified time period for the statistics generation
- `user_id` - the ID of the user
- `virtual_machine_id` - the ID of the VS the system service add-on in question is assigned to
- `service_addon_id` - the ID of the system service add-on
- `cpus` - the number of cores used
- `required_cpus_licenses` - the number of licenses required

The generated reports will be stored at the SPLA Report page. However, if you have statistics archiving enabled for your cloud, the reports will be stored according to the period, specified for the archiving.
14 Templates

This chapter provides an overview on what templates in OnApp are, the management tips, the information on creating your own templates and providing them as a paid resource for your customers.

14.1 What Are Templates?

A template is a fully preconfigured operating system environment – a tar + gzip archive that contains the root directory of an operating system. A basic template includes the data needed for a minimum OS installation, but templates may also include applications and additional OS components.

OnApp templates are used to deploy virtual servers in your cloud. The OnApp template library includes over 100 VS templates based on various 32-bit and 64-bit flavours of Windows and Linux operating systems. OnApp customers can also access a large number of JumpBox virtual Compute resources and deploy them as templates in OnApp.

14.2 Windows Templates

On this page:
- What Are Templates?
- Windows Templates
- Types of Templates
- Where Templates Are Stored
- Template store
- My Template Group
- Configuration Options
- Installation and Update
- Billing

See also:
- Manage Templates
- Template Software Licenses
Windows 2008 and Windows 2008 R2 templates are not supported after 6.2 Patch 1.

To create a virtual server from a template which is based on paid software, such as MS Windows, you must have a valid license. The system verifies if you have a license before allowing the VS to be created, so before creating a VS you must first upload the license keys you've bought to OnApp, or connect to a licensing server.

OnApp supports three license types:

- **MAK licensing**: the default licensing type applied to all Windows-based VSSs.
- **KMS licensing**: this is applicable to Windows 7 VSSs only.
- **User licenses**: allow end users to input a license key when creating a VS.

Windows Server 2003/XP OSs have come to their end-of-life on July 14th, 2015 and are no longer supported. Thus OnApp version 4.0 introduces new Windows templates version 4.x with Cygwin as SSH server (instead of CopSSH as in versions 3.x).

- New 4.0 templates cannot be used in OnApp version 3.x or below.
- Windows templates version 3.x can be used in OnApp version 4.0 without restrictions.

For more information refer to [Template Software Licenses](#) page.

### 14.3 Types of Templates

There are two different kinds of template:

- **System templates.** These are provided by OnApp and downloaded from an online library. They comprise an operating system with the latest set of packages installed. Windows 2008 templates require 20GB of free disk space. Windows 2003 templates require 10GB. Most Linux templates require 2–10GB. Some Windows Templates with additional software may require minimum disk size of 30 GB - e.g. *win12_x64_std-sqlweb-ver3.2-kvm_virtio*. Minimum disk size for new 4.0 Windows templates is 30 GB (40 GB for templates with MS SQL).

- **Custom/user templates.** These are templates you create by backing up an existing virtual server, and converting that backup to a template. This allows you to pre-configure virtual servers (for example with specific OS settings, or pre-installed applications) and use the same configuration again and again.
For more details on how to create a custom templates from a backup, refer to Convert Virtual Server Backup to Template and Create Custom Templates sections.

You can use the following templates for smart servers and baremetal server creation:

<table>
<thead>
<tr>
<th>OS</th>
<th>Baremetal Servers</th>
<th>Smart Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux</td>
<td>CentOS 6 64 bit</td>
<td>Debian 6.0 x64</td>
</tr>
<tr>
<td></td>
<td>Redhat 6 64 bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debian 6 64 bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ubuntu 12 64 bit</td>
<td></td>
</tr>
</tbody>
</table>

The templates with embedded Microsoft SQL have been removed from OnApp repository. You can use a new template with Microsoft SQL Express in it, which is free to use. If you require a full SQL version, you should build a new template from a base Windows platform.

14.4 Where Templates Are Stored

Depending on the configuration of your cloud, new templates are stored at different locations:

<table>
<thead>
<tr>
<th>Configuration of your cloud</th>
<th>Storage locations for templates</th>
</tr>
</thead>
<tbody>
<tr>
<td>No backup servers and ssh_file_transfer option is disabled</td>
<td>In this configuration, the templates will be uploaded to all Compute resources. If this template already exists somewhere, the action is skipped. In such case NFS or any other sharing service should be enabled between Compute resource's.</td>
</tr>
<tr>
<td>No backup servers and ssh_file_transfer option is enabled</td>
<td>The template is uploaded to this ssh_file_transfer server only.</td>
</tr>
<tr>
<td>There are backup servers and ssh_file_transfer option is disabled</td>
<td>The templates are uploaded to all backup servers. The action is skipped if such a template already exists. In this configuration ensure that some sharing service is between backup servers. Provisioning is performed at backup servers only. If there is more than one backup server in the cloud, the user is prompted to choose to which BS a template will be stored.</td>
</tr>
<tr>
<td>There are backup servers and ssh_file_transfer is enabled</td>
<td>The templates are uploaded to this ssh_file_transfer server only.</td>
</tr>
<tr>
<td>High Availability is configured for the Cloud</td>
<td>In this configuration, make sure to store templates at Database&amp;Transactions server or any other server with shared NFS service, so that both Control Panels could access the templates directory.</td>
</tr>
</tbody>
</table>
14.5 Template store

Template store enables you to organize individual templates into groups that can be used as a paid resource for buckets. This allows you to easily create groups of templates which can be added to the bucket. Only those groups which are added to a bucket will be available to a user.

For detailed instructions, refer to Template Store section.

14.6 My Template Group

My Template Groups allow you to create own license groups for your own personal/custom templates. The groups cannot be shared amongst the users. Also, for Windows based templates, My Template Groups provide the possibility to use your own licensing type regardless of your bucket.

For detailed instructions, refer to My Template Groups section.

14.7 Configuration Options
You can set template configurations for your cloud in the settings menu at Dashboard > Admin > Settings > Configuration > Backups/Templates tab. This menu lets you set the following template-related parameters:

- The URL of the required template server
- Whether you want to delete the downloaded templates after they were distributed
- The system path to templates and recovery templates

During Control panel install/upgrade process, the following values are set by default:

- Template server URL - http://templates-manager.onapp.com
- Path to Templates - /onapp/templates
- Path to Recovery templates - /onapp/tools/recovery

Templates and backups can be stored on a remote server or a mounted disk. If you wish to store templates and backups remotely, you should also configure the following settings:

- Template/backup server IP, user login and SSH options
- Whether to use SSH file transfer for your template/backup server or not

For more information, refer to Edit Backups/Templates Configuration.

14.8 Installation and Update

The OnApp template library includes over 100 VS templates based on various 32-bit and 64-bit flavours of Windows and Linux operating systems. You can also access a large number of JumpBox virtual compute resources and deploy them as templates in OnApp. The templates library is constantly updated. You can manage new templates with the OnApp template manager that connects to template server and allows you to:

- update the system templates which are already installed to your cloud
- download and install new templates available on a template server.

The Template server URL has to be set at Control Panel > Admin > Settings > Configuration > Backups/templates tab as a prerequisite for installing/upgrading templates.

For detailed instructions, refer to Install/Update Templates page.

14.9 Billing
You can set up templates as a paid resource in several ways. To set the pricing for the individual templates, go to the buckets Rate Card at Control Panel > Admin > Buckets > Label > Rate Card > Other and add the required template stores. Here you can set a price for each individual template per hour. As a single template can be included in multiple template stores, the same template will have the same price in all the template stores added to the rate card of a single bucket. If you add/edit the price of a template in one template store, the price of the same template will change to the new value in all the template stores in the rate card.

Once you add a template to the Rate Card, all the template stores that contain that template will be added to that Rate Card with a price set only for that template.

You can also set the pricing for the template storage space and the amount of templates allowed per account.

If the templates are stored on compute resources or SSH file transfer server, you can apply the Templates, ISOs & Backups Storage and Template limits in the Miscellaneous section of the bucket.

If the templates are stored on backup servers, apply the limits and pricing for Backup Server Zone limits.

- For more info, refer to Template Store and Configure Resource Allocation And Prices.
- If you add template related resources only to the bucket's Rate Card, users under the bucket will not have access to the templates. You need to configure the bucket's Access Control to make resources available to the users under the bucket.

14.10 Create and Manage Templates

You can perform a set of actions with the templates:
- view/edit/delete system templates
- create/edit/delete/make public custom templates
- manage template recipes and recipe variables
- manage template system service add-ons
- download new and update existing templates

14.10.1 View Template Details

The Control Panel's Templates List menu lists all of the templates available on your system, their version number, the number of recipes assigned to the template, the Operating System they install, whether swap disk is allowed, whether you can adjust their CPU cores/priority & RAM without rebooting a virtual server based on that template ("resize without reboot"), and whether hot migration is allowed.

The templates are organized into four tabs:
- System templates - the OS images provided by OnApp.
- My templates - the list of custom templates created by the user who is currently logged in.
• **User templates** - the list of templates converted by all users in the cloud from VS backups. To see user templates, make sure the See User Templates permission is enabled.

• **Inactive templates** - the templates that are currently unavailable to build VS on.

**On this page:**

• **View Template Details**

• **Edit Template Details**

• **Install/Update Templates**

• **Delete System Templates**

• **Create Custom Templates**

• **Edit Custom Templates**

• **Delete Custom Templates**

• **Make Templates Public**

• **Allow Users to Make Templates Public**

**See also:**

• **Manage Template Recipes**

• **Manage Template Recipe Custom Variables**

• **Template Software Licenses**

• **Template Store**

• **My Template Groups**

To see which virtual servers are based on a specific template:

1. Go to your Control Panel > **Cloud** > **Templates** > **Templates List** menu to bring up the list of templates.

2. Click the template's label (name) in the list.

If you are viewing the templates list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click **Apply**. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the templates list. You can always alter your column selection later. Note that by default the Backup server column is not visible in the table on narrow screens.
Column selection is currently set for one browser. If you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.

### 14.10.2 Edit Template Details

You can edit a range of template details through the Control Panel, including minimum disk size required, version number, filename and label. To do so:

1. Go to your Control Panel > **Cloud** > **Templates** > **Templates List** menu. You’ll see a list of templates on your system.
2. Click the **Actions** icon next to the template you want to change, then choose **Edit Template**.
3. On the screen that follows, enter template details as required:
   - **Label** – change the template name
   - **Filename** – edit the template filename
   - **Version** – the template version
   - **Min disk size** – the minimum VS disk size required to build a VS on this template (in GB)
   - **Min memory size** – the minimum VS RAM required to build a VS on this template (in MB)

   The maximum RAM that can be assigned to a VS is 168 GB regardless of the Max RAM value set in the bucket.

   The maximum RAM that can be assigned to a VS built on a XEN 32bit (x86) template is 16 GB.

   - **Allowed hot migrate** - move the slider to the right if you want to be able to hot-migrate VS created from this template.
4. Click the **Save** button to finish.

### 14.10.3 Install/Update Templates

The Template server URL has to be set at **Control panel** > **Admin** > **Settings** > **Configuration** > **Backups/Templates** tab as a prerequisite for installing/upgrading templates.

VMware vCenter templates are not installed using the template server. For information on installing VMware templates, refer to the **Create & Manage vApp Templates** section.
OnApp template manager allows you to update the system templates which are already installed to your cloud and download new templates available on a template server.

The OnApp template library includes over 100 VS templates based on various 32-bit and 64-bit flavours of Windows and Linux operating systems. OnApp customers can also access a large number of JumpBox virtual Compute resources and deploy them as templates in OnApp.

Only customers with a Paid license have access to the complete template library, and special deals with JumpBox.

14.10.3.1 Installing Templates
To download and install a template from a remote template server:
1. Go to the Control Panel > Cloud > Templates menu.
2. Click the System Templates tab. The page that loads will list all the templates installed to your cloud.
3. Click the Available tab.
4. You will see the list of all templates available for installation. You can scroll through the list of templates with the Previous/Next buttons at the bottom of the screen.
5. Click the plus button next to a required template to install.

14.10.3.2 Upgrading Templates
Template manager allows you to update the installed templates from the template server.
To update a template:
1. Go to your Control Panel > Cloud > Templates menu.
2. Click the System Templates tab.
3. On the page that appears, the Updates tab will show the list of templates with more recent version than you have installed.
4. Click the plus button next to a required update to install.

If you update an existing template (by downloading a more recent version) it will not update existing VSs built on the previous version. Only new VSs, or those that are rebuilt, will use the new template.

14.10.3.3 Installations
You can see the status of the active downloads and cancel/restart them.
For this:
1. Go to the Control Panel > Cloud > Templates menu.
2. Click the System Templates tab. The page that loads will list all the templates installed to your cloud.
3. Click the Installations tab.
4. You will see the list of all templates that are currently being installed to your Cloud with their details and status.
5. Click the Properties icon next to a required template to restart or delete the template installation/update.
14.10.3.4 Where Templates Are Stored

Depending on the configuration of your cloud, new templates are stored at different locations.

**No backup servers and ssh_file_transfer option is disabled**

In this configuration, the templates will be uploaded to all Compute resources. If this template already exists somewhere, the action is skipped. In such case NFS or any other sharing service should be enabled between Compute resource's.

**No backup servers and ssh_file_transfer option is enabled**

The template is uploaded to this ssh_file_transfer server only.

**There are backup servers and ssh_file_transfer option is disabled**

The templates are uploaded to all backup servers. The action is skipped if such a template already exists. In this configuration ensure that some sharing service is between backup servers. Provisioning is performed at backup servers only. If there is more than one backup server in the cloud, the user is prompted to choose to which BS a template will be stored.

**There are backup servers and ssh_file_transfer is enabled**

The templates are uploaded to this ssh_file_transfer server only.

**High Availability is configured for the Cloud**

In this configuration, make sure to store templates at Database&Transactions server or any other server with shared NFS service, so that both Control Panels could access the templates directory.

While creating a virtual server from a template, make sure that the template is located on a backup server that is attached to the compute resource on which you wish to built the VS, otherwise, the creation of the VS will fail.

---

14.10.4 Delete System Templates

To delete a template:

1. Go to the Control Panel > Cloud > Templates > Templates List menu.
2. Click the Actions icon next to the template you wish to delete, then choose Delete Template.

You cannot delete a template if there are virtual servers in your system built on that template. To delete the said template you will have to destroy such virtual server first.

---

14.10.5 Create Custom Templates

You can create custom templates by making a backup of an existing virtual server and saving it as a template for future use. To create a custom template:

1. Create a new virtual server and configure it as you would like for your template.
2. Click the Actions icon next to this virtual server, then choose Backups.
3. In the list of backups, click **Convert to Template** next to the backup you want to convert.

4. Click **OK** to proceed.

5. On the next screen, enter the following:
   a. A label for your template.
   b. The minimum memory size: make sure the minimum memory size takes into account the settings for the template on which the VS was built, plus any modifications you may have made to the template before making the backup.
   c. The minimum disk size: ensure the value is based on the template settings and any possible modifications you may have made, e.g. installing additional software.
   d. Click the **Convert Backup** button.

6. The backup will be scheduled for creation. When conversion is complete, it will be then listed on the **Templates > Templates List > User Templates** tab, from where you can edit it.

   - If templates limit has been exceeded, you will get the following error message: "You have reached your template creation limit".
   - During the custom Windows template creation the Admin account is created anew.
   - To select a preferred licensing type (KMS, MAK, own) for a Windows virtual server built on a custom template you need to add this custom template to **My Template Groups** and associate the desired licensing type with such group.
   - When updating a custom template (by converting a more recent backup of a VS, for example), existing VSs built on previous versions will not be updated. Only new VSs, or those that are rebuilt, will use the new template.

### 14.10.6 Edit Custom Templates

You can edit your custom templates at any time. To do so:

1. Go to your Control Panel > **Cloud > Templates > Templates List** menu and click the **User Templates** tab. Your custom templates will be listed there.

2. Click the **Actions** icon next to the template you want to change.

3. Choose **Edit Template**, make your changes on the screen that follows, and click **Save**.

### 14.10.7 Delete Custom Templates

You can delete your custom templates at any time. To do so:

1. Go to your Control Panel > **Cloud > Templates > Templates List** menu and click the **User Templates** tab. Your custom templates will be listed there.

2. Click the **Actions** icon next to the template you want to delete.
3. Choose the **Delete Template** button next to a template if you want to delete it.

You cannot delete a template if there are virtual servers in your system built on that template. To delete the said template you will have to destroy such virtual server first.

### 14.10.8 Make Templates Public

The template list is organized into three tabs. The User templates tab lists all the custom templates created from the backups. By default those templates are available only to those users who created them. When you make templates public, you make your templates available to all users:

1. Go to your Control Panel > **Cloud** > **Templates** > **Templates List** menu.
2. Click **User templates** tab.
3. Click the **Actions** button next to the template you want to make public, then select **Make public**.
4. Confirm the window that pops up.

When you make a custom template public, it is moved to a **System templates** tab.

### 14.10.9 Allow Users to Make Templates Public

All custom templates are private by default, which means they are only available to the users who created them. As the administrator, you can give users the right to create templates that are available to all users – i.e. to create public templates. This is handled through the Control Panel's **Roles** menu:

1. Go to your Control Panel > **Admin** > **Roles** menu.
2. Click the **Edit** icon next to the role you want to edit.
3. On the screen that follows, check the box next to the **Make own template public** permission and click the **Save** button.

### 14.11 Manage Template Recipes

In this document, you can find information on how to manage Template Recipes.

#### 14.11.1 View Recipes

You can see whether any recipes are assigned to a template at **Control Panel > Cloud** > **Templates** > **Template List**. The **Recipes** column indicates the number of recipes assigned to the template.

To view template recipes:

1. Go to your Control Panel > **Cloud** > **Templates** > **Templates List** menu. You’ll see a list of templates on your system.
2. Click the **Actions** icon next to the template you want to change, then choose **Manage Recipes**.
3. The screen that follows shows details of all the recipes in the cloud:

- The right pane displays the list of events to which the recipes can be assigned to.
- The left pane shows the list of all recipes in the cloud.

**On this page:**

- View Recipes
- Assign Recipe
- Delete Recipe

**See also:**

- Manage Template Recipe Custom Variables
- Template Software Licenses
- Template Store
- My Template Groups

### 14.11.2 Assign Recipe

Use drag and drop feature to assign a recipe to a desired event.

You can assign template recipes to the following events:

- **VS provisioning** - run the recipe during the virtual server provisioning
- **VS network rebuild** - run the recipe while rebuilding a network
- **VS disk added** - run the recipe while adding a disk to the virtual server
- **IP address allocated for VS** - run the recipe when adding an IP address to the VS network interface
- **IP address revoked from VS** - run the recipe when removing an IP address from the VS network interface
- **VS network interface added** - run the recipe while adding a network interface to the virtual server
- **VS network interface removed** - run the recipe while deleting a network interface from the virtual server
- **VS disk resized** - run the recipe while resizing a virtual server disk
- **VS resize** - run the recipe while resizing the virtual server
- **VS IP address add** - run the recipe while adding an IP address to the virtual server
- **VS IP address remove** - run the recipe while removing an IP address from the virtual server
- **VS start** - run the recipe while starting the virtual server
- **VS reboot** - run the recipe while rebooting the virtual server
- **VS hot migrate** - run the recipe during the hot migration of the virtual server
• **VS hot full migrate** - run the recipe during the hot migration of the virtual server with disk
• **VS failover** - run the recipe during the failover process

To use recipes with own Windows templates, the templates must be version 3.1 or later.

Note that a VS related recipe is always executed first, for example:
1. You have two recipes, one assigned to a template and another assigned to a VS.
2. You assign both of them to a required event.
3. After the VS is built, the VS related recipe is run first.
4. Next, the template recipe is run.

This execution order is also relevant when the VS related recipe and template recipe are both assigned to the same event.

### To use drag and drop:
1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

### 14.11.3 Delete Recipe

To remove recipe:

1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the *Delete* button next to the recipe you want to remove.

### 14.12 Manage Template Recipe Custom Variables

You can define custom variables for image templates. To do so:

1. Go to your Control Panel > **Cloud** > **Templates** > **Templates List** menu
2. Click the **Actions** icon next to the template you want to change, then choose **Manage Custom Recipe Variables**.
3. On the screen that appears, click the "+" button to add new recipe variable.
4. Specify the recipe name and its value.
5. Move the **Enabled** slider to the right to allow use of this recipe.
6. Click **Save**.

To edit a custom variable, click the **Edit** icon next to the required variable and change its details.
To delete a custom variable, click the **Delete** icon next to the variable you want to remove. You will be asked to confirm the deletion.

It is possible to set custom variables for image templates, as well as for virtual servers. Virtual server custom variables will always overlay template custom variables.

See also:
- [Manage Template Recipes](#)
- [Template Software Licenses](#)
- [Template Store](#)
- [My Template Groups](#)

### 14.13 Manage Template System Service Add-ons

A system service add-on provides the ability for you to add to a template obligatory services, which cannot be removed by an end user. In this document, you can find information on how to manage template system service add-ons.

#### 14.13.1 View system service add-ons assigned to template

To view template system service add-ons:

1. Go to your Control Panel > **Cloud > Templates > Templates List** menu. You'll see a list of templates on your system.
2. Click the **Actions** icon next to the template you want to change, then choose **Manage System Service Add-ons** option.
3. The screen that follows shows the list of the system service add-ons assigned to this template.

#### 14.13.2 Assign system service add-on to template

If you assign a system service add-on to the template, the system service add-on will be assigned to the virtual servers later built from this template.

To assign a system service add-on to a template:

1. Go to your Control Panel > **Cloud > Templates > Templates List** menu.
2. Click the **Actions** icon next to the template you want to change, then choose **Manage System Service Add-ons** option.
3. Click the ‘+’ button.
4. The screen that follows shows the list of the available system service add-ons organized into groups. Click the arrow button next to a group to expand the list of add-ons assigned to it.

5. Click the label of the necessary system service add-on to see its details:
   - **Label**
   - **Type** - user or system
   - **Description**
   - **Price**
   - **Apply to existing Virtual Servers** - move the slider to the right to assign the system service add-on to the VSs built from this template

6. Click the **Assign** button to finish.

   Please note if you rebuild a virtual server from a different OS template, all added system service add-ons will be removed from it.

14.13.3 Unassign system service add-on from template

To unassign a system service add-on from a template:

1. Go to your Control Panel > **Cloud > Templates > Templates List** menu.

2. Click the **Actions** icon next to the template you want to change, then choose **Manage System Service Add-ons** option.

3. The screen that follows shows the list of the system service add-ons assigned to this template.

4. Click the **Delete** button next to the system service add-on you want to remove.

5. Confirm the deletion.

   If you unassign a system service add-on from a template, the system service add-on stays assigned to the existing virtual server based on this template by default.

14.14 Manage Template Software Licenses

Windows 2008 and Windows 2008 R2 templates are not supported after **6.2 Patch 1**.

To create a virtual server from a template which is based on paid software, such as MS Windows, you must have a valid license. The system verifies if you have a license before allowing the VS to be created, so before creating a VS you must first upload the license keys you've bought to OnApp, or connect to a licensing server. OnApp supports three license types:

- **MAK licensing**: the default licensing type applied to all Windows-based VSs.
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- **KMS licensing:** this is applicable to every VS since Windows 7 or newer Windows versions.
- **User licenses:** allow end users to input a license key when creating a VS.

The template licenses in OnApp are managed in two places:

- **Cloud > Templates > Template Store** – where you specify which license types can be applied to templates assigned to the particular template group.
- **Admin > Buckets** – where you specify which license types a user on this plan can apply to their Windows-based VSs.

To avoid billing issues, do not use different Windows licensing types for the same template in one bucket. In case you assign a template to template groups with different licensing types or different prices, it will be charged at a smaller price.

The bucket settings override the template group settings. For example, if the KMS licensing is allowed by template group settings, but is not enabled in bucket configuration, the user will not be able to create VSs using KMS licensing.

The user specifies the license type for a particular virtual server during the VS creation process. The list of available license types depends on the template which is chosen for the VS and the bucket the user is signed up to.

To enable users to choose the license type:

1. **Create a template group**
2. **Specify which licenses can be used within this group**
3. **Assign the templates to this group**
4. **Create a bucket**
5. **Specify which license types can be used within this bucket**
6. **Assign template groups to a bucket** (optional)
7. **Assign a user to this bucket**

- If you do not assign a template to a template group, the default MAK licensing is applied to that template.
- If you do not assign any template group to a bucket, the user can build VSs on any template available in the cloud. The choice of licenses will depend on the settings specified for the template group to which this template belongs.

**On this page:**

- [KMS Licensing](#)
- [MAC Licensing](#)

**See also:**

- [Template Store](#)
• Template Groups

• Buckets

14.14.1 KMS Licensing

To allow your users to create virtual servers (applicable to every VS since Windows 7 \ Server 2008 or newer Windows versions) using KMS licensing:

1. Log in to your Control Panel as an Admin.

2. Enable KMS licensing for a particular template group, and attach the templates for which you plan to enable KMS licensing to this group (see Template Store in the next section).

Windows 2003 and XP templates do not support KMS licensing.

3. Enable KMS licensing for a bucket, and assign this template group to a bucket (see the Buckets section)

4. Sign up a user to this bucket (see the Assign Users to Bucket section).

14.14.2 MAK Licensing

To add a MAK license to OnApp:

1. Go to your Control Panel > Cloud > Templates > Software Licenses menu.

2. Click the Add new License button.

3. Set the necessary parameters in the form that appears.

Where:

- Label – Windows OS distribution (2003, 7)
- R2 – tick this parameter if your license is for the second edition of Windows OS distribution
- x64 or x86 - specify the architecture
- Specify the Edition – STD (Standard), ENT (Enterprise), WEB (web), PRO (Professional), DC (Data center)
- License – enter the license code, e.g. TZXTC-R4GGG-9TT3V-DYDY4-T628B
- Total - the total number of servers allowed by the license (the amount of licenses you bought from Microsoft)

4. Click Save.

To view MAK license details:

1. Go to your Control Panel > Cloud > Templates > Software Licenses menu. This screen lists all the licenses you’ve added to your OnApp installation with their details:

- Label – the license name specifying the OS distribution, architecture and edition
- License - the license code
- Total - the number of VSs allowed by the license
• **Count** - the number of licenses used

**To edit/delete an existing MAK license:**

1. Go to your Control Panel > **Cloud** > **Templates** > **Software Licenses** menu. This screen lists all the licenses you’ve added to your OnApp installation.

2. Click the **Edit/Delete** icons next to the license you’re interested in.

### 14.15 Template Store

Template store enables you to organize individual templates into groups that can be used as a paid resource for buckets. This allows you to easily create groups of templates which can be added to the bucket to limit the amount or types of templates that are available to a user. Also you can add ISO and OVA templates to the template store and set prices for these templates in the bucket. After ISO or OVA template is added to the template store, you can create a VS using this template.

Starting from OnApp version 5.6 prices for templates are set in the bucket's Rate Card. For more information refer to [Configure Resource Allocation And Prices](#).

### 14.15.1 Template Group Management

**On this page:**

- [Template Group Management](#)
- [Add ISO to Template Store](#)
- [Add OVA to Template Store](#)

**See also:**

- [Configure Resource Allocation And Prices](#)
- [Template Groups](#)
- [ISOs](#)
- [OVAs](#)

The template groups have hierarchical (tree) structure:

- Template group – e.g. OS
- Child group
- Templates

Click the Template group’s label to expand the list of child groups, then click the template group's label to view the list of templates, respectively.

**To add a template group:**
1. Go to your Control Panel > **Cloud > Templates > Template Store** menu.

2. Click the "+" button in the upper right corner of the page.

3. Give a name to your group.

4. Specify the Windows Licensing type: MAK, KMS, or User license.

5. For KMS licensing, set the following parameters:
   - **Server label** – the name of the KMS server
   - **KMS server host** – the hostname of the licensing server
   - **KMS server port** – the port used to connect to the licensing server

6. Click **Save**.

7. You can add child template groups to your template group by clicking the "+" button > Add Child next to your template group.

To assign a template to a template group:

1. Go to your Control Panel > **Cloud > Templates > Template Store** menu.

2. Click the "+" button next to the required child group's label, then select Add Template.

3. Choose the template from the drop-down box at the **Add a template** section and click **Save**.

To remove a template from a template group:

1. Go to your Control Panel > **Cloud > Templates > Template Store** menu.

2. Click the template group's label, then click the name of the template group from which you wish to remove a template.

3. Click the **Delete** icon next to a template you want to remove.

4. Confirm the deletion.

To view/edit/delete a template group:

1. Go to your Control Panel > **Cloud > Templates > Template Store** menu.

2. On the page that follows, you'll see the list of all template groups created within your cloud:
   - Click the group's label, then click the child group label to see the list of templates assigned to this group.
   - Click the **Edit** icon next to a group to edit its name.
   - Click **Delete** icon to delete a group.

### 14.15.2 Add ISO to Template Store

Before VS creation from ISO, you should add ISO to the Template store. To add ISO template to the template store:

1. Go to your Control Panel > **Cloud > Templates > Template Store** menu.

2. Click the "+" button next to specific template group and click **Add ISO**.

3. Choose ISO from the drop-down menu.

4. Click **Save**.
14.15.3 Add OVA to Template Store

When the OVA file is uploaded and converted into a template, you should add this template to the template store before creating a virtual server. To add an OVA template to the template store:

1. Go to your Control Panel > Cloud > Templates > Template Store menu.
2. Click the "+" button next to OVA template group and click Add OVA.
3. Choose the required OVA from the drop-down menu.
4. Click Save.

14.16 My Template Groups

My Template Groups allow you to create own license groups for your own personal/custom templates. The groups cannot be shared amongst the users. Also, for Windows-based templates, My Template Groups provide the possibility to use your own licensing type regardless of your bucket.

For your convenience, My Template Groups have hierarchical (tree) structure:

- Template group – e.g. OS
- Child group
- Templates

You may assign templates directly to the group, or create a child group(s) and assign templates there.

14.16.1 Add Template Group

On this page:

- Add Template Group
- Add Child Group
- Assign Template to Template Group / Child Group
- Remove Template from Template Group
- View/Edit/Delete Template Group

See also:

- Template Store
- Template Software Licenses
- Create and Manage Templates

To add a template group:

1. Go to your Control Panel > Cloud > Templates > My Template Groups menu.
2. On the page that follows, click the "+" button.
3. Give a name to your group in the window that appeared.
4. If you are planning to use this group for Windows templates, specify the Windows Licensing type: MAK, KMS, or Own (user license).

   This licensing type will apply to all templates directly in the group and in the child groups.

5. For KMS licensing, set the following parameters:
   - Server label – the name of the KMS server
   - KMS server host – the hostname of the licensing server
   - KMS server port – the port used to connect to the licensing server

6. Click Save.

On the page that appears, you can add a template or a child to the group, edit the group, or delete it.

14.16.2 Add Child Group

To add a child group to the group:
1. Go to your Control Panel > Cloud > Templates > My Template Groups menu.
2. Click the "+" button next to the required group.
3. Select Add Child from a drop-down menu.
4. In the screen that appears fill in:
   - Label – the name of the child group
   - If you are planning to use this group for Windows templates, specify the Windows Licensing type: MAK, KMS, or Own (user license).

   This licensing type will apply to all templates in the child group. Providing you have indicated the licensing type for the parent group - both types will apply

   - For KMS licensing, set the following parameters:
     - Server label – the name of the KMS server
     - KMS server host – the hostname of the licensing server
     - KMS server port – the port used to connect to the licensing server

   Providing the KMS licensing was selected for the parent group, both KMS servers will be available for selection while creating a virtual server based on the templates in the child group

5. Click Save.
14.16.3 Assign Template to Template Group / Child Group

To assign a template to a template group or child group:
1. Go to your Control Panel > Cloud > Templates > My Template Groups menu.
2. Click the "+" button next to the required group's label, then select Add Template, or click on the group's label to expand it, then click the "+" button next to the required child group's label.
3. Choose the template from the drop-down box at the Add a template section.

Only your custom templates will be available for selection

4. Click Save.

14.16.4 Remove Template from Template Group

To remove a template from a template group:
1. Go to your Control Panel > Cloud > Templates > My Template Groups menu.
2. Click the template group's label or click the name of the template group from which you wish to remove a template.
3. Click the Delete icon next to a template you want to remove.
4. Confirm the deletion.

14.16.5 View/Edit/Delete Template Group

To view/edit/delete a template group:
1. Go to your Control Panel > Cloud > Templates > My Template Groups menu.
2. On the page that follows, you'll see the list of all template groups created within your cloud:
   - Click the group's label to see the child groups or the list of templates assigned to this group; click the child group label to see the list of templates assigned to the child group.
   - Click the Edit icon next to a group or a child group to edit its name and the type of Windows licensing; click Save button upon making the necessary changes.
   - Click Delete icon to delete a group or a child group. The templates which were assigned to this group/child group will become your ungrouped templates.
15 Manage ISOs

OnApp allows uploading your custom bootable ISOs for recovery purposes. These could be different images for Windows/Linux/FreeBSD or any additional software. As a cloud administrator, you can limit user’s ability to upload and manage ISOs by permissions and in buckets. You can boot virtual servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. The default maximum size for uploading ISOs from the file system is 1 GB, this value can be changed at Control Panel > Admin > Settings > Configuration > Max upload size in bytes. There are no space limitations for the ISOs uploaded form the URL (except for your disk space limitations).

- OnApp supports rebooting existing virtual and smart servers from ISO.
- To build a new server from an ISO, create a server using the creation wizard and then reboot this VS from the appropriate ISO.
- As soon as you boot a VS from the installation ISO, OnApp cannot control any VS components (backups, networks, disks).
- Be aware that all the contents of the disk might be deleted if a VS is booted from the ISO that installs a new distributive.
- If you boot a VS from an ISO with the RAM requirement larger than the VS’s RAM, the transaction will fail.
- If your cloud deployment is not a fresh installation, make sure that permissions on ISOs are enabled. For more info, refer to List of all OnApp Permissions.

You can upload your own ISOs and make them available to all users of the cloud (the way the templates work in OnApp). After the ISO is uploaded, it is possible to select the Boot from ISO option on VS management screen.

15.1 View ISOs

On this page:
- View ISOs
  - Boot from ISO
    - Share ISO Location
    - Enable ISO Permissions
    - Upload ISO
    - Make ISO Public
    - Boot Server from ISO
  - Upload ISOs
    - Upload ISO
    - Make ISO Public
To view the ISOs available to you:

1. Go to **Control Panel > Cloud** and click **Templates**.
2. Select **ISO list** from the menu that expands.
3. The page that loads, will show the list of ISOs available to you separated into four tabs:
   - **All ISOs** - the list of all ISOs available on your system
   - **System ISOs** - the list of the ISOs that are publicly available to all users
   - **My ISOs** - the list of custom ISOs uploaded by the user who is currently logged in
   - **User ISOs** - the list of the ISOs uploaded by your users

For each ISO listed, you see the following details displayed:

- **Log status** - the status of the last log item of the ISO (complete/pending/failed). Click the status to view the log details for the ISO (available to the ISOs that were uploaded through an URL).
- **OS** - the icon that indicates the operating system of the ISO
- **Label** - the name of the ISO
- **Min memory size** - the minimum RAM size required for the ISO
- **Operating systems** - the operating system on the ISO
- **Virtualization** - the virtualization type chosen for the ISO
- **Actions** - click the Actions icon to perform the following procedures with the ISO:
  - Edit ISO
  - Delete ISO
  - Make Public - only for the images from the My ISOs and User ISOs tabs

### 15.2 Boot from ISO
15.2.1 Share Location Where ISOs are Stored

The default configuration is to upload ISOs on the Control Panel server. Then it is required to mount and share the location where the ISOs are stored at CP with all the compute resources. When the virtual servers are booted from the ISOs, the ISO is taken from the compute resource server. The location is preconfigured at on_app.yml config file which can be found in /onapp/interface/config/on_app.yml.

- **iso_path_on_cp** - specifies the location where ISOs are stored on the Control Panel server. By default the location is /data. You can change it to any other suitable location. Make sure that this location is shared with the specified iso_path_on_hv location.

- **iso_path_on_hv** - specifies the location where ISOs are located on the compute resource servers. By default the location is /data. You can change it to any other suitable location with the onapp owner and read/write access. Make sure that this location is mounted to the specified iso_path_on_cp location.

CloudBoot compute resources mount the /data location automatically at boot to the /onapp/tools/recovery on HV. ISOs can be hosted on a dedicated server at any desired location with an arbitrary name if you wish. In this case it is necessary to mount the ISOs' location on this server to the Control Panel iso_path_on_cp directory and all the compute resources' iso_path_on_hv locations. This can be a backup server to avoid the excess usage of the Control Panel's space.

15.2.2 Enable ISO Permissions

If your cloud deployment is not a fresh installation, make sure to enable the following permissions for your Admin and other roles as appropriate:

- **Any action on ISOs** - the user can take any action on ISOs
- **Create a new ISO** - the user can create a new ISO
- **Destroy any ISO** - the user can delete any ISO (own, user, and public)
- **Destroy own ISO** - the user can only delete own ISO
- **Destroy user ISO** - the user can delete ISOs created by any user, but not public ISOs
- **Make any ISO public** - the user can make public any ISO available to all users
- **Make own ISO public** - the user can make public own ISOs only
- **Make user ISO public** - the user can make public ISOs created by any user
- **Create and manage own ISOs** - the user can create and edit/delete/view own ISOs
- **Manage all ISOs** - the user can manage own/user/public ISOs
- **Create and manage user ISOs** - the user can view/create/edit/delete ISOs created by any user
- **See all ISOs** - the user can view all ISOs in the cloud
- **See own ISOs** - the user can only view the ISOs created by themselves
- **See all public ISOs** - the user can view all public ISOs
- **See user ISOs** - the user can view the ISOs created by any user in the cloud
- **Update any ISO** - the user can edit any ISO in the cloud
- **Update own ISO** - the user can only edit own ISO
- **Update user ISO** - the user can edit the ISOs created by any user in the cloud

For more info refer to [List of all OnApp Permissions](#).
15.2.3 Upload ISO(s) into the Cloud

Once you've configured the locations for storing ISOs, you can add a new ISO to the system. You can upload files only in the .iso extension.

To upload an ISO file, follow the next steps:

1. Go to your Control Panel > Cloud and click the Templates menu from the left navigation pane.
2. Select ISO list from the menu that expands.
3. On the page that loads, click the Upload ISO button at the bottom of the screen.
4. Choose the ISO to upload and fill its details:
   - Make public - move the slider to the right if you want to make the ISO publicly available
   - Allowed hot migrate - move the slider to the right if you want to be able to hot-migrate VS created from this ISO
   - Label - choose a name for the ISO
   - Version - fill in the version of the ISO
   - Min disk size - specify the minimum required disk size for the ISO (1 GB by default)
   - Min memory size - specify the minimum required RAM for the ISO (128 MB by default)
   - Operating system - choose the operating system of the ISO
   - Operating system distro - fill in the operating system distribution of the ISO in free form
   - Virtualization - tick the required virtualization type(s): XEN, KVM or KVM+Virtio
5. Click Next. On the page that appears, click File or File URL tab depending on the upload method:
   - File - click Choose File to select the required ISO file from your file system. The yellow infobox will show the maximum file size for ISOs. The max upload size is pre-configured at Settings > Configuration (the Max upload size in bytes). Click the Upload ISO button.
   - File URL - select this tab if you want to upload the ISO from URL and specify the link from which the ISO will be uploaded.
6. Click Save to upload the ISO.

After you upload an ISO to the cloud, it can be found at Cloud > Templates > ISO List > My ISOs tab. The ISOs uploaded by your users are under the User ISOs tab.

15.2.4 Make ISO(s) Public

By default ISOs are available only to those users who uploaded them. These ISO images are available in the My ISOs tab. To make your ISO public and accessible for all users:

1. Go to your Control Panel > Cloud > Templates > ISO List menu.
2. Click My ISOs tab.
3. Click the Actions button next to the ISO you want to make public, then select Make public.
4. Confirm the window that pops up.

When you make a user ISO public, it is moved to the System ISOs tab.
• Make sure that you have enabled the *Any power action on own virtual servers* and *Allow own virtual servers to boot from ISO* permissions for the user to be able to boot servers from ISO.
• Note that you should track the Operating System Type option of the compute resource where the current VS lives.
  o If the compute resource is set to *Any*, any ISO that has other suitable requirements is available to boot from.
  o If the compute resource has *Windows only* option enabled, the ISO that has Windows operating system is available for selection.
  o If the compute resource has the *Non-Windows option* enabled, the ISOs with OSs Linux and FreeBSD are available for selection.

15.2.5 Boot Virtual or Smart Server from ISO

Once you have shared the location where ISOs are stored and uploaded ISOs into the system, you can boot virtual or smart servers from them using the server's power options menu. To boot a virtual/smart server from ISO:

1. Go to your Control Panel > **Cloud** > **Virtual Servers/Smart Servers** menu.
2. Click the label of the required server.
3. Click the **Tools** button on the server's screen to expand the **Tools** menu.
4. Select **Boot from ISO**. You can boot virtual/smart servers from your own ISOs or the ISOs that are uploaded and made publicly available by other users. If you boot a server from an ISO with the RAM requirement larger than the server's RAM, the transaction will fail.

15.3 Upload ISOs

Before uploading ISO for the first time, a root user has to create a `/data` folder in one's Control Panel.

Once you've configured the locations for storing ISOs and enabled the necessary permissions, you can add new ISOs to the system. You can also make your ISOs public so that other users can boot their virtual servers from the ISOs you have uploaded.

15.3.1 Upload ISO(s) into the Cloud

To upload a file in the `.iso` extension to your cloud, follow this procedure:

1. Go to your Control Panel > **Cloud** and click the **Templates** menu from the left navigation pane.
2. Select **ISO list** from the menu that expands.
3. On the page that loads, click the **Upload ISO** button at the bottom of the screen.
4. Choose the ISO to upload and fill its details:
   - Make public - move the slider to the right if you want to make the ISO publicly available
   - Allowed hot migrate - move the slider to the right if you want to be able to hot-migrate VS created from this ISO
   - Label - choose a name for the ISO
   - Version - fill in the version of the ISO
   - Min disk size - specify the minimum required disk size for the ISO (1 GB by default)
   - Min memory size - specify the minimum required RAM for the ISO (128 MB by default)
   - Operating system - choose the operating system of the ISO
   - Operating system distro - fill in the operating system distribution of the ISO in free form
   - Virtualization - tick the required virtualization type(s): XEN, KVM or KVM+Virtio
5. Click Next. On the page that appears, click File or File URL tab depending on the upload method:
   - File - click Choose File to select the required ISO file from your file system. The yellow infobox will show the maximum file size for ISOs. The max upload size is pre-configured at Settings > Configuration (the Max upload size in bytes). Click the Upload ISO button.
   - File URL - select this tab if you want to upload the ISO from URL and specify the link from which the ISO will be uploaded.
6. Click Save to upload the ISO.

After you upload an ISO to the cloud, it can be found at Cloud > Templates > ISO List > My ISOs tab. The ISOs uploaded by your users are under the User ISOs tab.

15.3.2 Make ISO(s) Public

By default ISOs are available only to those users who uploaded them. These ISO images are available in the My ISOs tab. To make your ISO public and accessible for all users:

1. Go to your Control Panel > Cloud > Templates > ISO List menu.
2. Click My ISOs tab.
3. Click the Actions button next to the ISO you want to make public, then select Make public.
4. Confirm the window that pops up.

When you make a user ISO public, it is moved to the System ISOs tab.

15.4 Edit ISOs

To edit the ISOs available to you:

1. Go to Control Panel > Cloud and click Templates.
2. Select ISO list from the menu that expands. The page that loads shows the list of ISOs available to you.
3. Click the Actions button next to the required ISO and choose Edit ISO.
4. On the page that loads you can edit the following ISO details:
   - *Allowed hot migrate* - move the slider to the right if you want to be able to hot-migrate VS created from this ISO
   - *label* - choose the name for the ISO
   - *version* - fill in the version of the ISO
   - *min disk size* - specify the minimum required disk size for the ISO
   - *min memory size* - specify the minimum required RAM for the ISO
   - *operating system* - choose the operating system of the ISO
   - *operating system distro* - fill in the operating system distribution of the ISO in free form
   - *virtualization* - tick the required virtualization type(s): XEN, KVM or KVM+Virtio

5. Click **Save**.

### 15.5 Delete ISOs

To delete an ISO:

1. Go to **Control Panel > Cloud** and click **Templates**.
2. Select **ISO list** from the menu that expands. The page that loads shows the list of ISOs available to you.
3. Click the **Actions** button next to the required ISO and choose **Delete ISO**.
16 Manage OVAs

Starting from OnApp 5.2, you can import virtual servers created at other virtualization platforms into OnApp, using the OVA functionality. OVA is a file with the Open Virtualization Format (OVF) package contents all zipped into a single archive. OVF is an open-source standard for packaging and distributing software applications for virtual servers.

The OVA import procedure involves uploading the OVA file to CP, converting it into a KVM and/or vCenter template, adding the template to the template store and building a virtual server from the template. This procedure consists of the following steps:

1. **Uploading OVA**
   To start with, you need to upload the OVA archive to your OnApp CP.

2. **Converting OVA**
   Next, you can convert OVA into a KVM-based and/or vCenter-based template with the VS configuration predefined in the OVA file.

3. **Adding Template to Template Store**
   After converting OVA, you need to add the template to any group in the template store so that it would be possible to build VSs from the template.

4. **Configuring Billing**
   Also, you can add a template group created during the previous step to a bucket in order to provide different levels of accessibility to the template group for different users.

5. **Building VS from Template**
   Finally, you can build a virtual server based on the OVA template.

Before you proceed to uploading OVA, take into account **Limitations and Prerequisites** and learn how to **Convert OVF to OVA**.

On this page:
- Limitations and Prerequisites
- Convert OVF to OVA
- View OVAs
- Upload OVAs
- Convert OVAs
- Make OVAs Public
- Edit OVAs
- Delete OVAs
- Use OVA on CloudBoot Backup Server

See also:
- Template Store
16.1 Limitations and Prerequisites

- OVA functionality is supported for KVM and vCenter compute resources.
- It is required to have at least one backup server running on CentOS 6 or CentOS 7 in the cloud to import OVA and build virtual servers from OVA templates.
- Ext3, Ext4 and XFS file systems are supported for OVAs. The XFS file system is supported for Linux OSs imported from OVA, both for primary and secondary disks.
- XFS partitions created on CentOS 7 cannot be mounted on CentOS 6, so it is recommended to use a CentOS7 backup server.
- If your cloud deployment is not a fresh installation, make sure that permissions on OVAs are enabled. For more info, refer to List of all OnApp Permissions.
- OVAs based on Windows 10 can be supported if the required CPU flags are enabled on the compute resource where the OVA virtual server will be built.
- It is not possible to create a VS based on OVA using instance packages at this time.
- Be aware, that when the backup server and OVA use default CentOS, the volume group names are identical and this can cause a conflict.
- Currently, the following file formats are supported for virtual hard disk drives: VMDK, VHD, RAW, IMG, VDI.
- Be aware that files inside OVA should not be archived, otherwise OVA upload will fail.
- Recipes and backups are not compatible with VSs built from Windows OVA.
- If you want to upload OVA with Network Appliance OS, set Min memory size to 5 GB.
- Ensure that there is enough free space in the /tmp directory in CP since Apache uses this directory to temporarily store files while uploading OVA to CP.
- The size of the OVA that could be uploaded to CP depends on the browser settings, Apache configurations and amount of free space available on CP.
- To increase the upload size, in the /onapp/onapp-cp.conf file, set the LimitRequestBody and MAX_UPLOAD_SIZE parameters to 0 (unlimited). The LimitRequestBody parameter restricts the total size of the HTTP request body sent from the client and can be set (in bytes) from 0 (unlimited) to 2147483647 (2GB). The MAX_UPLOAD_SIZE parameter indicates the maximum file size allowed for uploading (in bytes) from 0 (unlimited) to 2147483647 (2GB).
To apply changes committed to the `LimitRequestBody` and `MAX_UPLOAD_SIZE` parameters in the `/onapp/onapp-cp.conf` file, you should edit the file before installing or upgrading the Control Panel server.

- The limits on OVAs are configured within the `Backup Server Zone Limits` resource type in the Access Control of the bucket. You can set the maximum amount of OVAs users can create in a backup server zone under the bucket and the maximum amount of disk space (GB) users get for storing their OVAs in this backup server zone under the bucket.

The limits on the number of OVAs and disk space allocated for storing OVAs are bound to a user who uploaded an OVA file. Therefore, when the OVA file is being converted, the bucket limits are checked for the user who uploaded OVA and not for the user who converts it.

### 16.2 Convert OVF to OVA

You can import virtual servers only from OVA. If you want to import from OVF, you should create an OVA file from OVF. The OVA file is a TAR archive, containing the `.ovf` and `.vmdk` files. Below you can find an example:

```
[root@OVA ~]# file /OVA/centos6default.ova
/OVA/centos6default.ova: POSIX tar archive (GNU)
[root@OVA ~]# tar -tf /OVA/centos6default.ova
centos6ovalvm.ovf
centos6ovalvm-disk1.vmdk
```

To create an OVA file (called `centos6.ova` for example) on Linux via command line, run the following:

```
[root@OVA OVA]# tar -cvf centos6.ova centos6ovalvm-disk1.vmdk centos6ovalvm.ovf
```

### 16.3 View OVAs

To view the OVAs available to you:

1. Go to Control Panel > Cloud and click Templates.
2. Click OVA List on the menu.
3. The open page shows the list of available OVAs separated into four tabs:
   - **All OVAs** - the list of all OVAs available on your system
For each OVA listed, you see the following details displayed:

- **Log status** - the icon that indicates the status of the last log item of the OVA (complete/pending/failed). Click the status to view the log details for the OVA (available to the OVAs that were uploaded through the URL).
- **OS** - the icon that indicates the operating system of the OVA (Linux, Windows or Other)
- **Label** - the name of the OVA
- **Min memory size** - the minimum RAM size required for the OVA
- **Operating system** - the operating system of the OVA
- **Backup server** - the backup server where the OVA is stored
- **Virtualization** - the virtualization type (KVM or vCenter). For the non-converted OVA files, no virtualization is specified in this column.
- **Actions** - click the Actions icon to perform the following procedures with the OVA:
  - Convert
  - Make public
  - Edit
  - Manage System Service Add-ons
  - Delete

### 16.4 Upload OVAs

The OVA upload is the first step of the OVA import. When OVA is uploaded, you can convert it into a KVM-based or vCenter-based template and add this template to the template store. When the template is available in the template store, then you will be able to build OVA-based VS from this template.

To upload OVA into your cloud:

1. Go to your Control Panel > Cloud and click the Templates menu from the left navigation pane.
2. Click OVA List on the menu.
3. On the page that loads, click the Upload OVA button under the OVAs list.
4. Fill in the following details:
   - **Label** - enter a name for OVA
   - **Backup server** - select the backup server where OVA will be stored

   - It is required to select a backup server where the OVA template should be stored. If the backup server is not selected, it will not be possible to upload OVA.
• If you are using local data store and plan to create a VS based on this template later, you have to copy your OVA template from the backup server to the /onapp/templates folder via ssh.

• If you are using local data store with multiple backup servers, it will not be possible to create OVA virtual server.

  o Version - fill in the version of OVA
  o Min memory size - specify the minimum required RAM for the OVA (128 MB by default). If you set the RAM value that is smaller than in the OVA file, this amount will be overwritten by real memory size from the OVA file after upload. If you set the value that is bigger than RAM in the OVA file, the settings will be applied.

5. Click Next. On the page that appears, click File or File URL tab depending on the upload method:
   o File - click Choose File to select the required OVA file from your file system. The yellow infobox will show the maximum file size for OVAs. The maximum upload size is pre-configured at Settings > Configuration (the Max upload size field). Click the Upload OVA button.
   o File URL - select this tab if you want to upload OVA from URL and specify the link from which the OVA archive will be uploaded.

6. Click Save to upload the OVA archive.

If an operating system of OVA is Linux and incremental backups are activated on your CP, you will not be able to upload the OVA file. To solve this issue, go to your Control Panel's Settings menu > Configuration > Backups/Templates tab and enable the Store extended attributes slider.

After you upload OVA to the cloud, it can be found at Templates > OVA List > My OVAs tab. The OVAs uploaded by your users are under the User OVAs tab.

To use the OVA to build virtual server next you need to convert the uploaded OVA into a KVM-based and/or vCenter-based template.

16.5 Convert OVAs

The uploaded OVA file is saved without the attached virtualization so that you can convert it more than once into both virtualization formats. To convert the uploaded OVA archive into a template:

1. Go to your Control Panel > Cloud and click the Templates menu from the left navigation panel.
2. Click the OVA List link in the menu.
3. Click the Actions icon > Convert next to the required OVA file.
4. In the pop-up window, select the Virtualization format (KVM or vCenter) and fill in other fields depending on the selected virtualization:
KVM Virtualization

- **Label** - enter a name for a new OVA file that will be created on the basis of the initially-uploaded one
- **Operating system** - select the operating system of the OVA (Linux, Windows, Network Appliance or Other). Choose the Other operating system if you want to convert the OVA with any other operating system (FreeBSD, Debian, etc) besides Windows and Linux.
- **Operating system distro** - select the operating system distribution of the OVA
- **Architecture** - select the architecture of the OVA (x86 or x64)
- **Edition** - select the edition of the OVA (for Windows-based OVAs only)
- **R2** - move the slider to the right if you want to use the updated release of Windows OS distribution (for Windows-based OVAs only)
- **Allowed hot migrate** - move the slider to the right if you want to be able to run hot migration of the VSs created from this OVA
- **Make public** - move the slider to the right if you want to make the OVA available to all users in the cloud

vCenter Virtualization

If you select the vCenter virtualization type, the additional fields will appear. For more information on how to convert OVA into a vCenter-based template, refer to the OnApp OVA Import to vCenter section.

5. Click **Save** to convert the OVA into the selected virtualization format.

- The OVA file is locked for the time period while it is being converted. You can unlock the OVA file to make the following actions instantly available: edit OVA and delete OVA. To unlock OVA, click the **Actions** button and select the **Unlock** option.
- The limits on the number of OVAs and disk space allocated for storing OVAs are bound to a user who uploaded an OVA file. Therefore, when the OVA file is being converted, the bucket limits are checked for the user who uploaded OVA and not for the user who converts it.

When the uploaded OVA file is converted into a template, you can proceed to add this template to the template store and then build a VS from this template.

16.6 Make OVAs Public

It is possible to make the OVA template public after converting. To make OVA public:

1. Go to **Control Panel > Cloud** and click **Templates**.
2. Click **OVA List** on the menu. The page that loads shows the list of OVAs available to you.
3. Click the **Actions** button next to the required converted OVA and click the **Make public** button.
4. Click the **OK** button in the pop-up box to confirm the action.

### 16.7 Edit OVAs

To edit the OVAs available to you:

1. Go to **Control Panel > Cloud** and click **Templates**.
2. Click **OVA List** on the menu. The page that loads shows the list of OVAs available to you.
3. Click the **Actions** button next to the required OVA and click the **Edit** button.
4. On the page that loads, you can edit the following OVA details:

   **No Virtualization**
   - **Label** - specify the name for OVA
   - **Version** - fill in the version of OVA
   - **Min memory size** - specify the minimum required RAM for OVA (128 MB by default). If you set smaller amount than in OVA file, this amount will be overwritten by real memory size from the OVA file after upload. If you set bigger amount than in the OVA file, the settings will be applied.

   **KVM Virtualization**
   - **Allowed hot migrate** - move the slider to the right if you want to be able to run hot migration of VS created from this OVA
   - **Label** - specify the name for OVA
   - **Version** - fill in the version of OVA
   - **Min memory size** - specify the minimum required RAM for OVA (128 MB by default). If you set smaller amount than in OVA file, this amount will be overwritten by real memory size from the OVA file after upload. If you set bigger amount than in the OVA file, the settings will be applied.

   **vCenter Virtualization**
   - **Allowed hot migrate** - move the slider to the right if you want to be able to run hot migration of VS created from this OVA
   - **Label** - specify the name for OVA
   - **Version** - fill in the version of OVA
   - **Min memory size** - specify the minimum required RAM for OVA (128 MB by default). If you set smaller amount than in OVA file, this amount will be overwritten by real memory size from the OVA file after upload. If you set bigger amount than in the OVA file, the settings will be applied.
   - **Initial username** - the initial vCenter username
   - **Initial password** - the initial vCenter password

5. Click **Save** when you are finished.
16.8 Manage System Service Add-ons

16.8.1 Assign system service add-ons to OVA
To assign a system service add-on to an OVA:

1. Go to Control Panel > Cloud and click Templates.
2. Click OVA List on the menu. The page that loads shows the list of OVAs available to you.
3. Click the Actions button next to the required OVA (converted or initially-uploaded) and click the Manage System Service Add-on button.
4. Click the '+' button.
5. The screen that follows shows the list of the available system service add-ons organized into groups. Click the arrow button next to a group to expand the list of add-ons assigned to it.
6. Click the label of the necessary system service add-on to see its details:
   - Label
   - Type - user or system
   - Description
   - Price
   - Apply to existing Virtual Servers - move the slider to the right to assign the system service add-on to all VSs built from this OVA
7. Click the Assign button to finish.

16.8.2 Unassign system service add-ons from OVA
To unassign a system service add-on from an OVA:
1. Go to your Control Panel > Cloud > Templates > OVA List menu.
2. Click the Actions icon next to the OVA you want to change, then choose Manage System Service Add-ons option.
3. The screen that follows shows the list of the system service add-ons assigned to this OVA.
4. Click the Delete button next to the system service add-on you want to remove.
5. Confirm the deletion.

16.9 Delete OVAs
You can delete uploaded OVA files of a converted template, so that the billing will not be calculated for the storage space. The files will be deleted, but the record in a database will be left. On the other hand, you can totally delete OVA (both converted and initially-uploaded).
If you delete the initially-uploaded OVA file, templates converted from this file are not deleted.

16.9.1 Delete OVA Files
To delete the OVA files:
1. Go to Control Panel > Cloud and click Templates.
2. Click OVA List on the menu. The page that loads shows the list of OVAs available to you.
3. Click the Actions button next to the required converted OVA and click the Delete files button.

When deleting OVA files, the OVA disk size (backup server limits section of buckets) will not be calculated, but the OVAs limit will be still charged.

16.9.2 Delete OVA
To delete OVA:
1. Go to Control Panel > Cloud and click Templates.
2. Click OVA List on the menu. The page that loads shows the list of OVAs available to you.
3. Click the Actions button next to the required OVA (converted or initially-uploaded) and click the Delete button.

You can delete a converted OVA template only if there are no VSs running on it.

16.10 Use OVA on CloudBoot Backup Server
To use OVA functionality on a Cloudboot Backup Server, take the following steps:
1. Log in via SSH to the Control Panel Server
2. Edit the `/etc/exports` file, on the line "/data X.X.X/YY(ro,no_root_squash)" - where X.X.X/YY is your network/subnet. Change the "ro," to "rw," and save the file.
3. Restart the NFS service
   
   "*/etc/init.d/nfs restart"

   Please note that restarting NFS server at the same time when files are in use from the NFS share may cause issues.
5. Go to **Control Panel > Admin > Settings > Compute Resources** > *Label* of the required CloudBoot compute resource.

6. Click the **Actions** icon > **Edit** next to the Cloudbot Backup Server.

7. Add the following to the Custom Config field:

```bash
cp /etc/lvm/lvm.conf /etc/lvm/lvm.conf.orig
sed -i 's/^[[:space:]]*filter = .*$/filter = \[ "r\|\|/dev\|nbd\|" \]/g'
/etc/lvm/lvm.conf
```

8. Click **Save**.

9. Reboot your Cloudbot Backup Server

You can also execute the custom config command directly on the Backup Server to apply it without reboot.
17 Recipes

The recipe is the plugin mechanism used for adding new functionalities to the OnApp cloud. Each recipe is a set of instructions that trigger events at certain stages during the execution of certain services/event in the cloud. Essentially, recipes allow inputting code into virtual servers, appliances or the Control Panel server. This enables administrators to use recipes for configuring the server or report on it, thus providing advanced customization options in a standard environment.

Recipes run over SSH, and all commands triggered can run on virtual servers, appliances or the Control Panel server.

SSH connection is not required for running recipes on VMware virtual servers.

See also:
- Create and Manage Recipes
- Recipe Permissions
- View Recipe Details

OnApp CP does not update the status of the recipe if it takes longer than 1 hour to complete the transaction.

17.1 Recipe Use

Recipes allow admins to perform the following operations:
- Perform post script installation.
- Use post provision installation scripts for third-party applications, agents, etc.
- Disk reclaiming.
- Update/modify virtual servers and Compute zones with script injection.
- Allow host to spin up custom virtual servers without requiring custom templates.
- Download, run and report audit tools.

Use of recipes brings cloud administrators more control over their cloud environment and allows them to self-maintain such tasks as custom template creation, etc.

You can use recipes for Unix (Linux and FreeBSD) and Windows virtual servers, smart servers, baremetal servers, virtual server templates, Compute zones and the control panel server. For details, refer to the relevant sections of the Admin guide:

- Template Recipes
- Virtual Server Recipes
- vCenter Virtual Server Recipes
- vCloud Virtual Server Recipes
- Smart Server Recipes
To be able to use recipes in the cloud, you must enable recipe permissions first.

17.2 Recipe Variables

The recipes run when the appropriate events are triggered on the compute resources, virtual servers or the CP server. Depending on the object where the event occurs, the recipe runs on compute resource/VS/CP and contains the variables for that object. When the recipe execution on compute resource is triggered by the event happening on a virtual server, then the recipe also contains the variables for the virtual server object. The same relates to the CP server.

Here is the list of variables that you can define in recipes:

**Compute resource variables**

- **IP_ADDRESS** - an IP address of a compute resource
- **HV_IP_ADDRESS** - a management IP address of a compute resource
- **IPJOIN_HYPERVISOR_IP_ADDRESS** - a compute resource management IP address where a virtual server (with a network interface with an assigned IP) is located on
- **VIRTUALIZATION** - a compute resource virtualization type: Xen, KVM, or VMware
- **SERVER_TYPE** - a server type: virtual, smart, or baremetal

**Virtual Server variables**

- **VM_IDENTIFIER** - a virtual server identifier
- **IP_ADDRESS** - an IP address of a virtual server
- **IP_EXTERNAL_ADDRESS** - an external IP address of a virtual server
- **IPJOIN_IP_ADDRESS** - an IP address as a string
- **IPJOIN_IP_ADDRESS_ID** - an ID of an IP Address
- **IPJOIN_NETWORK_IDENTIFIER** - a MAC address of a network interface an IP address is assigned to
- **IPJOIN_NIC_MAC_ADDRESS** - a MAC address of a network interface
- **HOSTNAME** - a hostname of a virtual server
- **ROOT_PASSWORD** - a server root password
- **OPERATING_SYSTEM** - a virtual server operating system
- **OPERATING_SYSTEM_DISTRO** - a virtual server OS distribution
- **OPERATING_SYSTEM_ARCH** - an architecture of an operating system
- **OPERATING_SYSTEM_EDITION** - an edition of an operating system
- **VM_USER_ID** - an ID of a virtual server user
- **VM_USER_FIRSTNAME** - the first name of a virtual server user
- **VM_USER_LASTNAME** - the last name of a virtual server user
- **VM_USER_EMAIL** - an email of a virtual server user
- **VM_NETWORK_INTERFACES** - a JSON string with information about network interfaces of the virtual server, for example:
"VM_NETWORK_INTERFACES"= "{"id":520,"identifier":"eoa","mac_address":"00:16:4e:ca:f5:6b","primary":true,"network_join":{"id":8,"network_identifier":"mcy","interface":"eth12"},"ip_addresses": [{"id":63,"address":"69.168.227.55","prefix":24,"gateway":"69.168.247.1"},"external_address":null]"

All recipes have access to these variables:

- **CP_ADDRESS** - an IP address of a control panel server
- **RESPONSE_FROM_PREVIOUS** - a response from the previous recipe step
- **TRIGGERING_EVENTS** - events that triggered execution of a recipe
- **TRIGGERED_BY_TRANSACTION** - a JSON string with information about a transaction that triggers the recipe. The string can include the transaction id, parent_type, parent_id, action, status, params, dependent_transaction_id, etc. The variable can be blank if there is no transaction that triggers the recipe.
- **RESOURCE_DIFF** - a JSON string with information about changes within resources that happened as a result of the transaction that triggered the recipe. The variable can be blank if no changes within resources occur as a result of the transaction.

Each user can set custom recipe variables for different appliances. For details, refer to the following sections:

- Virtual Server Recipe Custom Variables
- VMware Virtual Server Custom Variables
- Smart Server Recipe Custom Variables
- Baremetal Server Recipe Custom Variables
- Manage Template Recipe Custom Variables

### 17.3 View List of All Recipes

To view the list of all recipes:

1. Go to your Control Panel > **Cloud** > **Recipes** menu.
2. On the screen that appears, you'll see the list of all recipes in the cloud.

Use the tabs above to view the particular recipe type:

- **All**
  - To view the list of all recipes, click the **All Recipes** tab.
- **Unix compatible**
  - To view the list of Unix compatible recipes, click the **Unix Compatible** tab.
- **Windows compatible**
  - To view the list of Windows compatible recipes, click the **Windows Compatible** tab.
- **Unowned**
• To view the list of recipes which owners have been deleted, click the **Unowned Recipes** tab. Recipes that run on other user’s resources are not deleted after their owners are removed. These recipes can be accessed via **Recipes > Unowned** recipes menu. A user with global permissions can become an owner of any of the unowned recipes by choosing **Actions > Become an owner**.

To **view a particular recipe details**, click the label of a required recipe.

**See also:**
- **Recipes**
- **Create and Manage Recipes**
- **View Recipe Details**

### 17.4 View Recipe Details

To view the recipe details:

1. Go to your Control Panel > **Cloud > Recipes** menu.
2. On the screen that appears, you’ll see the list of all recipes in the cloud.
3. Click the required recipe label to view the following recipe details, along with the recipe step information:
   - **Label** - recipe label
   - **Description** - recipe description
   - **Unix compatible** - whether the recipe is compatible with Unix virtual servers
   - **Windows compatible** - whether the recipe is compatible with Windows virtual servers
   - Recipe steps along with their details:
     - **Script** - step code
     - **Result source** - step result source
     - **Pass values** - specify the pass output value, for example, 0
     - **On success** - recipe behavior on success
     - **Fail values** - specify the pass output value
     - **On failure** - the recipe behaviour on failure

For information how to see the list of servers to which the recipe is assigned, see **View the List of Assigned Servers** section.

**See also:**
- **Recipes**
- **Create and Manage Recipes**
- **Recipe Permissions**
- **View List of All Recipes**
17.5 View the List of Assigned Servers

To view the list of servers that use the recipe:
1. Go to your Control Panel > Cloud > Recipes menu.
2. On the screen that appears, you'll see the list of all recipes in the cloud.
3. Click the Actions icon next to the required recipe, then select Applied to VS.
4. On the screen that appears, you will see the list of servers this recipe is assigned to.

See also:
- Virtual Servers
- Virtual Server Recipes
- Recipes

17.6 Create and Manage Recipes

A recipe is a plugin mechanism used for adding new functionalities to the OnApp cloud. Each recipe is a set of instructions that trigger events at certain stages during the execution of certain services/event in the cloud. Essentially, recipes allow inputting code into virtual servers, appliances or the Control Panel server. This enables administrators to use recipes for configuring the server or report on it, thus providing advanced customization options in a standard environment. In this document you can find information on how to create and manage recipes.

You can create and use recipes for Unix (Linux and FreeBSD) and Windows virtual servers, smart servers, baremetal servers, virtual server templates, Compute zones and the control panel server. For details, refer to the relevant sections of the Admin guide:
- Template Recipes
- Virtual Server Recipes
- VMware Virtual Server Recipes
- Smart Server Recipes
- Baremetal Server Recipes
- Compute Zone Recipes
- Control Panel Recipes

On this page:
- Create Recipe
- Assign Recipe to Multiple Servers
- Edit Recipe
- Edit Recipe Step
- Delete Recipe

See also:
17.6.1 Create Recipe

Adding a recipe consists of two stages:
1. Creating a recipe
2. Creating a recipe step

17.6.1.1 Create Recipe
To create a recipe:
1. Go to your Control Panel > Cloud > Recipes menu.
2. Click the "+" button.
3. Fill in the recipe creation form:
   - **Properties**
     - **Label** - give your recipe a label
     - **Description** - provide a short recipe description (optional)
     - **Compatible with** - choose if this recipe can be assigned to Unix or Windows virtual servers. For Windows compatible recipe, specify the script type. You can select the following script types:
       - BAT
       - VBS
       - PowerShell v1.0
4. Click **Save**.

After that, you’ll be redirected to the recipe details screen where you can add steps to this recipe.

17.6.1.2 Create Steps
To create a new recipe step:
1. Click the "+" button in the upper right corner of the **Steps** screen.
2. In the pop-up window, specify step details as required:
   - **Script** - input the recipe code.
   - **Result source** - specify the step result source:
     - Exit Code - an exit code, for example, 0 is the default value returned on success.

To use exit code in the VBS or PowerShell scripts, you have to specify it directly in the script. For example:

```VBS
```
Script:
```powershell
WScript.Echo "test"
WScript.Quit 95
```

PowerShell Script:
```powershell
get-date -displayhint date
exit 227
```

- STDOUT - standard output.
- STDERR - standard error
- STDOUT and STDERR - standard output and standard error.

Move the Pass anything else slider to the right if you do not want to specify the pass output value. Otherwise, leave this slider disabled to set the pass values.

**Pass values** - specify the pass output value, for example, 0.

You cannot specify both pass and fail values for one recipe step. You can specify multiple recipe values. In this case, you have to specify each value from a new line.

**On success** - the recipe behavior on success:
- Proceed - proceed to the next step.
- Fail - terminate the recipe and mark it as failed.
- Stop - terminate the recipe and mark it as successful.
- Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

In case you have already specified the recipe pass values, you will get the Fail anything else slider enabled automatically, as you cannot specify both pass and fail values for one recipe step. Move this slider to the left if you want to set fail values (Pass anything else slider will be enabled automatically).

**Fail values** - specify the pass output value.

**On failure** - the recipe behavior on failure
- Proceed - proceed to the next step.
- Fail - terminate the recipe and mark it as failed.
- Stop - terminate the recipe and mark it as successful.
- Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

3. Press **Save**.

Drag and drop steps to change their order. To do so:
1. Select the required step and hold it down with the left mouse button.
2. Drag the recipe up to the required position and release the mouse button to drop it.

17.6.2 Assign Recipe to Multiple Servers

You can assign recipe to several virtual or smart servers at once. To do so:
1. Go to your Control Panel > Cloud > Recipes menu.
2. On the screen that appears, you’ll see the list of all recipes in the cloud.
3. Click the Actions icon next to required recipe and click the Run Recipe on Vs(s) button.
4. On the screen that appear, tick the check boxes next to the servers you want to assign the recipe to.
5. Click the Run on Selected button to confirm the selection.

Assigning several recipes to the same server may lead to simultaneous recipe implementation and performance issues.

- When assigning one recipe to several servers via API, there is possibility to run the recipe incompatible with the server type (Unix recipe on Windows servers or vice versa). In this case the transaction will be scheduled and completed, but the recipe will not do anything.
- Note that a VS related recipe is always executed first.

Example:
1. You have two recipes, one assigned to a template and another assigned to a VS
2. You assign both of them to a desired event
3. After the VS is built, the VS related recipe is run first
4. Next, the template recipe is run

This execution order is also relevant when the VS related recipe and template recipe are both assigned to the same event.

17.6.3 Edit Recipe

To adjust recipe details:
1. Go to your Control Panel > Cloud > Recipes menu.
2. Click the label of a recipe you want to edit, then click the Edit icon. You can edit the following recipe details:
   - Label - recipe label
   - Description - recipe description
   - Compatible with - click the appropriate button (Unix or Windows) to use this recipe for Unix or Windows virtual servers
3. Click the **Save** button to save your changes.

To edit recipe step, click the edit icon next to the required step, then change its details as required. Refer to the **Edit Recipe Step** section below for details.

### 17.6.4 Edit Recipe Step

To edit recipe steps:

1. Go to your Control Panel > **Cloud** > **Recipes** menu.
2. Click the **Actions** icon next to the recipe you want to change, then click the **Edit** button.
3. On the screen that appears, you'll see the list of recipe steps. Click the **Edit** icon next to the step you want to edit.
4. In the pop-up window, edit the step details as required:

   **Script** - input the recipe code.

   **Result source** - specify the step result source:
   - Exit Code - an exit code, for example, 0 is the default value returned on success.
   - STDOUT - standard output.
   - STDERR - standard error
   - STDOUT and STDERR - standard output and standard error.

