OnApp Cloud 5.8
Administration Guide
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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 5.8

**Added**
- Added the [Backup Plugin System](#) chapter
- Added the [Manage Virtual Server Backup Resources](#) section
- Added the [Manage Virtual Server Recovery Points](#) section
- Added the [Manage Compute Zone Backup Resource Zones](#) section
- Added the [Manage Virtual Server Advanced Configuration](#) section
- Added the [SDN Management](#) chapter

**Updated**
- Updated [Zone Types](#): added information on the Backup Resource Zone type.
- Updated [Buckets](#): added information on billing for backup resource zones.
- Updated [Configure Resource Allocation and Prices](#) with the following information:
  - Added Backup Resource Zone Limits and CDN Bandwidth Limits to the Other section of Access Control
  - Added Pricing for Backup Resource Zones to the Other section of Rate Card
- Added information on Recovery Points Count and OVAs Count to the following documents:
  - [User Profile](#)
  - [Create and Manage User Accounts](#)
- Updated [Notifications Setup](#) and [Manage Notifications](#): removed the _hot_migrate_alert_ notification template.
- Updated [Create Virtual Server](#) and [Manage Virtual Servers](#): added an infobox on setting the correct amount of CPU sockets.
- Updated [Manage Virtual Servers](#): added information on the hot migration of VSs and disks.
- Updated [Manage Virtual Server Power Options](#) and [Manage Compute Resources](#): added information on the possibility to simultaneously power on/off all virtual servers that run on the same compute resource.
- Added the following new permission sets to the [List of all OnApp Permissions](#) and [List of Default Permissions for Admin Role](#) documents:
  - Backup Resources
  - Backup Resource Zones
  - Backup Resource Auto Backup Presets
  - Recovery Points
  - SDN Managers
  - SDN Networks
- Added the following new permissions to the [List of all OnApp Permissions](#) document:
  - Edit advanced XML configuration for any VS
  - Edit advanced XML configuration for own VS
• Updated **Cloud Usage**: added information on the statistics generation for the specified time period.

• Updated **Manage Languages**: added a note block on copying a source text in English into the custom language.

• Updated **Create and Manage Backup Servers**: added information that OVAs are taken into account while calculating the free storage space on backup servers.

• Updated the following documents with an infobox that to run a backup schedule with the failed status once again users need to select the *Enabled* option during the schedule editing:
  - Create and Manage Backup Schedules
  - Manage Virtual Server Backup Schedules
  - ISO Virtual Server Backup Schedules
  - OVA Virtual Server Backup Schedules
  - Manage Smart Server Backup Schedules
  - Manage Application Server Backup Schedules
  - Manage Container Server Backup Schedules

• Updated **Create and Manage CloudBoot Compute Resources**: updated versions of CentOS for Xen 4 and Baremetal resource types.

• Updated **Edit Defaults Configuration**: added information on the *Allow advanced VS management* option.
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4 What's New in OnApp Cloud 5.8

The OnApp Cloud 5.8 release contains the following changes and new features:

4.1 Backup Plugin System

OnApp 5.8 introduces the Backup Plugin System that enables you to integrate OnApp with the 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. Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases. The integration of a backup plugin involves completing the following steps:

- Creating and installing a backup plugin to integrate your backup service with OnApp.
- Creating a backup resource that will use your plugin to manage the backup process on the OnApp side.
- Creating a backup resource zone and attaching the backup resource to this zone.
- Attaching the backup resource zone to a compute zone to back up virtual servers that run on compute resources in this compute zone.
- Adding the backup resource zone to a bucket for this zone to be available for users in your cloud.
- Creating auto backup presets to schedule when backups are automatically run to back up virtual servers.
- Attaching the backup resource to virtual servers that run on compute resources from the destination compute zone.
- Restoring a virtual server from a recovery point when it is necessary.

4.2 Software Defined Networking

OnApp 5.8 introduces Software Defined Networking to simplify network management. The feature provides the ability to manage networks faster using VXLAN technology across OnApp cloud compute resources. Among the features of the SDN functionality are:

- The SDN Manager functionality to manage the SDN infrastructure using API calls for the ODL controller.
- The SDN Nodes functionality to be able to select the compute resource from compute zones.
- The SDN Networks functionality to manage networks using VXLAN technology.

4.3 Hot Migration

OnApp 5.8 introduces the Hot Migration feature for virtual servers and virtual server disks. This feature enables you to perform migration using the following methods:

- **Hot Migration Between Compute Resources**
  Migrate an online virtual server to another compute resource within the same compute zone.

- **VS and Disks Hot Migration**
  Migrate an online virtual server to another compute resource within the same compute zone and disks to a new data store that is associated with the destination compute zone and compute resource.
- **Disks Hot Migration**
  Migrate disks between compute resources that share common data stores or data store zones.

### 4.4 Improvements for Virtual Servers

OnApp 5.8 provides new possibilities for managing virtual servers that are built on Xen and KVM compute resources:

- 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.

- You can simultaneously power on and power off multiple virtual servers that reside on the same compute resource.
# 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>
</tr>
</thead>
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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: 

```
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:
```
echo "cp <LOCATION OF vnc.xml> /etc/vmware/firewall/vnc.xml" >> /etc/rc.local
echo "localcli network firewall refresh" >> /etc/rc.local
echo "esxcli network firewall refresh" >> /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.

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
Compute Resources
CloudBoot Compute Resources
Virtual Servers
Smart Servers
Baremetal Servers
Storage Devices
Networks
Templates
Scalability
High Availability
Security

See also:
Hardware & Software Requirements
API and Integrations
Network Configurations
Zone Types

6.1.1.2 Compute Resources
Compute resources are Xen, KVM, or VMware ESXi/vSphere 5.0-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
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 5.7 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>

#### CP Server
- **Processor**: 2 x 8 Core CPUs
  - eg. Xeon e5-2640 v3
- **Memory**: 32GB RAM
- **Disks**: 4 x 100GB SSD
- **RAID Configuration**: RAID 10
- **Network Adapters**: Dual port 1Gbps + Dual Port 10Gbps
  - eg. Intel I350 + X520

#### Backup Server
- **Processor**: 2 x 8 Core CPUs
  - eg. Intel Xeon e5-2620 v3
- **Memory**: 32GB RAM
- **HDDs**: 12x2TB SAS
- **RAID**: RAID10
- **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
- **Memory**: 256GB
- **HDDs**: 8 x 400GB SSD
- **RAID Controller**: PCIe gen3
  - eg. PERC H730, 1GB cache
- **RAID Configuration**: JBOD
- **Network**: 4 x 10Gbps
### 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>
<tbody>
<tr>
<td>• OnApp Integrated Storage can group together any number of drives across any compute resource. We strongly recommend a minimum of 2 drives per compute resource to enable redundant data store configurations.</td>
<td>• minimum 1 dedicated partition in each compute resource</td>
<td>• centralisedBlockStorage SAN (iSCSI, ATA over Ethernet or Fibre Channel) accessible to every compute resource</td>
</tr>
<tr>
<td>• At least 1 dedicated NIC assigned per compute resource for the storage network (SAN)</td>
<td>• separate disk from the primary OS drive recommended</td>
<td>• at least 1 dedicated 1GBit/s NIC assigned per compute resource for the SAN</td>
</tr>
<tr>
<td>• IGMP snooping must be disabled on storage switch for storage network</td>
<td></td>
<td>• multiple NICs bonded or 10GBit/s ethernet recommended</td>
</tr>
</tbody>
</table>

### 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 SchemeAdvanced Backup Scheme
6.5.1.1 Cloud only Network Diagram (BBS)
6.5.1.2 Cloud only Network Diagram (ABS)

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)
6.6 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 vCloud 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>vCloud 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>vCloud Director</td>
<td>VPC</td>
</tr>
<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>vCloud 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

The OnApp dashboard is displayed after logging into the system. You can view resource usage statistics, activity log and summary of the entire cloud.

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

See also:
- API Key
- Login Screen
- User Profile
- Cloud Search Tool

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:

<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>
</tbody>
</table>
| Storage  | Total amount of storage currently | Sum total of all VS disks | The points on the graph show daily peaks of used storage space (in GB) for a particular time period.
Go to your Control Panel’s **Settings > Configuration > Interface tab > 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 ordinary 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 in the entire cloud.

### 7.3 Activity Log

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

- Normal users see recent transactions for their virtual servers.
- Administrators see recent transactions for the entire cloud.
7.4 Additional Navigation

**Build** – in the upper right corner, click the **Build** button to create new virtual server, application server, load balancer, edge server, storage server or new blueprint.

Click the **Arrow** button to hide the Control Panel's menu.

Use the **Search** tool for global search across the cloud.

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 normal username/password credentials during API operations.

To generate a key for a user, go to the user's profile page at **Control Panel > 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 > 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 > 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.

---

**See also:**

- [Configuration Settings](#)
- [Authentication](#)
- [Tools](#)
- [Localization and Customization](#)
- [User Profile](#)
- [Users](#)
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 > 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 > 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.

### 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 through the Control Panel's **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  
User Details  
Amazon Web Services  
Additional Info  
Oauth Authentication  
Yubico Info  
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.

Yubico Info

This section appears in the profile only if you have either the Update Yubikey or the Update own Yubikey permission enabled.

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

- Use Yubikey - move the slider to the right to enable logging in 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 window that pops up shows the list of your YubiKeys and when each of them was last used. You can add up to five YubiKeys.
  - To add a new YubiKey:
    - a.i. Enter a label for your YubiKey in the Enter label field.
    - a.ii. Click in the Touch your yubikey field.
    - a.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.
  - 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 appears 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.
- **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.

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 whitelist 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 quick access to the creation wizards of most common OnApp entities at **Control Panel > 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**

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:

<table>
<thead>
<tr>
<th>Server Options</th>
<th>Virtual Servers</th>
<th>Smart Servers</th>
<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

<table>
<thead>
<tr>
<th>Power Options</th>
<th>Virtual Servers</th>
<th>Smart Servers</th>
<th>Application Servers</th>
<th>Baremetal Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reboot</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Reboot in recovery</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boot from ISO</td>
<td>✓</td>
<td></td>
<td></td>
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<td>Shut down</td>
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</tr>
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<td>Startup</td>
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Administrative Options

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<tr>
<th>Administrative Options</th>
<th>Virtual Servers</th>
<th>Smart Servers</th>
<th>Application Servers</th>
<th>Baremetal Servers</th>
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<tr>
<td>Reset Root Password</td>
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<tr>
<td>Change owner</td>
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<td>Set SSH keys</td>
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<td>Edit Administrator's note</td>
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<tr>
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<tr>
<td>Transactions and logs</td>
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Networks

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<td>Rebuild network</td>
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<table>
<thead>
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<th>Option</th>
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<tr>
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<tr>
<td>Virtual server IP addresses</td>
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<td>✓</td>
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<tr>
<td>Display network speed for network interfaces</td>
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<td>✓</td>
</tr>
<tr>
<td>Edit network speed</td>
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<td>Create disks</td>
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<tr>
<td>Edit disks</td>
<td>✓</td>
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<td>Migrate disks</td>
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<td>Delete disks</td>
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<td>View</td>
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<tr>
<td>Convert to template</td>
<td>✓</td>
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<tr>
<td>Restore backup</td>
<td>✓</td>
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<tr>
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</tr>
<tr>
<td>Edit backup note</td>
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<td>Backup Schedules</td>
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<td>View schedules</td>
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</tr>
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<td>Create schedule</td>
<td>✓</td>
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<tr>
<td>Edit schedule</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Delete schedule</td>
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<td>Statistics</td>
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<tr>
<td>CPU utilization</td>
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</tr>
<tr>
<td>Billing statistics</td>
<td>✓</td>
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</tr>
<tr>
<td>Network interface statistics</td>
<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td>Disk IOPS statistics</td>
<td>✓</td>
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</tr>
<tr>
<td>Recipes</td>
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<tr>
<td>Recipes</td>
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<td>Custom variables</td>
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</tbody>
</table>

### 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:

<table>
<thead>
<tr>
<th>Virtual Server Options</th>
<th>Power Options</th>
<th>Administrative Options</th>
<th>Network Settings</th>
<th>Disk Settings</th>
<th>Backup Settings</th>
<th>Backup Schedules</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot</td>
<td>Reset Root Password</td>
<td>Configure network</td>
<td>Create View</td>
<td>View Schedule</td>
<td>CPU Utilization</td>
<td>Recipes</td>
<td></td>
<td>Service Addons</td>
</tr>
</tbody>
</table>

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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.

<table>
<thead>
<tr>
<th>Rebuild manually</th>
<th>Reboot in recovery</th>
<th>Change owner</th>
<th>Rebuild network</th>
<th>Edit disks</th>
<th>Convert to template</th>
<th>Create schedule</th>
<th>Billing statistics</th>
<th>Custom variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Migrate</strong></td>
<td>SUSPEND</td>
<td>Set SSH keys</td>
<td>Set firewall rules</td>
<td>Migrate disks</td>
<td>Restore backup</td>
<td>Edit schedule</td>
<td>Network interface statistics</td>
<td></td>
</tr>
<tr>
<td><strong>Delete</strong></td>
<td>SHUTDOWN</td>
<td>Edit administrator's note</td>
<td>Virtual server IP addresses</td>
<td>Delet e disks</td>
<td>Delete backup</td>
<td>Delete schedule</td>
<td>Disk IOPS statistics</td>
<td></td>
</tr>
<tr>
<td><strong>Segregate</strong></td>
<td>STARTUP</td>
<td>Integrated console</td>
<td>Display network speed for network interfaces</td>
<td>Edit backup note</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Set VIP status</strong></td>
<td>STARTUP on Recovery</td>
<td>Transactions and logs</td>
<td>Edit network speed</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>Autoscale</strong></td>
<td>Boot from ISO</td>
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<tr>
<td><strong>Enable Disaster Recovery</strong></td>
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</table>

<table>
<thead>
<tr>
<th>interface</th>
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</tr>
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<tbody>
<tr>
<td>Rebuild manually</td>
<td>Reboot in recovery</td>
<td>Change owner</td>
<td>Rebuild network</td>
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<tr>
<td><strong>Delete</strong></td>
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<td>Edit administrator's note</td>
<td>Virtual server IP addresses</td>
<td>Delet e disks</td>
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<td><strong>Segregate</strong></td>
<td>STARTUP</td>
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<td>Display network speed for network interfaces</td>
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<tr>
<td><strong>Set VIP status</strong></td>
<td>STARTUP on Recovery</td>
<td>Transactions and logs</td>
<td>Edit network speed</td>
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<tr>
<td><strong>Autoscale</strong></td>
<td>Boot from ISO</td>
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<tr>
<td><strong>Enable Disaster Recovery</strong></td>
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</tbody>
</table>
• **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.