   To use exit code in the VBS or PowerShell scripts, you have to specify it directly in the script. For example:

   **VBS**
   ```vbscript
   WScript.Echo "test"
   WScript.Quit 95
   **PowerShell**
   ```powershell
   get-date -displayhint date
   exit 227
   ```

   Move the **Pass anything else** slider to the right if you do not want to specify the pass output value. Otherwise leave this slider disabled to set the pass values.

   **Pass values** - specify the pass output value, for example, 0.

   You cannot specify both pass and fail values for one recipe step.

   You can specify multiple recipe values. In this case you have to specify each value from a new line.

   **On success** - the recipe behavior on success:
Proceed - proceed to the next step.

Fail - terminate the recipe and mark it as failed.

Stop - terminate the recipe and mark it as successful.

Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

In case you have already specified the recipe pass values, you will get the Fail anything else slider enabled automatically, as you cannot specify both pass and fail values for one recipe step. Move this slider to the left if you want to set set fail values (Pass anything else slider will be enabled automatically).

Fail values - specify the pass output value.

On failure - the recipe behaviour on failure

Proceed - proceed to the next step.

Fail - terminate the recipe and mark it as failed.

Stop - terminate the recipe and mark it as successful.

Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

5. Press Save.

Drag and drop steps to change their order. To do so:

1. Select the required step and hold it down with the left mouse button.
2. Drag the recipe up to the required position and release the mouse button to drop it.

17.6.5 Delete Recipe

To delete a recipe:

1. Go to your Control Panel > Cloud > Recipes menu.
2. Click the Delete icon next to the recipe you want to remove.
3. Confirm the deletion.

17.7 Recipe Permissions

You can control user access to recipes functionality by giving different user roles certain permissions. The list below includes all the recipe permissions that can be set up in OnApp.

17.7.1 Recipes

- Any actions on recipes (recipes) - the user can take any action on recipes
- Create new recipes (recipes.create) - the user can create a new recipe
- Delete any recipe (recipes.delete) - the user can delete any recipe
- Delete own recipes (recipes.delete.own) - the user can delete own recipes
• Edit any recipe (recipes.edit) - the user can edit any recipe
• Edit own recipes (recipes.edit.own) - the user can edit own recipes
• Read any recipe (recipes.read) - the user can view all recipes
• Read own recipes (recipes.read.own) - the user can view own recipes

17.7.2 Recipe Groups
• Any action on recipe groups - the user can take any action on recipe groups
• Create a new recipe group – the user can create a new recipe group
• Destroy any recipe group - the user can delete any recipe group
• See list of all recipe groups – the user can view the list of recipe groups
• See all recipe groups – the user can view any recipe group details
• Update any recipe group – the user can edit all recipe groups

17.7.3 Recipe Group Relations
• Any action on recipe group relations - the user can take any action on recipe relation group
• Create a new recipe group relation - the user can create a new recipe relation group
• Destroy any recipe group relation - the user can delete any recipe relation group
• See list of all recipe group relations - the user can view the list recipe relation groups
• See all recipe group relations – the user can see recipe relation group details
• Update any recipe group relation – the user can edit any recipe relation group

17.7.4 Control Panel
• Add recipe to control panel (control_panel.recipe_add) - the user can add recipes to the control panel
• Remove recipe from control panel (control_panel.recipe_delete) - the user can remove recipes from the control panel

17.7.5 Compute Zones
• Add recipe to Compute zone (hypervisor_zones.recipe_add) - the user can add recipes to Compute zone
• Remove recipe from Compute zone (hypervisor_zones.recipe_delete) - the user can remove recipes from Compute zone

17.7.6 Virtual Servers
• Add recipe to virtual machine (virtual_machines.recipe_add) - the user can detach recipes from own virtual servers
• Remove recipe from virtual machine (virtual_machines.recipe_delete) - the user can detach recipes from all virtual servers

17.7.7 Smart Servers
• Add recipe to any smart server (smart_servers.recipe_add) - the user can add recipes to any smart servers
- Add recipe to own smart server (smart_servers.recipe_add.own) - the user can add recipes to own smart servers
- Remove recipe from any smart server (smart_servers.recipe_delete) - the user can remove recipes from any smart servers
- Remove recipe from own smart server (smart_servers.recipe_delete.own) - the user can remove recipes from own smart servers

17.7.8 Baremetal Servers
- Add recipe to any baremetal server (baremetal_servers.recipe_add) - the user can add recipes to any baremetal servers
- Add recipe to own baremetal server (baremetal_servers.recipe_add.own) - the user can add recipes to own baremetal servers
- Remove recipe from any baremetal server (baremetal_servers.recipe_delete) - the user can remove recipes from any baremetal servers
- Remove recipe from own baremetal server (baremetal_servers.recipe_delete.own) - the user can remove recipes from own baremetal servers

17.7.9 Templates
- Add recipe to any template (templates.recipe_add) - the user can add a recipe to any template
- Add recipe to own templates (templates.recipe_add.own) - the user can add recipes to own templates
- Remove recipe from any template (templates.recipe_delete) - the user can remove recipes from any template
- Remove recipe from own templates (templates.recipe_delete.own) - the user can remove recipes from own templates

On this page:
- Recipes
- Recipe Groups
- Recipe Group Relations
- Control Panel
- Compute Zones
- Virtual Servers
- Smart Servers
- Baremetal Servers
- Templates

See also:
- List of All OnApp Permissions
- Recipe Groups
- Recipe Use Examples
- Control Panel Recipes Settings
17.8 Recipe Groups

Recipe groups allow OnApp administrators to organize individual recipes into groups that can be used as a bucket resource. This allows you to easily create groups of recipes which can be added to the bucket to limit the recipes that are available to a user.

The recipe groups have hierarchical (tree) structure:

- Recipe group
- Child group
- Recipes

You can also add a recipe directly to the recipe group section without assigning it to a child group.

Click the recipe group's label to expand the list of child groups, then click the recipe group's label to view the list of recipes, respectively.

17.8.1 View Recipe Groups

On this page:

- View Recipe Groups
- Add Recipe Group
- Add Child Group to Recipe Group
- Assign Recipe to Recipe Group
- Remove Recipe from Recipe Group
- Edit Recipe Group
- Delete Recipe Group

See also:

- Create and Manage Recipes
- Recipe Permissions
- Recipe Use Examples
- Control Panel Recipes Settings

To view the list of recipe groups:

1. Go to your Control Panel > **Cloud** > **Recipes** > **Recipe Groups** menu.
2. On the page that follows, you will see the list of all recipe groups.
3. Click the arrow next to the recipe group to expand the list of child groups and assigned recipes.
17.8.2 Add Recipe Group

To add a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. On the page that follows, click the "+" button.
3. Give a name to your group.
4. Click Save.
5. On the page that appears, you'll be prompted to assign a recipe to a group.

17.8.3 Add Child Group to Recipe Group

To add a child group to a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. Click the "+" button next to the required group's label, then select Add Child.
3. Give a name to your child group.
4. Click the Save button to confirm.

17.8.4 Assign Recipe to Recipe Group

To assign a recipe to a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. Click the "+" button next to the required group's or child group's label, then select Add Recipe.
3. Choose the required recipe from the drop-down menu.
4. Click the Save button to confirm.

17.8.5 Remove Recipe from Recipe Group

To remove a recipe from a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. Click the arrow button next to the required recipe group to expand the list of recipes.
3. Click the Delete icon next to a required recipe.
4. Confirm the deletion.

17.8.6 Edit Recipe Group

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To edit a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. On the page that follows, you'll see the list of all recipe groups created within your cloud.
3. Click the Edit icon next to a group to edit its name.
4. Click the Save button to save your changes.

17.8.7 Delete Recipe Group

To delete a recipe group:
1. Go to your Control Panel > Cloud > Recipes > Recipe Groups menu.
2. On the page that follows, you'll see the list of all recipe groups created within your cloud.
3. Click the Delete icon next to the required group to remove it.
4. Confirm the deletion.

17.9 Recipe Use Examples

The set of examples aimed to illustrate the recipe utilization.

17.9.1 Recipe 1

Runs on VSs for Apache server installation and default web page configuration.
Can be used for the following events:
- VS provisioning (starts Apache server during the VS creation)
- Network rebuild
- Network interface added
Consists of 5 steps. Each step depends on the previous step result.

On this page:
- Recipe 1
- Recipe 2
- Recipe 3
- Recipe 4

See also:
- Create and Manage Recipes
- Recipe Permissions
- Recipe Groups
Control Panel Recipes Settings

Step 1

```bash
# if echo $OPERATING_SYSTEM_DISTRO |grep rhel ; then
  if rpm -qa |grep httpd |grep -v grep ; then
    yum -y update httpd
  else
    yum -y install httpd
  fi
# else
  # exit 1
#fi
```

Result source: Exit code

Pass values: 0

On success: Proceed

Fail values: Fail anything else

On failure: Fail

Step 2

```bash
```

Result source: Exit code

Pass values: 0

On success: Go to step 5

Fail values: Fail anything else

On failure: Go to step 4

Step 3

```bash
service httpd restart
```

Result source: Exit code

Pass values: 0

On success: Stop

Fail values: Fail anything else

On failure: Fail

Step 4

```bash
echo "Can not write to file" > /var/log/recipes.log
```
Step 5

```
```

Result source: Exit code
Pass values: 0
On success: Go to step 3
Fail values: Fail anything else
On failure: Go to step 4

17.9.2 Recipe 2

Run on Compute resources to check the virtualization type.
Can be used for the following events:

- When Xen/KVM Compute resource goes online

Step 1

```
    if rpm -qa |grep -q $qayd ; then
        ps aux |grep -q xend || exit 1
    else
        ps aux |grep libvirtd || exit 1
    fi
```

Result source: Exit code
Pass values: 0
On success: Proceed
Fail values: Fail anything else
On failure: Fail

17.9.3 Recipe 3

Runs on Compute resources to check the snmpd and snmpd traps services and restarts them.
Can be used for Compute resource and control panel server events.

### Step 1

```
service snmpd restart && service snmptrapd restart
```

*Result source:* Exit code  
*Pass values:* 0  
*On success:* Proceed  
*Fail values:* Fail anything else  
*On failure:* Fail

### 17.9.4 Recipe 4

Runs on Windows virtual servers to check if the Apache folder is present and deletes it, otherwise installs Apache.  
Can be used for Windows virtual server events.

### Step 1
$files = dir 'C:\Program Files (x86)\Apache*'  
$process = "ApacheMonitor*"

if ($files -ne $null)
{
  "there's installed apache. Removing apache ..."
  $installer = dir 'c:\apache.msi'
  Stop-Process -Name $process
  Start-Sleep -Second 5
  Remove-Item $files -Force -Recurse
  Remove-Item $installer -Force -Recurse
  $files = dir 'C:\Program Files (x86)\Apache*'
  if ($files -ne $null)
  {
    "Failed to remove apache"
    return 1
  }
  else
  {
    "apache has been removed"
    return 0
  }
}
else
{
  "Apache has not been installed."
  "Downloading installer..."


  "silence apache installation.."
  c:\apache.msi /quiet

  return 0
}

**Result source:** Exit code

**Pass values:** 0

**On success:** Proceed

**Fail values:** Fail anything else

**On failure:** Fail

### 17.9.5 Recipe 5

Runs on Windows virtual servers to install Firefox web browser.

Virtual Server variable "VM_IDENTIFIER" is used in this example.

**Step 1**
# Silent Install Firefox
# Download URL: https://www.mozilla.org/en-US/firefox/all/

# Path for the workdir
$workdir = "c:\installer-$env:VM_IDENTIFIER\"

# Check if work directory exists if not create it
if (Test-Path -Path $workdir -PathType Container) { Write-Host "$workdir already exists" -ForegroundColor Red} ELSE { New-Item -Path $workdir -ItemType directory }

# Download the installer
if ( ($env:PROCESSOR_ARCHITECTURE -eq 'x86') { echo "Running 32-bit PowerShell"
} else {
  echo "Running 64-bit PowerShell"
  $source = "https://download.mozilla.org/?product=firefox-latest&os=win64&lang=en-US"
} )

$destination = "$workdir\firefox.exe"

# Check if Invoke-WebRequest exists otherwise execute WebClient
if (Get-Command 'Invoke-WebRequest') {
  Invoke-WebRequest $source -OutFile $destination
} else {
  $webclient.DownloadFile($source, $destination)
}

# Start the installation
Start-Process -FilePath "$workdir\firefox.exe" -ArgumentList "/S"

# Wait XX Seconds for the installation to finish
Start-Sleep -s 60

# Remove the installer
rm -Force $workdir\firefox*

---

**Result source:** Exit code

**Pass values:** 0

**On success:** Proceed

**Fail values:** Fail anything else

**On failure:** Fail
17.10 Control Panel Recipe Settings

Recipes are sets of instructions that are triggered during the certain stages of events defined. By managing recipes via the Settings menu, you can assign recipes to the control panel server.

To manage this functionality, make sure that you have the Manage recipes for Control Panel permission enabled.

17.10.1 View Recipe Settings

To manage Control Panel recipes settings:

1. Go to your Control Panel > Admin > Settings menu and click the Recipes icon.
2. On the screen that appears, you will see the details of all recipes in the cloud:
   - The left pane shows the list of all recipes in the cloud organized into recipe groups.
   - The right pane displays the list of control panel events to which the recipes can be assigned to.

On this page:

- View Recipe Settings
- Assign Recipe
- Delete Recipe

See also:

- Create and Manage Recipes
- Recipe Permissions
- Recipe Groups
- Recipe Use Examples

17.10.2 Assign Recipe

Drag and drop recipe to assign it to a desired control panel event.

You can assign recipes to the following events:

- **KVM compute resource goes online** - run the recipe when the KVM compute resource comes online
- **KVM compute resource goes offline** - run the recipe when the KVM compute resource goes offline
• **XEN compute resource goes online** - run the recipe when the Xen compute resource comes online
• **XEN compute resource goes offline** - run the recipe when the Xen compute resource goes offline
• **VMware compute resource goes online** - run the recipe when the VMware compute resource comes online
• **VMware compute resource goes offline** - run the recipe when the VMware compute resource goes offline

The recipe will be triggered when the statistics are not received from a compute resource for a certain period of time for some reason. If the compute resource is offline, the recipe will not run.

• **Compute resource added** - run the recipe when the new compute resource is added
• **Compute resource removed** - run the recipe when compute resource is removed
• **VS Provisioning** - run the recipe during VS provisioning
• **VS Network rebuild** - run the recipe when rebuilding a network
• **VS Disk added** - run the recipe when adding a disk
• **VS Network Interface added** - run the recipe when adding a network interface
• **VS Disk resized** - run the recipe when resizing a VS disk
• **VS Resize** - run the recipe when resizing a VS

**To use drag and drop:**

1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

**17.10.3 Delete Recipe**

To delete recipe:

1. Click the arrow button in front of the required event to view the list of recipes assigned to it.
2. Click the **Delete** button next to the recipe you want to remove.
18 AWS

You can manage Amazon EC2 instances from OnApp Control Panel using the AWS API. EC2 management is represented with as much similarity to AWS as possible. The following sections provide the details on how to manage AWS and Amazon EC2 instances in CP. AWS is enabled globally for the cloud.

Amazon EC2 support is an opt-in feature that is available for a small additional fee on top of your normal OnApp license. Please discuss with your account manager if you plan to enable EC2 support for your cloud.

See also:
- Enable/Disable AWS
- Manage EC2 Instances
- Launch New EC2

18.1 Enable/Disable AWS

Amazon EC2 support is an opt-in feature that is available for a small additional fee on top of your normal OnApp license. Please contact your account manager before enabling Amazon EC2 support.

To enable AWS for your cloud, follow the procedure below:

1. Go to your OnApp Control Panel > Admin > Settings > Configuration and switch on the Allow users connect to AWS toggle. This will enable AWS for the cloud.
2. Go to the Admin > Users menu and click the name of the appropriate user.
3. Find Amazon Web Services and click Connect.
4. To connect, provide the following credentials:
   - AWS access key - go to your Amazon profile > Security credentials > Users > Manage
   - AWS secret access key - use the same path as above. For security reasons, AWS secret access key is stored encrypted in the OnApp DB.
5. In the left navigation pane of your Control Panel, a new entry AWS > EC2 instances will appear.

If AWS is disabled, the above option will disappear from the dashboard, but all users’ credentials will be kept in OnApp DB.

See also:
18.2 Manage EC2 Instances

EC2 Instances menu lists your machines per selected region and lets you Launch New EC2.

OnApp does not cache, store, or change any information regarding the instances and takes it via API from AWS.

18.2.1 View List of EC2 Instances

To view the details of your EC2 Instances:
1. Go to your Control Panel > Cloud > AWS > EC2 Instances menu.
2. The page that loads will list your EC2 instances and the following details:
   - ID
   - Name
   - Instance type
   - Availability zone
   - Status
   - Public DNS name
   - Public IP address
3. You can perform the following actions to your instances:
   - Start/Stop

On this page:
- View List of EC2 Instances
- View EC2 Instances Details
- Edit EC2 Instance

See also:
- Launch New EC2
- Enable/Disable AWS
- OnApp License
- Terminate (only if stopped)
- Reboot
- Connect - instruction how to connect to a console of the instance.

The instances are listed per region, so if you do not have instances in the selected region the list will be empty.

18.2.2 View EC2 Instances Details

To view the details of your EC2 Instances:
1. Go to your Control Panel > Cloud > AWS > EC2 Instances menu.
2. The page that loads will list your EC2 instances. Click the ID of instance you are interested in.
3. On the screen that appears, you will see the following EC2 instance details:
   - ID
   - Instance Type
   - Status
   - Availability zone
   - Key Name
   - Subnet
   - Image
   - Launch time
   - Actions buttons: Start, Stop, Reboot
   - Public dns name
   - Public IP address
   - Private dns name
   - Private IP address
   - Virtualization type
   - Ebs optimized
   - Root device type
   - Root device name

You can connect to your EC2 instance using the Connect button in the upper left corner, which will provide corresponding instructions.

18.2.3 Edit EC2 Instance

To edit EC2 Instance:
1. Go to your Control Panel > Cloud > AWS > EC2 Instances menu.
2. The page that loads will list your EC2 instances. Click the ID of instance you are interested in.

3. On the screen that appears, you will see the EC2 instance details.

4. Click the button in the upper right corner. Choose another instance type from the drop-down menu and click Apply.

18.2.4 Delete EC2 Instance

To delete EC2 Instance:
1. Go to your Control Panel > Cloud > AWS > EC2 Instances menu.
2. The page that loads will list your EC2 instances. Click the ID of instance you are interested in.
3. On the screen that appears, you will see the EC2 instance details.
4. Click the button in the upper right corner. Confirm the deletion by clicking the Terminate button.

18.3 Launch New EC2

Launching a new instance is a process similar to the creation of a new virtual server. In this document you can find information on how to launch a new EC2 instance.

See also:
- Enable/Disable AWS
- OnApp License
- Manage EC2 Instances

18.3.1 Launch EC2 Instance

Launching a new instance is a process similar to the creation of a new virtual server. In this document you can find information on how to launch a new EC2 instance.

To launch a new instance:
1. Go to your Control Panel > Cloud > AWS > EC2 instances menu.
2. Click the “+” icon or click Launch EC2 Instance at the bottom of the list. This step initiates a wizard which will guide you through the EC2 instance launch.

Select the AMI template from your list or search the marketplace. The right panel lists the main AMI’s properties.
You may search using one or more keywords or using the AMI ID. Please note, that search timeout is 30 seconds. If your request times out - try shortening the search time by making it more specific.

Instance Type

Select the instance type. It must be compatible with the AMI. If not - a corresponding error message will be displayed after the EC2 instance creation wizard completes.

Instance Details

On this step you need to fill in the following information:

- Indicate the number of instances to be launched. You may launch several identical instances at the same time.
- Specify network configuration. Choose network and subnet.
- Select the key name.

Review and Launch

On this step, you can see the information on the EC2 instance you are going to create. You can either initialize the EC2 instance creation process or click the Previous button to change the required details of the instance.

3. Click Launch EC2 Instance button.

- Some of the templates from the marketplace are not free of charge and require a subscription at AWS. Unfortunately, this information cannot be obtained via API in the process of AMI selection. So, in case a paid AMI is selected, an error message will be displayed, requesting you to accept the terms and conditions and subscribe to the selected AMI at the Amazon website.

- If during the search in AWS Marketplace you get an error message about request timeout, perform the following:
  1. open file /onapp/interface/config/info_hub.yml
  2. increase timeout by editing parameter search_query_timeout
19 Users

OnApp provides very fine control over cloud users and what they're allowed to do. You can set up as many different types of user as you need, and customize their access to cloud resources and Control Panel functions as required.

For example, standard, VIP and reseller users can have different capabilities and resource limits. You might provide basic cloud management functionality to L1 support staff (e.g. reboot virtual servers but not destroy them) while your L3 admins have full rights. Your development teams will probably need to deploy test VSs in the cloud just as a customer would, only without being charged for them. Meanwhile, your billing staff need a “billing only” view with no access to customer resources.

This fine control is enabled by a combination of user accounts, roles, permissions, and buckets.

See also:
- Create and Manage User Accounts
- Users with Config Problems
- User Profile

19.1 Create and Manage User Accounts

There are two types of accounts in OnApp: administrators and users. An administrator account is created automatically when OnApp is installed. Administrators have full access to the system, including managing virtual servers and Compute resources, performing actions on templates and backups, and configuring data stores and networks. There can be several administrators in OnApp. User accounts are created by administrators, and only have access to those actions which are specified by an administrator. In this document you can find information on how to manage user accounts.

19.1.1 View Users

For a quick view of user account details, go to your Control Panel > Admin > Users menu. You'll see a list of all user accounts in your cloud, along with their details:

- **Full name** – user's name and surname
- **Username** – user's screen name
- **User role** – the role set for the user
- **User group** – the group to which the user is assigned
- **Status** – user's status (active ✔️, suspended !, or deleted ⌐)

If you are viewing the users list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click **Apply**. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the users list. You can always alter your column selection later.

On this page:
- View Users
- View User Account Details
- Create User
- User Additional Fields
- Manage User Payments
- View User Billing Statistics
- User Whitelist IPs
- Log in as User
- Edit User
- Add SSH Key
- Delete User
- Suspend and Activate Users
- View User Backups
- Unlock User

See also:
- Users with Config Problems
- List of all OnApp Permissions
- AWS

Column selection is currently set for one browser. If you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.

You can scroll through the list of users with the Previous/Next buttons at the bottom of the screen, as well as use search tool to search for a specific user. Click the Actions button next to the required user to edit, suspend or delete them, view the list of whitelist IPs or login as a user. Click Drop All Sessions button to terminate all sessions.

Every user including you will be logged out.

To get the list of additional fields, click the User Additional Fields button. To view detailed information about a user's account, click user's full name.
19.1.2 View User Account Details

To view account details of a particular user:

1. Go to your Control Panel > Admin > Users menu.

2. On the screen that appears, click the full name of the user to view their account details.

The user details screen that appears shows the following information:

**User details**
These are the settings which are specified at user creation process.

- **User's avatar** (This feature is available if the Use gravatar option is enabled).
- **User's name and surname.**
- **User's email.**
- **Last access log** - click to see information on the IP addresses that logged in to your account directly from the OnApp login page using your login and password, and the time and date of access.
- **Drop other sessions** - click this button to drop other sessions except the active one, will be dropped
- **Login** - user's screen name.
- **User role** – the role set for the user.
- **User group** – the group to which the user is assigned.
- **Time Zone** - timezone set for this user.
- **Locale** - locales set for this user.
- **System theme** - system theme set for this user.
- **Display infoboxes** – whether infoboxes are displayed or not for this user.
- **Restore infoboxes** - click this button to display infoboxes for the user (this option may be disabled depending on the user's permissions).
- **Send Password Reminder** - click this button to send the password reminder to the user. The user will receive an email with a link for change password action.

Ensure that **Allow user to send password reminder** permission is on before sending password reminder. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

**Amazon Web Services**
Shows the status of the Amazon Web Services: disconnected or connected. For more information, see Enable/Disable AWS.

Here you can also connect Amazon Web Services:

1. Click the (Connect) icon.
2. On the following page provide your AWS credentials: AWS access key ID and AWS secret access key.
3. Click Submit to connect AWS to your account.

**2-factor Authentication**
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• This section appears in the profile if you have either the Update Yubikey or the Update own Yubikey permission enabled or TOTP authentication is enabled for the cloud.

• You can use only one two-factor authentication option per user profile (Yubikey or TOTP). Once the TOTP authentication is enabled successfully, the Yubikey switch will become disabled.

Here you can enable/disable logging into OnApp using a YubiKey, add/delete YubiKeys, and enable/disable TOTP authentication. It is required to add at least one YubiKey to the user profile at Manage YubiKeys before you can enable the Use YubiKey option.

• TOTP Autentication - move the slider to the right to enable logging in by using time-based two-factor authentication. In the pop-up window that appears, scan the QR code with your mobile application (Google Authenticator or any other TOTP authentication app that complies with the RFC). Enter the generated one-time password to validate that the application works properly. If the password is correct, the TOTP Authentication will become enabled. This slider will be displayed only if TOTP authentication is enabled for the cloud.

• Use Yubikey - move the slider to the right to enable logging in by using a YubiKey for this user. You can enable this option only if you have added at least one YubiKey to your profile. If you delete all your Yubikeys, this option will be disabled automatically.

• Manage YubiKeys - click this button to add or delete YubiKey to your profile. The pop up window shows the list of your YubiKeys and the time of usage for each of them. You can add up to five YubiKeys.
  o To add a new YubiKey:
    i. Enter a label for your YubiKey in the Enter label field.
    ii. Click the Touch your yubikey field.
    iii. Press your finger to the gold Yubikey button. A long line of characters will appear in the field and the new Yubikey will be added to your profile.
  o To delete a YubiKey click the button next to the YubiKey you want to delete.

Be careful when deleting a YubiKey as it will no longer be possible to log in using that Yubikey unless you add it again to your profile.

The Yubico info section will appear in the user profile only if the Use Yubico login option is enabled for your cloud at Control Panel > Settings > Configuration.

Billing Details

• Price per last hour - shows the price for VSs, Load Balancers, and other resources charged for the previous hour.

• Price per last hour (including discount) - shows the price for VSs, Load Balancers, and other resources charged for the previous hour with the discount included (if any).

• Bucket - the bucket this user is assigned to. Click the bucket label to see its details.

• Outstanding amount - the total amount of money owned by this user since it has been created, for all resources, minus the amount of Payments. The sum is displayed for the period since a user has been created until the last 24hrs.
• **Monthly fee** - a set monthly price for a bucket.

• **Total cost** - the sum of all used resources cost and virtual servers cost. This sum does not take into consideration the free limits for resources set in the bucket. The cost that takes into account the bucket’s free limits is displayed in the *Total cost with discount* field.

• **Payments** - the total amount of payments made.

• **Discount due to free** - the price of the resources that were created within the bucket's free limits. This sum will be subtracted from the *Total cost*.

• **Total cost with discount** - the price of used resources that excludes the cost of the resources that were created within the bucket's free limits.

• **Virtual Server Hourly Statistic** - clicking this link will generate billing statistics for all virtual servers owned by this user. For more information, see [Virtual Server Billing Statistics](#).

• **User Statistic** - clicking this link will generate user's resource usage statistics. For more information, see [User Billing Statistics](#).

• **Monthly Bills** - clicking this link will generate the bills list that shows the total due per each month of the year. To view billing statistics, select a year from the drop-down list and click **Apply**. The list that appears displays a particular month of the selected year and the cost of used resources for that month. At the bottom of the list there is the total amount of money which was to be paid for the selected period.

• **System Service Add-ons Report** - report for the system service add-ons usage.

• **SPLA Report** - report for Windows system service add-ons.

### Prices

The list of all used resources and their price per hour for two states: server powered ON and server powered OFF. The prices in this section do not take into consideration the free limits for resources set in the bucket.

### Servers

Shows the list of all virtual servers, load balancers, edge servers, smart servers, application servers in the cloud with their prices for server on and off. The prices in this section do not take into consideration the free limits for resources set in the bucket.

### Backups

The prices in this section do not take into consideration the free limits for resources set in the bucket.

• **Backups Count** - the price per hour for the quantity of the user's backups.

• **Templates Count** - the price per hour for the quantity of the user's templates.

• **ISOs Count** - the price per hour for the quantity of the user's ISOs.

• **OVAs Count** - the price per hour for the quantity of the user's OVAs.

• **Templates, ISOs & Backups Disk Size** - the price per hour for the disk space user's ISOs/OVAs/backups/templates occupy.

• **Recovery Points Count** - the price per hour for recovery points created on the backup resource.

• **Autoscaling Monitor Fee** - the price per hour for autoscaling monitors.

• **Backup Server Groups** - the price per hour for the resources consumed by backup server groups.

### 19.1.3 Create User

To add a new user:
1. Go to your Control Panel > Admin > Users menu. You'll see a list of all user accounts in your cloud.

2. Click the Create User button at the bottom of the list.

3. Fill in the user creation form step by step:

   **Step 1 of 4**
   - Move the Use Gravatar slider to the right to use the gravatar image.
   - Login name - provide user login name. It can consist of 2-40 characters, letters [A-Za-z], digits [0-9], dash [-], lower dash [ _ ], [@]. You can use both lower- and uppercase letters.
     - The dash [-] and [@] symbols are not allowed as first characters of the login name.
   - First name - specify user first name. It can consist of any 1-20 characters.
   - Last name - specify user last name. It can consist of any 1-20 characters.
   - Email address - specify user email.
   - Time zone - select the required time zone from the drop-down box.
   - Locale - specify user locale settings by selecting the appropriate locale from the drop-down box (see Locales section for details).
   - Password - specify user password and confirm it. The password can consist of 6-40 characters and must meet the password complexity requirements.
   - Repeat password - repeat user password
   - Additional info - fill in a custom field, created using Additional fields functionality, with corresponding information
   - Display infoboxes - move the slider to the right to display guidance infoboxes for the user.
   - Click Next.

   **Step 2 of 4**
   - User role - select the user role for this user.
   - User group - assign a user to the user group by selecting the required user group from the drop-down box.
   - Click Next.

   **Step 3 of 4**
   - Assign a user to the bucket by selecting the required bucket from the drop-down box.
   - Click Next.

   **Step 4**
Specify Auto-suspending options if any. You can configure the system to suspend a user at a definite time or in several hours after creation.

4. Click the **Save** button to finish.

### 19.1.4 User Additional Fields

User Additional Fields allow administrators to create custom fields and use them with the API or a third party system. The custom fields are stored and edited in the user profile.

As an administrator, you can create additional field via **Users** menu. Then when going to a particular user profile, you can use the additional fields as a complementary information. For more info refer to the Create user section of this guide.

- The *User additional fields* permissions control the ability to create/edit/delete user additional fields.
- The *Update any user* permission controls the ability to assign an additional field for a particular user when creating a new user.

For more information about permissions refer to the List of all OnApp Permissions section of this guide.

To add a new Additional Field:

1. Log in to the Control Panel as an Admin.
2. Go to the **Admin > Users** menu.
3. On the screen that appears, click the **User Additional Fields** button at the bottom of the list.
4. Click the **Create Additional Field** at the bottom of the list.
5. Fill in the form that appears. You can choose the string/integer data type, and set the Default Value that will be displayed if a user hasn’t specified data for this field, or if they have entered information that doesn’t match the data type.
6. Click the **Create New Field** button to finish.

To edit or delete an additional field:

1. Click the **Edit** icon next to an additional field to change its details.
2. Click the **Delete** icon next to an additional field to delete it.

### 19.1.5 Manage User Payments

To view, add and edit payments for a user:

1. Go to your Control Panel **Admin > Users** menu.
2. Click the name of the required user.
3. On the screen that appears, click **Payments** tab.
4. Click the **Edit** icon to change details of a specific payment.
5. Click the **Create Payment** button at the end of the list to add a new payment.  
Also you can add payments at **Control Panel > Payments** menu. For more information refer to the [Create and Manage Payments](#) section of this guide.

### 19.1.6 View User Statistics

The system has a record of all the billing statistics on a user account for the last three months. If the account was created less than three months ago, statistics are generated for the actual period. You can also define a shorter period by setting Start and End time.

To view billing statistics for an account:

1. Go to your Control Panel **Admin > Users** menu.
2. You'll see a list of all user accounts in your cloud. Click a name of the appropriate user.
3. Go to **Billing Details** and click the **User Statistic** button.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button. By default the statistics is generated for the last day. The statistics for each resource is divided into the **Costs** and **Free amount**. The **Costs** of resources do not take into consideration the free limits for resources set in the bucket. The **Free amount** displays the cost of components within the bucket's free limits for each resource. The **Free amount** is subtracted from the total cost of a resource. You can see the statistics for the following resources:
   - **Backups** - the price for the number of backups taken by the user during the chosen period on the compute resource.
   - **Templates** - the price for the templates made by the user during the chosen period.
   - **ISOs** - the price for the number of ISO images uploaded by the user during the chosen period.
   - **Templates, ISOs & Backups Storage** - the price for the disk space taken by the templates, ISOs, and backups on the compute resource. For backups and templates, applies if you use compute resources for disk-related actions. If there is a backup server in the cloud, **Backup Zones Backup Disk Size Cost** and **Template Disk Size Cost** will apply.
   - **Backup Zones Backups** - the price for the number of backups of the backup zones taken during the selected period. Applies if backup servers are used for disk-related actions. Otherwise **Backups cost record** will apply.
   - **Backup Zones Backup Disk Size** - the price for the disk size taken by backups on the backup servers during the predefined period. Applies if backup servers are used for disk-related actions, otherwise, **Templates, ISOs & Backups Storage Costs** record will apply.
   - **Backup Zones Templates Count** - the price for the number of templates of the backup zones made during the chosen period.
   - **Backup Zones Template Disk** - the price for the disk size taken by templates stored on the backup zones during the predefined period.
   - **Recovery Points** - the price for the number of recovery points created by means of a backup plugin.
   - **Recovery Points Size** - the price for the size in Gb occupied by recovery points.
   - **Autoscaling monitor** - the price for using the autoscaling monitor during the selected period.
   - **Acceleration** - the price for the number of accelerated VSs for the selected period.
   - **OVAs count** - the price for the number of OVAs uploaded by the user during the selected period.
• **OVAs size** - the price for the disk size taken by OVA files stored on the backup server during the predefined period.

• **Virtual Servers** - the total due for all the VSs minus Backups/Templates Cost (if any) for the predefined period.

• **Total User Resources Costs**
  - **User Resources Cost** - the price for all the resources, except for virtual servers, consumed by the user during the selected period. This price can include costs of the following resources:
    - Disk size
    - Data read/written
    - Input/Output requests
    - Port speed
    - Data received
    - Data sent
  - **User Resources Free Amount** - the price of free limits that will be subtracted from the **User Resources Cost**.
  - **Monthly Free Amount** - the price of all free limits per month for the selected period.

    If the selected period contains several calendar months, for example 10th of February - 10th of March, the **Monthly Free Amount** will be displayed for both months and the **Total Cost** will be reduced by the monthly free amount.

• **Total Cost** - the total price for the selected period of time that includes the **User Resources Cost and Virtual Servers Cost**.
  - **Total Free Amount** - the total price of free limits both per hour and per month that will be subtracted from the **Total Cost**.
  - **Total Cost with Discount** - the total price of used resources that excludes the cost of the resources that were created within the bucket's free limits.

**User Statistics**
  - **Virtual Server** - the list of virtual servers owned by the user
  - **Total** - the total due for a virtual server, including the price for the virtual server itself and all **User Resources Cost**. The prices in this section do not take into consideration the free limits for resources set in the bucket.

19.1.7 **User Whitelist IPs**

Whitelist IP addresses are IPs from which a particular user can access the OnApp control panel. If whitelisted IP addresses are specified for a particular user, the user can only access CP from that defined IP addresses.
To add a whitelist IP address:
1. Go to your Control Panel > Admin > Users menu.
2. Click the name of the required user. You will see the User Profile page.
3. Click the Create White List tab.
4. On the page that appears, click Create White List IP button.
5. Fill in the form that appears:
   - IP - an IP you wish to enter to the white list.
   - Description - any description (this may be a reason why you entered an IP to the list, etc.)
6. Click Save IP.
7. Repeat steps 4-6 if you need to add more IPs to the white list.
To edit/delete a whitelisted IP address, click the Actions button next to the required IP address, and then choose the required action.

19.1.8 Log in as User

Administrators can log in as a user to see their view of the cloud. To do so:
1. Go to your Control Panel > Admin > Users menu. You'll see a list of all user accounts in your cloud.
2. Click Actions next to the user you'd like to log in as and click Login as.
3. Your screen will be updated and you will be be logged in as the selected user.

- You cannot log in as a user whose account is locked. First, unlock the account and then login as the user.
- To return to your original view of the cloud, click the Back to Admin Area link at the top of the screen.

19.1.9 Edit User

To edit a user account:
1. Go to your Control Panel > Admin > Users menu. You'll see a list of all user accounts in your cloud.
2. Click the Edit icon next to the user you want to edit.
3. Change their details as required on the screen that appears:
   - Move the Use Gravatar slider to the right to use the gravatar image.
Login name - provide user login name. It can consist of 2-40 characters, letters [A-Za-z], digits [0-9], dash [-], lower dash [ _ ], [@]. You can use both lower- and uppercase letters.

First name - specify user first name. It can consist of any 1-20 characters.

Last name - specify user last name. It can consist of any 1-20 characters.

Email address - specify user email.

Time zone - select the required time zone from the drop-down box.

Locale - specify user locale settings by selecting the appropriate locale from the drop-down box (see Locales section for details).

System theme - specify the desired theme for the user CP look and feel. By default, the global cloud settings are applied.

Password - specify user password and confirm it. The password can consist of 6-40 characters and must meet the password complexity requirements.

Repeat password - repeat user password

Display infoboxes - move the slider to the right to display guidance infoboxes for the user.

Bucket - select the required bucket from the drop-down box.

User roles - select the user role for this user.

User group - assign the user to the user group by selecting the required user group from the drop-down box.

Auto suspending - edit the auto-suspending options.

4. Click the Save button to finish.

19.1.10 Add SSH Key

To add an SSH key to a user profile:

1. Go to your Control Panel > Admin > Users menu.
2. Click the Edit icon next to the required user.
3. Click the SSH Key button.
4. On the pop-up screen you can add a new key, and edit/delete a key.

The SSH key will be automatically assigned to all VSs the user creates.

To assign keys to existing VSs, go to the VS Overview > Properties menu.

19.1.11 Delete User

Completely deleting a user from the system is a two-step process.

19.1.11.1 Step 1. Deleting users and their resources

To delete a user:

1. Go to your Control Panel > Admin > Users menu. You'll see a list of all user accounts in your cloud.
2. Click the **Actions** icon next to the user you want to remove, then choose **Delete**. A confirmation window with the warning that all resources associated with the user will be removed as well will appear. Click the **Confirm** button. The additional window pops up with the requirement to enter the admin password. Enter the password and click **Confirm**.

To enable confirmation of user deletion by means of password go to Control Panel's **Settings** menu > **Configuration** > **Defaults** tab and move the **Enable password protection on user deleting** slider to the right. Otherwise, the password protection will be disabled by default.

After this process all user's resources will be deleted, however, the user and their statistics will remain in the cloud. Recipes that run on other user's resources are not deleted after their owners are removed. These recipes can be accessed via **Recipes** > **Unowned** recipes menu. User with global permissions can become an owner of any of the unowned recipes by choosing **Actions** > **Become an owner**.

19.1.11.2 Step 2. Erasing the user
The deleted user will appear in the users list with the deleted status. The cloud administrator can completely erase the user from the cloud by performing the following procedure:

1. Go to your Control Panel's **Users** menu. You'll see a list of all user accounts in your cloud. Click the **Show Deleted** button to see the list of deleted users.

2. Click the **Actions** icon next to the user you want to delete, then choose **Erase**. You'll be asked for confirmation before the user is erased.

### 19.1.12 Suspend and Activate Users

Please note that suspending a user results in powering off all one's active virtual servers.

Suspending a user account makes it inactive, but still present on the system. A suspended user will not be able to log into the Control Panel. To suspend an account:

1. Go to your Control Panel's **Users** menu. You'll see a list of all user accounts in your cloud.

2. Click the **Suspend** icon next to the user you want to suspend. You'll be asked for confirmation before the user is suspended.

3. To activate a suspended user, click the **Activate** user button next to their entry in the Users menu.

You can also set a user to auto-suspend at a certain time/date on the user's Edit Profile screen (**Users** > [user name] > **Edit Profile** tab).

### 19.1.13 View User Backups

Backups in OnApp clouds are associated with a user account. To view backups of a particular user:

1. Go to your Control Panel's **Users** menu.
2. You'll see a list of all user accounts in your cloud. Click the name of a required user.
3. On the User Details screen, click Backups tab.
4. On the screen that appears, you'll see the list of backups that belong to this user along with their details:
   - date when the backup was taken
   - target
   - status
   - backup size
   - initiated
   - backup server
   - note
   - virtual server
   - customer

   To move to the VS backups page, delete a backup or convert it to a template, click the Actions button next to template and then select the required action.

19.1.14 Unlock User

To unlock the user:
1. Go to your Control Panel's Users menu. You'll see a list of all user accounts in your cloud.
2. Click the Actions button next to the locked user, then click the Unlock Account button.

19.2 Manage Sessions

The Drop session panel is used to terminate a session from an OSA-ICC. You can use this functionality if you need to terminate a session because you can't get to a PC or you have a bad connection. If the auto-reconnect option was selected during the customization of your session, the option will automatically reconnect your session after you drop it.

To be able to use drop session functionality, you should have the following permissions enabled for your user role:
- Drop all the existing sessions (sessions.drop_all)
- Drop all the user sessions but the current (sessions.drop_others)

For details on permissions, refer to the Permissions List section.

On this page:
- Drop All Sessions
- Drop Own Sessions
19.2.1 Drop All Sessions

To drop sessions:
1. Go to your Control Panel > Admin > Users menu.
2. On the Users tab, click the Drop all sessions tab in the lower left corner of your screen.

19.2.2 Drop Own Sessions

To terminate own sessions:
1. Click on your user name at the top of the Control Panel screen to view details of the user account you're currently logged in with.
2. On the screen that appears, click Drop Other Sessions button.
All sessions, except the active one, will be dropped.

19.3 Users with Config Problems

With OnApp you can manage users which have some configuration problems and resolve those issues through the Users with config problems menu.

For this:
1. Go to your Control Panel > Admin > Users menu.
2. Click the Users with Config Problems tab, and then choose one of the following:
   o Users without roles - shows the list of those users who do not have the roles assigned.
   o Users without time zones - shows the list of users who do not have the time zones set.
   o Users without user groups - shows the list of users who are not assigned to any user group.
3. On the page that appears, click the Actions button next to a required user to perform the following:
4. 
   o Log in as User
   o Edit User
   o Delete User
   o Suspend and Activate Users
- **Whitelist IPs**

**See also:**

- [Create and Manage User Accounts](#)
- [Manage Sessions](#)
- [Tools](#)
20 Manage Groups

You can assign users to different user groups, so you can tie some users together and offer similar cloud experiences. At present, you can configure the following for user groups:

- assign a UI theme to specific user groups (Admin > Settings > Look&Feel)
- set the default roles
- specify buckets

User groups are also used for configuring restrictions sets to correctly set up the reseller role. These can limit the resources available to a user based on either the user's bucket or the user group.

The following actions are available in OnApp for user groups:

20.1 View User Group

To view user groups:

1. Go to your Control Panel > Admin > Groups menu.
2. Click a group's label to see all the roles and buckets assigned to the questioned group.
3. Click the number of users to see the list of users assigned to this user group.

On this page:

- View User Group
- Create User Group
- Edit User Group
- Assign New User to Group
- Change User Group for User
- User Group Additional Fields
- Delete User Group

See also:

- Restrictions Sets
- Permissions
- Create and Manage User Accounts
- Create and Manage Roles

20.2 Create User Group
The *Create Group* page allows a user to create an OnApp user group.

To create a user group:

1. Go to your Control Panel > **Admin** > **Groups** menu.
2. On the page that follows, click *Create Group* button.
3. On the next page, fill in the user group details:
   - *label* - choose a name for the user group
   The following parameters affect *Restrictions Sets* only:
   - *roles* - assign role(s) which will be available to resellers with the appropriate restrictions set
   - *buckets* - assign bucket(s) which will be available to resellers with the appropriate restrictions set
5. Click **Save**.

### 20.3 Edit User Group

The *Edit Group* page allows a user to edit an OnApp user group.

To edit a user group:

1. Go to your Control Panel > **Admin** > **Groups** menu.
2. Click the **Actions** button next to the user group you want to change, then click **Edit**. Alternatively, you can click the user group’s label and on the screen that appears, click the Edit (**pencil**) icon.
3. Edit the user group details:
   - *label* - choose a name for the user group
   The following parameters affect *restrictions sets configuration* only:
   - *roles* - assign role(s) which will be available to resellers with the appropriate restrictions set
   - *buckets* - assign bucket(s) which will be available to resellers with the appropriate restrictions set
5. Click **Save**.

### 20.4 Assign New User to Group

You can do this on the Add New User screen, as part of the user creation process:

1. Go to your Control Panel > **Admin** > **Users** menu.
2. Click the **Create User** button.
3. In the **Roles & Groups** section, select the User Group from the drop-down menu.
4. Complete the other user detail fields, and click **Save**.
20.5 Change User Group for User

You can change the group a user is assigned to on the Edit User screen:

1. Go to your Control Panel > Admin > Users menu.
2. Click the Actions icon next to the user, then click Edit.
3. Select a user group for the user from the user group drop-down menu.
4. Click the Save button.

20.6 User Group Additional Fields

User Group Additional Fields allow administrators to create custom fields and use them with the API or a third party system.

As an administrator, you can create additional field via User Groups menu. Then when going to a particular user group, you can use the additional fields as a complementary information.

The User group additional fields permissions control the ability to create/edit/delete user additional fields. For more information about permissions, refer to the List of all OnApp Permissions section of this guide.

To add a new Additional Field:

1. Log in to the Control Panel as an Admin.
2. Go to the Admin > User Groups menu.
3. On the screen that appears, click the User Group Additional Fields button at the bottom of the list.
4. Click Create Additional Field at the bottom of the list.
5. Fill in the form that appears. You can choose the string/integer data type, and set the Default Value that will be displayed if a user group hasn't specified data for this field, or if they have entered information that doesn't match the data type.
6. Click the Create New Field button to finish.

To edit or delete an additional field:

1. Click the Edit icon next to an additional field to change its details.
2. Click the Delete icon next to an additional field to delete it.

20.7 Delete User Group

To delete a user group:

1. Go to your Control Panel > Admin > Groups menu.
2. Click **Delete** in the **Actions** list next to a user group/organization to delete a specific group.
21 Roles

OnApp allows you to assign roles to users. Each role has a set of permissions associated with it. By assigning users to different roles you can control what those users are allowed to do.

To view the roles list, go to the Control Panel's Roles menu. You will get the list of roles together with their labels, amount of assigned users and actions, which you can perform with the role (Edit, Delete, Clone).

Roles are assigned to users during the user creation process. OnApp provides the following pre-configured user roles:

- **Administrator**
- **User**

For details on user permissions, see Permissions List.

See also:

- [Create and Manage Roles](#)
- [List of Default Permissions for Admin Role](#)
- [List of Default Permissions for User Role](#)

21.1 Transaction Approvals

Make sure that the required Approvals permissions are enabled to be able to use this functionality.

OnApp 5.5 offers the functionality that lets you set up certain users (approvers) so that they can approve or decline actions performed by other users (requesters). This feature is tied to roles. You can enable the ability to approve transactions for a user role and you can configure that certain transactions performed by a user role will require approval. Note that any approver can approve or decline any transaction that requires approval in the cloud.

After a transaction that requires approval is initiated, it is paused with the 'Pending' status and a notification is sent to the approver users. After an approver has made a decision, a notification is sent to the requester. Note that if an action initiates several transactions, all its transactions will be approved in case the main transaction is approved. For example, the schedule build virtual server transaction includes the transactions that create the VS resources and which will be approved automatically if the schedule build virtual server transaction is approved.

On this page:

- [Enable Transaction Approvals for Your Cloud](#)
- [Set up Approver User Role(s)](#)
- [Configure the List of Actions that Require Approval](#)
21.1.1 Enable Transaction Approvals for Your Cloud

Firstly, you need to enable transaction approvals for your cloud. You can do this at the Configuration section. To enable transaction approvals for your cloud:

1. Go to Control Panel > Settings > Configuration > System tab.
2. Move the Transaction approvals slider in the Miscellaneous section to enable approvals.
3. Click the Save Configuration button.

Next you can proceed to setting up approver user roles.

21.1.2 Set up Approver User Role(s)

Approvers have the ability to approve or decline transactions in the cloud, they receive notifications about the transactions that are pending approval. By default, only the admin user role has the permissions to approve/decline transactions. To add this permission to other user roles go to Control Panel > Roles > Label > Edit and enable the Approvals permissions.

After you configure the approval user roles you need to set up the list of transactions that require approval for that or other user role.

21.1.3 Configure the List of Actions that Require Approval

Once you enable the permissions for the approver user role(s), you can configure which transactions require approval for each of the user roles.

To set the list of transaction that will require approval for a user role:

1. Go to Control Panel > Roles > Actions icon next the required user role and select Set approvals.
2. On the page that loads set Yes for the action(s) which should require approval:
   - attach disk - adding a disk to a server with the Hot attach option selected
   - build disk - adding a disk to a server without the Hot attach option selected or adding a disk during virtual server creation
   - compose vApp - composing a new vApp
   - create data store - adding a new data store
   - create resource pool - adding a new resource pool from the Control Panel > Resource Pools page
   - destroy data store - deleting an existing data store
o **destroy disk** - deleting an existing disk that was created without the *Hot attach* option selected
o **delete vApp** - deleting an existing vApp
o **destroy resource pool** - deleting an existing resource pool
o **destroy virtual server** - deleting an existing server. This option refers to the destruction of any type of server in OnApp: virtual server, application server, storage server, VS in Federation, etc.
- **detach disk** - removing a disk that was created with the *Hot attach* option selected
o **recompose vApp** - recomposing a vApp
o **resize disk** - resizing an existing disk
- **resize virtual server** - resizing an existing server with a reboot. This option refers to the resize of any type of server in OnApp: virtual server, application server, storage server, VS in Federation, etc.
- **resize VS without reboot** - resizing an existing server without a reboot. This option refers to the resize of any type of server in OnApp: virtual server, application server, storage server, VS in Federation, etc.
- **schedule build vDC** - adding a new resource pool after an orchestration model deployment
- **schedule build virtual server** - creating a new VS. This option refers to the creation of any type of server in OnApp: virtual server, application server, storage server, VS in Federation, etc.
- **schedule rebuild virtual server** - rebuilding virtual server. This option refers to the creation of any type of server in OnApp: virtual server, application server, storage server, VS in Federation, etc.
- **update data store** - changing the properties of a data store
- **update resource pool** - changing the properties of a resource pool

3. When you have finished, click **Save**.

If you set approvals for a user role that has permissions to approve transactions, the transactions performed by the representatives of this user role will be approved automatically.

After the above configuration the selected transactions performed by a representative of the user role will be paused until they are approved or declined by an approver. Next you can set up notifications so that approvers are notified in case there are transactions that are pending approval and the requesters will be notified after their transaction has been approved/declined.

### 21.1.4 Configure Approval Notifications

You can configure the system to send notifications to the approver users when there is a transaction pending approval. Requester users can also be sent emails after there has been a decision regarding the transaction they have initiated.

To set up notifications for the approver users:

1. **Enable notifications** for you cloud at **Control Panel > Notifications > Configuration**.
2. **Configure gateways** at Control Panel > Notifications > Gateways. You can configure to send either internal notifications in OnApp or emails.

3. Add **notification templates** at Control Panel > Notifications > Notification Templates. These templates are the messages that are sent to the approvers. You can add any text to the messages. Add the `%{message}` text to the template for the messages to automatically include the link to the transaction that is pending approval.

4. Create the approver **recipients list** at Control Panel > Notifications > Recipients Lists and add the approver users to it.

5. Set up **subscriptions** at Control Panel > Notifications > Subscriptions. Add the gateway (step 2), the notification template (step 3), the recipients list (step 4) and select the Pending approval event for the new subscription.

After the above configuration, the approver users will receive notifications when there is a transaction pending approval in the cloud.

To set up notifications for the requester users:

1. Go to Control Panel > Notifications > Gateways
2. Click the **New gateway** button
3. On the page that loads select the SENDMAIL delivery method for the gateway
4. Click Select to proceed to the next gateway creation step
5. Depending on the selected delivery method fill in the following details:
   
   For the SENDMAIL delivery method:
   - **Name** - the name for your new gateway.
   - **From** - the email address from which emails will be sent
   - **Host** - the server IP or URL

   For successful notification configuration for requesters, the name of the gateway should be **System SENDMAIL Gateway**.

   For the SMTP delivery method:
   - **Name** - the name for your new gateway.
   - **From** - the email address from which emails will be sent
   - **Host** - the server IP or URL
   - **Smtp address** - address of the SMTP server
   - **Smtp port** - port of the SMTP server
   - **Smtp domain** - associated domain
   - **Smtp user name** - user name to login into SMTP server
   - **Smtp password** - password to login into SMTP server
   - **Smtp authentication** - select an authentication mechanism from a drop-down menu: plain, login or cram_md5
   - **Smtp enable starttls auto** - enable the StartTLS extension

   For successful notification configuration for requesters, the name of the gateway should be **System SMTP Gateway**.
6. Click **Save** to finish the creation process

After the above configuration, the requestor users will automatically be sent an email after their transaction has been approved or declined.

For detailed information on notifications refer to [Notifications Setup](#).

### 21.1.5 Approve or Decline Transactions

The **Control Panel > Approvals** menu contains the list of all the transactions that require or required approval with their details:

- **ref** - the reference number of the transaction. Click the number to view the details of the transaction.
- **status** - the status of the transaction: approved, declined or pending
- **date** - the date when the transaction was initiated
- **action** - the action performed by the transaction
- **target** - the entity to which the transaction is related: vApp, VS, resource pool, data store or disk
- **requester** - the user who initiated the transaction. Click the name of the user to view their profile.
- **approver** - the user who has approved or declined the transaction. Click the name of the user to view their profile. The link to the approver appears only after the transaction has been declined or approved.

To approve or decline a transaction click its reference number and select the **Approve** or the **Decline** button at the bottom of the page. The page will also display the output and details of the transaction. The resource difference tables contain the changes in resource distribution before and after the transaction.

For detailed information on logs refer to [Logs](#).

### 21.2 Create and Manage Roles

OnApp allows you to assign roles to users. Each role has a set of permissions associated with it. By assigning users to different roles you can control what those users are allowed to do. This section contains information on actions you can perform with the role which are Create, Edit, Delete, and Clone.

#### 21.2.1 Create New Role

To add a new role:

1. Go to **Control Panel > Roles**.
2. Press the "+" button or click the **Create Role** button at the bottom of the screen.
3. On the screen that follows, give the role a name (label) and use the radio buttons to set its permissions.
4. **Based on default role** - move the slider to the right to create the role based on one of the default roles.
   - **Role based on** - select the Administrator or User option from the dropdown
5. Click the **Save** button to finish.
On the Add New Role screen there are also buttons to give full access to the role (this automatically checks all relevant boxes to allow that role to perform any action) and to deselect all permissions, if you want to start from scratch.

Make sure to enable either the Select resources manually on virtual server creation or the Select instance package on virtual server creation permission, or both if required. If the user does not have any of these permissions enabled, they will not be able to create virtual servers.

21.2.2 Edit Role

To edit a role:

1. Go to Control Panel > Roles.
2. You'll see a list of all roles on your system and a number of users assigned to each role.
3. Click the Actions button next to the role you want to change, then click Edit.
4. On the screen that appears, change the role's description and permissions, then click the Save button.

21.2.3 Clone Role

You can copy the role with all its permissions in OnApp. To clone a role:

1. Go to Control Panel > Roles.
2. You'll see a list of all roles in your system and a number of users assigned to each role.
3. Click the **Actions** button next to the role you want to change, then click **Clone**.

Now the role is copied with the name of the original role proceeded with the date and time suffix.

To change the role’s name or the set of permissions, edit its details:

1. Go to **Control Panel > Roles**.
2. You'll see a list of all roles in your system and a number of users assigned to each role.
3. On the screen that appears, click the **Edit** (pencil) icon.
4. Change the permissions and role's label if required.
5. Click **Save** to apply the changes.

To clone a default role to a new user, go to **Control Panel > Roles >Templates Role** tab. Clicking on the label of a role, you will see the template role details and the assigned permissions.

### 21.2.4 Delete Role

To delete a role:

1. Go to **Control Panel > Roles**.
2. You'll see a list of all roles in your system.
3. Click the **Actions** button next to the role you want to delete, then click **Delete**. You'll be asked for confirmation before the role is removed.
22 Restrictions Sets

The restrictions set is a customizable group of limitations. Configure restrictions sets to create a sub-admin role, i.e. reseller role, with control over a limited amount of cloud resources. This tool gives cloud administrators more flexibility in limiting resources and operations available to reseller role(s). Creating a new restrictions set associates a role or number of roles with certain resources' limitations. The resellers can only view and control the part of cloud assigned to them by the cloud administrator. Within that part they have admin permissions. However, they cannot view or use the resources of the whole cloud.

Previously, the exact list of resources and actions that the users were able to handle in their cloud was defined by the following parameters:

- **bucket** - configures which resources are available to users (e.g. data store zones, recipes, network zones, and so on). If none are added, the user will have unlimited resources.

- **roles/permissions** - specifies which actions the user can perform with those resources configured by the bucket (e.g. See all data store zones in the cloud, edit own recipes only, etc.).

The restrictions sets add the possibility to tie the user limitations with the user groups. With this new option, you can choose if the particular resources are restricted by the following:

- **buckets** - if restricted by buckets, the resellers will be able to manage only those resources which are added to a bucket. If nothing is added, no resources will be available.

- **user groups** - if the resource is restricted by user group, the reseller will be able to handle only the resources owned by the users of their group.

See also:

- [Create and Manage Restriction Sets](#)
- [Manage Groups](#)
- [Buckets](#)

- Resellers cannot create any new zones or resources.

- A reseller cannot create roles, therefore, the roles that reseller requires have to be created by the cloud administrator. Further corrections to user roles can only be performed by the cloud administrator.

- Reseller’s users have the same permissions as regular OnApp users.

- We recommend that the cloud administrator grants the reseller full access to all resources excluding the following permissions:
  - **Restrictions Resources group**
  - **Restrictions Sets group**
  - **Create/update/destroy role**
  - **Create new zones or resources**
### 22.1 List of Restrictions Resources

Restrictions sets can limit the following resources:

Some resources can be limited both by **bucket** and **user group**. If two restrictions are selected for one parameter, the reseller’s access to this resource will be defined by both these limitations at the same time.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Restriction Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity logs</td>
<td>by user group</td>
<td>The reseller can see the activity log of those users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Autoscaling configuration</td>
<td>by user group</td>
<td>The reseller can manage only those autoscaling configurations, which are created for VSs created by users who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage autoscaling configurations for VSs which are created on Compute resources in Compute zones added to reseller bucket.</td>
</tr>
<tr>
<td>Backups server zones</td>
<td>by bucket resources</td>
<td>The resellers can manage backup server zones within the limits set in their bucket.</td>
</tr>
<tr>
<td>Backup servers</td>
<td>by bucket resources</td>
<td>The reseller can see and use only those backup servers, which are set in his bucket.</td>
</tr>
<tr>
<td>Backups</td>
<td>by user group</td>
<td>The reseller can configure only those backups, which are created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage backups created on backup server zones added to the reseller bucket.</td>
</tr>
<tr>
<td>Base resources</td>
<td>by user group</td>
<td>The reseller can manage only those base resources of buckets (Miscellaneous section) which are assigned to users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Buckets</td>
<td>by user group</td>
<td>The reseller can manage only those buckets, which are assigned to users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Blueprints</td>
<td>by bucket resources</td>
<td>The reseller can manage blueprints stored on data store zones which are added to reseller bucket.</td>
</tr>
<tr>
<td></td>
<td>by user group</td>
<td>The reseller can see and use only those blueprints, which were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Data store zones</td>
<td>by bucket resources</td>
<td>The reseller can manage data store zones within the limits set in his bucket.</td>
</tr>
<tr>
<td>Data stores</td>
<td>by bucket resources</td>
<td>The reseller can manage data stores added to data store zones specified in their bucket. Without this restriction, the</td>
</tr>
<tr>
<td>Resource</td>
<td>Restriction Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Disks</td>
<td>by user group</td>
<td>The reseller can manage only those disks, which are used by customers, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage disks located on data store zones which are assigned to their bucket.</td>
</tr>
<tr>
<td>DNS zones</td>
<td>by user group</td>
<td>The reseller can manage only those DNS zones, which are created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Edge groups</td>
<td>by bucket resources</td>
<td>The reseller can manage edge groups within the limits set in his bucket.</td>
</tr>
<tr>
<td>Edge servers</td>
<td>by user group</td>
<td>The reseller can manage only those edge servers, which are created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage edge servers within the limits set in his bucket.</td>
</tr>
<tr>
<td>Firewall rules</td>
<td>by user group</td>
<td>The reseller can manage only those firewall rules, which are set by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage firewall rules for VSs created in network zones which are added to the reseller bucket.</td>
</tr>
<tr>
<td>Compute zones</td>
<td>by bucket resources</td>
<td>The reseller can manage Compute zones within the limits set in his bucket.</td>
</tr>
<tr>
<td>Compute resources</td>
<td>by bucket resources</td>
<td>The reseller can manage Compute resources assigned to Compute zones which are added to their bucket.</td>
</tr>
<tr>
<td>iFrames</td>
<td>by user group</td>
<td>The reseller can manage only those iFrames, which are created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Template groups</td>
<td>by bucket resources</td>
<td>The reseller can manage template groups within the limits set in his bucket.</td>
</tr>
<tr>
<td>Templates</td>
<td>by bucket resources</td>
<td>The reseller can manage templates assigned to template stores which are added to the reseller bucket.</td>
</tr>
<tr>
<td>IO statistics</td>
<td>by user group</td>
<td>The reseller can monitor only IO statistics of those users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage IO statistics stored on data store zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>Resource</td>
<td>Restriction Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Virtual server's</td>
<td>by user group</td>
<td>The reseller can manage IP addresses for VSs, which are owned by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>IP addresses</td>
<td>by bucket resources</td>
<td>The reseller can manage IP addresses for VSs running on Compute resources assigned to Compute zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>IP addresses</td>
<td>by bucket resources</td>
<td>The reseller can manage IP addresses in the network zones added to reseller buckets.</td>
</tr>
<tr>
<td>Last access log</td>
<td>by user group</td>
<td>The reseller can view only the last access log of those users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Load balancers</td>
<td>by user group</td>
<td>The reseller can manage only those load balancers that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can manage load balancers running on Compute resources attached to Compute zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>Load balancing clusters</td>
<td>by user group</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket resources</td>
<td>The reseller can see and manage load balancing clusters running on Compute resources attached to Compute zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>Log items</td>
<td>by user group</td>
<td>The reseller can view only the log items of users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Nameservers</td>
<td>by bucket resources</td>
<td>The reseller can configure resolvers on network zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>Network zones</td>
<td>by bucket resources</td>
<td>The reseller can see and manage network zones within the limits set in his bucket.</td>
</tr>
<tr>
<td>Networks</td>
<td>by bucket resources</td>
<td>The reseller can see and manage only networks attached to network zones which are added to reseller bucket.</td>
</tr>
<tr>
<td>OAuth providers</td>
<td>by user group</td>
<td>The reseller can configure only those OAuth identity providers that are used by customers, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Payments</td>
<td>by user group</td>
<td>The reseller can view only the payments made by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Recipe groups</td>
<td>by bucket resources</td>
<td>The reseller can see and manage recipe groups within the limits set in his bucket.</td>
</tr>
<tr>
<td>Recipes</td>
<td>by user group</td>
<td>The reseller can manage only those recipes, that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>Resource</td>
<td>Restriction Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>by bucket</td>
<td>The reseller can manage recipes assigned to recipe groups which are added to the reseller bucket.</td>
</tr>
<tr>
<td>Roles</td>
<td>by user group</td>
<td>The reseller can see and manage only those roles that are assigned to his user group.</td>
</tr>
<tr>
<td>SAML identity</td>
<td>by user group</td>
<td>The reseller can see and manage only those SAML identity providers that were configured by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>providers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule logs</td>
<td>by user group</td>
<td>The reseller can view only the schedule logs of the users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket</td>
<td>The reseller can view schedule logs depending on where the backup schedules have been taken:</td>
</tr>
<tr>
<td></td>
<td>resources</td>
<td>• for normal backups, the schedule logs for data store zones added to reseller bucket are available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• for incremental backups, the schedule logs for Compute zones added to reseller bucket are available</td>
</tr>
<tr>
<td>Schedules</td>
<td>by user group</td>
<td>The reseller can see and manage only those schedules, that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket</td>
<td>The reseller can view schedules depending on where they have been taken:</td>
</tr>
<tr>
<td></td>
<td>resources</td>
<td>• for normal backups, the schedules for data store zones added to reseller bucket are available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• for incremental backups, the schedules for Compute zones added to reseller bucket are available</td>
</tr>
<tr>
<td>Storage servers</td>
<td>by user group</td>
<td>The reseller can see and manage only those storage servers, that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td></td>
<td>by bucket</td>
<td>The reseller can manage storage servers that are based on Compute resources from Compute zones added to reseller bucket.</td>
</tr>
<tr>
<td></td>
<td>resources</td>
<td></td>
</tr>
<tr>
<td>Transactions</td>
<td>by user group</td>
<td>The reseller can view only the transactions of those users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td>User groups</td>
<td>by user group</td>
<td>The reseller can see and manage only those user groups, that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
</tbody>
</table>

If there is a restriction set by user group, then the counter for Users under the Roles menu.
### Resource Restriction Type Description

- **White IPs**
  - **by user group**: The reseller can see and manage only those white IPs that were added by users, who are members of the user group to which this reseller is assigned.

- **Users**
  - **by user group**: The reseller can see and manage only those users who are members of the user group to which this reseller is assigned.

- **Virtual server snapshots**
  - **by user group**: The reseller can see and manage only those virtual server snapshots, that were created by users, who are members of the user group to which this reseller is assigned.
  - **by bucket resources**: The reseller can see and manage snapshots of virtual servers running on the Compute resources from the Compute zones added to reseller bucket.

- **Virtual servers**
  - **by user group**: The reseller can manage only those virtual servers, that were created by users, who are members of the user group to which this reseller is assigned.
  - **by bucket resources**: The reseller can see and create virtual servers within the limits set in his bucket.

- **Virtual machine statistics**
  - **by user group**: The reseller can view only the virtual server statistics of those users, who are members of the user group to which this reseller is assigned.
  - **by bucket resources**: The reseller can view the statistics for virtual servers running on the Compute resources from the Compute zones added to reseller bucket.

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#### 22.2 Create and Manage Restriction Sets

The restrictions set is a customizable group of limitations. You can configure restrictions sets to create a sub-admin role, i.e. reseller role, with control over a limited amount of cloud resources. Comparing to administrator’s role, resellers have admin permissions within specific part of the cloud. This section contains information on how you can create, edit and delete restrictions sets.

#### 22.2.1 Create Restrictions Sets

To create a restrictions set:

1. Go to the **Control Panel > Admin > Sets** menu.
2. Press the "+" button or click the **Create Set** button at the bottom of the screen.
3. On the screen that follows, fill in the restrictions set details:
   - **Label** - choose a name for the restrictions set
   - **Roles** - select the roles that will be limited under the restrictions set
   - **Resources** - choose the resources you want to limit for the resellers assigned to the role specified above. You can restrict users by bucket or user group or both:
     - **Buckets** - if restricted by buckets, the resellers will be able to access only those resources which are added to a bucket. If nothing is added to a bucket, no resources will be available.
     - **User groups** - if the resource is restricted by the user group, the reseller will be able to access only the resources available to the users of the reseller's group.
     - **Buckets and User groups** - if the resource is restricted both by user group and bucket, the reseller's access to this resource will be defined by both these limitations at the same time. For the list of resources that can be limited under a restrictions set, see **List of Restrictions Resources**.

4. Click the **Submit** button to finish.

**On this page:**
- Create Restrictions Sets
- Edit Restrictions Sets
- Delete Restrictions Sets

**See also:**
- Configure Resource Allocation And Prices
- Create New Role
- List of Restrictions Resources
- Reseller Roles

### 22.2.2 Edit Restrictions Sets

To edit a restrictions set:
1. Go to **Control Panel > Admin > Sets** menu.
2. You'll see a list of all restrictions sets.
3. Click the **Actions** button next to the restrictions set you want to change, then click **Edit**.
4. On the screen that appears, you can change the following parameters:
   - **Label**
   - **Roles**
   - **Resources**
5. Click the **Submit** button.
22.2.3 Delete Restrictions Sets

To delete a restrictions set:

1. Go to Control Panel > Admin > Sets menu.
2. You'll see the list of all restrictions sets.
3. Click the Actions button next to the restrictions set you want to remove, then click Delete. You'll be asked for confirmation before the restrictions set is removed.
23 Create and Manage Resellers

You can configure a reseller role with control over a limited amount of cloud resources, using the restriction sets. Comparing to cloud administrators, resellers have admin permissions within a specific part of the cloud. The reseller's users have the same permissions as regular OnApp users. This section contains information on how you can configure the reseller role.

The reseller role is limited only to the part of the cloud assigned to the reseller by the cloud administrator. Resellers have no influence on the cloud as a whole. This section describes the steps the cloud administrator needs to perform to configure the reseller role. After resellers are granted access to the cloud, they can manage the Look&Feel options of OnApp Control Panel according to their preferences.

To implement and use the reseller instance, cloud administrator must create and tie together the following:

- Reseller role
- Restrictions set
- Bucket
- User group
- Reseller account

23.1 Create Reseller Role

The cloud administrator creates a reseller role for a user. This process is similar to creating other roles in OnApp. For more information on how to create the reseller role, see Create New Role.

We recommend that the cloud administrator grants the reseller full access to all resources, excluding the following permissions:
• **Restrictions Resources group**
• **Restrictions Sets group**
• **Create/update/destroy role**
• **Create new zones or resources:**
  - Create a new backup server zone
  - Create backup resource zone
  - Create a new data store zone
  - Create a new compute zone
  - Create a new DNS zone
  - Create a new network zone
  - Create backup resource
  - Create a new CDN resource
  - Create a new compute resource

### 23.2 Create Restrictions Set

The restrictions set specifies to which resources in the cloud the reseller will have the limited access. If you do not limit a particular resource, the reseller will have unlimited admin-like access to it. When creating a restrictions set, you tie the role to which a reseller user is assigned with the limitations configured in this set. For information on how to create a restriction set, see [Create and Manage Restriction Sets](#).

### 23.3 Create Bucket

Create a bucket for the reseller and specify the limits and prices for the resources. For more information, see [Configure Resource Allocation And Prices](#).

### 23.4 Create User Group

To tie the restrictions set with the end users of the reseller and their resources, create a user group and add there the appropriate user roles.

To create a User Group:

1. Go to your Control Panel > **Admin > Groups**.
2. Click the "+" button to create a new User Group.
3. On the page that appears specify the following parameters:
   - **Label** - specify the user group’s label
23.5 Create Reseller Account

Create a reseller account:
- Assign the reseller role to this account
- Assign the reseller's bucket to this account
- Add the reseller to the user group created earlier

For more information on creating users, see Create User.

23.6 Create Other Roles Required by Reseller

Create the roles which the reseller requires so that they could add their own users based on it, as the reseller cannot create new or update existing roles. This process is similar to creating other roles on OnApp. For more information, refer to Create New Role section. All further corrections to the roles are performed by the cloud administrator. Therefore, it is important that the resellers inform the cloud administrator what functionality they require for users to have access to.

23.7 Billing for Reseller and Reseller's Users

The reseller and the reseller's users are billed separately according to the limits and prices configured in their buckets. The limits and prices set in the reseller's bucket do not affect the limits and prices set in the corresponding user's bucket and vice versa.

If resellers have particular compute/datastore/backup/network zones added to the bucket's Access Control and their users have the corresponding zones restrictions controlled by the bucket, only those zones that are added to the reseller's bucket will be available to the end users. Therefore, the following restricted resources for end users depend upon compute/datastore/backup/network zones added to the reseller's bucket:
- Compute Zones (By bucket resources)
- Data Store Zones (By bucket resources)
- Backup Server Zones (By bucket resources)
- Network Zones (By bucket resources)
24 Buckets

Before users can create virtual servers in your cloud, it is important to give access to the resources and set prices for the resources they use. This is a three-step process: creating a bucket, setting prices and resources limits for that bucket, and then assigning users to that bucket.

In OnApp 5.6 billing plans are substituted by buckets. Buckets enable you to set up resources allocation and pricing separately. If you only want to configure the resources to which a user has access, you can easily do that using the Access Control and the pricing parameters will not appear in the process. If you want to set up both access to the resources and pricing, you only need to proceed from Access Control to Rate Card where the prices and the number of free resources are set.

The bucket representation depends on the resources available in the cloud:

See also:
- Create and Manage Buckets
- Configure Resource Allocation And Prices
- Billing Calculation
- Create and Manage Payments

- If there are no resources of a certain server type in the system, the section corresponding to that server type will not appear in the bucket.
- If there are no resources of a certain type that do not have a server type, e.g. service add-on groups, the selection of that resource will not be available in the Other section of the Access Control/Rate Card.

Buckets are arranged into two tabs:
- Access Control - in this section you configure the resources allocation for the users under this bucket. If you assign a bucket to a user, that user will have access only to those resources which you have added to the bucket. If no resources are added to a section of the Access Control, e.g. compute zones, the user under the bucket will not have access to any of the compute zones in the cloud.
- Rate Card - in this section you set up prices for the resources and the amount of resources users can request for free. Users under the bucket will be billed according to the prices you configure in the Rate Card.

In case you remove from Access Control a resource on which users under the bucket have running servers, the users' existing servers will remain as they are, but users will not be able to use these resources to create new servers. If you leave such a resource in the Rate Card, the users' existing servers will continue to be billed according to the prices you have configured.

The Access Control and Rate Card tabs are further subdivided into sections that depend on the server types of resources you have in the cloud:
- Virtual - the server type under which Xen, KVM, or CloudBoot compute, data store, network and backup server zones of the virtual server type can be added
OnApp 6.4 Administration Guide

- **Smart** - the server type under which KVM compute, data store, network and backup server zones of the smart type can be added
- **Baremetal** - the server type under which XEN compute and network zones of the baremetal type can be added
- **Other** - the resources that relate to the system and do not have a server type. This section includes backup resource zones, template store, edge groups, recipe groups and service add-on groups.

Note that the user under the bucket has access only to the resources added to the Access Control. If you add a resource to the Rate Card but do not add it to the Access Control, the user under this bucket will not have access to that resource.

For convenience, you can duplicate resources from the Access Control to the Rate Card and vice versa. When adding a resource to the Access Control tick the **Duplicate to rate card** checkbox and the resource will be added to the Rate Card no prices and free resource limits. Similarly, when adding a resource to the Rate Card tick the **Duplicate to access control** checkbox box and the resource will be added to the Access Control with no limits by default.

If you have VMware Cloud Director resources in the cloud, the bucket will also contain the VPC server type section. For information on setting up VCD resources in the bucket, refer to the [VMware Cloud Director Buckets](#) section of the OnApp and VMware Cloud Director Configuration Guide.

24.1 Create and Manage Buckets

OnApp buckets manage access to cloud infrastructure as well as allow you to set prices for the resources allocated to a user. In this document, you can find information on how to create and manage buckets.

24.1.1 Create Bucket

To create a bucket:

1. Go to your Control Panel > **Admin > Buckets** menu.
2. On the screen that appears, click the **+** button or click **New Bucket** at the bottom of the screen.
3. Complete the form on the screen that appears:
   - **Label** – enter a name for the bucket
   - **Monthly price** – set a monthly price for the bucket. This price will be applied regardless of the actual prices for used resources.

Be aware that the maximum value that you can set is $10^{13}$.

On this page:

- **Create Bucket**
• Assign Users to Bucket
• Assign User Groups to Bucket
• View List of Users Assigned to Bucket
• Edit Bucket
• Copy Bucket
• Delete Bucket

See also:
• Buckets
• Configure Resource Allocation and Prices
• Billing Calculation

• Currency - set a currency to charge in
4. Specify Windows licensing support settings:
• Tick the Allows mak box to enable MAK licensing for a user signed up for this bucket
• Tick the Allows kms box to allow using KMS service
• Choose Allows own to permit inserting custom licenses
5. Click Save to finish.

When the bucket is created, its Access control and Rate card are empty. That means that no resources are available under that bucket, and the prices are not configured. Click the bucket label to configure resource allocation and pricing.

24.1.2 Assign Users to Bucket

You can assign a bucket to an individual user while creating or editing a user profile.
To assign a bucket to a new user:
1. Go to the Control Panel > Admin > Users menu. The page that loads shows all the users in your cloud.
2. Click the + icon or the Create User button. You will be forwarded to the first step of the user creation wizard.
3. Fill in the login, first and last name, email and password for the new user and click Next.
4. At the second step of the user creation process select the user group and one or several roles for the user from the drop-down lists. Click Next to proceed.
5. Select the bucket under which the user will be billed. Click Next to proceed to the final step of the user creation process.
6. Set the auto suspending options if required and click Save to create the user. The new user will be able to log into OnApp with the credentials you have specified during creation and will be billed according to the bucket you have selected.

To assign a bucket to an existing user:
1. Go to the Control Panel > Admin > Users menu. The page that loads shows all the users in your cloud.
2. Click the Actions icon next to the user to which you want to assign a bucket.

3. To assign a certain bucket to a user, select the required bucket from the drop-down list in the Buckets field. On this page, you can also change other details of the user account, e.g., login, email, password, etc.

4. Click Save to change the details of the user profile. After this process the user will be billed according to the bucket you have selected.

When a user is reassigned to a new bucket all statistics as well as the user's VS prices are recalculated depending on whether CPU units are enabled in the new bucket.

24.1.3 Assign User Groups to Bucket

You can assign a bucket to a user group while creating or editing a group.

The total number of Virtual Servers created by all users in the group cannot exceed the Virtual Servers limit set in the bucket for that user group. The exact number of VSs that can be allocated to each user in the group is not predefined in the group's bucket. Therefore, when one group member uses, for example, half of the group's bucket VS limit, the remaining amount of VSs is left for the rest of users in the group. To provide the exact number of VSs to specific users, you need to specify the VS limit in the individual buckets. If the VS bucket limit is reached, users will not be able to create new virtual servers. Currently, such behavior is implemented only for the Virtual Servers functionality.

To assign a bucket to a new user group:
1. Go to the Control Panel > Admin > User Groups menu. The page that loads shows all the user groups in your cloud.
2. Click the + icon or the Create Group button.
3. At the Add a New User Group page, fill in the user group details:
   - Label - type a name for the user group
   - Buckets - select a bucket for the user group
   - Roles - assign role(s) that come with the appropriate Permissions set
   - User Buckets - specify the list of buckets that will be available for assignment to users within this user group. This parameter relates to restriction sets only.
4. Click Save to create the user group. Users assigned to this group will be charged according to the bucket you have selected.

To assign a bucket to an existing user group:
1. Go to the Control Panel > Admin > User Groups menu. The page that loads shows all the user groups in your cloud.
2. Click the Actions icon next to the target user group and click the Edit button.
3. To assign a certain bucket to a user group, select the required bucket from the drop-down list in the **Buckets** field. On this page, you can also change other details of the user group, e.g., label, roles, etc.

4. Click **Save** to change the details of the user group. As a result, users assigned to this user group will be charged according to the bucket you have selected.

### 24.1.4 View List of Users Assigned to Bucket

You can view the list of users assigned to a bucket from the buckets list page.

To view the list of users assigned to a bucket:

1. Go to **Control Panel > Admin > Buckets**. The page that loads lists all the buckets in your cloud.

2. In the **Associated with users** column click the number next to the bucket you are interested in. This number indicates how many active users are associated with this bucket. You will be forwarded to the list of users to whom the bucket is assigned. The users which have been deleted or deactivated are not shown at this list.

3. Click the user’s **Full Name** to view the account details or click the **Actions** icon next to the user to edit, delete or perform other action related to this user.

### 24.1.5 Edit Bucket

To edit a bucket:

1. Go to your **Control Panel > Admin > Buckets** menu.

2. Click the **Actions** button next to the required bucket and then click **Edit**.

3. Change the required settings and click the **Save** button.

   **Editing a bucket that is associated with more than one user will affect all users attached to it. If you want to affect only a particular user, copy the bucket, assign it to this user and then edit the bucket.**

### 24.1.6 Copy Bucket

To copy a bucket:

1. Go to your **Control Panel > Admin > Buckets** menu. The screen that appears will show all the buckets currently set up on the cloud.

2. Click the **Actions** icon next to a required bucket, then click **Copy**.

3. You will be forwarded to the Access Control section of the copied version of the original bucket. The copy will be displayed in the bucket's list at **Control Panel > Admin > Buckets** with a label consisting of ‘Bucket clone of’ and the name of the original bucket, e.g. ‘Bucket Clone of Test.Bucket’.
24.1.7 Delete Bucket

To delete a bucket:

1. Go to your Control Panel > Admin > Buckets menu. The screen that appears will show all the buckets currently set up in the cloud.

2. Click the Delete icon next to a bucket to remove it from the system. You'll be asked for confirmation before the bucket is removed.

Deleting a bucket that is associated with more than one user will affect all users attached to it. If you want to delete or change the bucket for a particular user, go to the Admin > Users menu and edit the bucket in the user profile.

24.2 Configure Resource Allocation And Prices

Buckets enable you to set up resources allocation and pricing separately. They are subdivided into two tabs:

- **Access Control** - in this section you configure the resources allocation for the users under this bucket. If you assign a bucket to a user, that user will have access only to those resources which you have added to the bucket. If no resources are added to a section of the Access Control, e.g. compute zones, the user under the bucket will not have access to any of the compute zones in the cloud.

- **Rate Card** - in this section you set up prices for the resources and the amount of resources users can request for free. Users under the bucket will be billed according to the prices you configure in the Rate Card.

These tabs are further subdivided into sections that depend on the server types of resources you have in the cloud:

- **Virtual** - the server type under which Xen, KVM, or CloudBoot compute, data store, network and backup server zones of the virtual server type can be created

- **Smart** - the server type under which KVM compute, data store, network and backup server zones of the smart type can be created

- **Baremetal** - the server type under which XEN compute and network zones of the baremetal type can be created

- **Other** - the resources that relate to the system and do not have a server type. This section includes backup resource zones, template store, edge groups, recipe groups and service add-on groups.

For convenience, you can duplicate resources from the Access Control to the Rate Card and vice versa. When adding a resource to the Access Control tick the **Duplicate to rate card** checkbox and the resource will be added to the Rate Card with no prices and free limits by default. Similarly, when adding a resource to the Rate Card tick the **Duplicate to access control** checkbox and the resource will be added to the access control with no limits by default.
Be careful when deleting or editing resources in buckets assigned to users or user groups and which have been used to build servers, as any changes will affect these servers. For example, if you have a server running on a template and the template’s store is removed from the bucket, the server will remain running but it will not be possible to edit it. Therefore, we advise to clone the required bucket and make the necessary changes in the cloned version.

On this page:

- Configure Access Control
  - Access Control for Virtual Server Type
  - Access Control for Baremetal Server Type
  - Access Control for Smart Server Type
  - Access Control for Other Resources
- Configure Rate Card
  - Rate Card for Virtual Server Type
  - Rate Card for Baremetal Server Type
  - Rate Card for Smart Server Type
  - Rate Card for Other Resources

See also:

- Buckets
- vCloud Director Configuration Administration Guide
- Assign CDN Edge Groups to Bucket

### 24.2.1 Configure Access Control

Access control is used to manage user’s resources availability. For the newly created bucket, the Access Control is empty, and that means that no resources are available to a user to whom this bucket is assigned. To make compute, disk space, or networking resources available, add the corresponding zones to a bucket.
If you do not add resources to a section of Access Control, e.g. compute zone, the user under this bucket will not have access to any of the compute zones in the cloud.

If you remove a template store or compute/data store/network/backup server zone from the user's Access Control, it will not be possible to edit the resources of the user's servers running in this zone(s).

To manage the resources allocation:

1. Go to your Control Panel > Admin > Buckets menu.
2. Click a label of a bucket. You will be redirected to the Access Control tab of the bucket.
3. Click an icon to select the required server type and add resources as follows:
   - Click the + in the appropriate box.
   - When the new windows pops up, set limits for resources (see the table below for reference).
   - Select as many compute zones as you need to set the same limits for all resources of the following types:
     1. **Compute zone resource**
     2. **Data store zone resource**
     3. **Network zone resource**
     4. **Backup server zone resource**

After you submit changes, you can edit limits for any zone resource in the bucket.

Select the Duplicate to rate card checkbox if you want to set free limits and prices for the resources.

### 24.2.1.1 Virtual Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>Virtual Servers</td>
<td>Max</td>
<td>The maximum number of virtual servers users can create in the cloud. This parameter affects the number of virtual servers, VSs in Federation and load balancers users can create. Leave the '-' value to set an unlimited amount of VSs available to users under this bucket.</td>
</tr>
<tr>
<td></td>
<td>Templates, ISO's &amp; Backups Storage</td>
<td>Max</td>
<td>The total amount of disk space (GB) users can request for storing their backups, ISOs and templates under this bucket. The Templates, ISOs &amp; Backup Storage limit will apply only if you use Compute resources for disk-related actions in your cloud.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>Templates</td>
<td>Max</td>
<td></td>
<td>Leave the '-' value to provide an unlimited amount of disk space for storing backups, ISOs and OVAs under this bucket. The maximum number of templates which users can create in the cloud. The disk space available for templates is defined by the <em>Templates, ISO's &amp; Backups Storage</em> limit. You can set prices per template per hour in the bucket's Rate Card. Leave the '-' value to let a user create an unlimited amount of templates under this bucket.</td>
</tr>
<tr>
<td>Autoscaling</td>
<td>Max</td>
<td></td>
<td>The maximum number of VSs for which the user can enable autoscaling under this bucket. After this number runs out, the user will not be able to switch on autoscaling for the next VSs. Leave the '-' value to let a user apply autoscaling to an unlimited amount of VSs under this bucket.</td>
</tr>
<tr>
<td>Backups</td>
<td>Max</td>
<td></td>
<td>The maximum number of backups (both manual and auto-backups) users can create under this bucket. Make sure that <em>Backups</em> max limit is no less than the rotation period or it will prevent auto-backups from creation. If the <em>Backups</em> max limit equals the rotation period, then one more auto-backup will be created to replace the existing one. The disk space available for backups is defined by the <em>Templates, ISO's &amp; Backups Storage</em> limit. The <em>Backups</em> limit will apply only if you use compute resources for disk-related actions in your cloud. Leave the '-' value to let a user create an unlimited amount of backups under this bucket. If there are backup servers in your cloud: set the <em>Backup server zone limits</em> in the bucket as required. set the <em>Backups</em> max limit in the Miscellaneous section of the Access Control to 0 to prevent creating both manual and auto-backups on compute resources.</td>
</tr>
<tr>
<td>ISO templates</td>
<td>Max</td>
<td></td>
<td>The maximum number of ISO templates users can create under this bucket. The disk space available for ISO templates is defined by the <em>Templates, ISO's &amp; Backups Storage</em> limit.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>Acceleration</td>
<td>Max</td>
<td></td>
<td>Leave the '-' value to let a user create an unlimited amount of ISO templates under this bucket. After you upgrade your Control Panel to 6.0 version, this resource becomes unavailable in Access control and available only in Rate cards section.</td>
</tr>
<tr>
<td>Container Server</td>
<td>Max</td>
<td></td>
<td>The maximum number of container servers in the cloud that the users can create under this bucket. Leave the '-' value to let a user create an unlimited amount of container servers under this bucket.</td>
</tr>
<tr>
<td>Application Servers</td>
<td>Max</td>
<td></td>
<td>The maximum number of application servers in the cloud that the users can create under this bucket. Leave the '-' value to let a user create an unlimited amount of application servers under this bucket.</td>
</tr>
<tr>
<td>Limits for compute zones</td>
<td>CPU Priority</td>
<td>Min</td>
<td>The minimum amount of CPU priority which can be set in the VS creation wizard when the user adds a VS under this bucket in the compute zone. If you enable the Use CPU Units then adding/editing a compute zone in the Access Control, this parameter will not apply to the users under this bucket. Instead, the Max CPU Units parameter will be used.</td>
</tr>
<tr>
<td>CPU Shares</td>
<td>Max</td>
<td>Default</td>
<td>the maximum amount of CPU shares users can request for all their servers in this compute zone under this bucket. Leave the '-' value to provide an unlimited amount of CPU Shares within the compute zone to a user under this bucket. the default amount of CPU shares that will be set in the VS creation wizard when the user adds a VS in this compute zone under this bucket. This parameter will apply to users under this bucket only if you enable the Use default CPU share option when adding/editing a compute zone in the Access Control.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RAM</td>
<td>Min/Max</td>
<td></td>
<td>the minimum amount of RAM that can be set in the VS creation wizard when the user adds a VS under this bucket in the compute zone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the maximum amount of RAM that users can request for all their VSs within this compute zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Leave the '-' value to provide an unlimited amount of RAM within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td>CPU</td>
<td>Min/Default</td>
<td></td>
<td>the minimum amount of virtualized CPU cores that can be set in the VS creation wizard when the user adds a VS under this bucket in the compute zone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the default amount of virtualized CPU cores that will be set in the VS creation wizard when the user adds a VS in this compute zone under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>This parameter will apply to users under this bucket only if you enable the Use default CPU option when adding/editing a compute zone in the Access Control.</td>
</tr>
<tr>
<td>CPU Cores</td>
<td>Max</td>
<td></td>
<td>The maximum amount of CPU cores that users can request for all their VSs within this compute zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Leave the '-' value to provide an unlimited amount of CPU cores within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td>CPU Units</td>
<td>Max</td>
<td></td>
<td>The maximum amount of CPU units that users can request for all their VSs within this compute zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>This parameter will apply to users under this bucket only if you enable the Use CPU Units option when adding/editing a compute zone in the Access Control.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Leave the '-' value to provide an unlimited amount of CPU units within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td>Use default CPU</td>
<td>Yes/No</td>
<td></td>
<td>Select whether you wish a default amount of CPU cores to be set in the VS creation wizard when the user adds a VS in this compute zone under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You can set the default amount of CPU cores using the Default CPU limit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>It is only possible to enable the Use default CPU option when resource prices and max limit are not set.</td>
</tr>
<tr>
<td>Use default CPU shares</td>
<td>Yes/No</td>
<td></td>
<td>Select whether you wish a default amount of CPU shares to be set in the VS creation wizard when the user adds a VS in this compute zone under this bucket.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>Limits for data store zones</td>
<td>Disk Size</td>
<td>Max</td>
<td>The maximum amount of disk space (GB) users can request in the data store zone under the bucket. Leave the '-' value to provide an unlimited amount of disk space within the data store zone to a user under this bucket.</td>
</tr>
<tr>
<td>Limits for network zones</td>
<td>IP Addresses</td>
<td>Max</td>
<td>The maximum amount of IP addresses users can request in this network zone under the bucket. Leave the '-' value to provide an unlimited amount of IP addresses within the network zone to a user under this bucket.</td>
</tr>
<tr>
<td>Limits for backup server zones</td>
<td>Backup</td>
<td>Max</td>
<td>The maximum number of backups (both manual and auto-backups) users can create under this bucket. Make sure that Backups max limit is no less than the rotation period or it will prevent auto-backups from creation. If the Backups max limit equals the rotation period, then one more auto-backup will be created to replace the existing one. Leave the '-' value to provide an ability to create an unlimited number of backups within the backup server zone to a user under this bucket.</td>
</tr>
<tr>
<td>Backup disk size</td>
<td>Max</td>
<td>The maximum amount of disk space (GB) users get for storing their backups in this backup server zone under the bucket. When the backup space is exceeded, users can take backups, but they cannot restore from them unless the size is freed up. Leave the '-' value to provide an unlimited amount of disk space for storing backups within the backup server zone to a user under this bucket.</td>
<td></td>
</tr>
</tbody>
</table>

You can set the default amount of CPU shares using the *Default CPU shares* limit. It is only possible to enable the *Use default CPU shares* option when resource prices and max limit are not set.

Use CPU Units

Select whether you wish to use CPU shares instead of CPU priority.

You can set the amount of CPU units available to users under this bucket using the *Max CPU Units* limit.

Please also set the Backups max limit to 0 in the Miscellaneous section of the
<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template</td>
<td>Max</td>
<td></td>
<td>The maximum amount of templates users can create in this backup server zone under the bucket. Leave the '-' value to provide an ability to create an unlimited number of templates within the backup server zone to a user under this bucket.</td>
</tr>
<tr>
<td>Template disk size</td>
<td>Max</td>
<td></td>
<td>The maximum amount of disk space (GB) users get for storing their templates in this backup server zone under the bucket. Leave the '-' value to provide an unlimited amount of disk space for storing templates within the backup server zone to a user under this bucket.</td>
</tr>
<tr>
<td>OVA</td>
<td>Max</td>
<td></td>
<td>The maximum amount of OVAs users can create in this backup server zone under the bucket. Leave the '-' value to provide an ability to create an unlimited number of OVAs within the backup server zone to a user under this bucket.</td>
</tr>
<tr>
<td>OVA disk size</td>
<td>Max</td>
<td></td>
<td>The maximum amount of disk space (GB) users get for storing their OVAs in this backup server zone under the bucket. Leave the '-' value to provide an unlimited amount of disk space for storing OVAs within the backup server zone to a user under this bucket.</td>
</tr>
<tr>
<td>Limits for guaranteed minIOPS Requests</td>
<td>Max</td>
<td></td>
<td>The maximum number of IOPS requests users can request in this data store zone under the bucket. Leave the '-' value to provide an unlimited amount of IOPS requests within the data store zone to a user under this bucket. This parameter is SolidFire related.</td>
</tr>
<tr>
<td>Limits for instance packages Instance Package</td>
<td>Compute zones Data store zones Network zones</td>
<td>Select an instance package and the compute, data store, and/or network zone(s) in which this package will be available to users under this bucket.</td>
<td></td>
</tr>
</tbody>
</table>

If no zones are selected for the instance package that you added to the Access Control, the instance package will be available in all zones added to this bucket. Here you can also edit the list of zones in which the package will be available to users under this bucket.
### 24.2.1.2 Baremetal Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits for compute zones</td>
<td>Select a zone from the dropdown menu.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limits for network zones</td>
<td>IP Addresses</td>
<td>Max</td>
<td>The maximum amount of IP addresses users can request in this network zone under the bucket.</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Baremetal server</td>
<td>Max</td>
<td>The total amount of baremetal servers users can create under this bucket.</td>
</tr>
</tbody>
</table>

### 24.2.1.3 Smart Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>Smart Servers</td>
<td>Max</td>
<td>The maximum number of smart servers users can create in the cloud. Leave the '-' value to let a user create an unlimited amount of smart servers under this bucket.</td>
</tr>
<tr>
<td>Templates, ISO's &amp; Backups Storage</td>
<td>Max</td>
<td>The total amount of disk space (GB) users can request for storing their backups, ISOs and templates under this bucket. The Templates, ISO's &amp; Backup Storage limit will apply only if you use Compute resources for disk-related actions in your cloud. Leave the '-' value to provide an unlimited amount of disk space for storing backups, ISOs and OVAs under this bucket.</td>
<td></td>
</tr>
<tr>
<td>Backups</td>
<td>Max</td>
<td>The maximum number of backups users can create under this bucket. The disk space available for backups is defined by the Templates, ISO's &amp; Backups Storage limit. The Backups limit will apply only if you use compute resources for disk-related actions in your cloud. Leave the '-' value to let a user create an unlimited amount of backups under this bucket.</td>
<td></td>
</tr>
</tbody>
</table>

If there are backup servers in your cloud:

- set the Backup server zone limits in the bucket as required.
- set the Backups and Templates, ISO's & Backups Storage max limit in the Miscellaneous section of the Access Control to 0 to prevent creating backups on compute resources.
<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits for compute zones</td>
<td>CPU Cores</td>
<td>Max</td>
<td>The maximum amount of CPU cores that users can request for all their smart servers within this compute zone under the bucket. Leave the '-' value to provide an unlimited amount of CPU cores within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td></td>
<td>CPU Shares</td>
<td>Max</td>
<td>The maximum amount of CPU shares (%) users can request for all their servers in this compute zone under this bucket. Leave the '-' value to provide an unlimited amount of CPU shares within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td></td>
<td>CPU Units</td>
<td>Max</td>
<td>The maximum amount of CPU units that users can request for all their smart servers within this compute zone under the bucket. This parameter will apply to users under this bucket only if you enable the Use CPU Units option when adding/editing a compute zone in the Access Control. Leave the '-' value to provide an unlimited amount of CPU units within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td></td>
<td>RAM</td>
<td>Max</td>
<td>The maximum amount of RAM (GB) that users can request for all their smart servers within this compute zone under the bucket. Leave the '-' value to provide an unlimited amount of RAM within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td></td>
<td>Use CPU Units</td>
<td>Yes/No</td>
<td>Select whether you want to use CPU units instead of CPU shares. You can set the amount of CPU units available to users under this bucket using the Max CPU Units limit.</td>
</tr>
<tr>
<td>Limits for data store zones</td>
<td>Disk Size</td>
<td>Max</td>
<td>The maximum amount of disk space (GB) users can request in the data store zone under the bucket. Leave the '-' value to provide an unlimited amount of disk space within the data store zone to a user under this bucket.</td>
</tr>
<tr>
<td>Limits for network zones</td>
<td>IP Addresses</td>
<td>Max</td>
<td>The maximum amount of IP addresses users can request in this network zone under the bucket. Leave the '-' value to provide an unlimited amount of IP addresses within the network zone to a user under this bucket.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Values</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Port Speed</td>
<td>Max</td>
<td>The maximum port speed (Mbps) users can request in this network zone under the bucket. Leave the '-' value to provide an unlimited port speed within the network zone to a user under this bucket.</td>
<td></td>
</tr>
<tr>
<td>Limits for backup server zones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup</td>
<td>Max</td>
<td>The maximum amount of backups users can create in this backup server zone under the bucket. Leave the '-' value to provide an ability to create an unlimited number of backups within the backup server zone to a user under this bucket.</td>
<td></td>
</tr>
<tr>
<td>Backup disk size</td>
<td>Max</td>
<td>The maximum amount of disk space (GB) users get for storing their backups in this backup server zone under the bucket. When the backup space is exceeded, users can take backups, but they cannot restore from them unless the size is freed up. Leave the '-' value to provide an unlimited amount of disk space for storing backups within the backup server zone to a user under this bucket.</td>
<td></td>
</tr>
<tr>
<td>Template</td>
<td>Max</td>
<td>The maximum amount of templates users can create in this backup server zone under the bucket. Leave the '-' value to provide an ability to create an unlimited number of templates within the backup server zone to a user under this bucket.</td>
<td></td>
</tr>
<tr>
<td>Template disk size</td>
<td>Max</td>
<td>The maximum amount of disk space (GB) users get for storing their templates in this backup server zone under the bucket. Leave the '-' value to provide an unlimited amount of disk space for storing templates within the backup server zone to a user under this bucket.</td>
<td></td>
</tr>
</tbody>
</table>

24.2.1.4 Other Resources

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits for backup resource zones</td>
<td>Select which backup resource zones will be available to users under this bucket.</td>
</tr>
<tr>
<td>Limits for edge groups</td>
<td>Select which edge groups will be available to users under this bucket.</td>
</tr>
<tr>
<td>Limits for CDN bandwidth</td>
<td>Specify the maximum CDN bandwidth limit in Gb per month available for each user under this bucket.</td>
</tr>
</tbody>
</table>
### Resource Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits for template store</td>
<td>Select which template stores from which templates will be available for users to select during a virtual server creation.</td>
</tr>
<tr>
<td>Limits for recipe groups</td>
<td>Select which groups of recipes will be available to users under this bucket.</td>
</tr>
<tr>
<td>Limits for service add-on groups</td>
<td>Select which service add-on groups will be available for users to assign to virtual servers.</td>
</tr>
<tr>
<td>Limits for blueprint groups</td>
<td>Select which blueprint groups will be available for users under this bucket.</td>
</tr>
</tbody>
</table>

#### 24.2.2 Configure Rate Card

Rate Card is used to manage the prices and the amount of free limits for resources. For the newly created bucket, the Rate Card is empty, and that means that a user, to whom this bucket is assigned, is not billed for any of the resources in the system. To configure pricing for compute, disk space, or networking resources, add the corresponding zones to the bucket's Rate Card.

If you add a resource to the Rate Card but do not add it to the Access Control, the user under this bucket will not have access to that resource.

In case you remove from Access Control a resource on which users under the bucket have running servers, the users' existing servers will remain as they are, but users will not be able to access these resources to create new servers. If you leave such a resource in the Rate Card, the users' existing servers will continue to be billed according to the prices you have configured.

If you remove a template store or compute/data store/network/backup server zone from the Rate Card, the prices for the removed resource will be set to zero for the servers using this zone(s).

Note that if you set price equal number with precision 10 or more (e.g.:0.008789062511) the price is saved equal number with precision 8 (e.g.:0.00878906).

If you want to disable prices completely you can do so by enabling the Disable billing slider at the [Edit System Configuration](#) page. When the billing is disabled, the Rate Cards are removed from existing buckets. Note that if billing is enabled again, the prices won't be recalculated again. Instead, the price calculation will start with the next hour.

To manage pricing for the resources:

Go to your Control Panel > Admin > Buckets menu.

Click a label of a bucket. You will be redirected to the Access Control tab of the bucket.

Click the Rate Card tab.

Click an icon to select the required server type and add resources as follows:

- Click the + in the appropriate section.
When the new windows pops up, set the value for the free limit and the price (see the table below for reference).

Select as many compute zones as you need to set the same limits for all resources of the following types:

- **Compute zone resource**
- **Data store zone resource**
- **Network zone resource**
- **Backup server zone resource**

After you submit changes, you can edit free limits and prices for any zone resource in the bucket.

Select the **Duplicate to access control** checkbox if you want to add the resource not only to Rate Card but also to Access Control.

### 24.2.2.1 Virtual Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>Autoscaling</td>
<td>Free</td>
<td>the amount of virtual servers for which the user can enable autoscaling for free under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price</td>
<td>the price per VS per hour for VSs for which the user enables autoscaling. This price applies to servers that exceed the free Autoscaling limit set in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Templates, ISO's &amp; Backups Storage</td>
<td>Free</td>
<td>Price</td>
<td>the amount of free disk space (in GB) users can allocate to storing backups, ISOs and templates together.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per GB per hour of disk space the user allocates to storing backups, ISOs and templates. This price applies once the user exceeds the free Templates, ISO's &amp; Backups Storage limit set in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Backups</td>
<td>Free</td>
<td>Price</td>
<td>the number of backups users can create for free under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per backup created by the user under this bucket per hour. This price applies once the user exceeds the amount of free backups available in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Templates</td>
<td>Free</td>
<td>Price</td>
<td>the number of templates a user under this bucket can create for free.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per template created by the user under this bucket per hour. This price applies once the user exceeds the amount of free templates available in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ISO Templates</td>
<td></td>
<td>Free Price</td>
<td>the number of ISOs a user under this bucket can create for free.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per ISO created by the user under this bucket per hour. This price applies once the user exceeds the amount of free ISOs available in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Acceleration</td>
<td>Free Price</td>
<td></td>
<td>the amount of virtual servers for which the user can enable acceleration for free under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per VS per hour for VSs for which the user enables acceleration. This price applies to servers that exceed the free Acceleration limit set in the bucket's Rate Card.</td>
</tr>
<tr>
<td>DRaaS</td>
<td>Price Disk Size</td>
<td></td>
<td>The additional price for disk size (GB/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Note that when establishing replication DRaaS dashboard an additional 1GB disk is created on the shadow VS to be used to store replication metadata. The price for this additional disk corresponds to the value of the Price Disk Size set in the bucket.</td>
</tr>
<tr>
<td></td>
<td>Price RAM</td>
<td></td>
<td>The additional price for RAM (GB/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Cores</td>
<td></td>
<td>The additional price for CPU (core/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Shares</td>
<td></td>
<td>The additional price for CPU shares (%/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Units</td>
<td></td>
<td>The additional price for CPU units (unit/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price Nodes</td>
<td></td>
<td>The additional price for nodes (node/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td>Pricing for compute zones</td>
<td>CPU</td>
<td>Price on Price off</td>
<td>the price per CPU core per hour, charged for powered on VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per CPU core per hour, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>RAM</td>
<td>Price on Price off Free</td>
<td>the price for RAM GB/hr, charged for powered on VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The price for RAM GB/hr, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>--------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price for RAM GB/hr, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of RAM (GB/hr) users can request for free for the total number of their VSs built in this compute zone under this bucket</td>
</tr>
<tr>
<td>CPU Shares</td>
<td>Price on</td>
<td>Price off</td>
<td>the price for CPU shares %/hr, charged for powered on VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Price off</td>
<td>Free</td>
<td>the price for CPU shares %/hr, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of CPU shares users can request for free for the total number of their VSs built in this compute zone under this bucket</td>
</tr>
<tr>
<td>CPU Units</td>
<td>Price on</td>
<td>Price off</td>
<td>the price per CPU unit per hour, charged for powered on VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Price off</td>
<td>Free</td>
<td>the price per CPU unit per hour, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of CPU units users can request for free for the total number of their VSs built in this compute zone under this bucket</td>
</tr>
<tr>
<td>CPU Cores</td>
<td>Free</td>
<td></td>
<td>The amount of CPU cores users can request for free for the total number of VSs built in this compute zone under this bucket</td>
</tr>
<tr>
<td>Pricing for data store zones</td>
<td>Disk Size</td>
<td>Price on</td>
<td>the price per GB of disk space per hour, charged for powered on VSs which are built in this data store zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Price off</td>
<td>Free per month</td>
<td>the price per GB of disk space per hour, charged for powered off VSs which are built in this data store zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td></td>
<td>set the the amount of disk space (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Disk Size parameter, the user will be billed only for the disk size that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting monthly free amount using the Free Disk Size per month parameter, the free limits for resources are set per month rather</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>Data Read</td>
<td>Price</td>
<td>Free</td>
<td>the price per GB of read data per hour, charged for VSSs which are built in this data store zone under this bucket set the amount of read data (GB/hr) users can request for free either per hour or per month: When setting <em>hourly</em> free amount using the <em>Free Data Read</em> parameter, the user will be billed only for the amount of data read that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting <em>monthly</em> free amount using the <em>Free Data Read per month</em> parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Written</td>
<td>Price</td>
<td>Free</td>
<td>the price per GB of written data per hour, charged for VSSs which are built in this data store zone under this bucket set the amount of written data (GB/hr) users can request for free either per hour or per month: When setting <em>hourly</em> free amount using the <em>Free Data Written</em> parameter, the user will be billed only for the amount of data written that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting <em>monthly</em> free amount using the <em>Free Data Written per month</em> parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Requests</td>
<td>Price</td>
<td>Free</td>
<td>the price per 1M input requests per hour, charged for VSSs which are built in this data store zone under this bucket set the amount of input requests (1M requests/hr) users can request for free either per hour or per month: When setting <em>hourly</em> free amount using the</td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Pricing for network zones

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Requests</td>
<td></td>
<td></td>
<td><strong>Free Input Requests</strong> parameter, the user will be billed only for the amount of input requests that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting <em>monthly</em> free amount using the <strong>Free Input Requests per month</strong> parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Price</strong></td>
<td><strong>Free</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Free per month</strong></td>
<td>the price per 1M output requests per hour, charged for VSs which are built in this datastore zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>set the amount of output requests (1M requests/hr) users can request for free either per hour or per month. When setting <em>hourly</em> free amount using the <strong>Free Output Requests</strong> parameter, the user will be billed only for the amount of output requests that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting <em>monthly</em> free amount using the <strong>Free Output Requests per month</strong> parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
</tr>
<tr>
<td>Pricing for</td>
<td>Port Speed</td>
<td><strong>Price on</strong></td>
<td><strong>Price off</strong></td>
</tr>
<tr>
<td>network zones</td>
<td></td>
<td><strong>Free</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per Mbps of port speed per hour, charged for powered on VSs which are built in this network zone under this bucket</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>the price per Mbps of port speed per hour, charged for powered off VSs which are built in this network zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of port speed (Mbps/hr) users can request for free for the total number of their VSs built in this network zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>IP Addresses</td>
<td><strong>Price on</strong></td>
<td><strong>Price off</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Free</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Free per month</strong></td>
<td>the price per IP address per hour, charged for powered on VSs which are built in this network zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the price per IP address per hour, charged for powered off VSs which are built in this network zone under this bucket</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>Data Sent</td>
<td>Price Free</td>
<td>the price per GB of data sent per hour, charged for VSs which are built in this network zone under this bucket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td>set the amount of data sent (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Data Sent parameter, the user will be billed only for the amount of data sent that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting monthly free amount using the Free Data Sent per month parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Price Free</td>
<td>the price per GB of data received per hour, charged for VSs which are built in this network zone under this bucket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free per month</td>
<td>set the amount of data received (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Data Received parameter, the user will be billed only for the amount of data received that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting monthly free amount using the Free Data Received per month parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
<td></td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pricing for backup server zones</td>
<td>Backup</td>
<td>Price Free</td>
<td>the price per backup per hour, charged for the backups stored in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of backups (backup/hour) users can store in this backup server zone for free under this bucket</td>
</tr>
<tr>
<td></td>
<td>Backup Disk Size</td>
<td>Price Free</td>
<td>the price per GB per hour, charged for the disk size occupied by the user's backups stored in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of disk space (GB/hr) users can request for free to store their backups in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Template</td>
<td>Price Free</td>
<td>the price per template per hour, charged for the backups stored on this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of templates (template/hr) users can store in this backup server zone for free under this bucket</td>
</tr>
<tr>
<td></td>
<td>Template Disk Size</td>
<td>Price Free</td>
<td>the price per GB per hour, charged for the disk size occupied by the user's templates stored in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of disk space (GB/hr) users can request for free to store their templates in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>OVA</td>
<td>Price Free</td>
<td>the price per OVA per hour, charged for the backups stored on this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of OVA (OVA/hr) users can store in this backup server zone for free under this bucket</td>
</tr>
<tr>
<td></td>
<td>OVA Disk Size</td>
<td>Price Free</td>
<td>the price per GB per hour, charged for the disk size occupied by the user's OVAs stored in this backup server zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of disk space (GB/hr) users can request for free to store their OVAs in this backup server zone under this bucket</td>
</tr>
<tr>
<td>Pricing for instance packages</td>
<td>Instance Package</td>
<td>Price on</td>
<td>the price per instance package per hour, charged for powered on VSs which are built using this instance package under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price Overused Bandwidth</td>
<td>the price per instance package per hour, charged for powered off VSs which are built using this instance package under this bucket</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource Name</td>
<td>Values</td>
<td>Description</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>the price per overused bandwidth for each network interface per hour (GB/hr), charged for all VSs which are built using this instance package under this bucket</td>
</tr>
</tbody>
</table>

### 24.2.2.2 Baremetal Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing for network zones</td>
<td>IP Addresses</td>
<td>Free Price</td>
<td>the amount of IP address (IP/hr) users can request for free under this bucket the price per IP per hour, charged for baremetal servers which are built in this network zone under this bucket</td>
</tr>
</tbody>
</table>

### 24.2.2.3 Smart Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>Backups</td>
<td>Free Price</td>
<td>the number of backups users can create for free under this bucket the price per backup created by the user under this bucket per hour. This price applies once the user exceeds the amount of free backups available in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Templates, ISO's &amp; Backups Storage</td>
<td>Free Price</td>
<td>the amount of free disk space (in GB) users can allocate to storing backups, ISOs and templates together the price per GB per hour of disk space the user allocates to storing backups, ISOs and templates. This price applies once the user exceeds the free Templates, ISO's &amp; Backups Storage limit set in the bucket's Rate Card.</td>
<td></td>
</tr>
<tr>
<td>Pricing for compute zones</td>
<td>CPU</td>
<td>Price on Price off</td>
<td>the price per CPU core per hour, charged for powered on smart servers which are built in this compute zone under this bucket the price per CPU core per hour, charged for powered off smart servers which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td>CPU Shares</td>
<td>Price on Price off Free</td>
<td>the price for CPU shares %/hr, charged for powered on smart servers which are built in this compute zone under this bucket the price for CPU shares %/hr, charged for powered off smart servers which are built in this compute zone under this bucket the amount of CPU shares users can request for free for the total number of their smart servers built in this compute zone under this bucket</td>
<td></td>
</tr>
</tbody>
</table>

If you enable the Use CPU Units option while adding/editing a compute zone in the Access Control,
<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Units</td>
<td>Price</td>
<td>on</td>
<td>the price per CPU unit per hour, charged for powered on smart servers which are built in this compute zone under this bucket. The price per CPU unit per hour, charged for powered off smart servers which are built in this compute zone under this bucket. The amount of CPU units users can request for free for the total number of their smart servers built in this compute zone under this bucket. These parameters will apply to users under this bucket only if you enable the <em>Use CPU Units</em> option when adding/editing a compute zone in the Access Control.</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>Price</td>
<td>on</td>
<td>the price for RAM GB/hr, charged for powered on smart servers which are built in this compute zone under this bucket. The price for RAM GB/hr, charged for powered off smart servers which are built in this compute zone under this bucket. The amount of RAM (GB/hr) users can request for free for the total number of their smart servers built in this compute zone under this bucket.</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Cores</td>
<td>Free</td>
<td></td>
<td>The amount of CPU cores users can request for free for the total number of smart servers built in this compute zone under this bucket.</td>
</tr>
<tr>
<td>Pricing for data store zones</td>
<td>Disk Size</td>
<td>Price</td>
<td>the price per GB of disk space per hour, charged for powered on smart servers which are built in this data store zone under this bucket. The price per GB of disk space per hour, charged for powered off smart servers which are built in this data store zone under this bucket. Set the amount of disk space (GB/hr) users can request for free per hour. When setting free amount using the <em>Free Disk Size</em> parameter, the user will be billed only for the disk size that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>Free</td>
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</tr>
<tr>
<td>Data Read</td>
<td>Price</td>
<td>Free</td>
<td>the price per GB of read data per hour, charged for smart servers which are built in this data store zone under this bucket. Set the amount of read data (GB/hr) users can request for free per hour. When setting free amount using the <em>Free Data</em> parameter, the user will be billed only for the read data that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
</tr>
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</tr>
<tr>
<td>Resource Type</td>
<td>Resource name</td>
<td>Values</td>
<td>Description</td>
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<tr>
<td></td>
<td></td>
<td><strong>Read</strong></td>
<td><em>Read parameter, the user will be billed only for the amount of data read that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</em></td>
</tr>
<tr>
<td><strong>Data Written</strong></td>
<td>Price</td>
<td><strong>Free</strong></td>
<td>the price per GB of written data per hour, charged for smart servers which are built in this data store zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>set the amount of written data (GB/hr) users can request for free per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>When setting free amount using the <em>Free Data Written</em> parameter, the user will be billed only for the amount of data written that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
</tr>
<tr>
<td><strong>Input Requests</strong></td>
<td>Price</td>
<td><strong>Free</strong></td>
<td>the price per 1M input requests per hour, charged for smart servers which are built in this data store zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>set the amount of input requests (1M requests/hr) users can request for free per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>When setting free amount using the <em>Free Input Requests</em> parameter, the user will be billed only for the amount of input requests that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
</tr>
<tr>
<td><strong>Output Requests</strong></td>
<td>Price</td>
<td><strong>Free</strong></td>
<td>the price per 1M output requests per hour, charged for smart servers which are built in this data store zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>set the amount of output requests (1M requests/hr) users can request for free per hour</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>When setting free amount using the <em>Free Output Requests</em> parameter, the user will be billed only for the amount of output requests that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
</tr>
<tr>
<td><strong>Pricing for</strong></td>
<td><strong>Port Speed</strong></td>
<td>Price</td>
<td>the price per Mbps of port speed per hour, charged for powered on smart servers which are built in this network zone under this bucket</td>
</tr>
<tr>
<td>network zones</td>
<td>Price on</td>
<td><strong>Free</strong></td>
<td>the price per Mbps of port speed per hour, charged for powered off smart servers which are built in this network zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Price off</td>
<td></td>
<td>the amount of port speed (Mbps/hr) users can request for free for the total number of their smart servers</td>
</tr>
<tr>
<td>Resource Type</td>
<td>Resource name</td>
<td>Values</td>
<td>Description</td>
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</tr>
<tr>
<td></td>
<td>servers built in this network zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Addresses</td>
<td>the price per IP address per hour, charged for powered on smart servers which are built in this network zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per IP address per hour, charged for powered off smart servers which are built in this network zone under this bucket</td>
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</tr>
<tr>
<td></td>
<td>set the amount of IP address (IP/hr) users can request for free per hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When setting free amount using the Free IP Addresses parameter, the user will be billed only for the amount of IP addresses that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sent</td>
<td>the price per GB of data sent per hour, charged for smart servers which are built in this network zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set the amount of data sent (GB/hr) users can request for free per hour</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>When setting free amount using the Free Data Sent parameter, the user will be billed only for the amount of data sent that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Received</td>
<td>the price per GB of data received per hour, charged for smart servers which are built in this network zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set the amount of data received (GB/hr) users can request for free per hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When setting free amount using the Free Data Received parameter, the user will be billed only for the amount of data received that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pricing for backup server zones</td>
<td>Backups</td>
<td>the price per backup per hour, charged for the backups stored in this backup server zone under this bucket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the amount of backups (backup/hour) users can store in this backup server zone for free under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per GB per hour, charged for the disk size occupied by the user's backups stored in this backup server zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the amount of disk space (GB/hr) users can request for free to store their backups in this backup server zone under this bucket</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Resource Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Templates</td>
<td>Price</td>
<td>Free</td>
<td>the price per template per hour, charged for the backups stored on this backup server zone under this bucket. The amount of templates (template/hour) users can store in this backup server zone for free under this bucket.</td>
</tr>
<tr>
<td>Template Disk Size</td>
<td>Price</td>
<td>Free</td>
<td>the price per GB per hour, charged for the disk size occupied by the user's templates stored in this backup server zone under this bucket. The amount of disk space (GB/hr) users can request for free to store their templates in this backup server zone under this bucket.</td>
</tr>
</tbody>
</table>

### 24.2.2.4 Other Resources

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing for backup resource zones</td>
<td>Recovery Point</td>
<td>Price</td>
<td>Free</td>
</tr>
<tr>
<td>Recovery Point Size</td>
<td>Price</td>
<td>Free</td>
<td>the price for a recovery point size in Gb per hour charged for recovery points stored in the backup resource zone under this bucket. The size (Gb/hour) that users can consume to store their recovery points in the backup resource zone for free under this bucket.</td>
</tr>
<tr>
<td>Space Used</td>
<td>Price</td>
<td>Free</td>
<td>set the price for a total disk size (Gb/hour) charged for all backups of a particular virtual server in the backup resource zone under this bucket. Set the free size (Gb/hour) that users can consume to store all backups of a particular virtual server in the backup resource zone under this bucket.</td>
</tr>
<tr>
<td>Pricing for edge groups</td>
<td>Edge Group Resource</td>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>Pricing for template store</td>
<td>Template Store</td>
<td>Price</td>
<td></td>
</tr>
</tbody>
</table>
Once you add a template to the Rate Card, all the template stores that contain that template will be added to that Rate Card with a price set only for that template.

Tick the **Apply to all buckets** checkbox to set the price you have configured for the templates in the store to all buckets that contain this template store.

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing for service add-on groups</td>
<td>Service Add-on Store</td>
<td>Price</td>
<td>The price that will be charged for adding the service add-ons from this service add-on store to virtual servers.</td>
</tr>
<tr>
<td>CPU</td>
<td>Price</td>
<td>Free</td>
<td>the additional price for CPU (CPU core/hr) that applies to VSs to which a service add-on is added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of CPU (CPU core/hr) users can request for free for the total number of VSs to which a service add-on is added.</td>
</tr>
<tr>
<td>Memory</td>
<td>Price</td>
<td>Free</td>
<td>the additional price for RAM (GB/hr) that applies to VSs to which a service add-on is added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of RAM (GB/hr) users can request for free for the total number of their VSs to which a service add-on is added.</td>
</tr>
<tr>
<td>Disk Size</td>
<td>Price</td>
<td>Free</td>
<td>the additional price for disk size (GB/hr) that applies to VSs to which a service add-on is added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the amount of disk space (GB/hr) users can request for free either per hour or per month.</td>
</tr>
</tbody>
</table>

### 24.3 Billing Calculation

Below you will find the description of the billing logic and how the billing is calculated for the following bucket resources:

- Free limits
- Free and free per month limit types
- Calculation for the missing period
- IP addresses
- Port speed
- Guaranteed minIOPS
- Disk size
- CPU
- CPU priority
- CPU shares
- CPU units
- Instance packages
- DRaaS
If you remove from the bucket a resource that has virtual server(s) running on it, the pricing for that resource will be removed for such VSs. This behavior refers to user VS limits, template stores, edge groups, recipe groups, backup server zones and guaranteed minIOPS.

See also:
Buckets
Create and Manage Buckets
Configure Resource Allocation And Prices
Create and Manage Payments

24.3.1 Free Limits
Starting with OnApp version 5.6, the logic behind free limits calculation has changed. Previously, when a new resource was created, the system compared the amount of resources with the free limit and produced prices for the resources that exceed the free limit set in the billing plan.

Now with the implementation of buckets, the system first adds up all resources as if there were no free limits configured and then, at the end of the hour, subtracts the cost of free resources from the total amount of used resources.

For example, a user's bucket has the free limit for acceleration set to '2' (VS/hr) and the price for acceleration set to '5 VSs'. If this user creates four VSs with acceleration enabled, at first, the system will calculate the price of all the servers excluding the free limit: 4*5=20. At the end of the billing period (hour) the system will subtract the price of the free resources, in this case 2*5=10, from the total amount for the used resource: 20-10=10.

24.3.2 Free and free per month resource limit types
It is possible to choose hourly or monthly free limits when adding a data store or network zone resources to the OnApp bucket.

When setting the 'free' resource type, the limit for resources is set per hour, and the statistics is gathered hourly and then is compared to the free resource limit. Then, the resource limits which exceed the free amount allowed are billed.

When setting the 'free per month' resource type, the limit for resources is set per month, and the statistics is gathered hourly and then is compared to the free resource limit set per month. When the free limit set per month is exceeded, the exceeding amount is billed based on the overusage price per resource per hour.

For example, a user adds a data store zone with 'free per month' limits to the bucket and sets free data read limit per month to 50 GB:
During the first hour, 50 GB are used (all the free limit).
During the second hour, 2 GB are used. As there's no free limit left, the user is charged for 2 GB per hour.
During the third hour, 5 GB are used. Since there's no free limit left, the user is charged for 5 GB per hour (previous 2 GB over limit are not taken into account, since they are already billed).
If a user adds a data store zone with 'free' limits to the billing plan and sets free data read limit per hour to 50 GB:
During the first hour, 5 GB are used. As the free limit is 50GB the user is not charged (all the free limit).
During the second hour, 52 GB are used. The user is charged for 2 GB over free limit per hour.

During the third hour, 55 GB are used. The user is charged for 5 GB per hour overusage (previous 2 GB over the limit are not taken into account since they are already billed).

24.3.3 Calculation for the missing period

Under certain circumstances, statistics might be missing for a period of time. This might happen due to daemon issues, cron jobs failures, or some other unexpected errors with the statistics collection mechanism. In such cases, the instant (raw) statistics is aggregated for the whole missing period, and the calculated amount is added into the hourly statistics for the first hour when the services are up again. This behavior is relevant only to the resources which are calculated dynamically on the hourly basis, in particular:

<table>
<thead>
<tr>
<th>Data store zones</th>
<th>Data read</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data written</td>
</tr>
<tr>
<td></td>
<td>Input requests</td>
</tr>
<tr>
<td></td>
<td>Output requests</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network zones</th>
<th>Data received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data sent</td>
</tr>
</tbody>
</table>

The following scheme demonstrates this behavior for Data Received for network zones as an example:

<table>
<thead>
<tr>
<th>Hour1</th>
<th>Hour2</th>
<th>Hour3</th>
<th>Hour4</th>
<th>Hour5</th>
<th>Hour6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Received 10GB</td>
<td>No Stats</td>
<td>No Stats</td>
<td>No Stats</td>
<td>No Stats</td>
<td>Data Received 60GB</td>
</tr>
</tbody>
</table>

In this example:

The last value for data received (Hour1) reported as hourly statistics for the network zone in question was 10GB. Then the OnApp daemon stopped working, and no hourly statistics were generated for Hour2, Hour3, Hour4, and Hour5. On Hour6 the problem was fixed, and daemon was up again. The hourly statistics for Hour6 will aggregate all the statistics for the whole missing period into that hour. Most probably you will get a huge value for the Hour6 as it will be the summary for the whole period when no stats have been reported. Pay attention that the Outstanding amount and Total amount for users will be calculated as per one hour: the whole aggregated statistics will be regarded as statistics per one hour, and compared to the free limits and charged for overusage.

As a workaround, to fix the overcharging for the aggregated stats, you can use the payments functionality. Add the appropriate value as a payment for a user, and it will be subtracted from the Total amount.
24.3.4  IP addresses

Each virtual server has two IP types: regular and outside. Public IP addresses are used for servers’ Internet access. Private IP addresses are used for private networks.

When calculating IP address billing for a particular resource, each virtual server’s IP address is compared to the free IP limit in a linear queue (starting with the first added IP address). Regular IPs are calculated first.

One IP address can be added as a regular and an outside IP at the same time. In this case, it will be only charged as a regular one. That is why outside IPs are calculated second.

The IP address billing calculation:

Example

Free IP address limit is 3.

VS 1

The first virtual server has two regular and two outside IP addresses, but the second regular IP address is the same as the second outside IP address, so the number of unique IPs assigned to this virtual server is 3.

VS2

The second virtual server has two regular and two outside IP addresses.

According to the billing algorithm, the first regular IP address checks if there are some IPs added before it and then gets compared to the free IP address limit. 1 < 3, so it is not charged (2 IPs of free limit left).
Then, the second IP address is compared to the remaining free IP address number. $1 < 2$, so the second IP also is not charged (1 IP of free limit left).

After that, the outside IPs are calculated:

The first outside IP address checks if there are some outside IPs added before it and then gets compared to the free IP address limit.

$1 \geq 1$, so this IP address is not charged (0 IP of free limit left).

Then, the second outside IP is compared to the remaining free IP address number. There are no free IPs left, but since the second regular IP address equals the second outside IP address, the second IP also is not billed.

Consequently, all IP addresses of the second virtual server are billed, as the free IP address limit is already used up.

### 24.3.5 Port Speed

Port speed is calculated by subtracting the free port speed value from free port speed limit and summing up the remainders. If the port speed is less than the free port speed limit, it is not billed.

If the NIC port speed is set as Unlimited in the bucket, it means that the maximum port speed value is the value specified in the Control Panel Admin > Settings > Configuration > Max network interface port speed field.

The port speed billing calculation is the following:

$$\text{(NIC 1 port speed - free port speed value)} + \text{(NIC 2 port speed - free port speed value)} \ldots \text{etc}$$
Example
In this example, the free port speed limit is 20 MB/second.

**VS 1**
The first virtual server has two NICs.

NIC 1 = 10 MB/second
NIC 2 = 25 MB/second

**VS 2**
Second virtual server has two NICs.
NIC 3 = 10 MB/second
NIC 4 = 30 MB/second

Then, \( (10 - 20) + (25 - 20) + (10 - 20) + (30 - 20) = 15 \) MB will be charged.
Since the first and the third NICs are less than the free amount, they are not charged.

### 24.3.6 Guaranteed minIOPS

Guaranteed minIOPS is calculated by subtracting the free IOPS value from each disk’s IOPS and summing up the remainders. If the disk’s IOPS is less than the free IOPS value, it is not billed.

With this in mind, the formula for minIOPS billing calculation is:

\[
(Disk 1 \text{ IOPS} - \text{free IOPS value}) + (Disk 2 \text{ IOPS} - \text{free IOPS value})\ldots\text{etc.}
\]
Example
In this example, free IOPS = 45

Disk 1 has 50 IOPS
Disk 2 has 45 IOPS
Disk 2 has 60 IOPS
Disk 4 has 20 IOPS

Then: \((50-45) + (45-45) + (60-45) + (20-45) = 20\) IOPS which is billed.

Since the second and the fourth disks’ IOPS values are less than the free amount, these disks are not billed.

24.3.7 Disk size

When calculating disk size billing for a particular resource, each virtual server’s disk size is compared to the free disk size limit in a linear queue (starting with the first added disk), then each next disk is compared to the free disk size limit remainders.

The disk size billing calculation is:
**Example**

Free disk size is 50 GB.

We have two virtual servers assigned to the same data store.

**VS 1**

The first virtual server has two disks.

- Disk 1 = 15 GB
- Disk 2 = 20 GB

**VS 2**

The second virtual server has two disks.

- Disk 1 = 20 GB
- Disk 2 = 15 GB

According to the billing algorithm, the first disk checks if there are disks added before it and then gets compared to the free disk size limit:

15 < 50, so it is not charged (35 GB of free disk size limit left).

Then, the second disk is compared to the remaining free disk size limit:

20 < 35 (15 GB of free disk size limit left).

So, the second disk is also not charged.

After that, the second virtual server’s disks are processed. The third disk is compared to the remaining free disk size limit:

20 > 15 (20 - 15 = 5, so 5 GB of the disk’s size will be charged).

Finally, the fourth disk is charged for the whole disk size, as the free disk size limit is already reached.

**24.3.8 CPU**

CPU, CPU shares, and memory limits are set for the Compute zone.

When calculating CPU billing for a particular resource, the sum of all virtual server’s CPU over the free limit is billed.

So, the CPU billing formula can be displayed as follows:

\[(\text{VS1 CPUs}) + (\text{V2 CPUs}) + (\text{VS# CPUs}) - \text{free CPU limit}\]
Example

Free CPU limit is 3.
If we have two virtual servers:

**VS 1**
The first VS has 2 CPUs

**VS 2**
The second VS has 3 CPUs

The number of CPUs charged: \((2+3) - 3 = 2\)

### 24.3.9 CPU shares

To calculate the CPU shares price for the virtual server, multiply the number of server’s cores by CPU priority percentage given.

Then, each virtual server’s CPU priority value is compared to the free CPU shares limit in a linear queue (starting with the first added virtual server), then each next virtual server is compared to the free CPU shares limit remainders.

**Example**

In this example, free CPU shares limit is 140.

**VS 1**
The first virtual server has 2 CPUs and 50% CPU priority (100% in total).

**VS 2**
The second virtual server has 3 CPUs and 40% CPU priority (120% in total).

According to the billing algorithm, the first virtual server checks if there are servers added before it and then gets compared to the free CPU shares limit:

100 < 140, so it is not charged (40 of free CPU shares limit left).

Then, the second virtual server is compared to the remaining CPU shares limit:
120 > 40 (120 − 40 = 80), so 80 percent of this server’s CPU shares will be charged.

24.3.10 CPU Priority

The amount of CPU resource a VS is given is the CPU priority (you can think of this as its "share percentage") multiplied by the number of cores allocated to that VS. This is a minimum number – clients can burst over it by manually adding up to 100% multiplied by the number of cores. You may do it by modifying the CPU priority value at the Adjust Resource Allocation page (Cloud > Virtual Servers > label of the necessary VS > Tools > Edit Virtual Server). For example, on a Compute resource with 3GHz CPU cores:

100% x 1 core = 3GHz (burstable to 3GHz)
10% x 2 cores = 600MHz (burstable to 6GHz)
5% x 4 cores = 600MHz (burstable to 12GHz)

By default, OnApp allows overselling of cloud resources. For example, OnApp will allow users to create 5 VSs with 100% CPU priority/1 CPU core on a Compute resource with a 4-core CPU. In this example, OnApp would reduce the guaranteed CPU for each VS.

If you build a VS on a KVM Compute resource, the CPU priority settings will be disabled and CPU priority value will be 100 by default.

24.3.11 CPU Units

The CPU unit is an abstract figure that replaces CPU priority. It is an arbitrary relative value that the host can enter to mark the capacity of the Compute resources in a zone. It is the host's responsibility to enter the values per Compute resources correctly and logically. You can set the amount of units per Compute zone and per each particular Compute resource in a zone. If you set the CPU Units per Compute zone, then each Compute resource in this zone will be assigned the number of units set. To set different capacity to a particular Compute resource, specify the CPU units amount to a required Compute resource not a zone. To bill for CPU Units, enable CPU units for a bucket and set the price per unit.

Each Compute resource core within a zone is given a 1000 CPU Units default value when CPU units are enabled per zone (this is made in the bucket). The Host can then change that number for each Compute resource to any other number between 1-100,000 to fit its capacity. The faster the Compute resource, the higher the value should be set.

CPU Units show the speed of the CPU - this can be done in any way that the host wants to as it’s just a number that is relative to another number. OnApp will simply process the numbers. For example, if one Compute resource is two times more powerful than another, then the CPU units could be 1000 and 500.

To evaluate Compute resource’s physical performance, you can take the following values:

CPU Mhz

Passmark Score (http://www.cpubenchmark.net/)

BogoMips (http://en.wikipedia.org/wiki/BogoMips)

When creating a VS, you will specify the desired amount of CPU Units that this VS will take out of total CPU Units set for Compute resource.
Please note that OnApp cannot guarantee identical performance over different Compute resources and workload types when migrating VSs.

**Example:** If you have a Compute zone (Compute resourceZ) with 5 Compute resources attached to it, and you set 1000 CPU Units to Compute resourceZ zone, then each of five Compute resources in this zone will have 1000 CPU Units. In case you would like to increase the capacity of specific Compute resource1 Compute resource to 2000 in this Compute resourceZ zone, set the CPU Units option of this Compute resource1 to 2000. For example, giving Compute resource 1 a score of 1000 and Compute resource 2 the score of 500 is the same as giving Compute resource 1 a score of 2 and Compute resource 2 a score of 1. However, the first case gives you more flexibility in spreading the resources between VSs.

When setting CPU units, the main thing is that the correlation between the CPU Units for each Compute resource should correspond to the correlation of their actual performance. Example of setting CPU units based on CPU speed:

<table>
<thead>
<tr>
<th>Compute resource</th>
<th>Compute resource CPU Mhz</th>
<th>Compute resource Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4000</td>
<td>1000</td>
</tr>
<tr>
<td>B</td>
<td>2000</td>
<td>500</td>
</tr>
<tr>
<td>C</td>
<td>1000</td>
<td>250</td>
</tr>
<tr>
<td>D</td>
<td>500</td>
<td>125</td>
</tr>
</tbody>
</table>

**Limitations**

CPU Units are available for Xen and KVM Compute resources only.

Do not apply CPU Units for KVM Compute resources running on VMware, baremetal servers, and load balancers.

So far only billing calculation can be performed based on CPU units. At this time we do not guarantee the same performance for VSs when migrating to another Compute resource with different capacity.

---

**24.3.12 Instance packages**

To set up billing for the instance packages, at first configure the amount of available resources in the package at the Admin > Instance Packages > Create Instance Package menu.

Second, add the instance package(s) to the bucket. There you set the price that will be charged per VS powered on/off for each appropriate instance package.

There are also a number of VS resources that are not set up during instance package creation but are configured automatically.
**CPU Priority** - CPU priority is automatically set to 100

**Swap disk size** - swap disk size can have the size of 1/2/3 GB. Its size is calculated by multiplying the RAM by two.

**IP address** - the first available IP address is selected. One IP address is assigned to the VS created using an instance package for free.

**Port speed** - depends on the bucket limit. If the port speed Max limit in the bucket is set to unlimited, the port speed in the instance package will also be set to unlimited. If the port speed Max limit in the bucket is set to a certain value, the port speed in the instance package will be set to that same value.

When you build a VS using an instance package, certain bucket limits will not apply to that VS:

Data read/written and input/output requests are not billed for disks of the VS built using an instance package. The VSs disk size will be defined by the disk size indicated in the selected instance package.

The Limits & Prices for Network Zones will only apply to the VSs that overuse the bandwidth limit set in the selected instance package. A free IP address is assigned to the VS. The VSs port speed, data sent and data received are not billed until the VS overuses the instance package’s bandwidth limit. After that, the data the VS sends and receives will be billed according to the Price over free units cost.

For more information, refer to the Billing for Instance Packages section.

### 24.3.13 DRaaS

In a bucket, DRaaS resources are a part of User VS limits. You can set the following additional fees for a VS with DRaaS enabled:

- for disk size per GB per hour
- for RAM per GB per hour
- for CPU core per core per hour
- for CPU per percent per hour or CPU per unit per hour
- for node per unit per hour

These prices are additional to regular prices per indicated resources.

**For example:**

Regular price for disk size, set in your bucket, is 10$ per GB per hour. Additionally, you set price for disk size for a VS using DRaaS, as 5$ per GB per hour. So the total price for the VS disk size will be 15$ per GB per hour when DRaaS enabled.

In case of billing per node, it is calculated how many nodes each VS with DRaaS enabled has. The number of nodes corresponds to the highest resource requirement, e.g. a VS with 1 Core, 1GB RAM, and 20GB Storage is equivalent to two nodes and is charged accordingly.

### 24.4 Create and Manage Payments

OnApp provides a possibility to add information about payments to OnApp Control Panel. Payments are already paid invoices for used resources according to billing plans. User payments are those which you charge for the resources created on XEN/KVM compute resources. For information on Company Payments, refer to the linked guide.
Ensure that Payments permissions are on before managing payments. Ensure that Monthly user group billing statistics permissions are on before managing a company payment and monthly bills.

Below you can find instructions on how to create and manage payments.

See also:
- Buckets
- Create and Manage Buckets
- Configure Resource Allocation And Prices
- Billing Calculation

### 24.4.1 View user payments

To view payments:

Go to your Control Panel > **Admin** > **Payments** menu.

On the screen that appears, you will see the list of all payments together with their details:

- **User** – the name of a user, who made the payment
- **Payment Date** – the date when the payment was done
- **Amount** – the money amount which was paid
- **Invoice Number** – the serial number of a paid invoice
- **Actions** – click the Actions button to edit or delete a payment

You can filter the list of payments by user - select the user from the drop-down menu and click the **Apply** button.

### 24.4.2 Create payment

To create a payment:

Go to your Control Panel > **Admin** > **Payments** menu.

On the screen that appears, you will see the list of all user payments. Click the **New Payment** button or the **+** button.

Complete the form on the screen that follows:

- **User** – the name of a user, who makes the payment. This parameter appears only for user payments.
- **Invoice Number** – the serial number of a paid invoice
- **Amount** – the money amount which was paid

Click **Save**.
You can also create and manage payments for a particular user at Control Panel > Admin > Users and Groups menu > User's name > Payments tab.

24.4.3 Edit payment

To edit a payment:

Go to your Control Panel > Admin > Payments menu.

On the screen that appears, you will see the list of all user payments. Click the Actions button next to the payment you want to edit, then click Edit.

Make changes on the screen that follows:

User – write the name of a user, who conducted the payment. This parameter appears only for user payments.

Invoice Number – put the serial number of a paid invoice

Amount – change the money amount which was paid

Click Save.

24.4.4 Delete payment

To delete a payment:

Go to your Control Panel > Admin > Payments menu.

On the screen that appears, you will see the list of all user payments. Click the Actions button next to the payment you want to delete, then click Delete.

Confirm the deletion.
25 Instance Packages

Instance packages are preconfigured CPU/RAM/Disk/Bandwidth packages that can be selected during the VS creation process, or change it later to another instance package with appropriate resources while editing the VS. You can add multiple instance packages specifying different values for the parameters to suit your customer's needs. Resources that are not set when creating an instance package, such as, for example, swap disk size, are calculated automatically.

Instance packages make it easier for users to create virtual servers. The users simply need to select one of the instance packages available to them in the wizard. However, it is still possible to set the VS resources manually if required. Instance packages apply only to virtual servers created on KVM or Xen compute resources.

To provide your users with the ability to choose VS resources from the predefined instance package(s), add the necessary packages to the users' bucket(s). After that, instance packages will appear in the server creation wizard, on the Resources step.

For more info on how to configure instance packages in your cloud, refer to Set up Instance Packages for Cloud.

See also:

Create and Manage Instance Packages
Create Virtual Server
Buckets

25.1 Create and Manage Instance Packages

Instance packages are preconfigured CPU/RAM/Disk/Bandwidth packages that can be selected during the VS creation process. Instance packages make it easier for users to create virtual servers. The users simply need to select one of the instance packages available to them in the wizard. You can add multiple instance packages specifying different values for the parameters to suit your customer's needs. In this section, you can learn how to create and manage instance packages.

25.1.1 View Instance Packages

The Instance Packages page shows the list of all instance packages in your cloud with their details. To view the list instance packages:

Go to your Control Panel > Admin > Instance Packages menu.

The screen that appears, shows the list of all instance packages and their details:

- **Label** - the name of the instance package
- **CPUs** - the number of CPU cores available in this instance package
- **Memory** - the RAM size (GB) available in the instance package
- **Disk Size** - the disk size available in this instance package
- **Bandwidth** - the bandwidth available in this instance package
- **Associated Buckets** - the number of bucket(s) which use this instance package. Click the number next to the instance package you are interested in to view the details of the buckets associated with it.

**Actions** - click the Actions button to either edit or delete the instance package

Click the label of an instance package to view its details:
Label - the name of the instance package
CPUs - the number of CPU cores available in this instance package
Memory - the RAM size (GB) available in the instance package
Disk Size - the Disk size available in this instance package
Bandwidth - the bandwidth available in this instance package
Associated Buckets - the labels of bucket(s) in which this instance package is used. Click the label of bucket to view it.

Associate Virtual Servers - the number of virtual servers that were created using this instance package. Click this number to view the details of the VSs associated with this instance package.

On this page:
View Instance Packages
Set up Instance Packages for Cloud
Enable the instance packages permission
Add instance packages to your cloud
Add the instance package(s) to the users' bucket
Interface configuration
Build Virtual Server Using Instance packages
Billing for Instance Packages
Add instance packages to your cloud
Add instance packages to the bucket
Edit Instance Package
Delete Instance Package

See also:
Create Virtual Server
Configure Resource Allocation And Prices
Create and Manage Buckets

25.1.2 Set up Instance Packages for Cloud

To enable your users to create virtual servers using instance packages, you need to perform the following configurations:
Enable the instance packages permission
Add instance package(s) to your cloud
Add the instance package(s) to the users' bucket
Interface configuration
Build virtual server using instance packages

25.1.2.1 Enable the instance packages permission
In OnApp, there are two permissions that control how resources are selected during virtual server creation: Select resources manually on virtual server creation and Select instance package on virtual server creation. You can enable one or both of these permissions for your users. By default, users with the role User have the Select resources manually on virtual server creation permission enabled.
creation enabled. If you want your users to be able to select instance packages during virtual server creation, you need to enable the *Select instance package on virtual server creation* permission. Depending on the permissions, the Resources step of the virtual server creation wizard can be different:

If both the *Select resources manually on virtual server creation* and *Select instance package on virtual server creation* permissions are enabled, the user will be able to choose whether to create a VS using an instance package or by setting resources manually.

If you disable the *Select resources manually on virtual server creation* permission and enable the *Select instance package on virtual server creation* permission, the user will be able to select VS resources only from the instance package(s) available to that user.

If you disable the *Select instance package on virtual server creation* permission and enable the *Select resources manually on virtual server creation* permission, the user will only be able to select resources manually.

If you are adding a custom role, make sure to enable either the *Select resources manually on virtual server creation* or the *Select instance package on virtual server creation* permission or both if required. If the user does not have any of these permissions enabled, they will not be able to create virtual servers.

For the list of OnApp permissions, refer to the Permissions List section.

25.1.2.2 Add instance packages to your cloud

After you enable the necessary permissions for your user(s), you need to add instance packages to your cloud. When you add a new instance package, you set CPU/RAM/Disk/Bandwidth. You can add multiple instance packages to provide your customers with a number of predefined packages to choose from. Resources that are not set when creating an instance package are calculated automatically.

To create an instance package:

Go to your Control Panel > Admin > Instance packages menu.

The screen that appears, shows the list of all instance packages. Click the "+" button at the top of the screen.

Complete the form on the screen that follows:

- **Label** - fill in the name of the instance package.
- **CPUs** - move the slider to set the number of CPU cores available in the instance package. The maximum CPUs value is 8.
- **Memory** - move the slider to set the RAM size available in the instance package. The maximum value is 16384 MB by default.
- **Disk Size** - move the slider to set the Disk size available in the instance package. The maximum value is 100 GB by default. The maximum disk size cannot be larger than the largest data store size in your cloud.
- **Bandwidth** - move the slider to set the bandwidth available in the instance package, the maximum value is 450 GB by default. Otherwise, tick the check box to set bandwidth to unlimited.

If the user exhausts the bandwidth limit, the resources they overuse will be calculated according to the bucket's Overused Bandwidth price in the Limits for Instance packages section.
You can change the default minimum and/or maximum values for memory, disk size and bandwidth by adding the following parameters to the config/on_app.yml file and restarting OnApp services:

- instance_package_min_disk_size (GB)
- instance_package_max_disk_size (GB)
- instance_package_max_memory (MB)
- instance_package_min_bandwidth (GB)

Click **Save** to finish.

### How are other VS resources calculated?

The following resources are set automatically for instance packages:

**CPU Priority** - CPU priority is automatically set to 100

**Swap disk size** - swap disk size can have the size of 1/2/3 GB. Its size is calculated by multiplying the RAM by two. If the calculated value is larger than three, the swap disk size is set to 3. If the calculated value is smaller than three, it is rounded to the closest value from the 1/2/3 range that is larger than the calculated size. If the calculated value is larger than the disk size set for the instance package, the swap disk is not added to the VS.

**IP address** - the first available IP address is selected

**Port speed** - depends on the bucket limit. If the port speed Max limit in the bucket is set to unlimited, the port speed in the instance package will also be set to *unlimited*. If the port speed Max limit in the bucket is set to a certain value, the port speed in the instance package will be set to that same value.

#### 25.1.2.3 Add the instance package(s) to the users' bucket

Once you created the instance packages, they can be added to bucket(s). This step is required to bundle the instance packages with the specific compute/data store/network zones. To add limits for instance packages:

Go to the **Admin > Buckets** list and click the label of the bucket to which you want to add instance or create a new bucket.

Click the "+" button in the upper right corner of the **Limits for Instance packages** box.

In the window that pops up, select the target instance package and the compute zone(s), data store zone(s) and network zone(s) to which the instance package will apply. Click **Add Resource**.

Set the price that will be charged per VS powered on/off for each appropriate instance package. You can also set the pricing for overused bandwidth per GB/hr.
Instance packages apply only to Xen and KVM compute zones. If you select a vCloud Director or VMware compute zone, the instance package will not be displayed in the virtual server creation wizard.

If you do not select any compute/data store/network zones, the instance package will apply to all compute/data store/network zones available for the user.

It is advisable that you limit the user’s bucket by the compute zones that have enough resources to support the instance package(s) you add to the user’s bucket. If the user selects a compute zone that does not have enough resources during virtual server creation, they will see all instance packages available to them, but those that have resources incompatible with the chosen compute zone will be greyed out. Greyed out instance packages cannot be selected.

Note that Instance package VSs can only be created on compute resources within compute zones where all compute resources are assigned the same amount of CPU units. If there are compute resources with different amount of CPU units set in a zone, it will not be possible to create Instance package VSs in such zones. The reason is that CPU priority for Instance package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.

If required, you can edit the zones to which the instance package applies:

Go to the **Admin > Buckets** list and click the label of the bucket you are interested in.

Click the **Actions** button next to the instance package you are interested in and select **Edit**.

In the window that pops up, edit the compute resource/data store/network zone(s) and click **Update**.

If there is a VS created on a compute/data store/network zone which you remove while editing the bucket, the VS will still be billed according to the instance package.

Also, you can delete instance packages from the bucket:

Go to the **Buckets** list and click the label of the bucket you are interested in.

Click the **Actions** button next to the instance package you want to remove and select **Delete**. You will be asked for confirmation before the instance package is removed from the bucket.

You cannot delete the Instance packages that are used for existing VVs.

After you add instance packages to the user’s bucket, they will be available in the virtual server creation wizard at the **Resources** step.

25.1.2.4 Interface configuration

After you add instance packages to the user’s bucket, you can configure how instance packages will be displayed in the virtual server creation wizard. This step is optional.

Instance packages can be displayed either in card or list view. Displaying instance packages in card view is convenient if there is one or several instance packages available to the user.
However, if the user can choose among a large number of instance packages, it is more convenient to view instance packages in list view.

To change the layout of instance packages in the virtual server creation wizard:
Go to your Control Panel Admin > Settings menu, and click the Configuration icon.
The page that loads is the System tab. At the bottom of this page, set the Instance packages number parameter. The default value is 3.
Click Save Configuration.

25.1.2.5 Build Virtual Server Using Instance packages
Once you have performed the above configurations, the instance packages can be selected during a virtual server creation.
Depending on the permissions, users will be able to select an instance package, set resources manually or choose one of these options on the Resources step.

If the user selects a compute zone that does not have enough resources during VS creation, the instance packages that have resources incompatible with the chosen compute zone will be grayed out and unavailable.
If there are no available IP addresses during VS creation, all instance packages will be grayed out in the wizard.
Check production_allocation.log to see why some resources are not suitable for a particular virtual server while adding/editing this VS using an instance package.

From this tab, you can choose one of the predefined instance packages for your virtual server.
For each of the instance packages the following details are displayed:
Memory - the RAM size (GB) available in the instance package
CPUs - the number of CPU cores available in this instance package
Disk Size - the disk size available in this instance package
Bandwidth - the bandwidth available in this instance package
Price per Hour:
Mode ON - hourly instance package price for the VS powered on
Mode OFF - hourly instance package price for the VS powered off
Price per Month:
Mode ON - monthly instance package price for the VS powered on
Mode OFF - monthly instance package price for the VS powered on
Click the instance package to select it. After that, the instance package you have chosen will be highlighted in green.
Click Next to proceed to the following step of the wizard.

You are forwarded to the next step from the tab you are currently on. If you select an instance package and then click the Create Your Own tab (where you set the resources manually) and proceed to the next step, the
The virtual servers you create using the *Instance packages* tab will be billed according to one of your preconfigured instance packages.

### 25.1.3 Billing for Instance Packages

Virtual servers that are built using instance packages are billed differently than VSs built by configuring resources manually. To set up billing for instance packages, you need to perform two steps:

1. **Add an instance package to your cloud and configure resources available to VS that will be built on the basis of this instance package.**
2. **Add the instance package to the bucket's Access Control and set prices charged for the instance package VS in the Rate Card.**

#### 25.1.3.1 Add instance packages to your cloud

To set up billing for instance packages, at first configure the number of resources available in the package at the **Admin > Instance packages > Create Instance package** menu. The users who build a VS applying that instance package will be limited to:

- **CPUs** - the number of CPU cores available in the instance package. The maximum CPUs value is 8.
- **Memory** - the RAM size (GB) available in the instance package. The maximum value is 16384 MB by default.
- **Disk Size** - the disk size available in the instance package. The maximum value is 100 GB by default. The maximum disk size cannot be larger than the largest data store size in your cloud.
- **Bandwidth** - the bandwidth available in the instance package. The maximum value is 450 GB by default. Otherwise, tick the checkbox to set bandwidth to unlimited.

Bandwidth calculation is based on **max_network_interface_port_speed** configuration parameter in on_app.yml file. Example:

If you have the max port speed equal to 2000 Mbit/second, bandwidth could not be more than $2000 \times 3600 \text{(seconds in one hour)} / (1000 \times 8) = 900 \text{ GB per hour}$. 

You can change the default minimum and/or maximum values for memory, disk size and bandwidth by adding the following parameters to the config/on_app.yml file and restarting OnApp services:

- `instance_package_min_disk_size` (GB)
- `instance_package_max_disk_size` (GB)
- `instance_package_max_memory` (MB)
- `instance_package_min_bandwidth` (GB)
25.1.3.2 Add instance packages to the bucket

After you create instance packages in your cloud, you need to add them to the bucket. You give users under the bucket access to the instance package(s) in the Access Control and set a price for each instance package per powered on/off VSs and per overused bandwidth in the Rate Card. In the Access Control, you can select the instance package and zone(s) in which this package will be available for users. If no zones are selected for the instance package that you added to the Access Control, the instance package will be available in all compute, network, and data store zones.

There are also a number of VS resources that are not configured during the instance package creation but are set automatically or differ from the standard procedure:

<table>
<thead>
<tr>
<th>Resource type</th>
<th>Resource</th>
<th>Default Value</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limits for Compute Zones</strong></td>
<td>CPU Priority</td>
<td>100</td>
<td>CPU priority is automatically set to 100.</td>
</tr>
<tr>
<td></td>
<td>The Free bucket limits</td>
<td>N/A</td>
<td>The Free bucket limits for compute zones do not apply to Instance package VSs.</td>
</tr>
<tr>
<td></td>
<td>for compute zones</td>
<td>N/A</td>
<td>Max limits for compute zone resources apply to Instance package VSs. The CPUs and Memory limits set in the instance package cannot exceed the corresponding limits in the bucket. If you create an instance package that exceeds the bucket limits, you will be able to add this instance package to a bucket and it will appear as available in the VS creation wizard. However, if this instance package is selected in the wizard, an error will occur after you try to proceed to the next step of the wizard.</td>
</tr>
<tr>
<td></td>
<td>The Max bucket limits</td>
<td>configurable</td>
<td>Max limits for compute zone resources apply to Instance package VSs. The CPUs and Memory limits set in the instance package cannot exceed the corresponding limits in the bucket. If you create an instance package that exceeds the bucket limit, you will be able to add this instance package to a bucket and it will appear as available in the VS creation wizard. However, if this instance package is selected in the wizard, an error will occur after you try to proceed to the next step of the wizard.</td>
</tr>
<tr>
<td></td>
<td>for compute zones</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limits for Data Store Zones</strong></td>
<td>The Free bucket limits</td>
<td>N/A</td>
<td>The Free bucket limits for data store zones do not apply to Instance package VSs.</td>
</tr>
<tr>
<td></td>
<td>for data store zones</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Max bucket limits</td>
<td>configurable</td>
<td>Max limits for data store resources apply to Instance package VSs. The Disk Size limit set in the instance package cannot exceed the corresponding limit in the bucket. If you create an instance package that exceeds the bucket limit, you will be able to add this instance package to a bucket and it will appear as available in the VS creation wizard. However, if this instance package is selected in the wizard, an error will occur after you try to proceed to the next step of the wizard.</td>
</tr>
<tr>
<td></td>
<td>for data store zones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Read/written</td>
<td>N/A</td>
<td></td>
<td>The VSs disk size will be defined by the disk size indicated in the selected instance package.</td>
</tr>
<tr>
<td>Input/output Requests</td>
<td>N/A</td>
<td></td>
<td>The VSs disk size will be defined by the disk size indicated in the selected instance package.</td>
</tr>
<tr>
<td>Swap Disk Size</td>
<td>1/2/3 GB</td>
<td></td>
<td>The size is calculated by multiplying the RAM by two. If the calculated value is larger than three, the swap disk size is set to 3. If the</td>
</tr>
<tr>
<td>Resource type</td>
<td>Resource</td>
<td>Default Value</td>
<td>Additional Information</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculated value is smaller than three, it is rounded to the closest value from the 1/2/3 range that is larger than the calculated size. If the calculated value is larger than the disk size set for the instance package, the swap disk is not added to the VS.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limits for Network Zones</td>
<td>IP Address</td>
</tr>
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<td></td>
<td></td>
<td>N/A</td>
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</tbody>
</table>

### 25.1.4 Edit Instance Package

You can edit all the resources set for an instance package.

To edit an instance package:

Go to your Control Panel > Admin > Instance packages menu.

The screen that appears, shows the list of all instance packages. Click the Actions button next the instance package you are interested in and select Edit.
Only those instance packages that are not used in a bucket and during VS creation can be edited. If you try to edit an instance package that is used an error message will appear.

On the page that loads, you can edit the following details:

* **Label** - edit the name of the instance package.

* **CPUs** - move the slider to set the number of CPU cores available in the instance package. The maximum CPUs value is 8.

* **Memory** - move the slider to set the RAM size (MB) available in the instance package. The maximum value is 16384 MB by default.

* **Disk Size** - move the slider to set the Disk size (GB) available in the instance package. The maximum value is 100 GB by default.

* **Bandwidth** - move the slider to set the bandwidth (GB) available in the instance package. The maximum value is 450 GB by default. Otherwise, tick the check box to set bandwidth to unlimited.

Click **Save** to finish.

You can change the default minimum and/or maximum values for memory, disk size and bandwidth by adding the following parameters to the config/on_app.yml file and restarting OnApp services:

- `instance_package_min_disk_size (GB)`
- `instance_package_max_disk_size (GB)`
- `instance_package_max_memory (MB)`
- `instance_package_min_bandwidth (GB)`

### 25.1.5 Delete Instance Package

To delete an instance package:

1. Go to your Control Panel > **Admin** > **Instance packages** menu.

2. The screen that appears, show the list of all instance packages. Click the **Actions** button next the instance package you are interested in and select **Delete**. You will be asked for confirmation before the instance package is removed.

Only those instance packages that are not used in a bucket and during VS creation can be deleted. If you try to delete an instance package that is used an error message will appear.
26 Compute Resource Settings

This chapter provides the details on the Control Panel's Compute resource Settings menu where you get detailed control over low-level cloud settings for all types of Compute resources and Compute zones.

The basic tools for viewing the list of compute resources within zones, editing compute resources, rebooting them can be also found at the left navigation pane Compute Resources menu.

For more details, refer to the Compute Resources section of this guide.

26.1 Compute Resources Settings

Compute resources are a critical part of the cloud. You should only change Compute resource settings if you are confident about what settings you want to change and how to configure them.

Compute resources have types which they inherit from the zone to which they belong. These types also define the type of resources (data stores, networks and backup servers) that can be associated with a compute zone or compute resource. Compute resources can be later moved from one compute zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available compute zone types for different compute resources:

<table>
<thead>
<tr>
<th>Compute Resource Type</th>
<th>Compute Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xen</td>
<td>Virtual/Baremetal</td>
</tr>
<tr>
<td>KVM</td>
<td>Virtual/Smart</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
<tr>
<td>vCloud Director</td>
<td>VPC</td>
</tr>
</tbody>
</table>

See also:
- Compute Resources
- Compute Zones Settings
- Manage Compute Resources

26.1.1 Create and Manage Compute Resources

Compute resources are used to provide hardware resources for virtual servers, ensuring highly efficient use of available hardware, and complete isolation of virtual server processes. Compute resources can be organized into Compute zones, which make it easy to offer tiered service levels and create private clouds for specific users. This section contains information on how to create and manage compute resources.

View Compute Resource Details

Each virtual server in the cloud is hosted by a specific physical compute resource server, from which it receives CPU time, RAM and storage capacity from the data stores attached to that compute resource.

You can view compute resource settings and hardware information.
Ensure that See all compute resources permission is on before viewing compute resource details. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

On this page:

View Compute Resource Details
View Integrated Storage Settings
Create Compute Resource
Edit Xen/KVM Compute Resource
Edit Integrated Storage Settings
Delete Compute Resource

See also:

Zone Types
Add Compute Resource to Compute Zone
Cloudboot Resources
Hardware Info

26.1.1.1 View Compute Resource Settings

To view compute resource settings:

Go to your Control Panel > Admin > Settings menu.

Click the Compute Resources icon.

On the screen that appears, you will see the list of all compute resources in the cloud along with their details:

Status - whether the compute resource is online, offline or in maintenance mode
Label - the name of the compute resource
IP Address - the IP address of the compute resource
Enabled - whether the compute resource is enabled or disabled. If disabled, you cannot create the virtual servers on it, or migrate the VSs to this compute resource.
Compute Zone - the compute zone to which the compute resource is assigned
Operating System - the operating system type of the virtual servers that can live on this compute resource
CPU Cores - number of CPU cores
RAM - total/free RAM (based on the compute resource type)
VS - the number of VSs associated to the compute resource
Features -

✓ ✓ ✗ ✓

, where the first icon shows compute resource’s failover status, the second one - statistics collection, the third one - CloudBoot status and the fourth one - backup status (for
CloudBoot compute resources only; it shows whether CloudBoot compute resource is used as a backup server.

If you are viewing the compute resources list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click Apply. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the compute resources list. You can always alter your column selection later.

Column selection is currently set for one browser. If the you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.

To sort information by column in ascending or descending order, mouse over the particular column header and click a triangle icon.

To view a particular compute resource details, click the label of a required compute resource. On the screen that appears you'll see compute resource details (RAM usage/RAM available, IP Address,CPU MHZ/CPU cores etc.) and Activity log of this compute resource. In the Target column, you can see an identification number and a name of a compute resource, to which the appropriate action was applied. To view details of a transaction from activity log, click its Ref number.

To edit or delete a compute resource, click the Actions button next to the compute resource, then select the required action.

26.1.1.2 View Compute Resource Hardware Info

To view compute resource hardware info:

Go to your Control Panel > Admin > Settings menu.

Click the Compute resources icon.

On the screen that appears, you will see the list of all compute resources in the cloud.

Click the Actions button next to the compute resource and press Hardware Info. Also you can click the label of a specific compute resource and select Tools > Hardware Info.

You will see the following details:

**Summary**

This section contains the basic information about the compute resource:

*Current Uptime* - the time the compute resource has been working and available, the number of its users, and the average load

*Total CPU* - the total amount of CPU (number of cores/frequency in MHz) allocated to the compute resource

*Memory* - the total amount of memory (GB) allocated to a compute resource

*Type* - the type of the compute resource, for example, Xen, KVM, etc

*OS* - the operating system of the compute resource

*Manufacturer/Model* - the manufacturer and model of the motherboard

*BIOS/Serial Number* - the system BIOS, its serial number and release date
CPU
This section shows CPU manufacturer logo and information about CPU slots. Click the CPU Details button to get detailed information about CPU from the Intel ARK database if available.

RAM
This section includes information about memory slots (double data rate, memory clock in MHz, size).

HD
This section shows information about the manufacturer and model of a hard disk drive and the hard disk drive capacity in GB.

Network
This section contains information about network cards. Click the Info button next to the specific network to get detailed information from the Intel ARK Database if available.

If hardware information is empty or incomplete, click the Update Hardware Info button in the right upper corner.

Click the Edit Custom Fields button to add/edit/delete custom fields for the hardware info. For more information on how to manage custom fields, refer to the Hardware Info page.

26.1.1.3 View Integrated Storage Settings
OnApp provides an overview of integrated storage settings enabled on compute resources available in your cloud. On the Integrated Storage Settings page, you can view information on SAN bonding mode and MTU value, information about disks assigned to cache and controller.

To view integrated storage settings:
Go to the Control Panel > Admin > Settings menu and click the Compute Resources icon.

On the page that appears, you will see the list of compute resources available in your cloud. Click the Actions button next to the label of a compute resource and select the Integrated Storage Settings option.

You will get the following details:
SAN bonding mode - the type of the bonding mode
MTU - the maximum transportation unit size
Cache settings:
Number of cache mirrors - the number of cache mirrors for the compute resource
Number of cache stripes - the number of cache stripes for the compute resource
Controller settings:
Controller RAM - the controller RAM value
Drives per controller - the number of disks per controller virtual server. By default, the controller virtual server is created per 4 disk drives.
Controller DB size - the controller DB size value

26.1.1.4 Create Compute Resource

You can add more physical Compute resources at any time. To add a Compute resource:
Go to your Control Panel > Admin > Settings menu.
Click the Compute resources icon.
Press "*" button or click the Add a new Compute resource button underneath the list of Compute resources on the screen.
On the screen that appears:
Label - enter a Compute resource label.

IP Address - add an IP address.

Compute Resource Type - choose a Compute resource type (Xen, KVM, vCloud or VMware).

For instructions on creating a VMware Compute resource, refer to vCenter Implementation Guide.

Operating System Type - choose an operating system type (Any OS, Windows only or Non-Windows).

Any OS - when this option is selected, any VS with any Operating system will live on compute resource. By default each compute resource will be created with the Any OS option. The existing compute resources also will have the Any OS set.

Windows only - when this option is selected, only VSs with the operating system Windows will be living on this compute resource. This compute resource will not be available for selection when creating a Linux or FreeBSD VS, nor when migrating a VS.

Non-Windows - when this option is selected, only VSs with the operating system Linux or FreeBSD will be possible to create on this compute resource. This compute resource will be skipped for Windows-based VSs in VS creation wizard, or when migrating a VS. Also when failover happens, Windows-based VSs won’t migrate to this compute resource.

Backups IP address - add a provisioning network IP address.

CPU Units - adjust the slider to set the desired amount of CPU units for this Compute resource. For more info on CPU units, refer to Billing Calculation. Do not apply CPU Units for KVM Compute resources running on baremetal servers. Mind that setting a different amount of CPU units will affect your cloud configuration. It will not be possible to create Instance Package VVs on the compute zone to which you assign this compute resource.

Enabled - move the slider to the right to enable a Compute resource. Compute resources that are not enabled cannot be used to host VSs.

Integrated Storage - move the slider to the right to enable Integrated Storage on static compute resources.

Collect Stats - move the slider to the right to collect statistics for this Compute resource.

Disable Failover - move the slider to the right to disable failover on this Compute resource (failover is automatic VS migration to another Compute resource if this one goes down).

Failover recipe - select a recipe to run before the failover process.

Power Cycle Command - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" - which will execute the entered command will appear in Tools menu at Admin > Settings > Compute resources > Compute resource page.
Currently, a command or commands should be written in one line separated by a semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under user `onapp`, this may be any script created in bash.

Click the **Save** button. The Compute resource will be added to the system. You can view it under the **Compute resources** menu. Click the **Back** button to return to the **Compute resource Settings** page.

For details how to create a CloudBoot Compute resource, refer to the Create CloudBoot Compute Resource section.

**After you create a compute resource you need to add it to a compute zone** of the required type. For more information on compute zone types, refer to **Zone Types**.

---

26.1.1.5 Edit Xen/KVM Compute Resource

To edit a Xen or KVM Compute resource:

Go to your Control Panel > **Admin** > **Settings** menu.

Click the **Compute resources** icon.

Click the **Actions** button next to the Compute resource you want to edit, then click **Edit**.

On the screen that follows, change details as required:

- **Label** - the Compute resource's name
- **IP Address** - IP address of the Compute resource
- **Operating System Type** - choose an operating system type (Any OS, Windows only or Non-Windows)

**Note that the compute resource won't be edited if the VSs with inappropriate operating system are present on it. Thus, it won't be possible to set Windows only type for a compute resource if there are any Linux or FreeBSD VSs living on it. Likewise, it won't be possible to set the Non-Windows type for a compute resource, if there are Windows-based VSs living on it.**

- **Backup IP address** - provisioning network IP address
- **CPU units** - change the amount of CPU units assigned to this Compute resource.

Mind that setting a different amount of CPU units will affect your cloud configuration. It will not be possible to create Instance
Package VSs on the compute zone to which you assign this compute resource.

*Enabled* - enable or disable the ability to install/boot virtual servers on this Compute resource

*Collect Stats* - enable or disable the ability to collect statistics for this Compute resource

*Disable failover* - enable or disable the VS migration to another Compute resource if this Compute resource is marked as offline by the Control panel server.

If you want to enable/disable failover for all compute resources within the compute zone, refer to [Manage Failover](#) section of this guide.

If you use automatic failover with write-back caching you may lose some data in the event of a failover.

*Failover recipe* - select a recipe to run before the failover process

*Power Cycle Command* - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" - which will execute the entered command will appear in Tools menu at Settings > Compute resources > Compute resource page.

Currently, a command or commands should be written in one line separated by semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under user onapp, this may be any script created in bash.

Click the *Save* button to save your changes.

### 26.1.1.6 Edit Integrated Storage Settings

To edit integrated storage settings:

Go to the *Control Panel > Admin > Settings* menu and click the *Compute Resources* icon.

On the page that appears, you will see the list of compute resources available in your cloud. Click the *Actions* button next to the label of a compute resource and select the *Integrated Storage Settings* option.

Click the *Edit* button.

On the screen that loads, edit the following parameters:

*SAN bonding mode* - choose bonding mode type from the drop-down menu

*MTU* - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

*VLAN id* - specify the ID of a VLAN number

Cache settings:

*Number of cache mirrors* - specify the number of cache mirrors for the compute resource

*Number of cache stripes* - specify the number of cache stripes for the compute resource
Controller settings:

*Controller RAM* - specify the the controller RAM value (minimum 640 MB, maximum 4096 MB)

*Drives per controller* - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives.

*Controller DB size* - select the controller DB size value (minimum 128 MB, maximum 256 MB)

Click the **Save** button to save changes.

26.1.1.7 Delete Compute Resource

Compute resources can be removed from your cloud if required. A Compute resource cannot be removed until all of the virtual servers assigned to it are migrated to another Compute resource.

To remove a Compute resource:

Go to your Control Panel > Admin > Settings menu.

Click the **Compute resources** icon.

Click the **Actions** button next to the Compute resource you want to delete, then click **Delete**.

26.1.2 Create and Manage CloudBoot Compute Resources

Compute resources are a critical part of the cloud. Compute resources have types which they inherit from the zone to which they belong. You can select the type of CloudBoot compute resource during the creation process. Also, this section provides information on how to edit CloudBoot compute resources for different types of servers and how to delete them.

CloudBoot compute resources are created via the **Admin > Settings** menu. To add a compute resource:

Configure the IP range which the Control Panel will assign to compute resources.

Add specific compute resources to the Control Panel itself.

After you create a compute resource you need to **add it to a compute zone** of the required type. For more information on compute zone types, refer to **Zone Types**.

---

**On this page:**

- Create an IP Range
- Create CloudBoot Compute Resource
- Edit CloudBoot Compute Resource
- Edit Baremetal CloudBoot Compute Resource
- Edit Smart CloudBoot Compute Resource
- Delete Compute Resource

**See also:**

- Data Stores Settings
- Networks
- Backup Servers Zone Settings
26.1.2.1 Create IP Range

To create an IP range:

Go to your Control Panel > Admin > Settings menu and click the Compute resources icon.

Click the CloudBoot IPs tab – this is where you add an IP address or range for the compute resource management interfaces, which Compute resources will acquire via DHCP when they boot. It is recommended to locate Compute resources management interfaces on a separate subnet with a NIC on the CP server also attached. In this configuration, the management subnet can use private address space and does not need to be externally addressable.

Next, power on your Compute resources. As they boot, the Control Panel will detect and record their MAC addresses.

Click the New IP Address button. On the page that loads, fill in the following information:

**IP Address** - enter a single address or a range of addresses to be used by the PXE server- e.g. 192.168.1.100-192.168.1.200 (see the note below)

**Netmask** - enter a netmask

**Gateway** - enter a default gateway address (see the note below)

Click the Submit button to finish.

The dynamic range should be quite a bit larger than the actual IPs that will get assigned. This allows space for reassigning new nodes that come online, without creating address collisions.

Compute resource management interfaces must be on the same subnet as the Control Panel server, and addresses must be valid for that addressable subnet. The Compute resource management interface must also have PXE boot enabled.

26.1.2.2 Create CloudBoot Compute Resource

To add a CloudBoot compute resource:

Go to your Control Panel > Admin > Settings > Compute Resources menu.

Click the Add New CloudBoot Compute Resource button at the bottom of the screen.

Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.

Click the Create CloudBoot Compute Resource button to start the creation process.

26.1.2.2.1 Step 1 of 5. Type

At this step, select the type of CloudBoot compute resource you want to create:

- KVM - KVM CloudBoot Compute Resource based on CentOS 6
- KVM - KVM CloudBoot Compute Resource based on CentOS 7
- Xen 4 - Xen 4 CloudBoot Compute Resource based on CentOS 6
- Xen 4 - Xen 4 CloudBoot Compute Resource based on CentOS 7
- Backup - CloudBoot Provisioning and Backup Resource for backups maintenance, based on CentOS 6
26.1.2.2 Step 2 of 5. MAC Address
At this step, select MAC IP Address of the new compute resource. It will be picked up automatically when you first PXE boot a new server on your cluster using the Control Panel.

Should you receive the "No available Compute Resources discovered" message, you can wait (this step is auto-refreshed every 30 seconds) or click the Refresh button until MAC IP Address appears.

Click Next to proceed to the following step of the wizard to specify the properties.

26.1.2.3 Step 3 of 5. Properties
At this step, specify the CloudBoot compute resource properties:

**Label** - give the compute resource a name

**Pxe IP address** - select an IP address for this compute resource from the address pool available

**Enabled** - move the slider to the right to allow VSs to be installed/booted on this compute resource

**Compute Zone** - select the compute zone, to which this compute resource will be assigned, from the drop-down list

**Apply Compute Zone Custom Config** - move this slider to the right to apply a compute zone custom config

If this check box is selected, a compute zone custom config is applied before a compute resource custom config.

**Custom Config** - specify any custom commands you want to run when compute resource is booted

Centos now defaults to NFSv4. This is known to cause compatibility issues so we strongly recommend that you use NFSv3 for all mounts. This can be done by passing `-t nfs -o vers=3` in any mount commands.

We strongly recommend that you recheck if custom config doesn't break any functionality. So before putting in production, the server with changed custom config should be rebooted, and the server behaviour rechecked. We recommend to perform the Storage Health Check and Network Health Check.
Show Advanced settings - move this slider to the right to specify advanced compute resource settings:

Backup IP address - add a provisioning network IP address

CPU Units - set the number of CPU units which will be assigned to the compute resource

Collect Stats - move the slider to the right to collect statistics for this compute resource. If you create a Backup CloudBoot resource type, the Collect Stats parameter is not available.

Disable Failover - move the slider to the right to disable VS migration to another compute resource if this compute resource is marked as offline by the Control Panel server

Failover option is not available for baremetal servers.

If you use automatic failover with write-back caching you may lose some data in the event of a failover.

MTU - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

The maximum transportation unit (MTU) is the maximum size of a unit that can be transmitted transferred via ethernet traffic. Any data that exceed the specified MTU value will be divided into smaller units before being transferred. Utilization of jumbo frames allows you to reduce/increase throughput (depending on a set frame size) and increase CPU utilization during large size file transfers.

SAN bonding mode - choose bonding mode type from the dropdown menu

After editing the SAN bonding mode option, it is required to reboot your Compute Resource to apply the settings.

Please note, that using more than one NIC for SAN subnet requires switch support. Please ensure that your network infrastructure supports the utilized NIC bonding and is configured correctly. By default, the utilized NICs bonding mode is IEEE 802.3ad Dynamic link aggregation which requires grouping appropriate ports together according to the section 5 Switch Configuration of Linux Ethernet Bonding Driver guide.

Storage Controller RAM - specify the storage controller RAM value (minimum 640 MB, maximum 4096 MB)

Storage Controller DB size - select the storage controller DB size value (minimum 128 MB, maximum 256 MB)

Drives per Controller - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives.

Dom0 RAM - allocate the amount of memory in MB for Dom0 on Xen compute resources. You need to allocate at least 4096 MB of Dom0 RAM.

Power Cycle Command - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" - which will execute
the entered command will appear in Tools menu at Admin > Settings > Compute resources > Compute resource page.

Currently, a command or commands should be written in one line separated with semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed.

Click Next to proceed to the following step of the wizard.

26.1.2.2.4 Step 4 of 5. Devices
At this step the compute resource is rebooted and the new configuration, set in step 3, is applied. It can take some time (the wizard makes 10 attempts with 1 minute interval). Once the compute resource comes back online you will be shown a list of devices that it contains - currently these are disks, cache settings and network interfaces. After the compute resource is created these devices can be further managed from the Control Panel (Admin > Settings > Compute Resources > label of compute resource > Tools > Manage devices).

Devices are unassigned by default. You can assign disks and network interfaces to a particular task.

26.1.2.2.4.1 Disks
Disks can be assigned to Storage (typical option when disk is connected to Integrated Storage) or to Cache (as cache device). To assign disks to one of these tasks, click on the required task near the device. Move the Format all assigned disks slider to the right to enable formatting for all disks, which are assigned to a particular task. You will get a confirmation pop-up window before formatting disks.

When you assign disk to Cache, then SSD caching is enabled. This feature increases disk I/O performance. There are two basic cache modes of operation:
- Write-through: improves read I/O performance, no impact on reliability
- Write-back: improves both read and write I/O performance, small chance of data loss.

Caching can be configured on two levels: per data store and per disk. For more information, refer to the SSD Caching section of OnApp Storage guide.

26.1.2.2.4.2 Cache Settings
Cache settings include the following options:
- Number of cache mirrors - specify the number of cache mirrors for the compute resource
- Number of cache stripes - specify the number of cache stripes for the compute resource

26.1.2.2.4.3 Network Interfaces
Network interfaces can be assigned to SAN. Using more than one NIC for SAN subnet requires switch support. Ensure that your network infrastructure supports the utilized NIC bonding and is configured correctly.
Ensure that the *Compute Resource Devices* permissions are on before managing devices. For more information, refer to the [List of all OnApp Permissions](#) section of this guide.

Click **Next** to proceed to the following step of the wizard.

### 26.1.2.2.5 Step 5 of 5. Finalize

At this step, wait until compute resource devices configuration is applied. Then you will be indicated that compute resource is successfully configured and ready for operation. Click the **Complete** button. The compute resource will be added to the system. You can view it under the **Compute resources** menu. You do not need to power cycle the Compute resource manually, the Control Panel handles this remotely and takes care of the configuration automatically.

### 26.1.2.3 Edit CloudBoot Compute Resource

To edit a CloudBoot compute resource:

Go to your Control Panel > **Admin** > **Settings** menu.

Click the **Compute Resources** icon.

Click the **Actions** button next to the CloudBoot compute resource you want to edit and then click **Edit**.

On the screen that follows, change details as required:

**Properties**

- **Label** - the compute resource’s name
- **MAC** - the MAC address of the compute resource
- **Backup IP address** - provisioning network IP address
- **CPU Units** - set the amount of CPU units assigned to this compute resource
- **Enabled** - enable or disable the ability to install/boot virtual servers on this compute resource
- **Collect Stats** - enable or disable the ability to collect statistics for this compute resource. If you edit a Backup CloudBoot resource type, the **Disable Failover** parameter is not available.
- **Disable Failover** - enable or disable the VS migration to another compute resource, if this compute resource is marked as offline by the Control Panel server
- If you edit a Backup CloudBoot resource type, the **Disable Failover** and **Failover Recipe** parameters are not available.

The Failover option is not available for baremetal servers.

- If you use automatic failover with write-back caching, you may lose some data in the event of a failover.

**Failover recipe** - select a recipe to run before the failover process

**Pxe IP address** - select a new IP address for this compute resource from the address pool
When you change the Pxe IP address, you should reboot the CloudBoot compute resource immediately after saving the new settings. If you do not reboot the resource immediately, the Control Panel will fail to connect to the new IP address, causing failover transactions. You can reboot the compute resource manually from the console or use the Power Cycle command (if configured).

You cannot use the Reboot option on the CP UI to reboot the resource after changing the IP address.

You can also change the IP address of a CloudBoot compute resource that is offline and once the resource is booted, it will be available on the new IP Address.

If InfiniBand is enabled for CloudBoot, you should change a value of the `cloud_boot pxe config` after changing the Pxe IP address.

**Advanced**

Move the Advanced slider to the right to edit advanced Compute resource settings:

*MTU* - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

The maximum transportation unit (MTU) is the maximum size of a unit that can be transmitted transferred via ethernet traffic. Any data that exceed the specified MTU value will be divided into smaller units before being transferred. Utilization of jumbo frames allows you to reduce increase throughput and increase CPU utilization during large size file transfers.

*SAN bonding mode* - choose bonding mode type from the drop-down menu

After editing the SAN bonding mode option, it is required to reboot your compute resource to apply the settings.

Please note that using more than one NIC for SAN subnet requires switch support. Please ensure that your network infrastructure supports the utilized NIC bonding and is configured correctly. By default, the utilized NICs bonding mode is IEEE 802.3ad Dynamic link aggregation which requires grouping appropriate ports together according to the section 5 Switch Configuration of Linux Ethernet Bonding Driver guide.

*Storage Controller RAM* - specify the storage controller RAM value (minimum 640 MB, maximum 4096 MB)

*Storage Controller DB size* - select the storage controller DB size value (minimum 128 MB, maximum 256 MB)

*Drives per Controller* - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives.
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**Dom0 RAM** - allocate the amount of memory in MB for Dom0 on Xen compute resources. You need to allocate at least 3072 MB of Dom0 RAM.

**Storage VLAN** - select VLAN for Integrated Storage Network

After editing the Storage VLAN, it is required to reboot your compute resource to apply settings. By default, Storage VLAN is set to 0 that is equal to no VLAN. If you already use a VLAN parameter in onappstore.conf that was added manually, please change the Storage VLAN parameter for each compute resource and save the CP configuration after editing to regenerate boot configuration. These requirements do not apply to VLAN used by means of a custom config script.

**Apply Compute Zone Custom Config** - move this slider to the right to apply a Compute Zone custom config

If this check box is selected, a Compute Zone custom config is applied before a CloudBoot compute resource custom config.

**Custom Config** - specify any custom commands you want to run when a compute resource is booted

**Power Cycle Command** - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" which will execute the entered command will appear in the Tools menu at Admin > Settings > Compute resources > Compute resource page.

Currently, a command or commands should be written in one line separated by a semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under user onapp, this may be any script created in bash.

5. Click the **Save** button to save your changes.

You can manage CloudBoot compute resource devices (disks, network interfaces, and PCI devices) on the Devices page. For more information, refer to Manage CloudBoot Compute Resource Devices.

26.1.2.4 Edit Baremetal CloudBoot Compute Resource

To edit a Baremetal CloudBoot compute resource:

Go to your Control Panel > Admin > Settings menu.
Click the **Compute resources** icon.
Click the **Actions** button next to the CloudBoot compute resource you want to edit and then click **Edit**.

On the screen that follows, change details as required:

- **Label** - the compute resource’s name
- **CPU units** - the amount of CPU units assigned to this compute resource
- **Enabled** - enable or disable the ability to install/boot virtual servers on this compute resource
- **Pxe IP address** - select a new IP address for this compute resource from the address pool

When you change the Pxe IP address, you should reboot the CloudBoot compute resource immediately after saving the new settings. If you do not reboot the resource immediately, the Control Panel will fail to connect to the new IP address. You can reboot the compute resource manually from the console or use the Power Cycle command (if configured). You cannot use the **Reboot** option on the CP UI to reboot the resource after changing the IP address. You can also change the IP address of a CloudBoot compute resource that is offline and once the resource is booted, it will be available on the new IP Address.

If InfiniBand is enabled for CloudBoot, you should change a value of the `cloud_boot` pxe config after changing the Pxe IP address.

**Apply Compute Zone Custom Config** - move this slider to the right to apply a Compute Zone custom config

If this check box is selected, a Compute Zone custom config is applied before a CloudBoot compute Resource custom config.

**Custom Config** - specify any custom commands you want to run when a compute resource is booted

**Power Cycle command** - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" which will execute the entered command will appear in the Tools menu at **Admin > Settings > Compute resources > Compute resource** page.

Currently, a command or commands should be written in one line separated by semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under user `onapp`, this may be any script created in bash.

Click the **Save** button to save your changes.

---

**26.1.2.5 Edit Smart CloudBoot Compute Resource**

To edit a Smart CloudBoot compute resource:
Go to your Control Panel > Admin > Settings menu.
Click the Compute resources icon.
Click the Actions button next to the CloudBoot compute resource you want to edit and then click Edit.
On the screen that follows, change details as required:

**Properties**

*Label* - the Compute resource’s name

*Backup IP address* - provisioning network IP address

*CPU units* - the amount of CPU units assigned to this compute resource

*Enabled* - enable or disable the ability to install/boot virtual servers on this compute resource

*Collect stats* - enable or disable the ability to collect statistics for this compute resource

*Disable failover* - enable or disable the VS migration to another compute resource, if this compute resource is marked as offline by the Control Panel server

If you use automatic failover with write-back caching you may lose some data in the event of a failover.

*Pxe IP address* - select a new IP address for this compute resource from the address pool

If you change the Pxe IP address, you should perform a manual reboot of a Smart CloudBoot compute resource after saving new settings.

If InfiniBand is enabled for CloudBoot, you should change a value of the cloud_boot pxe config after changing the Pxe IP address.

**Storage disks**

Move the slider next to the available disk to the right to select it for this Compute resource.

**Storage NICs**

For each Compute resource NIC, you can use one of the following options:

*Unassigned* - leave the NIC unused.

*SAN subnet* - select this option to use this interface for the storage network. In this case, the NIC interface will be bonded with the virtual network interface of the Storage Controller Server.

*Passthrough to storage* - this option is available for Xen CloudBoot compute resources. The network interface will be added to the Storage Controller Server without the bond and the Storage Controller Server will have the complete control over this interface.

*Passthrough to Guest* - this option is available for smart CloudBoot compute resources. The network interface will be added to the smart server.
Advanced

Move the Advanced slider to the right to edit advanced compute resource settings:

**MTU** - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

The maximum transportation unit (MTU) is the maximum size of a unit that can be transmitted via ethernet traffic. Any data that exceed the specified MTU value will be divided into smaller units before being transferred. Utilization of jumbo frames allows you to reduce increase throughput and increase CPU utilization during large size file transfers.

**Storage controller RAM** - specify the storage controller RAM value (minimum 640 MB)

**Storage Controller DB size** - select the storage controller DB size value (minimum 128 MB, maximum 256 MB)

**Drives per controller** - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives.

**Allow unsafe assigned interrupts** - move this slider to the right to allow/restrict unsafe assigned interrupts. This parameter is disabled by default during the smart CloudBoot Compute resource creation.

**Storage VLAN** - select VLAN for Integrated Storage Network

After editing the Storage VLAN, it is required to reboot your compute resource to apply settings. By default, Storage VLAN is set to 0 that is equal to no VLAN. If you already use a VLAN parameter in onappstore.conf that was added manually, please change the Storage VLAN parameter for each compute resource and save the CP configuration after editing to regenerate boot configuration. These requirements do not apply to VLAN used by means of a custom config script.

**Apply Compute Zone Custom Config** - move this slider to the right to apply a Compute Zone custom config

If this check box is selected, a Compute Zone custom config is applied before a CloudBoot compute resource custom config.

**Custom config** - specify any custom commands you want to run when Compute resource is booted

**Power Cycle Command** - arbitrary command string to be executed by IPMI from the CP server. If the command is entered, a new option "Power Cycle Compute resource" - which will execute the entered command will appear in Tools menu at Admin > Settings > Compute resources > Compute resource page.
Currently, a command or commands should be written in one line separated by semicolon. If the command(s) is written in two lines you will receive a "fail" response, although the transaction will be performed. The power cycle command is executed on Control Panel under user onapp, this may be any script created in bash.

26.1.2.6 Delete Compute Resource

Compute resources can be removed from your cloud if required. A Compute resource cannot be removed until all of the virtual servers assigned to it are migrated to another Compute resource.

To remove a Compute resource:

Go to your Control Panel > Admin > Settings menu.
Click the Compute resources icon.
Click the Actions button next to the Compute resource you want to delete, then click Delete.

26.1.3 Manage Static Compute Resource Hardware Devices

You can manage static compute resource hardware devices (disks and network interfaces), which are configured during Static compute resource creation.

To edit static compute resource hardware devices configuration:

Go to Control Panel > Admin > Settings menu > Compute Resources > label of compute resource > Tools > Hardware Devices.

The page that loads displays the Storage versions details and the list of devices together with their details. The Storage version displays the onappstore rpm version and may have the UNKNOWN VERSION value if the compute resource was booted from an older ramdisk image.

For disks - name, status and SCSi identifier
For network interfaces - name, status and MAC
Click the Edit Hardware Device Configuration button.
Assign each disk to Storage or to Cache, or leave it unassigned
Configure disks:
Unassigned - leave the disk unused
Assigned to Storage - select this option to use this disk into storage datastore
Assigned to Cache - select this option to use this disk for DM-Cache
Configure network interfaces. For each Compute resource NIC, you can use one of the following options:
Unassigned - leave the NIC unused.
Assigned to SAN - select this option to use this interface for storage network. In this case, NIC interface will be bonded with virtual network interface of the Storage Controller Server.
Click Next.
After devices are successfully reconfigured, click Finish.

26.1.4 Manage CloudBoot Compute Resource Devices

You can manage CloudBoot compute resource devices (disks, network interfaces, and PCI devices), which are configured during Create CloudBoot Compute Resource.
To edit CloudBoot compute resource devices configuration:

Go to Control Panel > Admin > Settings > Compute Resources > Label > Tools > Hardware devices.

The page that loads displays the Storage and CloudBoot versions details and the list of devices together with their details. The Storage version displays the onappstore rpm version and may have the UNKNOWN VERSION value if the compute resource was booted from an older ramdisk image.

For disks - name, status, and SCSi identifier
For network interfaces - name, status, and MAC

Click the Edit Device Configuration button.

Configure disks:

- move the Passthrough all disks slider to the right to pass through all disks to Storage Controller Server without the bond and the Storage Controller Server will have the complete control over disks.
- assign each disk to Storage or to Cache, or leave it unassigned
- for disks assigned to Cache, specify the number of mirrors and stripes

Configure cache settings:

- Number of cache mirrors - specify the number of cache mirrors for the compute resource
- Number of cache stripes - specify the number of cache stripes for the compute resource

Configure network interfaces. For each Compute resource NIC, you can use one of the following options:

- Unassigned - leave the NIC unused.
- SAN subnet - select this option to use this interface for the storage network. In this case, NIC interface will be bonded with the virtual network interface of the Storage Controller Server.
- Passthrough to storage - this option is available for Xen CloudBoot compute resources. The network interface will be added to the Storage Controller Server without the bond and the Storage Controller Server will have the complete control over this interface.
- Passthrough to Guest - this option is available for smart CloudBoot Compute resources. The network interface will be added to the smart server.

Click Next.

After devices are successfully reconfigured, click Finish.

Note that Storage drives cannot be formatted as integrated storage in case they were previously used in LVM. Therefore, you need to run the following commands to clean the device:

```
pvremove /dev/<device>
dd if=/dev/zero of=/dev/<disk> bs=1024 count=1000
```
26.1.5 Manage Compute Resource Data Stores

Data stores can easily be attached and removed from Compute resources. This association between a Compute resource and a data store is called a data store join.

You can add data stores to a compute resource only if they are assigned to the zones of the same type. For more information refer to Zone Types.

To add/remove data store joins:
Go to your Control Panel > Admin > Settings menu and click the Compute resources icon.
Click the label of the Compute resource you want to manage data stores for.
On the screen that appears, click the Tools button, then click Manage Data Stores.
On the screen that follows, you'll see a list of all data stores currently associated with this Compute resource.
To remove a data store join, click the Delete icon next to it. You'll be asked for confirmation before the store is removed.
To add a new data store join, choose a data store from the drop-down menu and click the Add Data Store button.

See also:
Compute Resources
Manage Compute Resources
Compute Resource Matrix
CloudBoot Compute Resources
Data Stores Settings

26.1.6 Manage Compute Resource Networks

Networks can easily be attached and removed from Compute resources. This association between a Compute resource and a network is called a network join.

You can add networks to a compute resource only if they are assigned to zones of the same type. For more information refer to Zone Types.

Note that starting from OnApp 5.4, it is allowed to attach only one network to a NIC, and different networks can be assigned to the same NICs if their VLANs are different. If you attach more than one network to the same NIC, all of them will be displayed in the interface, but only one will work.

To add/remove network joins:
Go to your Control Panel > Admin > Settings menu and click the Compute resources icon.
Click the label of the Compute resource you want to manage networks for.
On the screen that appears, click the Tools button, then click Manage Networks.
On the screen that follows, you'll see a list of all networks currently associated with this Compute resource.

To remove a network join, click the **Delete** icon next to it. You'll be asked for confirmation before the network is removed.

To add a new network join, choose a network from the drop-down menu, enter its interface name (eth0, eth1) and click the **Add Network** button.

**See also:**
- Compute Resources
- Manage Compute Resources
- Compute Resource Matrix

### 26.1.7 Maintenance Mode for Xen/KVM Compute Resources

Compute resources provide hardware for virtual servers, ensuring highly efficient use of available hardware. Below you can find the solutions regarding compute resource maintenance.

If you need to take a compute resource out of service, fix or upgrade it, use the maintenance mode feature. The VSs will be migrated to another compute resource and you can easily maintain your hardware. Be aware that after maintenance, VSs will not be migrated back to your compute resource automatically. You should manually bring VSs back to this compute resource.

If a compute resource is overloaded, but you do not want to take it out of service, you can enable or disable the ability to install/boot virtual servers on the compute resource by means of the **Enabled** slider while editing compute resource. Virtual servers that are already created on this compute resource will not be migrated and will be running.

Maintenance mode is applicable only to Xen/KVM compute resources.

Ensure that the **Set maintenance mode for any compute resource** permission is on before managing maintenance mode. For more information, refer to the List of all OnApp Permissions section of this guide.

Starting with OnApp 5.4, maintenance mode is also available for CloudBoot compute resources. Also, you can disable Integrated Storage for CloudBoot compute resources with Integrated Storage.

**See also:**
- Compute Resources
- Manage Compute Resources
- Compute Resource Matrix
- Add Xen/KVM Compute Resource (API)
- List of all OnApp Permissions
- Manage Virtual Servers

#### 26.1.7.1 Enable Maintenance Mode

To enable maintenance mode for a particular compute resource:
Go to your Control Panel > Admin > Settings menu.
Click the Compute Resources icon.
Click the label of the compute resource you are interested in.
Click Tools > Enable Maintenance Mode.
On the screen that follows:
Move the first slider to the right if you want to stop all virtual servers that cannot be migrated to another compute resource. This might happen because there are not enough resources on other compute resources in this zone for all VSs, or there is only one compute resource in a zone. All VSs, which have the hot migration option enabled, are attempted to be migrated to another compute resource. Note that smart servers can be migrated using only the cold migration option.
Move the second slider to the right if you are sure you want to enable maintenance mode for this compute resource.
Click the Confirm button. The action will be confirmed only if both options are enabled.
VSs will be sequentially migrated to other compute resources within the compute zone to which your compute resource is assigned. The compute resource will be marked as in maintenance mode and you will be able to fix or upgrade it.

Be aware that Xen-based VSs are migrated to Xen compute resources and KVM-based VSs - to KVM compute resources respectively within one compute zone. If you want to enable maintenance mode for Xen compute resource, there must be at least one more Xen compute resource within a compute zone to which both of them are assigned, otherwise, you will not be able to activate maintenance mode for this compute resource.

26.1.7.2 Disable Maintenance Mode
To bring a compute resource back online, switch maintenance mode off:
Go to your Control Panel > Admin > Settings menu.
Click the Compute Resources icon.
Click the label of the compute resource you are interested in.
Click Tools > Disable Maintenance Mode.
If you want to return VSs to the compute resource, from which they were migrated, you should manually bring VSs back to this compute resource.

Disabling maintenance mode initiates automatic reboot of a compute resource.

26.1.7.3 Maintenance Mode and Extended CPU Configuration
If the compute zone has extended CPU configuration (CPU model/flags) and one of the compute resources from this compute zone goes to maintenance mode, there are several scenarios that can take effect when the resource goes back online:
If the compute resource after maintenance has the same CPU performance characteristics as other compute resources in a compute zone, the CPU model remains the same for this compute zone.

If the compute resource after maintenance has better CPU performance characteristics than other compute resources in a compute zone, the CPU model remains the same for this compute zone.

If the compute resource after maintenance has worse CPU performance characteristics than other compute resources in a compute zone, the CPU model is downgraded for this compute zone.

Consider assigning a compute resource with worse or better CPU performance characteristics to another compute zone, where a CPU model would correspond to the actual CPU performance.

### 26.1.8 Enable Kernel Crash Dumping

Kdump is a kernel crash dumping mechanism designed for saving the system's memory contents for later analysis. It is especially helpful for the purposes of debugging when you want to discover the cause of a crash. At OnApp, Kdump feature allows you to create and collect kernel crash dumps on the CloudBoot compute resources. This feature is implemented for CentOS 6 KVM and CentOS 7 KVM compute resources only.

To enable kernel crash dumping:

- Go to your Control Panel > Admin > Settings menu.
- Click the Compute Resources icon.
- Click the label of the Compute resource you want to enable Kdump on.
- On the screen that appears, click the Tools button, then click Enable Kernel Crash Dumping.
- Move the Kernel Crash Dumping slider to the right to enable Kernel Crash Dumping.
- Click Save to proceed.

After you have enabled kernel crash dumping, reboot your compute resources at a convenient time to apply the changes.

The core dumps should be stored on NFS resource(s), because CloudBoot doesn't have any local storage. The resource will be $NFS_IP:/data. By default the NFS share is located on the Control Panel server.

For additional information on kernel crash dumping refer to Kernel Crash Dumping Mechanism on KVM Compute Resources section.

See also:

- Compute Resources
- Manage Compute Resources
- Compute Resource Matrix

### 26.1.9 Compute Resource CPU Model Configuration

OnApp provides a possibility to use CPU model configuration to group compute resources with similar CPU performance characteristics into compute zones. The CPU model configuration is implemented on a per-compute-zone basis. The compute zone with CPU configuration is
automatically assigned to a CPU model with a set of default and additional CPU flags. On the compute resource level, you can view the CPU model and the list of default, additional and unmatching CPU flags.

The extended CPU configuration is applicable only to KVM compute resources.

Currently, there are three types of CPU model configuration:
default KVM
extended CPU configuration
passthrough Host CPU
For more information on these CPU configurations of the compute resource, refer to the following sections.

On this page:
Prerequisites
Compute Resource CPU Flags
See also:
Create and Manage Compute Zones
Compute Zone Extended CPU Configuration
Maintenance Mode for Xen/KVM Compute Resources

26.1.9.1 Prerequisites

The CPU model configuration is managed per compute zone and each compute resource assigned to the zone inherits CPU model and CPU flags from the compute zone.

To use CPU model configuration:
Select the CPU Model Configuration from the corresponding dropbox while creating or editing a compute zone. After selection, all compute resources in this zone are automatically attached to a CPU model with a set of default and additional CPU flags. The CPU model is selected based on the CPU characteristics common for each compute resource assigned to this zone.

When you add a new compute resource to a compute zone with extended CPU configuration, wait for CPU flags to be updated after all the related transactions are finished.

Manage the CPU model configuration for a compute zone. For more information, refer to the Compute Zone CPU Model Configuration section of this guide.

26.1.9.2 Compute Resource CPU Flags

To view the list of extended CPU flags of a compute resource:
Go to your Control Panel > Admin > Settings menu and click the Compute Resources icon.
Click the label of the compute resource you are interested in.

On the screen that appears, click **Tools > Extended CPU Configuration**.

On the screen that follows, you will see the following information on the extended CPU configuration:

- **CPU Model Configuration** - provides a label of a CPU model set for this compute resource, as well as the list of default CPU flags. You cannot edit the list of default CPU flags.

- **Additional CPU Flags** - includes the list of additional CPU flags available for each compute resource in this zone. The enabled CPU flags are displayed in green boxes and the disabled CPU flags are dimmed. You can edit the list of additional CPU flags in the **Settings > Compute Zones > compute zone label > Tools > Extended CPU Configuration** menu.

- **Unmatching CPU Flags** - lists CPU flags that are available for the current compute resource but cannot be enabled for the entire compute zone as they are not available for each of the compute resources in this zone.

If there are some unmatching CPU flags, consider assigning a compute resource to another compute zone, where a CPU model would correspond to the actual CPU performance of the compute resource.

### 26.1.10 Set Default CPU Quota

CPU quota is a percentage value limiting maximum VS CPU load on a compute resource. CPU quota functionality allows limiting CPU usage for the particular virtual server in order to avoid abuse usage which is affecting all virtual servers on the KVM compute resource.

This option is available for the users under administrator's role. Make sure you have enabled *Manage CPU quota* permission first.

This feature is available only for KVM compute resources.

Before you enable CPU quota, its value is set to unlimited for all the VSs on this compute resource.

You can set the default value of CPU quota on the compute resource level and edit the custom value on the virtual server level.

**On this page:**

Set CPU Quota for Compute Resource

**See also:**

Compute Resource CPU Model Configuration
Create and Manage Compute Resources
Manage Compute Resource Data Stores
Manage Compute Resource Networks
26.1.10.1 Set CPU Quota for Compute Resource

To set default CPU quota for KVM compute resource:

Go to your Control Panel > Admin > Settings menu and click the Compute Resources icon.

Click the label of the compute resource you are interested in.

On the screen that appears, click Tools > Set default CPU Quota.

Move the CPU Quota enabled slider to the right to enable CPU quota and set the default value.

Set CPU quota. The maximum value is 99%. Also, you can select the ∞ unlimited checkbox to set an unlimited amount of CPU quota.

Click the Save button.

If default CPU quota value is changed or CPU quota is enabled, it does not affect running virtual servers until they are restarted.

If default CPU quota is disabled, it is set unlimited for all running virtual servers.

26.2 Compute Zones Settings

Compute zones can be used to create different tiers of service - for example, by setting up different zones for high-performance Compute resource servers, with different prices for virtual servers deployed on that zone.

Compute zones can have data stores and networks attached to them. The combination of Compute resource, data store and network groups can be used to create private clouds for customers.

Compute zones have types which are inherited by the compute resources in the zone. These types also define the type of resources (data stores, networks and backup servers) that can be associated with a compute zone or compute resource. Compute resources can be later moved from one compute zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available compute zone types for different compute resources:

<table>
<thead>
<tr>
<th>Compute Resource Type</th>
<th>Compute Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xen</td>
<td>Virtual</td>
</tr>
<tr>
<td></td>
<td>Baremetal</td>
</tr>
<tr>
<td>KVM</td>
<td>Virtual</td>
</tr>
<tr>
<td></td>
<td>Smart</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
<tr>
<td>vCloud Director</td>
<td>VPC</td>
</tr>
</tbody>
</table>

If there is only one Compute resource located in the Compute zone, it will not be marked as offline during the management network failure. This is an expected OnApp behavior.

See also:
26.2.1 Create and Manage Compute Zones

Compute zones can be used to create different tiers of service and have data stores and networks attached to them. The combination of Compute resource, data store, and network groups can be used to create private clouds for customers. Compute zones have types which are inherited by the compute resources in the zone. This section provides information on how you can create and manage compute zones.

26.2.1.1 View Compute Zones

To view Compute zones:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

The screen that appears will show all zones currently set up in the cloud along with the following details:

* **Label** - Compute zone's name
* **Zone type** - type of the zone: Virtual, Smart, Baremetal, or VPC
* **Location group** - the location group to which the Compute zone is assigned

To view a particular compute zone details, click the label of a required zone.

To view the list of compute zones via the Control Panel menu, click the Compute resources menu in the left pane.
26.2.1.2 View Compute Zone Details

To view details of a compute zone:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

Click the label of the zone you're interested in. The screen that follows shows details of that zone:

- **Label** - the compute zone’s name.
- **Location group** - the location group where this zone is located.
- **Max VS to start at once** - the maximum number of VSs which can run simultaneously in this zone.
- **Placement type** - the compute resource selection algorithm, which will be used on virtual server provisioning and recovery.
- **Failover timeout** - the time period (in minutes) for which the iterations will run during the failover if the compute resource does not respond.
- **Release resource type** - shows which option is set for over-committing RAM, CPU and CPU shares.
- **Extended CPU Configuration** - shows whether the Extended CPU Configuration is enabled for this zone.
- **Assigned Compute resources** - the list of compute resources assigned to the zone.
- **Unassigned Compute resources** - the list of Compute resources in the cloud that are not assigned to the zone. This list depends on the compute zone type. Only compute resource that can be assigned to a compute zone of this type, will be shown here. For the details see the Zone Types doc.

26.2.1.3 Create Compute Zone

Follow the below procedure to create a Compute Zone for any type of Compute resources apart from VMware. To create a Compute Zone for VMware Compute resources, please, refer to Create VMware Compute Zone.

After you create a compute zone you need to attach compute resources, networks and backup servers to it.

Keep in mind that you can attach only those resources that have the same type as the compute zone.

Do not add CloudBoot and static compute resources, as well as Xen and KVM compute resources, to one compute zone. The reason is that KVM virtual servers cannot be migrated to a Xen compute resource.

To create a new compute zone:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

Press "+" or click the Create Compute Zone button.

On the screen that follows the parameters you need to input depend on the type of the compute zone you want to create:
View Compute Zones
View Compute Zone Details
Create Compute Zone
Create Virtual Compute Zone
Create Smart Compute Zone
Create Baremetal Compute Zone
Add Compute Resource to Compute Zone
Remove Compute Resource from Compute Zone
Delete Compute Zone

After you fill in all the parameters, click the **Save** button.

26.2.1.4 Create Virtual Compute Zone

**Label** - give your compute zone a name.

**Server type** - choose the server type from the drop-down box. Choose the *virtual* server type to create a Xen, KVM, or CloudBoot zone. Only XEN, KVM and VMware compute resources can be attached to a zone of this type.

The zone's type cannot be changed after the zone is created.

**Location group** - select the location group to which this compute zone will be assigned.

**Release resource type** - this option allows you to free up the compute resource resources and over-commit RAM, CPU and CPU shares by means of the virtual servers that are shut down. By default, the compute zone is created with the *Memory Guarantee* option enabled. In this case the over-committing cannot be used. To enable resource releasing, choose either the *Ballooning* or *Only Started Virtual Servers* option.

**Memory guarantee** - the actual free compute resource memory is calculated. All virtual servers residing on the compute resource will be able to start.

**Ballooning** (KVM Compute resources only) - free compute resource memory is calculated with the ability to use memory over-committing.

A virtual server may be migrated to another compute resource if there is not enough memory for it to start up on the compute resource with the ballooning option enabled.

Do not use the ballooning option if there is at least one edge or storage server within the compute zone.

When using ballooning option it is impossible to monitor the exact free compute resource memory as it is a floating value. Therefore, some VS edit or start actions may fail.

**Only started Virtual Servers** - only the memory of running virtual servers is calculated.

**Max VS to start at once** - specify the maximum number of virtual servers that can be started simultaneously on a compute resource (5 recommended). This option ensures that virtual servers with VIP status will be booted prior to other servers.

**Placement type** - specify the compute resource selection algorithm, which will be used on virtual server provisioning and recovery, per compute zone.
**Take HV with maximum free RAM (Sparse)** - set this type to select the compute resource with maximum free RAM during the VS recovery. This option allows you to perform faster migration of virtual servers with a lesser (sparse) number of iterations during the failover.

This option behaves in different ways, depending on the event:
- **On provisioning**, the round-robin algorithm will be used on compute resource selection.
- **On recovery**, the compute resource with maximum free RAM will be selected.

**Take HV with minimum free RAM (Dense)** - with this type the system selects the compute resource with minimum required free RAM. This option allows filling a compute resource as densely as possible before starting to use the next compute resource in the zone.

**Failover timeout** - time period (in minutes) for which the iterations will run during the failover if the compute resource does not respond.

**CPU units** - set the number of CPU units which will be assigned to each compute resource in this zone by default. Do not apply CPU Units for baremetal servers.

**Set max memory** (appears only if the Ballooning release resource type is selected) - move the slider to the right to enable a max memory parameter for virtual servers within the compute zone.

When you enable the **Set max memory** option, the limit for VSs is calculated as follows:

\[
\text{Max Memory Limit} = \text{Memory} \times \text{Compute Resource Max Memory Rate}
\]

**Where:**

- **Memory** - the amount of RAM currently allocated to a virtual server
- **Compute Resource Max Memory Rate** - the default max memory rate is eight (8). To modify the default max memory rate, change a value of the `kvm_max_memory_rate` parameter in the `on_app.yml` file.

If the calculated max memory limit is more than 90% of free RAM available on a compute resource, then the limit is equal to 90% of free RAM available on the compute resource.

You can customize a max memory limit for a particular virtual server. For more information, refer to **Set Max Memory**.

**CPU guarantee** - move the slider to the right to ensure there is enough CPU on the compute zone to create a new VS.

**Run sysprep** - move the slider to enable Windows virtual server deployment with running sysprep. If the slider is disabled and there are several simple deployed virtual servers from the same template in the cloud, they will have identical SIDS. This will result in the system conflict.

It is not possible to set VS password when creating a Windows-based VMware virtual server without running a sysprep.

**CPU Model Configuration** - select the type of CPU model configuration

- **Default KVM** - regular CPU model configuration with no default CPU flags
- **Extended CPU Configuration** - CPU model with a set of extended CPU flags that can be applied to new and existing VSs in a zone.
**Passthrough Host CPU** - CPU model with a set of default and additional flags automatically applied to existing and new VSs

**Instance Package VSs** - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually). If this slider does not appear, this zone is inappropriate for creating Instance Package VSs.

Note that **Instance Package VSs** can only be created on compute resources within compute zones where all compute resources are assigned the same amount of CPU units. If there are compute resources with different amount of CPU units set in a zone, it will not be possible to create Instance Package VSs in such zones. The reason is that CPU priority for Instance Package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.

**Use Local Read Path** - move the slider to the right to minimize the network throughput dependency for read heavy workloads. When the Use Local Read Path option is enabled, reads go over the local software bridge to a local replica of the data rather than traverse a physical NIC + switch. This parameter is Integrated Storage related.

**Custom Config** - specify any custom commands you want to run when a compute zone is booted.

### 26.2.1.5 Create Smart Compute Zone

**Label** - give your compute zone a name.

**Server type** - choose the server type from the drop-down box. Choose the **smart** server type to create a smart server zone. Only KVM compute resources can be attached to a zone of this type. Smart servers will be further created on such compute resources.

The zone's type cannot be changed after the zone is created.

**Location group** - select the location group to which this compute zone will be assigned.

**Placement type** - specify the compute resource selection algorithm, which will be used on virtual server provisioning and recovery, per compute zone.

**Take HV with maximum free RAM (Sparse)** - set this type to select the compute resource with maximum free RAM during the VS recovery. This option allows you to perform faster migration of virtual servers with a lesser (sparse) number of iterations during the failover. This option behaves in different ways, depending on the event:

- **On provisioning**, the round-robin algorithm will be used on compute resource selection.
- **On recovery**, the compute resource with maximum free RAM will be selected.

**Take HV with minimum free RAM (Dense)** - with this type the system selects the compute resource with minimum required free RAM. This option allows filling a compute resource as densely as possible before starting to use the next compute resource in the zone.

**Failover timeout** - time period (in minutes) for which the iterations will run during the failover if the compute resource does not respond.

**Run sysprep** - move the slider to enable Windows virtual server deployment with running sysprep. If the slider is disabled and there are several simple deployed virtual servers from the same template in the cloud, they will have identical SIDS. This will result in the system conflict.
It is not possible to set VS password when creating a Windows-based VMware virtual server without running a sysprep.

**CPU Model Configuration** - select the type of CPU model configuration

*Default KVM* - regular CPU model configuration with no default CPU flags

*Extended CPU Configuration* - CPU model with a set of extended CPU flags that can be applied to new and existing VSs in a zone

*Passsthrough Host CPU* - CPU model with a set of default and additional flags automatically applied to existing and new VSs

*Use Local Read Path* - move the slider to the right to minimize the network throughput dependency for read heavy workloads. When the Use Local Read Path option is enabled, reads go over the local software bridge to a local replica of the data rather than traverse a physical NIC + switch. This parameter is Integrated Storage related.

*Custom Config* - specify any custom commands you want to run when a compute zone is booted.

26.2.1.6 Create Baremetal Compute Zone

*Label* - give your compute zone a name.

*Server type* - choose the server type from the drop-down box. Choose the *baremetal* server type to create a baremetal server zone. Only XEN compute resources can be attached to a zone of this type. Baremetal servers will be further created on such compute resources.

The zone's type cannot be changed after the zone is created.

*Location group* - select the location group to which this compute zone will be assigned.

*Run sysprep* - move the slider to enable Windows virtual server deployment with running sysprep. If the slider is disabled and there are several simple deployed virtual servers from the same template in the cloud, they will have identical SIDS. This will result in the system conflict.

It is not possible to set VS password when creating a Windows-based VMware virtual server without running a sysprep.

**CPU Model Configuration** - select the type of CPU model configuration

*Default KVM* - regular CPU model configuration with no default CPU flags

*Extended CPU Configuration* - CPU model with a set of extended CPU flags that can be applied to new and existing VSs in a zone

*Passsthrough Host CPU* - CPU model with a set of default and additional flags automatically applied to existing and new VSs

*Custom Config* - specify any custom commands you want to run when a compute zone is booted.

26.2.1.7 Add Compute Resource to Compute Zone

When adding several compute resources to a zone, you can arrange the servers running on particular compute resources into a paid service. Besides, adding several compute resources into one zone provides the failover capabilities to your services.
Only compute resources of relevant type can be added to a zone. For more information refer to Zone Types. When you add a compute resource to a compute zone, the compute resource inherits the zone's type.

To add a compute resource to a zone:

Go to your Control Panel's Settings menu and click the Compute Zones icon.

Click the label of the zone you want to add a Compute resource to. The screen that appears will show you the list of Compute resources in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.

In the unassigned list, find the Compute resource you want to add to the zone and click the Actions button next to it, then click Add.

Be careful when adding new compute resources to compute zone with Extended CPU Configuration enabled. For more information, refer to the Manage Extended CPU Flags for Compute Zone section of this guide.

26.2.1.8 Remove Compute Resource from Compute Zone

To remove a Compute resource from a zone:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

Click the label of the zone you want to remove a Compute resource from. The screen that appears will show you all Compute resources in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.

In the assigned list, find the Compute resource you want to remove and click the delete button (~) in the the Actions section next to it.

You cannot remove a vCloud Director compute resource from a compute zone.

You can only remove a compute resource from a compute zone if it currently hosts no virtual servers.

It is possible to re-assign compute resources only between compute zones of the same type. For more information, refer to Zone Types.

26.2.9 Delete Compute Zone

To delete a Compute zone:

Go to your Control Panel > Admin > Settings menu, and click the Compute Zones icon.

The screen that appears will show all zones currently set up in the cloud.

Click the Actions button next to the zone you want to remove, then choose Delete to remove it from the cloud. You will be asked to confirm the deletion.

26.2.2 Edit Compute Zone

To edit Compute zones:

Go to your Control Panel > Admin > Settings menu, and click the Compute Zones icon.
The screen that appears will show all zones currently set up in the cloud. Click the **Actions** button next to the required Compute zone, then click **Edit**. You can edit the following Compute zone details:

**See also:**
- Compute Resources
- Zone Types
- Compute Zones Settings

**Properties**

*Label* - Compute zone's name

*Location group* - location group to which the Compute zone is assigned. You can change the already set location if there are no virtual servers built on Compute resources of this zone.

*Release resource type* - Compute zone's resource type. This option allows you to free up the Compute resource resources and over-commit RAM, CPU and CPU shares by means of the virtual servers that are shut down. By default, the Compute zone is created with the *Memory Guarantee* option enabled. In this case, the over-committing cannot be used. To enable resource releasing, choose either the *Ballooning* or *Only Started VS* option.

*Memory guarantee* - the actual free Compute resource memory is calculated. All virtual servers residing on the Compute resource will be able to start.

*Ballooning (KVM Compute resources only)* - free Compute resource memory is calculated with the ability to use memory over-committing.

A virtual server may be migrated to another Compute resource if there is not enough memory for it to start up on the Compute resource with the ballooning option enabled.

Do not use the ballooning option if there is at least one edge or storage server within the Compute zone.

When using ballooning option it is impossible to monitor the exact free compute resource memory as it is a floating value. Therefore some VS edit or start actions may fail.

*Only started VS* - only the memory of running virtual servers is calculated.

*Max VS to start at once* - the maximum number of virtual servers that can be started simultaneously on this Compute resource (5 recommended). This option ensures that virtual servers with VIP status will be booted prior to other servers.

*Placement type* - specify the Compute resource selection algorithm, that will be used on virtual server provisioning and recovery, per Compute zone:

- *Take HV with maximum free RAM (Sparse)* - set this type to select the Compute resource with maximum free RAM during the VS recovery. This option allows performing faster migration of virtual servers with the lesser (sparse) number of iterations during the failover.

This option behaves in different ways, depending on the event:

On provisioning, the round-robin algorithm will be used on Compute resource selection.

On recovery, the Compute resource with maximum free RAM will be selected.
**Take HV with minimum free RAM (Dense)** - with this type the system selects the Compute resource with the minimum required free RAM. This option allows filling Compute resource as densely as possible before starting to use next Compute resource in the zone.

**Failover timeout** - the time period in minutes for which the iterations will run during the failover if the Compute resource does not respond. To manage failover, refer to Manage Failover section of this guide.

**CPU Units** - edit a number of CPU units assigned to each Compute resource in this zone by default.

**Set max memory** (appears only if ballooning release resource type is chosen) - move the slider to the right to enable max memory parameter for every VS within the compute zone. The max memory parameter will be set as 90% of free compute resource memory.

**CPU guarantee** - move the slider to the right to ensure there is enough CPU on the Compute zone to create a new VS.

**Update Compute resource CPU units** - move the slider to apply the edited number of CPU units to all the Compute resources in this zone.

**Run Sysprep** - enable or disable Windows virtual server deployment without running sysprep.

It is not possible to set VS password when creating a Windows-based VMware virtual server without running sysprep.

**CPU Model Configuration** - select the type of CPU model configuration

- **Default KVM** - regular CPU model configuration with no default CPU flags
- **Extended CPU Configuration** - CPU model with a set of extended CPU flags that can be applied to new and existing VSs in a zone
- **Passthrough Host CPU** - CPU model with a set of default and additional flags automatically applied to existing and new VSs

**Instance Package VSs** - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually). If this slider does not appear, this zone is inappropriate for creating Instance Package VSs.

*Note that Instance Package VSs can only be created on compute resources within compute zones where all compute resources are assigned the same amount of CPU units. If there are compute resources with different amount of CPU units set in a zone, it will not be possible to create Instance Package VSs in such zones. The reason is that CPU priority for Instance Package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.*

**Custom Config** - add or edit any custom commands you want to run when a compute zone is booted.

The custom configs are only applicable to Virtual, Smart, and Baremetal compute zones.
Integrated Storage

Use local reads path - minimize the network throughput dependency for read-heavy workloads. When the Use Local Read Path option is enabled, reads go over the local software bridge to a local replica of the data rather than traverse a physical NIC + switch.

4. Click the Save button to save your changes.

26.2.3 Manage Compute Zone Data Stores

Data stores can easily be attached and removed from Compute zones. This association between a Compute zone and a data store is called a data store join.

You can add data stores to a compute zone only if the the data store belongs to a data store zone of the same type as the compute zone. For more information refer to Zone Types.

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon. Click the label of the Compute zone you want to manage data stores for. On the screen that appears, click the Manage Data Stores link in the Tools section. On the screen that follows you'll see a list of all data stores currently associated with this Compute zone. To remove a data store from the zone, click the Delete icon next to it. You'll be asked for confirmation before the store is removed. To add a new data store, choose one from the drop-down menu and click the Add Data Store button.

See also:
- Compute Resources
- Compute Zones Settings
- Manage Compute Zone Networks
- Manage Compute Zone Recipes
- Manage Compute Zone Backup Servers

26.2.4 Manage Compute Zone Networks

Networks can easily be attached and removed from Compute zones. This association between a Compute zone and a network is called a network join. Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon. Click the label of the Compute zone you want to manage data stores for. On the screen that appears, click the Manage Networks link in the Tools section. On the screen that follows you'll see a list of all networks currently associated with this Compute zone. To remove a network, click the Delete icon next to it. You'll be asked for confirmation before the network is removed.
To add a new network, choose one from the drop-down menu, enter its interface name (eth0, eth1) and click the **Add Network** button.

If the Compute zone loses network connection, a warning message "All Compute resources are not responsive" will be displayed.

You can add networks to a compute zone only if the network belongs to a network zone of the same type as the compute zone. For more information refer to **Zone Types**.

---

**See also:**
- Compute Resources
- Compute Zones Settings
- Manage Compute Zone Recipes
- Manage Compute Zone Backup Servers
- Manage Compute Zone Data Stores

### 26.2.5 Manage Compute Zone Recipes

To manage Compute zone recipes:

Go to your Control Panel > **Admin > Settings** menu and click the **Compute Zones** icon.

Click the label of the zone you're interested in.

On the Compute zone details page click the **Tools** button, then select **Manage Recipes**.

The screen that follows shows details of all the recipes in the cloud:

The right pane displays the list of Compute zone events to which the recipes can be assigned to.

The left pane shows the list of all recipes in the cloud.

**Assign recipe**

Use drag and drop feature to assign a recipe to a desired Compute zone event.

You can assign template recipes to the following events:

- **Compute resource comes online** - run the recipe when the compute resource comes online
- **Compute resource goes offline** - run the recipe when the compute resource goes offline
- **KVM compute resource goes online** - run the recipe when the KVM compute resource goes online
- **KVM compute resource goes offline** - run the recipe when the KVM compute resource goes offline
- **Xen compute resource goes online** - run the recipe when the Xen compute resource goes online
- **Xen compute resource goes offline** - run the recipe when the Xen compute resource goes offline
- **vCenter compute resource goes online** - run the recipe when the vCenter compute resource goes online
- **vCenter compute resource goes offline** - run the recipe when the vCenter compute resource goes offline
**Baremetal compute resource goes online** - run the recipe when the Baremetal compute resource goes online

**Baremetal compute resource goes offline** - run the recipe when the Baremetal compute resource goes offline

The **X compute resource goes offline** recipe will be triggered when the statistics is not received from a compute resource for a certain period of time for some reason. If the compute resource is offline, the recipe will not run.

**VS provisioning** - run the recipe during the virtual server provisioning

**VS network rebuild** - run the recipe while rebuilding a network

**VS disk added** - run the recipe while adding a disk to the virtual server

**IP address allocated for VS** - run the recipe when adding an IP address to the VS network interface

**IP address revoked from VS** - run the recipe when removing an IP address from the VS network interface

**VS network interface added** - run the recipe while adding a network interface to the virtual server

**VS network interface removed** - run the recipe while deleting a network interface from the virtual server

**VS disk resized** - run the recipe while resizing a virtual server disk

**VS resize** - run the recipe while resizing the virtual server

**VS IP address add** - run the recipe while adding an IP address the virtual server

**VS IP address remove** - run the recipe while removing an IP address from the virtual server

**VS start** - run the recipe while starting the virtual server

**VS reboot** - run the recipe while rebooting the virtual server

**VS hot migrate** - run the recipe during the hot migration of the virtual server

**VS hot full migrate** - run the recipe during the hot migration of the virtual server with disk

**VS failover** - run the recipe during the failover process

**To use drag and drop:**

Click the arrow button in front of the required event to unfold it.

Click the arrow button in front of the required recipe group to unfold it. Select the required recipe in the left pane and hold it down with the left mouse button.

Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

**Remove recipe**

To remove recipe:

Click the arrow button in front of the required event to view the list of recipes assigned to it.

Click the **Delete** button next to the recipe you want to remove.

**See also:**

[Compute Resources](#)

[Compute Zones Settings](#)
26.2.6 Manage Compute Zone Backup Servers

When you attach a backup server to a specific compute zone, the backups on current backup server will be created only for compute resources within this compute zone.

Ensure that *Update any compute zone* permission is on before managing compute zone backup servers. For more information about permissions refer to the Permissions section of this guide.

See also:

Manage Compute Zone Data Stores
Manage Compute Zone Networks
Manage Compute Zone Recipes

26.2.6.1 View Compute Zone Backup Servers

To view compute zone backup servers:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

Click the label of the Compute zone.

On the screen that appears, click the Manage Backup Servers link in the Tools section.

On the screen that follows you'll see a list of all backup servers currently associated with this compute zone together with their details:

- **Label** - the name of the backup server
- **IP Address** - backup server IP Address
- **Enabled** - whether backup server is enabled or not

26.2.6.2 Add Backup Server to Compute Zone

You can add backup servers to a compute zone only if the the backup server belongs to a backup server zone of the same type as the compute zone. For more information refer to Zone Types.

To add backup server to a compute zone:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.

Click the label of the Compute zone you want to manage backup servers for.

On the screen that appears, click the Manage Backup Servers link in the Tools section.

On the screen that follows you'll see a list of all backup servers currently associated with this compute zone.

Choose one from the drop-down menu and click the Add Backup Server button.
26.2.6.3 Remove Backup Server from Compute Zone

To remove a backup server from the compute zone:

1. Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.
2. Click the label of the Compute zone you want to manage backup servers for.
3. On the screen that appears, click the Manage Backup Servers link in the Tools section.
4. On the screen that follows you’ll see a list of all backup servers currently associated with this compute zone.
5. Click the icon next to backup server you want to remove. You’ll be asked for confirmation before the backup server is removed.

Be cautious when detaching a backup server from compute zone. It will still be possible to restore a backup and convert the backups to templates, though you will not be able to provision a server from that template.

26.2.7 Manage Compute Zone Backup Resource Zones

Backup resource zones include backup resources built on plugins that enable integration of a third-party backup service with OnApp. You can attach backup resource zones to compute zones if you complete the following procedures:

- Install Backup Plugin
- Create Backup Resource
- Create Backup Resource Zone
- Attach Backup Resource to Backup Resource Zone

Adding a backup resource zone to the destination compute zone enables you to handle virtual server backups on the integrated system. As a result, virtual servers that run on compute resources in this compute zone can be backed up by means of a backup plugin.

In this document, you can find information on how to attach and remove backup resource zones to and from compute zones.

26.2.7.1 Attach Backup Resource Zone to Compute Zone

To attach a backup resource zone to compute zone, follow the next steps:

1. Go to your Control Panel > Admin > Settings menu.
2. Click the Compute Zones icon.
3. Click a label of a compute zone you want to attach a backup resource zone to.
4. Expand the Tools menu and click Manage Backup Resource Zones button.
5. On the page that appears, you will see a list of backup resource zones that you can add to the compute zone.
You can attach a backup resource zone from the same location group as a compute zone. The backup resource zones from unmatching location groups are not displayed on this page.

Select the required backup resource zone from the drop-down menu and click the Submit button.

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.

On this page:
- Attach Backup Resource Zone to Compute Zone
- Remove Backup Resource Zone from Compute Zone

See also:
- Install Plugins
- Manage Virtual Servers Backup Resources
- Backup Resource Zones
- Auto Backup Presets

26.2.7.2 Remove Backup Resource Zone from Compute Zone

To remove a backup resource zone from a compute zone, follow the next steps:
Go to your Control Panel > Admin > Settings menu.
Click the Compute Zones icon.
Click a label of a compute zone you want to remove a backup resource zone from.
Expand the Tools menu and click Manage Backup Resource Zones button.
On the page that appears, you will see a list of backup resource zones added to the compute zone.
Click the ‘-’ button next to the required backup resource zone to remove it from the compute zone.

26.2.7.3 What’s Next?
- Create Auto Backup Preset
- Add Backup Resource Zone to Bucket
- Attach Backup Resource to Virtual Server

26.2.8 Manage Failover

Compute resource failover means VS migration to another compute resource if the compute resource on which it is running goes offline.
If you want to enable/disable failover for all compute resources within the compute zone, do the following:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.
Click the label of the Compute zone you want to manage failover for.
On the screen that appears, click the Manage Failover link in the Tools section.
Click the Enable All button to enable failover for all compute resources within this zone.
If the failover is already enabled you can disable it by clicking the Disable All button.

When you change the compute zone’s failover status, this change will be applied to all compute resources within this zone.

See also:
Zone Types
Compute Zones Settings
Create and Manage Compute Zones

26.2.9 Compute Zone CPU Model Configuration

Due to virtualization environment, different VSs with various operating systems can work on the same physical compute resource. The virtualization layer allows the VS to work on CPUs that differ from CPU used on the compute resource.
The main advantage of virtualization is the ability to select a CPU model for guest VSs and distribute shared host CPU among many VSs that run using their own virtual CPU.

26.2.9.1 Select CPU Model Configuration
You can use CPU model configuration to group compute resources with similar CPU performance characteristics into compute zones. The CPU model is selected based on the CPU characteristics common for all compute resources assigned to one compute zone.

You can select the CPU model configuration functionality while creating or editing a compute zone. There are three types of CPU model configuration: default KVM, extended CPU configuration, and passthrough host CPU. Proper CPU model selection for zone provides the best virtual CPU for VS with a safe hot migration option. For more information on these modes, refer to the following sections.

On this page:

Select CPU Model Configuration
Manage CPU Model Configuration
Additional Considerations for Virtual Servers

See also:
Buckets
Maintenance Mode for Xen/KVM Compute Resources
Create and Manage Compute Zones
Create Virtual Servers
Compute Resource Extended CPU Configuration
26.2.9.1.1 Default KVM
The default KVM CPU model allows libvirt to select the closest model for the current host from the list in /usr/share/libvirt/cpu_map.xml. QEMU/KVM comes with a number of predefined named CPU models, that typically refer to specific generations of hardware released by CPU vendors. These allow the guest VSs to have a degree of isolation from the host CPU, allowing greater flexibility in live migrating between hosts with different hardware. The default KVM CPU model provides flexibility and live migration, but disadvantage of this method is the lowest capabilities delivered to virtual CPU.

Use `virsh capabilities` command on host to check what configuration will be used.

26.2.9.1.2 Extended CPU configuration
Extended CPU configuration model is a more advanced option that provides better capabilities of virtual CPU and saves VS hot migration possibilities. OnApp gathers CPU capabilities info from all compute resources in the zone and determines a Baseline CPU model with appropriate features set. CPU model and flag set are recalculated and may change after adding/removing compute resources in the zone.

After selection, all compute resources in this zone are automatically attached to a CPU model with a default set of CPU flags that are common for all compute resources within this zone and that cannot be disabled. You can also select some additional CPU flags that are applicable to all compute resources in the compute zone.

You can view the selected CPU model in comparison to Host's CPU model on the compute resource level.

26.2.9.1.2.1 Adding a new compute resource with extended CPU configuration
There are several scenarios that can take effect when a new compute resource is added to a compute zone with extended CPU configuration:

If the new compute resource has the same CPU hardware chip as one of resources that are already in a compute zone, the new compute resource inherits the CPU model and CPU flags set in this compute zone.

If the new compute resource has CPU with better performance characteristics than those resources that are already in a compute zone, the new compute resource inherits the CPU model and CPU flags set in this compute zone. The other flags will be disabled and listed in the Unmatching CPU Flags box at the Admin > Settings > Compute Resources > compute resource label > Tools > Extended CPU Configuration page.

If the new compute resource has CPU with worse performance characteristics than those resources that are already in a compute zone, the CPU model of the entire compute zone and all compute resources in this zone is automatically downgraded. The list of default and additional CPU flags will be updated in order to include only those flags that are common for each compute resource in the compute zone.

If a compute resource with worse performance characteristics than other resources is removed from a compute zone, the CPU model of the entire compute zone and all compute resources in this zone is automatically upgraded. The list of default and additional CPU flags will be updated in order to include only those flags that are common for each compute resource in the compute zone.
To achieve a CPU consistency between compute resources in a compute zone, assign the compute resource with worse or better CPU performance characteristics to the compute zone, where a CPU model would correspond to the actual CPU performance.

When you add a new compute resource to a compute zone with extended CPU configuration, wait for CPU flags to be updated after all the related transactions are finished.

26.2.9.1.3 Passthrough Host CPU
Passthrough host CPU model configuration passes the host CPU model and features directly to the guest VS. Note that some host CPU model features, if they can't be supported with virtualization, will be filtered out by KVM. This mode provides maximum available capabilities of the host's CPU to VS's virtual CPU. VS hot migration is possible only to a host with identical hardware. Setting passthrough host CPU for compute zone is recommended when all compute resources have identical CPU hardware or when it isn't important to have the hot migration option in the zone.

Both the extended CPU configuration and Passthrough Host CPU are applicable only to KVM compute resources.

You can set different prices in buckets for compute zones according to their CPU performance.

To view and manage the list of CPU flags available for a compute zone, proceed to the following section.

26.2.9.2 Manage CPU Model Configuration

After the CPU model configuration is selected for a compute zone, you can view and manage CPU configuration of this zone as follows:

Go to your Control Panel > Admin > Settings menu and click the Compute Zones icon.
Click a label of the required compute zone.
Expand the Tools menu and click the Manage CPU Configuration button.
On the screen that appears, you will see the following information on CPU configuration:

The CPU Model Configuration box provides a label of a CPU model set for this compute zone, as well as the list of default CPU flags that are enabled for each compute resource in this zone. You cannot edit the list of default CPU flags.

The Additional CPU Flags box includes the list of additional CPU flags available for each compute resource in this zone. Click a CPU flag to enable or disable it. The enabled CPU flags are displayed in green boxes and the disabled CPU flags are dimmed. You can also click the Select All and Deselect All buttons to manage additional flags. Any changes you make with additional flags are applied immediately.
CPU flags (or capabilities) may change with a CPU microcode patch/update. This happens due to CPU vendor changes CPU internal instructions to improve its capabilities or fix possible vulnerabilities.

If a compute zone is attached to a CPU model and then one of the compute resources of this zone goes to maintenance mode, the set of CPU flags can be different when it goes back online. For more information, refer to the Maintenance Mode for Xen/KVM Compute Resources section.

Some operation systems need special flags provided by CPU when they are running as VS appliances. For such cases, OnApp may add a necessary option to the models described above.

Be careful when adding new compute resources to a compute zone with extended CPU configuration. For more information, refer to this section.

26.2.9.3 Additional Considerations for Virtual Servers

Below you can find some additional considerations that you should take into account while creating VSs on compute resources with certain CPU model configuration enabled.

26.2.9.3.1 Passthrough Host CPU

Note that that hot and hot full VS migration will fail in case the hardware of your source and destination compute resource, namely the processors, is different.

The migration of virtual servers with a set of flags different from those available on the compute zone level will become available only after the reboot of VS or its shutdown and subsequent startup. After the boot, the VS configuration is updated to include the relevant set of CPU flags. Consequently, the migration of the rebooted virtual server will become available again.

26.2.9.3.2 Extended CPU configuration

When a new compute resource with worse CPU performance characteristics is added to a compute zone, as a result, the CPU model is downgraded and unmatching CPU flags are disabled for this zone and all the compute resources with better CPU, virtual servers that were earlier built in this zone on compute resources with a bigger set of flags will preserve all their flags. However, since such a VS has more flags than the compute zone and all the compute resources in this zone, it will not be possible to migrate this VS.

The migration of virtual servers with a set of flags different from those available on the compute zone level will become available only after the reboot of VS or its shutdown and subsequent startup. After the boot, the VS configuration is updated to include the relevant set of CPU flags. Consequently, the migration of the rebooted virtual server will become available again.
For more information on how to reboot a VS, refer to the Virtual Server Power Options document.
27 Storage Settings

The Control Panel's Storage Settings menu is where you get detailed control over low-level cloud settings for data stores, data store zones and disks.

See also:
- Data Stores Settings
- Data Store Zones Settings
- Disks Settings

27.1 Data Store Zones Settings

Data store zones can be used to create different tiers of service – for example, by setting up different zones for ordinary and high-performance SANs in the cloud. Zones can also be used to create private clouds for specific users.

Data store zones have types which are inherited by the data stores in the zone. Later data stores can be attached to a compute resource/compute zone of the same type. Data stores can be moved from one data store zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available data store zone types for different data stores:

<table>
<thead>
<tr>
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<td>SolidFire</td>
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</tr>
<tr>
<td>vCloud Director</td>
<td>VPC</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
</tbody>
</table>

See also:
- Data Stores Settings
- Disks Settings
- Manage Compute Zone Data Stores

27.1.1 Create and Manage Data Store Zones

A data store zone consists of several data stores sharing the same permissions. Data store zones can be used to create different tiers of service. Zones can also be used to create private clouds for specific users. This section contains information on how to create data stores and manage them within the data store zone.

27.1.1.1 View Data Store Zones

To view data store zones:

Go to your Control Panel > Admin > Settings menu, and click the Data Store Zones icon.

The screen that appears will show all data store zones currently set up in the cloud with their labels, type and the location groups they are assigned to. A data store zone can have the Virtual, Smart or VPC type.
Click a zone's label (name) to see details of the zone and to access the functions for adding/removing data stores to/from the zone.

**On this page:**
- View Data Store Zones
- View Data Store Zone Details
- Create Data Store Zone
- Create Solidfire Data Store Zone
- Edit Data Store Zone
- Attach Data Stores to Data Store Zone
- Remove Data Stores from Data Store Zone
- Delete Data Store Zone

**See also:**
- Zone Types
- Data Stores Settings
- Disks Settings
- Storage Settings

### 27.1.1.2 View Data Store Zone Details

To view details of a data store zone:

Go to your Control Panel > Admin > Settings menu and click the Data Store Zones icon.

Click the label of the zone you’re interested in. On the screen that appears, you will see the following data store zone details:

- Its label
- A list of data stores assigned to the zone
- A list of data stores unassigned to the zone

### 27.1.1.3 Create Data Store Zone

To create a new data store zone:

Go to your Control Panel > Admin > Settings menu and click the Data Store Zones icon.

Click the Create Data Store Zone button.

On the screen that follows:

- **Label** - give your data store zone a name.
- **Server type** - choose the server type from the drop-down box:
  - Choose the *virtual* server type to create a Xen, KVM, or CloudBoot zone
  - Choose the *smart* server type to create a smart server zone.
  - Choose the *Virtual Private Cloud* server type to create a vCloud Director server zone.

The zone's type cannot be changed after the zone is created.
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Location group - select the location group you wish to assign this data store zone to from the drop-down list.

Instance Package VSs - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually).

Click the Save button.

27.1.1.4 Create Solidfire Data Store Zone

To create a new data store zone:

Go to your Control Panel > Admin > Settings menu and click the Data Store Zones icon.

Click the Create Data Store Zone button.

On the screen that follows:

Label - give your data store zone a name.

Server type - choose the server type from the drop-down box:

Choose the virtual server type to create a Xen, KVM, or CloudBoot zone

Choose the smart server type to create a smart server zone.

The zone's type cannot be changed after the zone is created.

Location group - select the location group you wish to assign this data store zone to from the drop-down list.

Click the Save button.

You will be redirected to the Data Store Zone overview page. On that page you will see Unassigned Data Stores which can be added to this Data Store Zone.

Click the "+" icon to assign a required SolidFire Data Store(s).

Afterwards click the "edit" icon to proceed with SolidFire Data Store zone settings.

On the page that follows specify the following options, which will be applied while selecting this data store zone when creating a virtual server or adding a disk to an existing virtual server:

Default max iops - the maximum number of Input/Output operations per second.

Default burst iops - the number of burst IOPS.

Both maximum and burst IOPS values cannot exceed 15000.

Min disk size - the minimum size of a disk to be added to a virtual server.

Click the Save button.

27.1.1.5 Edit Data Store Zone

To edit data store zones:
Go to your Control Panel > Admin > Settings menu, and click the Data Store Zones icon. The screen that appears will show all data store zones currently set up in the cloud.

To change the zone's name and location group, click the Actions button next to the data store zone you are interested in, then click Edit.

On the page that loads you can change the following data store zone details:

- **Label** - give your data store zone a name.
- **Location group** - select the location group you wish to assign this data store zone to from the drop-down list. You can change the already assigned location group only if there are no disks or ISOs built on data stores of current zone.
- **Instance Package VSs** - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually).

Click Save.

### 27.1.1.6 Attach Data Stores to Data Store Zone

To add a data store to a zone:

Go to your Control Panel > Admin > Settings menu and click the Data Store Zones icon.

Click the label of the zone you want to add a data store to.

On the screen that follows, click the "+" icon next to the unassigned data store you want to add.

When you add a data store to a data store zone, the data store inherits the zone's type. For more information refer to Zone Types.

### 27.1.7 Remove Data Stores from Data Store Zone

To remove a data store from a zone:

Go to your Control Panel > Admin > Settings menu and click the Data Store Zones icon.

Click the label of the zone you want to remove a data store from.

On the screen that appears, click the "−" icon next to the data store you want to remove, to delete it.

### 27.1.8 Delete Data Store Zone

Delete data store zones:

Go to your Control Panel > Admin > Settings menu, and click the Data Store Zones icon. The screen that appears will show all data store zones currently set up in the cloud.

Click the Actions button next to the zone you want to remove, then click Delete. You'll be asked for confirmation before the zone is removed.

### 27.2 Data Stores Settings

Data stores provide disk space for your virtual servers and operating systems. Data stores are attached to Compute resources. There are several types of data stores in OnApp:

- **Traditional logical volume data stores** based on a centralized SAN.
- **ESXi datastores** used under VMware (refer to vCenter Implementation Guide for details)
- **Integrated storage data stores** (the core Integrated Storage functionality). See Integrated Storage chapter for details.
- **SolidFire data stores**.
StorPool data stores. See StorPool chapter for details.

The basic management tools are the same for all data store types, but the creation process differs.

See also:
- Data Store Zones Settings
- Disks Settings
- Manage Compute Zone Data Stores

Data stores have types which they inherit from the zone to which they belong. Later data stores can be attached to a compute resource/compute zone of the same type. Data stores can be moved from one data store zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available data store zone types for different data stores:

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</tr>
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</table>

Use caution when changing data store settings!

OnApp is integrated with the SolidFire storage management system. It is now possible to perform the following options with the SolidFire:

- Allocate dedicated LUN from SF cluster per virtual server disk, when creating a VS (LUN is created per each VS disk, with a separate LUN per swap disk).
- Create virtual servers without the swap disk.
- Implement backups / snapshots using SF CloneVolume method

Logical unit number (LUN) is a unique identifier assigned to one or several virtual server disks, addressed by SCSI protocol. In the SolidFire SAN environment, a RAID controller provides multiple LUN support, presenting storage as multiple devices. In this case, a LUN is used to present a view of the disk storage to the virtual server. When a LUN is assigned to a virtual server, it acts as its physical disk drive. Regardless of the use, each logical unit is treated as a single device.

LUN allows differentiating up to eight logical units. In LUN division, SAN is configured in such a way to match LUNs to proper virtual servers.
Use of LUN mapping allows improving security by setting a storage access limitations so that only LUNs authorized to access a particular virtual server can access the specific port.

27.2.1 Create and Manage Data Stores
Data stores provide disk space for your virtual servers and operating systems. Data stores are attached to Compute resources. The basic management tools are the same for all data store types, but the creation process differs. This section provides information on how you can view, create, edit and delete data stores.

View Data Stores

To view all data stores on your cloud:
Go to your Control Panel > Admin > Settings menu.
Click the Data Stores icon. The screen that appears lists all data stores currently available and their details:

- **Label** - the name of the data store
- **IP address** - the IP address of the data store
- **Shared?** - whether the data store is shared between several compute resources or not
- **Identifier** - the identifier of the data store
- **Enabled** - whether the data store is enabled or not
- **Data Store Zone** - the data store zone to which this data store is assigned
- **Location Group** - the location group to which this data store is assigned
- **Disk Usage** - used disk size within the data store
- **Disk Capacity** - the disk capacity set for the data store

**Actions** - click the Actions icon to Edit or Delete a data store

To use the data store, you have to add it to a data store zone and assign it either to a compute resource or a compute zone.

On this page:
- View Data Stores
- Create LVM Data Store
- Create SolidFire Data Store
- Edit Data Store
- Edit Data Store IO Limits

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Delete Data Store

See also:
Integrated Storage
Data Store Zone Settings
Zone Types
Manage Compute Zone Data Stores

27.2.1.1 Create LVM Data Store

To create a data store:

Go to your Control Panel > Admin > Settings menu.
Click the Data Stores icon.
Click the Create Data Store link at the bottom of the screen.
Follow the steps in the creation wizard:

   Step 1 of 2. Properties

   Label - choose a name for the data store
   IP address - enter an IP address for your data store
   Data store type - select the lvm data store type

   Enabled - move the slider to the right to enable the data store. When disabled, OnApp will not allow new disks to be created automatically on that data store. This is useful to prevent an established data store from becoming too full. It also lets you prevent the automatic creation of root disks on 'special' data stores (high speed, etc).
   Click Next.

   Step 2. Resources

   Disk Capacity - set disk capacity in GB
   Local Compute resource - if required, you can also bind the data store with a local Compute resource. This is helpful if you wish that the data store and a Compute resource were located on the same physical server thus decreasing the time needed for a Compute resource-data store connection.

   Data Store Zone - assign the data store to a data store zone. The drop-down menu lists all data store zones set up in the cloud (to add or edit data store zones, see Data Store Zones Settings).
   Unless you assign a data store to a data store zone and compute resource or zone, you won't be able to use this data store for storage. When you add a data store to a data store zone, the data store inherits the zone's type. It will be possible to move such a data store only to a data store zone of the same type. For more information refer to Zone Types.

   When you've finished configuring the store, click the Create Data Store button.
   OnApp doesn't support the 4 K block size for local LVM data stores.
27.2.1.2 Create SolidFire Data Store

You can create one SolidFire data store per cloud that will represent the space available at the SolidFire side.

To create a SolidFire data store:

Go to your Control Panel > Admin > Settings menu.

Click the Data Stores icon.

Click the Create Data Store link at the bottom of the screen.

Follow the steps in the creation wizard:

Step 1 of 3. Properties

Label - enter a data store label

IP address - specify an IP address to be used for managing the data store via CP (Inasmuch SolidFire data stores have two interfaces, you'll have to specify the IP address for the cluster admin later)

Data store type - select a solidfire data store type

Enabled - move the slider to the right to enable a data store. When disabled, OnApp will not allow new disks to be created automatically on that data store. This is useful to prevent an established data store from becoming too full. It also lets you prevent the automatic creation of root disks on 'special' data stores (high speed, etc).

Click Next.

Step 2 of 3. Resources

Disk Capacity - set disk capacity in GB.

Local Compute resource - if required, you can also bind the data store with a local Compute resource. This is helpful if you wish that the data store and a Compute resource were located on the same physical server thus decreasing the time needed for a Compute resource-data store connection.

Data Store Zone - assign the data store to a data store zone. The drop-down menu lists all data store zones set up in the cloud (to add or edit data store zones, see Data Store Zones Settings).

When you add a data store to a data store zone, the data store inherits the zone's type. It will be possible to move such a data store only to a data store zone of the same type. For more information refer to Zone Types.

Step 3. Authentication Settings

Specify the cluster Admin settings:

iSCSI IP - iSCSI IP address

Username - specify username for cluster authorization

Password - specify password for cluster authorization

Specify the SolidFire Account settings:
Username - specify SolidFire account username

Initiator secret - specify iSCSI initiator secret (optional)

Target secret - specify iSCSI target secret (optional)

Initiator secret and target secret are optional parameters. They are created automatically for a newly created account. For the new account they will be taken from the SolidFire database. If you specify target and initiator secrets for an existing user, they will be overwritten.

When you've finished configuring the store, click the Create Data Store button.

27.2.1.3 Edit Data Store

To edit a data store:

Go to your Control Panel > Admin > Settings menu.

Click the Data Stores icon. You'll see a list of the data stores on your system.

Click the Actions button next to the store you want to change, then click Edit.

On the following page the appropriate data store details:

Label - the name of the data store.

IP address - the IP address of the data store.

Iscsi IP - iSCSI IP address.

Disk Capacity - set disk capacity in GB.

Enabled - move the slider to the right to enable a data store. When disabled, OnApp will not allow new disks to be created automatically on that data store. This is useful to prevent an established data store from becoming too full. It also lets you prevent the automatic creation of root disks on 'special' data stores (high speed, etc).

Local Compute resource - if required, you can also bind the data store with a local Compute resource. This is helpful if you wish that the data store and a Compute resource were located on the same physical server thus decreasing the time needed for a Compute resource-data store connection.

Data Store Zone - you can re-assign the data store to another data store zone. The drop-down menu lists all data store zones set up in the cloud (to add or edit data store zones, see Data Store Zones Settings).

It is possible to move data stores only between data store zones of the same type. For more information, refer to Zone Types.

Data Store Type - edit the data store type.

Trim - select the checkbox to enable Trim on your SSD. For more information about the option, see TRIM.
If you have an integrated data store, the following parameters will be additionally available:

Auto Healing - move the slider to the right to enable auto healing

Epoch - move the slider to the right to enable epochs.

Integrated Storage Cache enabled - move the slider to the right to enable caching

Click the Save Data Store button to finish.

27.2.1.4 Edit Data Store IO Limits

IOPS limiting functionality allows you to prioritize the load on a SAN for VSs. IOPS limiting can be set for data store or for separate disks.

Ensure that the IO Limiting permissions are on before managing IO limits. For more information refer to the List of all OnApp Permissions section of this guide.

All IO limits are set to unlimited by default.

The IOPS limit, set for a data store, is automatically applied to all disks within this data store.

To edit a data store IO limits:

Go to your Control Panel > Admin > Settings menu.

Click the Data Stores icon. You'll see a list of the data stores on your system.

Click the Actions button next to the store you want to change, then click Edit IO Limits.

On the following page edit the appropriate data store details:

Read IOPS - set the read IOPS amount

Write IOPS - set the write IOPS amount

Read throughput - specify the read throughput (in MB/s)

Write throughput - specify the write throughput (in MB/s)

Click the Save button to finish.

To disable IOPS limiting:

Go to your Control Panel > Admin > Settings menu.

Click the Data Stores icon. You'll see a list of the data stores on your system.

Click the Actions button next to the store you want to change then click Edit IO Limits.

On the following page set all parameters to Unlimited.

Click the Save button to finish.
Go to `/onapp/interface/config/on_app.yml` file and set the `io_limiting_enabled` parameter as 'false'. Disabling will only remove the feature from the UI, old vdisk limits will be used if not set to unlimited.

27.2.1.5 Delete Data Store

To delete a data store:

Go to your Control Panel > Admin > Settings menu.

Click the Data Store icon. You'll see a list of the data stores in your system.

Click the Actions icon next to the data store you want to delete, then click Delete. You'll be asked for confirmation before the store is deleted.

27.2.2 Logical Volume Management (LVM)

LVM allows for very flexible disk space management. It provides features like the ability to add disk space to a logical volume and its filesystem while that filesystem is mounted and active and it allows for the collection of multiple physical hard drives and partitions into a single volume group which can then be divided into logical volumes.

OnApp doesn't support the 4 K block size for local LVM data stores.

27.2.2.1 Discards for LVM Level Thin Provisioning

OnApp offers the configuration of Logical Volume Management version 2 (LVM2) on OnApp compute resources or Backup Servers to support LVM discards. For that purpose, LVM has a configuration option called issue_discards. By default this option is disabled (i.e. set to 0).

After enabling this option:

LVM will issue discards to physical extents (PEs) that are no longer used by a logical volume (LVs).

Discards are then sent to an LV's underlying physical volumes when the LV is no longer using the physical volumes' space, e.g. after lvremove or lvreduce command invocation.

Discards inform the storage that a region is no longer used.

Storage that supports discards advertises the protocol-specific way discards should be issued by the kernel (TRIM, UNMAP, or WRITE SAME with UNMAP bit set).

27.2.2.1.1 Requirements

Prepare your storage - only SSDs and thinly provisioned LUNs support discards.

Storage Area Network (SAN) should support issuing discards

The kernel to support issuing discards on CentOS6 and CentOS7 the default kernel should support this action

27.2.2.1.2 Limitations

Enabling discards may cause the following issues, so performance should be monitored after enabling discards:

Increased load on lower block device - disk or attached SAN. Performance hit will depend on the specific way of discards processing by the block device (SAN).

IOWait could rise and potentially may slow down other VSs, which are running on that compute resource or SAN.

Removing logical volumes (lvremove) and reducing its size (lvreduce) may take more time to complete.
You may wish to enable this option on one Backup Server or across a single Compute Zone before enabling the whole cloud.

### 27.2.2.1.3 Enable Discards
To enable discards:

1. Open the `/etc/lvm/lvm.conf` file.
2. Click the `issue_discards` line.
3. Change the "0" value to "1."

You can repeat this procedure on all servers where you want to have this option enabled. Reboot or restart of servers and services is not required for enabling or disabling this option.

### 27.2.2 Moving from LVM Data Stores to Integrated Storage
This document will guide you through the steps needed when you consider moving from LVM data stores to Integrated Storage.

#### 27.2.2.2.1 Step 1. Reprovision the Backup Server as a CloudBoot hypervisor.
Add a CloudBoot backups server according to Create CloudBoot Backup Server documentation in Administration Guide.

#### 27.2.2.2.2 Step 2. Add at least one new CloudBoot hypervisor and configure.
Create a CloudBoot hypervisor and make appropriate configuration. Refer to Create CloudBoot Hypervisor section of the Administration Guide for details.

#### 27.2.2.2.3 Step 3. Create a test VS to make sure the configuration is working correctly.
When creating a VS, make sure to choose the CloudBoot hypervisor you've just created. Follow the VS Creation docs for instructions.

#### 27.2.2.2.4 Step 4. Migrate all VSs from the first static hypervisor to the new hypervisor.
Choose the static hypervisor to start with, and shut down all the virtual servers running on it and migrate to a CloudBoot hypervisor created in Step 2. For instructions, refer to Migrate Virtual Server section of the Administration Guide. Ensure that you cold migrate the VSs.

#### 27.2.2.2.5 Step 5. Reconfigure the now empty hypervisor as CloudBoot.
For this, you have to delete the hypervisor from which you migrated VSs in the previous step and create a CloudBoot hypervisor based on the MAC address of the removed hypervisor.

#### 27.2.2.2.6 Step 6. Migrate VSs from the next static HV to the just added CloudBoot HV.
Choose the next static hypervisor to proceed, and migrate all the virtual servers running on it to a CloudBoot hypervisor created in the previous step.

#### 27.2.2.2.7 Step 7. Repeat with each of the rest hypervisors and virtual servers.
At this stage, all virtual servers would be running from the LVM data store from CloudBoot hypervisors.

#### 27.2.2.2.8 Step 8. Configure Integrated Storage.
Now it's time to configure the integrated storage data stores and add VDisks. Refer to Integrated Storage chapter of the Administration Guide for details and instructions.

#### 27.2.2.2.9 Step 9. Migrate the disks to the new data store.
Migrate the disks from your local data stores to the integrated storage you've just configured in the previous step. The instructions can be found at Migrate Disks section of the Administration...
27.2.2.3 LVM Locking for Data Stores
OnApp 6.0 introduces a new feature called LVM locking for data stores. This feature is optional and you can enable it when you want to prevent LVM disks from corruption when starting a VS on multiple compute resources. Adding locking to LVM data stores allows you to have exclusive locks to make live migrations and shared locks to prevent concurrent activation of logical volumes (or data stores). Thus, you keep your LVM metadata more consistent and avoid accidental data store activation.

LVM Locking support is activated in two steps:

Compute Resource Configuration

Enabling LVM locking for a data store

27.2.2.3.1 Prerequisites and Limitations
Update your Control panel to version 6.0

This feature applies only to CloudBoot and static compute resources running CentOS 7 (Xen/KVM)

Make sure all data stores are inactive before you enable the locking

All hosts must support and work with locking

Logical Volume (LV) name dlvmlock will be created inside a shared volume group

On this page:

Prerequisites and Limitations
Compute Resource Configuration

Static Compute Resources
CloudBoot Compute Resources

Enabling LVM Locking for Data Store

Enabling LVM Locking for New Data Store
Enabling LVM Locking for Existing Data Store

27.2.2.3.2 Compute Resource Configuration

27.2.2.3.2.1 Static Compute Resources
To configure static compute resources, run the following command:

```
/onapp/onapp-hv-install/onapp-hv-config.sh -l HOST_ID
```

Where host_id - unique host ID, which is manually specified for each static compute resource and is between 257 and 2000. This command should be run on all compute resources and backups servers in a compute zone.

27.2.2.3.2.2 CloudBoot Compute Resources
To configure CloudBoot compute resources, run the following commands in a custom config script:
After the data store configuration is completed, uncomment the `sleep 30` and `vgchange --lock-start` commands.

27.2.2.3.3 Enabling LVM Locking for Data Store
LVM locks activation process depends on the type of the data store you want to enable it for. LVM locking support can be added to both the new data stores and already existing data stores with disks.

27.2.2.3.3.1 Enabling LVM Locking for New Data Store

Configure `lvm.conf` across all hosts accessing shared volume group (VG):

```
locking_type = 1
use_lvmlockd = 1
```

Assign unique `host_id` in `lvmlocal.conf` across all hosts accessing shared VG:

```
host_id = 1000  # just an example
```

Start LVM locking daemon (lvmlockd) across all hosts accessing shared VG:

```
# lvmlockd
```

Start sanlock across all hosts accessing shared VG:

```
# systemctl start wdmd sanlock
```

Create a volume group on one host:
# vgcreate
```
--shared testvg /dev/sdb
```
Enabling sanlock global lock
Logical volume "lvmlock" created.
Volume group "testvg" successfully created
VG testvg starting sanlock lockspace
Starting locking. Waiting until locks are ready...

Start locking across all hosts accessing shared VG:
```
# vgchange
--lock-start
```
Skipping global lock: lockspace not found or started
VG testvg starting sanlock lockspace
Starting locking. Waiting for sanlock may take 20 sec to 3 min...

Commands 1 to 4 will run automatically after you run the script
```
```
Commands 5 to 6 have to be input manually

27.2.3.3.2 Enabling LVM Locking for Existing Data Store

Only one VG (data store) could be used to provide global locks, thus if there is more than one shared VG you can use only one of them for locking.

Make VG and all its LVs inactive on all hosts accessing shared VG (in case of multiple shared VGs make this step for each of them on all hosts):
```
vgchange -an onapp-jhsdohofoswhfsoh
```

To enable LVM locking for existing data store, do the following:

Configure lvmlockinginlvm.conf across all hosts accessing shared VG:
```
locking_type = 1
use_lvmlockd = 1
```

It is preferable to use lvmetad- so enable it in lvm.conf on all hosts accessing shared VG:
```
use_lvmetad = 1
```

Assign unique host_id in lvmlocal.conf across all hosts accessing shared VG:
host_id = 100

Start lvmlockd across all hosts accessing shared VG:

```bash
# lvmlockd
```

Start lvmetad on all hosts accessing shared VG:

```bash
systemctl start lvm2-lvmetad
```

Check if there is no Global Locking configured:

```bash
lvmlockctl -i | grep 'LK GL'
```

Create small local block device with a loop:

```bash
# truncate -s 10g /root/tmp.img
# losetup -f /root/tmp.img
losetup -l
```

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE LIMIT</th>
<th>OFFSET</th>
<th>AUTO CLEAR</th>
<th>READ ONLY</th>
<th>BACK-FILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/loop0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>/root/tmp.img</td>
</tr>
</tbody>
</table>

Create new temporary VG, which holds Global Lock:

```bash
# vgcreate --shared tmpvg /dev/loop0
Enabling sanlock global lock
Physical volume "/dev/loop0" successfully created.
Logical volume "lvmlock" created.
Volume group "tmpvg" successfully created
VG tmpvg starting sanlock lockspace
Starting locking. Waiting until locks are ready...
```

Start locking (sometimes it is needed):

```bash
vgchange --lock-start tmpvg
vgchange --lock-start
```

Check if we get Global Lock here:

```bash
# lvmlockctl -i
VG tmpvg lock_type=sanlock sSsiZU-U4pV-6Eui-p2kh-Hv32-N1M6-YA1KYH
LS sanlock lvm_tmpvg
LK VG un ver 0
LK GL un ver 0
```

Change the lock type on VG:

```bash
# vgchange --lock-type sanlock existingVG
Logical volume "lvmlock" created.
Volume group "existingVG" successfully changed
```

Start locking on VG:
# vgchange
```
VG existingVG starting sanlock lockspace
Starting locking. Waiting for sanlock may take 20 sec to 3 min...
```

Check where is Global Lock (GL) located:
```
# lvmlockctl -i
VG tmpvg lock_type=sanlock sSsi2U-U4pV-6Eui-p2kh-Hv32-N1M6-YA1KYH
LS sanlock lvm_tmpvg
LK VG un ver 0
LK GL un ver 3
VG existingVG lock_type=sanlock bsoMzh-jd84-kSOy-So00-97DI-gb4K-IFkEWB
LS sanlock lvm_existingVG
LK VG un ver 0
```

Enable GL on existing VG:
```
lvmlockctl --gl-enable existingVG
```

Clean up tmpvg:
```
# vgchange -an tmpvg
# vgremove tmpvg
VG tmpvg held the sanlock global lock, enable global lock in another VG.
Volume group "tmpvg" successfully removed
# losetup -l
NAME SIZE LIMIT OFFSET AUTOCLEAR RO BACK-FILE
/dev/loop0 0 0 0 0 /root/tmp.img
# losetup -d /dev/loop0
# rm /root/tmp.img
rm: remove regular file '/root/tmp.img'? y
```

Check if Global Lock is still present on existing VG:
```
# lvmlockctl -i
VG existingVG lock_type=sanlock bsoMzh-jd84-kSOy-So00-97DI-gb4K-IFkEWB
LS sanlock lvm_existingVG
LK VG un ver 0
LK GL un ver 0
```

### 27.3 Disks Settings

The disk settings screen lets you view, edit, migrate and delete every disk in the cloud, and provides quick access to their backup and schedule functions.

Do not create multiple partitions on one disk for virtual servers. OnApp Control Panel supports only one partition per disk. In cases when you change disk partition, the CP might lose control of such a disk and the VS associated with it. If required, create additional disks instead.
Data Stores Settings
Data Store Zones Settings
Manage Compute Zone Data Stores

27.3.1 Manage Disk Settings

Virtual server storage is provided by disks. A disk is a partition of a data store that is allocated to a specific virtual server. Disks can be assigned as standard or swap disks. Managing disks for the entire cloud is handled through the Control Panel's Settings menu. This section contains information on how to view, edit, migrate and delete every disk in the cloud, and get quick access to their backup and schedule functions.

Do not create multiple partitions on one disk for virtual servers. OnApp Control Panel supports only one partition per disk. In cases when you change disk partition, the CP might lose control of such a disk and the VS associated with it. If required, create additional disks instead.

27.3.1.1 View Disks

To view a disk:

Go to your Control Panel > Admin > Settings > Disks menu.

On the page that loads, you can see the list of all the disks in the cloud and their details:

- **Disk** - disk ID
- **Label** - disk label
- **Size** - disk size in GB
- **Data Store** - data store the disk is configured on
- **Virtual Server** - the virtual server the disk is assigned to
- **Mounted?** - whether the disk is mounted or not
- **File system** - the disk's file system
- **Type** - the disk's type (swap or standard)
- **Built?** - whether the disk has been built or not
- **Backups** - number of backups taken
- **Auto-backup?** - whether auto-backups are scheduled for this disk

On this page:

- **View Disks**
- **Enable Disk Auto-Backups**
- **Backup Disks**
- **Migrate Disks**
- **View Disk IOPS**
- **Edit Disk IO Limits**
- **Schedule Disks for Backups**
27.3.1.2 Enable Disk Auto-Backups

To enable disk auto-backups:
Go to your Control Panel > Admin > Settings > Disks menu.
Move the Auto-backup icon to the right next to the required disk.
You can use disk auto-backups to enable/disable automatic backups for a particular disk. If the incremental backups are enabled in your cloud, you can set auto-backups per VS rather than per disk.

If disk auto-backups were turned on before enabling the incremental backups option, you will need to disable the disk auto-backups and enable incremental auto-backup per virtual server.

27.3.1.3 Backup Disks

The Disks screen lists all the disks in the cloud and indicates disk ID, disk label, disk size, data store they're configured on, the virtual server they're assigned to, their type, status, number of backups taken and backup status.
To back up a disk:
Go to your Control Panel > Admin > Settings > Disks menu.
Click the Actions > Backup button next to the required disk.
Click Take a Backup button.

27.3.1.4 Migrate Disks

If you are viewing the disks list on a narrow screen, you can customize the way the table is displayed by clicking the actions icon at the top of the table. In the drop-down list that appears, check the columns you want to be displayed and click Apply. The narrower your screen is, the more unchecked columns will be hidden from the table. If your screen is too narrow to fit all the columns you have checked, a scrollbar will appear at the bottom of the disks list. You can always alter your column selection later. Note that by default the Backups, Auto-backup? and Disk columns are not visible in the table on narrow screens.

Column selection is currently set for one browser. If you have checked some columns in one browser and open the list in some other browser, the column selection will be the default one for that other browser.
If required, you can change the block size which is used during disk migration at **Control Panel > Settings > Configuration** by editing the **Block Size (MB)** parameter.

We recommend to create a disk backup before starting the migration process to avoid potential data loss.

You can migrate disks to other data stores, which are allocated to the same Compute resource. Unlike VS migration – disk migration requires reboot of the VS (despite the template it is based on). You can only migrate disks to data stores in data store zones assigned to your bucket.

To migrate a disk to another data store:

Go to your **Control Panel > Admin > Settings > Disks** menu.

Click the **Actions** button next to the disk you want to change, then click the **Migrate** link.

Choose the type of migration (can be hot or cold).

Choose a target data store.

Click the **Start Migrate** button.

### 27.3.1.5 View Disk IOPS

To see IOPS for a disk:

Go to your **Control Panel > Admin > Settings > Disks** menu.

Click the **Actions** button next to the required disk, then click the **IOPS** link.

There are four charts on the screen that appears:

- **Instant IOPS** - summary IO operations per minute
- **Hourly IOPS** - summary IO operations per hour
- **Instant data written/read** - data written/read for the last 24 hours

To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

### 27.3.1.6 Edit Disk IO Limits

IOPS limiting functionality allows you to prioritize the load on a SAN for VSs. IOPS limiting can be set for data store or for separate disks.

Ensure that the **IO Limiting** permissions are on before managing IO limits. For more information refer to the List of all OnApp Permissions section of this guide.

To edit a disk IO limits:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Disks** icon. You'll see a list of the disks on your system.

Click the **Actions** button next to the disk you want to change, then click **Edit IO Limits**.

On the following page move the **Override DataStore IO Limits** slider to the right to edit the appropriate details:

- **Read IOPS** - set the read IOPS amount
- **Write IOPS** - set the write IOPS amount
Read throughput - specify the read throughput (in MB/s)
Write throughput - specify the write throughput (in MB/s)

Click the Save button to finish.

To disable IOPS limiting:

Go to your Control Panel > Admin > Settings menu.

Click the Disks icon. You’ll see a list of the disks on your system.

Click the Actions button next to the disk you want to change, then click Edit IO Limits.

On the following page set all parameters to Unlimited.

Click the Save button to finish.

Go to /onapp/interface/config/on_app.yml file and set the io_limiting_enabled parameter as ‘false’. Disabling will only remove the feature from the UI, old vdisk limits will be used if not set to unlimited.

27.3.1.7 Schedule Disks for Backups

In addition to the system auto-backup presets, you can schedule backups of virtual servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

To schedule a backup:

Go to your Control Panel > Admin > Settings > Disks menu.

Click Actions > Schedule for backups button next to a disk to schedule a backup for.

27.3.1.8 Delete Disks

To delete a disk:

Go to your Control Panel > Admin > Settings > Disks menu.

Click Actions > Delete button next to a disk to delete it. You’ll be asked for confirmation before the disk is removed. All backups for this disk will be removed too.

27.3.1.8.1 Disk Wipe

OnApp Cloud provides two ways to clean VS data when deleting or migrating a VS’s disk. By default, OnApp Cloud will format the physical disk space used by a virtual server when that VS’s virtual disk is deleted, or when the VS disk is migrated to another data store.

You can also choose to wipe/format a VS’s disk (filling it with zeroes) by changing a configuration setting on the OnApp Control Panel server. To enable this behavior:

Log in as root on your OnApp Control Panel server.

Edit the following configuration file: /onapp/interface/config/on_app.yml and set the wipe_out_disk_on_destroy parameter to true.

Restart OnApp service: service onapp restart.

The wipe_out_disk_on_destroy value is set to FALSE by default. If you wish to return disk wiping behaviour to the default setting (formatting rather than zeroing disks), simply edit the config file and set the value to FALSE again.
28 Location Groups

The location group ties compute resource, network, data store and backup server zones into the same location group. So, when you create a compute resource and choose a compute zone assigned to a specific location group, the network, data store and backup servers will be limited to this location group. This enables you to host different types of servers (virtual, smart, application, edge and storage) in remote locations using a single control panel. Please contact your cloud specialist to enable this feature.

Make sure to enable the Access Token to use Location groups functionality (Admin > Settings > Configuration menu).

The location group specified per server predetermines the selection of compute zones and, consequently, its compute resources.

If a user has compute zones assigned to location groups in their bucket, the Cloud Locations step will appear in the virtual server creation wizard. On this step, the user selects the country and city where the cloud is located. If the user's bucket has several compute zones, some of which are assigned to location groups, whereas others are not - the cloud locations screen will not be available in the wizard.

See also:

Create and Manage Backup Server Zones
Compute Resources
Create and Manage Compute Zones

28.1 Create and Manage Location Groups

The location group ties compute resource, network, data store and backup server zones into the same location group. This enables you to host different types of servers (virtual, smart, application, edge and storage) in remote locations using a single control panel. This section contains information on how you can view, add and edit location groups as well as assign zones to location groups and unassign them. Note that you cannot delete location groups with assigned zones.

28.1.1 View Location Groups

The Location Groups are added in OnApp Dashboard. So, when you log in to your Control Panel, the system lists all the locations added and configured in OnApp Dashboard.

To view the list of Location Groups available in your cloud:

Go to your Control Panel > Admin > Settings menu.

Click the Location Groups icon. The page that appears will show all the location groups in your cloud.
Click the location group name to see its details:

country and city
CDN locations
Compute resource, data store, network, and backup server zones assigned to this location

**On this page:**
*View Location Groups*
*Add Location Groups*
*Edit Location Groups*
*Assign Zones to Location Groups*
*Unassign Zones from Location Groups*

**See also:**
*Create and Manage Backup Server Zones*
*Compute Resources*
*Compute Zones*

---

### 28.1.2 Add Location Groups

To add a location group:

Add and properly configure a location in OnApp Dashboard.

Go to your **Control Panel > Admin > Settings > Location Groups** screen.

The page that loads will show the groups of all available locations.

Click the **Refresh** button if the required location is not listed.

After that, configure the resources that will be attached to the location groups. We recommend the following configuration sequence to ensure correct relationships within location groups:

Add resources to the zones. For example, attach data stores to the data store zones.

Add zones you configured at Step 1 to the required location group.

Create relations between resources themselves: attach data stores and networks to the Compute zones.

**Do not delete location groups with assigned zones!**

---

### 28.1.3 Edit Location Groups

It is possible to modify an existing location in OnApp Dashboard if the location is not used by any zone.

If special requirements are met, you can change the location already assigned to Compute resource/data store/network/backup server zones. For more info on this, refer to the following sections:
28.1.4 Assign Zones to Location Groups

To properly configure the Location groups in your cloud, assign the Compute resource, Data store, Network and Backup server zones to them.

To assign zones to a location group:

Log in to your OnApp Control Panel > Admin.
Go to your Settings > Location Groups menu.
Click the Country or City of the Location Group in question.
The page that loads is organized into the list of Compute resource/Data store/Network/Backup server zones. Click the "+" button next to a required zone.
In the window that pops up, choose a particular location or zone and click Attach.
Repeat the procedure for other zones/locations.

You can also assign a Location Group to a particular Compute resource/Data store/Network/Backup server zone on the following screens:

- Edit Compute Zone
- Edit Data Store Zone
- Edit Network Zone
- Edit Backup Server Zone

28.1.5 Unassign Zones from Location Groups

To unassign a Compute resource/Data store/Network/Backup server zone from a location group:

Log in to your OnApp Control Panel > Admin.
Go to your Settings > Location Groups menu.
Click the Country or City of the Location Group in question.
The page that loads is organized into the list of Compute resource/Data store/Network/Backup server zones. Click the "-" (Delete) button in the last column next to a required zone.
Repeat the procedure for other required zones.

You cannot unassign a Compute resource/Data store/Network/Backup server zone from a Location Group if such zone is used by any virtual server. It is impossible to unassign a CDN Location, if this location has Edge servers within it.
You can also unassign a Location Group from a particular Compute resource/Data store/Network/Backup server zone on the following screens:

- Edit Compute Zone
- Edit Data Store Zone
- Edit Network Zone
- Edit Backup Server Zone
29 Backup Settings

The Control Panel's Backup Settings menu is where you get detailed control over low-level cloud settings for backup servers and backup server zones.

For general information on how backups work, where they are stored, the types of backups, refer to Virtual Server Backups section of this guide.

See also:
- Manage Virtual Server Backups
- Edit Backups/Templates Configuration
- Virtual Servers

29.1 Auto-Backup Presets Settings

Auto-backup presets are a simple way to set up an automatic backup schedule when virtual servers are created. Once configured, they can be applied to a VS automatically when the Automatic Backups Required box is checked during VS creation. A number of preset backup time periods are available (daily, weekly, monthly and annual backups) which are configured further by specifying how often each backup is taken. So, for example, you can set up automatic backups every 2 days, every 1 month, or even every 12 months (the same as every 1 year). Each type of backup can be enabled or disabled.

To view and edit auto-backup presets:

Go to your Control Panel > Admin > Settings menu

Click the Auto-backup Presets icon. You'll see a list of the presets available on the following screen, and whether they are enabled or not.

To change a preset, click its Actions icon, then click Edit to change the following auto-backup preset details:

- **Period** - the frequency of how often the backups are taken per period type
- **Period type** - the period for which the auto backup preset is set that can be Days, Weeks, Months, and Years
- **Rotation frequency** - the number of backups to keep before deleting the initial backup
- **Enabled** - the status that indicates whether the auto-backup preset is enabled or not

Click the Save button to finish.

To add more schedules, click Back.

The combination of Auto-backup Presets and Scheduled VS backups provides a great deal of flexibility in the way backups are handled for the cloud, and for individual VSs. Auto-backup Presets can be applied to all new VSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VSs, outside of the auto-backup pattern.
You can configure the re-run period for auto-backup in case of auto-backup transaction failure. By default, it is set to 3 hours, but you may change the time value in the info_hub.yaml configuration file.

See also:
- Manage Virtual Server Backups
- Edit Backups/Templates Configuration
- Virtual Servers

### 29.2 Backup Servers Settings

Backup servers are servers responsible for storing backups and templates of virtual servers running in the cloud, in order to prevent data loss in the event of failure.

There are now three ways to handle backup and template storage in your cloud:
- Basic backup scheme
- Advanced backup scheme
- CloudBoot backup scheme

See also:
- Backup Server Zone Settings
- Schedules Settings
- Auto-backup Presets Settings
- Create and Manage Backup Servers

Only one Backup Scheme can be used per cloud.

### 29.2.1 Basic Backup Scheme

**Running disk-related actions on Compute resources**

This was the default backup method prior to OnApp Cloud 2.3.2. In this scenario, template/backup storage works as follows:

Backups and templates are stored on a single backup/template server.

Backup transactions are performed on Compute resources.

After the backup is taken on a Compute resource, it is put on the backup/template server. This server can be accessed via SSH or NFS.

In order to make this server accessible via SSH, you should configure SSH file transfer server options.

In order to make this server accessible via NFS, you should mount the appropriate directory from this server to each Compute resource.
Centos now defaults to NFSv4. This is known to cause compatibility issues so we strongly recommend that you use NFSv3 for all mounts. This can be done by passing `-t nfs -o vers=3` in any mount commands.

Backups created are stored at the path defined in Admin > Settings > Configuration > Backups/templates

OnApp SANity can only use the Basic Backup Scheme.

29.2.2 Advanced Backup Scheme

**Running disk-related actions on one or more dedicated backup servers**

This backup scheme can be used in OnApp Cloud 2.3.2 and above. This option does not use Compute resources to take backups. Instead, you deploy one or more dedicated backup servers, which handle transactions and store all backups & templates.

If you have added one or more backup servers, all backups will be stored on these servers. If there is more than one backup server, backups are performed on the server with the most available disk space.

A network is used to connect Compute resource with the backup server. (An IP address is assigned to Compute resource and a backup server to build an iSCSI connection. If no IP is assigned to the Compute resource, an IP from the management network will be used.

Using this method, templates are also stored on the dedicated backup server(s). When converting a backup to a template, the new template will be stored on the same server as the backup.

Dedicated backup servers handle the following activities:

**Backup and template related actions**

- Take a backup
- Restore a backup
- Convert backup to template
- Destroy backup
- Destroy template

**Disk related actions**

- Configure OS on virtual server
- Provision virtual server
- Create disk
- Format disk
- Resize disk
- Migrate disk
- Destroy disk

**VS related actions**

- Set SSH keys
- Network Configuration
- Rebuild network
Attach/detach Network Interface

If there are no dedicated backup servers in the cloud, all these actions will be performed by Compute resources, and backups/templates stored according to the settings defined in **Admin > Settings > Configuration > Backups/templates**.

Please note that volume groups of each non-local data store based on SAN must be shared with the backup server.

### 29.2.3 CloudBoot Backup Scheme

Starting from the OnApp v3.0 you can use dedicated CloudBoot backup servers in your cloud. Please refer to the [Create CloudBoot Backup Server](#) section for more details.

**Disabling backup servers**

Be aware, that if you switch off a backup server, transactions "restore backups" (those backups which are located on this server) will be failed. Also if OS template is located ONLY on this backup server, provisioning disk transaction will be failed.

### 29.2.4 Create and Manage Backup Servers

Backup servers are servers responsible for storing backups and templates of virtual servers running in the cloud, in order to prevent data loss in the event of failure. Backup servers enable recovery of files, applications and databases and so guarantee security of an IT environment. Besides, backup servers are used for scheduling backup jobs and committing associated backup details to the database. At OnApp, you can create, edit, enable, disable and delete backup servers.

#### 29.2.4.1 View Backup Servers

To view information on all backup servers available on the system:

Go to the **Control Panel > Admin > Settings** menu.

Click the **Backup Servers** icon.

On the page that appears, you will see the following information:

- **Label** - the name of the backup server
- **IP Address** - the IP address allocated to the backup server

- **Enabled** - the icon that indicates whether the backup server is enabled or not
- **Backup Server Zone** - the zone to which the backup server belongs
- **Location Group** - the location group to which the backup server belongs
- **Storage** - the total and free amount of storage space available on the backup server. The amount of free storage space is calculated based on the amount of space that ISOs, OVAs, backups, and templates occupy on the backup server.
- **Backups** - the number of backups stored on the backup server
To view details for a particular backup server, refer to the following section.

**29.2.4.2 View Backup Server Details**

To view details for a particular backup server:

Go to the *Control Panel > Admin > Settings* menu.

Click the *Backup Servers* icon.

Click the label of the specific backup server. You will get the list of backups on this backup server together with their details:

- **Date** - the date of the backup creation
- **Target** - the backup target
- **Status** - the status of the backup
- **Backup Size** - the backup size
- **Initiated** - the way how the backup was created
- **Backup Server** - the label of the backup server, where backup is created
- **Note** - the text of the additional note
- **VS** - the label of VS, where backup is created
- **Customer** - the owner of the VS, where backup is created

**Actions** icon - the actions you can perform with the backup, such as **Convert to template**, **Delete**, **Edit Note**.

**29.2.4.3 View Backup Server Hardware Info**
OnApp provides an overview of hardware that is used by backup servers available in your cloud. On the Hardware Info page, you can view information on CPU, RAM, hard disk drives, networks and other hardware components.

To view the hardware information:

Go to the Control Panel > Admin > Settings menu and click the Backup Servers icon.

On the page that appears, you will see the list of backup servers available in your cloud. Click the Actions button next to the label of a backup server and select the Hardware Info option.

You will get the following details:

**Summary**
This section contains the basic information about the backup server:

- **Current Uptime** - the time the backup server has been working and available, the number of its users, and the average load.
- **Total CPU** - the total amount of CPU (number of cores/frequency in MHz) allocated to the backup server
- **Memory** - the total amount of memory (GB) allocated to the backup server
- **Type** - the type of a resource (Backup server)
- **OS** - the operating system of the backup server
- **Manufacturer/Model** - the manufacturer and model of the motherboard
- **BIOS/Serial Number** - the system BIOS, its serial number and release date

**CPU**
This section shows CPU manufacturer logo and information about CPU slots. Click the CPU Details button to get detailed information about CPU from the Intel ARK database if available.

**RAM**
This section includes information about memory slots (double data rate, memory clock in MHz, size).

**HD**
This section shows information about the manufacturer and model of a hard disk drive and the hard disk drive capacity in GB.

**Network**
This section contains information about network cards. Click the Info button next to the specific network to get detailed information from the Intel ARK Database if available.

If hardware information is empty or incomplete, click the Update Hardware Info button in the right upper corner.

Click the Edit Custom Fields button to add/edit/delete custom fields for the hardware info. For more information on how to manage custom fields, refer to the Hardware Info page.

---

**29.2.4.4 View Integrated Storage Settings**

OnApp provides an overview of integrated storage settings enabled on backup servers available in your cloud. On the Integrated Storage Settings page, you can view information on SAN bonding mode and MTU value.

To view integrated storage settings:

Go to the Control Panel > Admin > Settings menu and click the Backup Servers icon.

On the page that appears, you will see the list of backup servers available in your cloud. Click the Actions button next to the label of a backup server and select the Integrated Storage Settings option.

You will get the following details:
SAN bonding mode - the type of the bonding mode

MTU - the maximum transportation unit size

Integrated Storage DB size - the controller DB size value

29.2.4.5 Create Backup Server

To create a backup server:

Go to your Control Panel > Admin > Settings menu, then press Backup Servers icon.

Click the Create Backup Server button.

Fill in the form that appears:

- **Label** - give your backup server a label
- **IP address** - enter the backup server IP address (IPv4)
- **Backup IP address** - add a provisioning network IP address
- **Capacity** - set the backup server capacity (in GB)
- **Backup server zone** - select the backup server zone to which this backup server will be assigned

4. Move the **Enabled** slider to the right to enable the backup server.
5. Move the **Enable Integrated Storage on Static Backup Server** slider to the right to enable Integrated Storage on static compute resources.
6. Click the **Add Backup server** button.

To use the backup server, you have to add it to a backup server zone and assign it either to a compute resource or a compute zone.

Once you've added a backup server to your cloud and wish to limit the backup resources, make sure to set the limits in bucket for backup server zone resources.

When you add a backup server to a backup server zone, the backup server inherits the zone's type. It will be possible to move such a backup server only to a backup server zone of the same type. For more information refer to Zone Types.

29.2.4.6 Edit Backup Server

To edit a backup server:

Go to your Control Panel > Admin > Settings menu and click the Backup Servers icon.

On the screen that appears, you'll see the list of all backup servers currently set up in the cloud. Click the Actions button next to the backup server you want to edit, then click Edit to change the backup server's properties:

- **Label** - the name of the backup server
- **IP address** - the backup server IP address (IPv4)
- **Backup IP address** - provisioning network IP address
Capacity (in GB) - the backup server capacity

Backup server zone - the backup server zone to which this backup server is assigned

It is possible to move backup servers only between backup server zones of the same type. For more information refer to Zone Types.

Enabled – move this slider to the right to enable the backup server or to the left to disable the backup server

Note that disabling a backup server affects backups and virtual server provisioning as follows:

Backups
You cannot create new backups on this backup server anymore.
Backups that were created before disabling the backup server remain on this BS.
You can restore virtual servers from backups available on this backup server.
You can convert virtual server backups to templates.

Provisioning
The virtual server provisioning is not available on this backup server except for the following case.
If a template is located only on this backup server, provisioning of virtual servers based on this template is still performed on this backup server.

Enable Integrated Storage on Static Backup Server - move the slider to the right to enable Integrated Storage on static backup server.

Click the Save Backup server button to save changes.

29.2.4.7 Edit Integrated Storage Settings

Please note that manual server reboot is required for changes to take place.

To edit integrated storage settings:
Go to the Control Panel > Admin > Settings menu and click the Backup Servers icon.
On the page that appears, you will see the list of backup servers available in your cloud. Click the Actions button next to the label of a backup server and select the Integrated Storage Settings option.
Click the Edit button.
On the screen that loads, edit the following parameters:
SAN bonding mode - choose bonding mode type from the drop-down menu

MTU - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

VLAN id - the ID of a VLAN number

Integrated Storage DB size - select the controller DB size value (minimum 128 MB, maximum 256 MB)

SAN bridge name - specify the SAN bridge name for the backup server

SAN bond name - specify the SAN bond name for the backup server

Click the Save button.

29.2.4.8 Delete Backup Server

To delete a backup server:

Go to your Control Panel > Admin > Settings menu and click the Backup Servers icon.

Click the backup server's label.

On the screen that appears, you'll see the list of all backup servers currently set up in the cloud.

Click the Actions button next to the backup server you want to remove from the cloud, then click Delete. You'll be asked to confirm deletion.

All the backups stored on that backup server will be deleted!

29.2.5 Backup Server Backups

The choice of a specific backup server on which a backup will be performed is called backup server balancing.

Previously when you sent a command to take a backup, the system would schedule a corresponding transaction at a specific backup server. This transaction would be pending until its queue came up. However, if the backup server was very loaded, offline, or somehow not available, this transaction would take very long, or even should be restarted manually.

Now, with Backup Server Balancing, when the transaction is launched, the system will reassign it to the most appropriate backup server.

OnApp supports two backup types: normal and incremental, each of them having its own procedure of selecting the most appropriate server to take a backup.

On this page:

Normal Backups
Incremental Backups
Manage Backups for Backup Server

See also:

Backup Server Settings
Backup Server Zones Settings
Schedules Settings
29.2.5.1 Normal Backups

For **Normal Backups** the system will follow the sequence below to take a backup:

- Check which backup servers are assigned to this location group
- Which of them are available to the user
- Which of those have enough space

From those remaining, the most appropriate backup server will be the one with the smallest count of “take backup” transactions at the moment of the check. If for several backup servers this quantity is equal (0, 1, 2, ... n), the backup server with the lowest load (highest `cpu_idle` parameter) will be selected as the most appropriate.

29.2.5.2 Incremental Backups

In case of **Incremental Backups**, the first backup (which is similar to normal backups) the server will be selected the same as for normal backups:

- Check which backup servers are assigned to this location group
- Which of them are available to the user
- Which of those have enough space

From those remaining, the most appropriate backup server will be the one with the smallest count of “take backup” transactions at the moment of the check. If for several backup servers this quantity is equal (0, 1, 2, ... n), the backup server with the lowest load (highest `cpu_idle` parameter) will be selected as the most appropriate.

All consequent backups will be performed at the same backup server as long as it is available and has enough storage space. If not - the alternative backup server will be selected following the principle described above.

29.2.5.3 Manage Backups for Backup Server

To manage backups for a backup server:

Go to your **Control Panel > Admin > Settings** menu and click the **Backup Servers** icon.

On the screen that appears, you’ll see the list of all backup servers currently set up in the cloud. Click the label of the specific backup server. You will get the list of backups on this backup server together with their details:

- **Date** - the date of the backup creation
- **Target** - the backup target
- **Status** - the status of the backup
- **Backup Size** - the backup size
- **Initiated** - the way how the backup was created
- **Backup Server** - the label of the backup server, where backup is created
- **Note** - the text of the additional note
- **VS** - the label of VS, where backup is created
- **Customer** - the owner of the VS, where backup is created

**Actions icon** - the actions you can perform with the backup ([Convert to template], [Delete], [Edit Note]).
29.2.6 Manage Backup Servers Hardware Devices

You can manage Integrated Storage Static Backup Server network interfaces at any time after the Backup server creation.

To edit IS Static Backup Server Hardware Devices configuration:

Go to Control Panel > Admin > Settings menu > Backup Servers > label of a backup server > Tools > Hardware Devices.

The page that loads displays Network Interfaces details:

Name
Status
MAC address

Click the Edit Hardware Device Configuration button.

Configure network interfaces. For each backup server NIC, you can use one of the following options:

*Unassigned* - leave the NIC unused.

*Assigned to SAN* - select this option to use this interface for storage network. In this case, NIC interface will be bonded with virtual network interface of the Storage Controller Server.

Click Next.

After devices are successfully reconfigured, click Finish.

29.2.7 Backup Server Options in Clouds Using Incremental Backups

The table below compares the backup server performance in the cloud using incremental backups. The information is provided for the following configurations:

The cloud with dedicated backup server with local storage
The cloud with dedicated backup server with NFS attached storage
The cloud with NFS share attached to hypervisors

<table>
<thead>
<tr>
<th></th>
<th>Dedicated Backup Server with Local Storage</th>
<th>Dedicated backup Server with NFS attached storage (NOT SUPPORTED)</th>
<th>NFS share attached to HVs (NOT SUPPORTED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Performance</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Low CPU load on HV</td>
<td>+++</td>
<td>+++</td>
<td>-</td>
</tr>
<tr>
<td>Low RAM usage on HV</td>
<td>+++</td>
<td>+++</td>
<td>-</td>
</tr>
<tr>
<td>Backup Load Balancing</td>
<td>+++</td>
<td>++**</td>
<td>-</td>
</tr>
<tr>
<td>Provisioning performance</td>
<td>+++</td>
<td>++**</td>
<td>+</td>
</tr>
<tr>
<td>Provisioning Load Balancing</td>
<td>+++</td>
<td>++**</td>
<td>-</td>
</tr>
<tr>
<td>Support ACLs</td>
<td>+++</td>
<td>++*</td>
<td>++*</td>
</tr>
<tr>
<td>Feature</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Support Xattrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of backup configuration</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Ease of provisioning configuration</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Scalable horizontally</td>
<td>+++</td>
<td>+++</td>
<td></td>
</tr>
</tbody>
</table>

**General Notes:**
- Has best performance for backups and provisioning, lowest CPU and RAM usage on HV, load balancing is possible for backups and provisioning, ACLs and Xattrs both supported.
- Has moderate backup performance, but lower CPU and RAM usage on HV, proper load balancing depends on NFS configuration, ACL support depends on NFS server vendor/model, Xattrs support is not available.
- Has lowest performance and highest CPU and RAM usage on HV, no load balancing (for both backups and provisioning), ACL support depends on NFS server vendor/model, Xattrs support is not available.

**Recommended for:**
- Clouds of all sizes.
- Medium sized, small clouds.
- Small clouds.

**Legend:**
- +++ very good
- ++ good
- + works
- - not supported

**Footnotes:**
- * ACL support depends on type, brand, vendor of NFS Server.
- ** Limited due to shared NFS storage

**Dedicated backup server**
Dedicated backup server with NFS

Hypervisor with NFS
29.3 Backup Server Zones Settings

The Backup server zones feature can be used to create different tiers of service – for example, by organizing backup servers in the cloud into different backup server zones. You can also specify limits and prices individually for each Backup Server Zone assigned to the Bucket. For general information on how backups work, where they are stored, the types of backups, refer to Virtual Server Backups section of this guide.

Backup server zones have types which are inherited by the backup servers in the zone. Later backup servers can be attached to a compute resource/compute zone of the same type. Backup servers can be moved from one backup server zone to another, but the zones should be of the same type. For more information refer to Zone Types. Backups server zones can have either the Virtual or the Smart type.

29.3.1 Create and Manage Backup Server Zones

A backup server zone consists of several backup servers that share the same user permissions. Backup server zones can be used for organizing and managing backup servers and creating different tiers of servers for customers. You can also specify limits and prices individually for each backup server zone assigned to the bucket. Backup server zones have types which are inherited by the backup servers in the zone. You may select the type during backup server zone creation process. To learn more about backup servers refer to Backup Servers section of this guide.

29.3.1.1 View Backup Server Zone Details

To view details of a backup server zone:

Go to your Control Panel > Admin > Settings menu and click the Backup Server Zones icon.

On the screen that appears, you'll see all backup server zones currently set up in the cloud.

Click the label of the zone you're interested in. The screen that appears shows details of that zone:

Zone's label
List of assigned backup servers
List of unassigned backup servers

On this page:
View Backup Server Zone Details
Create Backup Server Zone
Edit Backup Server Zone
Add Backup Server to Backup Server Zone
Remove Backup Server From Backup Server Zone
Delete Backup Server Zone
See also:
Virtual Server Backups
Zone Types
Backup Server Settings
Schedules Settings

29.3.1.2 Create Backup Server Zone

To create a new backup server zone:
Go to your Control Panel > Admin > Settings menu and click the Backup Server Zones icon. On the screen that appears, click the Create New Backup Zone button at the bottom of the list.
On the screen that follows:
Label - Give your backup server zone a name.
Server type - select the server type for the zone, it can be either Virtual or Smart. The zone's type cannot be changed after the zone is created.
Location group - select the location group you wish to assign this backup server zone to from the drop-down list.
Click the Save button.

29.3.1.3 Edit Backup Server Zone

To edit a backup server zone:
Go to your Control Panel > Admin > Settings menu.
Click the Backup Server Zones icon.
Click the Actions button next to the backup server zone, then click Edit to change the zone's label and location group. You can change the already assigned location only if there are no backups or templates stores on backup servers of the current zone.
Click Save.
29.3.1.4 Add Backup Server to Backup Server Zone
To attach a backup server to the backup server zone:

Go to your Control Panel > Admin > Settings menu and click the Backup Server Zones icon.

Click the label of the zone you want to attach a backup server to. On the screen that appears you will see the list of all backup servers in the cloud organized into two groups – those already assigned to this backup server zone and those that are unassigned.

Choose an unassigned backup server and click the Add icon next to it.

When you add a backup server to a backup server zone, the backup server inherits the zone's type. For more information refer to Zone Types.

29.3.1.5 Remove Backup Server From Backup Server Zone
To remove a backup server from the backup server zone:

Go to your Control Panel > Admin > Settings menu and click the Backup Server Zones icon.

Click the label of the zone you want to remove a backup server from. On the screen that appears you will see the list of all backup servers in the cloud organized into two groups – those already assigned to this backup server zone and those that are unassigned.

In the assigned list, find the backup server you want to remove, and click the Delete icon next to it.

29.3.1.6 Delete Backup Server Zone
To delete a backup server zone:

Go to your Control Panel > Admin > Settings menu

Click the Backup Server Zones icon.

Click the Actions button next to the zone you want to remove, then click Delete. You will be asked to confirm deletion.

29.4 Schedules Settings

Schedules settings screen provides overview of all virtual servers' backup schedules in the cloud. Depending on the backup type set in your cloud settings, schedules are created either per virtual server or per disk:

If you are using normal backups, the schedules are created per disk.

If you are using incremental backups, the schedules are created per virtual server.

When you create a schedule, you can set the time when the backup will be taken. Each backup erases the previous backup and a new backup is not scheduled if another auto-backup from the same schedule is pending or running. When a schedule is no longer needed, we recommend deleting it so that the task will no longer run.

Backup schedules are managed per server. See the following sections for details:

Virtual Server Backup Schedules
View Smart Server Backup Schedules

See also:

Virtual Server Backup Schedules
View Smart Server Backup Schedules
Virtual Servers

29.4.1 Manage Backup Schedules

The Schedules settings page provides an overview of all virtual servers' backup schedules in the cloud. Schedules are created either per virtual server or per disk, depending on the backup type set in your cloud settings. When you create a schedule, you can set the time when the backup will be taken. Note that each backup erases the previous backup and a new backup is not scheduled if another auto-backup from the same schedule is pending or running. This section provides the information on how you can view, edit and delete backup schedules.

29.4.1.1 View Schedules
To view the list of all schedules:

Go to your Control Panel > Admin > Settings menu.
Click the Schedules icon to see a list of all schedules on the system along with their details:

On this page:
View Schedules
Edit Schedules
Delete Schedules

See also:
Backup Server Zones Settings
Backup Server Settings
Virtual Server Backup Schedules
Smart Server Backup Schedules

Date - the time when the schedule was created
Target - the server or disk for which the schedule was created (depending on the backup type)
Action - the scheduled action
Period - how frequently the backup will occur according to a period type set in the next step.

For example, if you set “2” as a period and “days” as a period type, the backup will take place at the same time every two days. By default, in this filed is set 1.

Period type - the backup period: days, weeks, months, or years
Rotation period - the number of backups, after which the first backup will be deleted.
By default, in this field is set 1, so it means that the old one backup is deleted after a new backup occurs. If you set 2 in this filed, it means that the first backup will be deleted next but one. If you set 4, three most recent backups and the new one will be stored, while the initial one will be deleted.

Next Start - the date and the hour of the next backup
User - the user who created the backup schedule
Status - schedule status

3. To view schedules of a particular server, see:
View Virtual Server Backup Schedules
Smart Server Backup Schedules

29.4.1.2 Edit Schedules

To edit a schedule:
Go to your Control Panel > Admin > Settings menu.
Click the Schedules icon to see a list of all schedules on the system.
Click the Edit icon next to a schedule to change its details:
Period - how frequently the backup will take place according to a period type. For example, the period of 2 and the period type of days will take a backup every two days.
Period type - the backup period: days, weeks, months, or years
Rotation period - the number of backups after which the first backup will be deleted. This parameter is for incremental backup schedules only.
Start Time - the time when the backup will be taken
Enabled - move the slider to enable or disable the schedule

For a schedule with the Failed status, you can move the Enabled slider to the right to run the shedule once again.

Click the Save button to save your changes.

You can also configure the re-run period for auto-backup in case of auto-backup transaction failure. By default, it is set to 3 hours, but you may change the time value in the info_hub.yaml configuration file. You will receive an event notification whenever any backup is postponed.

29.4.1.3 Delete Schedules

To delete a schedule:
Go to your Control Panel > Admin > Settings menu.
Click the Schedules icon to see a list of all schedules on the system.
Click the Actions icon next to the schedule you want to remove, then choose Delete.

29.5 OnApp Database Backup

OnApp provides the ready-to-use tool for database backing up - /onapp/onapp-cp-install/onapp-database-dump.sh. This tool is a part of onapp-cp-install package, so it is mandatory for every Control Panel. It is configured as a cron job to dump OnApp database regularly. Also this tool is used by the CP installer (onapp-cp-install.sh) to dump OnApp database before any upgrade.

To set dumping properties, the tool reads the following configuration files:

<table>
<thead>
<tr>
<th>File</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>/onapp/interface/config/database.yml</td>
<td>specifies MySQL/MariaDB connection properties, like: database, host, password, port, username.</td>
</tr>
<tr>
<td>/onapp/interface/config/on_app.yml</td>
<td>specifies whether SSH File Transfer Server is used: use_ssh_file_transfer, ssh_file_transfer_server, ssh_file_transfer_user, ssh_file_transfer_options, backups_path.</td>
</tr>
<tr>
<td>/onapp/onapp-cp.conf</td>
<td>specifies: extra configuration (e.g. custom dump server) and connection option to it (e.g. DB_DUMP_SERVER, DB_DUMP_USER, DB_DUMP_SERVER_ROOT, DB_DUMP_SERVERSSH_OPT) files rotating option (KEEP_DUMPS) crontab configuration (DB_DUMP_CRON) the path on CP for temporary dumps, accordingly to /onapp/interface (ONAPP_DB_DUMP_ROOT)</td>
</tr>
</tbody>
</table>

29.5.1 When to run?

The tool is configured as cron job to run hourly. This could be customised in DB_DUMP_CRON variable (/onapp/onapp-cp.conf):

The default value is "40 * * * *"

Set any other crontab-styled value or leave it blank to disable the job.

Pass the "-D" option to the CP installer (onapp-cp-install-sh). This will:
- disable database dumping during CP install/upgrade;
- make sure that dumping is disabled in the cron;
- make sure no cron job is running during install/upgrade.

29.5.2 How many copies to store?

The number of stored dumps is configured by KEEP_DUMPS variable. The default value is "168" (store 24 dumps per day, and keep for a last week).

The variable value should be set before CP installer runs.
29.5.3 Where to store dumps?

The dumps are temporarily stored on the Control Panel server in the /onapp/interface/$ONAPP_DB_DUMP_ROOT directory. The directory /onapp/interface/db/dump is set by default. The ONAPP_DB_DUMP_ROOT variable value could be changed in the /onapp/onapp-cp.conf file. It is possible to move dumps into remote box automatically and to rotate there. The remote box could be:

**SSH File Transfer Server** if enabled in the OnApp configuration. The backups will be moved into server's backups_path directory and rotated there. The dumps are removed from CP box if transfer to remote box is successful.

Any custom box. It could be configured via DB_DUMP_SERVER in the /onapp/onapp-cp.conf. The backups will be moved into server's DB_DUMP_SERVER_ROOT directory and rotated there. The dumps are removed from CP box if transfer to remote box is successful.

The custom box should be accessible via ssh from CP box using onapp user without specifying the password.
30 Backup Plugin System

The Backup Plugin System enables you to integrate OnApp with a third-party backup service. The plugin allows to back up and restore your virtual servers by means of a service that you use for backup management. OnApp provides the plugins for R1Soft Server Backup Manager and Veeam Backup & Replication that you can install to your Control Panel. You can also create your own plugin to integrate OnApp with a backup service of your choice.

You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter.

To use the Backup Plugin System in your cloud, you need to apply the workflow that includes the next steps.

Create Backup Plugin

To start with, you need to create a plugin to integrate your backup service with OnApp. You can also use the plugins for R1Soft 6.4 and Veeam 9.5 that were developed by OnApp.

Install Backup Plugin

Install your custom or default plugin for it to be available on your Control Panel.

Create Backup Resource

Create a backup resource that will use your plugin to manage the backup process on the OnApp side.

Create Backup Resource Zone

Create a backup resource zone where your backup resource will reside.

Attach Backup Resource to Backup Resource Zone

Attach your backup resource to the backup resource zone that you created in the preceding step.
Attach Backup Resource Zone to Compute Zone
Attach the backup resource zone to a compute zone to back up virtual servers that run on compute resources in this compute zone by means of your plugin.

Add Backup Resource Zone to Bucket
Add the backup resource zone to a bucket for this zone to be available for users in your cloud.

Create Auto Backup Preset
Create auto backup presets to schedule when backups are automatically run on your third-party service to back up virtual servers hosted in OnApp.

Attach Backup Resource to Virtual Server
Attach your backup resource to virtual servers that run on compute resources from the compute zone to which you assigned the backup resource zone.

30.1 What's Next?
- Creating Backup Plugins
- Installing Backup Plugins
- Backup Resources
- Resource Zones
- Auto Backup Presets
- Billing for Backup Resource Zones
- Recovery Points

30.2 Create and Manage Backup Resources
Backup resources are based on plugins that enable running backups on third-party systems. Creating a backup resource is the first step to take after installing a backup plugin. You can install you custom plugin or default plugins that are provided for R1Soft 6.4 and Veeam 10.0. In this section, you can find information on how to view, create, edit and delete backup resources.

You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter. If you want to use a plugin for Veeam Backup &
Replication, make sure that you complete the steps from Prerequisites for Veeam.

30.2.1 Prerequisites for Veeam

Before you install a plugin for Veeam and create a backup resource, complete the following steps via Veeam Backup & Replication UI:

Add your VMware vCenter Servers or VMware vCloud Director to the Veeam backup infrastructure.

Also, you must add different VMware resources to your servers. If you add identical VMware resource to multiple Veeam Backup & Replication servers managed by the same Veeam Backup Enterprise Manager, the configuration will fail.

Add a Backup Repository to the Veeam backup infrastructure.

Create a vSphere backup job and specify the Retention Policy settings.

After you complete the preceding steps, you can create a backup resource and add advanced options that are required for Veeam.

On this page:
- Prerequisites for Veeam
- Prerequisites for R1Soft
- View Backup Resources

- View Backup Resource Details
- Create Backup Resource
- Edit Backup Resource
- Manage Advanced Options
- Delete Backup Resource

See also:
- Install Plugins
- Manage Virtual Server Backup Resources
- Create and Manage Backup Resource Zones
- Create and Manage Auto Backup Presets
- Billing for Backup Resource Zones
30.2.2 Prerequisites for R1Soft

Before you install a plugin for R1Soft and create a backup resource, make sure your firewall configuration is correct. If you are using a network firewall or host-based firewall (e.g. iptables), you may need to change your firewall configuration to open ports that Server Backup Manager uses for network communication.

API Server Network Ports

30.2.2.1 Input:
allow TCP packets from any port to the Backup Manager port 9080
allow TCP packets from any port to the Backup Manager port 9443

30.2.2.2 Output:
allow TCP packets from the Backup Manager port 9080 to any port range 1024-65535
allow TCP packets from the Backup Manager port 9443 to any port range 1024-65535

To access the API server, you will need to allow network traffic to the Backup Managers IP address, TCP port 9080 for HTTP traffic, and TCP port 9443 for HTTPS traffic.

HTTP and HTTPS ports are configurable. "9080" and "9443" are the default values. If you change the ports, do not forget to change your firewall configuration to reflect the changes.

30.2.3 View Backup Resources

To view backup resources available in your cloud, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resources icon.

On the page that appears, you will see the list of available backup resources and the following details:

- **Label** - the name of the backup resource
- **Primary host** - the primary address (either hostname or IP address) used to connect to the third-party backup system
- **Enabled** - the status that indicates whether the backup resource is enabled (YES) or not (NO)
- **Resource zone** - the backup resource zone to which the backup resource is assigned
- **Plugin** - the name of the backup plugin

The Actions button allows to run the following actions on the backup resource:

- Manage auto backup presets
- Edit backup resource
- Delete backup resource
- Manage advanced options

To view properties of a particular backup resource, refer to the following section.
30.2.4 View Backup Resource Details

To view details of a particular backup resource, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resources icon.

Click a label of a backup resource to view the following details:

- **Label** - the name of the backup resource
- **Backup resource zone** - the backup resource zone to which the backup resource is assigned
- **Enabled** - the status that indicates whether the backup resource is enabled (YES) or not (NO)
- **Plugin** - the name of the backup plugin
- **Primary host** - the primary address (either hostname or IP address) used to connect to the third-party backup system
- **Secondary host** - the secondary address (either hostname or IP address) used to connect to the third-party backup system
- **Username** - the username used to connect to the third-party backup system

On the backup resource details page, you can also click the Edit icon to change the resource settings.

30.2.5 Create Backup Resource

Backup resources that are built on the R1Soft plugin are not currently supported for Windows-based virtual servers.

To create a new backup resource, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resources icon.

On the page that appears, click the ‘+’ or New Backup Resource button and provide the following details:

- **Label** - type the name of the backup resource
- **Enabled** - turn the slider to the right/left to enable/disable the backup resource

The disabled backup resource cannot be attached to a virtual server. Make sure that the Enabled slider is turned on before attaching the backup resource to virtual servers.

**Backup resource zone** - select the backup resource zone to assign the backup resource to
If you have no backup resource zone at this point, you can assign the backup resource to the zone when it is created.

**Plugin** - select the plugin for the backup resource

**Primary host** - enter the primary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol and port type of the primary host, that is http://[address]:{port} or https://[address]:{port}.

**Secondary host** - enter the secondary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol and port type of the secondary host, that is http://[address]:{port} or https://[address]:{port}.

**Username** - type the username used to connect to the third-party backup system

**Password** - type the password used to connect to the third-party backup system

Click the **Create** button to add a new backup resource.

---

### 30.2.6 Edit Backup Resource

To edit a backup resource, follow the next steps:

1. Go to your **Control Panel > Admin > Settings** menu.
2. Click the **Backup Resources** icon.
3. On the page that appears, click the **Actions** button next to the required backup resource and then click **Edit**. You can change the following properties of the backup resource:

   - **Label** - type the name of the backup resource
   - **Enabled** - turn the slider to the right/left to enable/disable the backup resource

   The disabled backup resource cannot be attached to a virtual server. Make sure that the **Enabled** slider is turned on before attaching the backup resource to virtual servers.

   - **Primary host** - enter the primary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol and port type of the primary host, that is http://[address]:{port} or https://[address]:{port}.

   - **Secondary host** - enter the secondary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol and port type of the secondary host, that is http://[address]:{port} or https://[address]:{port}.

   - **Username** - type the username used to connect to the third-party backup system

   - **Password** - type the password used to connect to the third-party backup system

   Click the **Save** button to apply new settings for the backup resource.

---

### 30.2.7 Manage Advanced Options
The advanced options for a backup resource are automatically fetched from the `config.xml` file of a backup plugin. You can edit the advanced options for the backup resource as follows:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Backup Resources** icon.

Click the **Actions** button next to the required backup resource and then click **Advanced options**.

You can manage the following advanced options, depending on a backup plugin:

**Veeam**

- **vSphere template job name** - enter a name of a vSphere backup job that is added to the Veeam backup infrastructure
- **Backup repository name** - enter a name of a backup repository that is added to the Veeam backup infrastructure
- **Power on after restore** - select this checkbox to power on virtual servers after restoring them from recovery points
- **Quick rollback** - select this checkbox to perform an incremental restore of virtual servers from recovery points

For more information on the incremental restore, see [Quick Rollback](#).

**R1Soft**

There are no options that require an advanced management for the R1Soft backup plugin.

**Custom Plugin**

You can manage advanced options that you provide for your custom plugin in the `config.xml` file. For more information, please refer to the Create Backup Plugin guidance.

5. Click the **Save** button to apply changes.

### 30.2.8 Delete Backup Resource

To delete a backup resource, follow the next steps:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Backup Resources** icon.

On the page that appears, click the **Actions** button next to the required backup resource and then click **Delete**.

In the pop-up box, click the **Ok** button to confirm your action.

If you delete a backup resource that is attached to a virtual server, the backups for this VS will be no longer run by means of the plugin.
30.2.9 What's Next?

- Create Backup Resource Zone
- Attach Backup Resource to Backup Resource Zone
- Attach Backup Resource Zone to Compute Zone
- Create Auto Backup Preset
- Add Backup Resource Zone to Bucket
- Attach Backup Resource to Virtual Server

30.3 Create and Manage Backup Resource Zones

When you have installed your backup plugin and have a backup resource up and running, you can create a backup resource zone and assign the backup resource to this zone. Afterwards, you need to assign the backup resource zone to a compute zone. In this document, you can find information on how to manage backup resource zones in OnApp CP.

30.3.1 View Backup Resource Zones

To view backup resource zones available in your cloud, follow the next steps:

1. Go to your Control Panel > Admin > Settings menu.
2. Click the Backup Resource Zones icon.
3. The page that appears will show the list backup resource zones with the following details:
   - Label - the name of the backup resource zone
   - Location group - the location group of the backup resource zone
4. The Actions button allows to run the following actions on the backup resource zone:
   - Edit backup resource zone
   - Delete backup resource zone
5. To view properties of a particular backup resource zone, click a label of the required zone.

On this page:
- View Backup Resource Zones
- View Backup Resource Zone Details
- Create Backup Resource Zone
- Edit Backup Resource Zone
- Attach Backup Resources to Backup Resource Zone
- Remove Backup Resources from Backup Resource Zone
- Delete Backup Resource Zone

See also:
- Install Plugins
- Create and Manage Backup Resources
- Manage Virtual Server Backup Resources
You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter.

### 30.3.2 View Backup Resource Zone Details

To view details of a backup resource zone, follow the next steps:

1. Go to your Control Panel > Admin > Settings menu.
2. Click the Backup Resource Zones icon.

The page that appears will show all backup resource zones that are currently set up in the cloud. Click a label of a required zone to view the following details:

- **Label** - the name of the backup resource zone
- **Location group** - the location group of the backup resource zone
- **Assigned Backup Resources** - the list of backup resources assigned to this zone
- **Unassigned Backup Resources** - the list of backup resources in the cloud that are not assigned to any backup resource zone

On the backup resource zone page, you can add and remove backup resources to and from the backup resource zone.

### 30.3.3 Create Backup Resource Zone

To create a new backup resource zone, follow the next steps:

1. Go to your Control Panel > Admin > Settings menu.
2. Click the Backup Resource Zones icon.
3. Click the ‘+’ or New Backup Resource Zone button.

On the page that appears, enter the following information:

- **Label** - type a name for your backup resource zone
- **Location group** - select a location group for your backup resource zone

You can attach backup resource zones to compute zones from the same location groups.

When you are finished, click the Create button.

After you created a backup resource zone, you can add and remove backup resources to and from this zone. Also, you can add the backup resource zone to the compute zone.
30.3.4 Edit Backup Resource Zone

To edit a backup resource zone, follow the next steps:

Go to your Control Panel > Admin > Settings menu.
Click the Backup Resource Zones icon.
Click the Actions button next to the required backup resource zone and then click Edit.
On the page that appears, you can edit the following information:
Label - type a name for your backup resource zone
Location group - select a location group for your backup resource zone

You can attach backup resource zones to compute zones from the same location groups.

When you are finished, click the Save button.

30.3.5 Attach Backup Resource to Backup Resource Zone

To attach a backup resource to a backup resource zone, follow the next steps:

Go to your Control Panel > Admin > Settings menu.
Click the Backup Resource Zones icon.
Click a label of a backup resource zone you want to add a backup resource to. The page that appears, contains the list of assigned and unassigned backup resources.
In the Unassigned Backup Resources box, click the ‘+’ button next to the backup resource that you want to add to this zone.

30.3.6 Remove Backup Resource from Backup Resource Zone

To remove a backup resource from a backup resource zone, follow the next steps:

Go to your Control Panel > Admin > Settings menu.
Click the Backup Resource Zones icon.
Click a label of a backup resource zone you want to remove a backup resource from. The page that appears, contains the list of assigned and unassigned backup resources.
In the Assigned Backup Resources box, click the ‘-’ button next to the backup resource that you want to remove from this zone.

You cannot remove a backup resource from a backup resource zone, if there are recovery points available on the backup resource.
30.3.7 Delete Backup Resource Zone

To delete a backup resource zone, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resource Zones icon.

On the page that appears, click the Actions button next to the required backup resource zone and then click Delete.

In the pop-up box, click the Ok button to confirm your action.

You cannot delete a backup resource zone if there are backup resources assigned to this zone.

30.3.8 What's Next?

Attach Backup Resource Zone to Compute Zone
Create Auto Backup Preset
Add Backup Resource Zone to Bucket
Attach Backup Resource to Virtual Server

30.4 Create and Manage Auto Backup Presets

After installing your plugin, creating backup resource and backup resource zone you can configure auto backup presets. Auto backup presets enable you to schedule when backups are automatically run on your third-party service to back up virtual servers hosted in OnApp. You can schedule backups to be run hourly, daily, weekly, monthly and yearly. In this document, you can find information on how to manage auto backup presets for your backup resource.

You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter.

30.4.1 View Auto Backup Presets

To view auto backup presets for a particular backup resource, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resources icon.

Click the Actions button next to the required backup resource and then click Auto backup presets.

On the page that appears, you will see the following details:

Enabled - the status that indicates whether the auto backup preset is enabled (YES) or not (NO)
**Period** - the period for which the auto backup preset is configured that can be the following:

- Hourly
- Daily
- Weekly
- Monthly
- Yearly

**Max recovery points** - the maximum number of recovery points to be created for a virtual server.

The recovery point represents a point-in-time full backup from which you can **restore a virtual server**. The **Max recovery points** option is used to set a total amount of recovery points that can be created for a destination VS. When the maximum limit is reached, new recovery points overwrite the existing ones.

For the Veeam backup plugin, you can skip the **Max recovery points** option because you control the limit of recovery points via **Retention Policy** in Veeam Backup & Replication UI.

To create, edit, and delete auto backup presets, refer to the following sections.

**On this page:**
- View Auto Backup Presets
- Create Auto Backup Preset
- Edit Auto Backup Preset
- Delete Auto Backup Preset

**See also:**
- Install Plugins
- Create and Manage Backup Resources
- Create and Manage Compute Zones
- Manage Virtual Server Backup Resources
- Recovery Points

### 30.4.2 Create Auto Backup Preset

For the R1Soft backup plugin, only an hourly auto backup preset is available. After the backup resource is created, one hourly preset is automatically added on this resource. You cannot create more hourly auto backup presets. To edit the default hourly preset, refer to **Edit Auto Backup Preset**.
For the Veeam backup plugin, all types of auto backup presets are available. You can create an unlimited number of auto backup presets for Veeam-based backup resources.

To create an auto backup preset, follow the next steps:

Go to your Control Panel > Admin > Settings menu.

Click the Backup Resources icon.

Click the Actions button next to the required backup resource and then click Auto backup presets.

Click the ‘+’ or New Auto Backup Preset button.

On the page that appears, select the Period and enter details, depending on the selected period:

**Hourly**

- **Enabled** - turn the slider to the right to enable the auto backup preset
- **Max recovery points** - type the maximum number of recovery points to be created for a virtual server

**Daily**

- **Enabled** - turn the slider to the right to enable the auto backup preset
- **Start time** - select the start time for running the auto backup preset
- **Max recovery points** - type the maximum number of recovery points to be created for a virtual server
- **Frequency** - specify the frequency of how often to run the auto backup preset
  For example, set 1 to run the auto backup preset every day, 2 - every second day, 3 - every third day, etc.

**Weekly**

- **Enabled** - turn the slider to the right to enable the auto backup preset
- **Start time** - select the start time for running the auto backup preset
- **Max recovery points** - type the maximum number of recovery points to be created for a virtual server
- **Days to run on** - select the day or days of the week when to run the auto backup preset

**Monthly**

- **Enabled** - turn the slider to the right to enable the auto backup preset
- **Start time** - select the start time for running the auto backup preset
- **Max recovery points** - set the maximum number of recovery points to be created for a virtual server
- **Week to run on** - specify the week when to run the auto backup preset
  For example, set 0 to run the auto backup preset on the first week of the month, 1 - the second week, 2 - the third week, or 3 - the fourth week.
- **Day to run on** - type the day or days of the week when to run the auto backup preset
  For example, set 0 to run the auto backup preset
on Sunday, 1 - Monday, 2 - Tuesday, 3 - Wednesday, 4 - Thursday, 5 - Friday, or 6 - Saturday.

**Yearly**

*Enabled* - turn the slider to the right to enable the auto backup preset

*Start time* - select the start time for running the auto backup preset

*Max recovery points* - type the maximum number of recovery points to be created for a virtual server

*Day to run on* - type the day or days of the week when to run the auto backup preset

For example, set 0 to run the auto backup preset on Sunday, 1 - Monday, 2 - Tuesday, 3 - Wednesday, 4 - Thursday, 5 - Friday, or 6 - Saturday.

6. When you are finished, click the **Create** button.

You can also configure the re-run period for auto-backup in case of auto-backup transaction failure. By default, it is set to 3 hours, but you may change the time value in the info_hub.yaml configuration file.

### 30.4.3 Edit Auto Backup Preset

When you edit an auto backup preset of a resource that is already attached to a virtual server, changes you make will not affect the existing backup schedule. For changes to be applied, detach a backup resource from VS, edit an auto backup preset and attach the resource again.

To edit an auto backup preset, follow the next steps:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Backup Resources** icon.

Click the **Actions** button next to the required backup resource and then click **Auto backup presets**.

On the page that appears, click the **Actions** button next to the required auto backup preset and then click **Edit**. You can change the following properties of the auto backup preset, depending on the selected period:

**Hourly**

*Enabled* - turn the slider to the right to enable the auto backup preset

*Max recovery points* - type the maximum number of recovery points to be created for a virtual server

**Daily**

*Enabled* - turn the slider to the right to enable the auto backup preset

*Start time* - select the start time for running the auto backup preset
Max recovery points - type the maximum number of recovery points to be created for a virtual server

Frequency - specify the frequency of how often to run the auto backup preset
For example, set 1 to run the auto backup preset every day, 2 - every second day, 3 - every third day, etc.

Weekly

Enabled - turn the slider to the right to enable the auto backup preset
Start time - select the start time for running the auto backup preset
Max recovery points - type the maximum number of recovery points to be created for a virtual server
Days to run on - select the day or days of the week when to run the auto backup preset

Monthly

Enabled - turn the slider to the right to enable the auto backup preset
Start time - select the start time for running the auto backup preset
Max recovery points - set the maximum number of recovery points to be created for a virtual server
Week to run on - specify the week when to run the auto backup preset
For example, set 0 to run the auto backup preset on the first week of the month, 1 - the second week, 2 - the third week, or 3 - the fourth week.
Day to run on - type the day or days of the week when to run the auto backup preset
For example, set 0 to run the auto backup preset on Sunday, 1 - Monday, 2 - Tuesday, 3 - Wednesday, 4 - Thursday, 5 - Friday, or 6 - Saturday.

Yearly

Enabled - turn the slider to the right to enable the auto backup preset
Start time - select the start time for running the auto backup preset
Max recovery points - type the maximum number of recovery points to be created for a virtual server
Day to run on - type the day or days of the week when to run the auto backup preset
For example, set 0 to run the auto backup preset on Sunday, 1 - Monday, 2 - Tuesday, 3 - Wednesday, 4 - Thursday, 5 - Friday, or 6 - Saturday.

5. When you are finished, click the Save button.

30.4.4 Delete Auto Backup Preset

To delete an auto backup preset, follow the next steps:

Go to your Control Panel > Admin > Settings menu.
Click the Backup Resources icon.
Click the Actions button next to the required backup resource and then click Auto backup presets.
On the page that appears, click the Actions button next to the required auto backup preset and then click Delete.
Click the Ok button to confirm your action.

30.4.5 What’s Next?

- Attach Backup Resource Zone to Compute Zone
- Add Backup Resource Zone to Bucket
- Attach Backup Resource to Virtual Server

30.5 Billing for Backup Resource Zones

The backup resource zone is available to users when it is present in the Access Control section of the users' bucket. In this document, you can find information on how to manage pricing and access to backup resource zones available in your cloud.

30.5.1 Configure Access Control

The access to backup resource zones is configured in the Access Control section of the bucket. To give access to a backup resource zone for users to whom the bucket is assigned:

Go to your Control Panel > Admin > Buckets menu.

Click a label of a destination bucket and open the Other tab from the Access Control section.

Click the Add New Backup Resource Zone (+) button in the Limits for Backup Resource Zones box.

Select a backup resource zone that you want to add to the bucket and click the Submit button.

Select the Duplicate to rate card checkbox before clicking Submit to add a backup resource zone to Rate Card of the bucket with the default price and free limit of 0.

When the backup resource zone is added to the Access Control section, users to whom the bucket is assigned will be able to use this zone. Go to the Rate Card tab to set a price for using backups available to users assigned to this bucket.

If no backup resource zones are added to Access Control, users under the bucket have access to none of the backup resource zones available on the system.

On this page:

- Configure Access Control
- Configure Rate Card

See also:
You can use the Veeam plugin only for VMware resources such as vCloud Director and vCenter.

30.5.2 Configure Rate Card

The prices and free limits for backup resource zones are configured in the Rate Card section of the bucket. To set a price and free limit for a backup resource zone:

Go to your Control Panel > Admin > Buckets menu.

Click a label of a destination bucket and open the Other tab from the Rate Card section.

Click the Add New Backup Resource Zone (+) button in the Pricing for Backup Resource Zones box.

Select a backup resource zone that you want to add to the bucket and enter the following settings:

**Price**

*Price* - set the price for a recovery point per hour charged for recovery points stored in the backup resource zone under this bucket

*Price Recovery Point Size* - set the price for a recovery point size (Gb/hour) charged for recovery points stored in the backup resource zone under this bucket

*Price Space Used* - set the price for a total disk size (Gb/hour) charged for all backups of a particular virtual server in the backup resource zone under this bucket

**Free**

*Free Limit* - set the number of recovery points (recovery point/hour) that users can store in the backup resource zone for free under this bucket

*Free Recovery Point Size* - set the free size (Gb/hour) that users can consume to store their recovery points in the backup resource zone under this bucket

*Free Space Used* - set the free size (Gb/hour) that users can consume to store all backups of a particular virtual server in the backup resource zone under this bucket

When you are finished, click the Submit button.

If you only add the prices and free limits for a backup resource zone in Rate Card but don't add the backup resource zone to Access Control, users under the bucket have no access to the backup resource.
zone. To give users under the bucket access to the backup resource zone, you need to add this zone to Access Control.

30.5.3 What's Next?

Attach Backup Resource Zone to Compute Zone
Attach Backup Resource to Virtual Server
31 Network Settings

The Control Panel's Network Settings menu is where you get detailed control over low-level cloud settings for networks, network zones, firewalls, resolvers.

To be able to provide IP addresses to the virtual servers you need to:

- Create a network zone of the virtual type.
- Create a network and specify the network zone which you wish to assign it.
- Add an IP net to the new network.
- Add IP ranges to the new IP net.

See also:

- Create and Manage Network Zones
- Create and Manage Networks
- Create and Manage IP Nets
- Create and Manage IP Ranges

31.1 Network Zones Settings

Network zones can be used to create different tiers of service – for example, by setting up different zones for different network resources in the cloud. Zones can also be used to create private clouds for specific users.

Network zones have types which are inherited by the networks in the zone. Later networks can be attached to a compute resource/compute zone of the same type. Networks can be moved from one network zone to another, but the zones should be of the same type. For more information refer to Zone Types. The table below demonstrates the available network zone types for different networks:

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Network Zone Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCloud Director</td>
<td>VPC</td>
</tr>
<tr>
<td>Other</td>
<td>Virtual/Smart/Baremetal</td>
</tr>
</tbody>
</table>

See also:

- Create and Manage Network Zones
- Create and Manage Networks
- Zone Types

31.1.1 Create and Manage Network Zones

Network zones represent segments of your network connected to the firewall and controlled by it. Network zoning improves security and privacy for users, servers, etc. Network zones usually have types which are inherited by the networks in the zone. Later networks can be attached to a compute resource/compute zone of the same type. For more information refer to Zone Types.

You can create new network zones, view existing network zones and its details, edit network zones as well as add and remove networks from network zone. For more information network settings refer to Network Settings.
31.1.1.1 Create Network Zone

To create new network zone:

Go to your Control Panel > Admin > Settings menu and click the Network Zones icon.

Click the Create Network Zone button.

On the screen that follows:

Label - give your network zone a name.

Server type - choose the server type from the drop-down box:

On this page:

Create Network Zone

View Network Zone

View Network Zone Details

Edit Network Zone

Add Networks to Network Zone

Remove Networks from Network Zone

Delete Network Zone

See also:

Network Settings

Create and Manage IP Nets

Virtual Servers

OnApp Configuration

Choose the virtual server type to create a Xen, KVM, or CloudBoot zone

Choose the smart server type to create a smart zone.

Choose the baremetal server type to create a baremetal server zone.

Choose the Virtual Private Cloud server type to create a vCloud Director zone

The Infrastructure server type is reserved for future functionality and should not be selected.

The zone's type cannot be changed after the zone is created.

Location group - select from the drop-down list the location group you wish to assign this network zone to.

Instance Package VSs - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually).
5. Click the **Save** button.

### 31.1.1.2 View Network Zone

To view network zones:

Go to your **Control Panel > Admin > Settings** menu, and click the **Network Zones** icon. The screen that appears will show all network zones currently set up in the cloud with the following details:

- **Label** - the name of the zone
- **Zone type** - type of the zone: Virtual, Smart, Baremetal or VPC
- **Location group** - the location group with which the zone is associated

Click a zone's label (name) to see details of the zone and to access the functions for adding/removing networks to/from the zone.

### 31.1.1.3 View Network Zone Details

To view details of a network zone:

Go to your **Control Panel > Admin > Settings** menu and click the **Network Zones** icon.

Click the label of the zone you're interested in. The screen that follows shows details of that zone:

- Network zone's label
- A list of networks assigned to the zone
- A list of networks unassigned to the zone

### 31.1.1.4 Edit Network Zone

To edit network zones:

Go to your **Control Panel > Admin > Settings** menu, and click the **Network Zones** icon.

The screen that appears will show all network zones currently set up in the cloud. Click a zone's label (name) to see details of the zone and to access the functions for adding/removing networks to/from the zone.

To change the network zone's label and location group, click the **Actions** button next to required zone, then click **Edit**.

- **Label** - the name of the zone
- **Location group** - the location group with which the zone is associated. You can change the already assigned location only if there are no network joins, IP addresses or name servers within networks in this zone.
- **Instance Package VSs** - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's **Resources** step for custom VSs (VSs built by setting resources manually).

Click **Save**.

### 31.1.1.5 Add Networks to Network Zone

To add a network to a zone:
Go to your **Control Panel > Admin > Settings** menu and click the **Network Zones** icon.

Click the label of the zone you want to add a network to. The screen that appears will show you all networks in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.

In the unassigned list, find the network you want to add to the zone and click the **Add** icon next to it.

*When you add a network to a network zone, the network inherits the zone’s type. For more information refer to Zone Types.*

---

### 31.1.1.6 Remove Networks from Network Zone

To remove a network from a zone:

Go to your **Control Panel > Admin > Settings** menu and click the **Network Zones** icon.

Click the label of the zone you want to remove a network from. The screen that appears will show you all networks in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.

In the assigned list, find the network you want to remove, and click the **Delete** icon next to it.

---

### 31.1.1.7 Delete Network Zone

To delete network zones:

Go to your **Control Panel > Admin > Settings** menu, and click the **Network Zones** icon.

The screen that appears will show all network zones currently set up in the cloud.

To remove a network zone from the cloud, click the **Actions** icon next to the zone, then click **Delete**. You’ll be asked for confirmation before the zone is removed.

---

### 31.2 Resolvers Settings

OnApp Resolvers work like DNS servers – they translate a hostname to an IP address.

*You should specify at least 2 resolvers for each network in OnApp. When a new VS is provisioned, these resolvers are injected into the resolver configuration automatically.*

---

### 31.2.1 Create and Manage Resolvers

OnApp Resolvers are names given to computers located with institutional networks and are used to meet user’s request of a domain name. Resolvers work like DNS servers – they translate a hostname to an IP address, thus, linking your computer and the Internet's DNS infrastructure. Note that you should specify at least 2 resolvers for each network in OnApp. When a new VS is provisioned, these resolvers are injected into the resolver configuration automatically.
31.2.1.1 View Resolvers
To view the resolvers on your system:
Go to your Control Panel > Admin > Settings menu.
Click the Resolvers icon. The screen that appears lists all resolvers set up for your cloud.

On this page:
View Resolvers
Create Resolver
Edit Resolver
Delete Resolver
See also:
Network Zones Settings
Network Settings
Virtual Servers

31.2.1.2 Create Resolver
To add a new resolver:
Go to your Control Panel > Admin > Settings menu.
Click the Resolvers icon.
On the screen that appears, click the Create Resolver button.
Specify resolver details:
Address - the resolver IP address
Network - the ID of the network to which this resolver should belong
Click Create Resolver button.

31.2.1.3 Edit Resolver
To edit an existing resolver:
Go to your Control Panel > Admin > Settings menu.
Click the Resolvers icon.
Click the Actions icon next to the resolver you want to change, then click Edit to change the resolver's address and network.
Click Save Resolvers to save changes.

31.2.1.4 Delete Resolver
To delete an existing resolver:
Go to your Control Panel > Admin > Settings menu.
Click the Resolvers icon.
Click the **Actions** button next to the resolver you want to remove, then click **Delete**. You will be asked for confirmation before the resolver is removed.

### 31.3 Networks Settings

OnApp 5.4 introduces IP nets and IP ranges in networking. A network can contain several IP nets which include IP ranges with a default gateway. The network details page shows the list of IP nets in a network with their IP ranges which include the IPs assigned to virtual servers and/or users. IPs that are not assigned to a user or a VS are not displayed on the network details page but they are available for selection during virtual server creation or when assigning IPs to users.

*Shared Networks* are the default type of network in OnApp where a user receives an IP address on the network they have access to.

**See also:**
- Network Zones Settings
- Virtual Servers
- OnApp Configuration

#### 31.3.1 View Networks

To view the networks currently available in your cloud:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Networks** icon.

The screen that appears shows the networks of the Shared type in your cloud with their label, identifier and VLAN.

Click a network’s label to view its details.

Click the **Actions** icon next to a network to edit or delete it.

#### 31.3.2 View Network IP Nets

To view details of a network:

Go to your **Control Panel > Admin > Settings** menu.

Click the **Networks** icon. The page that loads shows the shared networks in your cloud.

Click the label of the network you are interested in. The screen the network’s label, identifier, VLAN and network zone.

This page also includes the IP nets in the selected network.

OnApp currently offers two types of IP nets: IP Pool and Manual IP. IP Pool nets are the regular type of IP net in OnApp, they contain IPs assigned to users/VSSs and are available during server creation. For information on manual IP nets refer to **Manual IP Nets**.

Click an IP net to view the list of IPs in it with the user and/or VS they are assigned to.

To find a particular IP net, type your query in the search box and click the **Search** button.

#### 31.3.3 Create and Manage Networks

Networks provide your virtual servers with Internet access. In OnApp you can create, edit and delete networks. You can also **Create and Manage IP Nets** in the networks you add to your cloud.
Shared Networks are the default type of network in OnApp where a user receives an IP address on the network they have access to.

31.3.3.1 Create Network
To add a new network:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud. For information on how to add other types of networks refer to Organization Networks and Create and Manage vApp Networks.

Click the Add New Network button at the end of the network list.

On the screen that follows, specify the following network details:

* Label - choose a name for the network

On this page:
Create Network
Edit Network
Delete Network

See also:
Network Settings
Create and Manage IP Nets
Create and Manage IP Ranges
Virtual Servers
OnApp Configuration

VLAN - fill in a VLAN number. The VLAN field only needs to be given a value if you are tagging the IP addresses you will add to this network with a VLAN ID (IEEE 802.1Q). If you plan to tag IP addresses in this way, you need to make sure the link to the public interface on the compute resources is a trunked network port. If you are not VLAN tagging addresses, this field can be left blank and the public port on the compute resource can be an access port. You can also enter a VXLAN segment ID which will in tern create the VXLAN wire across the compute resources.

Network group - assign the network to a network zone. When you add a network to a network zone, the network inherits the zone's type. It will be possible to move such a network only to a network zone of the same type. For more information refer to Zone Types.

Type - the type of the network, select Shared Network - the default type of network in OnApp where a user receives an IP address when users receive an IP address on the network they have access to.

5. Click the Submit button to finish.

To use the network, you have to add it to a network zone and assign it either to a Compute resource or a Compute zone.

Once you have added a network to OnApp you need to add the IP Net and IP ranges to the new network.
Baremetal servers are not compatible with VLANs.

31.3.3.2 Edit Network
To change the name, VLAN or network zone of an existing network:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud.

Click the Actions icon next to the network you want to change, then click Edit.

On the screen that follows, change the details of the network:

- **Label** - the name of the network
- **VLAN** - a VLAN number. The VLAN field only needs to be given a value if you are tagging the IP addresses you will add to this network with a VLAN ID (IEEE 802.1Q). If you plan to tag IP addresses in this way, you need to make sure the link to the public interface on the Compute resources is a trunked network port. If you are not VLAN tagging addresses, this field can be left blank and the public port on the Compute resource can be an access port. You cannot edit this parameter for Org networks.
- **Network Zone** - you can re-assign the network to another network zone. It is possible to move networks only between network zones of the same type. For more information refer to Zone Types. You cannot edit this parameter for Org networks.
- **Shared** - whether this parameter is shared or not. This parameter is applicable only for Org networks.

Click the Update button to save the changes.

31.3.3.3 Delete Network
Before deleting a network, please, ensure that it is detached from compute zone and compute resources.

To delete an existing network, so it is no longer available as a cloud resource:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud.

Click the Actions icon next to the network you want to remove, then click Delete. You will be asked for confirmation before the network is deleted.

31.3.4 Assign/Unassign IP Address to User
You can assign and and unassign IP addresses to users from the network overview page.

You can assign and unassign IP addresses from shared networks only.

31.3.4.1 Assign IP Address to User
See also:
Network Settings
Create and Manage IP Nets
Create and Manage IP Ranges
Create and Manage Networks

You can assign an IP address or several IP addresses to a particular user, so that they could create a VS based on it:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud.

Click the name (label) of the network from which you wish to assign an IP address to a user.

Click the Assign IP addresses button.

On the window that pops up, select the following parameters:

* IP net - select from the drop-down list the IP net from which the IP address should be assigned
* IP range - select from the drop-down list the IP range from which the IP address should be assigned
* User - select from the drop-down list the user to whom you wish to assign IP addresses
* Selection - type in the IP address you wish to assign and click Add. You can assign multiple IPs from the same form by filling in an address in the Selection field, clicking Add and repeating the process for all the required IPs.

You can assign a range of IPs by typing them in one of the following formats: 192.168.128.11-20, 192.168.128.11-192.168.128.20 or 192.168.128.11/30. If one or several IPs from the range are assigned to a different user or to VSs that do not belong to the required user, the IP range will not be assigned.

The IP addresses and ranges that are to be assigned appear in the IP Addresses field. If you wish to modify an address or range, select it in the IP Addresses field, make the necessary changes in the Selection field and click Modify.

IP Addresses - IPs and ranges that are to be assigned. You can remove the unnecessary addresses or ranges by selecting them and clicking Remove.

Currently, assigning multiple IPs to a user works only with IPv4.

Click the Assign button.

31.3.4.2 Unassign IP Address to User

You can unassign an IP Address from a particular user at any time:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon.

Click the name (label) of the network from which you wish unassign an IP address.

Click the Unassign IP addresses button.

On the window that pops up, select the following parameters:

* User - select from the drop-down list the user/s from which you wish to unassign the IP address
* IP addresses - select from the drop-down list one or more IP addresses you wish to unassign from a user

Click the Unassign button.
31.3.5 Create and Manage IP Nets

IP nets contain the IP address ranges of the network. You can add new IP nets to the network, edit and delete the existing nets and add and edit IP ranges in the IP nets. For information on how to add IP ranges to IP nets, refer to Create and Manage IP Ranges.

You can add IP nets only to shared networks.

31.3.5.1 Create IP Net

To add an IP net to a network:

On this page:

Create IP Net
Edit IP Net
Delete IP Net

See also:
Network Settings
Create and Manage Networks
Create and Manage IP Ranges
Virtual Servers
OnApp Configuration

Go to Control Panel > Admin > Settings > Networks. The page that loads shows the shared networks in your cloud.

Click the label of the network to which you want to add an IP net.

On the page that loads click the New IP Net button.

Fill in the details of the new IP net:

- **label** - the name of the IP net
- **network address** - the network address of the IP net
- **network mask** - the network mask. Must be less or equal 32.
- **default gateway** - the default gateway to be added to the IP net automatically
- **add default IP range** - tick this checkbox for the default IP range to be added to the IP net automatically. Otherwise, you'll need to add the required IP ranges after the IP net is created.
- **allow gateway to be outside from IP net** - tick this checkbox to allow gateway to be outside from the IP net.

Click **Submit** to finish.

31.3.5.2 Edit IP Net

To edit an IP net:

Go to Control Panel > Admin > Settings > Networks. The page that loads shows the shared networks in your cloud.
Click the label of the network which contains the IP net you wish to edit. Click the **Actions** icon next to the IP net you want to modify and select **Edit**.

Edit the details of the IP net:

*label* - the name of the IP net

*network address* - the network address of the IP net

*network mask* - the network mask

Click **Submit** to save changes.

### 31.3.5.3 Delete IP Net

You can delete only those IP nets that do not contain any IP ranges.

To delete an IP net:

Go to **Control Panel > Admin > Settings > Networks**. The page that loads shows the shared networks in your cloud.

Click the label of the network to which you want to add an IP net. Click the **Actions** icon next to the required IP net and select **Delete**.

### 31.3.6 Create and Manage IP Ranges

IP ranges reside inside IP nets and include the IP addresses within your cloud that are either assigned to a user or used by a VS. The IPs that are neither assigned to a user nor a VS, are not shown in the IP range list, but are available during VS creation. You can add new IP ranges and edit and delete the existing ones. To add IP ranges you first need to create a network and then add an IP net to that network.

You can manage IP ranges only for shared networks.

### 31.3.6.1 Add IP Range to IP Net

---

**On this page:**

- Add IP Range to IP Net
- Edit IP Range
- Delete IP Range

**See also:**

- Network Settings
- Create and Manage IP Nets
- Create and Manage Networks
- Virtual Servers
- OnApp Configuration
To add an IP range to an IP net:

Go to **Control Panel > Admin > Settings > Networks**. The page that loads shows the shared networks in your cloud.

Click the label of the network to which you want to add an IP net.

Click the **Actions** icon next to the required IP net and select **Add New IP Range**.

Fill in the the start and end address and the default gateway of the new IP range.

Click **Add** to save the new IP range.

---

**31.3.6.2 Edit IP Range**

To edit an IP range in an IP net:

Go to **Control Panel > Admin > Settings > Networks**. The page that loads shows the shared networks in your cloud.

Click the label of the required network.

Click the IP net in which you want to edit an IP range.

Click the **Actions** icon next to the required IP net and select **Edit**.

Fill in the the start and end address and the default gateway of the IP range.

If you edit an IP range that includes used IPs, the edited range should include these IPs after the changes.

Click **Submit** to save the changes.

---

**31.3.6.3 Delete IP Range**

Go to **Control Panel > Admin > Settings > Networks**. The page that loads shows the shared networks in your cloud.

Click the label of the required network.

Click the IP net in which you want to edit an IP range.

Click the **Actions** icon next to the required IP net and select **Delete**.

---

**31.4 SDN Management**

Software-defined networking (SDN) implies several kinds of network technology intended to make the network as agile and flexible as the virtualized server and storage infrastructure of the modern data center. The feature provides the ability to manage networks using VXLAN technology across OnApp cloud compute resources. Thus, you receive a tool to build level-two network infrastructure with OnApp on top of existing IP (level three) network.

In this chapter, you will find the following:

- **SDN manager**, which is the entity in OnApp Control Panel to connect to ODL controller
- **SDN nodes**, which are instances of Open vSwitch on a compute resource
**SDN networks**, which are attached to compute resources that are selected as SDN nodes on the SDN Network creation page

### Prerequisites
Before you start an SDN network creation process, the following steps should be taken:

- Install and configure ODL controller.
- Create SDN Manager.
- Enable and start openvswitch on your compute resources.
- Add SDN Manager’s connection options, used to connect SDN nodes.
- Add SDN nodes to the created SDN Manager.

A schematic of OnApp running SDN is shown below.

#### 31.4.1 Install OpenDayLight Controller
This document provides information on installing and configuring OpenDayLight (ODL) Controller to work with OnApp Software-defined networking. The provided procedure was tested and verified with OpenDaylight 0.12.1 Magnesium version.
31.4.1.1 Prerequisites

<table>
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<tr>
<th>Minimum System Requirements</th>
<th>Recommended System Requirements</th>
<th>OS Requirements</th>
</tr>
</thead>
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<tr>
<td>CPU: 2 Cores</td>
<td>CPU: 8 Cores</td>
<td>CentOS 7.x</td>
</tr>
<tr>
<td>RAM: 2 GB</td>
<td>RAM: 8 GB</td>
<td>Java Virtual Machine 11</td>
</tr>
<tr>
<td>Storage: 16 GB</td>
<td>Storage: 64 GB</td>
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</tr>
</tbody>
</table>

On this page:

Prerequisites

Install OpenDaylight Magnesium

See also:

Manage SDN Manager

Manage SDN Nodes

Create and Manage SDN Networks

31.4.1.2 Install OpenDaylight Magnesium

To install OpenDaylight Magnesium, follow the next procedure:

Switch to the root home directory and download an archive with ODL:

```bash
# wget https://nexus.opendaylight.org/content/repositories/opendaylight.release/org/opendaylight/0.12.1.zip
```

Unpack the archive by running the following command:

```bash
# unzip.opendaylight-0.12.1.zip
```

Install JVM by running the following command:

```bash
# yum install java-11
```

Set JAVA_HOME by running the next command:

```bash
# export JAVA_HOME=/usr/lib/jvm/jre-11
```

Start controller and install the required tools with the following command:

```bash
# cd /root/opendaylight-0.12.1
# ./bin/karaf
```

After the ODL console is opened, perform the refresh of repositories with the next command:

```bash
opendaylight-user@root> feature:repo-refresh
```

Install feature needed by OpenDaylight:
After the features are installed, log out from the *karaf*:

```
opendaylight-user@root> logout
```

Ensure that ODL listens to OnApp on 8181 and 6640 ports:

```
root@OpenDaylight-Magnesium:~# netstat -lnp | grep java

TCP        0      0 127.0.0.1:2550          0.0.0.0:*               LISTEN
2054/java  0      0 127.0.0.1:44440         0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:8185           0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:44444          0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:8101           0.0.0.0:*               LISTEN
2054/java  0      0 127.0.0.1:1099         0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:36908          0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:6640           0.0.0.0:*               LISTEN
2054/java  0      0 0.0.0.0:8181           0.0.0.0:*               LISTEN
```

31.4.1.3  Create a Service to Be Run at Startup

To create a service to be run at startup, use the following command:

```
# ln -s /root/opendaylight-0.12.1 /etc/sdn
# touch /etc/systemd/system/opendaylight.service
# vi /etc/systemd/system/opendaylight.service
[Unit]
Description=OpenDayLight Controller
After=network.target
[Service]
Type=forking
User=root
ExecStart=/etc/sdn/bin/start
Restart=on-abort
[Install]
WantedBy=multi-user.target

# systemctl daemon-reload
# systemctl enable opendaylight
# systemctl start opendaylight
```

Don't forget to set correct credentials and port (8181) at [https://onapp--cp--ip/settings/sdn/managers/1/edit](https://onapp--cp--ip/settings/sdn/managers/1/edit)
31.4.1.4 Password Change
The password for the admin account can be changed according to this example:

Create a file with a password as a parameter:

```
# cat user.json
{
    "name":"admin",
    "description":"admin account",
    "enabled":1,
    "email":"
    "password":"newpass"
}
```

Run API call by the command:

```
# curl -u admin:admin -X PUT -H "Content-Type: application/json" --data-binary @./user.json http://localhost:8181/auth/v1/users/admin@sdn
```

31.4.1.5 Tweaks
To prevent intensive logging, you need to decrease log level. It can be done in config /etc/sdn/etc/org.ops4j.pax.logging.cfg, by changing the value log4j2.rootLogger.level from INFO to ERROR.