• **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](#). To create a virtual server:

1. Go to your Control Panel's **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.

---

OnApp must be configured properly before VSs can be created. You must have:

- At least one [data store](#) configured and assigned to a [data store zone](#)
- At least one [network](#) configured and assigned to a [network zone](#)
- At least one [compute resource](#) configured and online
- At least one [compute resource](#) assigned to a [compute zone](#)
- At least one [data store](#) attached to a [compute resource](#)
- At least one [network](#) attached to a [compute resource](#)
- [Assigned a bucket](#) to the user creating the VS

---

On this page:

- [Step 1 of 6. Cloud Locations](#)
- [Step 2 of 6. Templates](#)
- [Step 3 of 6. Virtual Server Properties](#)
- [Step 4 of 6. Resources](#)
- [Step 5 of 6. Recipes or Service Add-ons](#)
- [Step 6 of 6. Confirmation](#)

See also:

- [Virtual Servers](#) - the information on managing virtual servers
- [Configure Resource Allocation And Prices](#) - bucket configuration
- [Template Software Licenses](#) - how to enable MAK or KMS
- [Set up Instance Packages for Cloud](#) - the walk-through for using packages of resources
- [Recipes](#) - recipes creation and management
- [Virtual Servers (API)](#) - the list of available API requests
9.1.1.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the 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 Templates step.

Indicate your virtual 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 virtual server templates.

9.1.1.2 Step 2 of 6. Templates

Make sure that the selected template is located on a backup server attached to the compute resource on which you wish to built the VS, otherwise, the creation of the VS will fail.

At this step, specify the template from which your virtual server will be built. To choose a template:

1. Click the required template store icon on the left (Windows, Linux, FreeBSD etc.) to expand the list of templates on the right. Every template contains the following info:
   - Template's label
   - Min memory size, required to create a VS from this template
   - Min disk size, required to create a VS from this template
   - Virtualization type (XEN, KVM)
   - Price per hour
2. Select the template.
3. Click Next.

**Windows Licensing Type**

This option only appears if your bucket allows it, and if the relevant licensing options have been configured for the template group this template belongs to. If this option is available, 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.
• It is not possible to select KMS or own licensing type when creating a Windows virtual
server from custom template. As a workaround, you can create a virtual server from the
template used for custom template creation.
Proceed to the following step of the wizard and specify the virtual server properties.

Template extraction is performed during server provisioning 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

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:
    o at least Ivy-Bridge-based Intel Xeon E series v2
    o 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.

9.1.1.3 Step 3 of 6. Virtual Server Properties
At this step you need to indicate your virtual server's properties, such as label, password and
other. You can create a virtual server having specified only the required parameters and
configure it later.
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://www.rfc-editor.org/rfc/rfc8740).

  Particular characters 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. The default value is `localdomain`. This parameter is not applicable for 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 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.

For more information on the VS password encryption, refer to the [FAQ](https://www.onapp.com/faq).

Click Next to proceed to the following step of the wizard to specify the virtual server resources.

---

### 9.1.1.4 Step 4 of 6. 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.

**Resources**

**Instance packages**

If the selected instance package applies to certain compute zones only, as indicated in the user's bucket, the VS will be created on one of the compute resources within one of those zones. Otherwise, the compute zone and compute resource for the VS will be selected automatically from the zones available to the user.

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.

You will see all instance packages available to you, but those that have resources incompatible with the available compute zone(s) 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 Virtual Server Provisioning.

When the *Show Compute resources on Virtual Machine creation* permission is disabled (so that user cannot select the Compute resource, but can choose the virtualization type), the Compute resource that meets the virtualization type and the resources set will be automatically selected. The data store will be set according to the compute zone selected.

**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 depends on virtualization type:

<table>
<thead>
<tr>
<th>KVM OS</th>
<th>Max RAM</th>
<th>XEN OS</th>
<th>Max RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS 5.x</td>
<td>512 GB</td>
<td>CentOS 5.x FV</td>
<td>512 GB</td>
</tr>
<tr>
<td>&lt;=CentOS 6.2</td>
<td>512 GB</td>
<td>CentOS 5.x PV</td>
<td>168 GB</td>
</tr>
<tr>
<td>CentOS 6.3</td>
<td>2000 GB</td>
<td>&gt;CentOS 5 FV</td>
<td>1024 GB</td>
</tr>
<tr>
<td>&gt;CentOS 6.3</td>
<td>4000 GB</td>
<td>&gt;CentOS 5 PV</td>
<td>512 GB</td>
</tr>
</tbody>
</table>

Set RAM to 512MB if you are creating a FreeBSD based virtual server. The RAM value can be later increased after the VS creation when editing the VS.

- **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. When the CPU topology is enabled, this amount specifies how many virtual cores the virtual server will have.

- **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 into how many sockets the CPU cores should be arranged. This value will affect the amount of cores per socket.

**Setting the correct amount of CPU sockets**
If the CPU topology is enabled, the CPU cores will mean a number of vCPUs, which is the maximum value that can be arranged into cpu sockets and cores per socket. **If the CPU topology is disabled, the CPU cores will actually mean the CPU sockets value with 1 core_per_socket.**

- 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.

**Primary Disk**
- **Data Store Zone** - choose a data store zone for VS's primary disk.
- **Primary disk size** - set the primary disk size.

**Swap Disk**
- **Data Store Zone** - choose a data store zone 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.

**Network Configuration**
- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the VS should get the IP address
- **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

- For federated VSs: be aware, that during VS creation you cannot set the network port speed greater than indicated by seller when adding zone to federation.
- Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS's primary network interface.
- **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 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 virtual server recipes.

9.1.1.5 Step 5 of 6. Recipes or Service Add-ons

This step can be either Recipes or Service Add-ons depending on the cloud configuration. If service add-on functionality is not available, you will get Recipes step.

**Recipes**

At this step you need to indicate the recipes you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing recipes and add them later if required.

1. Choose a recipe you want to assign to this virtual 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 that completes the virtual server creation process.

The recipes step can be missing in the wizard if there are no recipes created in the cloud.

If mentioned below prerequisites are met, the Recipes step will be replaced with the Service Add-ons step.

**Service Add-ons**

**Prerequisites**

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 bucket.

In case there are no available service add-ons, this step of the wizard will be skipped.

At this step you need to indicate the service add-ons you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing service add-ons and add them later if required.

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.

9.1.1.6 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 **Enable Automated Backup** slider to the right if you want this VS to be backed up automatically (according to the backup settings configured in the Settings/Auto-backup Presets menu).

- 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.

- Move the **Enable Autoscale** slider to the right to set autoscaling for this VS.

  - 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 **Accelerate** slider to the right to enable accelerator for this VS. For more information, refer to the **CDN Accelerator** section.

  The **Accelerate** 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 VS, which will be created, including the info on how many cores/cores per socket/sockets the VS will have.

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.

9.1.2 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: Recipes
- Choose a recipe
- Assign a custom variable

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

Click the Create Virtual Server button to start the creation process
9.1.3 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.

9.1.3.1 View Virtual Servers

To view all virtual servers deployed in the cloud:

1. Go to your Control Panel's **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.
   - 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):

   - **View Virtual Servers**
   - **View Virtual Server Details**
   - **Rebuild/Build Virtual Server Manually**
   - **Edit Virtual Server**
   - **Migrate Virtual Server**
   - **Autoscale Virtual Server**
   - **Set VIP Status for Virtual Server**
   - **Purge Content**
   - **Segregate Virtual Server**
   - **Delete Virtual Server**

See also:

- **Compute Resources**
- **Permissions**
- **Service Add-ons**
- **Create Virtual Server**
- **Virtual Server Disks**

- Recovery reboot
- Power off a VS
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:

9.1.3.2 View Virtual Server Details

To view details of a specific virtual server:

1. Go to your Control Panel’s **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.

9.1.3.2.1 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 Speed
- 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.
- 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.
- Accelerate - move the Accelerate slider to the right to enable acceleration for this VS or move this slider to the left to disable acceleration for this VS. For more information, refer to
CDN Accelerator section. 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.

9.1.3.2.2 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.

9.1.3.2.3 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
- **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.

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.

9.1.3.2.4 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.

9.1.3.3 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's 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.

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 or Linux
- **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.

| After you rebuild your template all data will be lost! |

9.1.3.4 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's **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.

9.1.3.5   Migrate Virtual Server

OnApp allows hot and cold migration of virtual servers:

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

9.1.3.5.1   Virtual Server Hot Migration

Migrate VS hot feature allows you to migrate an online VS from one compute resource to another compute resource live that are both utilizing local/shared/IS storage or across zones. There are two types of hot migration at OnApp, Compute Resource - migration between compute resource and Compute Resource and Storage (Hot) - VS and disk migration.

9.1.3.5.1.1   Hot Migration Between Compute Resources

To hot migrate a virtual server:

1. Go to your Control Panel's 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 migration type - Compute Resource.
5. Choose the target compute resource from the drop-down menu.
6. Move the Cold-migrate when hot-migration fails slider to the right if you want to apply cold migration in case of the hot migration failure.
7. Move the Are you sure you want to migrate? slider to the right to confirm the hot migration.
8. Click the Start Migration button.

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

To check if your Windows template supports hot migration, see the [Windows templates list](#).

9.1.3.5.1.2   VS and Disks Hot Migration

9.1.3.5.1.2.1   Prerequisites
There are several prerequisites for the migration:
The current and the target compute resources and data stores should be in the same location. Migration between locations is not possible.

Networks must be the same across the zones. That means that compute zones should have the same network attached.

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

This feature is suitable for VSs with local storage. Be aware, that migration will take much 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 for the shared data stores within the same compute zone.

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 hot migrate a virtual server:

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the virtual server you want to migrate.
3. Click the Tools button and click the Migrate Virtual Server link.
4. In the window that appears, choose migration type - Compute Resource and Storage (Hot).
5. Choose the target compute zone and compute resource from the drop-down menu. The list will include the other zones that you have access to within the same network (i.e. KVM to KVM migration but not KVM to XEN migration).
6. Also, you can see each disk associated with the virtual server with a drop-down menu. Choose the data stores where you wish to move each disk. The list will include available data stores associated with the compute zone and compute resource, selected in the previous step.
7. Move the Are you sure you want to migrate? slider to the right to confirm the hot migration.
8. Click the Start Migration button.

- Hot migration is not performed if VS has temporary disks (attached to or from other VS).
- Hot migration is not performed for Integrated Storage data stores if any of the disks has snapshots.
- Hot migration is not applicable for federated VSs, which 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 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 Control Panel's Settings menu > Configuration > Defaults tab > 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 LVM data store to Integrated Storage data store; from Integrated Storage data store to LVM data store. This feature is not applicable for SolidFire storage.

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 at source data store and will be marked as offline zombie disks. You need to delete them manually, otherwise, you will get an error during backward 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.

9.1.3.5.2 VS and Disks Cold Migration

9.1.3.5.2.1 Prerequisites

There are several prerequisites for the migration:

- The virtual server should be shut down to perform migration.
- The current and the target compute resources and data stores should be in the same location. Migration between locations is not possible.
- Networks must be the same across the zones. That means that compute zones should have the same network attached.
- The bandwidth from compute resource to compute resource should be sufficient enough to allow transferring of virtual servers.
- This feature is suitable for VSs with local storage. Be aware, that migration will take much 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 for the shared data stores within the same compute zone.

To cold migrate a virtual server:
1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the virtual server you want to migrate.
3. Click the **Tools** button and click the **Migrate Virtual Server** link.
4. In the window that appears, choose migration type - **Compute Resource and Storage (Cold)**.
5. Choose the target compute zone and compute resource from the drop-down menu. The list will include the other zones that you have access to within the same network (i.e. KVM to KVM migration but not KVM to XEN migration).
6. Also, you can see each disk associated with the virtual server with a drop-down menu. Choose the data stores where you wish to move each disk. The list will include available data stores associated with the compute zone and compute resource, selected in the previous step.
7. Move the **Are you sure you want to migrate?** slider to the right to confirm the cold migration.
8. Click the **Start Migration** button.

- Cold migration is not applicable for federated VSs, which are built in compute zones submitted to the Marketplace.
- If you have local backups on source compute resource, please move them manually to a target 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.
- Go to Control Panel's **Settings** menu > **Configuration** > **Defaults** tab > **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 LVM data store to Integrated Storage data store; from Integrated Storage data store to LVM data store. This feature is not applicable for SolidFire storage.
- 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 delete them manually, otherwise, you will get an error during the backward migration.

OnApp administrators can control user access to the 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.

### 9.1.3.6 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.

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 VSs.

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's 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:

- 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 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 will want to activate them in future.

---

### 9.1.3.7 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's **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.

---

### 9.1.3.8 Purge Content

This action is available only for **accelerated** virtual servers.

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 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 **Control Panel** > **Virtual Servers**.
2. Click the label of the required virtual server.
3. On the page that appears, click the **Purge** tab.
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 > Virtual Servers**.
2. Click the label of the required virtual server.
3. On the page that appears, click the **Purge** tab.
4. Click the **Purge All Contents of this Site** button to purge all content.

### 9.1.3.9 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’s **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’s **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.

### 9.1.3.10 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's **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 tick the **Destroy All Existing Backups** 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.

9.1.4 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's **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):

9.1.4.1 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

9.1.4.2 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.

9.1.4.3 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.

9.1.4.4 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 **Settings > Configuration > System**, the VS will be shut down forcefully.

3. Click the **Apply** button to shut down the VS.

9.1.4.5 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**.

9.1.4.6 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.

9.1.4.7 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.

9.1.4.8 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.

### 9.1.5 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’s **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:

#### 9.1.5.1 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.
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 [&]
  - parentheses [(),]

9.1.5.2 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.

9.1.5.3 Set 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.

• 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.