```
# grep log4j2.rootLogger.level /etc/sdn/etc/org.ops4j.pax.logging.cfg
log4j2.rootLogger.level = INFO
```

ovsdb-rpc-task-timeout and json-rpc-decoder-max-frame-length parameters can be changed in /etc/sdn/etc/org.opendaylight.ovsdb.library.cfg Default values are as follows:

```
# grep -E 'ovsdb-rpc-task-timeout|json-rpc-decoder-max-frame-length' /etc/sdn/etc/org.opendaylight.ovsdb.library.cfg
json-rpc-decoder-max-frame-length = 100000
ovsdb-rpc-task-timeout = 1000
```

31.4.2 Create and Manage SDN Manager
SDN manager is an OnApp control panel entity used to manage the SDN infrastructure using API calls for the ODL controller. SDN manager connection options are used to connect SDN Nodes to the ODL controller. You can view, edit and delete SDN manager.

Before you start working with SDN manager, make sure your ODL controller is installed and properly configured:

OnApp is compatible with OpenDaylight 0.12.1 Magnesium version

ODL controller should be accessible from Control Panel with SDN manager host:port and from compute resources with selected connection options (tcp:ip_address:port)
For information on how to install and configure ODL controller, refer to OpenDayLight Controller Installation Guide.

View SDN Manager

To view SDN manager on your system:

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Currently, only one SDN manager per cloud is available.

On this page:

View SDN Managers
Create SDN Manager
Edit SDN Managers
Delete SDN Managers

Connection Options

View Connection Options
Add Connection Options
Delete Connection Options

See also:
Create and Manage Networks
Manage SDN Nodes
Create and Manage SDN Networks
Network Settings

3. Click the label of an SDN manager to view its details:

   Label - the name of the SDN manager
   Host - the hostname or IP address of the ODL controller
   Type - the type of the manager. Currently, manual type is available.

   Nodes Connection Options - how OpenVSwitch will be connected to SDN manager using the format: protocol:IP:port. Currently, TCP protocol is available as a connection option.

31.4.2.1 Create SDN Manager

To add SDN manager:

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the Add Manual Manager button.
On the screen that follows, fill in the following details:

*Label* - the name of the SDN manager

*Host* - the hostname or IP address of the ODL controller

*Port* - specify the port to connect to ODL controller (e.g. 9090, 8080)

*Login* - provide user login name to login into ODL controller

*Password* - specify user password and confirm it

Click the **Submit** button to save the changes.

### 31.4.2.2 Edit SDN Manager

During editing an SDN manager, please make sure the connection with ODL controller can be established. For that, click the **Check connection** button at the bottom right part of the screen.

To edit an SDN manager:

Go to your **Control Panel > Admin > Settings** menu.

Click the **SDN Management** icon.

Click the **Actions** button next to the SDN manager and then click **Edit**.

On the screen that follows, change details as required:

*Label* - the name of the SDN manager

*Host* - the hostname or IP address of the ODL controller

*Port* - specify the port to connect to ODL controller (e.g. 9090, 8080)

*Login* - provide user login name to login into ODL controller

*Password* - specify user password and confirm it

Click the **Submit** button to save your changes.

### 31.4.2.3 Delete SDN Manager

To delete an SDN manager:

Go to your **Control Panel > Admin > Settings** menu.

Click the **SDN Management** icon.

Click the **Actions** button next to the SDN manager you want to delete and then click **Delete**.

Note that you cannot delete SDN manager if it has any nodes assigned.

### 31.4.2.4 Connection Options

At OnApp, OpenSwitch instances installed on compute resources are connected to ODL controller using different connection options. SDN manager contains a list of accepted TCP connection options that you can use.

### 31.4.2.4.1 View Connection Options

To view connection options:
Go to your **Control Panel > Admin > Settings** menu.
Click the **SDN Management** icon.
Click the **Actions** button next to the SDN manager and then click **Connection Options**.

### 31.4.2.4.2 Add Connection Options
**To add new connection option:**

Go to your **Control Panel > Admin > Settings** menu and click the **SDN Management** icon.
Click the **Actions** button next to the SDN manager and then click **Connection Options**.

Insert the new connection option using the format: tcp:ipv4_address:port OR tcp:[ipv6_address]:port. (6640 default port for OVSDB)

Click the "+" button.

OpenDayLight has a current limitation of 50 ports. If you plan to use more, please contact [support](mailto: support) or your account manager.

### 31.4.2.4.3 Delete Connection Options
**To delete a connection option:**

Go to your **Control Panel > Admin > Settings** menu and click the **SDN Management** icon.
Click the **Actions** button next to the SDN manager and then click **Connection Options**.

To delete a connection option, click the **Delete** button next to the connection option you want to remove.

### 31.4.3 Manage SDN Nodes

A node is an OpenVSwitch instance installed by OnApp installation script on compute resources. You can assign and unassign nodes that have OpenVSwitch installed to be managed by SDN manager (Currently, only CentOS 7 KVM type of compute resources is supported). It will allow you to select the compute resource from compute resource zones. Adding nodes is the first step of the SDN network creation.

#### Prerequisite

Before you start configuring SDN Nodes, enable and start OpenVSwitch on each static compute resource that will host an SDN Node:

```bash
systemctl enable openvswitch.service
systemctl start openvswitch.service
```

View SDN Nodes

You can view both nodes assigned to your managers and the compute resources without nodes.

To view SDN nodes:
On this page:

View SDN Nodes

Add SDN Nodes

Reattach SDN Node

Delete SDN Nodes

See also:

Manage SDN Manager

Create and Manage SDN Networks

Network Settings

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the label of the SDN manager.

Click the Nodes tab.

Click the label of a compute zone to view the details:

Compute Zone - compute zone’s name

Connection Option - how OpenVSwitch will be connected to SDN manager using the format: protocol:IP:port. Currently, only TCP protocol is available as a connection option

System ID - the ID of the compute resource

Connected - whether an SDN node is successfully connected to an SDN manager or not

31.4.3.1 Add SDN Nodes

To add SDN nodes:

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the label of the SDN manager.

Click the Nodes tab.

Click the label of a compute zone to which you want to add a node in 'Compute resources without node' section, select the connection option and then click the “+” button.

When using overlays, it is important to remember that an entire Ethernet frame is being encapsulated. This means that the Maximum Transmission Unit (MTU) for the underlay must be increased. By default, MTU for an Ethernet NIC is set to 1500. However, the MTU for each network interface, used for VXLAN tunnels, must be set to 1600 or higher to avoid issues with communication between VSs connected to different SDN nodes. Also, network infrastructure where the SDN is built should be configured for Jumbo Frames.
31.4.3.2 Reattach SDN Node
Sometimes adding SDN nodes to SDN manager may fail. In this case, you can detach SDN node from SDN manager and then attach it again. This action is available only if the node and the network are not connected to each other.

To reattach SDN node:

Go to your **Control Panel > Admin > Settings** menu.

Click the **SDN Management** icon.

Click the label of the SDN manager.

Click the **Nodes** tab.

Click the label of a compute zone from which you want to reattach a node.

Click the **Actions** button next to the node you want to reattach, then click **Reattach**.

31.4.3.3 Delete SDN Nodes
To delete your SDN nodes:

Go to your **Control Panel > Admin > Settings** menu.

Click the **SDN Management** icon.

Click the label of the SDN manager.

Click the **Nodes** tab.

Click the label of a compute zone from which you want to delete a node and then click the **Delete** button.

**Note that you cannot delete SDN node if it has any compute resources.**

31.4.4 Create and Manage SDN Networks
An SDN network consists of Open vSwitch (OVS) bridges interconnected using VXLAN Tunnel End Points. These bridges are created on compute resources selected during SDN network creation process. Such a network is created quickly, just in a few clicks. Like other networks, using SDN network requires adding **IP nets** and **IP ranges**.

31.4.4.1 View SDN Networks
To view SDN networks:

Go to your **Control Panel > Admin > Settings** menu.

Click the **SDN Management** icon.

Click the label of the manager.

Click the **Network management** tab.

Click the label of an SDN network to view its details:

**On this page:**

*View SDN Networks*
Create SDN network

Connect SDN Network to SDN Node

Assign/Unassign SDN Network to User

Delete SDN Network

Manage Bridges

Cleanup Zombie Tunnels

See also:

Manage SDN Manager

Manage SDN Nodes

Create and Manage IP Nets

Create and Manage IP Ranges

Label - the name of the SDN network

VNI - VXLAN Network Identifier (or VXLAN Segment ID)

Network zone - the label of the zone to which a network is assigned

Nodes - the list of the nodes on which the network’s bridges are created

You can also view SDN networks at Control Panel > Admin > Settings > Networks, although without the possibility to edit or delete them.

31.4.4.2 Create SDN Network

To add a new SDN network:

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the label of the manager.

Click the Network management tab.

Click the Add SDN Network button.

On the page that loads fill in the following details:

Label - the name of the SDN network

VNI - VXLAN Network Identifier (or VXLAN Segment ID)

Network zone - select from the drop-down menu the label of the zone to which a network will be assigned

Click the + button to add an SDN node

In a popup box that appears on the screen, identify the following parameters:

Node - select the node from the drop-down menu

IP - IP address that will be used for the connection (transmit/receive VXLAN traffic) with other nodes
Click **Add** to save the parameters.
Click **Apply** to save the network.

After you created the network, you have to add IP nets and IP ranges for the virtual server to use the network.

For information on how to add IP nets to networks, refer to [Create and Manage IP Nets](#).

For information on how to add IP ranges to IP nets, refer to [Create and Manage IP Ranges](#).

### 31.4.4.3 Connect SDN Network to SDN Node
If you want to extend your SDN network you can increase the set of SDN nodes to which the network is attached.

To connect SDN network to SDN node:

1. Go to your **Control Panel > Admin > Settings** menu.
2. Click the **SDN Management** icon.
3. Click the label of the manager.
4. Click the **Network management** tab.
5. Click the **Actions** button next to the SDN network to which you want to attach a node and then click **Connect node**.

On the page that loads, fill in the following details:

- **Connecting Node** - select the SDN network node from the drop-down menu
- **Node** - the node to which SDN network is connected
- **Local IP** - IP address of the node
- **Remote IP** - IP address of the connecting node

Click the **Submit** button.

### 31.4.4.4 Assign/Unassign SDN Network to/from User
You can assign and unassign networks to/from users from the networks overview page. A user assigned to a specific SDN network can then assign this network's IP nets to his/her virtual routers and this network will be available only for this user for the VS creation/managing.

To assign a network to a particular user:

1. Go to your **Control Panel > Admin > Settings** menu.
2. Click the **Networks** icon. The page that loads shows the shared networks in your cloud.
3. Click the **Actions** button next to the SDN network you want to assign and then click **Assign to user**.
4. In the pop-up box, select the user from the dropdown menu.
Click the Assign button.

To unassign a network from a particular user:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud.

Click the Actions button next to the assigned SDN network you want to unassign and then click Unassign.

In the pop-up box, click the Unassign button.

31.4.4.5 Delete SDN Network

To delete an SDN Network:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon.

Click the Actions button next to the SDN network you want to delete and then click Delete.

31.4.4.6 Manage Bridges

SDN network consists with required OVS bridges and tunnels between bridges. The bridge is created on the SDN node and is deleted when you detach network from a node.

In case bridge creation transaction fails, you can try to recreate the bridge.

To recreate bridges:

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the label of the manager.

Click the Network management tab.

Click the label of the SDN network you want to edit.

Click the Tools button and then click Manage bridges.

Click the Actions button next to the SDN bridge you want to recreate and then click Recreate.

To delete a bridge (detach network from a node):

Go to your Control Panel > Admin > Settings menu.

Click the SDN Management icon.

Click the label of the manager.

Click the Network management tab.

Click the label of the SDN network you want to edit.

Click the Tools button and then click Manage bridges.

Click the Actions button next to the SDN bridge you want to recreate and then click Destroy.

31.4.4.7 Cleanup Zombie Tunnels

Destroying an OVS bridge schedules automatic zombie tunnels cleanup transaction. If bridge deleting process is interrupted or cancelled, the transaction may fail. In this case, we recommend to cleanup such zombie tunnels manually.
To cleanup zombie tunnels:
Go to your Control Panel > Admin > Settings menu.
Click the SDN Management icon.
Click the label of the manager.
Click the Network management tab.
Click the label of the SDN network you want to edit.
Click the Tools button and then click Cleanup zombie tunnels.

31.4.5 Upgrade ODL Controller
This document provides information on upgrading OpenDayLight (ODL) Controller to work with OnApp Software-defined networking.

31.4.5.1 Backup of the Datastore in Old ODL Controller

To backup the datastore in an old ODL controller, follow the next procedure:
Create a file with backup file name as a parameter:

```
# cat ./backup.json
{
  "input": {
    "file-path": "/tmp/datastore_backup"
  }
}
```

2. Run API call, with proper admin and pass parameters:

```
```

31.4.5.2 Stop Old ODL Controller and Remove Java

Stop an old ODL Controller and remove Java by running the following command:

```
# systemctl stop opendaylight
# yum remove java*
```

31.4.5.3 Install OpenDaylight Magnesium
To install OpenDaylight Magnesium, follow the next procedure:
Switch to the root home directory and download an archive with ODL by running the next command:
# wget https://nexus.opendaylight.org/content/repositories/opendaylight.release/org/opendaylight
# unzip opendaylight-0.12.1.zip

Unpack the archive by running the following command:

## Unpack the archive by running the following command:

# unzip opendaylight-0.12.1.zip

Install JVM by running the following command:

## Install JVM by running the following command:

# yum install java-11

Set JAVA_HOME by running the next command:

## Set JAVA_HOME by running the next command:

# export JAVA_HOME=/usr/lib/jvm/jre-11

Start controller and install the required tools with the following command:

## Start controller and install the required tools with the following command:

# cd /root/opendaylight-0.12.1
# ./bin/karaf

After the ODL console is opened, perform the refresh of repositories with the next command:

## After the ODL console is opened, perform the refresh of repositories with the next command:

opendaylight-user@root> feature:repo-refresh

7. Install feature needed by OpenDaylight:

opendaylight-user@root> feature:install odl-ovsdb-library odl-restconf-all odl-ovsdb-southbound-api odl-ovsdb-southbound-impl odl-ovsdb-southbound-impl-rest

8. After the features are installed, log out from the karaf by the following command:
9. Update link:

```bash
# unlink /etc/sdn
# ln -s /root/opendaylight-0.12.1 /etc/sdn
```

### 31.4.5.4 Restore From Backup

To restore the backup on the target node, the backup file needs to be placed into the `$KARAF_HOME/clustered-datastore-restore` directory and then, the node restarted. If the directory does not exist (which is quite likely if this is a first-time restore), it needs to be created. On startup, ODL checks if the journal and snapshots directories in `$KARAF_HOME` are empty and, only then, tries to read the contents of the `clustered-datastore-restore` directory if it exists. Thus, for a successful restore, these two directories should be empty. The backup file name itself does not matter; the startup process will delete it after a successful restore.

Restore the backup by running the following command:

```bash
# rm -rf /root/opendaylight-0.12.1/journal/*
# rm -rf /root/opendaylight-0.12.1/snapshots/*
# mkdir /root/opendaylight-0.12.1/clustered-datastore-restore
# cp /tmp/datastore_backup /root/opendaylight-0.12.1/clustered-datastore-restore/
```

### 31.4.5.5 Start OpenDaylight Service

To start OpenDaylight Service, use the following command:

```bash
# systemctl start opendaylight
```

Similar record should be displayed in the log file at `/root/opendaylight-0.12.1/data/log/karaf.log`

```plaintext
2020-07-01T13:55:12,889 | INFO | Blueprint Extender: 3 | DatastoreSnapshotRestore | 227 - org.opendaylight.controller.sal-distributed-datastore - 1.11.1 | Clustered datastore will be restored from file ./clustered-datastore-restore/datastore_backup
```

Don’t forget to set correct credentials and port (8181) at [https://onapp--cp--ip/settings/sdn/managers/1/edit](https://onapp--cp--ip/settings/sdn/managers/1/edit)

### 31.4.5.6 Password Change

The password can be changed according to this example:

Create a file with password as a parameter:
# cat user.json
{
  "name":"admin",
  "description":"admin account",
  "enabled":1,
  "email":"
  "password":"newpass"
}

2. Run API call:

```bash
# curl -u admin:adminpass -X PUT -H "Content-Type: application/json" --data-binary @./user.json http://localhost:8181/auth/v1/users/admin@sdn
{"userid":"admin@sdn","name":"admin","description":"admin account","enabled":1,"email":"","password":"**********","salt":"**********","domainid":"sdn"}
```

31.4.5.7 Tweaks

To prevent intensive logging, you need to decrease log level. It can be done in config /etc/sdn/etc/org.ops4j.pax.logging.cfg, by changing the value `log4j2.rootLogger.level` from INFO to ERROR.

```bash
# grep log4j2.rootLogger.level /etc/sdn/etc/org.ops4j.pax.logging.cfg
log4j2.rootLogger.level = INFO
```

In that case, `ovsdb-rpc-task-timeout` and `json-rpc-decoder-max-frame-length` parameters can be changed in /etc/sdn/etc/org.opendaylight.ovsdb.library.cfg

Default values are as follows:

```bash
# grep -R 'ovsdb-rpc-task-timeout|json-rpc-decoder-max-frame-length'
/etc/sdn/etc/org.opendaylight.ovsdb.library.cfg
json-rpc-decoder-max-frame-length = 100000
ovsdb-rpc-task-timeout = 100000
```

31.5 Edge Accelerator

Starting from OnApp 6.0, you can accelerate all types of networks to speed up the traffic flow running for the corresponding virtual server. After you enable acceleration for a network, the Edge Accelerator instance is created automatically. Edge accelerator is a new type of VS, which is built from specific template and is aimed to serve as a router for traffic between CDN core and CDN-enabled Virtual Servers. Edge accelerator gives your customers all the benefits of a global CDN without any of the hassle of configuring and maintaining a CDN platform. Edge accelerator requires no modifications to the web applications running on virtual servers. All optimization is entirely automatic, and using minification & lossless compression of pages, scripts and images, will not modify or reduce the quality of the source content.
This functionality is applicable only to virtual servers and smart servers running on KVM or Xen compute resources.

For details on how to install Edge Accelerator functionality, refer to Edge Accelerator Deployment sections at Install Compute Resources.

On this page:

View Accelerated Networks
View Accelerated Network Details
Enable Acceleration for Networks
Disable Acceleration for Networks

See also:

Create Accelerator
Network Settings
Create and Manage Networks

31.5.1 View Accelerated Networks

To view accelerated networks, do the following:

Go to your Control Panel > Admin > Settings menu.

Click the Edge Accelerator Dashboard icon.

The screen that appears shows the networks in your cloud with the following details:

Network - the label of the network

Edge accelerator - the ID of the edge accelerator used to accelerate the network

Remote Edge Accelerator Status - edge accelerator status, active or inactive

Acceleration status - network acceleration status, enabled or disabled.

Click a network's label to view its details.

31.5.2 View Accelerated Network Details

To view details of a network:

Go to your Control Panel > Admin > Settings menu.

Click the Networks icon. The page that loads shows the shared networks in your cloud.

Click the label of the network you are interested in. The screen that loads shows the network's label, identifier, VLAN and network zone.

This page also includes the IP nets in the selected network.

OnApp currently offers two types of IP nets: IP Pool and Manual IP. IP Pool nets are the regular type of IP net it OnApp, they contain IPs assigned to users/VSSs and are available during server creation. For information on manual IP nets, refer to Manual IP Nets.
Click an IP net to view the list of IPs in it with the user and/or VS they are assigned to. To find a particular IP net, type your query in the search box and click the Search button.

31.5.3 Enable Acceleration for Networks

Enabling acceleration for networks brings the following results:
Remote accelerator is created. Two networks cannot be used for one Accelerator simultaneously. Only one Accelerator is created per network.
All VSs that exist in this particular network and have acceleration allowed become accelerated.

Accelerator creation usually takes 20 minutes to synchronize between CDN and OnApp. To configure the delay in seconds between executing background tasks, do the following:

Go to your Control Panel > Admin > Settings menu, and click the Configuration icon.

Click the Infrastructure tab and edit the CDN sync application setting.

To enable acceleration for networks, do the following:
Go to your Control Panel > Admin > Settings menu.
Click the Edge Accelerator Dashboard icon.
On the screen that loads, click the button next to the network you want to accelerate.

31.5.4 Disable Acceleration for Networks

To disable acceleration for networks, do the following:
Go to your Control Panel > Admin > Settings menu.
Click the Edge Accelerator Dashboard icon.
On the screen that loads, click the button next to the network you want to disable acceleration for.

After the network acceleration has been disabled, you can re-enable it again.
32 OnApp Configuration

The Control Panel's OnApp Configuration menu is where you get detailed control over the configuration of OnApp itself.

32.1 Authentication

OnApp offers you a possibility to log in using the credentials from a third-party Identity Provider. This section contains information on SAML, OAuth, and TOTP authentication possibilities.

See also:
SAML Authentication
OAuth
Manage Identity Providers

32.1.1 OAuth

OAuth - open standard for authorization - enables your users to log into OnApp using their Google and Facebook accounts.
To provide users of your cloud with such login possibility:
Cloud Administrator must enable OAuth provider
User must connect the enabled provider to their profile

32.1.1.1 Enabling OAuth for Cloud
Go to OnApp Dashboard > Admin > Settings > Authentication page
Select OAuthProviders tab
Move the Enable slider next to the required OAuth providers.

See also:
Authentication
SAML Authentication
Create and Manage User Accounts
Facebook
Select an icon to be displayed during the login
Fill in the app key and app secret from the Facebook application

**Configure Facebook application**
To create and configure the Facebook application for your cloud:

Log in as Facebook developer at [https://developers.facebook.com/](https://developers.facebook.com/)

Create an application:

- enter display name
- select suitable category for your product
- on the Dashboard of the created app you will see App ID and App Secret which are required in step 2 above

Go to the **Settings** menu, press **Add Platform** and select **Website**

- in the appearing field **Site URL** specify the address of your Control Panel
- specify your **Contact Email**, otherwise your application cannot go live

- go to **Status & Review** menu and make your application public using the slider in the top right corner

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32.1.1.2 Google
Select an icon to be displayed during the login
Fill in the app key and app secret from the Google application

**Configure Google application**

Go to the [Google Developers Console](https://console.developers.google.com).

Select a project, or create a new one by clicking **Create Project**. Use a single project to hold all platform instances of your app (Android, iOS, web, etc.), each with a different Client ID.

- In the **Project name** field, type in a name for your project.
- In the **Project ID** field, optionally type in a project ID for your project or use the one that the console has created for you. This ID must be unique world-wide.

Click the **Create** button and wait for the project to be created. **Note:** There may be short delay of up to 30 seconds before the project is created. The project name appears at the top of the left sidebar, indicating you are now editing the project.
In the left sidebar, select **APIs & auth**. A list of Google web services appears.

Find the **Google+ API** service and set its status to **ON**—notice that this action moves the service to the top of the list.

Enable any other APIs that your app requires.

In the sidebar, select **Credentials**.

In the **OAuth** section of the page, select **Create New Client ID**.

In the resulting **Create Client ID** dialog box, register the origins where your app is allowed to access the Google APIs, as follows. The origin is the unique combination of protocol, hostname, and port.

- In the **Application type** section of the dialog, select **Web application**.
- In the **Authorized JavaScript origins** field, enter the origin for your app. You can enter multiple origins to allow for your app to run on different protocols, domains, or subdomains. Wildcards are not allowed. In the example below, the second URL could be a production URL.

  - http://onapp.cp
  - https://myproductionurl.example.com

- In the **Authorized redirect URI** field, enter your redirect URI callback:

  - http://onapp.cp/users/auth/google/callback

It is important to set the configuration indicated in the box above, otherwise the Google will set the default value as http://onapp.cp/callback

Select **Create Client ID**.

Go into the **Consent Screen** and add your email address and a product name. The other fields are optional.

In the resulting **Client ID for web application** section, note or copy the **Client ID** and **Client secret** that your app will need to use to access the APIs.

* Configurations are taken from official Goggle instructions "Step 1: Create a client ID and client secret".
Log in to OnApp cloud using OnApp credentials.

Go to their own profile by clicking the name on the top panel of the dashboard or in the list of users in Users and Groups menu.

In the Oauth Authentication section press the Connect button next to the required provider. User will be redirected to confirm such connection.

Upon completion, the user will be able to log in to OnApp with the OAuth Provider they have connected.

32.1.2 SAML Authentication

SAML Authentication enables the integration of OnApp as a Service Provider into third-party systems via Single Sign-On possibility, so that users of third-party systems can use their credentials to access OnApp services, without the need to be previously registered in OnApp Cloud.

This Authentication is enabled by adding an Identity Provider (IdP) instance, which is used to direct OnApp login requests to the server configured with SAML.

It must be configured properly to be able to store OnApp mapping attributes (user role, time zone, etc).

It requires that only HTTPS protocol is used.

See also:

Users with Config Problems
Authentication
OAuth

Selecting a SAML IdP on OnApp login screen or from the drop-down menu, a user will be redirected to the login screen of that identity provider. Upon logging in there with their email and password (or if they are already logged in), they will be redirected back to OnApp Control Panel. This final redirect will contain an email attribute of that user which is used for their recognition in OnApp system – if such a user already exists he or she are recognized and authorized, if not - a new OnApp user will be automatically created.
A new user will not be created without the OnApp Key attribute.

The attributes of the third party system users will be synchronized during every login, depending on the available keys for attributes mapping. This will enable a third-party system administrator to preset the main OnApp user properties (user role, time zone, group) without the necessity to enter OnApp and make the required configurations manually.

Users created without these attributes can be located and managed at Users > Users with Config Problems on your OnApp Control Panel.

If required, you may configure the cloud access for SAML users only by using SAML credentials.
To do so, disable the switch Local Login for SAML Users at Control Panel > Admin > Settings > Configuration > System.

32.1.2.1 Add New ID Provider

Enabling the possibility to log into OnApp through Identity Provider involves two stages:

- **Add the Identity Provider (IdP) instance to Service Provider (SP)**
- **Configure Service Provider at Identity Provider**

**See also:**
- Authentication
- SAML Authentication
- Manage Identity Providers
- Add IdP Instance on CP

It is important to access OnApp CP via HTTPS before the following steps, to ensure the links containing in the Metadata file are correct.

To add a new Identity Provider instance, follow these steps:

Go to your Control Panel > Admin > Settings > Authentication tab.

Click New SAML Id Provider or a "+" icon.

Fill in the fields in the new window:

- **Idp sso target url** and **Idp cert** are given by the Identity Provider. **Idp cert fingerprint** will be calculated by the system.

- **Enabled** - move the slider to the right to enable this identity provider at the login screen
- **Name** - enter the name of the identity provider
- **Icon** - select the icon file, which will be displayed on the login page
- **Issuer** - the name of the service provider; by default - the address of your OnApp Control Panel
- **Idp sso target url** - the URL to which the login authentication request should be sent
- **Idp slo target url** - the URL to which the logout request should be sent
- **Idp cert** - the identity provider's certificate in PEM format
- **Nameid format** - specify a format of name identifier according to the Oasis SAML specification

It is required that the IdP assertions are encrypted and there is a decrypting private key added to OnApp. The key will be used
to sign the Single Logout requests.

Upload the Service Provider certificate and key:

*Private key* - private key of the service provider in PEM format
*Certificate* - the service provider’s certificate in x509 format

Fill in the keys for attributes mapping.

If the SAML Identity Provider does not send the user’s email as *name_id* in response, the user needs to fill in the *User email key* when configuring an ID provider.

These keys are the names of attributes of the third-party system users that will be synchronized with OnApp. See [Attributes Mapping Configuration](#) for more details.

**Required Attributes Mapping**

*User bucket key* - the key to assign the user to a particular bucket under which this user will be billed

*OnApp Key* - the key that enables the import and synchronization of user attributes during every login to OnApp; third-party system users who are not yet registered in OnApp will not be created without this key

*User email key* - the email of the user

*User name key* - login name of the user that cannot be changed or synchronized after creating. If this key is missing, the email address will be utilized as a login name for the user.

**Optional Attributes Mapping**

*First name key* - the key for the first name of the user

*Last name key* - the key for the last name of the user

*Locale key* - the key for the language in which OnApp Cloud UI will be available to the user

*System theme key* - the key for one of the default system themes in which OnApp Cloud UI will be available to the user

*Display infoboxes key* - the key that enables or disables the display of infoboxes to the user

*Disable auto suspend key* - the key that enables or disables auto-suspending of the user

*Suspend after key* - the key that indicates the period of time in hours after which the user will be suspended

*Suspend at key* - the key that indicates the date and time when the user will be suspended

*User group key* - the group attribute to assign the user to a particular group

*Roles key* - the key of the role attribute that will create/sync the user's role in OnApp
Time zone key - the key of the time zone to which the user will be associated

Click **Save** button.

**Configure Service Provider**

Besides adding the IdP instance, the Identity Provider must also configure the SP instance in their system. To simplify this configuration process, the Identity Provider may use the SP metadata as follows:

Upon creation, you will be redirected to the page with details of the Identity Provider. At the bottom of the page, you will see the **Link to Metadata**.

Copy this link and submit it to the Identity Provider in the **Select Data Source** menu.

In the **Claim Rules** menu, create a new rule by clicking **Add Rule** and select **Transform an Incoming Claim** as the template.

Select **E-mail Address** as the **Incoming Claim Type**.

For **Outgoing Claim Type**, select **Name ID**.

For **Outgoing Name ID Format**, select **Email**.

Now, this identity provider may be selected on the login page.

32.1.2.2 Attributes Mapping Configuration

To import users into OnApp Cloud already with a number of preset properties (user role, time zone, group, etc.), the administrator of the Identity Provider adds additional attributes to their users. These attributes can be imported into or synchronized with the Server Provider (OnApp Cloud), making it possible to configure SP users in Identity Provider’s system.

To import users with additional attributes, the administrator of the Identity Provider adds the required attribute(s) to users and fills them in with values from OnApp. For example, the administrator of the Identity Provider wants a user imported with a role. For this, the role attribute should be created and given a value of an OnApp role(s). The name of this parameter is entered in the **Roles key** field.

When a user enters OnApp Cloud through the IdP instance, the system will check whether the synchronization is enabled and then it will look for the OnApp-dedicated attributes. Keys for attributes mapping are the names of the said attributes.

Note that some attributes cannot be changed once the user is imported to OnApp cloud. These include **User bucket key** for all of the users and **User group key** for the vCloud users. If there is a mismatch between preset properties and OnApp-dedicated attributes, the user authorization will fail.

The table below lists the mandatory and optional keys for attributes mapping.

<table>
<thead>
<tr>
<th><strong>Mandatory keys for attributes mapping</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OnApp key</strong></td>
</tr>
<tr>
<td><strong>User bucket key</strong></td>
</tr>
<tr>
<td><strong>User email key</strong></td>
</tr>
</tbody>
</table>
**Mandatory keys for attributes mapping**

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User name key</strong></td>
<td>The login name of the user that cannot be changed or synchronized after creating. If this key is missing the email address will be utilized as a login name for the user.</td>
</tr>
</tbody>
</table>

**Optional keys for attributes mapping**

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First name key</strong></td>
<td>The first name of the user.</td>
</tr>
<tr>
<td><strong>Last name key</strong></td>
<td>The last name of the user.</td>
</tr>
<tr>
<td><strong>Locale key</strong></td>
<td>The language in which OnApp Cloud UI will be available to the user. Make sure that the language for this key is selected in the Locales box at the Settings &gt; Configuration &gt; Interface page.</td>
</tr>
<tr>
<td><strong>System theme key</strong></td>
<td>The default system theme that is available in OnApp. There are light and dark system themes that can be used for this key.</td>
</tr>
<tr>
<td><strong>Display infoboxes key</strong></td>
<td>The option that enables or disables the display of infoboxes for the user.</td>
</tr>
<tr>
<td><strong>Disable auto suspend key</strong></td>
<td>The option that enables or disables auto-suspend of the user.</td>
</tr>
<tr>
<td><strong>Suspend after key</strong></td>
<td>The period of time in hours after which the user will be suspended.</td>
</tr>
<tr>
<td><strong>Suspend at key</strong></td>
<td>The date and time when the user will be suspended.</td>
</tr>
<tr>
<td><strong>User group key</strong></td>
<td>The attribute to assign the user to a particular user group.</td>
</tr>
<tr>
<td><strong>Roles key</strong></td>
<td>The key of the role attribute that will create or sync the user’s role in OnApp. If an irrelevant role attribute is specified for this key, the user will be assigned to a role with no permissions.</td>
</tr>
<tr>
<td><strong>Time zone key</strong></td>
<td>The key of the time zone with which the user will be associated.</td>
</tr>
</tbody>
</table>

The SAML Authentication will work if the optional fields are left blank. Do not fill in these fields if the attributes were not added by the administrator of the Identity Provider.

An example of Attribute Mappings keys may look like the following:

- `OnApp key - OnApp_Enabled`
- `User bucket key - OnApp_Bucket`
- `User email key - OnApp_UserEmail`
- `User name key - OnApp_UserName`
First name key - OnApp_FirstName
Last name key - OnApp_LastName

Locale key - OnApp_Locale

System theme key - OnApp_SystemTheme

Display infoboxes key - OnApp_DisplayInfoboxes

Disable auto suspend key - OnApp_DisableAutoSuspend

Suspend after key - OnApp_SuspendAfter

Suspend at key - OnApp_SuspendAt

User group key - OnApp_UserGroup

Roles key - OnApp_Roles

Time zone key - OnApp_TimeZone

These attributes have to contain values which will be imported or synchronized with corresponding OnApp user entries. The attributes are case insensitive and belong to the following types:
OnApp_Enabled - the boolean type with two possible values that are true or false
OnApp_Bucket - the string type with the value corresponding to the bucket label

OnApp_UserEmail - the string type with the value corresponding to the user email address
OnApp_UserName - the string type with the value corresponding to the username
OnApp_FirstName - the string type with the value corresponding to the user first name
OnApp_LastName - the string type with the value corresponding to the user last name

OnApp_Locale - the string type with the value corresponding to the language label

OnApp_SystemTheme - the string type with the value corresponding to one of the available system theme labels that are dark or light

OnApp_DisplayInfoboxes - the boolean type with two possible values that are true or false

OnApp_DisableAutoSuspend - the boolean type with two possible values that are true or false

OnApp_SuspendAfter - the integer type with the value corresponding to the number of hours after which the user will be suspended
OnApp_SuspendAt - the datetime type with the value corresponding to the date when the user will be suspended
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32.1.2.3 Manage Identity Providers

To see the list of Identity Providers and manage them:

Go to your **Control Panel > Admin > Settings > Authentication**. You will see all SAML IdPs available in your cloud with their key details:

**Name** - name of the Identity Provider

**IdP SSO Target Url** - the URL to which the authentication request is sent

**Status** - either **Active** or **Disabled**

**Action** - click the **gear** button to **Edit**, **Delete** or access **Metadata** of this Identity Provider

To see more detailed description of the Identity Provider - click its label.

To enable or disable IdP - go to **Edit** screen.

**See also:**
- Authentication
- Add New ID Provider
- SAML Authentication

**Edit SAML ID Provider**

To edit identity Provider instance, do the following:

Go to your **Control Panel > Admin > Settings > Authentication** tab.

Click the **Actions** button next to the Identity Provider you want to edit, then click **Edit**.

Fill in the fields in the new window:

- **Idp sso target url** and **Idp cert** are given by the Identity Provider. **Idp cert fingerprint** will be calculated by the system.

- **Enabled** - move the slider to the right to enable this identity provider at the login screen
Name - enter the name of the identity provider
Icon - select the icon file, which will be displayed on the login page
Issuer - the name of the service provider; by default - the address of your OnApp Control Panel
Idp sso target url - the URL to which the login authentication request should be sent
Idp slo target url - the URL to which the logout request should be sent
Idp cert - the identity provider’s certificate in PEM format
Nameid format - specify a format of name identifier according to the Oasis SAML specification

It is required that the IdP assertions are encrypted and there is a decrypting private key added to OnApp. The key will be used to sign the Single Logout requests.

Upload the Service Provider certificate and key:
Private key - private key of the service provider in PEM format
Certificate - the service provider’s certificate in x509 format
Fill in the keys for attributes mapping.

If the SAML Identity Provider does not send the user’s email as name_id in response, the user needs to fill in the User email key when configuring an ID provider.

These keys are the names of attributes of the third-party system users that will be synchronized with OnApp. See Attributes Mapping Configuration for more details.

Required Attributes Mapping

User bucket key - the key to assign the user to a particular bucket under which this user will be billed
OnApp Key - the key that enables the import and synchronization of user attributes during every login to OnApp; third-party system users who are not yet registered in OnApp will not be created without this key
User email key - the email of the user
User name key - login name of the user that cannot be changed or synchronized after creating. If this key is missing, the email address will be utilized as a login name for the user.

Optional Attributes Mapping

First name key - the key for the first name of the user
Last name key - the key for the last name of the user
Locale key - the key for the language in which OnApp Cloud UI will be available to the user
System theme key - the key for one of the default system themes in which OnApp Cloud UI will be available to the user
Display infoboxes key - the key that enables or disables the display of infoboxes to the user

Disable auto suspend key - the key that enables or disables auto-suspending of the user

Suspend after key - the key that indicates the period of time in hours after which the user will be suspended

Suspend at key - the key that indicates the date and time when the user will be suspended

User group key - the group attribute to assign the user to a particular group

Roles key - the key of the role attribute that will create/sync the user's role in OnApp

Time zone key - the key of the time zone to which the user will be associated

Click Save button.

32.1.2.4 SAML Troubleshooting

Some errors you may encounter while setting up a connection between OnApp and Identity Provider and how to solve them:

missing name_id - make sure that you set up an email for a user on IdP

fingerprint mismatch - ensure you are using an appropriate certificate or fingerprint. Note, the certificate takes precedence on the fingerprint if both are indicated

Idp cert - the identity provider's certificate must be in PEM format

Make sure to access OnApp CP via https before adding the identity provider instance to ensure the links containing in the Metadata file are correct. If the link in the Metadata is incorrect (http instead of https), please delete the IdP instance and create it again having accessed OnApp CP via https.

See also:

SAML Authentication
Manage Identity Providers
Add New ID Provider

32.1.3 TOTP Authentication

If you would like your users to utilize Google Authenticator or any similar application with their OnApp account to enhance security, you may enable TOTP authentication for two-factor authentication (2FA).

The admin user with the Update Settings or Any Action on Settings permission enabled can enable or disable TOTP authentication for the cloud. If TOTP is enabled in the cloud settings, the TOTP Authenticator slider is displayed at the User Profile page, and users can enable this feature for their accounts. If TOTP authentication is disabled for the entire cloud, the corresponding slider at the User Profile page will not be displayed. If a user has TOTP 2FA enabled, after entering login and password, one-time password must be entered too to log in successfully.

An OnApp user will be able to enable TOTP two-factor authentication from the User Profile if TOTP is enabled for the entire cloud in settings. TOTP authentication can be enabled for users only by themselves, other users cannot enable it for them.

There is a limitation of one two-factor authentication method per user. However, a cloud admin can enable multiple two-factor...
authentication methods on the same cloud to be available for the end-users.

Once the TOTP authentication is enabled successfully for a specific user, the Yubikey switch on User Profile page becomes disabled.

32.1.3.1 Enable TOTP Authentication

To enable TOTP Authentication for the cloud:

Go to your Control Panel > Admin > Settings > Configuration > System tab.

Move the TOTP Login slider to the right.

Confirm the enablement.

Once TOTP is enabled for the cloud, users will be able to enable TOTP Authentication for themselves by using the following instructions:

Go to your Control Panel > User Profile.

In the 2-factor authentication section, move the TOTP Authenticator slider to the right.

In the pop-up window that appears, scan the QR code with your mobile application (Google Authenticator or any other TOTP authentication app that complies with the RFC6238).

The QR code will be regenerated every time you open the facebox.

Enter the generated one-time password to validate that the application works properly.

If the password is correct, the TOTP Authentication will become enabled for the user account.

Once the two-factor TOTP Authentication is enabled, during the next login attempt the user will see a form for a one-time password after entering the login and password. If the one-time password is correct, the user will be logged in.
32.1.3.2 Disable TOTP Authentication

32.1.3.2.1 Disable TOTP for cloud
To disable TOTP authentication for the entire cloud, go to your Control Panel > Admin > Settings > Configuration > System tab and move the TOTP login slider to the left.

32.1.3.2.2 Disable TOTP for user
Users can disable TOTP authentication for themselves by using the following instructions:

Go to your Control Panel > User Profile.

In the 2-factor authentication section, move the TOTP Authenticator slider to the left.

In the pop-up window that appears, scan the QR code with your mobile application.

Enter the generated one-time password to validate that the application works properly.

If the password is correct, the TOTP Authentication will become disabled for the user account.

User with the Disable TOTP authentication permission enabled can disable TOTP for any user without entering one-time password.

32.2 Global Whitelist

Global whitelist enhances security of your admin account by restricting login from the IP addresses that are not on the list. It is also applied when using the Login as option for an admin to log in as another user.

The whitelists of your end users will not be affected by the global whitelist.

32.2.1 Configure global whitelist

To configure global whitelist:

Go to /onapp/interface/config/on_app.yml

Specify the IP addresses or CIDR for the global_white_list_ips parameter in the on_app.yml file.

Example:

```
global_white_list_ips:
  - 127.0.0.1
  - 122.105.78.0/26
```

After modifying the on_app.yml file, restart the httpd service:
Once the OnApp service is restarted, global whitelist is configured for your account.

See also:
Advanced Configuration Settings
Create and Manage User Accounts
Login Screen

32.3 License

OnApp Cloud provides two licensing models that enable you to use your Control Panel with a set of available services – Online and Offline or Isolated license. The Isolated license is applicable to a Control Panel that is run in an isolated environment that allows no external access from the public Internet. The Online license can be used for those CPs that are not managed in an isolated environment and allow external access.

For any queries regarding your OnApp license, please contact your account manager.

On this page:
View License Details
Online License
Isolated License

32.3.1 View License Details

To view your OnApp license details:

Go to your Control Panel > Admin > Settings menu.

Click the License icon.

The Licensing page provides the following license details:

- License Type - the license type
- License Key - the license key
- License Status - the license status that can be valid or invalid
- License Expires In - the license expiry date
- XEN/KVM Compute Resources Limit - the current usage and limit of XEN/KVM compute resources
- XEN/KVM Compute Resources Core Limit - the current usage and core limit of XEN/KVM compute resources
VCENTER Compute Resources Core Limit - the current usage and core limit of vCenter compute resources

Integrated storage Limit - the current usage and limit of the integrated storage disk size measured in GB

Virtual Server number limit on XEN/KVM Compute Resources - the current usage and limit on the number of virtual servers on XEN/KVM compute resources

Virtual Server number limit on VCENTER Compute Resources - the current usage and limit on the number of virtual servers on vCenter compute resources

Trader status - the status of the trader

Supplier status - the status of the supplier

If you exceed the limits available in your license, you can no longer use the API and Control Panel. All your requests will be redirected to the Licensing page. If you reach the limit defined in your license, you will not be able to create new resources.

Licensed Features

The Licensed Features box contains the list of available features and indicates whether they are enabled or disabled for the present license:

Compute Resource Supported - lists supported compute resources (e.g. Xen, KVM, VMware Cloud, VMware that is vCenter, etc)

Software Defined Storage - shows whether Integrated Storage is enabled for the license

InfiniBand - shows whether InfiniBand is enabled for the license

AWS - indicates whether Amazon Web Service is enabled for the licence

DRaaS - shows whether Disaster Recovery as a Service (DRaaS) is enabled for the license

CP High Availability - indicates whether High Availability CP is enabled for the license

Application Servers - shows whether application servers are enabled for the license

Container Servers - shows whether container servers are enabled for the license

Edge Accelerator - shows whether the accelerator server for CDN is enabled for the license

Starting from OnApp 6.0, CDN accelerator is free of charge and is enabled in your license by default.

Service Add-Ons - shows whether service add-ons are enabled for the license

SDN - shows whether Software-Defined Networking (SDN) is enabled for the license

NSX for vCenter - shows whether NSX feature for vCenter is enabled for the license

NSX for vCloud - shows whether NSX feature for VMware Cloud is enabled for the license

At the bottom of the Licensed Features box, you can see the date of the last sync with the licensing server.
32.3.2 Online License

If you use an online license, use the following procedure to change your license key:

Go to your Control Panel > Admin > Settings menu.
Click the License icon.
Click the Change License Key button to change the OnApp license key. You will be redirected to the System tab at the Settings > Configuration page where you can change and save a new license key.
To accelerate the license validation after changing the license key, click the Restart License Client button.

You can control a user’s ability to restart license client by enabling or disabling the Restart Dashboard Client permission.

32.3.3 Isolated License

To use an isolated license for your CP, run the following steps:

Go to your Control Panel > Admin > Settings menu.
Click the Configuration icon.
In the System tab, move the Enable isolated license slider to the right.
Click the Save Configuration button.
When the isolated license functionality is enabled, you can go to Control Panel > Admin > Settings > License and download a validation request or upload a validation request:

Download Validation Request
Click this button to download a validation request. You then need to upload this request to the Licensing collection website. Uploading of the validation request initiates downloading of the validation response that you will need to upload into your CP.

Upload Validation Response
Click this button to upload the validation response that you have earlier downloaded from the Licensing collection website. Choose the response file stored on your computer and click Submit.

You need to upload the validation response to your Control Panel within 30 minutes after receiving it, otherwise, the response will not be accepted on your Control Panel.

After the Control Panel upgrade, you need to manually sync with the dashboard by downloading the validation request and then uploading the validation response as described above.
32.4 Configuration Settings

The configuration settings screen lets you change various aspects of your OnApp installation. To edit these OnApp configuration settings:

Go to your Control Panel > Admin > Settings menu.

Click the Configuration icon. Click the tabs to edit the relevant config settings (System, Backups/Templates, Interface, Defaults) – these are explained in the subsections that follow.

32.4.1 Edit System Configuration

This section contains information on how to edit Yubico, CloudBoot, OnApp Storage and other application settings.

On this page:
License Info
File Upload Configuration
TOTP
SAML
Yubico
Compute Resources
VS Console Ports
Miscellaneous
CloudBoot
OnApp Storage
OnApp Storage Healthchecks
DRAas
Billing Management
Statistics Management
Custom Tools in Recovery Images
SNMP Trap Settings
OnApp Dashboard API
Instance Packages
Allow Control Panel to Send Crash Reports

To edit system configuration, do the following:

Go to your Control Panel > Admin > Settings menu, and click the Configuration icon.

Click the System tab to change the following application settings:

If you change any settings here and save, the Control Panel server will restart OnApp services.
See also:

Edit Backups/Templates Configuration

Edit Interface Configuration

Edit Defaults Configuration

Edit Infrastructure Configuration

32.4.1.1 License Info

*Key* - the key for your OnApp installation.

*Enable isolated license* - move this slider to the right to enable the usage of an *Isolated License* on your CP.

32.4.1.2 File Upload Configuration

*Max upload size* - the maximum file size in bytes for ISOs that can be uploaded to boot a VS.

32.4.1.3 TOTP

*TOTP login* - enabling this feature will force TOTP users to log into the cloud only with their third-party credentials and disable the possibility for them to log with OnApp login and password.

32.4.1.4 SAML

*Force SAML login* - enabling this feature will force SAML users to log into the cloud only with their third-party credentials and disable the possibility for them to log with OnApp login and password.

32.4.1.5 Yubico

By setting up the *Use Yubico login* option for your cloud, you give your customers the ability to log into OnApp by entering their credentials and using a Yubikey.

*Use Yubico login* - move the slider to the right to enable logging in using a Yubikey

*Yubico client ID* - enter your Yubico client ID

*Yubico secret key* - enter your Yubico secret key

You can retrieve your Yubico client ID and secret key at [https://upgrade.yubico.com/getapikey/](https://upgrade.yubico.com/getapikey/).
32.4.1.6 Compute Resources*

*Requests before marked as failed* - determines how many times the Control Panel server will attempt to contact a compute resource before failover is initiated. For the Integrated Storage, we recommend increasing this parameter to 30, so that the storage platform has enough time to mark the Compute resources accordingly and allow the VSs to start up after a failed Compute resource. In integrated storage statuses of backend, nodes are marked as inactive approximately in 3 minutes after a backend node has stopped reporting its status. Integrated storage is a distributed system and it takes some time to sync/converge metadata across nodes.

The time before the CP initiates failover may differ depending on the number of compute resources and their load.

*Ping hosted virtual servers before initiating failover* - enable this feature for the VSs to ping the compute resource on which they reside to make sure it is offline before migrating to another compute resource.

32.4.1.7 VS Console Ports*

These are the ports used to remotely connect to virtual servers using the integrated VNC console.

Set the port range using the *First port* and *Last port* fields.

32.4.1.8 Miscellaneous

*Support help email* - the email to which requests are sent from the Help form at Control Panel

*System host* - enter a server IP or URL. Email alerts link to transaction logs for alert events, and those logs are opened from the server configured here.

*Application name* – here you may change the application name, which is displayed at the welcome screen.

*Block Size (MB)* - the block size in MB for disks which is used when migrating disks to another data store. This parameter also regulates the block size during backup creation. The default value is 8 MB.

*Config comment* - this text is added by OnApp to system configuration files and is stored at *etc/resolv.conf*, *etc/network/interfaces* and *etc/hosts* files.

*Session Timeout (minutes)* - the timeout between sessions within OnApp where the default value is 480 minutes

*Enable super admin permissions* - move this slider to the right to activate a super admin feature that will help to restrict a user to create roles, assign users to roles and log in to CP as users with permissions exceeding her or his own permissions.

Note that the corresponding role does not appear in the list of roles at the Dashboard > Roles and is not assigned to any user. For more
information on how to create and manage this role, refer to Create and Manage Super Admin Role in OnApp.

Show IP address selection for new VS – move this slider to the right to enable IP address assignment during VS creation.

Transaction approvals - move the slider to the right to enable approvals.

Number of simultaneous transactions - the number of transaction runners which the daemon will execute at the same time.

Zombie transaction time - set the duration in minutes after which the transaction running longer than the indicated time will be marked as zombie.

System alert reminder period - the duration in minutes for the system to email alerts to admin if the failover resources are not enough. The default value is 60.

Enable wrong activated logical volume alerts - move the slider to the right to enable system alerts.

Wrong activated logical volume minutes - specify the alert emails frequency in minutes.

Timeout Before Shutting Down VSs (30-600 sec) - specify the VS shutdown period within the given range. This parameter indicates the time during which OnApp will try to shut down a VS gracefully; after the selected period the VS will be shutdown forcefully. This will allow refusing the shutdown if the VS is booting and retry every 30 seconds till it is registered.

IP address reservation time - specify the duration in seconds during which the IP address will be reserved for a user and unavailable for other users. The default value is 60.

Max number of IP addresses which can be assigned to user simultaneously - specify the maximum number of IP addresses that can be assigned to user simultaneously. The default value is 256.

Allow VS password encryption – move this slider to the right to enable root password encryption for virtual servers.

For more information on the VS password encryption, refer to the FAQ.

Allow VMware Compute resource password encryption – move this slider to the right to enable root password encryption for VMware Compute resources.

Use HTML 5 VNC console - move this slider to the right to enable the use of HTML 5 VNC console. VNP ports from the CP server are not required if the HTML 5 console is enabled.

It is only possible to use HTML 5 console if the Control Panel server is based on CentOS6.

Max network interface port speed - maximum NIC port speed in MB for the appliance network

Allow users connect to AWS - move this slider to the right to enable AWS for the cloud

Enable CloudBoot - move this slider to the right to enable/disable the PXE boot system on the cloud

Enable InfiniBand boot - move the slider to enable InfiniBand mode
**Static Config target** - the IP of NFS server that contains virtual server image templates

**CP server Cloudboot target** - the IP of Control Panel server

**CloudBoot Domain Name Servers** - IP of domain name servers

### 32.4.1.10 OnApp Storage

**Enable OnApp Storage** - move this slider to the right to enable/disable the OnApp storage on the cloud. This option is unavailable if **Enable CloudBoot** option is switched off.

| Use Local Read Path, Use unicast, and Enforce datastore redundancy across HVs options are unavailable if **Enable OnApp storage** option is switched off. |

**Use Local Read Path** - move this slider to the right to minimize the network throughput dependency for read-heavy workloads. When the **Use Local Read Path** feature is enabled, reads go over the local software bridge to a local replica of the data rather than traverse a physical NIC + switch.

**Use unicast** - switch from multicast to unicast mode. Instead of CP server setting a multicast 'channel' and restarting all Compute resource control stacks that are added to the zone, the CP server now maintains the list of unicast hosts. This is the list of IDs of all hosts in the same zone separated with a comma. CP server updates the unicast hosts list for all Compute resources whenever any member is added or deleted from the set. This parameter is stored in the `onappstore.conf` file, and the CP server explicitly copies the `/rw/onappstore.conf` to `/onappstore/onappstore.conf` on all Compute resources whenever a change is made.

Please, be aware this is a beta option. We suggest switching to unicast mode only in case you are not able to use multicast. Also, if at least one Virtual Server is running - unicast cannot be turned on.

When the unicast mode is enabled, compute resources must be kept online to maintain full coherency of the database. In the event when a compute resource is offline but still enabled in the Control Panel, any subsequent reboots of other nodes will cause a delay in a convergence of the Integrated Storage database across the nodes that have been rebooted. To avoid this scenario, either:

- Ensure that all compute resources in the unicast group are active and booted (recommended)
- or
- Remove compute resources from the Control Panel if they are inactive for an extended period of time

**Enforce datastore redundancy across HVs** - when the slider is enabled, it will be possible to create IS data stores only with the disks that are replicated between different compute resources (in one compute zone). In this case, disks will be created only when there are at least two compute resources in the cloud. If this option is disabled, it will be possible to create data stores with disks that are replicated on hard drives of the same compute resource. In this case, if the compute resource crashes, no failover for disks is possible.
32.4.1.11 OnApp Storage HealthChecks

**Content distribution within Compute Resource threshold ratio** - specify the percentage ratio of the average free space for all nodes in the compute resource. The default value is 5%. You will receive a warning in the storage health check if the free space on one of the compute resource's nodes will be smaller by the indicated value as compared to the other nodes on the compute resource.

**Content distribution across Compute Resources threshold ratio** - specify the percentage ratio of the average free space for all compute resources within one compute zone. The default value is 5%. You will receive a warning in the storage health check if the free space on one of the compute resources in the zone will be smaller by the indicated value as compared to the other resources in the compute zone.

**Node capacity uniformity within DataStores threshold ratio** - specify the value (%) by which the size of a node in a data store can differ from the average node size in this data store. The default value is 5%. If this value is exceeded, you will receive a warning in the storage health check.

32.4.1.12 DRaas

**Enable DRaaS** - enable [DRaaS](https://www.onapp.com/) locally on your Control Panel

32.4.1.13 Billing Management

**Disable billing** - move this slider to the right to disable prices display. All prices-related pages and fields will be hidden including but not limited to:

- Rate Cards in the Buckets menu
- Virtual Servers (all types of the servers)
- User Profile
- User Group

Also, all price-related statistics will not be calculated at the VS overview details page and at the User Profile page.

It is possible to disable billing only if there are no compute zones that are added to Federation or any compute zones subscribed from the Federation on your OnApp CP.
32.4.1.14 Statistics Management

*Time of instant statistics storage (days)* - the number of days the instant statistics from Compute resource will be stored. Starting with OnApp version 5.0, the default value for new installations is 1. For the clouds that have been upgraded from OnApp version 4.3, the default value is 10.

*Enable hourly statistics archiving* - move the slider to the right to switch on archiving for hourly statistics. If enabled, hourly statistics will be converted into monthly and stored as an archive for all the period that exceeds the time specified in the *Time of hourly statistics storage (months)* parameter below.

*Time of hourly statistics storage (months)* - this parameter configures how long you want the detailed hourly statistics to be stored in a database before being converted into monthly statistics. For example, if you set that parameter to 10, the hourly statistics will be stored for the current month and the 10 previous months. And everything older than 10 months will be sent to archive (that is converted into monthly statistics). If this parameter is set as 1, then you can view the detailed hourly statistics for both the current and the previous month.

*Enable logs cleaning* - this parameter enables logs cleaning after the time period, specified in the *Period to store logs (days)* parameter below.

*Period to store logs (days)* - this parameter configures how many days you want logs to be kept in a database before deletion.

32.4.1.15 Custom Tools In Recovery Images

*URL for custom tools* - specify the full URL to the tools file packed with GNU Tar + Gzip, like http://domain.com/file.tgz. These tools will be copied to a recovery VS after rebooting in recovery mode. The users will then be able to unpack and use these tools as they wish to.

If the recovery image file is too large, the virtual servers may fail to start up in the recovery mode. We highly recommend you to test the custom recovery image on the virtual server with minimum RAM size before using it.

32.4.1.16 SNMP Trap Settings

*Snmptrap addresses* - a set of IPv4 management network IP(s) from the CP server separated by a comma. These IP addresses will be used for communication between Control Panel and Compute resources.

*Snmptrap port* - port used for snmptrap. This must be greater than 1024.

We recommend that you do not change the default value. In case you change the port value on your OnApp CP - the corresponding change of the port VM_STATUS_SNMP_PORT should be made for all Compute resources in /etc/onapp.conf file.
32.4.1.17 OnApp Dashboard API

Access Token - enter the Access token that is displayed in your OnApp Dashboard for your user account details. This token is used to synchronize locations between OnApp CP and OnApp Dashboard.

32.4.1.18 Instance Packages

Instance Packages number - when the specified number is reached, instance packages are shown in the linear view in the virtual server creation wizard for easier instance package selection. The default value is 3.

32.4.1.19 Allow Control Panel to Send Crash Reports

Allow to collect errors - move the slider to enable Control Panel to collect, aggregate, encrypt and send crash reports. If you enable this feature, the error list from your Control Panel will be sent to OnApp in a form of an encrypted API call. By default, this option is disabled.

3. Click the Save Configuration button to finish.

32.4.2 Edit Backups/Templates Configuration

This section contains information on how to edit backup or template server, backup processes, incremental backups and other application settings.

On this page:

Manage Templates

Paths to

Backup/template server

Backup processes

Incremental backups

Rsync options

To edit backups or templates configuration, do the following:

Go to your Control Panel > Admin > Settings menu, and click the Configuration icon.

Click the Backups/Templates tab to manage the following settings:

If you change any settings here and save, the Control Panel server will restart OnApp services.

See also:
32.4.2.1 Manage Templates

To enable template update and install, set the following parameters:


*Delete template source after install* - enable this option to delete the downloaded templates after they were distributed.

Do not enable this option if the location of your templates is shared with CP box. Otherwise, recently downloaded templates may be removed!

32.4.2.2 Paths to

Sets paths for various OnApp files (shown here with default path examples)

*Templates* - /onapp/templates

*Recovery templates* - /onapp/tools/recovery

*Backups* - /onapp/backups

32.4.2.3 Backup/template server

Backups and templates can be stored on a remote server or a mounted disk. To store backups & templates remotely, configure the following settings:

*Allow incremental backups* - move this slider to the right to enable incremental backups. Incremental backups are advanced method of taking backups. During the incremental backup, only the changes made after the last backup are archived instead of backing up the whole target. See Virtual Server Backups for details. Incremental backups are not available for Windows virtual servers, as well as under VMware and SolidFire.

If the *Allow incremental backups* option is enabled, the new provisioning scheme will be used (with unpacked templates). Otherwise, the system will use the traditional provisioning method. When the incremental backups option is enabled, the ability to create full backups will be disabled (except for the servers that do not support incremental backup type). Existing full backups will be still accessible via Backups > Images menu.
If you are using incremental backups option AND ssh_file_transfer is disabled, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your Compute resources.

Use SSH file transfer - move this slider to the right to enable SSH data transfer for your template/backup server. If this option is not enabled, you will need to mount the templates/backup server manually. It is not possible to utilize SSH file transfer option when incremental backups are enabled.

Skip this option if you are using incremental backups.

Server IP - specify the IP address of the backup/template server.

User login - the login used for remote server authentication. A password is not required, but it is required that you store a host key.

SSH options - the SSH protocol options that set the rules and behavior of how to log into the remote server. By default, the options are set to omit adding new host keys to the host file and skip password authentication. They also specify the path where the host key is stored. For a detailed list of configuration options, refer to SSH protocol man pages (under the -o option description. See http://unixhelp.ed.ac.uk/CGI/man-cgi?ssh+1).

32.4.2.4 Backup processes

Total number allowed - the maximum number of compute resource, backup server and data store backup processes allowed at once on the Control Panel.

Total per data store - if this number exceeds the overall total, the overall total limit will be enforced.

Total per compute resource - if this number exceeds the overall total, the overall total limit will be enforced.

Total per backup server - if this number exceeds the overall total, the overall total limit will be enforced.

For example: if Total number allowed is 10, and Total per data store is 3, total per backup server is 3, and total per compute resource is set to 4, then up to 10 backups can be taken at once – 3 per data store, 3 per backup server, and 4 per compute resource.

32.4.2.5 Incremental backups

Minimum Disk Size Calculation Coefficient for Template - this parameter is for incremental backups only. During the backup conversion to template, backup’s size is multiplied by this coefficient to make sure that template will be slightly bigger than the actual size for correct performance.

32.4.2.6 Rsync options

These options are for clouds with enabled incremental backups. Your cloud must have a dedicated backup server configured with one of the following file systems: ext2, ext3, ext4, reiserfs or xfs.

Store extended attributes - enable this option to store extended attributes when taking incremental backups.

Store ACLs - enable this option to store access control lists.
3. Click the **Save Configuration** button to finish.

### 32.4.3 Edit Interface Configuration

This section contains information on how to edit locales, pagination, system themes, and other application settings.

**On this page:**

- **Locales**
- **AJAX update rates (ms)**
- **Pagination**
- **System themes**
- **Dashboard Statistics**

To edit interface configuration, do the following:

Go to your **Control Panel > Admin > Settings** menu, and click the **Configuration** icon.

Click the **Interface** tab to change the following application settings:

> Please note, the system will restart OnApp services automatically after you save the new configuration.

---

**See also:**

- [Edit System Configuration](#)
- [Edit Backups/Template Configuration](#)
- [Edit Defaults Configuration](#)
- [Edit Infrastructure Configuration](#)

**Locales**

*Locales* – select locales which will be available for the users from the drop-down menu. You may select multiple locales.

**AJAX update rates (ms)**

*VS Status* - AJAX pagination update time for virtual servers

*Dashboard/logs/other* - AJAX pagination update time for dashboard, logs, and other screens

**Pagination**

*Max items limit* – set the maximum amount of items which can be displayed per page applying the **Show All** button in the list. If the overall number of the items in the list exceeds the number entered herein, the **Show All** button will not be available in the list menu.
Log items pages limit on dashboard – set the maximum amount of pages to list log items in the Activity Log section at the main Dashboard page. You can view all the available log items at the Logs page, including those items that cannot be displayed at Dashboard within the specified amount of pages.

System Themes

Default system theme – select a system theme from a drop-down menu. It can be light or dark.

Default custom theme – select a custom theme that will be automatically applied to all future organizations/user groups. If you do not specify the custom theme, new entities will use the default one.

Dashboard Statistics

Dashboard stats – select the statistics, which will be shown on a dashboard, from a drop-down menu.

3. Click the Save Configuration button to finish.

32.4.4 Edit Defaults Configuration

This section contains information on how to edit password complexity, new virtual servers, firewall, and other application settings.

On this page:
New Virtual Servers
Firewall
SSH Options
SSH Keys
Recipes Options
Migration Options

To edit defaults configuration, do the following:

Go to your Control Panel > Admin > Settings menu, and click the Configuration icon.

Click the Defaults tab to change the following application settings:

Please note, the system will restart OnApp services automatically after you save new configuration.

Enable password protection on user deleting - move this slider to the right to enable confirmation of user deletion by means of administrator password.

Enforce password complexity - move this slider to the right to specify the following password complexity configuration settings:

Minimum length - specify minimum required password length (0-99). The default value is 6.

Enforce at least one upper and lower case letter - move this slider to the right to enforce user using both uppercase and lowercase letters in their password.

Enforce at least one letter and number - move this slider to the right to enforce user using both letters and numbers in their password.
Enforce symbols - move this slider to the right to enforce user using symbols in their password.

Enforce unique password every time - move this slider to the right to make user enter unique password each time they change the password (the last 12 passwords are saved in OnApp configuration). This refers to the user account passwords only.

Lockout attempts - the number of unsuccessful login attempts that are allowed before user’s account is locked out.

Expiry (Months) - specify the password expiry period in months.

To save password complexity configuration disable the Enforce Password Complexity option and enable it again.

Allow advanced VS management - move this slider to the right to enable managing the advanced configuration for virtual servers in your CP

See also:
- Edit System Configuration
- Edit Interface Configuration
- Edit Infrastructure Configuration
- Edit Backups/Templates Configuration

New Virtual Servers

Default Image Template - choose a particular OS template as the default for VS creation. A new virtual server will be created using this template, unless otherwise set in the wizard.

Service Account Name - specify the service account name that will be automatically created on VMware virtual servers to be able to communicate with them.

Default acceleration policy - move this slider to the right to enable default acceleration policy and have all the newly created VSs accelerated by default. Note that when you enable this option here, then the Acceleration slider will be missing in the VS creation wizard.

Default virsh console policy - move this slider to the right to be able to access all the newly created virtual servers via the Virsh console.

Firewall

Drop firewall policy allowed ips - enter the IP addresses to be allowed as an exception if the default firewall policy is DROP

Default firewall policy - default settings for a VS’s Networking > Firewall tab (ACCEPT/DROP). Changes in the default firewall policy will be applied only to those VSs that are created after these changes are applied.

Allow to start more than one Virtual Server with the same IP - move this slider to the right to allow starting up virtual servers with one IP address.
SSH Options

SSH port - specify the port used to connect to Compute resources and backup servers.

SSH timeout - specify the timeout used when connecting to the compute resource and backup server. The default value is 10 seconds.

SSH Keys

SSH-keys - click to manage the administrator SSH keys. The keys will be automatically assigned to all VSs which will be created in the cloud later.

To assign the keys to existing VSs, go to VS Overview > Properties menu.

Recipes options

Recipe temporary directory - specify the temporary recipe directory where all recipe scripts (on Control Panel, compute resources and virtual servers) are generated. The default value is /tmp.

Migration options

Migration rate limit - the maximum rate limit per one transaction used for migrating the VS. The default value is 10 MiB.

Simultaneous migrations per hypervisor - the maximum amount of transactions which can be run simultaneously on the target compute resource when migrating a VS. The default value is 5.

Applicable only to Migrate VS and Disks.

3. Click the Save Configuration button to finish.

32.4.5 Edit Infrastructure Configuration

This section contains information on how to edit delay between executing background tasks, background processes, RabbitMQ, and other application settings.

On this page:

Delay in seconds between executing background tasks

Background processes

RabbitMQ

Zabbix Settings

To edit infrastructure configuration, do the following:

Go to your Control Panel > Admin > Settings menu, and click the Configuration icon.

Click the Infrastructure tab to change the following application settings:

If you change any settings here and save, the Control Panel server will restart OnApp services.
See also:
Edit System Configuration
Edit Backups/Templates Configuration
Edit Interface Configuration
Edit Defaults Configuration

Delay in seconds between executing background tasks

*Backup taker* - this process schedules auto-backups

*Billing event processor* - this process generates billing statistics

*CDN sync* - synchronization between CDN and OnApp. By default, this parameter is set to 20 minutes.

*Cluster monitor* - this parameter is deprecated

*Compute resource monitor* - this parameter is deprecated

*Schedule runner* - this process runs schedules which request auto-backups to be taken

*Transaction runner* - this process covers the following tasks: transactions_processor - the task which is responsible for running transactions, SupplierRunnerProcessor - this process relates to Federation and starts transactions on the seller cloud which send notifications to the Market, TraderRunnerProcessor - this process relates to Federation and starts transactions which send different requests to the Market and process notifications from the seller

*Snmp stats level1 period* - this process gathers information about compute resources uptime and virtual servers' statuses

*Snmp stats level2 period* - this process gathers information about the disk usage, network usage, CPU usage statistics and the list of virtual servers

*Snmp stats level3 period* - this process generates the list of volume groups and logical volumes

If you change any of the *Snmp stats* parameters, you need to restart the OnApp Engine to save changes. To restart the OnApp Engine run the following commands in the console:

```
    service onapp-engine stop
    service onapp-engine start
```
Amount of service instances - the number of system processes that perform the OnApp engine tasks simultaneously. Each of the system processes performs the task using a separate CPU core. The default value is 2. Currently, the maximum value is 12. If you input a value larger than 12, the number of system process will still be 12.

Transaction standby period - the time which a transaction spends in stand-by period before requeueing to pending queue. The default value is 30. We recommend increasing this parameter for clouds with thousands of pending long lasting transactions (like backups) in order to decrease CPU/IO load.

Time period, given to OnApp Engine to perform graceful stop - if the OnApp Engine is stopped, running transactions will fail after the amount of time (seconds) indicated by this parameter. By default, this parameter is set to 300 seconds.

Log level - log detalization level: debug, info, warn, error and fatal. This parameter is available only for CPs in development mode. It is not displayed for Control Panels in staging or production modes. By default, this parameter is set to 'info'.

RabbitMQ

RabbitMQ Host - RabbitMQ server IP address
RabbitMQ Port - RabbitMQ port
RabbitMQ Virtual Host - the name of the "virtual host" (or vhost) that specifies the namespace for entities (exchanges and queues) referred to by the protocol. Note that this is not virtual hosting in the HTTP sense.
RabbitMQ Login - RabbitMQ login
RabbitMQ Password - RabbitMQ password

Zabbix Settings

Starting with version 4.2, OnApp uses Zabbix for autoscaling. If you already have a Zabbix server, you can connect it to your cloud by adding the necessary information in the fields provided below:
Zabbix host - the IP address of your Zabbix server
Zabbix url - the path to the Zabbix web-interface
Zabbix user - your Zabbix user
Zabbix password - your Zabbix password

Click the Save Configuration button to finish.

32.5 Control Panel Recipes Settings

Recipes are sets of instructions that are triggered during the certain stages of events defined. By managing recipes via the Settings menu, you can assign recipes to the control panel server.

To manage this functionality make sure that you have the Manage recipes for Control Panel permission enabled.

To manage Control Panel recipes settings:
Go to your Control Panel > Admin > Settings menu and click the Recipes icon.
On the screen that appears, you will see the details of all the recipes in the cloud:
The left pane shows the list of all recipes in the cloud organized into recipe groups.
The right pane displays the list of control panel events to which the recipes can be assigned to.

32.5.1 Assign Recipe
Drag and drop the recipe to assign it to a desired control panel event.

You can assign recipes to the following events:

- **KVM Compute resource goes online** - run the recipe when the KVM Compute resource comes online
- **KVM Compute resource goes offline** - run the recipe when the KVM Compute resource goes offline
- **XEN Compute resource goes online** - run the recipe when the Xen Compute resource comes online
- **XEN Compute resource goes offline** - run the recipe when the Xen Compute resource goes offline
- **vCenter Compute resource goes online** - run the recipe when the vCenter Compute resource comes online
- **vCenter Compute resource goes offline** - run the recipe when the vCenter Compute resource goes offline
- **Baremetal compute resource goes online** - run the recipe when the Baremetal compute resource goes online
- **Baremetal compute resource goes offline** - run the recipe when the Baremetal compute resource goes offline

The **X compute resource goes offline** recipe will be triggered when the statistics is not received from a compute resource for a certain period of time for some reason. If the compute resource is offline, the recipe will not run.

- **VS provisioning** - run the recipe during the virtual server provisioning
- **VS network rebuild** - run the recipe while rebuilding a network
- **VS disk added** - run the recipe while adding a disk to the virtual server
- **IP address allocated for VS** - run the recipe when adding an IP address to the VS network interface
- **IP address revoked from VS** - run the recipe when removing an IP address from the VS network interface
- **VS network interface added** - run the recipe while adding a network interface to the virtual server
- **VS network interface removed** - run the recipe while deleting a network interface from the virtual server
- **VS disk resized** - run the recipe while resizing a virtual server disk
- **VS resize** - run the recipe while resizing the virtual server
- **VS IP address add** - run the recipe while adding an IP address the virtual server
- **VS IP address remove** - run the recipe while removing an IP address from the virtual server
- **VS start** - run the recipe while starting the virtual server
VS reboot - run the recipe while rebooting the virtual server
VS hot migrate - run the recipe during the hot migration of the virtual server
VS hot full migrate - run the recipe during the hot migration of the virtual server with disk
VS failover - run the recipe during the failover process

To use drag and drop:
Click the arrow button in front of the required event to unfold it.
Select the required recipe in the left pane and hold it down with the left mouse button.
Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

32.5.2 Remove Recipe
To remove the recipe:

Click the arrow button in front of the required event to view the list of recipes assigned to it.
Click the Delete button next to the recipe you want to remove.

32.6 Hardware Info

OnApp provides an overview of hardware that is used by compute resources and backup servers available in your cloud. On the Hardware Info page, you can view information on CPU, RAM, hard disk drives, networks and other hardware components. You can also create custom fields to provide additional hardware information that you find necessary. In this document, you can find information on how to view and manage your hardware info.

Permissions
The level of user access to the Admin > Settings > Hardware Info page is controlled under the following permissions:

See all Hardware Info - the user can see all hardware information in the Settings menu

Any actions on Custom Fields - the user can take any action on custom fields

The access to the Hardware Info page for a particular compute resource or backup server is controlled under the See all compute resources/See all backup servers and Update any compute resource/Update any backup server permissions. For more information, refer to List of all OnApp Permissions.
32.6.1 View Hardware Info

To view the hardware information:

Go to Control Panel > Admin > Settings menu and click the Hardware Info button.

On the page that appears, you will see the list of compute resources and backup servers available in your cloud. Click the Show/Hide button next to the label of a resource to expand/collapse the hardware infobox.

The hardware infobox provides the following information:

**Summary**

This section contains the basic information about the compute resource/backup server:

- **Current Uptime** - the time the compute resource/backup server has been working and available, the number of its users, and the average load.
- **Total CPU** - the total amount of CPU (number of cores/frequency in MHz) allocated to the compute resource/backup server.
- **Memory** - the total amount of memory (GB) allocated to the compute resource/backup server.
- **Type** - the type of the compute resource, for example, Xen, KVM, etc. For backup servers, the type is Backup server.
- **OS** - the operating system of the compute resource/backup server.
- **Manufacturer/Model** - the manufacturer and model of the motherboard.
- **BIOS/Serial Number** - the system BIOS, its serial number and release date.

- **CPU** - the manufacturer and model of the processor and the processor base frequency in GHz.
- **RAM** - the list of memory slots that includes information on the memory type, speed, and capacity (e.g. DDR4, 2400 MHz, 16384 MB).
- **HD** - the manufacturer and model of the hard disk drive and the hard disk drive capacity in GB.
- **Networks** - the manufacturer and model of network cards.

To edit the hardware info and add custom fields, refer to the following section.

32.6.2 Add Custom Field

You can add a custom field that will be displayed on the Hardware Info page as an infotip next to the default field, to which the custom field was added.
To add the custom field to the hardware info:

Go to the Control Panel > Admin > Settings menu and click the Hardware Info button.

Click the Edit button next to a label of a compute resource/backup server.

On the page that appears, you will see the list of sections available in the hardware infobox. Expand the section to which you want to add a custom field and click the + button.

In the Properties box, provide the following information:

- **Custom field** - the label of the custom field that you want to add
- **Value** - the value displayed in the custom field

When you have finished, click the Save button.

To view the custom field, hover over the icon that appears next to the default field, to which the custom field was added.

### 32.6.3 Edit Custom Field

To edit the custom field added to the hardware info:

Go to the Control Panel > Admin > Settings menu and click the Hardware Info button.

Click the Edit button next to a label of a compute resource/backup server.

On the page that appears, you will see the list of sections available in the hardware infobox. Expand the section where you want to edit a custom field and click the Edit button.

In the Properties box, edit the following information:

- **Custom field** - the label of the custom field that you want to add
- **Value** - the value displayed in the custom field

When you have finished, click the Save button.

To view the custom field, hover over the icon that appeared next to the default field, to which the custom field was added.

### 32.6.4 Delete Custom Field

To delete the custom field added to the hardware info:

Go to the Control Panel > Admin > Settings menu and click the Hardware Info button.

Click the Edit button next to a label of a compute resource/backup server.

On the page that appears, you will see the list of sections available in the hardware infobox. Expand the section from which you want to delete a custom field and click the Delete button.

Click the OK button to confirm the deletion.
33 Notifications Setup

The Control Panel's Notification menu lets you configure the notifications for your CP. You can select the events about which to notify your users. To configure notifications for your cloud you need to:

- Enable notifications for your cloud - the configured subscriptions will send notifications only if you enable this option.
- Configure gateways - select what type of notifications you want to send: SMTP/SENDMAIL emails or internal notifications in CP.
- Add notification templates - notification templates determine the text of the messages your users will receive.
- Add custom events - you can add custom events to send notifications when you require.
- Create recipients lists - recipients lists include users whom you want to address certain notifications.
- Set up subscriptions - a subscription ties all your configurations together. After you set up subscriptions your users will start receiving notifications.

After these configurations you can:

- Check whether your notification have been delivered - you can check whether the sent notifications have been delivered successfully.
- View internal notifications in CP - you can view internal notification in your Control Panel.

You need to have messaging permissions enabled to configure notification for the cloud. For more information, refer to List of all OnApp Permissions.

For information on managing subscriptions, gateways and other elements of notifications refer to Manage Notifications.

See also:
- OnApp Configuration
- Logs
- Sysadmin
- Alerts
- Manage Notifications
33.1 Enable Notifications for Your Cloud

Firstly, you need to enable notifications for your cloud. You can do this at the Configuration section. All notification sections will be available in the Control Panel if notifications are disabled for the cloud, but no notifications will be sent.

To enable notifications for your cloud:

Go to Control Panel > Admin > Notifications > Configuration

Move the Enable notifications slider to enable notifications. By default, this option is disabled.

Specify the number of unread notifications to show. It is set to 5 by default.

Specify the notification subject prefix. By default, this value is 'OnApp.'

Click the Save Configuration button

33.2 Configure Gateways

The Gateways section lets you create gateways for your notification system. Gateways are used when setting up a subscription and determine in what way users will be contacted: via email or internal notifications in CP. You can create multiple gateways to verify without any limitation.

To view your gateways go to Control Panel > Admin > Notifications > Gateways. The page that loads shows your gateways with their names and the types of the gateways: SMTP, SENDMAIL or INTERNAL.

To add a new gateway:

Go to Control Panel > Admin > Notifications > Gateways

Click the New gateway or the button

On the page that loads select the delivery method for the gateway: SMTP or SENDMAIL for email notifications or INTERNAL for internal notifications in the CP

Click Select to proceed to the next gateway creation step

Depending on the selected delivery method fill in the following details:

For the Transaction Approvals functionality you need to add a SENDMAIL gateway with the System SENDMAIL Gateway label or/and an SMTP gateway with the System SMTP Gateway label.

For the SENDMAIL delivery method:

Label - the name for your new gateway. The name of the gateway should not contain any special characters.

Primary - move the slider to the right to mark current gateway as primary. Previous primary gateway will be unmarked.

From - the email address from which emails will be sent

Host - the server IP or URL

For the INTERNAL delivery method:
**Label** - the name for your new gateway. The name of the gateway should not contain any special characters.

For the SMTP delivery method:

**Label** - the name for your new gateway. The name of the gateway should not contain any special characters.

**Primary** - move the slider to the right to mark current gateway as primary. Previous primary gateway will be unmarked.

**From** - the email address from which emails will be sent

**Host** - the server IP or URL

**Smtp address** - address of the SMTP server

**Smtp port** - port of the SMTP server

**Smtp domain** - associated domain

**Smtp user name** - user name to login into SMTP server

**Smtp password** - password to login into SMTP server

**Smtp authentication** - select an authentication mechanism from a drop-down menu: plain, login or cram_md5

**Smtp enable starttls auto** - enable the StartTLS extension

Click **Save** to finish the creation process

For information on how to edit and delete gateways refer to Manage Notifications.

---

### 33.3 Add Notification Templates

The **Notification Templates** section lets you create message texts that will be sent to your users via email or internal notifications in CP. Notification templates are used when setting up a subscription for your users. There are two types of notification templates: system templates that come pre-installed with OnApp and cannot be deleted but only edited, and custom templates which you add to your cloud.

To view your notification templates go to Control Panel > Admin > Notifications > Notification Templates. The page that loads shows your notification templates with their labels, indicators whether this is a system or a custom template and the template’s text. If a template contains a long message, only the beginning of the text will be displayed.

To add a new notification template:

Go to Control Panel > Admin > Notifications > Notification Templates

Click the **New notification template** or the **button**

On the page that loads fill in the label and the text of the template. The label of the template should not contain any special characters. The text of the template is the message which your users will receive.

Click the **Save** button to add the notification template.

If you add a ‘%(message)’ text to the template, the notification will contain the full text of the event that is written into logs. If you add a ‘%(name)’ text to the template, the notification will contain the name of the user who will receive the notification. You can set ‘%(message)’ and
%{name} placeholders for almost any type of event, however, the following events will have the
different placeholders available:

* federation new announcement - `{label}` and `{period_for_federation_announcement}` placeholders.
* federation templates changed - `{label}` placeholder.

For custom events you can only set the `%{message}` and `%{name}` placeholders.

### 33.4 Add Custom Event Types

The **Events** page shows the events which occurred in the cloud and about which users were
notified. To view the list of events go to **Control Panel > Admin > Notifications > Events**. The
page that loads shows the list of events which have occurred in the system with their details:

* **Date** - the time and date when the event occurred
* **Event Type** - the type of the event
* **Data** - the text of the notification that was sent about the event

OnApp currently offers two event types, system event types and custom event types. To view
the list of system event types go to **Control Panel > Admin > Notifications > Event Types > System Event Types**. The page that loads shows the list of system event types registered in system with their details:

* **ID** - the ID of the event
* **Event Type** - the type of the event

If required you can add a custom event type which can later be selected when setting up a
subscription.

To add a custom event type:

1. Go to **Control Panel > Admin > Notifications > Event Types > Custom Event types** tab
2. Click the **Create new Event type** button
3. On the page that loads enter a name and a description for your custom event type
4. Click **Create** to save the new event type

### 33.4.1 Trigger Custom Events

If required, you can trigger the event from the list of custom events manually. When you trigger
a custom event type, a new popup window appears where you can enter the text of the message to be passed into the notification template. Triggered custom events are displayed in
the **Events** section together with the system events that have occurred in the cloud.

To trigger a custom event:

1. Go to **Control Panel > Admin > Notifications > Event Types > Custom Event types** tab.
Click the **Actions** icon next to the event type you want to trigger and select **Trigger**.
Enter a text which will be included into your notification.

Click **Trigger** to send the notifications.

For information on how to delete event types for a particular period of time refer to **Manage Notifications**.

### 33.5 Create Recipients Lists

Recipients lists determine to whom of your users notifications will be sent. If required, you can add different recipients lists for different events. One recipients list can be used in multiple subscriptions and you can create multiple recipients lists, as well. If you want to send notifications to emails that are not registered in your OnApp cloud, you need to add such contacts as external recipients. Recipients lists can include both OnApp users and external recipients.

#### 33.5.1 External Recipients

If you want to send notifications to emails that are not registered in your OnApp cloud you can add them to your **External Recipients**. Later these contacts can be added to recipients lists of users who will receive notifications about certain events.

To view the list of external recipients go to **Control Panel > Admin > Notifications > External Recipients**. The page that loads shows the added external contacts with their name and email.

To add a new external recipient:

Go to **Control Panel > Admin > Notifications > External Recipients**

Click the **New External Recipient** or the button

On the page that loads enter a name for recipient and their email address. The name of the recipient should not contain any special characters

Click **Submit** to save the recipient

#### 33.5.2 Recipients Lists

The **Recipients Lists** section lets you create lists of users whom you want to notify about certain events. Recipients lists are used when setting up a subscription to select whom of the users to notify about which events in the cloud.

To view your recipients lists go to **Control Panel > Admin > Notifications > Recipients Lists**.
The page that loads shows all your recipients lists.

Click the label of the recipient list to view its list of users with their emails.

To add a new recipients list:

Go to **Control Panel > Admin > Notifications > Recipients Lists**

Click the **New Recipients List** or the button

On the page that loads fill in the name and select the recipients from the drop-down list. The name of the list should not contain any special characters. External recipients will also appear in the drop-down list.
Click **Create** to save the new recipients list.

For information on how to edit and delete recipients lists refer to Manage Notifications.

### 33.6 Set up Subscriptions

Using the **Subscriptions** section you determine who of your users are notified about which events. A subscription is the final step of a notifications configuration which ties together a recipients list, a gateway and a notification template.

To view the list of subscriptions go to **Control Panel > Admin > Notifications > Subscriptions**. The page that loads shows your subscriptions with the following details:

- **Name** - the label of the subscription.
- **Event Type** - the event type with which the subscription is associated.
- **Template** - the subscription's notification template. Click the template to view its details.
- **Gateways** - the name of the gateway and the means by which the notifications will be sent. Click the gateway to view its details.
- **Recipients Lists** - the subscription's recipients list. Click the label of the recipients list to view the list of users in it and their emails.

#### 33.6.1 Create New Subscription

To add a new subscription:

Go to **Control Panel > Admin > Notifications > Subscriptions**

Click the **New Subscription** or the button

On the page that loads fill in the following details:

- **Name** - the label for the subscription
- **Recipients list** - select from the drop-down menu the list of recipients to whom the notifications will be sent. You can use one recipients list for several subscriptions
- **Gateways** - select from the drop-down list the gateway for the subscription. The gateway determines whether notifications will be send via email or internal notifications in CP. You can use one gateway for several subscriptions.

Click the button to add an event

In the new popup windows that appears fill in the following details:

- **Event** - select from the drop-down list the event about which the notifications will be sent. Every time the event takes place a notification will be sent to users from the recipients list you select
- **Notification template** - select from the drop-down list the event and the notifications template for the subscription. You can use one notification template for several subscription
You can create multiple events for the custom events which are non-deletable but open to editing. These custom events include reset password instructions, unlock instructions, set password instructions, and confirmation instructions.

Click the **Add** button

Click **Submit** to add the subscription

You can set up notifications for the following events:

- **All compute resources status** - all compute resources in a compute zone have changed their statuses to to Online/Offline/Inactive
- **Auto healing failed diagnostics** - the disk automatic repair failed due to some errors detected
- **Auto healing processing disk repair** - the disk automatic repair has been initiated
- **Can't schedule transaction** - a transaction could not be scheduled in the cloud
- **Autobackup failed** - the backup creation limit has been reached
- **Daemon notification** - the status of the OnApp engine has changed to Active/Up/Inactive
- **Daily storage health report** - the daily storage health report will be sent in the notification
- **Failed task** - a task failed in the cloud
- **Failover compute resource** - deprecated option, it will be removed in the next version
- **Failover process** - failover process has been initiated
- **Federation new announcement** - new notification that will be sent to all the buyers who are subscribed to the selected zone
- **Federation templates changed** - the templates have underwent some changes. These changes may include adding a new template, changing the limits of the existing template or deleting one
- **Generate hourly stats failed** - hourly statistics failed to be generated
- **Hourly storage health report** - the hourly storage health report will be sent in the notification
- **Compute resource missing CPU flags** - a compute resource without CPU flags has been detected in the cloud
- **Compute resource status** - one of the compute resources in the cloud has changed its status to Online/Offline/Inactive
- **Compute resource group responsive** - an unresponsive compute zone has been detected in the cloud
- **Maintenance mode** - the Control Panel has been switched to maintenance mode
- **Reclaim baremetal compute resource** - a baremetal server has been deleted. It has been removed from the DB, but it may remain working. To fully remove the baremetal server it might be required to reboot the compute resource on which it was running.
- **Service addon event** - an event with custom message, which is used during creation of service add-on 'Raise event' action

- **System resources** - a hardware resource of the CP server is exhausted
- **Processes status** - deprecated option, it will be removed in the next version
- **Wrong activated logical volumes** - the system has detected VSS’s disks that are either activated on the wrong compute resource or on two compute resources simultaneously
Custom event - this is your custom event configured at Control Panel > Notifications > Event Types > Custom Event types tab

Internal server error - an internal server error occurred in the system

Pending approval - a transaction that requires approval has been requested

Approved - a transaction that requires approval has been approved

Declined - a transaction that requires approval has been declined

For information on how to edit and delete subscriptions refer to Manage Notifications.

33.7 Check Notifications Delivery

The Deliveries section shows all the notification deliveries in your cloud. If a subscription has a recipient list which contains multiple users, a separate delivery will be displayed for each of the recipients of the notification. At Control Panel > Admin > Notifications > Deliveries you can see the deliveries in your system with the following details:

Status - whether the notification was delivered. This status can indicate that the delivery is Complete, Running or Failed.

ID - the ID of the delivery

Subscription Name - the subscription within which this delivery was initiated. Click the label of the subscription to view its details.

Recipient - the user to whom the notification is to be delivered

Destination - the destination to which the notification was delivered: SMTP or SENDMAIL for email notifications and INTERNAL for notifications in CP

Date - the time when the notification was sent

For information on how to delete deliveries for a particular period of time refer to Manage Notifications.

33.8 View Internal Notifications in CP

Your Notifications are displayed as a bell near your Profile icon and contain the internal notifications received by your Control Panel. These notifications are configured at Control Panel > Admin > Notifications. The notification count includes only unread notifications. You can configure the amount of unread notifications at Control Panel > Admin > Notifications > Configuration. Each of the notifications is displayed with the following details:

Topic - the event about which the notification is sent

Message - the message of the notification. The message of an unread notification is displayed in bold. Click the message to view its full text. The notification will include the text generated by the alert and the text from the notification template.

Date - the time when the notification was delivered

For information on how to delete notifications for a particular period of time refer to Manage Notifications.
33.9 Manage Notifications

OnApp introduces new notifications functionality that fully replaces the previous email notifications set up at the Configuration page in CP. You can manage the following elements of the notification system:

- **Gateways** define what type of notifications will be sent: SMTP/SENDMAIL emails or internal notifications in CP.
- **Notification templates** determine the text of the messages your users will receive.
- **External recipients** are the contacts not registered in OnApp whom notification can be sent.
- **Recipients lists** include users whom certain notifications will be addressed.
- **Subscriptions** tie all your configurations together. After you set up subscriptions your users will start receiving notifications.

You can also [disable notifications](#) for your cloud and [delete](#) for a period of time.

You need to have messaging permissions enabled to manage notifications. For more information, refer to [List of all OnApp Permissions](#).

For information on configuring notifications for your cloud refer to [Notifications Setup](#).

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**On this page:**
- [Manage Gateways](#)
- [Manage Notification Templates](#)
- [Manage External Recipients](#)
- [Manage Recipients Lists](#)
- [Manage Subscriptions](#)
- [Delete Notification Data](#)
- [Disable Notifications](#)

**See also:**
- [OnApp Configuration](#)
- [Logs](#)
- [Sysadmin](#)
- [Alerts](#)
- [Notifications Setup](#)
33.9.1 Manage Gateways

Gateways are used when setting up a subscription and determine in what way users will be contacted: via email or internal notifications in CP. To view your gateways go to Control Panel > Admin > Notifications > Gateways. The page that loads shows your gateways with their names and the types of the gateways: SMTP, SENDMAIL or INTERNAL.

33.9.1.1 Edit Gateway

To edit a gateway:

Go to Control Panel > Admin > Notifications > Gateways

Click the Actions icon next to the required gateway and select Edit

Depending on the gateway's delivery method edit the following details:

For the SENDMAIL delivery method:

Label - the name for your new gateway. The name of the gateway should not contain any special characters.

From - the email address from which emails will be sent

Host - the server IP or URL

For the INTERNAL delivery method:

Label - the name for your new gateway. The name of the gateway should not contain any special characters.

For the SMTP delivery method:

Label - the name for your new gateway. The name of the gateway should not contain any special characters.

From - the email address from which emails will be sent

Host - the server IP or URL

Smtp address - address of the SMTP server

Smtp port - port of the SMTP server

Smtp domain - associated domain

Smtp user name - user name to login into SMTP server

Smtp password - password to login into SMTP server

Smtp authentication - select an authentication mechanism from a drop-down menu: plain, login or cram_md5

Smtp enable starttls auto - enable the STARTTLS extension

Verify certificate (if tls enabled) - enable if you want to verify your certificates or leave disabled if you want to skip verification during notifications delivery

Click Save to apply changes

33.9.1.2 Delete Gateway

To delete a gateway:

Go to Control Panel > Admin > Notifications > Gateways
Click the Actions icon new to the gateway you want to edit and select **Delete**

A gateway that is associated with at least one subscription cannot be deleted.

### 33.9.2 Manage Notification Templates

Notification templates include message texts that will be sent to your users via email or internal notifications in CP. There are two types of notification templates: system templates that come pre-installed with OnApp and cannot be deleted but only edited, and custom templates which you add to your cloud. To view your notification templates go to **Control Panel > Admin > Notifications > Notification Templates**. The page that loads shows your notification templates with their names, indicators whether this is a system or a custom template and the template's text. If a template contains a long message, only the beginning of the text will be displayed.

#### 33.9.2.1 Edit Notification Template

To edit a notification template:

Go to **Control Panel > Admin > Notifications > Notification Templates**.

Click the Actions icon next to the required template and select **Edit**.

On the page that loads you can edit the name and the text of the template. The name of the template should not contain any special characters. After editing the text you can save the changes or restore it to the default.

When editing a system template, you can configure if HTTP or HTTPS should used in the links sent in the notifications.

Click **Save** for the changes to take effect.

To edit system notification templates you need to have the the **Update notification template** permission enabled. You can also restore the message of a system template to default at **Control Panel > Admin > Notifications > Templates > Actions** icon > **Restore to default**.

If you add a '%{message}' text to the template, the notification will contain the full text of the event that is written into logs. If you add a '%{name}' text to the template, the notification will contain the name of the user who will receive the notification. You can set the %{message} and %{name} placeholders for almost any type of event, however, the following events will have the different placeholders available:

*federation new announcement* - `{label}` and `{period_for_federation_announcement}` placeholders.

*federation templates changed* - `{label}` placeholder.

For custom events you can only set the %{message} and %{name} placeholders.

#### 33.9.2.2 Delete Notification Template

To delete a notification template:

Go to **Control Panel > Admin > Notifications > Notification Templates**
Click the Actions icon next to the required template and select **Delete**

A notification template that is associated with at least one subscription cannot be deleted.

System notification templates for the reset password, account lock and transaction approval cannot be deleted.

### 33.9.3 Manage External Recipients

If you want to send notifications to emails that are not registered in your OnApp cloud you can add them to your External Recipients. Later these contacts can be added to recipients lists of users who will receive notifications about certain events.

To view the list of external recipients go to **Control Panel > Admin > Notifications > External Recipients**. The page that loads shows the added external contacts with their name and email.

#### 33.9.3.1 Edit External Recipients

To edit an external recipient:

Go to **Control Panel > Admin > Notifications > External Recipients**

Click the Actions icon next to the recipient you want to edit and select **Edit**.

On the page that loads, edit the recipient's name and email. The name of the recipient should not contain any special characters.

Click **Submit** to save changes

#### 33.9.3.2 Delete External Recipients

To delete an external recipient:

Go to **Control Panel > Admin > Notifications > External Recipients**.

Click the Actions icon next to the recipient you want to edit and select **Delete**. If you are attempting to delete an external recipient who is included into a recipients list, a confirmation window will appear.

### 33.9.4 Manage Recipients Lists

Recipients lists include the users whom you want to notify about certain events. To view your recipients lists go to **Control Panel > Admin > Notifications > Recipients Lists**. The page that loads shows all your recipients lists.

Click the name of the recipient list to view its list of users with their emails.

#### 33.9.4.1 Edit Recipients List

To edit a recipients list:

Go to **Control Panel > Admin > Notifications > Recipients Lists**
Click the Actions icon new to the list you want to edit and select **Edit**. Or just click the name of the required list.

On the page that loads you can change the name of the list and add new recipients. The name of the list should not contain any special characters. External recipients will also appear in the drop-down list. The page also shows the recipients that are already in the list at the top of the screen. You can delete recipients from the list by clicking the icon next to the required recipient.

Click **Update** to save changes.

### 33.9.4.2 Delete Recipients List

To delete a recipients list:

Go to **Control Panel > Notifications > Recipients Lists**

Click the Actions icon new to the list you want to edit and select **Delete**

A recipients list that is associated with at least one subscription cannot be deleted.

### 33.9.5 Manage Subscriptions

Using the **Subscriptions** section you determine who of your users are notified about which events. A subscription is the final step of a notifications configuration which ties together a recipients list, a gateway and a notification template. To view the list of subscriptions go to **Control Panel > Admin > Notifications > Subscriptions**.

Click the name of the subscription to view the gateways, recipients lists, events and templates associated with it.

#### 33.9.5.1 Edit Subscriptions

To edit a subscription:

Go to **Control Panel > Admin > Notifications > Subscriptions**.

Click the name of the subscription you want to edit.

Click the **Edit Subscription** button.

On the page that loads you can change the name of the subscription and add new recipients lists, events and gateways. You can add events by clicking the button and delete events from the list by clicking the icon next to the required event.

Click **Update** to save changes.

#### 33.9.5.2 Delete Subscriptions

Subscriptions determine who of your users are notified about which events and the type of the notification: email or internal notification in CP.
To delete a subscription:

Go to Control Panel > Admin > Notifications > Subscriptions

Click the Actions icon next to the required subscription and select Delete

33.9.6 Delete Notification Data

You can delete notification data, including events, deliveries and notifications for a particular period of time. To delete all notification data, you need to run the following command from the onapp user:

```
cd /onapp/interface
RAILS_ENV=production rake messaging:clean_notification_elements[2016-09-20,2016-09-23]
```

Change the dates in the example above to the ones you require and separate them by comma. The notification data is deleted for the period from the first date up to and including the second date you specify.

If the deletion of notification data fails, you can run the following command:

```
cd /onapp/interface
RAILS_ENV=production rake messaging:fix_events_data
```

After running this command, you can repeat the previous step to delete notification data.

33.9.7 Disable Notifications

If required, you can switch off notifications for your cloud. In this case all your configurations will be preserved but notifications will not be sent to users. You can switch notifications back on at any time.

To enable/disable notifications for your cloud:

Go to Control Panel > Admin > Notifications > Configuration

Move the Enable notifications slider to enable/disable notifications. By default, this option is disabled.

Click the Save Configuration button
34 Permissions List

The permissions are used to determine what the OnApp users are authorized to do within the cloud. OnApp uses role-based access to specify what users can view, edit, create or remove in OnApp. Each role is a set of permissions defined for the OnApp cloud that you can assign to specific users to control user access to the cloud settings.

To set the permissions:

Go to your Control Panel > Admin > Roles and Sets menu.

On the screen that follows, you'll see a list of all roles on your system on the following screen. Click the Actions button next to the relevant role, then click Edit.

Change the role's permissions for users as required, then click the Save button.

Now, you have a user with the customized set of Permissions. For OnApp administrators, this set includes access to a wider range of OnApp functionality. OnApp administrators can control users' ability to manage different components through the Control Panel's Roles menu.

The Permissions chapter comprises the complete list of OnApp cloud permissions as well as the default permissions for the Admin and User roles.

34.1 List of all OnApp Permissions

34.1.1 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

The list below includes all the permissions that can be set up in OnApp.

34.1.2 A

Accelerators

OnApp administrators can control users’ ability to manage accelerators through the Control Panel's Roles menu. You can set the following accelerator permissions for user roles:

Any action on Accelerators - the user can take any actions on accelerators
Change an owner of any Accelerator - the user can change the owner of any accelerator
Create a new Accelerator - the user can create a new accelerator
Destroy any Accelerator - the user can destroy any accelerator
Destroy own Accelerators - the user can destroy own accelerators
Migrate any Accelerator - the user can migrate any accelerator
Migrate own Accelerators - the user can migrate own accelerators
Any power action on Accelerators - the user can take any power-related action on accelerator
Any power action on own Accelerators - the user can take any power-related action on own accelerators
See all Accelerators - the user can see all accelerators
See own Accelerators - the user can see own accelerators
Rebuild Network on any Accelerator - the user can rebuild network on any accelerator
Rebuild Network on own Accelerators - the user can only rebuild network on own accelerators
Change Suspended status for any Accelerator - the user can change Suspended status for any accelerator
Unlock any Accelerator - the user can unlock any accelerator

Update any Accelerator - the user can update any accelerator

Update own Accelerators - the user can update own accelerators

For details, refer to the Accelerators section.

**Activity Logs**

OnApp administrators can control users’ ability to manage activity logs configuration through the Control Panel's Roles menu. The following activity logs for user roles can be set:

*Any action on Activity Logs* - the user can take any action on activity logs

*Destroy any Activity Logs* - the user can delete activity logs

*Destroy own Activity Logs* - the user can only delete their own activity logs

*See list of all Activity Logs* - the user can see list of all activity logs

*See list own Activity Logs* - the user can only see list of their own activity logs

*See all Activity Logs* - the user can see all activity logs

*See all own Activity Logs* - the user can only see their own activity logs

34.1.2.1 Application Servers

OnApp administrators can control users’ ability to manage application servers. This is handled through the Control Panel's Roles menu. You can set the following application servers permissions for user roles:

*Any action on application servers* – the user can take any action on application servers

*Change an owner of any application server* – the user can change the owner of any application server

*Create a new application server* – the user can create a new application server

*Destroy any application server* – the user can delete any application server. To delete any application server together with its backups, the user needs to have the *Destroy any backup* permission enabled. Otherwise, the backups of the application server deleted by the user will remain in the system.

*Destroy own application servers* – the user can only delete their own application servers. To delete an application server together with its backups, the user needs to have the *Destroy own backup* permission enabled. Otherwise, the backups of the application server deleted by the user will remain in the system.

*Migrate any application server* – the user can migrate any application server

*Migrate own application servers* – the user can only migrate their own application servers

*Any power action on application servers* – the user can take any power-related action on application servers

*Any power action on own application servers* – the user can only take power-related actions on their own application servers

*See all application servers* – the user can view any application server. If this permission is enabled, the user can manage applications deployed on any application server.

*See own application servers* – the user can only view their own application servers. If this permission is enabled, the user can manage applications deployed on their application servers

*Read VIP status* - the user can read VIP status of application servers.

*Rebuild Network on any application server* – the user can rebuild network of any application server
Rebuild Network on own application servers – the user can only rebuild network of own application server

Set VIP status - the user can set/delete VIP status for application servers

Change Suspended status for application server – the user can change Suspended status for an application server

Unlock any application server – the user can unlock any application server

Update any application server – the user can edit any application server

Update own application servers – the user can only edit their own application servers

For details, refer to the Application Servers section.

34.1.2.2 Approvals

OnApp administrators can control users’ ability to approve and decline transactions through the Control Panel’s Roles menu. The following permissions for transaction approvals can be set:

Any Actions on Approvals - the user can take any action on approvals

See all Approvals - the user can see if any of the transactions is pending for approval

Update any Approval - the user can approve or decline transactions

For details, refer to the Transaction Approvals section.

34.1.2.3 Autoscaling Configuration

OnApp administrators can control users’ ability to manage VS autoscaling configuration through the Control Panel's Roles menu. The following autoscaling permissions for user roles can be set:

Any Actions with Autoscaling Configuration - the user can take any action on autoscaling configuration

Create Autoscaling Configuration - the user can create autoscaling configuration

Destroy any Autoscaling Configuration - the user can delete autoscaling configuration

Destroy own Autoscaling Configuration - the user can only delete own autoscaling configuration

Read all Autoscaling Configuration - the user can read autoscaling configuration

Read own Autoscaling Configuration - the user can only read own autoscaling configuration

Update all Autoscaling Configuration - the user can edit autoscaling configuration

Update own Autoscaling Configuration - the user can only edit own autoscaling configuration

For details, refer to the Autoscale Virtual Server section.

Autoscaling Monitors

OnApp administrators can control users’ access to monitis monitors. You can set the following monitis monitors permissions for user roles:

Any Actions on relation autoscaling monitors - the user can perform any actions on relation monitis monitors

View autoscaling monitor information - the user can view monitis monitor information

For details, refer to the View Load Balancer Autoscaling Monitors section.
34.1.2.4 Auto-Backup Presets
OnApp administrators can control users’ ability to manage auto-backup presets configuration through the Control Panel’s Roles menu. The following auto-backup presets permissions for user roles can be set:

- **Any action on auto-backup presets** - the user can take any action on auto-backup presets that have been backed up automatically
- **See all auto-backup presets** - the user can see all auto-backup presets that have been backed up automatically
- **Update any auto-backup presets** - the user can edit any auto-backup presets that has been backed up automatically

For details, refer to the [Auto-Backup Presets Settings](#) section.

34.1.2.5 Availability
OnApp administrators can control users’ ability to access and manage the High Availability system via *Settings > HA Clusters*. The following permission for user roles can be set:

- **Any action on Availability settings** - a user can take any actions on High Availability general settings, hosts, clusters, communication rings, etc

For details, refer to the [High Availability](#) section.

34.1.3 B

34.1.3.1 Backups
OnApp administrators can control users’ ability to manage backups through the Control Panel’s Roles menu. You can set the following backup permissions for user roles:

- **Any action on backups** - the user can take any action on any backup
- **Convert any backup to template** - the user can take any backup of any virtual server, and convert it to a template
- **Convert own backup to template** - the user can only convert their own backups to templates
- **Create backup for any VS** - the user can create a backup of any virtual server
- **Create backup for own VS** - the user can only create backups of their own virtual servers
- **Destroy any backup** - the user can delete any backup. To delete any virtual server together with its backups, the user needs to have this permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.
- **Destroy own backup** - the user can only delete their own backups. To delete own virtual server together with its backups, the user needs to have this permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.
- **See all backups** - the user can see all backups
- **See own backups** - the user can only see their own backups
- **Update any backup** - the user can edit any backup
- **Update own backup** - the user can only edit their own backups

For details, refer to the [Virtual Server Backups](#) section.

34.1.3.2 Backup Resources
OnApp administrators can control users ability to manage backup resources through the Control Panel's Roles menu. You can set the following backup resources permissions for user roles:
Any action on backup resources - the user can take any action on backup resources
Create backup resource - the user can create a backup resource
Delete any backup resource - the user can delete any backup resource
See any backup resource - the user can see any backup resource
Update any backup resource - the user can edit any backup resource

For details, refer to the Create and Manage Backup Resources section.

34.1.3.3 Backup Resource Zones
OnApp administrators can control users ability to manage backup resource zones through the Control Panel's Roles menu. You can set the following backup resource zones permissions for user roles:
Any action on backup resource zones - the user can take any action on backup resource zones
Create backup resource zone - the user can create a backup resource zone
Delete any backup resource zone - the user can delete any backup resource zone
See any backup resource zone - the user can see any backup resource zone
Update any backup resource zone - the user can edit any backup resource zone

For details, refer to the Create and Manage Backup Resource Zones section.

Backup Resource Auto Backup Presets
OnApp administrators can control users ability to manage auto backup presets for backup resources through the Control Panel's Roles menu. You can set the following auto backup presets permissions for user roles:
Any action on auto backup presets - the user can take any action on auto backup presets
Create auto backup preset - the user can create an auto backup preset
Delete any auto backup preset - the user can delete any auto backup preset
See any auto backup preset - the user can see any auto backup preset
Update any auto backup preset - the user can edit any auto backup preset

For details, refer to the Create and Manage Auto Backup Presets section.

34.1.3.4 Backup Servers
OnApp administrators can control users' ability to manage backup servers through the Control Panel's Roles menu. You can set the following backup server permissions for user roles:
Any action on Backup servers - the user can take any action on any Backup server
Add a new Backup server - the user can add a Backup server
Delete any Backup server - the user can delete any Backup server
See all Backup servers - the user can see all Backup servers
Update any Backup server - the user can edit any Backup server

For details, refer to the Backup Servers Settings section.
A
Accelerators
Activity Logs
Application Servers
Approvals
Autoscaling Configuration
Autoscaling Monitors
Auto-Backup Presets
Availability
B
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34.1.4 Backup Server Zones

OnApp administrators can control users' ability to manage backup server zones through the Control Panel's Roles menu. The following backup server zone permissions for user roles can be set:

- **Any action on backup server zones** - the user can take any action on backup server zones
- **Create a new backup server zone** - the user can create a new backup server zone
- **Delete any backup server zone** - the user can delete any backup server zone
- **See list of all backup server zones** - the user can see list of all backup server zones
- **See details of any backup server zone** - the user can see details of any backup server zone
- **Update any backup server zone** - the user can edit any backup server zone

For details, refer to the Backup Server Zones Settings section.

34.1.4.1 Base Resources

OnApp administrators can control users' ability to manage bucket resources through the Control Panel's Roles menu. You can set the following base resource permissions for user roles:

- **Any action on resources** - the user can take any action on base resources
- **Create a new resource** - the user can create a new base resource
- **Delete any resource** - the user can delete any base resource
- **See list of all resources** - the user can see list of all base resources
- **See details of any resource** - the user can see details of any base resource
34.1.4.2 Blueprints
OnApp administrators can control users' ability to manage blueprints through the Control Panel's Roles menu. You can set the following blueprint permissions for user roles:

- Any action on Blueprints - the user can take any action on any blueprint
- Create a new blueprint - the user can create a new blueprint
- Destroy any blueprint - the user can delete any blueprint
- Deploy any blueprint - the user can deploy any blueprint
- Deploy own blueprint - the user can deploy own blueprint
- See all blueprints - the user can view all blueprints
- Read own blueprint - the user can read own blueprints
- Update any blueprint - the user can edit any blueprint
- Update own blueprint - the user can edit own blueprints

For details, refer to the Blueprints section.

Blueprint Groups
OnApp administrators can control users' ability to manage blueprint groups through the Control Panel's Roles menu. You can set the following blueprint groups permissions for user roles:

- Any action on Blueprint Groups - the user can take any action on blueprint groups
- Create a new Blueprint Group - the user can create a new blueprint group
- Destroy any Blueprint Group - the user can delete a blueprint group
- See all Blueprint Groups - the user can view all blueprint groups
- Update any Blueprint Group - the user can edit any blueprint group

For details, refer to the Blueprint Groups section.

Buckets
OnApp administrators can control users' ability to manage buckets through the Control Panel's Roles menu. You can set the following bucket permissions for user roles:

- Any action on buckets - the user can take any action on any bucket
- Create a new bucket - the user can create a new bucket
- Delete any bucket - the user can delete any bucket
- See list of all buckets - the user can see list of all buckets
- See details of any bucket - the user can see details of any bucket
- See own bucket - the user can only see own bucket
- Update any bucket - the user can edit any bucket

For details, refer to the Buckets section.
34.1.5 C

34.1.5.1 CloudBoot
Manage CloudBoot configurations - the user can manage Cloud Boot settings

34.1.5.2 Compute Resources
OnApp administrators can control users' ability to manage Compute resources. This is handled through the Control Panel's Roles menu. You can set the following Compute resource permissions for user roles:

Any action on Compute resources - the user can take any action on Compute resources
Create a new Compute resource - the user can create a new Compute resource
Destroy any Compute resource - the user can delete any Compute resource
Set maintenance mode for any compute resource - the user can set maintenance mode for any Compute resource
See all Compute resources - the user can see all Compute resources
Show Compute resources on Virtual Server creation - display Compute resources on Add New Virtual Server screen. Note: the See All Compute resources permission must be enabled for this permission to work properly.
Reboot any Compute resource - the user can reboot any Compute resource
Enable/Disable Storage-related services - the user can enable and disable the storage-related services for any compute resource
Manage auto import rules - the user can manage auto import rules for any compute resource
Update any Compute resource - the user can edit any Compute resource

For details, refer to the Compute Resource Settings section.

34.1.5.3 Compute Resource Devices
OnApp administrators can control users' ability to manage compute resource devices. This is handled through the Control Panel's Roles menu. You can set the following compute resource devices permissions for user roles:

Any action on Compute Resource Devices - the user can take any action on compute resource devices
See all Compute Resource Devices - the user can see all compute resource devices
Update any Compute Resource Device - the user can edit any compute resource device

34.1.5.4 Compute Zones
OnApp administrators can control users' ability to manage Compute zones. This is handled through the Control Panel's Roles menu. You can set the following Compute zone permissions for user roles:

Any action on Compute zones - the user can take any action on Compute zones
Create a new Compute zone - the user can create a new Compute zone
Delete any Compute zone - the user can delete any Compute zone
See list of all Compute zones - the user can see list of all Compute zones
See details of any Compute zone - the user can see details of any Compute zone

Show Compute Zones on Virtual server creation - display Compute zones on Add New Virtual Server screen. Note: the See Details of any Compute Zone permission must be enabled for this permission to work properly.

Manage recipes for Compute zone - the user can manage recipes for any Compute zone

Update any Compute zone - the user can edit any Compute zone

For details, refer to the Compute Zones Settings section.

34.1.5.5 Container Servers

OnApp administrators can control users' ability to manage container servers. This is handled through the Control Panel's Roles menu. You can set the following company control server permissions for user roles:

Any action on container servers - the user can take any actions on container servers

Build/rebuild any container server - the user can build/rebuild any container server

Build/rebuild user's own container server - the user can build/rebuild his own container server

Change an owner of any container server - the user can change the owner of any container server

Console to any container server - the user can access any container server via console

Console to own container server - the user can only access their own container server via console

Allow user to set CPU topology - the user can set CPU topology options for container server

Create a new container server - the user can create a new container server

Destroy any container server - the user can destroy any container server

Destroy own container servers - the user can destroy own container servers

Edit any container server's cloud config - the user can edit any container server's cloud config

Edit own container server's cloud config - the user can only edit their own container server's cloud config

Migrate any container server - the user can migrate any container server

Migrate own container servers - the user can migrate own container servers

Any power action on container servers - the user can take any power-related action on container server

Any power action on own container servers - the user can take any power-related action on own container servers

See all container servers - the user can see all container servers

See own container servers - the user can see own container servers

Read container server's root password - the user can read container server's root password

Read own container server's root password - the user can read own container server's root password

Read VIP status - the user can read VIP status of container servers

Rebuild network of any container server - the user can rebuild network of any container server

Rebuild network of own container server - the user can only rebuild network of own container server

Manage recipes joins for all container servers - the user can manage recipes joins for all container servers
Manage recipes joins for own container servers - the user can manage recipes joins for own container servers

Reset root password to any container server - the user can reset the root password for any container server

Reset root password to own container server - the user can only reset the root password for their own container servers

Set VIP status - the user can set/delete VIP status for container servers

Change Suspended status for container server - the user can change Suspended status for any container server

Unlock any container server - the user can unlock any container server

Update any container server - the user can update any container server

Update own container servers - the user can update own container servers

For details, refer to the Container Servers section.

34.1.5.6 Control Panel

Manage recipes for Control Panel - the user can manage recipes for any Control Panel

This permission will not be granted by pressing Full access button while editing the list of Permissions in the Roles section and can only be selected manually.

34.1.5.7 CPU Quota

OnApp administrators can control users' ability to manage CPU quota. You can set the following CPU quota permissions for user roles:

Manage CPU Quota - the user can enable/disable/edit CPU quota. Editing includes setting the default value of CPU quota on the compute resource level and editing the custom value on the virtual server level.

For details, refer to the Set Default CPU Quota section.

Currencies

OnApp administrators can control users' ability to manage currency through the Control Panel's Roles menu. You can set the following currency permissions for user roles:

Any action on Currencies - the user can take any action on currencies

Create new Currency - the user can create a new currency

Delete any Currency - the user can delete any currency

See list of all Currencies - the user can view any currency

Update all Currencies - the user can update any currency

For details, refer to the Currencies section.
34.1.5.8 Custom Fields

OnApp administrators can control users' ability to manage the Hardware Info custom fields. You can set the following custom fields permissions for user roles:

*Any actions on Custom Fields* - the user can take any action on custom fields

For details, refer to the Hardware Info section.

34.1.6 Dashboard

34.1.6.1 Dashboard

OnApp administrators can control users' access to the dashboard through the Control Panel's Roles menu. You can set the following dashboard permissions for user roles:

*All actions on Dashboard* - the user can see all available dashboard actions

*See Alerts* - the user can see alerts on the dashboard, including zombie VSs and transactions, and background processes

*See Global Statistic* - the user can see Global Dashboard statistics

*See License Details* - the user can see Dashboard Cloud Licenses' details

*Show cloud dashboard* - the user can see the cloud details on the dashboard

For details, refer to the Dashboard section.

Data Stores

OnApp administrators can control user access to datastore management. You can set the following data store permissions for user roles:

*Any action on data_stores* - the user can take any action on data stores

*Create a new data_store* - the user can create a new data store

*Destroy any data_store* - the user can delete any data store

*See all data_stores* - the user can see all data stores

*Show Data Stores on Virtual Server creation* - the user can see data stores in the VS creation wizard

*Update any data_store* - the user can edit any data store

For details, refer to the Data Stores Settings section.

Data Store Joins

OnApp administrators can control users' ability to manage data store joins through the Control Panel's Roles menu. You can set the following data store joins permissions for user roles:

*All actions on datastores on Compute resource* - the user can take any action on data stores attached to a Compute resource

*Add Data Store to any Compute resource* - the user can add a data store to any Compute resource

*Remove Data Store from any Compute resource* - the user can detach a data store from any Compute resource

For details, refer to Manage Compute Zone Data Stores section.
## Data Store Zones

OnApp administrators can control user access to data store zones management. You can set the following data store zone permissions for user roles:

- **Any action on data store zones** - the user can take any action on data store zones
- **Create a new data store zone** - the user can create a new data store zone
- **Delete any data store zone** - the user can delete any data store zone
- **See list of all data store zones** - the user can see list of all data store zones
- **See details of any data store zone** - the user can see details of any data store zone
- **Show Data Store Zones on Virtual Server creation** - the user can see data store zones in the VS creation wizard
- **Update any data store zone** - the user can edit any data store zone

For details, refer to the [Data Store Zones Settings](#) section.

## Disks

OnApp administrators can control user access to disks management. You can set the following disks permissions for user roles:

- **Any action on disks** - the user can take any action on disks
- **Assign any disk to VS** - the user can assign the disks of any users to another VS of that user
- **Assign own disk to VS** - the user can assign own disks to another own VS
- **Auto-backup for any disk** - the user can schedule an automatic backup on any disk
- **Auto-backup for own disk** - the user can only schedule automatic backups on their own disks
- **Create a new disk** - the user can create a new disk
- **Destroy any disk** - the user can delete any disk
- **Destroy own disk** - the user can only delete their own disks
- **Migrate any disk** - the user can migrate any disk
- **Migrate own disks** - the user can only migrate their own disks
- **See all disks** - the user can see all disks
- **See own disks** - the user can only see their own disks
- **Unlock any disk** - the user can unlock any disk
- **Update any disk** - the user can edit any disk
- **Update own disk** - the user can only edit their own disks

For details, refer to the [Virtual Server Disks](#) section.

## DRaaS

OnApp administrators can control users' ability to manage DRaaS through the Control Panel's Roles menu. You can set the following DRaaS permissions for user roles:

- **Any action related to DRaaS** - the user can take any action related to DRaaS
34.1.7 E

34.1.8 F

34.1.8.1 Federation
OnApp administrators can control users' ability to access federated resources through the Control Panel's Roles menu. You can set the following federation permissions for user roles:

- **Any actions on federation resources** - the user can perform any action on federated resources
- **Add Compute zone to federation** - the user can add Compute zone to federation
- **View unsubscribed federation resources** - the user can view unsubscribed federation resources
- **Remove Compute zone from federation** - the user can remove Compute zone from federation
- **Activate or deactivate Compute zone for federation** - the user can activate or deactivate Compute zone for federation
- **Subscribe to the Compute zone** - the user can subscribe to the Compute zone
- **Unsubscribe from the Compute zone** - the user can unsubscribe from the Compute zone

For details, refer to the Federation section.

34.1.8.2 Federation Failed Action
OnApp administrators can control users' ability to manage federated VSs failed actions through the Control Panel's Roles menu. You can set the following federated VSs failed actions permissions for user roles:

- **Any actions on federation failed actions** - the user can perform any action on failed actions
- **Clean all federation failed actions** - the user can clean all failed actions
- **Clean own federation failed actions** - the user can clean only those failed actions that refer to theVSs they have built
- **Read all federation failed actions** - the user can view all failed actions
- **Read own federation failed actions** - the user can view only those failed actions that refer to theVSs they have built

34.1.8.3 Firewall Rules
OnApp administrators can control users' ability to manage firewall rules through the Control Panel's Roles menu. You can set the following firewall rules permissions for user roles:

- **Any Action on Firewall Rules** - the user can take any actions with firewall rules
- **Create Firewall Rules for anyone** - the user can create firewall rules for anyone
- **Create own Firewall Rules** - the user can only create own firewall rules
- **Destroy any Firewall Rules** - the user can delete any firewall rules
- **Destroy own Firewall Rules** - the user can only delete own firewall rules
- **Read all Firewall Rules** - the user can read all firewall rules
- **Read own Firewall Rules** - the user can only read own firewall rules
- **Update all Firewall Rules** - the user can edit all firewall rules
- **Update own Firewall Rules** - the user can only edit own firewall rules

For details, refer to the Set Virtual Server Firewall Rules section.
34.1.9 G

34.1.9.1 Global Search
OnApp administrators can control user access to global search. You can set the following global search for user roles:

- Global search - global search through the whole database

For details, refer to the Cloud Search Tool section.

34.1.9.2 Groups
This set of permissions is reserved for future use and currently is not used. Enabling or disabling those permissions will not affect the system in any way.

34.1.10 H

34.1.10.1 Hardware Info
OnApp administrators can control user access to hardware information that is available for all compute resources and backup servers in the Settings menu. The access to the Hardware Info page for a particular compute resource or backup server is controlled under the See all compute resources/See all backup servers and Update any compute resource/Update any backup server permissions.

You can set the following hardware info permissions for user roles:

- See all Hardware Info - the user can see all hardware information in the Settings menu

For details, refer to the Hardware Info section.

34.1.10.2 Help
OnApp administrators can control user access to help section.

- All actions on Help - the user can take any action under the Help menu
- Send Support requests - the user can send support requests from the Help menu

For details, refer to the Help chapter.

34.1.10.3 HTTP Caching Rules
OnApp Administrators can control user's ability to manage HTTP Caching rules. You can set the following permissions:

- Any actions on http caching rules - the user can create/delete/set rules/edit rules.
- Create http caching rules - the user can only create HTTP caching rules.
- Delete http caching rules - the user can remove HTTP caching rules.
- Update http caching rules - the user can edit http caching rules.

34.1.11 I

34.1.11.1 Instance Packages
OnApp administrators can control user access to instance packages. You can set the following permissions for user roles:

- Any action on instance packages - the user can take any action on instance packages
- Create instance package - the user can create new instance packages
- Delete any instance package - the user can delete any instance package
- See all instance packages - the user can see all instance packages
Update any instance package - the user can update any instance package
For details, refer to the Instance Packages section.

34.1.11.2 Internationalization
Edit Internationalization Locales - the user can view and edit all non-English language phrases
For details, refer to the Localization and Customization section.

34.1.11.3 IO Limiting
OnApp administrators can control user access to IO limiting.
Any actions on IO limits - the user can take any action on IO limits
Update any IO limits - the user can update IO limits for any disks and data stores
Update own IO limits - the user can update IO limits for own disks
For details on IO limiting, refer to the Edit Data Store IO Limits section.

34.1.11.4 IO Statistics
OnApp administrators can control user access to IOPS statistics.
Full access to IO Statistics - the user has full access to IO Statistics
See all IO Statistics - the user can see all IO Statistics
See own IO Statistics - the user can see own IO Statistics
For details on IO Statistics, refer to the View Disk IOPS section.

34.1.11.5 IP Addresses
OnApp administrators can control users' ability to manage IP addresses. This is handled through the Control Panel's Roles menu. You can set the following IP address permissions for user roles:
Any action on IP addresses - the user can take any action on IP addresses
Assign IP address to user - the user can assign IP address to user
Create a new IP address - the user can create a new IP address
Destroy any IP address - the user can delete any IP address
See all IP addresses - the user can see all IP addresses
Unassign IP address from user - the user can unassign IP address from user
Update any IP address settings - the user can edit any IP address settings
For details, refer to the Assign/Unassign IP Address to User section.

34.1.11.6 IP Nets
OnApp administrators can control users' ability to manage IP nets. This is handled through the Control Panel's Roles menu. You can set the following IP nets permissions for user roles:
All actions on IP Nets - the user can take any action on IP net
Add IP Nets to any network - the user can add an IP net to any network
Add IP net to own networks - the user can only add IP net to their own networks
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Remove IP Nets from any network - the user can remove an IP net from any network
Remove IP nets from own networks - the user can only remove IP net from their own networks
View IP Nets assigned to any network - the user can see IP nets assigned to any network
View IP nets assigned to own networks - the user can only see IP nets assigned to their own networks
Update IP Nets - the user can edit IP nets
Update IP nets in own networks - the user can edit IP nets only in their own network

For details, refer to Create and Manage IP Nets section.

34.1.11.7 IP Ranges
OnApp administrators can control users' ability to manage IP ranges. This is handled through the Control Panel's Roles menu. You can set the following IP ranges permissions for user roles:

All actions on IP Ranges - the user can take any action on IP ranges
Add IP Ranges to any IP Net - the user can add an IP range to any IP net
Add IP Ranges to own IP Nets - the user can only add IP range to their own IP nets
Remove IP Ranges from any IP Net - the user can remove an IP range from any IP net
Remove IP Ranges from own IP Nets - the user can only remove IP range from their own IP nets
View IP Ranges assigned to any IP Net - the user can see IP ranges assigned to any IP net
View IP Ranges assigned to own IP Nets - the user can only see IP ranges assigned to their own IP nets
Update IP Ranges - the user can edit all IP ranges
Update IP Ranges in own network - the user can edit IP ranges only in their own network

For details, refer to Create and Manage IP Ranges section.

34.1.11.8 ISOs
OnApp administrators can control users' ability to manage ISOs. This is handled through the Control Panel's Roles menu. You can set the following ISO permissions for user roles:

Any action on ISOs - the user can take any action on ISOs
Create a new ISO - the user can create a new ISO
Destroy any ISO - the user can delete any ISO (own, user, and public)
Destroy own ISO - the user can only delete own ISO
Destroy user ISO - the user can delete ISOs created by any user, but not public ISOs
Make any ISO public - the user can make public any ISO available to all users
Make own ISO public - the user can make public own ISOs only
Make user ISO public - the user can make public ISOs created by any user
Create and manage own ISOs - the user can create and edit/delete/view own ISOs
Manage all ISOs - the user can manage own/user/public ISOs
Create and manage user ISOs - the user can view/create/edit/delete ISOs created by any user
See all ISOs - the user can view all ISOs in the cloud
See own ISOs - the user can only view the ISOs created by themselves
See all public ISOs - the user can view all public ISOs
See user ISOs - the user can view the ISOs created by any user in the cloud
Update any ISO - the user can edit any ISO in the cloud
Update own ISO - the user can only edit own ISO
Update user ISO - the user can edit the ISOs created by any user in the cloud
For details, refer to the ISOs section.

34.1.12 J

34.1.13 K

34.1.14 L

34.1.14.1 Last Access Log
OnApp administrators can control users access to logs. You can set the following last access log permissions for user roles:
Any action on last access log - the user can perform any action on last access log of any user
See the last access log of any user - the user can see the last access log of other users
See own last access log - the user can only see their own last access log

34.1.14.2 Load Balancers
OnApp administrators can control users' ability to manage load balancers. This is handled through the Control Panel's Roles menu. You can set the following load balancer permissions for user roles:
Any action on load balancer - the user can take any action on load balancer
Migrate any load balancer - the user can migrate any load balancer
Migrate own load balancer - the user can only migrate their own load balancer

To migrate a load balancer, you need to have both the Migrate any/own load balancer and See details of any/own load balancing cluster permissions enabled.

For details, refer to the Load Balancers section.

34.1.14.3 Load Balancing Clusters
OnApp administrators can control users' ability to manage load balancing clusters. This is handled through the Control Panel's Roles menu. You can set the following load balancing cluster permissions for user roles:
Any action on load balancing cluster - the user can make any action on relation load balancing
Configure autoscale out parameter of load balancing cluster - the user can configure Autoscale Out when creating/updating a load balancing cluster
Create a new load balancing cluster - the user can create a new load balancing cluster
Delete any load balancing cluster - the user can delete any load balancing cluster
Delete own load balancing cluster - the user can only delete own load balancing clusters
See details of any load balancing cluster - the user can see details of any load balancing cluster

See details of own load balancing cluster - the user can only see details of own load balancing cluster

Change any load balancing cluster - the user can make changes on any load balancing cluster

Change own load balancing cluster - the user can only change own load balancing cluster

For details, refer to the Load Balancers section.

34.1.14.4 Location Groups
OnApp administrators can control users’ ability to manage location groups. You can set the following location groups permissions for user roles:

Any action on location groups - the user can take any action on location groups

Create a new location group - the user can create a new location group

Delete any location group - the user can attempt to delete location group

See all location groups - the user can see details of any location group

Refresh location groups - the user can refresh location groups

For details, refer to the Location Groups section.

34.1.14.5 Log Items
OnApp administrators can control users’ ability to manage log items. You can set the following log items permissions for user roles:

Any action on log items - the user can take any action on log items

Delete any log item - the user can delete any log item

Delete own log item - the user can only delete their own log items

See list of all log items - the user can see all log items

See list of own log items - the user can only see their own log items

See details of any log item - the user can see details of any log item

See details of own log item - the user can only see details of their own log items

For details, refer to the Logs section.

34.1.15 M

34.1.15.1 Media
OnApp administrators can control users’ ability to manage Media files through the Control Panel’s Roles menu. You can set the following media permissions for user roles:

Any action on Media - the user can take any action on media files

Delete any Media - the user can delete any media files

See any Media - the user can view any media files

Update any Media - the user can edit any media files

34.1.15.2 Messaging: Deliveries
OnApp administrators can control users’ access to messaging deliveries. You can set the following messaging deliveries permissions for user roles:
Any action on deliveries - the user can perform any action on deliveries
See all deliveries - the user can see all deliveries
For details, refer to the Notifications Setup section.

34.1.15.3 Messaging: Events
OnApp administrators can control users’ access to messaging events. You can set the following messaging events permissions for user roles:
Any action on events - the user can perform any action on messaging events
Add a new event - the user can add new messaging events
See all events - the user can see all messaging events
For details, refer to the Notifications Setup section.

34.1.15.4 Messaging: External Recipients
OnApp administrators can control users’ access to external recipients. You can set the following external recipients permissions for user roles:
Any action on external recipients - the user can perform any action on external recipients
Add a new external recipient - the user can add new external recipients
Delete external recipient - the user can delete any external recipients
See all external recipients - the user can see all external recipients
Update external recipients - the user can edit any external recipients
For details, refer to the Notifications Setup section.

34.1.15.5 Messaging: Gateways
OnApp administrators can control users’ access to messaging gateways. You can set the following messaging gateways permissions for user roles:
Any action on gateways - the user can perform any action on gateways
Add a new gateway - the user can add new messaging gateways
Delete gateway - the user can delete any messaging gateways
See all gateways - the user can see all messaging gateways
Update gateway - the user can edit any messaging gateways
For details, refer to the Notifications Setup section.

34.1.15.6 Messaging: Notifications
OnApp administrators can control users’ access to messaging notifications. You can set the following messaging notifications permissions for user roles:
Any action on notifications - the user can perform any action on notifications
See own notifications - the user can see only own notifications
For details, refer to the Notifications Setup section.

34.1.15.7 Messaging: Notification Templates
OnApp administrators can control users’ access to messaging notification templates. You can set the following messaging notification templates permissions for user roles:
Any action on notification templates - the user can perform any action on notification templates
Add a new notification template - the user can add new notification templates
Delete notification template - the user can delete any notification templates
See all notification templates - the user can view all notification templates
Update notification template - the user can edit any notification templates
For details, refer to the Notifications Setup section.

34.1.15.8 Messaging: Recipients Lists
OnApp administrators can control users’ access to recipients lists. You can set the following recipients lists permissions for user roles:
Any action on recipients lists - the user can perform any action on recipients lists
Add a new recipients list - the user can add new recipients lists
Delete recipients lists - the user can delete any recipients lists
See all recipients lists - the user can see all recipients lists
Update recipients lists - the user can update any recipients lists
For details, refer to the Notifications Setup section.

34.1.15.9 Messaging: Subscriptions
OnApp administrators can control users’ access to messaging subscriptions. You can set the following subscriptions permissions for user roles:
Any action on recipients subscriptions - the user can perform any action on messaging subscriptions
Add a new subscription - the user can add new messaging subscriptions
Delete subscription - the user can delete any subscriptions
See all subscriptions - the user can view all subscriptions
For details, refer to Notifications Setup section.

34.1.15.10 Monthly User Billing Statistics
OnApp administrators can control users’ access to monthly user billing statistics. You can set the following user monthly bills permissions for user roles:
Full access to user Monthly Bills Statistics - the user has full access to user monthly bills statistics
See all Monthly user Bills Statistics - the user can see all user monthly bills statistics
See only own user Monthly Bills Statistics - the user can only see own user monthly bills statistics

34.1.15.11 Monthly User Group Billing Statistics
OnApp administrators can control users’ access to monthly user group billing statistics. You can set the following user group monthly bills permissions for user roles:
Full access to user group Monthly Bills Statistics - the user has full access to user group monthly bills statistics
See all Monthly user group Bills Statistics - the user can see all user group monthly bills statistics
See only own user group Monthly Bills Statistics - the user can only see own user group monthly bills statistics
34.1.16 Nameservers

OnApp administrators can control users' ability to manage name servers. This is handled through the Control Panel's Roles menu. You can set the following nameservers permissions for user roles:

- **Any action on nameservers** - the user can take any action on nameservers
- **Create a new nameserver** - the user can create a new nameserver
- **Destroy any nameserver** - the user can delete any nameserver
- **See all nameservers** - the user can see all nameservers
- **Update any nameserver settings** - the user can edit any nameserver

34.1.16.2 Networks

OnApp administrators control how users can manage networks. This is handled through the Control Panel's Roles menu. You can set the following network permissions for user roles:

- **Any action on networks** - the user can take any action on networks
- **Add new network** - the user can create a new network. This permission also controls the user's ability to create IP nets and IP ranges.
- **Delete network** - the user can delete a network
- **Show Networks on Virtual Server creation** - the user can see networks in a VS creation wizard
- **See all networks** - the user can see all networks
- **See all own networks** - the user can see all own networks
- **Update networks** - the user can edit any network

Network Joins

OnApp administrators can control users' ability to manage network joins through the Control Panel's Roles menu. You can set the following network joins permissions for user roles:

- **All actions on network joins** - the user can attach or detach all/own networks to a compute resource or a compute zone
- **Attach network to any compute resource or a compute zone** - the user can attach all/own networks to any compute resource or a compute zone
- **Detach network from any compute resource or a compute zone** - the user can detach all/own networks from any compute resource or a compute zone

For details, refer to the Manage Compute Zone Networks section.

34.1.16.3 Network Zones

OnApp administrators control a user's ability to manage network zones. This is handled through the Control Panel's Roles menu. You can set the following network zone management permissions for user roles:

- **Any action on network zones** - the user can take any action on network zones
- **Create a new network zone** - the user can create a new network zone
- **Delete any network zone** - the user can delete any network zone
- **Show Network Zones on Virtual Server creation** - the user can see network zones in a VS creation wizard
- **See list of all network zones** - the user can see list of all network zones
See details of any network zone - the user can see details of any network zone
Update any network zone - the user can update any network zone
For details, refer to the Network Zones Settings section.

34.1.17 O

34.1.17.1 OnApp Storage
Manage OnApp storage - the user can access the OnApp storage settings
Override Integrated Storage cache settings - the user can override Integrated Storage cache settings

34.1.17.2 OAuth Providers
OnApp administrators can control users' ability to manage OAuth providers through the Control Panel's Roles menu. You can set the following OAuth providers permissions for user roles:
Any action on OAuth providers - the user can take any action on OAuth providers
See all OAuth providers - the user can see all configured OAuth providers
Update any OAuth provider - the user can edit any OAuth provider
For details, refer to the User Profile section.

34.1.17.3 OVAs
OnApp administrators can control users' ability to manage OVAs. This is handled through the Control Panel's Roles menu. You can set the following OVA permissions for user roles:
Any action on OVAs - the user can take any action on OVAs
Create a new OVA - the user can create a new OVA
Destroy any OVA - the user can delete any OVA (own, user, and public)
Destroy own OVA - the user can only delete own OVA
Destroy user OVA - the user can delete OVAs created by any user, but not public OVAs
Make any OVA public - the user can make public any OVA available to all users
Make own OVA public - the user can make public own OVAs only
Create and manage OVAs - the user can create and edit/delete/view OVAs
Manage public OVAs - the user can manage public OVAs
Create and manage user OVAs - the user can view/create/edit/delete OVAs created by any user
See all OVAs - the user can view all OVAs in the cloud
See own OVAs - the user can only view the OVAs created by themselves
Read all public OVAs - the user can view all public OVAs
See user OVAs - the user can view the OVAs created by any user in the cloud
Unlock any OVA - the user can unlock any OVA that is currently being converted
Update any OVA - the user can edit any OVA in the cloud
Update own OVA - the user can only edit own OVA
Update user OVA - the user can edit the OVAs created by any user in the cloud
Manage System Service Add-ons - the user can manage all the system service add-ons in the cloud
Manage own System Service Add-ons - the user can manage system service add-ons assigned to the user's own OVAs

For details, refer to the OVAs section.

34.1.18 P

34.1.18.1 Payments
OnApp administrators control how users can manage payments. This is handled through the Control Panel's Roles menu. You can set the following payments permissions for user roles:

- Any action on payments - the user can take any action on payments
- Create a new payment - the user can create a new payment
- Destroy any payment - the user can delete any payment
- See all payments - the user can see all payments
- See own user payments - the user can only see their own user payments
- Update any payment - the user can edit any payment

For details, refer to the User Payments section.

34.1.18.2 Permissions
OnApp administrators control a user's ability to manage permissions. This is handled through the Control Panel's Roles menu.

- Any action on permissions - the user can take any action on permissions
- Create a new permission - the user can grant a new permission
- Destroy any permission - the user can revoke any permission
- See all permissions - the user can see all permissions
- Update any permission - the user can edit any permission

34.1.18.3 Provider Resource Pools
OnApp administrators control how users can manage provider resource pools. This is handled through the Control Panel's Roles menu. You can set the following provider resource pool permissions for user roles:

- Any action on Provider Resource Pools - the user can take any action on provider resource pools
- Read any Provider Resource Pool - the user can see the list of all provider resource pools

34.1.19 Q

34.1.20 R

34.1.20.1 Recipes
OnApp administrators control a user's ability to manage recipes. This is handled through the Control Panel's Roles menu.

- Any actions on Recipes - the user can take any action on recipes
- Create new Recipes - the user can create new recipes
Delete any Recipe - the user can delete any recipe

Delete own Recipes - the user can delete own recipes

Edit any Recipe - the user can edit any recipe

Edit own Recipes - the user can edit own recipes

Read any Recipe - the user can read any recipe

Read own Recipes - the user can read own recipes

For details, refer to the Recipes section.

34.1.20.2 Recipe Groups
Any action on recipe groups - the user can take any action on recipe groups
Create a new recipe group – the user can create a new recipe group
Destroy any recipe group - the user can delete any recipe group
See list of all recipe groups – the user can view the list of recipe groups
See all recipe groups – the user can view any recipe group details
Update any recipe group – the user can edit all recipe groups

For details, refer to the Recipe Groups section.

34.1.20.3 Recipe Group Relations
Any action on recipe group relations - the user can take any action on recipe relation group
Create a new recipe group relation - the user can create a new recipe relation group
Destroy any recipe group relation - the user can delete any recipe relation group
See list of all recipe group relations - the user can view the list recipe relation groups
See all recipe group relations – the user can see recipe relation group details
Update any recipe group relation – the user can edit any recipe relation group

For details, refer to the Recipe Groups section.

Recovery Points
OnApp administrators control how users can manage recovery points for virtual servers with the assigned backup resources. This is handled through the Control Panel's Roles menu. You can set the following permissions for user roles:
Any action on recovery points - the user can take any action on recovery point
Create any recovery point - the user can create a recovery point for any VS
Create own recovery point - the user can create a recovery point for his or her own VS
See any recovery point - the user can see a recovery point for any VS
See own recovery point - the user can see a recovery point for his or her own VS
See any recovery point size - the user can see a recovery point size for any VS
See own recovery point size - the user can see a recovery point size for his or her own VS
Restore any recovery point - the user can restore any VS from a recovery point
Restore own recovery point - the user can restore his or her own VS from a recovery point

For details, refer to the Recovery Points section.

34.1.20.4 Relation Group Templates
OnApp administrators control how users can manage relation group templates. This is handled through the Control Panel's Roles menu. You can set the following relation group templates permissions for user roles:

Any action on relation group templates - the user can take any action on relation group templates
Create a new relation group template - the user can create a new relation group template
Create own relation group template - the user can create his own template group
Destroy any relation group template - the user can delete any relation group template
Destroy own relation group templates - the user can delete own relation group templates
See all relation group templates - the user can see all relation group templates
See own relation group templates - the user can see his own relation group templates
Update price for relation group template - the user can update price for relation group template

For details, refer to the Template Store and My Template Groups sections.

34.1.20.5 Resource Diff
OnApp administrators control how users can manage resource differences. This is handled through the Control Panel's Roles menu. Resource differences are changes which a resource has undergone (e.g. disk resize), the resource difference contains both the old and the new value of the resource. You can set the following resource differences permissions for user roles:

Any actions on resource diff - the user can take any action on resource differences
See any Resource Diff - the user can see all resource differences in the cloud
See own Resource Diff - the user can see changes to resources of only their objects

34.1.20.6 Resource Limits
OnApp administrators control how users can manage resource limits. This is handled through the Control Panel's Roles menu. You can set the following resource limits permissions for user roles:

Any action on resource limit - the user can take any action on resource limits
Create a new resource limit - the user can create a new resource limit
Destroy any resource limit - the user can delete any resource limit
See all resource limits - the user can see all resource limits
See own resource limits - the user can only see their own resource limits
Update any resource limit - the user can edit resource limits for any user account

For details, refer to Configure Resource Allocation And Prices section.
34.1.20.7 Restrictions Resources
OnApp administrators can control users' ability to manage restrictions resources through the Control Panel's Roles menu. You can set the following restrictions resources permissions for user roles:

Any actions on restrictions resources - the user can take any actions on restrictions resources while configuring restriction sets (Roles > Restrictions Sets tab > Resources)
See all restrictions resources - the user can see all restrictions resources while configuring restriction sets (Roles > Restrictions Sets tab > Resources)

34.1.20.8 Restrictions Sets
OnApp administrators can control users' ability to manage restrictions sets through the Control Panel's Roles menu. You can set the following restrictions sets permissions for user roles:

Any action on restrictions sets - the user can take any action on restrictions sets
Create a new restrictions set - the user can create a new restrictions set
Delete restrictions set - the user can delete any restrictions set
See all restrictions sets - the user can see all restrictions sets
See own restrictions sets - the user can see restrictions sets assigned to his role(s)
Update restrictions set - the user can update any restrictions set

For details, refer to the Restrictions Sets section.

34.1.20.9 Roles
OnApp administrators control a user's ability to manage roles. This is handled through the Control Panel's Roles menu.

Any action on Roles - the user can take any action on roles
Create a new Role - the user can create a new role
Destroy any Role - the user can delete any role
See all Roles - the user can see all roles
See user's own roles - the user can see only roles assigned to them
Update any Role - the user can edit any role

For details, refer to the Roles section.

34.1.21 S
34.1.21.1 SAML Identity Providers
Any action on SAML identity providers - the user can perform any action on SAML Identity Providers
Create a SAML identity provider - the user can add new Identity Provider
Destroy any SAML identity provider - the user can delete any Identity Provider
See all SAML identity providers - the user can see the list of all Identity Providers
Update any SAML identity provider - the user can edit any SAML Identity Provider
34.1.21.2 Schedule Logs
OnApp administrators control a user's ability to manage schedule logs. This is handled through the Control Panel's Roles menu.

Any action on schedule logs - the user can take any action on schedule logs
Create a new schedule log - the user can create a new schedule log
Destroy any schedule log - the user can destroy any schedule log
See all schedule logs - the user can see all schedule logs
See own schedule logs - the user can only see their own schedule logs
Update any schedule log - the user can edit any schedule log

For details, refer to the Schedules Settings section.

34.1.21.3 Schedules
OnApp administrators control users' ability to manage schedules. This is handled through the Control Panel's Roles menu. You can set the following schedule management permissions for user roles:

Any action on schedules - the user can take any action on schedules
Create a new schedule - the user can create a new schedule
Destroy any schedule - the user can delete any schedule
Destroy own schedule - the user can only delete their own schedules
See all schedules - the user can see all schedules
See own schedules - the user can only see their own schedules
Update any schedule - the user can edit any schedule
Update own schedule - the user can only edit their own schedules

For details, refer to the Schedules Settings section.

34.1.21.4 SDN Managers
OnApp administrators control how users can manage SDN managers. This is handled through the Control Panel's Roles menu.

Any action on SDN Managers - the user can take any action on SDN manager

For details, refer to the SDN Managers section.

34.1.21.5 SDN Networks
OnApp administrators control how users can manage SDN networks. This is handled through the Control Panel's Roles menu.

Any action on SDN Networks - the user can take any action on SDN networks

For details, refer to the SDN Networks section.

Service Add-ons
OnApp administrators control users' ability to manage service add-ons. This is handled through the Control Panel's Roles menu. You can set the following service add-on management permissions for user roles:

Any actions on Service Add-ons - the user can perform any operations on Service Add-ons - view, create, edit and delete service add-ons
Create new Service Add-ons - the user can create new Service Add-ons (Control Panel's Service Add-ons menu > the "+") button)

Delete Service Add-ons and Delete own Service Add-ons - the user can delete Service Add-ons (Control Panel's Service Add-ons menu > the "Actions" icon > Delete)

Edit any Service Add-on and Edit own Service Add-ons - the user can update Service Add-ons (Control Panel's Service Add-ons menu > the "Actions" icon > Edit)

Read all Service Add-ons and Read own Service Add-ons - the user can view Service Add-ons (Control Panel's Service Add-ons menu)

For details, refer to the Service Add-ons section.

34.1.21.6 Service Add-on Groups
OnApp administrators control users' ability to manage service add-on groups. This is handled through the Control Panel's Roles menu. You can set the following service add-on group management permissions for user roles:

Any action on Service Add-on Groups - the user can take any action on Service Add-on Groups - view, create, edit and delete service add-on groups

Create a new Service Add-on group - the user can create a new Service Add-on group and add child service add-on groups (Control Panel's Service Add-ons menu > Store > the "+" button and Add Child button)

Destroy any Service Add-on group and Destroy own Service Add-on group - the user can delete Service Add-on groups (Control Panel's Service Add-ons menu > Store > the "Delete" button next to the service add-on group you want to delete)

See all Service Add-on groups - the user can see all Service Add-on groups (Control Panel's Service Add-ons menu > Store)

Manage any Service Add-on group - the user can manage a Service Add-on group (the user can edit a service add-on group, assign a particular service add-on to a service add-on group, remove service add-on from the service add-on group, edit service add-on price).

For details, refer to the Manage Service Add-on Store section.

34.1.21.7 Service Catalog
OnApp administrators control users' ability to access the service catalog. This is handled through the Control Panel's Roles menu. You can set the following service catalog permission for user roles:

Any action related to service catalog - user can take any action related to the service catalog

34.1.21.8 Service Insertion Groups
OnApp administrators control users' ability to access the service insertion groups. This is handled through the Control Panel's Roles menu. You can set the following service insertion groups permissions for user roles:

Any action on Service Insertion Groups - the user can take any action on service insertion groups

Create new Service Insertion Group - the user can create a new service insertion group

Destroy any Service Insertion Group - the user can delete any service insertion group

See all Service Insertion Groups - the user can view all service insertion groups
Update any Service Insertion Group - the user can update any service insertion group
For details, refer to the Service Insertion Framework Configuration section.

34.1.21.9 Service Insertion Pages
OnApp administrators control users' ability to access the service insertion pages. This is handled through the Control Panel's Roles menu. You can set the following service insertion pages permissions for user roles:
Any action on Service Insertion Pages - the user can take any action on service insertion pages
Create new Service Insertion Page - the user can create a new service insertion page
Destroy any Service Insertion Page - the user can delete any service insertion page
See all Service Insertion Pages - the user can view all service insertion pages
See own Service Insertion Pages - the user can view only own service insertion pages
Update any Service Insertion Page - the user can update any service insertion page
For details, refer to the Service Insertion Framework Configuration section.

34.1.21.10 Sessions
OnApp administrators control a user's ability to drop sessions. You can set the following drop session permissions for user roles:
Any actions on sessions - the user can take any action on sessions
Drop all the existing sessions - the user can drop all the existing sessions including their own
Drop all the user sessions but the current - the user can delete all the sessions created under their account but their current
For details, refer to the View User Account Details section.

34.1.21.11 Settings
OnApp administrators control a user's ability to manage settings. This is handled through the Control Panel's Roles menu.
Any action on settings - the user can take any action on settings
Manage SSL certificate - the user can upload and update SSL certificate located under config/ssl_certificates folder
See read settings - the user can see all settings
Restart Dashboard Client - the user can restart the dashboard client
Update Settings - the user can edit everything in the Settings menu
View OnApp version - the user can navigate to version to see which version of OnApp is installed
For details, refer to the OnApp Configuration section.

34.1.21.12 Smart Servers
OnApp administrators control how users can manage Smart Servers. This is handled through the Control Panel's Roles menu. You can set the following Smart Servers permissions for user roles:
Add recipe to any Smart Server - the user can add recipes to any smart server
Add recipe to own Smart Server - the user can add recipes to own smart servers only
Remove recipe from any Smart Server - the user can remove a recipe from any smart server
Remove recipe from own Smart Server - the user can remove recipe from own smart server
For details, refer to the Smart Servers section.

34.1.21.13 SSH Keys
OnApp administrators control how users can manage SSH keys. This is handled through the Control Panel's Roles menu. You can set the following SSH keys permissions for user roles:

Add ssh keys for all the virtual servers - the user can add ssh keys for all the virtual servers. Enabling this permission means that the keys are configured in Settings > SSH keys and are added to all VSs in the cloud every time a user creates a new VS or runs Set SSH keys for his VS. Therefore, we recommend enabling this permission only for those users that might really need it, namely, administrators.

Add ssh keys for own virtual servers - the user can only add ssh keys for own virtual servers. Enabling this permission means that the keys won't be added to Settings > SSH keys and will be added to the VSs that belong to this particular user only.
For details, refer to the Create and Manage User Accounts section.

34.1.21.14 Sysadmin Tools
OnApp administrators control how users can manage sysadmin tools. This is handled through the Control Panel's Roles menu. You can set the following sysadmin tools permissions for user roles:

Any action Sysadmin Tools - the user can see all actions on the Sysadmin Tools menu
For details, refer to the Sysadmin section.

34.1.22 T
34.1.22.1 Templates
OnApp administrators control how users can manage templates. You can set the following template sets permissions for user roles:

Any action on templates - the user can take any action on all templates

See the list of available for installation templates - the user can see all templates available for the installation from the template server (Templates > System templates > Available tab)

Install template upgrades - the user can install upgrades to the system templates

See the list of template upgrades - the user can see the upgrades for the installed system templates

Create a new template - the user can create a new template

Destroy any template - the user can delete any template

Destroy own template - the user can only delete their own templates

Destroy user template - the user can delete any user templates

See the list of inactive templates - the user can see the list of inactive templates

See list of active installations - the user can see the list of active template installations

Make any template public - the user can make any template public
Make own template public - the user can only make their own templates public
Make user template public - the user can make any user templates public
Manage own templates - the user can create and view/edit/delete their own templates
Manage public templates - the user can create/edit/delete/view system/public template
Manage user templates - the user can create and manage user templates
See all templates - the user can see all templates
See own templates - the user can only see their own templates
See all public templates - the user can see all system templates including public
See user templates - the user can see any user templates
Manage recipe for any template - the user can manage recipes for any template
Manage recipe for own templates - the user can manage recipes for own templates only

Restart failed installation - the user can restart failed template installation
Update any template - the user can edit any template (Templates > System templates > Edit template)
Update own template - the user can only edit their own templates (Templates > My templates > Edit template)
Update user template - the user can update user templates (Templates > User templates > Edit template)
Manage System Service Add-ons - the user can manage all the system service add-ons in the cloud
Manage own System Service Add-ons - the user can manage system service add-ons assigned to the user's own templates
For details, refer to the Templates section.

34.1.22.2 Template Groups
OnApp administrators can control users' ability to manage image template groups. This is handled through the Control Panel's Roles menu. You can set the following image template groups permissions for user roles:

Any action on template group - the user can take any action on template groups
Create a new template group - the user can create a new template group
Create own template group - the user can create his own template group
Delete any template group - the user can delete a template group
Delete own template group - the user can delete his own template group
See details of any template group (image_template_groups.read) - the user can view template group details
See details of own template groups - the user can view his own template groups
Update any template group (image_template_groups.update) - the user can edit any template group
Update own template groups - the user can edit his own template groups
For details, refer to the Template Store and My Template Groups sections.
34.1.22.3 Themes
OnApp administrators control a user's ability to manage themes. You can set the following themes permissions for user roles:

*Any action on Themes* - the user can make any action on themes
*Create Theme* - the user can create new themes
*Destroy Theme* - the user can delete themes
*Read Theme* - the user can read themes
*Update Theme* - the user can make changes in themes

For details, refer to the [Look & Feel](#) section.

34.1.22.4 Transactions
OnApp administrators control a user's ability to manage transactions. You can set the following transactions permissions for user roles:

*Any action on transactions* - the user can take any action on transactions
*Cancel zombie transactions* - the user can cancel transactions which run too long and are most likely failed
*Cancel own zombie transactions* - the user can cancel transactions which run too long and are most likely failed and belong to this user
*Delete all transactions from log* - the user can delete all transactions from a log
*Delete own transactions from logs* - the user can only delete their own transactions from a log
*See list of all transactions* - the user can see all transactions
*See list of own transactions* - the user can only see their own transactions
*See details of all transactions* - the user can see details of any transaction
*See details of own transaction* - the user can only see details of their own transactions

For details, refer to the [Virtual Server Transactions and Logs](#) and [Smart Server Transactions and Logs](#) sections.

34.1.22.5 Tunnels
OnApp administrators control how users can manage VPN tunnels. This is handled through the Control Panel's Roles menu. You can set the following tunnels permissions for user roles:

*Any action on tunnels* - the user can take any action on tunnels
*Create tunnels for anyone* - the user can create tunnels for anyone
*Create own tunnels* - the user can only create own tunnels
*Destroy any tunnels* - the user can delete any tunnels
*Destroy own tunnels* - the user can only delete own tunnels
*Read all tunnels* - the user can see all tunnels
*Read own tunnels* - the user can only see own tunnels
*Update all tunnels* - the user can edit all tunnels
*Update own tunnels* - the user can only edit own tunnels
34.1.23 Users

OnApp administrators can control users' ability to manage configuration. This is handled through the Control Panel's Roles menu. You can set the following users permissions for user roles:

- **Any action on users** - the user can take any action on user accounts
- **Upload avatar** - the user can upload an avatar
- **Change user password** - the user can change user's password
- **Change own password** - the user can only change own password
- **Create any user** - the user can create a new user account
- **Destroy any user** - the user can delete any user account
- **Destroy own user** - the user can only delete their own user account
- **Allow user to send password reminder** - the user can send password reminder for other users at user profile page
- **User can login as any user** - the user can log in as any user
- **See all users** - the user can see all user accounts
- **See all users prices** - the user can see all users prices. By disabling this permission together with the **See user outstanding amount** and **See user summary payments** permissions, you can hide the payment screen on the dashboard.
- **See user backups/templates prices** – the user can see users' backups/templates prices
- **See user bucket** – the user can see users’ buckets
- **See user hourly prices** – the user can see users’ hourly prices
- **See user monthly prices** – the user can see users’ monthly prices
- **See user outstanding amount** – the user can see users’ outstanding amount. By disabling this permission together with the **See all users prices** and **See user summary payments** permissions, you can hide the payment screen on the dashboard.
- **See user summary payments** – the user can see user’s summary payments. By disabling this permission together with the **See user outstanding amount** and **See all users prices** permissions, you can hide the payment screen on the dashboard.
- **See user total cost** – the user can see users’ total cost
- **See user virtual server prices** – the user can see users’ virtual server prices
- **See own users** – the user can only see their own user account
- **Suspend and unsuspend users** – the user can suspend/unsuspend any users
- **Unlock any user** - the user can unlock any user
- **Update any user** – the user can edit any user account
- **Update own user** – the user can only edit their own user account
- **Generate API key** – the user can generate API key for all users
- **Generate own API key** – the user can only generate own key
- **Update Yubikey** - the user can modify all user Yubikeys. If a user does not have this or the **Update own Yubikey** permission enabled, they will not be able to manage YubiKeys in the user profile.
- **Update own Yubikey** - the user can modify only their own Yubikey. If a user does not have this or the **Update Yubikey** permission enabled, they will not be able to manage YubiKeys in the user profile.
Disable TOTP authentication - the user can disable TOTP-based authentication for two factor authentication (2FA)
For details, refer to the Users section.

34.1.23.2 User Additional Fields
OnApp administrators control a user's ability to create user additional fields. You should edit user profile to add necessary info to this additional field. It is regulated by Update any user permission. You can set the following user additional fields permissions for user roles:

*Any action on user additional fields* - the user can perform any action on user additional fields
*Create user additional fields* - the user can create user additional fields
*Destroy any user additional fields* - the user can delete any user additional fields
*Read all user additional fields* - the user can read all user additional fields
*Update all user additional fields* - the user can edit all user additional fields

For details, refer to the Create and Manage User Accounts section.

34.1.23.3 User Groups
OnApp administrators control a user's ability to manage user groups. You can set the following user groups permissions for user roles:

*Any action on user groups* - the user can take any action on user groups
*Create a new user group* - the user can create a new user group
*Destroy user group* - the user can delete any user group
*See list of all user groups* - the user can see the list of all user groups
*See details of any user group* - the user can see details of any user group
*Update any user group* - the user can edit any user group

For details, refer to the Groups section.

34.1.23.4 User Group Additional Fields
OnApp administrators control a user's ability to manage user group additional fields. You can set the following user groups permissions for user roles:

*Any action on user group additional fields* - the user can create, edit, view and delete user group additional fields
*Create user group additional fields* - the user can add new custom additional fields
*Destroy any user group additional fields* - the user can delete any user group additional fields
*Read all user group additional fields* - the user can view all user group additional fields in the user profile
*Update all user group additional fields* - the user can edit all user group additional fields

For details, refer to the Manage Groups section.

34.1.24 Virtual Routers
OnApp administrators can control users' ability to manage virtual routers. This is handled through the Control Panel's Roles menu. You can set the following virtual routers permissions for user roles:
Any actions on Virtual Routers - the user can take any action on virtual routers
Change an owner of any Virtual Router - the user can change the owner of any virtual router
Convert any Virtual Server to Virtual Router - the user can convert any virtual server to virtual router
Convert own Virtual Server to Virtual Router - the user can convert own virtual server to virtual router
Delete any Virtual Router - the user can delete any virtual router
Delete own Virtual Router - the user can delete own virtual router
Migrate any Virtual Router - the user can migrate any virtual router
Migrate own Virtual Router - the user can migrate own virtual router
Any power action on Virtual Router - the user can take any power-related action on virtual router
Any power action on own Virtual Router - the user can take any power-related action on own virtual router
See any Virtual Router - the user can see any virtual router
See own Virtual Routers - the user can see own virtual routers
Rebuild network on any Virtual Router - the user can rebuild network and assign IP nets on any virtual router
Rebuild network on own Virtual Routers - the user can rebuild network and assign IP nets on own virtual routers
Change Suspended status for any Virtual Router - the user can change suspended status for any virtual router
Unlock any Virtual Router - the user can unlock any virtual router

34.1.24.1 Virtual Servers
OnApp administrators can control users' ability to manage virtual servers. This is handled through the Control Panel's Roles menu. You can set the following virtual servers permissions for user roles:
Any action on virtual servers - the user can take any action on virtual servers
Accelerate any Virtual Server - the user can accelerate any virtual server
Accelerate own Virtual Servers - the user can accelerate only own virtual servers
Edit advanced XML configuration for any VS - the user can edit an advanced XML configuration for any virtual server
Edit advanced XML configuration for own VS - the user can edit an advanced XML configuration for their own virtual servers
Schedule autobackups on any virtual server - the user can schedule autobackups on any virtual server
Schedule autobackups on own virtual servers - the user can schedule autobackups on their own virtual servers
Allow all virtual servers to boot from ISO - the user can boot from ISO any virtual server in the cloud
Allow own virtual servers to boot from ISO - the user can boot from ISO their own virtual servers only
Build/rebuild any virtual server - the user can build or rebuild any virtual server
Build/rebuild user’s own virtual server - the user can build or rebuild their own virtual servers only

Change an owner of any virtual server - the user can change the owner of any virtual server

Clone any virtual server - the user can clone any virtual server

Clone own virtual servers - the user can clone only their own virtual servers

Console to any virtual server - the user can access any virtual server via console

Console to own virtual server - the user can only access their own virtual server via console

Allow user to set CPU topology - the user can set CPU topology options for virtual server

Create a new virtual server - the user can create a new virtual server

Destroy any virtual server - the user can delete any virtual server. To delete any virtual server together with its backups, the user needs to have the Destroy any backup permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.

Destroy own virtual server - the user can only delete their own virtual servers. To delete a virtual server together with its backups, the user needs to have the Destroy own backup permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.

Manage publications for all virtual servers - the user can manage publications for all virtual servers

Manage publications for own virtual servers - the user can manage their own publications only

Manage Virsh Console - the user can enable or disable the usage of Virsh console for all virtual servers

Migrate any virtual server - the user can migrate any virtual server

Migrate own virtual server - the user can only migrate their own virtual servers

Move any virtual server to another federated location - the user can move any virtual server to another federated location

Move own virtual server to another federated location - the user can move their own virtual servers to another federated location

Any power action on virtual servers - the user can take any power-related action on virtual servers

Any power action on own virtual servers - the user can only take power-related actions on their own virtual servers

Allow to purge content of all virtual servers - the user can purge content of any virtual server

Allow to purge content of own virtual servers - the user can purge content of own virtual servers only

Read any virtual server - the user can read any virtual server

Read own virtual servers - the user can only read their own virtual servers

Read Virtual Server's root password - the user can view any virtual servers root password

Read own Virtual Server's root password - the user can view their own virtual servers root password

Read VIP status - the user can read VIP status of virtual servers

Rebuild network of any virtual server - the user can rebuild network of any virtual server

Rebuild network of own virtual server - the user can only rebuild network of own virtual server

Manage recipes joins for all virtual servers - the user can manage recipes joins for all virtual servers
Manage recipes joins for own virtual servers - the user can manage recipes joins for own virtual servers

Report a federation problem on any virtual server - the user can report a federation problem on any virtual server

Report a federation problem on user's own virtual server - the user can report a federation problem on user's own virtual server

Reset root password of any virtual server - the user can reset the root password for any virtual server

Reset root password of own virtual server - the user can only reset the root password of their own virtual servers

Select instance package on virtual server creation - the user can select instance packages on virtual server creation

Select resources manually on virtual server creation - the user can select resources manually on virtual server creation

Manage Service Add-ons for all virtual servers - the user can manage Service Add-ons for all virtual servers (Control Panel's Virtual Servers menu > VS label > Overview > Service Add-ons)

Manage Service Add-ons own virtual servers - the user can manage their own Service Add-ons only (Control Panel's Virtual Servers menu > VS label > Overview > Service Add-ons)

Set Max Memory - the user can set a max memory override for KVM-based virtual servers

Set SSH keys - the user can set their own ssh keys after the virtual server is created

Set VIP status - the user can set/delete VIP status for virtual servers

Change suspended status for virtual server - the user can change Suspended status for a virtual server

Allow insert/eject media for all virtual server - the user can insert/eject media for all virtual servers

Allow insert/eject media for own virtual server - the user can insert/eject media for own virtual servers

Unlock any virtual server - the user can unlock any virtual server

Update all virtual server - the user can edit any virtual server

Update own virtual server - the user can only edit their own virtual servers

Allow use virtual server as gateway - the user can use virtual servers as gateways for other virtual servers

Any action with admin note - the user can take any action on Admin notes

Manage System Service Add-ons - the user can manage all the system service add-ons assigned to VSs in the cloud

Manage own System Service Add-ons - the user can manage the system service add-ons assigned to one's own VSs

For details, refer to the Appliances section.

34.1.24.2 Virtual Machine Statistics

OnApp administrators control user's access to virtual server statistics. You can set the following statistics permissions for user roles:

See Virtual Machine Statistics – the user has full access to statistics

See all Virtual Machines Statistics – the user can see statistics of all virtual servers
See own Virtual Machines Statistics – the user can only see their own statistics
For details, refer to the Virtual Server Statistics section.

34.1.24.3 Virtual Server's IP Addresses
OnApp administrators can control users' ability to manage IP address joins. This is handled through the Control Panel's Roles menu. You can set the following IP address joins permissions for user roles:

**All actions on virtual server's IP addresses** - the user can take any action on virtual server IP addresses

**Add IP address to any virtual server** - the user can add an IP address to any virtual server

**Add IP address to own virtual server** - the user can only add IP addresses to their own virtual servers

**Remove IP address from any virtual server** - the user can remove an IP address from any virtual server

**Remove IP address from own virtual server** - the user can only remove IP addresses from their own virtual servers

**See IP addresses assigned to any virtual servers** - the user can see IP addresses assigned to any virtual server

**See IP addresses assigned to own virtual servers** - the user can only see IP addresses assigned to their own virtual servers

For details, refer to the Virtual Server IP Addresses section.

34.1.25 W

34.1.25.1 White IPs
OnApp administrators control a user's ability to manage white IPs. You can set the following white IPs permissions for user roles:

**Manage all White IPs for users** - the user can take any action on White IPs for users

**Create white IP for all users** - the user can create any white IP

**Create own white IP** - the user can create own white IP

**Destroy white IP for all users** - the user can destroy any white IP

**Destroy own white IPs** - the user can only destroy own white IP

**Read all white user IPs** - the user can read all white IPs

**Read own white IPs** - the user can read own white IPs

**Update white IP for all users** - the user can update any white IP

**Update own white IPs** - the user can update own white IP

For details, refer to the User Whitelist IPs section.
OnApp administrators can control users' ability to manage the Zabbix server. This is handled through the Control Panel's Roles menu. You can set the following Zabbix server permission for user roles:

*Any action related to zabbix server* - user can perform any action related to the Zabbix server

### 34.2 List of Default Permissions for Admin Role

The list below includes the set of default permissions for the Admin role in OnApp.

**Activity logs**

*Any action on Activity Logs* - the user can take any action on activity logs

**Application Servers**

*Any action on application servers* – the user can take any action on application servers

**Approvals**

*Any Actions on Approvals* - the user can take any actions on transaction approvals

**Autoscalings**

*Any Actions on Autoscaling Configuration* - the user can take any actions with autoscaling configuration

**Autoscaling Monitors**

*Any Actions on relation autoscaling monitors* - the user can perform any actions on relation monitors

**Auto-backup Presets**

*Any action on auto-backup presets* - the user can take any action on auto-backup presets that have been backed up automatically

**Availability**

*Any action on Availability settings* - user can take any actions on Availability settings

### 34.2.1 Backup Resources

*Any action on backup resources* - the user can take any action on backup resources

### 34.2.2 Backup Resource Zones

*Any action on backup resource zones* - the user can take any action on backup resource zones

**Backup Resource Auto Backup Presets**
Any action on auto backup presets - the user can take any action on auto backup presets

Backup Server Zones
Any action on backup server zones - the user can take any action on backup server zones

Backup Servers
Any action on Backup servers - the user can take any action on any Backup server

Backups
Any action on backups - the user can take any action on any backup

Base Resources
Any action on resources - the user can take any action on base resources

Blueprints
Any action on Blueprints - the user can take any action on any blueprint

Blueprint Groups
Any action on Blueprint Groups - the user can take any action on blueprint groups

Buckets
Any action on buckets - the user can take any action on any bucket

CloudBoot
Manage CloudBoot - the user can manage Cloud Boot settings

Compute resource devices
Any action on Compute resource devices - the user can take any action on Compute resource devices

Container servers
Any action on container servers - the user can take any actions on container servers

Control panel
Manage recipes for Control Panel - the user can manage recipes for any Control Panel

This permission will not be granted by pressing Full access button while editing the list of Permissions in the Roles section and can only be selected manually.

Currencies
Any action with currencies - the user can take any action on currencies

Dashboard
All actions on dashboard - the user can see all available dashboard actions

Show cloud dashboard - the user can see the dial pane and the percentage of cloud usage shown on the dashboard.

Data Store Joins
All actions on data stores on Compute resource - the user can take any action on data stores attached to a Compute resource

Data Store Zones
Any action on data store zones - the user can take any action on data store zones

Data Stores
Any action on data_stores - the user can take any action on data stores

Disks
Any action on disks - the user can take any action on disks

Edge Groups
Any action on edge groups - the user can take any action on edge groups

Edge Servers
Any action on Edge Server - the user can take any actions on edge servers

Firewall Rules
Any Action on Firewall Rules - the user can take any actions with firewall rules

Global Search
Global search - global search through the whole database

Groups
Any action on groups - the user can take any action on groups

Help
All actions on help - the user can take any action under the Help menu

HTTP Caching Rules
Any actions on http caching rules - the user can take any action on HTTP caching rules

Compute resource Zones
Any action on Compute zones - the user can take any action on Compute zones

Compute resources
Any action on Compute resources - the user can take any action on Compute resources

iFrame
Any action on iFrame - the user can take any action on iFrame

Instance Packages
Any action on Instance Packages - the user can take any action on Instance Packages

Internationalization
Edit internationalization locales - the user can view and edit all non-English language phrases

IO Limiting
Any actions on IO limits - the user can take any action on IO limits

IO Statistics
Full access to IO Statistics - the user has full access to IO Statistics

IP Addresses
Any action on IP addresses - the user can take any action on IP addresses

IP Nets
All actions on IP Nets - the user can take any action on IP net

IPRanges
All actions on IP Ranges - the user can take any action on IP ranges

ISOs
Any action on ISOs - the user can take any actions on ISOs
Last Access Log
*Any action on last access log* - the user can perform any action on last access log of any user

Load Balancers
*Any action on load balancer* - the user can take any action on load balancer

Load Balancing Clusters
*Any action on load balancing cluster* - the user can make any action on relation load balancing

Location Groups
*Any action on location groups* - the user can take any action on location groups

Log Items
*Any action on log items* - the user can take any action on log items

34.2.3 Messaging: Deliveries
*Any action on deliveries* - the user can perform any action on deliveries

34.2.4 Messaging: Events
*Any action on events* - the user can perform any action on messaging events

34.2.5 Messaging: External Recipients
*Any action on external recipients* - the user can perform any action on external recipients

34.2.6 Messaging: Gateways
*Any action on gateways* - the user can perform any action on gateways

34.2.7 Messaging: Notifications
*Any action on notifications* - the user can perform any action on notifications

34.2.8 Messaging: Notification Templates
*Any action on notification templates* - the user can perform any action on notification templates

34.2.9 Messaging: Recipients Lists
*Any action on recipients lists* - the user can perform any action on recipients lists

34.2.10 Messaging: Subscriptions
*Any action on recipients subscriptions* - the user can perform any action on messaging subscriptions

Monthly Billing Statistics
*Full access to Monthly Bills Statistics* - the user has full access to monthly bills statistics

Nameservers
*Any action on nameservers* - the user can take any action on nameservers

Network Zones
*Any action on network zones* - the user can take any action on network zones
Networks
Any action on networks - the user can take any action on networks

OAuth Providers
Any action on OAuth providers - the user can take any action on OAuth providers

OnApp Storage
Manage OnApp storage - the user can access the OnApp storage settings

OVAs
Any action on OVAs - the user can take any action on OVAs

Payments
Any action on payments - the user can take any action on payments

Permissions
Any action on permissions - the user can take any action on permissions

Recipes
Any actions on Recipes - the user can take any action on recipes

Recipe Groups
Any action on recipe groups - the user can take any action on recipe groups

Recipe Group Relations
Any action on recipe group relations - the user can take any action on recipe relation group

Recovery Points
Any action on recovery points - the user can take any action on recovery point

Relation Group Templates
Any action on relation group templates - the user can take any action on relation group templates

Resource Diff
Any action on Resource Diff - the user can take any action on resource diff

Resource Limits
Any action on resource limit - the user can take any action on resource limits

Restrictions Resources
Any actions on restrictions resources - the user can take any actions on restrictions resources while configuring restriction sets

Restrictions Sets
Any action on restrictions sets - the user can take any action on restrictions sets

Roles
Any action on Roles - the user can take any action on roles

SAML Identity Providers
Any action on SAML identity providers - the user can perform any action on SAML identity providers

Schedule Logs
Any action on schedule logs - the user can take any action on schedule logs

Schedules
Any action on schedules - the user can take any action on schedules
34.2.11 SDN Managers

Any action on SDN Managers - the user can take any action on SDN manager

34.2.12 SDN Networks

Any action on SDN Networks - the user can take any action on SDN networks

Service Add-ons

Any actions on Service Add-ons - the user can perform any operations on Service Add-ons

Service Add-on Groups

Any action on Service Add-on Groups - the user can take any action on Service Add-on Groups

Service Catalog

Any action related to service catalog - user can take any action related to the service catalog

Service Insertion Groups

Any action on Service Insertion Groups - the user can take any action on Service Insertion Groups

Service Insertion Pages

Any action on Service Insertion Pages - the user can take any action on Service Insertion Pages

Sessions

Any actions on sessions - the user can take any action on sessions

Settings

Any action on settings - the user can take any action on settings

Smart Servers

Add recipe to any Smart Server - the user can add recipes to any smart server

SSH Keys

Add ssh keys for all the virtual servers - the user can add ssh keys for all the virtual servers

Storage Servers

Any action on Storage Server - the user can take any actions on storage servers

Sysadmin Tools

All actions on Sysadmin Tools - the user can take any action on the Sysadmin Tools menu

Templates

Any action on templates - the user can take any action on templates

Template Groups

Any action on template group - the user can take any action on template groups

Themes

Any action on Themes - the user can make any action on themes

Transactions

Any action on transactions - the user can take any action on transactions

Users

Any action on users - the user can take any action on user accounts

User Additional Fields
Any action on user additional fields - the user can perform any action on additional fields for user

**User Groups**
Any action on user groups - the user can take any action on user groups

**Virtual Servers**
Any action on Virtual Servers – the user can take any action on virtual servers

**Virtual Server's IP Addresses**
All actions on virtual server's IP addresses - the user can take any action on virtual server IP addresses

**Virtual Server Snapshots**
Any action on Virtual Server Snapshots - the user can take any action on snapshots

**Virtual Machine's Statistics**
See Virtual Machine Statistics – the user has full access to statistics

**White IPs**
Manage all White IPs for users - the user can take any action on White IPs for users

**Zabbix Server**
Any action related to zabbix server - user can perform any action related to the Zabbix server

### 34.3 List of Default Permissions for User Role

The list below includes the set of default permissions for the User role.

**Activity Logs**
See all own Activity Logs - the user can only see the details of their own activity log

**Backups**
Convert own backup to template - the user can only convert their own backups to templates
Create backup for own VS - the user can only create backups of their own virtual servers
Destroy own backup - the user can only delete their own backups
See own backups - the user can only see their own backups
Update own backup - the user can only edit their own backups

**Blueprints**
Deploy own blueprint - the user can deploy own blueprint

**Buckets**
See own bucket - the user can only see own bucket

**Container Servers**
Build/rebuild user's own container server - the user can build/rebuild his own container server
Console to own container server - the user can only access their own container server via console
Create a new container server - the user can create a new container server
Destroy own container servers - the user can destroy own container servers
Edit own container server's cloud config - the user can only edit their own container server's cloud config

Migrate own container servers - the user can migrate own container servers

Any power action on own container servers - the user can take any power-related action on own container servers

See own container servers - the user can see own container servers

Read own container server's root password - the user can read own container server's root password

Rebuild network of own container server - the user can only rebuild network of own container server

Manage recipes joins for own container servers - the user can manage recipes joins for own container servers

Reset root password to own container server - the user can only reset the root password for their own container servers

Update own container servers - the user can update own container servers

Dashboard

Show cloud dashboard - the user can see the cloud details on the dashboard

Data Store Zones

Show Data Store Zones on Virtual Server creation - the user can see all data store zones during VS creation in VS Creation wizard

Data Stores

See all data stores - the user can see all data stores

Show Data Stores on Virtual Server creation - the user can see all data stores during VS creation in VS Creation wizard

Disks

Auto-backup for own disk - the user can only schedule automatic backups on their own disks

Assign own disk to VS - the user can assign own disks to another own VS

Create a new disk - the user can create a new disk

Destroy own disk - the user can only delete their own disks

See own disks - the user can only see their own disks

Unlock any disk - the user can unlock any disk

Update own disk - the user can only edit their own disks

Edge Groups

See all edge groups - the user can see all edge groups

Firewall Rules

Create own Firewall Rules - the user can only create own firewall rules

Destroy own Firewall Rules - the user can only delete own firewall rules

Read own Firewall Rules - the user can only read own firewall rules

Update own Firewall Rules - the user can only edit own firewall rules

Federation failed action

Clean own federation failed actions
Read own federation failed actions

Compute resources

See all Compute resources - the user can see all Compute resources
Show Compute resources on Virtual Server creation - display Compute resources on Add New Virtual Server screen

Template Groups
See details of any template group (image_template_groups.read) - the user can view template group details

IO Statistics
See own IO Statistics - the user can see own IO Statistics

Virtual Server’s IP Addresses
Add IP address to own virtual server - the user can only add IP addresses to their own virtual servers
Remove IP address from own virtual server - the user can only remove IP addresses from their own virtual servers
See IP addresses assigned to any virtual servers - the user can only see IP addresses assigned to their own virtual servers

IP Addresses
See all IP addresses - the user can see all IP addresses

IP Nets
View IP Nets assigned to any network - the user can see IP nets assigned to any network

IP Ranges
View IP Ranges assigned to any IP Net - the user can see IP ranges assigned to any IP net

ISOs
Read all public ISOs - the user can view public ISOs

Load Balancers
Migrate own load balancer - the user can only migrate their own load balancer

Load Balancing Clusters
Create new load balancing cluster - the user can create a new load balancing cluster
Delete own load balancing cluster - the user can only delete own load balancing clusters
See details of own load balancing cluster - the user can only see details of own load balancing cluster
Change own load balancing cluster - the user can only change own load balancing cluster

Log Items
Delete own log item - the user can only delete their own log items
See details of own log item - the user can only see details of their own log items

Messaging: Notifications
Any action on notifications

Monthly Billing Statistics
See only own Monthly Bills Statistics - the user can only see own monthly bills statistics
Nameservers
See all nameservers - the user can see all nameservers

Networks
See all networks - the user can see all networks

Payments
See own user payments - the user can only see their own user payments

Recipes
Create Recipes - the user can add new recipes
Delete own Recipes - the user can delete own recipes

Edit own Recipes - the user can edit own recipes

Read own Recipes - the user can view own recipes

Recipe groups
See all recipe groups - the user can view the list of recipe groups

Recipe group relations
See all recipe group relations - the user can view the list of recipe group relations

Roles
See user's own roles - the user can see only roles assigned to him.

Service Catalog
Any action related to service catalog - user can take any action related to the service catalog

Templates
Manage own templates - the user can create and manage their own templates
See all public templates - the user can see all public templates

Transactions
Delete own transactions from logs - the user can only delete their own transactions from a log
See details of own transactions - the user can only see details of their own transactions

Users
Change own password - the user can only change own password
See own users – the user can only see their own user account
See user backups/templates prices – the user can see users’ backups/templates prices
See user bucket – the user can see users’ buckets
See user hourly prices – the user can see users’ hourly prices
See user monthly prices – the user can see users’ monthly prices
See user outstanding amount – the user can see users’ outstanding amount
See user summary payments – the user can see user’s summary payments
See user virtual server prices – the user can see users’ virtual server prices
Update own user – the user can only edit their own user account
Generate own API key - the user can only generate own key
Update own Yubikey - the user can modify their own Yubikey

**Virtual server snapshots**

Create or restore own virtual server snapshot - the user can create/restore own snapshots
Destroy own virtual server snapshot - the user can delete own snapshots
See own virtual server snapshots - the user can see the list of own snapshots

**Virtual Servers**

Build/rebuild user's own virtual server - the user can build/rebuild their own virtual server's only
Console to own virtual server – the user can only access their own virtual server via console
Create a new virtual server – the user can create a new virtual server
Destroy own virtual server – the user can only delete their own virtual servers
Manage publications for all virtual servers - the user can manage publications for all virtual servers
Migrate own virtual server – the user can only migrate their own virtual servers
Any power action on own virtual servers – the user can only take power-related actions on their own virtual servers
See own virtual servers – the user can only see their own virtual servers
Read Virtual Server's root password - the user can read Virtual Server's root password
Rebuild network of own virtual server – the user can only rebuild network of own virtual server
Manage recipes joins for own virtual servers - the user can manage recipe joins for own virtual servers
Reset root password to own virtual server – the user can only reset the root password of their own virtual servers
Select resources manually on virtual server creation - the user can select resources manually on virtual server creation
Update own virtual server – the user can only edit their own virtual servers
Allow own virtual servers to boot from ISO - the user can boot from ISO their own virtual servers only
Schedule autobackups on own virtual server

**Virtual Machine Statistics**

See own virtual machine statistics - the user can only see statistics for their virtual machines
35 Tools

OnApp provides a number of tools to help you monitor and manage your OnApp system: Logs, Cloud Usage Statistics, Sysadmin Tools, and Alerts. To access them, click the corresponding links under the main Tools menu item in the Control Panel > Admin.

35.1 Logs

OnApp logs all cloud management actions that take place on cloud resources, including virtual servers, disks, data stores, compute resources, templates, networks.

35.1.1 View and Manage Logs

To access and manage logs, click the Control Panel > Admin > Logs menu, where you can view the log of all transactions in the cloud. The Activity Log table provides the following details:

**On this page:**

- View and Manage Logs
- Change Tracking

**See Also:**

- List of all OnApp Permissions
- Virtual Servers
- Tools

**Icon** - indicates the status of an action

**Ref** - number that you can click to view details of a specific transaction

**Date** - time when the action was performed

**Action** - name of the transaction

**Target** - cloud resource with an identification number that you can click to view its details

You can view details on target cloud resources that are displayed in bold, indicating that they are available in the cloud. You cannot view details on resources that are unavailable, for example, resources that failed to be created.

**Dependent** - action's ref number that you can click to view its details

At the Logs page, you can click:

**Hide Successful Market Notifications** to remove from the list actions that were performed successfully. Click this button again to show the full list.
**Complete, Running, Failed or Cancelled** to filter logs by their status

**Failover Processes** to view the list of failover logs. See [Failover Processes](#) section for details.

**Clean Logs** to clear the logs completely

**Cancel All Pending Tasks** to cancel all tasks scheduled for completion

**Cancel All Pending Backups** to remove all pending backups

To search for a specific transaction, you can use the search box at the top.

You can also relegate "pending" transactions to the failed status. To do so, hover over the pending status icon of a transaction > click the cross sign that pops up. This option becomes available if the transaction has been pending for the period of time specified in the **Settings > Admin > Configuration > Zombie** transaction time parameter.

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Starting with OnApp version 4.0, users see transaction logs updated in real time. This is achieved by means of tail -f Unix command, which causes tail to not stop when the end of file is reached but rather to wait for additional data to be appended to the output.

To enhance readability, the following log items are pointed out with color and font size:

- Remote Server
- Fatal
- Executing Rollback

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### 35.1.2 Change Tracking

To view changes that have been made during a transaction, you need to have the appropriate **Resource Diff permissions** enabled.

If the size of certain resources is changed, the logs will contain the information about both current and previous size of the resource. Change tracking is available for the following transactions:

- **Resize Disk** - changes of the disk size
- **ResizeVirtualServer** - changes to a VS's number of CPU cores, priority value and RAM size
- **ResizeContainerServer** - changes to a container server's number of CPU cores, priority value and RAM size
- **ResizeApplicationServer** - changes to an application server's number of CPU cores, priority value and RAM size
- **ResizeVirtualServerwithoutreboot** - changes to a VS's number of CPU cores, priority value and RAM size performed without a reboot
- **ResizeApplicationServerwithoutreboot** - changes to an application server's number of CPU cores, priority value and RAM size performed without a reboot
ResizeContainerServerwithoutreboot - changes to a container server's number of CPU cores, priority value and RAM size performed without a reboot

UpdateResourcePool - changes to the resource pool's resources

EditFirewallRule - changes to the firewalls

EditNATRule - changes to the NAT rules

EditIPSECVPNRule - changes to the IPSECVPN rules

HotMigrate - changes to the ID, label, and IP address of the source/destination compute resource when the VS is online

ColdMigrate - changes to the ID, label, and IP address of the source/destination compute resource when the VS is offline

To view resource changes in these transactions for all resources in the cloud: go to the Activity Log section of the Control Panel page or to Control Panel > Admin > Logs > Ref number

for a virtual server's resources: go to Control Panel > Cloud > Virtual Servers > Label > Activity Log > Ref number

At the beginning of the page that loads you will see a table with the list of resources with their values before and after the transaction. If you have Approvals permissions enabled, you will see the Approve and Decline buttons at the bottom of the screen in case the transaction is pending for approval. For more information refer to Transaction Approvals.

35.2 Sysadmin

The Sysadmin page provides statistics and tools for a number of system administration tasks. These tools are divided into the following tabs:

Sysadmin Tools
Services
Application Errors
Activity Logs
Zabbix Setup
Control Panel Maintenance
IP Usage Report
Resource Diffs

See also:
Tools
Logs
Failover Configuration

35.2.1 Sysadmin Tools

Background Task Daemon

Daemon is responsible for executing all background tasks such as:
Transactions
Backup takers
Billing stats updater
Cluster monitor
Compute resource monitor
Schedule runner

To operate the daemon, use the following buttons:

**Reload daemon** – restarts the tasks, and completes all running tasks if their PIDs still exist.

**Stop daemon** - completes any backups in progress, but prevents any more backups from starting; stops all tasks in progress.

**Start daemon** - starts up all the tasks.

**Check status** – shows PID of the task and its status.

To get details on daemon processes activity, run the [Track Daemon Process Activity](#) tool.

**Availability Check**
Availability check enables to see the status of [OnApp Services Monitoring Tool](#) and perform the following functions:

- Reload the OnApp Services Monitoring Tool
- Disable the OnApp Services Monitoring Tool
- Enable the OnApp Services Monitoring Tool
- Check status the OnApp Services Monitoring Tool

**Running Processes**
This section displays the list of the running system processes:

- **Generate hourly stats** - last time hourly statistics was aggregated.
- **Clean Redundant Instant Stat** - last time redundant statistics was deleted.
- **CDN Sync Runner** - last time synchronization between CDN and OnApp was performed.

- **SNMP stats runner** - last time SNMP statistics was gathered from the compute resources and virtual servers running in the cloud.
  There are three levels of an SNMP statistics gathering:
  - Level 1 - every 10 seconds. CP gets info about Compute resources uptime/virtual servers' statuses.
  - Level 2 - every 60 seconds. CP gets info about the disk usage, network usage, CPU usage statistics and the list of virtual servers.
  - Level 3 every 120 seconds. CP gets list of volume groups and logical volumes.

  The level values can be changed in the onapp.yml file. For details, see [Advanced Configuration Settings](#) section.

- **VMware stats** - last time VMware statistics was gathered from the vCenter.
  There are two levels of VMware statistics gathering:
  - Level 1 - every 60 seconds.
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Level 2 - every 180 seconds.
For details, see Advanced Configuration Settings section.
Delete old stats - last time when the old SNMP has been deleted.
Last time started - the last time when the transaction started.
Last time finished - the last time when the transaction finished successfully. When the
transaction has failed, the last time finished field will display the time of the last successful
transaction, thus indicating the failure.

Running processes time is always displayed in UTC format.

Solidfire Stats Level 1 - last time the statistics on disks situated on SolidFire data stores was
gathered. This statistic is gathered every 2 minutes.

35.2.2 Services

Services Status
This tab shows the statuses of all the services for High Availability clusters. Click the Services
Status button to load the page with the list of services, their PID number and the online/offline
status.

35.2.3 Application Errors

This tab provides the list of errors registered in your Control Panel. The OnApp error collector
records the errors within a CP and aggregates an error list. After that, your Control Panel may
send crash reports to OnApp in a form of an encrypted API call. You can enable the sending of
the error list from your CP at Dashboard > Admin > Settings > Configuration > System tab.
Errors are displayed with the following details:

id - ID of the error
Class - the class of the error
Last detected - the last time the error was detected
Quantity - how many times the error has occurred
Reported - whether the error has been reported or not

Click the class of the error to view its details. This information will be sent to OnApp if you allow
your CP to send crash reports:

Class - the class of the error
Last detected - the last time the error was detected
Quantity - how many times the error has occurred
Message - the message that will be sent with this error
Backtrace - the backtrace of the error
35.2.4 Activity Log

OnApp provides a possibility to trace back any user’s behavior in the cloud to prevent possible misconduct or damage from staying unrevealed.

This Activity Log covers the following actions:
- DestroyVM
- DestroyUser
- DestroyBackup
- DestroyDisk
- Change Password
- LoginAs
- StopVirtualServer
- BuildVM
- Delete CDN Resource
- Delete DNS Zone

Activity Log registers actions with the following information:
- id - ID of the User in the DB
- username - name of the user
- created at - when the user was created
- action - what action was performed
- dependent - id of the action on which the current one was depending
- dependent type - type of the dependent
- ip address - ip address from which the action was launched
- user agent - description of the agent through which the cloud was accessed

To download a CSV file with the Activity Log, click the Download Activity Log as CSV. The download will start automatically after you click the button.

35.2.5 Zabbix Setup

Starting with version 4.2, OnApp uses Zabbix for autoscaling. OnApp provides the automatic UI-based installation and configuration procedure for Zabbix on a server that you indicate. It can be either a physical server or a virtual server.

OnApp supports 2.4.x Zabbix version.

We recommend the following configuration for the Zabbix server:
- **Server**: a separate physical server or a virtual server
- **Operating system**: CentOS 6.x or 7.x
- **Network requirements**: make sure that IP address of the zabbix server is available to the Control Panel server and all virtual servers.
**Memory:** 128 MB of physical memory and 256 MB of free disk space are minimum requirements. However, the amount of required disk memory depends on the number of hosts that are being monitored.

The examples of recommended configuration:

<table>
<thead>
<tr>
<th>Deployment type</th>
<th>Platform</th>
<th>CPU/Memory</th>
<th>Database</th>
<th>Monitored VSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>CentOS 6.x or 7.x</td>
<td>2 CPU cores/2GB</td>
<td>MySQL InnoDB</td>
<td>500</td>
</tr>
<tr>
<td>Large</td>
<td>CentOS 6.x or 7.x</td>
<td>4 CPU cores/8GB</td>
<td>RAID10 MySQL InnoDB or PostgreSQL</td>
<td>&gt;1000</td>
</tr>
</tbody>
</table>

Zabbix will be used for autoscaling of newly created VSs.

**We strongly do not recommend installing Zabbix on the Control Panel server.** You can use a separate server or a VS (if your network allows it) as the Zabbix server.

For successful configuration, the Control Panel should have access to the Zabbix server without a password. Therefore, SSH keys should be added to the Zabbix server. To add SSH keys, run the following command on the Control Panel.

```
bash#> ssh-copy-id -i /home/onapp/.ssh/id_rsa.pub root@ZABBIX_SERVER_HOST_IP
```

You need to indicate the IP of your Zabbix server in the command above. You will also be prompted to enter the password for the root user on the Zabbix server. After you enter the password the SSH keys will be added to `/root/.ssh/authorized_keys`.

35.2.5.1 Set Up New Zabbix Server

Go to your Control Panel Sysadmin menu.

Switch to the Zabbix setup tab.

Indicate the server IP address in the corresponding field.

Select the operating system of the server from the drop-down menu.

Press **Deploy zabbix server.**

Please be aware that default administrator credentials "Admin"/"zabbix" are used during Zabbix server deployment. It is recommended to change the credentials due to security reasons.

OnApp will install and configure Zabbix on the server with that IP. Make sure you meet the hardware and software requirements before deploying a Zabbix server.
35.2.5.2 Add Existing Zabbix Server to Cloud
If you already have a Zabbix server, you can connect it to your cloud by using the following procedure:

Fill in the following fields at Control Panel > Admin > Settings > Configuration > Infrastructure tab.

- **Zabbix host** - the IP address of your Zabbix server
- **Zabbix url** - the path to the Zabbix web-interface
- **Zabbix user** - your Zabbix user
- **Zabbix password** - your Zabbix password

For more information, see Edit System Configuration.

Configure the existing Zabbix server by pressing the Reconfigure Existing Zabbix Server button at Control Panel > Admin > Sysadmin > Zabbix Setup tab. OnApp will take credentials data, provided in step 1, and schedule a transaction to reconfigure server.

35.2.5.3 Uninstall Zabbix Server
Refer to a separate doc to uninstall a Zabbix server if required. Pay attention that when you uninstall a Zabbix server, autoscaling will stop working.

35.2.6 Control Panel Maintenance

From this tab you can click Enable to switch on the maintenance for the CP. Control panel maintenance is a tool which enables administrators to block the CP. Administrators having permissions on managing Sysadmin Tools will have access to the Control Panel as usual. However, the CP will be blocked for all other users. Servers and services will remain running.

The screenshot illustrates what users who do not have the necessary permissions will see when they try to access the CP.
35.2.7 IP Usage Report

This tab contains the history of the IP address usage and provides information about:
- IP address assign/unassign to the VS
- IP address assign/unassign to the User

To view the IP usage report:

Go to Control Panel > Admin > Sysadmin > IP Usage Report tab.

Insert the IP address in the corresponding field.

You can filter the statistics by time - select the time period from the drop-down menu and click the Apply button.

You will get the statistics divided into several sections:
- From - time and date from which IP address was assigned
- To - time and date from to which IP address was assigned
- Full name - user's first and last name
- Username - the user to whom the IP address is assigned
- Email - user email
- VS hostname - the name of your host
- VS identifier - the VS identifier
- NIC identifier - the identifier of the network interface
- NIC MAC - MAC address of the network interface

By default, the statistics is stored for no less than six months and is kept on file for easy access by law enforcement and/or other authorities who request this information.

To export the statistics in csv format, click the Download CSV button.

35.2.8 Resource Diffs

To view changes that have been made during a transaction, you need to have the appropriate Resource Diff permissions enabled.

This tab contains the transactions that have caused a change in the distribution of resources. The list contains the transactions that change the amount of resources allocated to an existing entity, e.g. disk resize, as well as the transactions that add or delete entities, e.g. virtual server destruction. Below is the example of some transactions that you may find on the page.

- **Resize Disk** - changes of the disk size
- **ResizeVirtualServer** - changes to a VS's number of CPU cores, priority value and RAM size
ResizeContainerServer - changes to a container server's number of CPU cores, priority value and RAM size

ResizeApplicationServer - changes to an application server's number of CPU cores, priority value and RAM size

ResizeVirtualServerwithoutreboot - changes to a VS's number of CPU cores, priority value and RAM size performed without a reboot

ResizeApplicationServerwithoutreboot - changes to an application server's number of CPU cores, priority value and RAM size performed without a reboot

ResizeContainerServerwithoutreboot - changes to a container server's number of CPU cores, priority value and RAM size performed without a reboot

HotMigrate - changes to a source/destination compute resource ID, label, and IP address

ColdMigrate - changes to a source/destination compute resource ID, label, and IP address

UpdateResourcePool - changes to the resource pool's resources

EditFirewallRule - changes to the firewalls

EditNATRule - changes to the NAT rules

EditIPSECVPNRule - changes to the IPSECVPN rules

Any other transactions that create or delete entities

Click the transaction to view its details. You will see the Before and After columns with the changed resources highlighted in red and green. The Before column will be empty if a transaction creates a new entity. Correspondingly, the After column will be empty if the transaction removes an entity. If you have Approvals permissions enabled, you will see the Approve and Decline buttons at the bottom of the screen in case the transaction is pending for approval. For more information refer to Transaction Approvals.

You can also view resource differences in the Control Panel's logs.

35.3 Alerts

Alerts are created when zombies appear on the system. These are listed in the Control Panel's Alerts screen. There are different kinds of zombies:

Zombie Virtual Servers - VSs which are detected by the OnApp controller as currently running on a Compute resource, but which are not in OnApp's database. Also, VSs running on a Compute resource the CP is not expecting it to be running on.

Zombie Disks - disks which are detected by the OnApp controller as existing on a data store, but which are not in OnApp's database.

Zombie Data stores - data stores which are detected by the OnApp controller as existing in the cloud, but which are not in OnApp's database.

Wrong Activated Logical Volumes - the virtual servers' disks that are either activated on two compute resources simultaneously or activated on the wrong compute resource.

Zombie Transactions - transactions which have running status but their PIDs do not exist on the system or transactions that have exceeded the zombie transaction time.

The Alerts menu also lists the background processes running on your system. Max Amount values show the maximum number of background processes which can run simultaneously. Running shows the number of processes running at the moment.

In most cases, you can remove the zombie elements from the system by clicking the Delete icon next to a zombie. For further help, contact...
In previous versions, OnApp used LVM commands to detect zombie disks. Since version 4.2, the Control Panel gathers text files from the disks in the system via SNMP and makes the decision to mark certain disks as 'zombie' based on these files. This solution reduces the load on LVM. The system can gather data from a maximum of approximately 4400 disks at a time per one compute resource or backup server.

See also:
Logs
Sysadmin
Failover Processes

35.4 Failover Processes

Failover processes show the list of failover logs that take place on the Compute zones in the cloud.

To view the list of failover processes:

Go to Control Panel > Admin > Logs.

Click the Failover Processes button. On the page that appears, you can see the following information for each failover log:
- Failover number
- Indication of the time when it started
- Compute zone on which the failover happened
- Time of the last iteration
- Failover action status: active or completed

To view the failover transaction details, click its reference number. For more information on failover, refer to Failover Configuration section of this guide.

See also:
Logs
Sysadmin
Alerts
36 Metrics

The Metrics menu unites usage trends, cloud usage, and top IOPS disks statistics. The statistics receiver is an SNMP agent that collects data from host and guest systems and saves it in the round-robin database for the future processing. The collected data are then converted into hourly, daily, weekly and monthly statistics. The interval can be changed in the application configuration file. Hourly statistics are stored in the database for the last 2 months. Daily statistics are stored for 12 months. Old statistics data are stored as a monthly statistics (12 months, respectively).

See also:
Usage Trends
Cloud Usage
Top IOPS Disks

36.1 Usage Trends

The charts at the User Trends page show the quick overview of your cloud infrastructure. Depending on the date range that you select, the charts will show hourly or daily statistics. For the 24 hours or less time period, the hourly statistics will be displayed. Otherwise, the charts will represent daily statistics.

Ensure that the See Global Statistic permission is on before viewing usage trends statistics. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

Below you can find how the details on usage trends statistics and its measurement.

On this page:
View Usage Trends
Usage Trends Statistics Measurement

See also:
Cloud Usage
CDN Usage Statistics
Top IOPS disks

36.1.1 View Usage Trends

To view Usage Trends of your cloud:
Go to your Control Panel > Metrics > User Trends.
Click the tab you are interested in (CPU usage, Memory usage, Disk usage, IOPS, Bandwidth, Virtual/baremetal/smart servers).
The chart with the statistics appears.
Period filter

By default, statistics are generated for the last three days. To specify another period, set the Start and End time and click the Apply button. Tick the Show in my Timezone box to show statistics according to your profile's time zone settings. You can zoom in a chart to view more detailed graphs.

Filtering by compute zone

It is possible to see the infrastructure statistics per compute zone as well as combination of the different zones. Statistics are shown in a form of area charts with highlighted color per each compute zone. On the side where the amount for each zone is shown, you can remove compute zones you do not wish to see by clicking on it. Selected compute zone will be grayed out and excluded from the graph. Also, the top 20 VSs are shown according to compute zone selection.

Top 20 VSs

Under the graphs you can find the list of top 20 VSs, which are shown for the compute zones selected in the filter, or for the whole cloud if nothing is filtered. Each VS is marked by color in accordance with compute zone color on the chart. Top 20 servers ordered by resource usage for the selected period are displayed together with their details:

<table>
<thead>
<tr>
<th>Details</th>
<th>CPU (cores)</th>
<th>Memory (MB)</th>
<th>Disk (GB)</th>
<th>IOPS (items)</th>
<th>Bandwidth (KB)</th>
<th>Virtual Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>VS operating system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Label</td>
<td>the name of the server</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk Size</td>
<td>disk size allocated to VS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>the RAM size available to VS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compute resource</td>
<td>compute resource on which VS is built</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User</td>
<td>username of the VS owner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Usage</td>
<td>the used amount of CPU cores for the last hour</td>
<td>the used amount of Memory for the last hour</td>
<td>the used amount of Disk for the last hour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage</td>
<td>average for the selected period is displayed. If the VS has not been existing for the whole period, the average for the actual (existing) period is displayed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Data</td>
<td>the latest instant usage data that we have</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>the total for the whole period is displayed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created at</td>
<td>server creation time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
36.1.2 Usage Trends Statistics Measurement

Below you can find what statistics is shown depending on the chosen time period.

<table>
<thead>
<tr>
<th>Chart</th>
<th>Hourly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>shows the total amount of cores per hour (virtual)</td>
<td>shows the maximum amount of cores per day for the set time period (virtual)</td>
</tr>
<tr>
<td>Memory</td>
<td>shows the total amount of RAM per hour for all VSs in the cloud</td>
<td>shows the max amount of RAM per day for the set time period for all VSs in the cloud</td>
</tr>
<tr>
<td>Storage</td>
<td>shows the total of all disks’ capacities per hour for all VSs in the cloud</td>
<td>shows the maximum of all disks’ capacities per day for the set time period for all VSs in the cloud</td>
</tr>
<tr>
<td>IOPS</td>
<td>shows the total of data read/written for the entire cloud per hour</td>
<td>shows the total of data read/written for each day for the entire cloud for the time period set</td>
</tr>
</tbody>
</table>

IOPS is measured in amount, indicated by metric prefix. For example, 8M=8 millions, 2G=2 billions etc.

| Baremetal servers | shows the total amount of baremetal servers per hour | shows the amount of baremetal servers in the cloud for each day for the time period set |
| Smart Servers     | shows the total amount of smart servers in the cloud per hour | shows the amount of smart servers in the cloud for each day for the time period set |
| VSS               | shows the amount of VSS per hour                      | shows the amount of VSS per day for the time period set                  |
| Bandwidth         | shows the total bytes sent/received for the entire cloud per hour | shows the total bytes sent/received for each day for the entire cloud for the time period set |

36.2 Cloud Usage

The Usage Statistics page lists each virtual server in your cloud, along with the following details:

- **Virtual Server** - the label the virtual server
- **Owner** - the username of the VS owner
- **CPU Used** - the average CPU percentage that the VS has been using during the last 48 hours or during the period you specified
- **Disk r/w Completed**
- **Disk reads completed** - the number of read operations completed on the disk
- **Disk writes completed** - the number of write operations completed on the disk
**Disk r/w Data**

**Disk data read** - the amount of data read from the disk

**Disk data written** - the amount of data written to the disk

**Bandwidth**

**Bandwidth sent** - the number of Kilobytes (KB) sent by the VS

**Bandwidth received** - the number of Kilobytes (KB) received by the VS

To sort the statistics in the table, hover over the required column and click the label. The arrow that appears while hovering over the label shows the order (ascending/descending) in which the data is sorted. Click the label again to sort the data in the different order. You can also view details of a specific VS or its owner by clicking the corresponding links in the table.

By default, statistics are generated for the last 48 hours. To specify another period, set the **Start** and **End** time and click the **Apply** button.

When you specify hours for statistics generation, pay attention that statistics will be generated as follows:

For a period of time where hours are specified without minutes, e.g. 15.00-17.00, the statistics will be generated for the specified period of time and the preceding hour, that is from 14.00 up to 17.00.

For a period of time where hours are specified with minutes, e.g. 15.30-17.00, the statistics will be generated for the specified period of time, that is from 15.00 up to 17.00.

To generate the statistics for one month, select a period without the following month, for example from 01.04.2019 00:00 to 30.04.2019 23:59 but not to 01.05.2019 00:00.

To download a CSV file with statistics for a selected period of time, click the **Save as CSV** button. The download will start automatically after you click the button.

**See also:**

- Top IOPS disks
- Usage Trends
- Virtual Servers

### 36.3 Top IOPS disks

Top IOPS statistics chart displays 10 disks with top IOPS usage along with the following details:

- **Label** - the name of a virtual server the disk is located at.
- **Disk** - disk ID.
- **IOPS Read** - number of read I/O operations per second (total value over the last hour).
- **IOPS Written** - number of written I/O operations per second (total value over the last hour).
- **Total IOPS** - total number of I/O operations for this disk.
36.4 Operator Dashboard

If you want to track the amount of bandwidth used by accelerated websites, you can view bandwidth statistics in the Operator Dashboard menu. By default, statistics are generated for the last 24 hours. To specify another period, use the period filter at the top right corner of the page.

To see bandwidth statistics:

1. Go to your Control Panel > Metrics > Operator Dashboard menu.
2. Set the Start and End time and click the Apply button.

The Operator Dashboard page lists each accelerated website in your cloud, along with the following details:

- **Highest CDN Bandwidth** - the highest total cached bandwidth (traffic served from CDN) served per day within the selected period
- **Highest Origin Bandwidth** - the highest total uncached bandwidth (traffic served from the origin) served per day within the selected period
- **Total Website Count** - the total number of active websites that are currently accelerated by the accelerator

See also:

- Edge Accelerator Statistics
- Usage Trends
- Cloud Usage
- Top IOPS disks
37 Localization and Customization

You can easily adapt the Control Panel to your requirements by translating to different custom languages, adding new currencies and currency formats, and changing images, colors, names and titles. You can also assign differently localized/customized Control Panel views to different users. This chapter explains all of this functionality.

37.1 Manage Languages

OnApp uses a standard Rails i18n internationalization system. You can add any language to your Control Panel and translate all the interface labels, error messages, and other texts from default language into one or more custom languages.

If you use custom languages on your CP, after the upgrade to OnApp 6.1, import custom languages by following the procedure.

37.1.1 Add Custom Language

You can add custom languages by translating the UI phrases from English into a custom language, using the i18n Customization menu on your CP. To add a custom language and provide translations:

Go to your Control Panel > Admin > Settings > i18n Customization menu.

Click the + button, select the required language from the list and click Submit.

Click the label of the required language. On the page that loads, you will see the following tabs with types of translations:

- **Missing translations** - lists phrases that are not translated from English into a custom language
- **Completed translations** - lists phrases that are translated from English into a custom language.

This tab is available if there are some phrases translated into a custom language.

On this page:

- Add Custom Language
- Export English Language
- Import Custom Language
- Enable Custom Language for Specific User

See also:

- Create and Manage Currencies
- Localization and Customization Search
- Look & Feel
- Service Insertion Framework Configuration
- OnApp Configuration
Updated translations - lists phrases that exist in English and are translated into a custom language but which were updated in English since the last translation into a custom language. This tab is available if there are some phrases updated in English.

Static pages - lists phrases that appear on static pages.

4. In all of the above-listed tabs, you can provide translations in the corresponding boxes next to the texts in English.

For extended texts that include HTML tags, variables, and other special symbols, click the —> button to copy the English variant into a target custom language to preserve the default structure.

Do not translate the words true and false in a label, preceeding a boolean variable. For example: true (Do not translate -- Enter true or false) - you can translate the label into your custom locale but the words true and false must be in English.

5. Click Apply to save the provided translations.

6. When you are finished with translations, return to the Locales menu and click the Save Changes button.

If you don’t click Save Changes, the translations you provided will not be applied to your custom language.

You should apply and save at least one translation to be able to make your custom language available on CP.

7. Go to Admin > Settings > Configuration > Interface tab, add your custom language into the Locales box and click the Save Configuration button. If a custom language is not added to the interface configuration, users will not be able to use it in your cloud.

37.1.2 Export English Language

You can export the English language from your Control Panel to a YAML file. The exported file will contain all the user interface labels, messages, and other texts in English. You can then translate them to your custom language and import the file back to Control Panel.

To export the English locale to a YAML file, run the following rake task:

```
rake onapp:language:default_dump[tmp]
```

Where default_dump is the name of the file and tmp\ is an example of a directory to save the file to.
37.1.3 Import Custom Language

You can also add a custom language to CP by uploading a YAML file with your translations to the `config/locales` directory. When the file is uploaded to `config/locales`, your custom language will become available in your cloud. However, in order to be able to edit translations for this language via the i18n Customization menu, you should run the following rake task:

```
rake onapp:language:import
```

After the rake task is executed, a dump file with your custom translations is automatically created in the `locales_dump` directory. The `onapp:language:import` rake task also ensures that after a subsequent upgrade to a newer OnApp version, all new UI labels, texts, and messages in the default language will be available for translation into the custom language in the Admin tab > Settings > Locales > language > Missing translations tab.

If you make any changes in the default English translations, you should run the following rake task for these changes to be applied on CP:

```
rake onapp:language:sync
```

37.1.4 Enable Custom Language for Specific User

Now that you have added one or more custom languages, you can specify which language a particular user will see in their view of the Control Panel.

Make sure that the required locales are added in the Admin tab > Settings > Configuration > Interface > Locales box.

Go to your Control Panel's Users menu.

Click a user's name.

On the page that appears, click the Edit Profile tab.

Choose your custom language from the Locales drop-down list.

Click Save.

37.2 Create and Manage Currencies

By default, the system includes three currencies: USD, EUR and GBP. You can add more currencies at any time. In this document you can find information on how to add, edit, and delete currencies.

37.2.1 Add Currency
To add a currency:
Go to your Control Panel > Admin > Settings menu.
Click the Currencies icon.
On the page that follows, click the Create New button.
Fill in the form that appears:
name - give the label to your currency
unit - insert a currency symbol
code - fill in a three-character currency code that is generally used to represent the currency you wish to add (e.g. USD, EUR)
separator - specify a character used to format decimal numbers, e.g. 100.99.
delimiter - set a grouping character used to separate thousands, e.g. 100,000,000.

Be aware that it is prohibited to set the delimiter and separator which are identical.

precision - specify the number of digits after the separator. The precision parameter is used to display the costs total for a certain period, e.g. Outstanding amount, Total Cost, Payments.
precision per unit - the number of digits after the separator. The precision per unit parameter is used to display the prices for the resources, e.g. for CPU, Disk size, RAM, IP, Data stores, Edge servers, Disks, Backups, Templates, etc.
The precision cannot exceed 8 symbols.

format - set how the currency will be displayed in the Control Panel. Use the following parameters:
%\n - for the digits
%\u - for the currency symbol
Click Save.

On this page:
Add Currency
Edit Currency
Delete Currency
See also:
Manage Languages
Localization and Customization Search
Look & Feel
Service Insertion Framework Configuration
OnApp Configuration

For example, the currency form for US Dollars might look as follows…
37.2.2 Edit Currency

To edit existing currencies:

Go to your Control Panel > Admin > Settings menu.

Click the Currencies icon.

Click the Actions icon next to the necessary currency on the list and select the Edit option. On the screen that appears, you may edit the following currency details:

name - the label of your currency

unit - a currency symbol

code - a three-character currency code that is generally used to represent the currency you wish to add

separator - a character used to format decimal numbers, e.g. 100.99.

delimiter - a grouping character used to separate thousands, e.g.: 100,000,000.

Be aware that it is prohibited to set the delimiter and separator which are identical.

precision - the number of digits after the separator. The precision parameter is used to display the costs total for a certain period, e.g. Outstanding amount, Total Cost, Payments.

precision per unit - the number of digits after the separator. The precision per unit parameter is used to display the prices for the resources, e.g. for CPU, Disk size, RAM, IP, Data stores, Edge servers, Disks, Backups, Templates, etc.

The precision cannot exceed 8 symbols.

format - how the currency will be displayed in the control panel. Use the following parameters:

%u%n - for the digits
37.2.3 Delete Currency

To delete existing currencies:

Go to your Control Panel > Admin > Settings menu.

Click the Currencies icon.

Click the Actions icon next to the currency you want to remove and select the Delete option. You will be asked for confirmation before the currency is deleted.

You cannot delete a currency that is associated with a bucket.

37.3 Localization and Customization Search

The search box in the Localization and Customization menu allows you to search by the following parameters:

- Item ID
- English Value
- Translation

37.3.1 Search Localization & Customization Menu

To search the Localization and Customization menu:

Log in to your Control Panel.

Go to Admin > Settings menu.

Click the i18n Customization icon.

Click the required language Name (e.g. "English").

Type the search phrase into the search box and click Search.

If required, make changes and click Apply.

See also:

- Languages
- Currencies
- Look & Feel
- Service Insertion Framework Configuration
- OnApp Configuration

37.4 Look & Feel

You can change the look of OnApp Control Panel in several ways:
Using Look & Feel UI options
Adding your custom CSS rules
Adding your custom Java Scripts

Please be aware that OnApp supports the following:
- Two latest versions of most popular browsers are supported (Google Chrome and Firefox)
- Opera is not supported
- JavaScript must be enabled in the browser

On this page:
- Look&Feel
- Custom CSS Rules
- Custom Java Scripts

See also:
- Languages
- Currencies
- Localization and Customization Search
- Service Insertion Framework Configuration
- OnApp Configuration

37.4.1 Theme

You can manage various aspects of the Control Panel's look & feel, including the logo displayed, background colors and other graphics and thus receive a unique theme.

To create a custom theme:

Go to your Control Panel > Admin > Settings menu and click the Look & Feel icon.
Press the + button.
Use the fields provided to manage the UI, as explained below:

Theme options

Label - give a name to your theme.
Active – use this checkbox to specify whether the theme is displayed or not. If this box is not checked, the default colors and graphics are used, irrespective of other settings.

User group
User Groups - check the groups of users for whom you wish to apply the theme.

**General**

*Title* - enter the desired title which will be displayed at the top left corner of the browser window.
*Logo* - click the Browse button to choose a custom logo.
Check the Disable Logo box to prevent a logo from displaying (no logo will be displayed)
Check the Remove logo box to delete a custom logo.
*Logo mini* - click the Browse button to choose a custom logo mini.
Check the Disable Logo mini box to prevent a logo mini from displaying (no logo mini will be displayed)
Check the Remove logo mini box to delete a custom logo mini.
*Favicon* - click the Browse button to choose a custom logo.
Check the Disable favicon box to prevent the favicon from displaying (no favicon will be displayed)
Check the Remove favicon box to delete a favicon.

**Powered by**

*Hide* – check the box to remove the Powered by OnApp message at the top of the navigation pane.
*Url* – enter an URL you wish to link to instead of http://www.onapp.com/.
*Color* - this is the color displayed in the main body of the page (e.g. behind the fields you're currently editing).
To change the color, click the field to pop up a palette chooser, or enter a CSS color code.
To revert to the default color, leave this field blank.
The color will not be displayed unless any full-screen Background Image you're using is disabled.
*Text* – specify the text which will be added after Powered by instead of OnApp.

**Header&Footer HTML**

*Header* - enter the HTML codes to display instead of default header.
*Footer* - enter the HTML codes to display instead of default footer.
Click Save Theme button to create and apply a theme.

**37.4.2 Custom CSS Rules**

You can add your own CSS rules to customize OnApp Control Panel.
To add CSS rule:
Go to /onapp/interface/public/themes folder.
Create custom.css file with CSS rule code you want to add. For example:
Save the file.
Go to OnApp Control Panel and refresh it. The background color will be changed:

![OnApp Control Panel showing a background color change](image)

### 37.4.3 Custom Java Scripts

You can add your own Java scripts to customize OnApp Control Panel.

To add a Java script:

Go to `/onapp/interface/public/themes` folder.

Create a `custom.js` file with a code you want to add.

Save the file.

Go to OnApp Control Panel and refresh it.

### 37.5 Service Insertion Framework Configuration

The Service Insertion Framework allows you to bring other portals into OnApp. Also, you can integrate an insertion framework into OnApp, which will display a web page within the user profile in the OnApp Control Panel (legacy mode).

Ensure that the Service Insertion Groups and Service Insertion Pages permissions are on before managing service insertion framework. For more information, refer to the List of all OnApp Permissions section of this guide.

Be aware that insertion framework may not be shown when header has `X-Frame-Options`. User can be logged in only if embedded source accepts credentials via GET request.

### 37.5.1 Configure Service Insertion Framework

To configure service insertion framework:

Create service insertion group, which is a container for service insertion pages. Service insertion group which is available for a chosen audience.
Create service insertion page(s), where you will add a URL, which will be displayed in the frame.

When service insertion groups and pages are configured, they will appear at Control Panel sidebar menu. Click the service insertion page's label to display the page in the main content panel.

Below you can find detailed information on how to create and manage service insertion groups and pages.

On this page:

Configure Service Insertion Framework
Service Insertion Groups
Create Groups
Edit Groups
Service Insertion Pages
Create Pages
Edit Pages
See also:
Languages
Currencies
Permissions
Look & Feel
OnApp Configuration

37.5.2 Service Insertion Groups

37.5.2.1 Create Service Insertion Group

To create a Service Insertion Group:

Log in to your OnApp Control Panel.
Go to Admin > Settings > Look & Feel.
On the page that loads, click the Service Insertion Framework > Service Insertion Groups tab.
At the bottom of the screen, click the Add Service Insertion Group button.
Fill in the following fields:

Label - fill in the name for service insertion group

Weight - select value from 10 to 0 to determine which group comes first. If all groups are weighted the same, then the list is displayed based on order retrieved from the database.

Target - choose the audience, which your service insertion group will be available to:

Global - service insertion group will be available to all users

User - Users field appears, where you indicate user(s), whom your service insertion group will be available to
User group - User groups field appears, where you indicate user group(s), to which your service insertion group will be available

Click Submit.

37.5.2.2 Edit Service Insertion Group
To edit a Service Insertion Group:
Log in to your OnApp Control Panel > Admin > Settings > Look & Feel.
On the page that loads, click the Service Insertion Framework > Service Insertion Groups tab.
The list of all Service Insertion Groups will load. Click the Actions icon next to a required Service Insertion Group, and click Edit or Delete if necessary to edit or remove the group respectively.

37.5.3 Service Insertion Pages

37.5.3.1 Create Service Insertion Page
To create a Service Insertion Page:
Log in to your OnApp Control Panel > Admin > Settings > Look & Feel.
On the page that loads, click the Service Insertion Framework > Service Insertion Pages tab.
At the bottom of the screen, click Add Service Insertion Page button.
Fill in the following fields:
Label - fill in the name for the service insertion page
URL - add URL, which will be displayed in the frame
Legacy mode - move the slider to the right to enable legacy mode and fill in the corresponding fields:
Users - select the appropriate users whose username will be used to form an URL
User field parameter - fill in the user field label
User field - select the required user parameter value from the drop-down list. This could be a login, email etc.
Password field parameter - fill in the password field label
Password field - select the password field value from the drop-down menu. These are the Additional fields of the specified user.

If a legacy mode is disabled, fill in the following:
Weight - select from 10 to 0 to determine which page comes first in the group. If all pages are weighted the same, then the list is displayed based on order retrieved from the database.
Service insertion groups - assign page to service insertion group(s)
Choose one of the credentials types (Global static, User based or User group based) from the drop-down list and fill in the corresponding fields:
User field parameter - fill in the user field label
User field - select the required user parameter value from the drop-down list. This could be a login, email etc.
Password field parameter - fill in the password field label
Password field - select the password field value from the drop-down menu. These are the Additional fields of the specified user.

If you want to clean all fields and restart the creation process, click the Reset Form Fields button.

Click Submit.

37.5.3.2 Edit Service Insertion Page
To edit a Service Insertion Page:
Log in to your OnApp Control Panel > Admin > Settings > Look & Feel.
On the page that loads, click the Service Insertion Framework > Service Insertion Pages tab.
The list of all Service Insertion Pages will load. Click the Actions icon next to a required Service Insertion Page, and click Edit or Delete if necessary to edit or remove the group respectively.
38 Miscellaneous

This chapter describes more sophisticated operations, which help manage different OnApp functionalities. It is highly recommended that only advanced users perform these tasks.

38.1 Reset Control Panel Administrator Password

To generate a new password for an administrator user:

Log in to your OnApp Cloud Control Panel using SSH:

```
ssh root@your.hostname
```

Go to the directory where your Control Panel is installed:

```
cd /onapp/interface
```

To set a predefined password, run:

```
RAILS_ENV=production rake onapp:password[admin,new_password]
```

See also:

- Failover Configuration
- Advanced Configuration Settings
- Track Daemon Process Activity
- Virtual Server Provisioning

Make sure there are no spaces in brackets.

If the operation was successful you will see a *Password successfully changed to 'new_password'* message. If the operation could not be completed, you will see an error report.

38.2 Create New Linux/Windows Templates

OnApp provides separate documents to explain how to create Windows and Linux templates from scratch, rather than from existing VS templates. Please refer to the Miscellaneous Documentation for details.

38.3 Transaction Server

Transaction server is an element of the location group (Compute resource or a backup server) where the particular transaction is performed.

These are *non-backup* transactions, related to Appliances (apart from VMware virtual servers), such as:

- destroy disk
- configuration of the operating system
- build disk
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format disk
provisioning
rebuild network (offline)
SetSshKey (offline)
ConfigureLoadBalancer (offline)

See also:
Failover Configuration
Virtual Server Provisioning
Advanced Configuration Settings
Add Google Map API Key

The system selects the element of your location group to be a transaction server according to the following principle:

If the appliance is associated with a Compute resource with only a local data store, this Compute resource will be selected.

If there are backup servers (server) available to the user who sets the transaction, any such backup server will be selected based on the lowest CPU load (highest \textit{cpu\_idle} parameter)

If the above user does not have access to the backup servers, but there are such in his location group, any of the available backup servers will be selected based on the lowest CPU load (highest \textit{cpu\_idle} parameter)

If there are no backup servers in the location group, the Compute resource associated with this virtual server will be selected as the transaction server.

38.4 Failover Configuration

OnApp allows configuring the compute resource failover behavior. The failover settings are specified per compute zone. Below you can find instructions on how to manage failover processes for compute resources.

38.4.1 How Failover Works

\textit{Requests before marked as failed} (default value = 12) specifies how many times we cannot get a reply from a compute resource after which the compute resource is marked as offline. If Compute resource is marked as offline and the failover is enabled, the failover process starts.

This parameter is configurable at Control Panel > Admin tab > Settings > Configuration, see the following Failover Settings section for details.

The compute resource will be rebooted in case it's completely unreachable for OnApp when failover is enabled.

Also the Ping hosted virtual servers before initiating failover slider should be enabled to contact VSs before initiating failover.
First iteration tries to migrate all VSs according to the failover algorithm set for the Compute zone. If some VSs weren't migrated, next iteration will start, until all VSs are migrated (iterations run once a minute).

Failover can be globally turned off/on for the whole cloud in the /onapp/interface/config/on_app.yml file. Please check if disable_hypervisor_failover is set to ‘false’ to have Failover enabled.

Note that you should also check the Operating System Type option of a target compute resource before the VS migration. A Windows-based VS can be only migrated to a compute resource with *Any* option or *Windows only* option enabled. The Linux-based or FreeBSD-based VS can be only migrated to a compute resource with *Any* option or *Non-Windows* option enabled.

**Additional Considerations for Integrated Storage**

In Integrated Storage backend nodes are marked as inactive approximately three minutes after a backend node has stopped reporting its status. IS is a distributed system and it takes some time to sync/converge metadata across nodes. If IS is used in the cloud it is strongly recommended to set the “Requests before marked as failed” parameter in Settings > Configuration menu to at least 18-20.

---

**On this page:**

*How Failover Works*

*Failover Settings*

*Failover Algorithm*

*Failover Logs*

*See also:*

*Reset Control Panel Administrator Password*

*Transaction Server*

*Advanced Configuration Settings*

*Virtual Server Provisioning*
38.4.2 Failover Settings

To configure Compute zone failover settings:

Go to your Control Panel's > Admin tab > Settings menu, and click the Compute resource Zones icon.
The screen that appears will show all zones currently set up in the cloud.

Click the Actions button next to the required Compute zone, then click Edit and specify the following parameters:

Placement type - specify the Compute resource selection algorithm, that will be used on virtual server provisioning and recovery, per Compute zone:
- Take Compute resource with maximum free RAM (Round Robin) - set this type to select the Compute resource with maximum free RAM during the VS recovery. This option allows performing faster migration of virtual servers with the lesser number of iterations during the failover.
  This option behaves in different ways, depending on the event:
  - On provisioning, the round-robin algorithm will be used on Compute resource selection.
  - On recovery, the Compute resource with maximum free RAM will be selected.
- Take Compute resource with minimum required free RAM - with this type the system selects the Compute resource with minimum required free RAM. This option allows filling Compute resource as tightly as possible before starting to use next Compute resource in the zone.

Failover timeout - set how many minutes the system should try to find the appropriate hypervisor to migrate the VSs from the compute resource that failed. The count will start after the first time the system will find no compute resources to which to migrate VSs.

You can disable failover for each particular Compute resource in Compute resource settings:

Go to your Control Panel's > Admin tab > Settings menu.

Click the Compute resources icon.

Click the Actions button next to the Compute resource you want to edit, then click Edit.

On the screen that follows, change the failover settings:

Disable failover - enable or disable the VS migration to another Compute resource if this Compute resource is marked as offline by the Control Panel server.

To configure the Requests before marked as failed parameter:

Go to your Control Panel's Admin tab > Settings menu, and click the Configuration icon.

Click the System tab to change the settings:

Requests before marked as failed - determines how many times the Control Panel server will attempt to contact a Compute resource before failover is initiated. For the Integrated Storage, we recommend increasing this parameter to 30, so that the storage platform has enough time to mark the Compute resources accordingly, and allow the VSs to start up after a failed Compute resource.

The time before the CP initiates failover may differ depending on the number of compute resources and their load.

Ping hosted virtual servers before initiating failover - move the slider to the right to enable contacting VSs before initiating failover for a particular compute resource. By default this slider is enabled.
Note that if you are using Floating IPs in your environment or if you have VS with primary IPs which could respond to your Control Panel server from elsewhere on your network we would recommend to disable this setting to avoid the possibility of a false-positive ICMP result.

38.4.3 Failover Algorithm

Control Panel daemon checks compute resource accessibility via the management network (using SNMP) each 10 seconds.

If after a certain number of attempts (indicated in settings as Requests before marked as failed) compute resource’s SNMP service is down, system should ensure that compute resource is offline.

Control Panel takes the following steps:

A option
Control Panel sends snmpget request. If it is successful, then SSH is added into compute resource virsh list and failure account (amount of requests before compute resource is marked as failed) is reset.

B option
In case of snmpget request failure SSH is checked. If command is successful, then SSH is added into compute resource, services (snmpd&snmptrapd, restart etc.) are checked and one more snmpget request is sent. If it is successful, then A option is applied.

C option
If option B is unsuccessful, then one more snmpget request is sent. If it is successful, then A option is applied. In case of failure you get an alert (with information that SNMP has unusual
configuration) and failure account (amount of requests before compute resource is marked as failed) is reset.

**D option**

If SSH checking request is unsuccessful, all booted VSs of the compute resource are pinged. This step is optional and depends if the *Ping hosted virtual servers before initiating failover* slider is enabled (by default this slider is enabled, see Failover settings section below).

**E option**

If ping of VSs is successful, you get an alert and failure account (amount of requests before compute resource is marked as failed) is reset.

**F option**

If ping of VSs is unsuccessful, failover is activated and compute resource is marked as offline.

Below you can find meanings of commands:

- `virsh list` - get virtualization system status (Xen or KVM) to ensure that it works properly
- `snmpget` - take uptime from compute resource

### 38.4.4 Failover Logs

Failover processes show the list of failover logs that take place on the Compute zones in the cloud.

To view the list of failover processes:

Go to **Control Panel > Admin tab > Logs**.

Click the **Failover Processes** button. On the page that appears, you can see the following information for each failover log:

- Failover number
- Indication of the time when it started
- Compute zone on which the failover happened
- Time of the last iteration
- Failover action status: active or completed

To view the failover transaction details, click its reference number.

### 38.5 Calculate Billing Statistics for the Missing Period

Sometimes customers are experiencing the problem of missing billing statistics because of daemon, delayed jobs, cron, and raw statistics temporary failures. After the mentioned services get started, raw statistics data gets inserted into the DB and afterward aggregated into raw hourly statistics (in most of the cases). Having raw hourly stats in DB allows generating billing statistics based on it. That doesn't happen automatically because of peculiarities of billing statistics generation. However, it can be done manually running the rake task specifying the period *(billing:calculate_hourly_stats_for_missed_period [:start_time, :end_time])*.
Usage example:

```bash
RAILS_ENV=production rake billing:calculate_hourly_stats_for_missed_period\['2014-06-01 01:00:00', '2014-06-05 23:00:00'\]
```

See also:
- Reset Control Panel Administrator Password
- Advanced Configuration Settings
- Track Daemon Process Activity
- Virtual Server Provisioning

### 38.6 Advanced Configuration Settings

Although you can edit most of the OnApp settings via the Control Panel user interface, there are some options that can be edited only in the on_app.yml file. You can use the Advanced Configuration Settings section to modify the OnApp configuration settings. This section contains the list of parameters you can edit in the on_app.yml file with their default values.

We recommend making a copy of the configuration file before making any changes.

See also:
- Reset Control Panel Administrator Password
- Failover Configuration
- Transaction Server
- Virtual Server Provisioning

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<td>system_email</td>
<td><a href="mailto:app@onapp.com">app@onapp.com</a></td>
</tr>
<tr>
<td>system_support_email</td>
<td><a href="mailto:support@onapp.com">support@onapp.com</a></td>
</tr>
<tr>
<td>system_host</td>
<td>onapp.com</td>
</tr>
<tr>
<td>system_notification</td>
<td>true</td>
</tr>
<tr>
<td>ips_allowed_for_login</td>
<td>should be empty to allow all or string with IPs comma-separated, like 1.1.1.1, 2.2.2.2, 2.3.3.3</td>
</tr>
<tr>
<td>enable_ipv6</td>
<td>true</td>
</tr>
<tr>
<td>remove_old_root_passwords</td>
<td>false</td>
</tr>
<tr>
<td>pagination_max_items_limit</td>
<td>100</td>
</tr>
<tr>
<td>monitis_path</td>
<td>/usr/local/monitis</td>
</tr>
<tr>
<td>monitis_account</td>
<td><a href="mailto:monitis@onapp.com">monitis@onapp.com</a></td>
</tr>
<tr>
<td>locales</td>
<td>[en]</td>
</tr>
<tr>
<td>default_firewall_policy</td>
<td>ACCEPT</td>
</tr>
<tr>
<td>app_name</td>
<td>OnApp</td>
</tr>
<tr>
<td>show_ip_address_selection_for_new_vm</td>
<td>false</td>
</tr>
<tr>
<td>backup_taker_delay</td>
<td>300*</td>
</tr>
<tr>
<td>cdn_sync_delay</td>
<td>1200</td>
</tr>
<tr>
<td>billing_stat_updater_delay</td>
<td>5</td>
</tr>
<tr>
<td>zombie_disk_space_updater_delay</td>
<td>300</td>
</tr>
<tr>
<td>cluster_monitor_delay</td>
<td>15</td>
</tr>
<tr>
<td>hypervisor_monitor_delay</td>
<td>5</td>
</tr>
<tr>
<td>schedule_runner_delay</td>
<td>60*</td>
</tr>
<tr>
<td>transaction_runner_delay</td>
<td>300*</td>
</tr>
<tr>
<td>zombie_transaction_time</td>
<td>20</td>
</tr>
<tr>
<td>kms_server_host</td>
<td></td>
</tr>
<tr>
<td>kms_server_port</td>
<td>1</td>
</tr>
<tr>
<td>ip_range_limit</td>
<td>1000</td>
</tr>
<tr>
<td>same_autoscaleout_nodes_virtualization_system</td>
<td>true</td>
</tr>
<tr>
<td>dns_enabled</td>
<td>false</td>
</tr>
<tr>
<td>enabled_libvirtAntiSpoofing</td>
<td>false</td>
</tr>
<tr>
<td>Parameter</td>
<td>Default value</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>allow_start_vms_with_one_ip</td>
<td>true</td>
</tr>
<tr>
<td>allow_initial_root_password_encryption</td>
<td>false</td>
</tr>
<tr>
<td>wipe_out_disk_on_destroy</td>
<td>false</td>
</tr>
<tr>
<td>password_enforce_complexity</td>
<td>true</td>
</tr>
<tr>
<td>password_minimum_length</td>
<td>12</td>
</tr>
<tr>
<td>password_upper_lowercase</td>
<td>true</td>
</tr>
<tr>
<td>password_letters_numbers</td>
<td>true</td>
</tr>
<tr>
<td>password_symbols</td>
<td>true</td>
</tr>
<tr>
<td>password_force_unique</td>
<td>true</td>
</tr>
<tr>
<td>password_lockout_attempts</td>
<td>3</td>
</tr>
<tr>
<td>password_expiry</td>
<td>1</td>
</tr>
<tr>
<td>password_history_length</td>
<td>12</td>
</tr>
<tr>
<td>cloud_boot_enabled</td>
<td>false</td>
</tr>
<tr>
<td>nfs_root_ip</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>cloud_boot_target</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>storage_enabled</td>
<td>false</td>
</tr>
<tr>
<td>prefer_local_reads</td>
<td>false</td>
</tr>
<tr>
<td>vmware_cluster_name</td>
<td>OnApp</td>
</tr>
<tr>
<td>service_account_name</td>
<td>onapp</td>
</tr>
<tr>
<td>system_alert_reminder_period</td>
<td>60</td>
</tr>
<tr>
<td>archive_stats_period</td>
<td>3</td>
</tr>
<tr>
<td>is_archive_stats_enabled</td>
<td>false</td>
</tr>
<tr>
<td>wrong_activated_logical_volume_minutes</td>
<td>60</td>
</tr>
<tr>
<td>use_html5_vnc_console</td>
<td>false</td>
</tr>
<tr>
<td>use_rrd_for_statistic_tables</td>
<td>true</td>
</tr>
<tr>
<td>partition_align_offset</td>
<td>2048</td>
</tr>
<tr>
<td>migration_rate_limit</td>
<td>10</td>
</tr>
<tr>
<td>iscsi_port_availability_check_timeout</td>
<td>5</td>
</tr>
</tbody>
</table>

* - these values are recommended for the specified parameters in order to provide more stable daemon workflow.
38.6.1 Daemon Workflow

To provide more stable daemon workflow for deployments with a high load we recommend increasing values for the following parameters in the /onapp/interface/config/on_app.yml file:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Recommended value</th>
</tr>
</thead>
<tbody>
<tr>
<td>backup_taker_delay</td>
<td>300</td>
</tr>
<tr>
<td>schedule_runner_delay</td>
<td>60</td>
</tr>
<tr>
<td>transaction_runner_delay</td>
<td>300</td>
</tr>
</tbody>
</table>

38.6.2 SNMP Statistics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>server_community</td>
<td>onapp</td>
</tr>
<tr>
<td>snmp_timeout</td>
<td>2</td>
</tr>
<tr>
<td>snmp_connect_retries</td>
<td>3</td>
</tr>
<tr>
<td>snmp_stats_level1_period</td>
<td>10</td>
</tr>
<tr>
<td>snmp_stats_level2_period</td>
<td>60</td>
</tr>
<tr>
<td>snmp_stats_level3_period</td>
<td>120</td>
</tr>
<tr>
<td>snmp_max_recv_bytes</td>
<td>100000</td>
</tr>
<tr>
<td>snmp_stats_protocol</td>
<td>udp</td>
</tr>
</tbody>
</table>

Both TCP and UDP protocols are enabled on compute resources by default. You can select the preferred protocol by changing the snmp_stats_protocol parameter value.

38.6.3 VMware Statistics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>vmware_stats_level1_period</td>
<td>60</td>
</tr>
<tr>
<td>vmware_stats_level2_period</td>
<td>180</td>
</tr>
<tr>
<td>vmware_stats_usage_interval</td>
<td>20</td>
</tr>
</tbody>
</table>
38.6.4 SolidFire Statistics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>solidfire_stats_usage_interval</td>
<td>120</td>
</tr>
</tbody>
</table>

38.6.5 Global Whitelist

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>global_white_list_ips</td>
<td>-</td>
</tr>
</tbody>
</table>

See [Global Whitelist](#) for more details.

38.7 Track Daemon Process Activity

To get the details on daemon process's activity, run the activity tracker:

```
./script/tools/process_logger.sh -p <PID> -l|--log-folder <log folder> -d|--pid-folder <pid folder>
```

Example:

```
./script/tools/process_logger.sh -p 4242 -l /tmp/logs -d /tmp/pids
```

See also:

- [Virtual Server Provisioning](#)
- [Add Google Map API Key](#)
- [Calculate Billing Statistics for the Missing Period](#)
- [Transaction Server](#)

Usage:
track -p <PID> -l|--log-folder <log folder> -d|--pid-folder <pid folder>

Logs folder structure: <LOG-FOLDER>/<PID>.
Example:
  LOG-FOLDER = /tmp/logs
  PID = 4242

  Result: /tmp/logs/4242/

Options:
  Required:
    -p|--pid
      PID of target process

    -l|--log-folder
      Folder, where logs are stored

    -d|--pid-folder
      Folder, where pid files are stored

  Optional:
    -t|--time-interval
      Refresh time in seconds. Works only for main log and lsof command
      Default: 1 second

    -m|--memory-alert-step
      Memory alert size. In megabytes.
      Default: 100m

    -r|--log-max-size
      Max log size, before it rotates. In megabytes.
      Default: 100m

Example:
  track.sh -p 4242 -l /tmp/logs -d /tmp/pids

38.8 Virtual Server Provisioning

Under certain circumstances, your virtual servers that are offline might be implicitly cold migrated to another compute resource within one compute zone. This occurs after manual start up with no additional information in the logs, when the compute resource cannot provide sufficient resources for the VS or is offline. If the compute resource is offline or OnApp considers that there are not enough resources to start the VS, usually because there is not enough free RAM available, the VS is implicitly cold migrated to a compute resource with sufficient resources and started there.

The mentioned conditions may also appear if a compute resource was rebooted, then came back online, but the information about its free and total RAM has not yet been obtained from the compute resource and you attempt to start up the VS. In such a case, OnApp considers that the compute resource does not have sufficient resources and migrates the VS.

To avoid such behavior, check the compute resources list at Control Panel > Settings > Compute Resources to see whether a compute resource you are interested in is online and actual information about its RAM is displaying. If there is enough free RAM for the VS, starting the virtual server will be done on the checked compute resource.
Note that you should also check the Operating System Type option of a target compute resource before the VS migration. A Windows-based VS can be only migrated to a compute resource with Any option or Windows only option enabled. The Linux-based or FreeBSD-based VS can be only migrated to a compute resource with Any option or Non-Windows option enabled.

See also:

- Reset Control Panel Administrator Password
- Transaction Server
- Advanced Configuration Settings
- Track Daemon Process Activity
39 Disaster Recovery as a Service (DRaaS)

OnApp DRaaS (Disaster Recovery as a Service) is a tool which replicates all of the virtual server data to a remote cloud in real-time. If anything happens to your replicated VS, then you can quickly boot a functionally identical VS on the DRaaS provider cloud.

Requirements

You must run OnApp Integrated Storage on all compute zones you wish to replicate.

By default, you must run two cloud installations of OnApp version >=4.2 to use DRaaS. Both clouds should have the same version and the same private networks. However, if necessary, you may also use one cloud and perform replication between two compute zones within the same cloud.

Your compute resources must be publicly accessible (e.g. via NAT). Alternatively, you may use a private network, but in this case this private network must be routable between the compute zones.

You should have sufficient bandwidth for the replication (recommended > 100Mbps).

Do not block any communication between the Control Panel and compute resources, including port 22 (default for SSH connection), and port 51820 (default for VPN).

Recommended speed for data transfer between Control Panel and compute resources is 1000+ Mbps.

---

DRaaS can be used for a compute zone which contains Integrated Storage data stores only (LVM and IS data stores can not be used at once).

For the instructions on how to enable and manage DRaaS for virtual servers, refer to Manage DRaaS.

---

39.1 Prerequisites

See also:
Manage DRaaS
DRaaS Dashboard
Permissions

OnApp Configuration

Tools

Resource Allocation And Prices
Update your Control Panel and CloudBoot to DRaaS (OnApp 4.2 version and up)
Check if DRaaS feature is enabled in your license

All the virtual servers you want to replicate must use OnApp Storage
Enable DRaaS locally on your Control Panel: go to Admin > Settings > Configuration > System > Enable DRaaS
CloudBoot must be enabled (Admin > Settings > Configuration > System > Enable CloudBoot)
If you have IP whitelisting enabled on your Control Panel server, allow the DRaaS dashboard IP address (89.238.147.228) to connect
Ensure that Any action related to DRaaS permission is on before managing DRaaS. For more information about permissions refer to the List of all OnApp Permissions section of this guide.
All compute resources you will use for DRaaS must be of the same virtualization type (both KVM) and have the same operating system.
Make sure to add a Location Group to all CloudBoot compute zones you will use for DRaaS.
Make sure DRaaS Dashboard is properly configured (registration of compute zones for DRaaS and indication of replication sites. Be aware that DRaaS login credentials for Cloud Owner users are set up by OnApp team, regular user accounts are created automatically once DRaaS is enabled for user VS.)

Once you have all requirements and prerequisites met and DRaaS Dashboard is configured, you may enable DRaaS for virtual server.

39.2 DRaaS Dashboard

The DRaaS Dashboard allows you to add and configure clouds, which is required for the setup of disaster recovery as a service.
The homepage displays all the recent transactions, that help you track all the disaster recovery setup, replication, failover, and failback processes, as well as cloud availability.
39.2.1 Prerequisites

Before adding clouds to the DRaaS Dashboard, make sure to assign at least one data store and one network for replication to each CloudBoot compute zone that you will use for DRaaS.

On this page:

Prerequisites
Add Clouds to DRaaS Dashboard
Configure Clouds on DRaaS Dashboard
Connect Clouds on DRaaS Dashboard
Configure Networks on DRaaS Dashboard
DRaaS Dashboard Users
Activate DRaaS
Failover
Failback
DRaaS Dashboard API Keys
Configure VPN on DRaaS Dashboard

See also:
Disaster Recovery as a Service (DRaaS)
Create and Manage CloudBoot Compute Resources
Compute Zones Settings

39.2.2 Add Clouds to DRaaS Dashboard

You will need to add two clouds to the DRaaS Dashboard one by one:

source cloud, where all the data will be primarily stored

provider cloud, that will be used for replication in case of disaster recovery

To register a new cloud on the DRaaS Dashboard:
Log in to the DRaaS Dashboard > Clouds tab.
Click the Register New Cloud button.
On the page that appears, fill in the following details:
Label - specify the cloud label
Subdomain - the IP address or hostname of the cloud

Go to the Credentials tab and click the Edit button.
On the page that appears, fill in the following details:
API Address - IP address that responds on API calls
API Login - email address of your user account
API Token - you can find it at the User Profile page in API Info section or generate it on same page if you don’t have it yet.

Having the first cloud added to the DRaaS Dashboard, you may now proceed to configure it.

39.2.3 Configure Clouds on DRaaS Dashboard
To configure clouds on DRaaS Dashboard:

Go to the IP Ranges tab and click the Add New IP Range button to add IP range of the network assigned to the CloudBoot compute zone.

Go to the Compute Zone tab and click the Register new compute zone button to register new CloudBoot compute zone.

Select from the dropbox the compute zone the VS will be replicated to. For the provider cloud, tick the Provider checkbox. For the source cloud, leave the checkbox empty.

Having added and configured one of two clouds, go back to the first step and add the second cloud.
Having both source and provider clouds added to the DRaaS Dashboard and configured, you may now connect them.

39.2.4 Connect Clouds on DRaaS Dashboard
The next step is connecting source and provider compute zones. There are two possible connection methods: via selecting the provider cloud directly from the dropbox, or by adding its private key. Here is the first method:

Go to the Compute Zones page and select the source compute zone from the list.

Go to the Links tab and click the Create new link button.

From the Provider dropbox select the necessary provider compute zone.

Click Save.

The alternative method of connecting source and provider compute zones includes additional steps for adding the provider private key. To use the additional method:
Go to the **Compute Zones** page and select the provider compute zone from the list.

On the page that appears, find and copy the Private Key value.

Get back to the **Compute Zones** page, and select the source compute zone from the list.

On the page that appears, go to the **Links** tab and click the **Create new link** button.

Paste the private key from step two into the **Private Key** field.

Click **Save**.

Once you have the source and provider clouds connected, you may proceed to configure networks.

### 39.2.5 Configure Networks on DRaaS Dashboard

In the DRaaS Dashboard, there may be three possible network types:

- **Replication** - used for the replication in all possible cases
- **Internal** - may be used for replication only in case there are no replication type networks added to the compute zone
- **Unused** - must not be used for replication even if it is the only available network in the compute zone

If several networks of replication and internal types are available in the compute zone, the network for replication will be randomly selected by the system.

By default, type of all networks added during clouds registration is **Replication**.

To change the network type:

Go to the **Compute Zones** page and select the necessary compute zone from the list.

On the page that appears, go to the **Networks** tab.

Select the required network and click the **Edit** button.

Select the necessary type (replication, internal, or unused) from the **Type** dropbox.

Click **Save**.
Once you have both clouds and networks configured and the other prerequisites are met, you may proceed to enable DRaaS for your VSs in OnApp Control Panel.

39.2.5.1 Connect Networks Assigned to Different Compute Zones

This functionality applies only to networks of internal type.

DRaaS Dashboard also allows to connect networks of internal type assigned to different compute zones. To connect internal networks from different compute zones:

Go to the Compute Zones page and select the source compute zone from the list.

On the page that appears, go to the Networks tab.

Click the label of the necessary internal type network.

Go to the Links tab and click the Create New Link button.

From the Provider Network dropbox select the necessary local network.

Click Save.

39.2.6 DRaaS Dashboard Users

There are three types of roles in DRaaS Dashboard:

Administrator - reserved for OnApp support engineers

Cloud owner - created by support engineers; login credentials are provided by a support engineer

Cloud user - is created automatically during cloud registration and can manage only one's own virtual server via the subdomain.draas.io dashboard (where subdomain stands for the user's VS IP address or hostname)

39.2.7 Activate DRaaS

Having both the source and provider clouds configured and the DRaaS Dashboard set up, you may now activate DRaaS:

Go to your Control Panel > Virtual Servers.

Click the label of the necessary source virtual server.

On the page that appears, click Tools and select the Activate DRaaS option.
Wait for the following transactions to be finished:

*Register Virtual Machine*
*Synchronize Virtual Machine Metadata*
*Replication healing*

To check the list of transactions of a specific virtual server, go to the [DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Events tab.](https://example.com)

Once all the transactions listed above are completed, wait for the replication to finish* as well. To check this, go to the [DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.](https://example.com)

*Please note that the replication process may take a lot of time to complete depending on different factors, such as data transfer speed, Internet speed, disks size, and others.*

Once the replication is completed, you have one active virtual server on the source cloud and one shadow virtual server on the provider cloud.

If any unexpected issues appear on the source cloud, the virtual server on the provider cloud automatically becomes available. Consequently, the provider cloud becomes the source cloud, and the virtual server on the initial source cloud becomes the shadow virtual server.

### 39.2.8 Failover

You may also start the disaster recovery procedure manually - initiate failover. To do so:

Go to your DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.

Click the **Failover** button.

Wait for the **Failover** transaction to finish. To check the transaction status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Events tab.
39.2.9 Failback

To revert the changes, you may also initiate failback manually. To do so:

Go to your DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.

Click the Start Failback button.

Wait for the Synchronize Virtual Machine Metadata and Replication healing transactions to finish. To check the transaction status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Events tab.

Wait for the replication to finish*. To check the replication status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.

*Please note that the replication process may take a lot of time to complete depending on different factors, such as data transfer speed, Internet speed, disks size, and others.

During the replication, the provider clouds remains available, and the source cloud is in the standby state until the replication is completed.

Once the replication is completed, go to your DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab and click the Finalize Failback button.

Wait for the Finalize Failback transaction to finish. To check the transaction status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Events tab.

Wait for the replication to finish*. To check the replication status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.

*Please note that the replication process may take a lot of time to complete depending on different factors, such as data transfer speed, Internet speed, disks size, and others.

Once the replication is completed, the clouds are back to the same state as after the successful DRaaS activation.
39.2.10 DRaaS Dashboard API Keys

API keys are used for running API requests to DRaaS Dashboard. You may view the existing API keys and issue a new API key at the DRaaS Dashboard > API Keys page.

39.2.11 Configure VPN on DRaaS Dashboard

DRaaS Dashboard VPN is not supported on CentOS 6 KVM compute resources.

VPN is a security feature that provides data transfer between two Control Panels via secure VPN tunnels.

You may enable VPN in your DRaaS Dashboard before DRaaS activation for the source VS in your OnApp CP. Also, you may use the alternative method, if you have DRaaS already activated on the OnApp CP side or want to do it first.

If DRaaS for the source VS is not yet activated on the OnApp CP side, follow these steps to configure VPN:

Go to your DRaaS Dashboard > Clouds > click the label of the source cloud.

In the Encryption Policy field of the Details tab, click the Edit button.

On the screen that appears, specify the necessary VPN configuration option, which may be one of the following:

- **Disabled** - VPN will not be used for this cloud
- **Preferred** - VPN will be used, but will be disabled automatically in cases of poor network connection, slow Internet, etc., and replication will continue without the encryption
- **Required** - VPN will be obligatory to start and proceed the replication, but in case of network connectivity issues the replication process may be unstable.
- **Restart Replication** - tick the checkbox to apply VPN to all of the already added and configured...
VSs in the DRaaS Dashboard through restarting replication on each of those. Otherwise, all the previously added VSs will continue working without VPN until the next replication, and all the newly added VSs will use secure VPN tunnels for data transfer after their initial replication.

Click Save.

Then activate DRaaS in OnApp Control Panel: go to your CP > Virtual Servers > label of the necessary source VS > Tools > Activate DRaaS.

To activate DRaaS first, follow this alternative method to configure VPN for the source cloud:

Activate DRaaS: go to you OnApp OnApp Control Panel > Virtual Servers > label of the necessary source VS > Tools > Activate DRaaS.

Wait for the replication to finish.

Go to your DRaaS Dashboard > Clouds > click the label of the source cloud.

In the Encryption Policy field of the Details tab, click the Edit button.

On the screen that appears, specify the necessary VPN configuration option, which may be one of the following:

Disabled - VPN will not be used for this cloud

Preferred - VPN will be used, but will be disabled automatically in cases of poor network connection, slow Internet, etc., and replication will continue without the encryption

Required - VPN will be obligatory to start and proceed the replication, but in case of network connectivity issues the replication process may be unstable.

Restart Replication - tick the checkbox to apply VPN to all of the already added and configured VSs in the DRaaS Dashboard through restarting replication on each of those. Otherwise, all the previously added VSs will continue working without VPN until the next replication, and all the newly added VSs will use secure VPN tunnels for data transfer after their initial replication.

Click Save.

The Encryption Policy update will be applied to the cloud and all VSs once replication is finished.

39.2.11.1 Activate VPN for VS

You may also activate VPN for a specific virtual server, so that it will only apply to this VS and cloud and other VSs in the DRaaS Dashboard will not be affected.

To activate VPN for a VS:

Make sure that VPN for the corresponding cloud on the DRaaS Dashboard is disabled (check at DRaaS Dashboard > Clouds > label of the source cloud > Details tab > Encryption policy field).

Activate DRaaS for the VS: go to you OnApp OnApp Control Panel > Virtual Servers > label of the necessary source VS > Tools > Activate DRaaS.

Wait for the replication to finish. To check the replication status, go to the DRaaS Dashboard > Virtual Machines > label of the necessary virtual server > Details tab.

Go to DRaaS Dashboard > Virtual Servers > label of the necessary VS > Details tab.

In the Encryption Policy field of the Details tab, click the Edit button.

On the screen that appears, specify the necessary VPN configuration option, which may be one of the following:

Disabled - VPN will not be used for this VS

Preferred - VPN will be used, but will be disabled automatically in cases of poor network connection, slow Internet, etc., and replication will continue without the encryption.
Required - VPN will be obligatory to start and proceed the replication, but in case of network connectivity issues the replication process may be unstable.

Restart Replication - tick the checkbox to restart replication, so that VPN will be enabled for the VS once the replication is finished. Click Save. The Encryption Policy update will be applied to the VS once replication is finished.

### 39.3 Manage DRaaS

Once you have enabled DRaaS on your cloud, registered on the dashboard and added your compute zones to DRaaS at the DRaaS dashboard, you can enable DRaaS on your virtual servers. DRaaS uses OnApp’s Integrated Storage, so any VS which you want to enable DRaaS on will need to use IS.

If VS is not provisioned or VS creation task is failed, Enable Disaster Recovery option will not be available.

**On this page:**

- Enable DRaaS for Virtual Server
- Disable DRaaS
- DRaaS Billing

#### 39.3.1 Enable DRaaS for Virtual Server

To enable DRaaS for a virtual server:

Go to your Control Panel's Virtual Servers menu.

Click the label of the required virtual server.

Click Tools > Enable Disaster Recovery. This triggers the following steps:

- It registers the VS on the DRaaS Dashboard and creates an account for the VS owner (if it differs from the cloud owner);
- It creates a shadow VS on the DRaaS provider zone that you chose;
- It creates an additional 1GB disk on the shadow VS to store replication metadata that enables quick resynchronization between source and shadow VSs after connection loss;
- It sets up a secure encrypted tunnel (if encryption is enabled) and begins to replicate all your data to the DRaaS provider site

If you log in to the Dashboard and click through to the details page for the VS, you will be able to see details of the progress.

The process of enabling DRaaS can take some time and depends on your available outbound bandwidth, how much storage you are using and other factors. Once all the data has been replicated and all the disks
are synchronized, then DRaaS is fully active and your VS is able to failover any time it needs to.

In case you need to resize a vdisk, the replication should be restarted manually to correctly synchronize the remote location.

### 39.3.2 Disable DRaaS

To disable DRaaS for a VS:

- Log in to the DRaaS Dashboard.
- Go to the **Virtual Servers** > label of the necessary VS > **Details** tab.
- Click the **Remove** button.

Once done, the VS will be removed from the provider cloud and will remain only on the source cloud. After successful removal of a VS from the DRaaS Dashboard, you may enable DRaaS for this VS once again when necessary.

### 39.3.3 DRaaS Billing

You can set pricing for DRaaS resources in user bucket.

In bucket DRaaS resources are a part of User VS limits. You can set the following additional fees for a VS with DRaaS enabled:

- for disk size per GB per hour
- for RAM per GB per hour
- for CPU core per core per hour
- for CPU per share per hour or CPU per unit per hour
- for node per unit per hour

In case of billing per node, it is calculated how many nodes each VS with DRaaS enabled has. The number of nodes corresponds to the highest resource requirement, e.g. a VS with 1 Core, 1GB RAM and 20GB Storage is equivalent to two nodes and is charged accordingly.

For more information on DRaaS billing, refer to the [Configure Resource Allocation And Prices](#) section of this guide.
40 SSL Certificates

OnApp implements SSL certificates management, so that customers can import their SSL certificates to the cloud via OnApp Control Panel. Below you can find instructions on how to add SSL certificates to OnApp Control Panel.

40.1 Prerequisites

Ensure that the following conditions are fulfilled before uploading SSL certificate to OnApp Control Panel:

- Manage SSL certificate permission is on. For more information refer to the List of all OnApp Permissions section of this guide.
- SSL certificate consists of three files with the following names: ca.crt, ca.key and bundle.crt.
- SSL certificate is not protected by password.

On this page:

- Prerequisites
- View SSL Certificates
- Add SSL Certificate

See also:

- OnApp Configuration
- Tools
- Miscellaneous
- Permissions

40.2 View SSL Certificates

To view the list of SSL certificates:

Go to your Control Panel > Admin tab > Settings > SSL Certificate button.

The page that loads, shows all available SSL certificates with their details:

- Name - the label of SSL certificate
- Path - the route to SSL certificate

40.3 Add SSL Certificate
You can either upload SSL certificate or set up a self-signed one (default self-signed certificate that comes with OnApp CP installation).

To upload SSL certificate:

Go to your Control Panel > Admin > Settings > SSL Certificate button.
Click Upload.
Click Choose File to select the required SSL certificate from your file system.
Click Submit.

To set up a self-signed SSL certificate:

Go to your Control Panel > Admin > Settings > SSL Certificate button.
Click the Setup self-signed SSL button. This action will setup default self-signed certificates that come with OnApp CP installation. Setting up certificates will restart the CP webserver and make it unavailable for few seconds.
Move the Confirm setup self-signed SSL slider to the right to confirm your action.
Click Submit.
41 Help

The help menu enables you and your users to submit support requests to the OnApp team. All OnApp customers with a full license are entitled to 24/7 support.

To submit a support request, go to your Control Panel > Admin > Help, and complete the form on the screen that follows.

Alternatively, you can call +1 (888) 876-8666 or use the OnApp support portal.

Be aware that Help enables your users to submit requests to OnApp on behalf of the cloud owner. All the requests received via Help are considered to be sent from a trusted source. You can prohibit certain users or user groups to access Help, using Permissions.
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