9.1.6 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 be supported by the OnApp support team.

9.1.6.1 Enable Advanced Configuration

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

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

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

1. Go to the Control Panel > 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.

9.1.6.2 Edit XML Configuration

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

1. Go to your Control Panel > 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.

9.1.6.3 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 cannot 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.

### 9.1.7 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.

#### 9.1.7.1 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's **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's **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:
   - **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.

9.1.7.2 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's **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 rebuild network, the system tries to reach VS's network interface without rebooting virtual server. Then, if it is not possible, transaction will quit. Force reboot action allowsto rebuild VS network with reboot action if liverebuild 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.

9.1.7.3 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
- Update own virtual server
- Read own virtual server

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

9.1.7.3.1 Add a specific firewall rule

To configure a specific firewall rule:

1. Go to your Control Panel's [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
## 9.1.7.3.1.1

### 9.1.7.3.2 Default firewall rules

To set default firewall rules for a network interface:

1. Go to your Control Panel’s **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

   ```bash
   /etc/init.d/httpd restart
   ```

4. The protocols you have enabled are now available at **Control Panel > 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:

- 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)
  - **Protocol type** (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
  - **Choose the protocol** (TCP, UDP, DCCP, SCTP or ICMP).

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.
<table>
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<th>IP</th>
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<td>CRUDP</td>
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9.1.7.4 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's 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.

To remove an IP address from a VS:
1. Go to your Control Panel's 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.

9.1.7.5 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's 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.
9.1.7.6 Edit Virtual Server Network Speed

To edit a virtual server's network speed:
1. Go to your Control Panel's 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.

9.1.7.7 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.
- KVM anti spoofing should be turned off if you want to use a VS as a gateway.

To use a virtual server as a gateway for a network interface:
1. Go to Control Panel > 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:

```bash
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:

```bash
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 > 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 gateway VS:

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

9.1.8 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).

You can also utilize incremental backups. For details, see Virtual Server Backups section of this guide.

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, where you can:
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

See also:
Virtual Servers
Create Virtual Server
Manage Virtual Server
Virtual Server Backups
Virtual Server Backup Schedules

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's 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.
   - The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.
   - Resizing disks to a value larger than 2 TB is not supported for Windows VSs and all VSs on KVM.
   - OnApp provides support only for the MS-DOS partition table. If your disk size exceeds 2 TB, the MS-DOS partition table can be changed to GUID Partition Table (GPT) from inside a virtual server and extended to more than 2 TB. However, such disks will be partially manageable by OnApp and the subsequent resizing operations will not be supported anymore and could lead to data loss.
   - Move the Hot Attach slider to the right if you want to enable disk hot attaching. In this case virtual server will not be stopped when adding a disk. Prerequisite: virtual
server template should support virtio virtualization and Linux OS. The hot attach option is only available on KVM compute resources under 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. 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.

9.1.8.2 Edit Virtual Server Disks

9.1.8.2.1 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 VS.

To change disk size:

1. Go to your Control Panel's **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.

- It is recommended to take a backup of a virtual server before editing the VS disk. In case of any issues during VS disk editing you will be able to restore the VS from the backup.
- You cannot decrease size of Integrated Storage data stored disks.
- You cannot decrease 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 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 disk resize and then decide to cancel it, there can be dangerous side effects including file system corruption.

### 9.1.8.2.2 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>
<tr>
<td>• File system</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.1.8.3 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's 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 zerodspaceln 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 > Settings > Configuration by editing the
9.1.8.4 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.

To assign a disk to another VS:

1. Go to your Control Panel's 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's **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.

### 9.1.8.5 Delete Virtual Server Disks

To delete a disk:
1. Go to your Control Panel's **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.

### 9.1.9 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 > Settings > Configuration** by editing the **Block Size (MB)** parameter.

### 9.1.9.1 Types of Backups

<table>
<thead>
<tr>
<th>Normal</th>
<th>Incremental</th>
</tr>
</thead>
<tbody>
<tr>
<td>The full copy of target data that is stored</td>
<td>Only the changes made after the last backup</td>
</tr>
</tbody>
</table>
in an archive, whether it has changed or not.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<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 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.

### 9.1.9.2 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 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).

9.1.9.3 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>VS Type</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>

9.1.9.4 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.
- 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.

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](#)

### 9.1.9.5 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 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.

9.1.9.6 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

9.1.9.7 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

9.1.9.8 View Virtual Server Backups
To view the list of virtual server's backups:

1. Go to your Control Panel's **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.

**9.1.9.9  Take Virtual Server Backup**

To take an incremental backup:

1. Go to your Control Panel's **Virtual 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 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 virtual server sorted by category.
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 virtual servers. 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 after it's extracted. If another 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

**9.1.9.10  Take Virtual Server Disk Backup**

To back up a virtual server:

1. Go to your Control Panel's **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.

**9.1.9.11 Convert Virtual Server Backup to Template**

To convert virtual server backup to template:

1. Go to your Control Panel's **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.

**9.1.9.12 Restore Virtual Server Backup**

To restore a backup:

1. Go to your Control Panel's **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**.

**9.1.9.13 Add Virtual Server Backup Note**

To edit virtual server backup's note:

1. Go to your Control Panel's **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**.

**9.1.9.14 Delete Virtual Server Backup**

To delete a backup:

1. Go to your Control Panel's **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**.

**9.1.10 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.

**9.1.10.1 View Virtual Server Backup Schedules**

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

**9.1.10.1.1 If normal backup options is selected for the cloud:**

1. Go to your Control Panel's **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

1.

- **Date** - time when the schedule was created
- **Target** - server or disk for which the schedule was created (depending on the backup type)
- **Action** - scheduled action
- **Frequency** - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days
- **Period** - the backup period: days, weeks, months or years
- **Rotation period** - the number of backups after which the first backup will be deleted

Despite the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

- **Next Start** - the date and the hour of the next backup
- **User** - user who created the backup schedule
- **Status** - schedule status

9.1.10.1.2 If incremental backup option is selected for the cloud

1. Go to your Control Panel's **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
- **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
- **Period** - 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** - the user who created the backup schedule
9.1.10.2 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 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

9.1.10.2.1 Adding a normal backup schedule
To add a normal backup schedule:

1. Go to your Control Panel's 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:
   - Frequency - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - Period - backup period: days, weeks, months or years. The period must be unique for each backup target (disk or server).
   - Rotation period - a number of backups after which the first backup will be deleted.

   Despite the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with the specific frequency, period and target will be stored in the system.

   - 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.

9.1.10.2.2 Adding an incremental backup schedule
1. Go to your Control Panel's 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:
6. Click the **Save** button to finish.

### 9.1.10.3 Edit Virtual Server Backup Schedule

#### 9.1.10.3.1 To edit a normal backup schedule:
1. Go to your Control Panel's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - 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).

Despite the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

- **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.

#### 9.1.10.3.2 To edit an incremental backup schedule:
1. Go to your Control Panel's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
5. Period - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
6. Rotation period - number of backups after which the first backup will be deleted. This parameter is for incremental backup schedules only.
7. 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.

9.1.10.4 Delete Virtual Server Backup Schedule

9.1.10.4.1 To delete a normal backup schedule:
1. Go to your Control Panel's 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.

9.1.10.4.2 To delete an incremental backup schedule:
1. Go to your Control Panel's 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.

9.1.11 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 requirements are satisfied, you can add a backup resource to virtual servers that run on compute resources from a compute zone to which you assigned a backup resource zone. In this document, you can find information on how to manage backup resources for your virtual servers.

- Backup resources that are built on the R1Soft plugin are not currently

Data from IC.
supported for Windows-based virtual servers.

- If you want to delete a virtual server that has an attached backup resource, first detach the resource. If you delete 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 backups (recovery points) will not be updated in OnApp CP.

9.1.11.1 View Backup Resources

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.

On this page:
View Backup Resources
Attach Backup Resource to VS
Remove Backup Resource from VS

See also:
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 > **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)
To enable or disable a backup resource for a virtual server, refer to the sections below.

9.1.11.2 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 > 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.

9.1.11.3 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 > 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.

9.1.12 Manage Virtual Server Recovery Points

Recovery points are created as a result of the virtual server data replication on a third-party service by means of a backup plugin. 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 execution of auto backup presets that you configured for a backup resource that is attached to VS. In this document, you can find information on how to restore virtual servers from recovery points.

You can set the total amount of recovery points that will be created for VS by the Max recovery points option while creating an auto backup preset. When the maximum limit is reached, new recovery points overwrite the existing ones.

9.1.12.1 View Recovery Points

To view the list of recovery points available for a virtual server, follow the next steps:

1. Go to your Control Panel > 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:

   - **Size** - the size of the backup from which the VS can be restored
   - **Created at** - the date when the backup was created
   - **State** - the state of the recovery point (e.g. available, locked, merged, etc.)
   - **Backup resource** - the backup resource on which the recovery point is created

To restore the virtual server from a specific recovery point, refer to the following section.

9.1.12.2 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 > **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.

For 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**.

### 9.1.13 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.

#### 9.1.13.1 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
- Accelerated Virtual Server Statistics

**See also:**

- Billing Plans
- Resource Allocation And Prices
- Accelerator
- Permissions
- User Billing Statistics

1. Go to your Control Panel's **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.

9.1.13.2 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's 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:
   - 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).

9.1.13.3 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 > 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:

   o Instant - the Instant chart shows the average speed in Megabits per second (Mbps) of data sent and data received over the network. The average speed is shown on a per-minute basis for the last 24 hours.

   o Hourly - the Hourly chart shows how much data in Kilobits (Kbit) is sent and received over the network. The amount of sent/received data is shown on a per-hour basis for a period of time up to three months.

1. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
2. 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.
9.1.13.4 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's 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.

9.1.13.5 Accelerated 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's Virtual Servers menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.

3. Click the **Overview** tab > **Acceleration 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.

### 9.1.14 Virtual Server Integrated Console

OnApp includes an integrated VNC console that gives users direct access to their virtual servers through the OnApp Control Panel, if their user role permits. Administrators can access all virtual server consoles for support and troubleshooting purposes.

The console connects the user's browser to the VNC port made available via the Compute resource for the guest console. Both the administrator and the end user web UIs offer a console connection, regardless of the OS.

To access the virtual server VNC console via the control panel interface:

1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. On the screen that appears, click the **Console** button in the upper menu.

For HTML5 console, use the Re-connect button if the connection got lost:

- If console running in normal state, pressing re-connect button will cause disconnect, and it will be re-connected automatically after 1.5 seconds.

- If console got stuck, pressing re-connect button will send all the information once again and will re-connect without page reload.

- If console got disconnected with any status code, and red lane with error message revealed, it will be re-connected automatically after 1.5 seconds.

To switch from HTML5 to Java console, go to **Settings > Configuration** menu.

**See also:**

- [Virtual Server Transactions and Logs](#)
- [Virtual Server Recipes](#)
- [Virtual Server Recipe Custom Variables](#)
- [Virtual Server Service Add-ons](#)

### 9.1.15 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's **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][hh][mm][ss]Z` format
- **action** - the action name
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- 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 loginfo with the arrow button in the upper right corner.

9.1.16 Virtual Server Recipes
In this document, you can find information on how to manage Virtual Server recipes.

9.1.16.1 View Virtual Server Recipes

To view virtual server recipes:
1. Go to your Control Panel's Virtual 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 Virtual Server Recipes
Assign Recipe
Remove recipe

See also:
Virtual Server Integrated Console
Virtual Server Transactions and Logs
Virtual Server Recipe Custom Variables
Virtual Server Service Add-ons

9.1.16.2 Assign Recipe
Use drag and drop feature to assign a recipe to the desired event.

You can assign virtual server recipes to the following events:
- 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

9.1.16.3 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.

9.1.17 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's 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

9.1.18 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.

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. For more information about permissions refer to the Permissions section of this guide.

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

### 9.1.18.1 View VS Service Add-Ons

To view virtual server service add-ons:

1. Go to your Control Panel's 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
- **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.

### 9.1.18.2 Assign Service Add-on to a VS
To assign service add-on to a VS:

1. Go to your Control Panel's **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. Choose the necessary service add-on and click Assign. The transaction to execute the On add event(s) will be scheduled for running. If you will 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.

9.1.18.3 Unassign Service Add-on from a VS

To unassign service add-on from a VS:

1. Go to your Control Panel's **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.

9.1.19 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.

9.1.19.1 Properties
You can view general properties of the suspended VS in the Control Panel > 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.

9.1.19.2 CPU Usage
You can view charts on CPU usage of the suspended VS in the Control Panel > 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.

9.1.19.3 Billing Statistics
You can view billing statistics of the suspended VS in the Control Panel > 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.

9.1.19.4 Recipes
You can view recipes assigned to the suspended VS in the Control Panel > 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 > Virtual Servers > Label > Overview
9.1.19.5 Service Add-Ons
You can view service add-ons assigned to the suspended VS in the Control Panel > 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.

9.1.19.6 Network Interfaces
You can view the virtual network interfaces allocated to the suspended VS in the Control Panel > 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.

9.1.19.7 Firewall Rules
You can view firewall rules that were added to VS before its suspension in the Control Panel > 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.

9.1.19.8 Disks
You can view the list of disks allocated to the suspended VS in the Control Panel > 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.

9.1.19.9 Backups
You can view the suspended VS backups that have already been taken and that are scheduled to be taken in the Control Panel > 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.

9.1.20 Alternative Copy of Create Virtual Server
Virtual servers are created from templates. To create a virtual server:
1. Go to your Control Panel's **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.

OnApp must be configured properly before VSs can be created. You must have:
- At least one [data store](#) configured and assigned to a [data store zone](#)
- At least one [network](#) configured and assigned to a [network zone](#)
- At least one [compute resource](#) configured and online
- At least one [compute resource](#) assigned to a [compute zone](#)
- At least one [data store](#) attached to a [compute resource](#)
- At least one [network](#) attached to a [compute resource](#)

**Assigned a bucket** to the user creating the VS

On this page:
- Step 1 of 6. Cloud Locations
- Step 2 of 6. Templates
- Step 3 of 6. Virtual Server Properties
- Step 4 of 6. Resources
- Step 5 of 6. Recipes or Service Add-ons
- Step 6 of 6. Confirmation

See also:
- [Virtual Servers](#) - the information on managing virtual servers
- [Configure Resource Allocation And Prices](#) - bucket configuration
- [Template Software Licenses](#) - how to enable MAK or KMS
- [Set up Instance Packages for Cloud](#) - the walk-through for using packages of resources
- [Recipes](#) - recipes creation and management
- [Virtual Servers (API)](#) - the list of available API requests

- **Step 1 of 6.**
- **Step 2 of 6.**
- **Step 3 of 6.**
- **Step 4 of 6.**
- **Step 5 of 6.**
- **Step 6 of 6.**

9.1.20.1 Cloud Locations

If you face the problem with viewing the maps, refer to the 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 Templates step.

Indicate your virtual 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 virtual server templates.

### 9.1.20.2 Templates

Make sure that the selected template is located on a backup server attached to the compute resource on which you wish to build the VS, otherwise, the creation of the VS will fail.

At this step, specify the template from which your virtual server will be built. To choose a template:

1. Click the required template store icon on the left (Windows, Linux, FreeBSD etc.) to expand the list of templates on the right. Every template contains the following info:
   - Template's label
   - Min memory size, required to create a VS from this template
   - Min disk size, required to create a VS from this template
   - Virtualization type (XEN, KVM)
   - Price per hour
2. Select the template.
3. Click **Next**.

**Windows Licensing Type**

This option only appears if your bucket allows it, and if the relevant licensing options have been configured for the template group this template belongs to. If this option is available, 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.
- It is not possible to select KMS or own licensing type when creating a Windows virtual server from custom template. As a workaround, you can create a virtual server from the template used for custom template creation.

Proceed to the following step of the wizard and specify the virtual server properties.

**Template extraction is performed during server provisioning 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

---

### 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.

---

**9.1.20.3 Virtual Server Properties**

At this step you need to indicate your virtual server’s properties, such as label, password and other. You can create a virtual server having specified only the required parameters and configure it later.

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](#).
Particular characters 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. The default value is **localdomain**. This parameter is not applicable for 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 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.

  For more information on the VS password encryption, refer to the FAQ.

Click **Next** to proceed to the following step of the wizard to specify the virtual server resources.

### 9.1.20.4 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.

Resources

Instance packages

If the selected instance package applies to certain compute zones only, as indicated in the user's bucket, the VS will be created on one of the compute resources within one of those zones. Otherwise, the compute zone and compute resource for the VS will be selected automatically from the zones available to the user.

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. You will see all instance packages available to you, but those that have resources incompatible with the available compute zone(s) 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 Virtual Server Provisioning.

  When the *Show Compute resources on Virtual Machine creation* permission is disabled (so that user cannot select the Compute resource, but can choose the virtualization type), the Compute resource that meets the virtualization type and the resources set will be automatically selected. The data store will be set according to the compute zone selected.

**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 depends on virtualization type:

<table>
<thead>
<tr>
<th>OS</th>
<th>Max RAM</th>
<th>OS</th>
<th>Max RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS 5.x</td>
<td>512 GB</td>
<td>CentOS 5.x FV</td>
<td>512 GB</td>
</tr>
<tr>
<td>&lt;=CentOS 6.2</td>
<td>512 GB</td>
<td>CentOS 5.x PV</td>
<td>168 GB</td>
</tr>
<tr>
<td>CentOS 6.3</td>
<td>2000 GB</td>
<td>&gt;CentOS 5 FV</td>
<td>1024 GB</td>
</tr>
<tr>
<td>&gt;CentOS 6.3</td>
<td>4000 GB</td>
<td>&gt;CentOS 5 PV</td>
<td>512 GB</td>
</tr>
</tbody>
</table>

Set RAM to 512MB is you are creating a FreeBSD based virtual server. The RAM value can be later increased after the VS creation when editing the VS.

- **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. When the CPU topology is enabled, this amount specifies how many virtual cores the virtual server will have.

- **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 into how many sockets the CPU cores should be arranged. This value will affect the amount of cores per socket.

**Setting the correct amount of CPU sockets**

![CPU sockets diagram]

If the CPU topology is enabled, the CPU cores will mean a number of vCPUs, which is the maximum value that can be arranged into cpu sockets and cores per socket. If the CPU topology is disabled, the CPU cores will
actually mean the CPU sockets value with 1 core_per_socket.

- 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.

Primary Disk

- **Data Store Zone** - choose a data store zone for VS’s primary disk.
- **Primary disk size** - set the primary disk size.

Swap Disk

- **Data Store Zone** - choose a data store zone 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.

Network Configuration

- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the VS should get the IP address
- **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

- For federated VSs: be aware, that during VS creation you cannot set the network port speed greater than indicated by seller when adding zone to federation.
- Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS’s primary network interface.
- **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 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 virtual server recipes.
9.1.20.5 Recipes or Service Add-ons
This step can be either Recipes or Service Add-ons depending on the cloud configuration. If service add-on functionality is not available, you will get Recipes step.

Recipes
At this step you need to indicate the recipes you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing recipes and add them later if required.

1. Choose a recipe you want to assign to this virtual 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 that completes the virtual server creation process.

The recipes step can be missing in the wizard if there are no recipes created in the cloud.

If mentioned below prerequisites are met, the Recipes step will be replaced with the Service Add-ons step.

Service Add-ons

Prerequisites
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 bucket.

In case there are no available service add-ons, this step of the wizard will be skipped.

At this step you need to indicate the service add-ons you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing service add-ons and add them later if required.

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
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add-ons. You can remove the selected service add-on from the list by clicking the \( \times \) button near the add-on.

3. Click **Next** to proceed to the next step of the wizard that completes the virtual server creation process.

9.1.20.6 Confirmation
At this step, configure the automation settings. This is the final step of the virtual server creation wizard.

- Move the **Enable Automated Backup** slider to the right if you want this VS to be backed up automatically (according to the backup settings configured in the Settings/Auto-backup Presets menu).
- 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.
- Move the **Enable Autoscale** slider to the right to set autoscaling for this VS.

  - 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 **Accelerate** slider to the right to enable accelerator for this VS. For more information, refer to **CDN Accelerator** section.

The **Accelerate** 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 VS, which will be created, including the info on how many cores/cores per socket/sockets the VS will have.

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.

### 9.1.21 Copy of Create Virtual Server-2

Virtual servers are created from templates. To create a virtual server:

1. Go to your Control Panel's 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.

OnApp must be configured properly before VSs can be created. You must have:

- At least one **data store** configured and assigned to a **data store zone**
- At least one **network** configured and assigned to a **network zone**
- At least one **compute resource** configured and online
- At least one **compute resource** assigned to a **compute zone**
- At least one **data store** attached to a **compute resource**
- At least one **network** attached to a **compute resource**

**Assigned a bucket** to the user creating the VS

On this page:

- [Step 1 of 6. Cloud Locations](#)
- [Step 2 of 6. Templates](#)
- [Step 3 of 6. Virtual Server Properties](#)
- [Step 4 of 6. Resources](#)
- [Step 5 of 6. Recipes or Service Add-ons](#)
- [Step 6 of 6. Confirmation](#)

See also:

- [Virtual Servers](#) - the information on managing virtual servers
- [Configure Resource Allocation And Prices](#) - bucket configuration
- [Template Software Licenses](#) - how to enable MAK or KMS
9.1.21.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the 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 Templates step.

Indicate your virtual 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 virtual server templates.

9.1.21.2 Step 2 of 6. Templates

Make sure that the selected template is located on a backup server attached to the compute resource on which you wish to built the VS, otherwise, the creation of the VS will fail.

At this step, specify the template from which your virtual server will be built.

To choose a template:

1. Click the required template store icon on the left (Windows, Linux, FreeBSD etc.) to expand the list of templates on the right.

Every template contains the following info:

- Template's label
- Min memory size, required to create a VS from this template
- Min disk size, required to create a VS from this template
2. Select the template.
3. Click **Next**.

9.1.21.2.1 Windows Licensing Type

This option only appears if your bucket allows it, and if the relevant licensing options have been configured for the template group this template belongs to. If this option is available, 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.
- It is not possible to select KMS or own licensing type when creating a Windows virtual server from custom template. As a workaround, you can create a virtual server from the template used for [custom template creation](#).

Proceed to the following step of the wizard and specify the virtual server properties.

9.1.21.2.2 Templates Extraction

Template extraction is performed during server provisioning 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

9.1.21.2.3 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.

9.1.21.3 Step 3 of 6. Virtual Server Properties

At this step you need to indicate your virtual server's properties, such as label, password and other. You can create a virtual server having specified only the required parameters and configure it later.

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.

- **Domain** - specify the domain for this VS. The default value is *localdomain*. This parameter is not applicable for 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 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.

For more information on the VS password encryption, refer to the FAQ.

Click **Next** to proceed to the following step of the wizard to specify the virtual server resources.
9.1.21.4 Step 4 of 6. 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.

9.1.21.4.1 Instance packages

- If the selected instance package applies to certain compute zones only, as indicated in the user's bucket, the VS will be created on one of the compute resources within one of those zones. Otherwise, the compute zone and compute resource for the VS will be selected automatically from the zones available to the user.

- 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.
• Virtual servers created using instance packages do not support autoscaling.

From this tab, you can choose one of the predefined **Instance Packages** for your virtual server. You will see all instance packages available to you, but those that have resources incompatible with the available compute zone(s) will be grayed out. Grayed out instance packages cannot be selected.

Click the instance package to select it. After that, the instance package you have chosen will be highlighted in green.

9.1.21.4.2

9.1.21.4.3 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 **Virtual Server Provisioning**.

Note that when the **Show Compute resources on Virtual Machine creation** permission is disabled (so that user cannot select the Compute resource, but can choose the virtualization type), the Compute resource that meets the virtualization type and the resources set will be automatically selected. The data store will be set according to the compute zone selected.

**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 depends on virtualization type:
  Set RAM to 512MB if you are creating a FreeBSD based virtual server. The RAM value can be later increased after the VS creation when **editing the VS**.
• **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. When the CPU topology is enabled, this amount specifies how many virtual cores the virtual server will have.
• **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:
  o **CPU Sockets** - set into how many sockets the CPU cores should be arranged. This value will affect the amount of cores_per_socket.

Setting the correct amount of CPU sockets
If the CPU topology is enabled, the CPU cores will mean a number of vCPUs, which is the maximum value that can be arranged into cpu sockets and cores per socket. If the CPU topology is disabled, the CPU cores will actually mean the CPU sockets value with 1 core_per_socket.

- 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.

Primary Disk
- **Data Store Zone** - choose a data store zone for VS's primary disk.
- **Primary disk size** - set the primary disk size.

Swap Disk
- **Data Store Zone** - choose a data store zone for VS's swap disk.
- **Swap disk size** - set the swap disk size. There is no swap disk for Windows-based VSSs. In all other cases, swap disk size must be greater than zero.

Network Configuration
- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the VS should get the IP address
- **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

- For federated VSs: be aware, that during VS creation you cannot set the network port speed for federation.

- Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS.

- **Selected IP address** option is enabled via the "Show IP address selection for new VS" slider on 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 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 virtual server recipes.

9.1.21.5  Step 5 of 6. Recipes or Service Add-ons
This step can be either Recipes or Service Add-ons depending on the cloud configuration.

- If service add-on functionality is not available, you will get Recipes step.
- If mentioned below prerequisites are met, the Recipes step will be replaced with the Service Add-ons step.

<table>
<thead>
<tr>
<th>Recipes</th>
<th>Service Add-ons</th>
</tr>
</thead>
<tbody>
<tr>
<td>At this step you need to indicate the recipes you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing recipes and add them later if required.</td>
<td>At this step you need to indicate the service add-ons you want to assign to your virtual server. This step is optional. You can create a virtual server without choosing service add-ons and <strong>add them later</strong> if required.</td>
</tr>
<tr>
<td>1. Choose a recipe you want to assign to this virtual server by dragging the required recipe to the <strong>Assigned recipes</strong> pane.</td>
<td>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:</td>
</tr>
<tr>
<td>2. To add a custom variable, click the &quot;+&quot; button next to the <strong>Custom recipe variables</strong> title bar, then specify variable details:</td>
<td>o Label</td>
</tr>
<tr>
<td>o Specify the recipe name and its value.</td>
<td>o VS’s types, with which this service add-on is compatible</td>
</tr>
<tr>
<td>o Move the <strong>Enabled</strong> slider to the right to allow use of this variable.</td>
<td>o description of the service add-on</td>
</tr>
<tr>
<td>3. Click <strong>Next</strong> to proceed to the next step of the wizard that completes the virtual server creation process.</td>
<td>o Price per hour</td>
</tr>
<tr>
<td>2. Select the service add-on by clicking on it. You can select several add-ons from different service add-on groups. Click <strong>View Selected Add-ons</strong> to see the list of selected service add-ons. You can remove the selected service add-on from the list by clicking the <strong>×</strong> button near the add-on.</td>
<td>2. Select the service add-on by clicking on it. You can select several add-ons from different service add-on groups. Click <strong>View Selected Add-ons</strong> to see the list of selected service add-ons. You can remove the selected service add-on from the list by clicking the <strong>×</strong> button near the add-on.</td>
</tr>
</tbody>
</table>
| 3. Click **Next** to proceed to the next step of the wizard that completes the virtual server creation process. | 3. Click **Next** to proceed to the next step of the wizard that completes the virtual server creation process.
The recipes step can be missing in the wizard if there are no recipes created in the cloud.

**Prerequisites**

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 bucket.

In case there are no available service add-ons, this step of the wizard will be skipped.

9.1.21.6  Step 6 of 6. Confirmation

![Image](image85x370_to_250x459)

At this step, configure the automation settings. This is the final step of the virtual server creation wizard. 

- Move the **Enable Automated Backup** slider to the right if you want this VS to be backed up automatically (according to the backup settings configured in the Settings/Auto-backup Presets menu)

- 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 automatically.

- Move the **Enable Autoscale** slider to the right to set autoscaling for this VS.

- Move the **Accelerate** slider to the right to enable accelerator for this VS. For more information, refer to [CDN Accelerator](#) section.

- 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)
9.1.21.6.1 How to make Accelerate Slider Available

The Accelerate 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 VS, which will be created, including the info on how many cores/cores per socket/sockets the VS will have.

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.

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's **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
- View ISO Virtual Server Transactions and Logs

**See also:**
- ISOs
- Create ISO Virtual Server
- Manage ISO Virtual Servers
- ISO Virtual Server Networks
- ISO Virtual Server Disks
- ISO Virtual Server Statistics

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):

   1. **Reboot a VS**
   2. **Recovery reboot**
   3. **Power off a VS**
   4. **CPU usage**
   5. **Shutdown**
   6. **Start up**
   7. **Recovery start up**
   8. **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's 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's **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's 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:

**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](http://example.com).

  Particular characters 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. The default value is `localdomain`. This parameter is not applicable for 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 a 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 VSSs 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 VSSs in such zones. The reason is that CPU priority for Instance package VSSs 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
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- **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.

Do not use CPU Units for KVM Compute resources running on CentOS5.

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.

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.
- When sockets and threads are set incorrectly, you may face huge load on Compute resource's under CentOS 5.x.

**Primary Disk**

- **Data Store Zone** - choose a data store zone for VS's primary disk.
- **Primary disk size** - set the primary disk size.
Swap Disk

- **Data Store Zone** - choose a data store zone 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.

Network Configuration

- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the VS should get the IP address
- **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** 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>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot / Reboot in recovery</td>
<td>Change owner</td>
<td>Configure network interface</td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspend</td>
<td></td>
<td>Set firewall rules</td>
</tr>
<tr>
<td>Delete</td>
<td>Shut down</td>
<td></td>
<td>Virtual server IP addresses</td>
</tr>
<tr>
<td>Segregate</td>
<td>Startup / Startup on Recovery</td>
<td></td>
<td>Display network speed for network interfaces</td>
</tr>
<tr>
<td></td>
<td>Boot from ISO</td>
<td></td>
<td>Edit network speed</td>
</tr>
</tbody>
</table>

Ensure that ISO permissions are on before managing ISO virtual servers. For more information refer to the Permissions section of this guide.

This document provides the information on how you can manage the virtual servers built from ISO.

**On this page:**
- Edit ISO Virtual Server
- Segregate ISO Virtual Server
- Migrate ISO Virtual Server
- Delete ISO Virtual Server
- ISO Virtual Server Power Options
- Change Owner of ISO Virtual Server

**See also:**
- ISOs
- ISO Virtual Server Networks
- ISO Virtual Server Disks
- ISO Virtual Server Statistics

#### 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 the way the VS resources were selected: either manually or using an instance package. To adjust VS resources:
1. Go to your Control Panel's **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's **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 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's **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.

9.2.5.4 **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's **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.

9.2.5.5 **ISO Virtual Server Power Options**

To manage a virtual server power options:

1. Go to your Control Panel's **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.
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- **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.

### 9.2.5.6 Change Owner of ISO Virtual Server

To change owner of ISO virtual server:

1. Go to your Control Panel's [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's **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](#)
- [Manage ISO Virtual Servers](#)
- [ISO Virtual Server Disks](#)
- [ISO Virtual Server Statistics](#)

To add a network interface:
1. Go to your Control Panel's **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:
   1. **Label** – a human-friendly name for the new interface.
   2. **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).
   3. **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
- Update own virtual server
- Read own virtual server

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's **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).

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's 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's 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's **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's **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's **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.

Creating multiple partitions on one disk is forbidden for all virtual servers.

### 9.2.7.1 Add Disks to ISO Virtual Servers

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's **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.

   The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.
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.
- When you add a new disk to a virtual server, it automatically becomes available to that server.

### 9.2.7.2 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 Panel's **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.

### 9.2.7.3 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 (despite the template it is based on).

To migrate a disk:
1. Go to your Control Panel's **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.

### 9.2.7.4 Delete ISO Virtual Server Disks

To delete a disk:
1. Go to your Control Panel's **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's 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's **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’s 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’s 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's Virtual Servers menu.
2. Click the label of the accelerate-enabled virtual server you're interested in.
3. Click the Overview tab > Acceleration 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's 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's 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's **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's **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's **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 VVSs. Auto-backup Presets can be applied to all new VVSs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VVSs, 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](#)
1. Go to your Control Panel's **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** - time when the schedule was created
   - **Target** - the disk for which the schedule was created
   - **Action** - scheduled action
   - **Frequency** - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years
   - **Rotation period** - number of backups after which the first backup will be deleted

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

   - **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

---

### 9.2.10.2 Create ISO Virtual Server Backup Schedule

To add a backup schedule:

1. Go to your Control Panel's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days.
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted.

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

7. Click the **Save** button to finish.

9.2.10.3 Edit ISO Virtual Server Backup Schedule

1. Go to your Control Panel's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days.
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted.

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
7. 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 Panel's 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 start/stop), and manual network configuration if the operating system is set as 'other'.

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:
9.3.1 View OVA Virtual Servers

To view all virtual servers deployed in the cloud:

1. Go to your Control Panel's **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.
   - **user**. The owner of this VS. Click the user name to see the owner details.
   - **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):

   1. **Reboot a VS**
   2. **Recovery reboot**
   3. **Power off a VS**
   4. **CPU usage**
   5. **Shutdown**
   6. **Start up**
   7. **Recovery start up**
   8. **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's **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 sum indicated here.

### 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's **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 > 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's **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:
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](https://tools.ietf.org/html/rfc2181).

Particular characters 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. The default value is `localdomain`. This parameter is not applicable for 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.

**Resources**
- **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. The minimum value is the taken from the OVA file. 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.

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
- **Data Store Zone** - choose a data store zone for VS's primary disk.
- **Primary disk size** - the primary disk size is imported from OVA configuration and can not be changed

Be aware, that only one (primary) disk is imported from the OVA configuration. You can add new disks after the VS is created and built. That will be totally new disks without the information from OVA.

### Network Configuration
- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the VS should get the IP address
- **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.

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.
- **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:

   ```
   grub2-install /dev/sda || grub-install /dev/sda
   ```

9.3.5 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>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot / Reboot in recovery</td>
<td>Change owner</td>
<td>Configure network interface</td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspend</td>
<td>Reset Root Password</td>
<td>Set firewall rules</td>
</tr>
<tr>
<td>Delete</td>
<td>Shut down</td>
<td>Set SSH keys</td>
<td>Virtual server IP addresses</td>
</tr>
<tr>
<td>Segregate</td>
<td>Startup / Startup on Recovery</td>
<td></td>
<td>Display network speed for network interface</td>
</tr>
<tr>
<td>Set VIP status</td>
<td></td>
<td></td>
<td>Edit network speed</td>
</tr>
</tbody>
</table>
```
Ensure that OVA permissions are on before managing OVA virtual servers. For more information refer to the Permissions section of this guide.

This document provides the information on how you can manage the virtual servers built from OVA.

On this page:
- Edit OVA Virtual Server
- Segregate OVA Virtual Server
- Migrate OVA Virtual Server
- Delete OVA Virtual Server
- OVA Virtual Server Power Options
- Change Owner of OVA Virtual Server
- Set SSH Keys for OVA Virtual Server
- Reset Root Password for OVA Virtual Server
- Set VIP Status for OVA Virtual Server

See also:
- Create OVA Virtual Server
- OVA Virtual Server Networks
- OVA Virtual Server Disks
- OVA Virtual Server Statistics

9.3.5.1 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's 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.

9.3.5.2 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's **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.

### 9.3.5.3 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's **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.

### 9.3.5.4 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's **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.

### 9.3.5.5 OVA Virtual Server Power Options

To manage a virtual server power options:
1. Go to your Control Panel's **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.

9.3.5.6 Change Owner of OVA Virtual Server

To change owner of OVA virtual server:

1. Go to your Control Panel's **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.

9.3.5.7 Set SSH Keys for OVA Virtual Server

To set SSH keys for OVA virtual server:

1. Go to your Control Panel's **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.

9.3.5.8 Reset Root Password for OVA Virtual Server

To reset root password of OVA virtual server:
1. Go to your Control Panel's **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.

### 9.3.5.9 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 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's **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.

### 9.3.6 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.

#### 9.3.6.1 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's **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's **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:
   - **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.

- 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.

### 9.3.6.2 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
- Read own virtual server
- Update own virtual server

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

### 9.3.6.2.1 Add a specific firewall rule

To configure a firewall rule:

1. Go to your Control Panel's **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).
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.

### 9.3.6.2.2 Default firewall rules

To set default firewall rules for a network interface:

1. Go to your Control Panel's **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.

9.3.6.3 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's 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's 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.

9.3.6.4 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's 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's 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.

9.3.7 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's Virtual Servers menu.

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.

9.3.7.1 Add Disks to OVA Virtual Servers

On this page:
Add Disks to OVA Virtual Servers
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

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's 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.
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.
- When you add a new disk to a virtual server, it automatically becomes available to that server.

---

**9.3.7.2 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's **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.

---

**9.3.7.3 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's **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
9.3.7.4 Delete OVA Virtual Server Disks

To delete a disk:

1. Go to your Control Panel's 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.

9.3.8 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.

9.3.8.1 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

- 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.
1. Go to your Control Panel's 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.

9.3.8.2 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's 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).

9.3.8.3 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's 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.

9.3.8.4 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's 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.

9.3.9 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 > Settings > Configuration by editing the Block Size (MB) parameter.

9.3.9.1 View OVA Virtual Server Backups

To view the list of OVA virtual server's backups:

1. Go to your Control Panel's 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
9.3.9.2 Take OVA Virtual Server Disk Backups

To back up an OVA virtual server disk:

1. Go to your Control Panel's 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.

9.3.9.3 Restore OVA Virtual Server Backup

To restore a backup:

1. Go to your Control Panel's 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.

9.3.9.4 Delete OVA Virtual Server Backup

To delete a backup:

1. Go to your Control Panel's 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.
9.3.9.5 Add OVA Virtual Server Backup Note

To add/edit virtual server backup's note:

1. Go to your Control Panel's 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.

9.3.10 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.

9.3.10.1 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
Smart Servers
Application Servers
Backup Settings
Edit Backups/Templates Configuration

1. Go to your Control Panel's 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:
9.3.10.2 Create OVA Virtual Server Backup Schedule

To add a backup schedule:

1. Go to your Control Panel's 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:
   o **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   o **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   o **Rotation period** - number of backups after which the first backup will be deleted.

Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

- **Date** - time when the schedule was created
- **Target** - the disk for which the schedule was created
- **Action** - scheduled action
- **Frequency** - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days
- **Period** - backup period: days, weeks, months or years
- **Rotation period** - 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
9.3.10.3 Edit OVA Virtual Server Backup Schedule

To edit a backup schedule:

1. Go to your Control Panel’s 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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted. Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
   - **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.

9.3.10.4 Delete OVA Virtual Server Backup Schedule

To delete a backup schedule:

1. Go to your Control Panel’s 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:

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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 configurations 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 does not perform a FLR reset:

1. Log in as root to a Compute resource where it is deployed
2. Run the following command:

   # lspci -vv|egrep "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's **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
- Edit Smart Server
- Smart Server Disks
- Smart Server Backups
- Create Virtual Server
- Set User Billing Plan Prices And Resource Limits
- Smart Servers

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#### 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 for 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

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Set the resources needed for this smart server:

- **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.

- **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. For KVM Compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.
- The following options are available for smart 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.
    - **CPU Threads** - set the amount of threads per core.
- **Data Store Zone** - choose a data store zone for the smart server’s primary disk.
- **Primary disk size** - set the primary disk size.
- **Data Store Zone** - choose a data store zone for this server’s swap disk.
- **Swap disk size** - set the swap disk size.
- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - the network from which the IP address for the smart server will be allocated
- **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.
- Click **Next**.

**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:

1. Currently you cannot set CPU sockets and threads parameters for existing smart servers.
2. After setting, the new parameters won’t be shown at the smart servers details screen.
3. Some Linux VSs fail to boot up.
4. When socket s and threads are set incorrectly, you may face huge load on Compute resource's under CentOS 5.x.

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).

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:
9.4.3 Manage 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 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's 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

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's **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.**

### 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's 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's 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 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's **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.

9.4.3.6 Autoscale Smart Server

Smart server autoscaling allows you to change the RAM, CPU and disk size settings of a smart server automatically. Smart server resources scaling is based on rules you specify. For example, you can set up a rule that will add 1000MB of memory to a smart 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 smart servers only.
- If the smart server is based on a template that allows resizing without the reboot - see the **Edit Smart Server** section – then smart server RAM and CPU will be increased without rebooting the server. Disk space autoscaling requires a smart server reboot.
- If you autoscale a smart server's memory to a value greater than current smart server RAM x 16 (which is a max_memory parameter in a configuration file and database), the smart server 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 VSs.

To configure autoscaling settings:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the appropriate smart server.
3. On the page that follows, click the **Overview** tab, and then click **Autoscaling**.

4. Press the required tab to set the autoscaling options for: **Memory Usage**, **Disk Usage** or **CPU Usage**.

5. 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.
   
   - Move the **Allow decreasing** slider to the right to enable autoscaling down

   Set autoscale down options:
   
   - If RAM usage is below \(X\)% for a specific time period, remove \(Y\) MB – but no more than \(Z\) MB in a 24 hour period.
   
   - If CPU usage is below \(X\)% for a specific time period, remove \(Y\)% - but no more than \(Z\)% in a 24 hour period.
   
   - If disk usage is below \(X\)% for a specific time period, remove \(Y\) GB - but no more than \(Z\) GB in a 24 hour period.
   
   - Move the **Allow decreasing** slider to the right to enable autoscaling down

6. Click **Apply**.

To delete an autoscaling rule:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the appropriate smart server.
3. On the page that follows, click the **Overview** tab, and then click **Autoscaling**.
4. Click **Delete**. This will delete all autoscaling rules.

   **Clicking the Apply button does not activate autoscaling if the Autoscale slider at the 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.**

9.4.3.7 **Purge Content**

This action is available only for accelerated smart servers.

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. On the page that appears, click the Purge tab.
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 Purge button to finish.

To purge all content:
1. Go to Control Panel > Smart Servers.
2. Click the label of the required smart server
3. On the page that appears, click the Purge tab.
4. Click the Purge All Contents of this Site button to purge all content.

9.4.3.8 Smart Server Power Options

To manage a smart server power options:
1. Go to your Control Panel's 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.

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 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 ISO, OnApp cannot control any components (backups, networks, disks) !!! The only available actions will be start and stop a VS. Be aware, that all the contents of the disk will be deleted.

### 9.4.3.9 Smart Server Administrative Options

To manage a smart server power options:

1. Go to your Control Panel's **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.

### 9.4.3.10 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's **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

**See also:**

- Smart Server Disks
- Smart Server Backups
- Smart Server Backup Schedules
- Smart Server Statistics
- Smart Server Integrated Console

To see the list of all network interfaces allocated to the smart server:

1. Go to your Control Panel's **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's 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).
6. 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's 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's 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's Smart Servers menu.
2. Click the label of the server you're interested in.
3. Click the Networking > Network Interfaces 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 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's 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.

9.4.5 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:

1. Go to your Control Panel's 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:
   o Specify disk's label
   o Choose the data store to create a disk on from the drop-down menu.
   o Set the desired disk size.
   
   The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.
   
   o Specify if this disk is swap space, and requires formatting.
   o 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.

9.4.5.2  Edit Smart Server Disks

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's **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.
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's **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's **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 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 > 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

On this page:

How Do Incremental Backups Work?
Backup Support by VM / Virtualization / OS
View Smart Server Backups
Take Smart Server Backup
Take Smart Server Disk Backup
Convert Smart Server Backup to Template
Restore Smart Server Backup
Edit Smart Server Backup Note
Delete Smart Server Backup

See also:
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

<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>
</tbody>
</table>
9.4.6.3 View Smart Server Backups

To view the list of smart server's backups:

1. Go to your Control Panel's **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's **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 the smart 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 a template from being used in other transactions during extraction, the template is locked during the extraction and unlocked on accomplishment.
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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's 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's 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 (see Create custom templates).

9.4.6.7 Restore Smart Server Backup

To restore a backup:
1. Go to your Control Panel's 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.

9.4.6.8 Edit Smart Server Backup Note

To edit smart server backup's note:
1. Go to your Control Panel's 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 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's 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 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:
1. Go to your Control Panel’s **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** - time when the schedule was created
   - **Target** - server or disk for which the schedule was created (depending on the backup type)
   - **Action** - scheduled action
   - **Frequency** - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years
   - **Rotation period** - number of backups after which the first backup will be deleted

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
   - **Next Start** - the date and the hour of the next backup
   - **User** - 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’s **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** - time when the schedule was created
   - **Target** - server or disk for which the schedule was created (depending on the backup type)
   - **Action** - scheduled action
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years
   - **Rotation period** - 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
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's 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:
   - Frequency - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - Period - backup period: days, weeks, months or years. The period must be unique for each backup target (disk or server).
   - Rotation period - a number of backups after which the first backup will be deleted.
   
   Despite the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with the specific frequency, period and target will be stored in the system.

   - 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's 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:
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's 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:
   o **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   o **Period** - backup period: days, weeks, months or years. The period must be unique for each backup target (disk or server).
   o **Rotation period** - a 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).

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

7. Click the Save button to finish.

9.4.7.3.2 To edit an incremental backup schedule:
1. Go to your Control Panel's 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:
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's **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's **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:

1. Go to your Control Panel's **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's **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:
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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’s 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:
   - 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.

9.4.9 Smart Server Integrated Console

OnApp includes an integrated VNC console that gives users direct access to their smart servers through the OnApp Control Panel, if their user role permits. Administrators can access all smart servers consoles for support and troubleshooting purposes.

The console connects the user's browser to the VNC port made available via the Compute resource for the guest console. Both the administrator and the end user web UIs offer a console connection, regardless of the OS.

To access the smart servers VNC console via the control panel interface:
1. Go to your Control Panel's Smart Servers menu.
2. Click the label of the smart server you're interested in.
3. On the screen that appears, click the Console button in the upper menu.

We recommend using Java 1.7, since OnApp VNC console was not tested with Java 1.8.

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
To view transactions for a smartserver:
1. Go to your Control Panel’s **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’s **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:
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- **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.

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's **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
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 Settings > Defaults configuration).

See also:
- Buckets
- Smart Server Integrated Console
- Smart Server Transactions and Logs
- Smart Server Recipe Custom Variables

9.5 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.

The advantages of baremetal servers:

- full access to the entire server
- tight security

Baremetal servers are hosted on Xen 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.

You can enable recovery mode for baremetal servers. For details, see Enable Recovery Mode:

- 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.
9.5.1 Create Baremetal Server

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's 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 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.

On this page:
Step 1 of 4. Templates
Step 2 of 4. Properties
Step 3 of 4. Resources
Step 4. Recipes

See also:
Baremetal Server Creation Workflow
Edit Baremetal Server
Delete Baremetal Server
Baremetal Server Billing
Baremetal Servers

9.5.1.2 Step 2 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 for 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 i
- **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.**
9.5.1.3  Step 3 of 4. 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. Please note: you can only reside your baremetal server on cloud booted Xen Compute resources.

- **Network Zone** - choose a network zone from the drop-down list.
- **Network** - choose the network from which the baremetal server should get the IP address.
- **Show only my IP addresses** - tick this checkbox to view only own IP addresses in the IP addresses dropdown.
- **Selected IP address** - the Baremetal Server's selected IP address.
- Click Next.

9.5.1.4  Step 4. Recipes

- Choose a recipe you want to assign to this baremetal server by dragging the required recipe to the **Assigned for provisioning** pane.

- 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.

At this step you can find the configuration summary of baremetal 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 baremetal server will be added to the system. You can view it under the **Baremetal Servers** menu.

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](http://templates.repo.onapp.com/Linux_templates.html)

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 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's **Settings > Configuration** menu). Usually this is set to Control Panel server IP, but you can change it to be any other server.

9.5.2  Baremetal Server Creation Workflow

The following scheme describes the steps required to create a baremetal server:
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 the List of Baremetal Servers

To view the list of all baremetal servers deployed in the cloud:

1. Go to your Control Panel's **Baremetal servers** menu to see an overview of all baremetal servers in the cloud with their details: OS, label, IP addresses, etc.

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
- Edit Baremetal Server
- Baremetal Server Recovery Mode
- Delete Baremetal Server

**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
   - Notes
   - Activity log

3. To remove all pending tasks from the log, click the **Clean all pending tasks for this Baremetal Server** button at the bottom of the screen.

9.5.3.3 Edit Baremetal Server

You can edit baremetal server details via the Control Panel's **Baremetal Servers** menu.

To edit the baremetal server details:
1. Go to your Control Panel's **Baremetal Servers** menu. On the screen that appears you'll see the list of all baremetal servers.

2. Click the required server name (label).

3. Click the **Actions** button, then click **Edit**.

4. On the screen that follows, change the server details.

5. Click the **Save** button to save your changes.

### 9.5.3.4 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**.

### 9.5.3.5 Delete Baremetal Server

To remove a baremetal server from the cloud:

1. Go to your Control Panel's **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.
9.5.4 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's **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's **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**
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's Settings menu > Configuration > System tab > Email
Application Server gives you high-end cloud management features including:

<table>
<thead>
<tr>
<th>Application Server Options</th>
<th>Power Options</th>
<th>Administrative Options</th>
<th>Networks</th>
<th>Disks</th>
<th>Backups</th>
<th>Backup Schedules</th>
<th>Statistics</th>
<th>Applications</th>
<th>Application Backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Reboot</td>
<td>Change owner</td>
<td>Configure network interface</td>
<td>Create disks</td>
<td>View</td>
<td>View schedule</td>
<td>CPU utilization</td>
<td>View Applications</td>
<td>View Application Backup</td>
</tr>
<tr>
<td>Rebuild manually</td>
<td>Start up</td>
<td>Edit Administrator's note</td>
<td>Rebuild network</td>
<td>Edit disks</td>
<td>Edit backup note</td>
<td>Create schedule</td>
<td>Billing statistics</td>
<td>Create Application</td>
<td>Create Application Backup</td>
</tr>
<tr>
<td>Migrate</td>
<td>Suspend</td>
<td>Transactions 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>
<td>Delete Application Backup</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</td>
<td>Delete Application Backup</td>
<td></td>
</tr>
<tr>
<td>Segregate</td>
<td>Recover Reboot</td>
<td>Display network speed for network interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set VIP status</td>
<td>Recover Start up</td>
<td>Edit network speed</td>
<td></td>
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</tr>
<tr>
<td>Autoscale</td>
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<td></td>
</tr>
</tbody>
</table>

The following options are not available for application servers:

- Reset Root Password
- Set SSH keys
- Integrated console
- Convert backup to template
- Recipes
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 Settings > Resolvers.
- Before creating an Application server you need to configure notifications for your cloud. This can be done at Control Panel > 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’s 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:
Edit Application Server
Delete Application Server
Application Server Billing
Application Server Disks
Application Server Backups
Application Servers

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 [-].

- **Domain** - specify the domain for this VS. The default value is `localdomain`. This parameter is not applicable for 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** to proceed to the following step of the wizard to specify the application server resources.

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.
  - **CPU Threads** - set the amount of threads per core.

Primary Disk

- **Data Store Zone** - choose a data store zone for application server's primary disk.
- **Primary disk size** - set the primary disk size.

Swap Disk

- **Data Store Zone** - choose a data store zone 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.

Network Configuration

- **Network Zone** - choose a network zone from the drop-down box.
- **Network** - choose the network from which the application server should get the IP address
- **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 dropdown.
- **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.

---

**Do not use CPU Units for KVM compute resources running on CentOS5.**

CPU topology (CPU sockets and CPU threads) is the Labs feature preview. Pay attention that setting CPU topology is at your own risk only!

You may face the following problems when setting CPU topology:

1. Currently you cannot set CPU sockets and threads parameters for existing application servers.
2. After setting, the new parameters won't be shown at the application server details screen.
3. Some Linux application servers fail to boot up.
4. When sockets and threads are set incorrectly, you may face huge load on HV's under CentOS 5.x.

**Show IP address selection for new application server** option is enabled via the ""Show IP address selection for new VS"".

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's Settings menu > Configuration > System tab > Email > From**.

### 9.6.2.1 View Application Servers

To view an application:

1. Go to your Control Panel's **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

- Operating system
- Label. Click the label to see details.
- IP Addresses
- Disk Size
- RAM
- Backups - the number of backups and the space these backups take.
- Compute Resource - the label of compute resource with which application server is associated
- User - the owner of this application server. Click the user name to see the owner details.
- Power status. Click the on/off buttons to change the status

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):

1. Reboot
2. Recovery reboot
3. Shutdown
4. Startup
5. Recovery startup
6. 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.

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:

9.6.2.2 View Application Server Details

To view details of a specific application server:

1. Go to your Control Panel’s 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.

9.6.2.2.1 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's 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's 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

OnApp allows hot and cold migration of application servers between compute resources that share common data stores (or data store zones). Hot migration means moving application servers that are running, while cold migration means moving application servers that are shut down.

To check if your Windows template supports hot migration, see [http://templates.repo.onapp.com/Windows_templates.html](http://templates.repo.onapp.com/Windows_templates.html)

To hot migrate an application server:

1. Go to your Control Panel's **Application Servers** menu.
2. Click the label of the application server you want to migrate.
3. Click the **Tools** button and press the **Migrate Application Server** link.
4. In the window that appears, choose the target compute resource from the drop-down menu.
5. Move the **Cold-migrate when hot-migration fails** slider to the right if you want to apply cold migration in case of hot migration failure.
6. Click the **Start Migration** 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.

### 9.6.2.6 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
To configure autoscaling settings:

1. Go to your Control Panel's **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's **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’s 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’s 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’s 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's **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 an application server after deleting it.
   - Deleting an application server removes all data stored on that application 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:

1. Go to your Control Panel's 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's 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's **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's 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).
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

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

1. Go to your Control Panel's 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's 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's 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:
   o 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.
   o 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's 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's 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's 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:
   o 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.

The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.

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: 

/\texttt{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 Edit Application Server Disks

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’s 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 decreasesize 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.

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></td>
<td>Mounted</td>
</tr>
<tr>
<td>• Mount point</td>
<td></td>
<td>Mount point</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's 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 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.

### 9.6.4.4 Delete Application Server Disks

To delete a disk:

1. Go to your Control Panel's **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 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 server zones 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 still be accessible via Backups > Images menu.

  - If required, you can change the block size which is used during backup creation at Control Panel (MB) parameter.
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's **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's **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
- extracted template /onapp/backups/templates/your_template
- locked template /onapp/backups/templates/your_template.lock

9.6.5.4 Take Application Server Disk Backup
To back up an application server:

1. Go to your Control Panel's 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's 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's 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's 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:

9.6.6.1.1 If normal backup option is selected for the cloud:
1. Go to your Control Panel's 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:

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date - time when the schedule was created</td>
<td>Target - server or disk for which the schedule was created (depending on the backup type)</td>
</tr>
</tbody>
</table>
Action - scheduled action

Frequency - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days

Period - backup period: days, weeks, months or years

Rotation period - number of backups after which the first backup will be deleted

Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

Next Start - the date and the hour of the next backup

Status - schedule status

9.6.6.1.2 If incremental backup option is selected for the cloud

1. Go to your Control Panel’s 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:
   - Date - time when the schedule was created
   - Target - server or disk for which the schedule was created (depending on the backup type)
   - Action - scheduled action
   - Frequency - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - Period - backup period: days, weeks, months or years
   - Rotation period - number of backups after which the first backup will be deleted
   - Next Start - the date and the hour of the next backup
   - Status - schedule status

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's 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:
   - Frequency - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - Period - backup period: days, weeks, months or years. The period must be unique for each backup target (disk or server).
   - Rotation period - a number of backups after which the first backup will be deleted.
   Despite the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with the specific frequency, period and target will be stored in the system.
   - 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's 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:
   - Frequency - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - Period - backup period: days, weeks, months or years. The period must be unique for each backup target (disk or server).
   - Rotation period - a 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's 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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted. Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
   - **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.

9.6.6.3.2 To edit an incremental backup schedule:

1. Go to your Control Panel's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - 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.

9.6.6.4 Delete Application Server Backup Schedule

9.6.6.4.1 To delete a normal backup schedule:

1. Go to your Control Panel's **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's 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:
Billing Plans
Resource Allocation And Prices
Permissions
User Billing Statistics

1. Go to your Control Panel's 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's 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's 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's 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:
   - 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.
9.6.8 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's **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][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
Application Server Billing

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 container server:
1. Add Container Server template to required template group.
2. Add the template group to the Access Control of the bucket at Control Panel > 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 > 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

9.7 Container Servers

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 > Templates > Template List > System Templates > Upgrades.

- We do not support container servers on CloudBoot compute resources running on CentOS 5.
- If you experience any container server issues, please, report them to containerserversbeta@onapp.com.

Container Server gives you high-end cloud management features including:

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</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

- We do not support container servers on CloudBoot compute resources running on CentOS 5.
- 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's 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 - the information on managing container servers

9.7.1.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the 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 for 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://tools.ietf.org/html/rfc1123).

**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.

---

**Do not use CPU Units for KVM Compute resources running on CentOS5.**

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.
  - **CPU Threads** - set the amount 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 container servers.
- After setting, the new parameters won't be shown at the container server details screen.
- Some container servers fail to boot up.
- When sockets and threads are set incorrectly, you may face huge load on Compute resource's under CentOS 5.x.

---

**Primary Disk**

- **Data Store Zone** - choose a data store zone for container server's primary disk.
- **Primary disk size** - set the primary disk size.

**Swap Disk**

- **Data Store Zone** - choose a data store zone for container server's swap disk.
- **Swap disk size** - set the swap disk size. Swap disk size must be greater than zero.

**Network Configuration**

- **Network Zone** - choose a network zone from the drop-down box.
- **Selected IP address** - select the IP address for the container server from the drop-down list
- **Network** - choose the network from which the container server should get the IP address
- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropdown.
- **Port Speed** - set the port speed for this VS

---

- 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.

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

We do not support container servers on CloudBoot compute resources running on CentOS 5.

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 cloud-config for your container server:

1. Go to your Control Panel's **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 > 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:

```yaml
#cloud-config
write-files:
  - path: /etc/hosts
    permissions: '0644'
    content: |
      master1_IP master1 coreos00
      master2_IP master2 coreos01
coreos:
edcd2:
  name: master1
  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
```

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

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.

- We do not support container servers on CloudBoot compute resources running on CentOS 5.
- If you experience any container server issues, please, report them to containerserversbeta@onapp.com.

#### 9.7.3.1 View Container Servers

To view all container servers deployed in the cloud:

1. Go to your Control Panel's **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.
- 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's 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.
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- 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

We do not support container servers on CloudBoot compute resources running on CentOS 5.

You can edit label, CPU and RAM resources for container servers. To edit the a container server:
1. Go to your Control Panel's 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 application server on the same (or another) template:
1. Go to your Control Panel's 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.**

---

### Migrate Container Server

OnApp allows hot and cold migration of container servers between compute resources that share common data stores (or data store zones). Hot migration means moving container servers that are running, while cold migration means moving container servers that are shut down.

**To hot migrate a container server:**

1. Go to your Control Panel's **Container Servers** menu.
2. Click the label of the container server you want to migrate.
3. Click the **Tools** button and press the **Migrate Container Server** link.
4. In the window that appears, choose the target Compute resource from the drop-down menu.
5. Move the **Cold-migrate when hot-migration fails** slider to the right if you want to apply cold migration in case of hot migration failure.
6. Click the **Start Migration** 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. 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.

### 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's **Container Servers** menu.
2. Use the icon in the **VIP** column next to a required server to change switch on/off the VIP status.

### 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's 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's 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's 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 Application 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’s **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 containerserver.

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's 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 containerserver.

9.7.4 Manage Container Server Networks

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
1. Go to your Control Panel's **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's **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's **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's **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)

- Protocol type (for ICMP protocol only) - indicate a type of the ICMP protocol (range from 0 to 255)
- Choose the protocol (TCP, UDP, DCCP, SCTP or ICMP).

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

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

1. Go to your Control Panel's 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:

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Protocols</th>
<th>Protocols</th>
<th>Protocols</th>
</tr>
</thead>
</table>
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’s 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’s 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's 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's **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**

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 loose 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](#)

**See also:**
- [Create Container Server](#)
- [Container Server Cloud Config](#)
- [Container Server Billing](#)
- [Container Server Backups](#)
- [Manage Container Server Backup Schedules](#)

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's **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.
   - The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.
   - 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 FSTAB.
   - 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.
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 Edit Container Server Disks

#### 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 disks.**

To change disk size:
1. Go to your Control Panel's **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's **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's 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

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 > 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:
To view the list of container server's backups:

1. Go to your Control Panel's **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's **Container 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 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's **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's **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

![Image](image_url)

To add/edit container server backup's note:

1. Go to your Control Panel's **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

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:**
1. Go to your Control Panel's **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
   - **Frequency** - how frequently the backup will take place according to the period set. For example, frequency of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years
   - **Rotation period** - number of backups after which the first backup will be deleted

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
   - **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's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted.

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

   - **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's **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:
   - **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
   - **Period** - backup period: days, weeks, months or years. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted.

   Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.
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- **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's **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**

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

**See also:**
- Billing Plans
- Resource Allocation And Prices
1. Go to your Control Panel's **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's **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).

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’s **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.

9.7.8.4 Container Server Disk IOPS Statistics

![Diagram](image.png)

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's **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

OnApp includes an integrated VNC console that gives users direct access to their container servers through the OnApp Control Panel, if their user role permits. Administrators can access all container server consoles for support and troubleshooting purposes. The console connects the user's browser to the VNC port made available via the Compute resource for the guest console. Both the administrator and the end user web UIs offer a console connection, regardless of the OS.

To access the container server VNC console via the Control Panel interface:

1. Go to your Control Panel's **Container Servers** menu.
2. Click the label of the container server you're interested in.
3. On the screen that appears, click the **Console** button in the upper menu.

For HTML5 console, use the Re-connect button if the connection got lost:

- If console is running in normal state, pressing re-connect button will cause disconnect, and it will be re-connected automatically after 1.5 seconds.

- If console got stuck, pressing re-connect button will send all the information once again and will re-connect without page reload.

- If console got disconnected with any status code, and red lane with error message revealed, it will be re-connected automatically after 1.5 seconds.

To switch from HTML5 to Java console, go to **Settings > Configuration** menu.
9.7.10 Container Server Transactions and Logs

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's 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

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's **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 container server 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 container server disk
- **VS resize** - run the recipe when resizing a container server

**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

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's **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

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 > 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 > 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
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.

- **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-Scale 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.

Load Balancers, both autoscaling clusters and load balancer clusters, can only be created on the basis of Virtual 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's 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.

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's **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.
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
- Node 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.
- CPU Priority – specify CPU priority. For more info on CPU priority, refer to **Create VSS** section.
- 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-Scaling clusters. In this document you can find information on how to manage Load Balancer and Auto-Scaling 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 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's 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 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.
- **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.
9.8.2.3 View Load Balancer Billing Statistics

To view billing statistics for a load balancer:

1. Go to your Control Panel's **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.
   - **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's **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 details screen
- CPU monitor details screen

9.8.2.4.1 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.

9.8.2.4.2 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.

9.8.2.5 Edit Load Balancer

To edit a load balancer:
1. Go to your Control Panel's **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.

9.8.2.6 Delete Load Balancer

To delete a load balancer:
1. Go to your Control Panel's **Load Balancers** menu.
2. Click the **Delete** icon next to a required load balancer.
3. Click **OK** to confirm the deletion.

9.9 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.

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></td>
<td></td>
</tr>
</tbody>
</table>
9.9.1 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.

9.9.2 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
### 9.9.3 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 AWS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provisioning</strong></td>
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<td>Self Service via UI</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Cloudboot</td>
<td>Y</td>
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<td>N</td>
<td>N</td>
<td>N</td>
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<td>Recipes</td>
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<td>Y</td>
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<td>OnApp Integrated Storage</td>
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<td>Incremental Backup</td>
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<td>see VMware VS Snapshots</td>
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<td>Manage Network Interfaces</td>
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<td>Y</td>
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<td>Hot RAM resize without reboot**</td>
<td>Y</td>
<td>Y</td>
<td>Y**</td>
<td>Y**</td>
<td>Y**</td>
<td>Windows 2008 and Windows 7 VSs N</td>
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<tr>
<td>Hot CPU cores resize without reboot</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Windows 2008 and Windows 7 VSs. Some Linux distributions N</td>
<td></td>
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<tr>
<td>Cold migration</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>VMware utilizes vMotion to ensure that the VSs are optimally placed on the compute resources</td>
<td>N</td>
</tr>
<tr>
<td>Disk hot attachment / detachment</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Available for Linux VSs (Virtio templates)</td>
<td>Available for Linux VSs (Virtio templates)</td>
<td>N</td>
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<tr>
<td>Disk resize (increase/decrease)</td>
<td>Available for Linux VSs. FreeBSD - increase only</td>
<td>Available for Linux VSs. FreeBSD - increase only</td>
<td>Available for Linux VSs. FreeBSD - increase only</td>
<td>Available for Linux VSs. FreeBSD - increase only</td>
<td>Available for Linux VSs. FreeBSD - increase only</td>
<td>Y - Increase only. Reboot is required.</td>
<td>N</td>
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<tr>
<td>Feature</td>
<td>Y</td>
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<td>IPv6 support</td>
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<td>Reboot in recovery</td>
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<td>Segregate</td>
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<td>Change owner</td>
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<td>CPU Topology</td>
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<td>Power on/off/reboot vApp</td>
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<td>Power on/off/reboot VS</td>
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<td>Build vApp from template</td>
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<td>Build VS from template</td>
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<td>Integrated VS into vApp</td>
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<td>Delete vApp</td>
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<td>Delete VS</td>
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<td>Reset root password</td>
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<td>Set SSH Keys</td>
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<tr>
<td>Edit VS</td>
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</tbody>
</table>

Disk resize is not available for primary FreeBSD disks. Disk size decrease is not available for Integrated Storage.

Disk resize is not available for primary FreeBSD disks.
Disk size decrease is not available for Integrated Storage.

IPv6 support
Reboot in recovery
Segregate
VIP status
Change owner
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Power on/off/reboot vApp
Power on/off/reboot VS
Build vApp from template
Build VS from template
Integrated VS into vApp
Delete vApp
Delete VS
Reset root password
Set SSH Keys
Edit VS
9.9.4 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 (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.

9.9.5 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.

9.9.6 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.

9.9.6.1 View Compute Resources

On this page:
View Compute Resources
View Compute Resource Details
Power On/Off Virtual Servers
The Control Panel provides a quick way to see a summary of compute resources available in your cloud. In the Appliances section, expand the Compute Resources menu and 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
- Failover
- VS (the number of deployed virtual servers)
- CPU
  - Cores
  - Used
  - Available
  - MHZ
- RAM
  - 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.

9.9.6.2 View Compute Resource Details

To view detailed information on a particular 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.
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 total
- **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.

9.9.6.3 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 **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
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:

1. Click the **Power On** button.
2. In the pop-up box, click the **YES** button to confirm your action.

**Power Off**

To power off the selected VSs:

1. Click the **Power Off** button.
2. 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
3. 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.

### 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 **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.
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
   - **Compute Resource Type** - the type of the compute resource (Xen, KVM, etc)
   - **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.

   - **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" will be added. It 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.
To reboot a compute resource:

1. Go to your Control Panel's **Compute resources** menu (or click a compute zone name underneath the main compute resource menu link).
2. Click the label (name) of the compute resource you want to reboot.
3. On the compute resource details screen that follows, click the **Tools** button, then click **Reboot Compute resource**.
4. A new screen will open asking for confirmation (via three checkboxes) before reboot:
   - **Start running virtual servers after reboot?** If this option enabled the system will initiate the failover process. 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?** Check this box if you want VSs that cannot be migrated to be powered off. When a compute resource is scheduled for a reboot, OnApp will first attempt to hot migrate all VSs it hosts. If hot migration is not possible for a VS, OnApp will attempt to cold migrate that VS. With this box checked, if cold migration fails, the VS will be stopped so the reboot may proceed. If you don't check this box, OnApp will attempt to hot and then cold migrate all VSs hosted by the compute resource being rebooted – but will stop the migration process if any VS cannot be migrated.
   - **Are you sure you want to reboot this Compute resource?** A simple confirmation to confirm that you want the compute resource to reboot.
5. When you're certain you want to proceed with the reboot, click the **Reboot** button.

**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)
   ```bash
   mkdir-p /onapp/backups
   mkdir-p /onapp/template
   s mount /dev/sda1 /onapp/backups
   ```
mount /dev/sda2 /onapp/templates

2. If your 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

9.9.7 OpenStack

<table>
<thead>
<tr>
<th>Feature / Virtualization Software</th>
<th>OpenStack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning</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>Storage</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>Availability</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>Networking</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>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>Linux VSs only</td>
<td></td>
</tr>
<tr>
<td>Hot RAM resize without reboot**</td>
<td>Y</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>Feature</td>
<td>Available Options</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------</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>Console</td>
<td></td>
</tr>
<tr>
<td>HTML 5 Console</td>
<td>Y</td>
</tr>
<tr>
<td>VMRC Console</td>
<td>N</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>Balooning 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.

### 9.10 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 Settings > Assets menu.

Compute resources that are already created but not assigned to a Compute resource group are managed via the Control Panel's 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:
   - click the "+" sign to add a VS to this Compute resource. You'll be prompted to a VS Creation Wizard.
   - click Tools > Edit Compute resource to change its details and resources.
   - click Tools > Reboot Compute resource to reboot an asset.
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 - the information on managing application servers
- Create Application Server - the instructions on creating an application server
- Application Server Billing - the info on how you can charge your customers for applications
- Applications (API) - the list of available API requests

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
• PivotX
• 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
• iCore
• 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
• Concrete 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
- Jcow
- 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
- Prisnotube Express
- Ampache

10.1.8 Admanager

- OpenClassifieds
- Prosper202
- OClass
- 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
- PHPprojekt
- TaskFreak
- todoyu
- Flyspray
- phpCollab
- Traq
- SiteDove
- Admidio
- Eventum
- Trac
- Burden
- Rukovoditel
- WebCollab
- ZenTao
- Bugs
- TestLink

### 10.1.11 Files
- ownCloud
- ProjectSend
- PHPfileNavigator
• Pydio
• eXplorer
• Arfoo
• 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
• Dada Mail
• Postfix Admin
• RainLoop Webmail

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
- Question2Answer
- Soholaunch
- Open Journal Systems
- PASTE
- ArticleSetup
- jobberBase
- PHP QR Code
- Privacy Policy Generator
- PhpGedView
- Codiad
- Hablator
- webtrees
- wallabag
- GLPI
- JoobsBox
- InfiniteWP
- PHPWeby
- Mautic
- OpenBiblio
- Open Conference Systems
- phpDocumentor
- XCloner
- Commentics
- u-Auctions
- SVNManager
- AJAX Chat
- XMS
- Brushtail
- BlaB
- Agora-Project
- Open Monograph Press
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's 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:
   o application name – the name of the application installed on this application server
   o software version – the version of the application software
   o software URL – this URL is a link to the application itself
   o Admin URL – this URL is a link for administrator, where he can enter credentials to log into application
   o Actions – click the Actions icon to perform the following procedures with the application:
     ▪ backup application
     ▪ remove application

   ![Image of the Application Management interface]

There is one more possibility to view an application:

1. Go to your Control Panel's 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's 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**

6. 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

7. **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.

8. Click **Proceed**.
9. 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

10. Click the Install button.

There is one more possibility to create an application:

1. Go to your Control Panel's 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's 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's 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)
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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's 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's 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's 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's 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)
   - 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's 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's 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's 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:
   - Name - the domain name
   - Path to Application - the route to application
   - Type - whether domain is addon or parked
   - 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's 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:
   - Domain - enter domain name
   - Choose domain path using one of the following tabs:
     - Application - choose application-based path from the drop-down menu
6. Click the Submit button.

10.5.3 Delete Domain

To delete a domain:
1. Go to your Control Panel's 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

Starting with OnApp 5.0 version, 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's 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’s 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’s 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's 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's 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's 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's 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's 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's **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's **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's 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:

On this page:
List of System Applications
PHP Version Switching

See also:
Applications
Application Backups
Application Servers

- **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

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's **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 **Application server** > **Applications** > **Email Accounts**.

   ![Email Accounts](image)

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.

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**On this page:**

[View Email Accounts](#)
[Deploy Email Server](#)
[Create Email Account](#)
[Remove Email Account](#)

**See also:**

[Application Servers](#)
[Manage Domains](#)

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### 10.8.2 Deploy Email Server
To install email services:

1. Go to your **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 **Application server** > **Applications** > **Email Accounts**.
2. Click the + button and fill in the following:
   - **User** - add text, which will be the part of the email account before the @ symbol
   - **Domain** - choose a domain from the drop-down list
   - **Password** - create a password for this email account
   - **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 **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 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/Rerun services

See also:
Application Servers
Applications

10.9.2 Start/Stop/Rerun Services

To manage services:

1. Go to your 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 Blueprints

Blueprints are used for VMware vCenter virtual server management. It allows importing VMware vApps images from the ESXi Compute resources at vCenter, and creating blueprints from that images within the OnApp Control Panel.

Using blueprint templates, OnApp administrators can create and manage multiple virtual servers as a single multi-tiered application (blueprint). A single blueprint template is a pre-configured template that contains virtual server operating system and the configuration settings (network configuration and firewall rules). Utilization of blueprints allows you to create sets of different types of servers: for example, web servers, database, etc. based on imported vApps templates.

Blueprint management is described in the Blueprints section of the vCenter Implementation guide.

See also:
- VMware vCenter
- Blueprints
12 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 machine, 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**

12.1 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.

12.2 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 minIOPS 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.
13 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 the Integrated Storage, you can create a virtual data store in 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.

The OnApp Integrated Storage makes exclusive use of CloudBoot to provision Compute resources, so Compute resources must be booted via CloudBoot in order to enable the integrated SAN functionality. For details, refer to the CloudBoot Compute Resources section.

See also:
- CloudBoot Compute Resources
- Integrated Storage Data Stores
- Integrated Storage Data Store Disks
- Storage Nodes
- Integrated Storage Drive Devices

13.1 Known Limitations and Restrictions

- You can use integrated storage on XEN and KVM cloudbooted Compute resources only. 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 integrated storage, you must have a Manage OnApp Storage permission enabled for your user role. Also, you have to enable the integrated storage in the system configuration manually (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
This chapter provides an overview on what service add-ons in OnApp are, the management tips, the information on creating your own service add-ons and providing them as a paid resource for your customers.

Service Add-ons functionality allows you to offer 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.

Service Add-on functionality provides the ability to add services to a virtual server. Below you can find more details on each step of the workflow.

### 14.1 Create service add-on

#### On this page:
- 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

#### See also:
- Manage Service add-ons
- Service Add-on Store
- Configure Resource Allocation And Prices

To create a service add-on:
1. Go to your Control Panel's **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).
   - **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.

### 14.2 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.

14.3 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 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.

14.4 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.

14.5 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)

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.

For more information about permissions, refer to the Permissions List chapter of this guide.

14.6 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 \( \times \) 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's **Virtual Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Overview** tab, then choose **Service Add-on s**.
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. 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 will 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.

### 14.7 Manage Service Add-ons

This chapter provides an overview on how to manage service add-ons in OnApp. You can view, create, edit, delete service add-ons and manage its On add, On remove, On VS Destroy and On VS Rebuild events.

**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
14.7.1 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's 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)
   - **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:

1. **All service add-ons** - the list of all the service add-ons created in the cloud.
o **Unix service add-ons** - the service add-ons that have been created as compatible with Unix virtual servers only.

o **Windows service add-ons** - the service add-ons that can be assigned to Windows VSs only.

o **Unix/Windows service add-ons** - the service add-ons that are compatible with both Unix and Windows-based virtual servers.

14.7.2 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's **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 Replace recipes permission is enabled and the billing settings allow).

   - **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.

14.7.3 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:

14.7.3.1 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's **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’s **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’s **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.

**14.7.3.2 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 > Notifications > Recipients Lists** and create a new recipient list of users whom you want to notify about certain event.
3. Go to **Control Panel > 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 > 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 add on event** from the drop-down list.
   - **Recipients list** - select the recipients list which you have configured in the second 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's 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's 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.

14.7.4 Edit service add-on

To edit a service add-on:

1. Go to your Control Panel's 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 Replace recipes permission is enabled and 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.
14.7.5 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's **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.

14.7.6 Delete service add-on

To delete a service add-on:

1. Go to the Control Panel's **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.
14.8 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.

14.8.1 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.

14.8.2 Add Service Add-On Groups

To add a service add-on group:
1. Go to your Control Panel's 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.
14.8.3 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's 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.

14.8.4 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's 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.

14.8.5 View/Edit/Delete a Service Add-on Group

To view/edit/delete a service add-on group:
1. Go to your Control Panel's 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.
15 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.

15.1 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.

15.2 Windows Templates

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.
- **KMS licensing**: this is applicable to Windows 2008 and Windows 7 VSs 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.

### 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.

### 15.3 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>Windows</td>
<td>2008 R2 Standard Edition</td>
<td>Windows 2008 x64 STD R2 XEN 3.1</td>
</tr>
<tr>
<td></td>
<td>2008 R2 Data Center Edition</td>
<td></td>
</tr>
<tr>
<td>Linux</td>
<td>CentOS 5 64 bit</td>
<td>Debian 6.0 x64</td>
</tr>
<tr>
<td></td>
<td>CentOS 6 64 bit</td>
<td></td>
</tr>
</tbody>
</table>
### 15.4 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>

The following scheme demonstrates the possible template storage locations depending on your system's configuration:
15.5 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.

15.6 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.
15.7 Configuration Options

You can set template configurations for your cloud in the settings menu at Dashboard > 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 the Control panel install/upgrade process, the following values are set by default:

- **Template server URL**: [http://templates-manager.onapp.com](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](#).

15.8 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 > Settings > Configuration > Backups/templates tab as a prerequisite for installing/upgrading templates.

For detailed instructions, refer to Install/Update Templates page.

15.9 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 > 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.

15.10 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
• download new and update existing templates
15.10.1 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, and whether you can adjust their CPU cores/priority & RAM without rebooting a virtual server based on that template ("resize without reboot"). 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's **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.

15.10.2 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's **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.

### 15.10.3 Install/Update Templates

The Template server URL has to be set at **Control panel > 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 **VMware Template Installation Guide** 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.

#### 15.10.3.1 Installing Templates

To download and install a template from a remote template server:

1. Go to the Control Panel's **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.

### 15.10.3.2 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's **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.**

### 15.10.3.3 Installations

You can see the status of the active downloads and cancel/restart them.

For this:

1. Go to the Control Panel's **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.

### 15.10.3.4 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.

15.10.4 Delete System Templates

To delete a template:
1. Go to the Control Panel's 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.

15.10.5 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.

15.10.6 Edit Custom Templates

You can edit your custom templates at any time. To do so:

1. Go to your Control Panel's 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.

15.10.7 Delete Custom Templates

You can delete your custom templates at any time. To do so:

1. Go to your Control Panel's 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.

15.10.8 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's 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.
15.10.9 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's 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.

15.11 Manage Template Recipes

In this document, you can find information on how to manage Template Recipes.

15.11.1 View Recipes

You can see whether any recipes are assigned to a template at Control Panel > 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's 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

15.11.2 Assign Recipe
Use drag and drop feature to assign recipetoassigna recipe to adesiredevent.

You can assign template recipes to the following events:

- **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 recipes with own Windows templates, the templates must be version 3.1 or later.

**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.

**15.11.3 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.

**15.12 Manage Template Recipe Custom Variables**

You can define custom variables for image templates. To do so:

1. Go to your Control Panel's **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
15.13 Manage Template Software Licenses

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.
- **KMS licensing**: this is applicable to every VS since Windows 7 \ Server 2008 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:

- **Template store** – where you specify which license types can be applied to templates assigned to the particular template group.
- **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 the template.
- If you do not assign any template group to a bucket, the user can build VSs on any template, based on the settings specified for the template group to which this template belongs.
15.13.1 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).

15.13.2 MAK Licensing

To add a MAK license to OnApp:

1. Go to your Control Panel's Software Licenses menu.
2. Click the Add new License button.
3. Set the necessary parameters in the form that appears.

   Where:
   - 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's 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, e.g. Windows 2008 R2 x64 STD/ENT
- **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's **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.

### 15.14 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](#).

#### 15.14.1 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's **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's **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's **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's **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.

### 15.14.2 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's **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**.

### 15.14.3 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's **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**.

### 15.15 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.

#### 15.15.1 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's **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
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- **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.

### 15.15.2 Add Child Group

To add a child group to the group:

1. Go to your Control Panel's **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**.

### 15.15.3 Assign Template to Template Group / Child Group

To assign a template to a template group or child group:

1. Go to your Control Panel's **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**.
15.15.4 Remove Template from Template Group

To remove a template from a template group:
1. Go to your Control Panel's **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.

15.15.5 View/Edit/Delete Template Group

To view/edit/delete a template group:
1. Go to your Control Panel's **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.
16 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 > Settings > Configuration > Max upload size. 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.

16.1 View ISOs

On this page:
View ISOs
- Share ISO Location
- Enable ISO Permissions
- Upload ISO
- Make ISO Public
- Boot Server from ISO

Upload ISOs
- Upload ISO
- Make ISO Public

Edit ISOs
Delete ISOs
To view the ISOs available to you:

1. Go to Control Panel 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 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

### 16.2 Boot from ISO

#### 16.2.1 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.

### 16.2.2 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](#).

### 16.2.3 Upload ISO(s) into the Cloud

Once you've configured the locations for storing ISOs, you can add a new ISO to the system. Follow this procedure:

1. Go to your **Control Panel** 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 field). 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 Templates > ISO List > My ISOs tab. The ISOs uploaded by your users are under the User ISOs tab.

### 16.2.4 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's 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.

### 16.2.5 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's 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.

16.3 Upload ISOs

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.

16.3.1 Upload ISO(s) into the Cloud

To upload ISOs into your cloud, follow this procedure:

1. Go to your **Control Panel** 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** field). 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 **Templates > ISO List > My ISOs** tab. The ISOs uploaded by your users are under the **User ISOs** tab.
16.3.2 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's 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.

16.4 Edit ISOs

To edit the ISOs available to you:

1. Go to Control Panel 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:
   o Allowed hot migrate - move the slider to the right if you want to be able to hot-migrate VS created from this ISO
   o label - choose the name for the ISO
   o version - fill in the version of the ISO
   o min disk size - specify the minimum required disk size for the ISO
   o min memory size - specify the minimum required RAM for the ISO
   o operating system - choose the operating system of the ISO
   o operating system distro - fill in the operating system distribution of the ISO in free form
   o virtualization - tick the required virtualization type(s): XEN, KVM or KVM+Virtio
5. Click Save.

16.5 Delete ISOs

To delete an ISO:

1. Go to Control Panel 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.
17 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

### 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
- Resource Allocation And Prices
- OVA Virtual Server
- List of all OnApp Permissions
- Cloudboot Backup Server
- Buckets

### 17.1 Limitations and Prerequisites

- Be aware, that only one (primary) disk is imported from the OVA configuration. You can add new disks after the VS is created and built. That will be totally new disks without the information from OVA.
- OVA functionality is supported for KVM and vCenter compute resources.
- It is required to have at least one backup server running on CentOS6 or CentOS 7 in the cloud to import from OVA.
- 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.
- Be aware, that OVA functionality is not supported for compute resources with CentOS 5.x.
- 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.

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.
17.2 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
centos6ovalvm-disk1.vmdk
centos6ovalvm.ovf
```

17.3 View OVAs

To view the OVAs available to you:

1. Go to Control Panel and click Templates.
2. Click OVA List on the menu.

![OVAs List](image)

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
   - System OVAs - the list of the OVAs that are publicly available to all users
   - My OVAs - the list of custom OVAs uploaded by the user who is currently logged in
   - User OVAs - the list of the OVAs uploaded by your users

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)
17.4 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 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
   - Version - fill in the version of OVA
   - 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:
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.

### 17.5 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** 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 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 vCenter OVA Import to OnApp 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.

### 17.6 Make OVAs Public

It is possible to make the OVA template public after converting. To make OVA public:

1. Go to **Control Panel** 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.
17.7 Edit OVAs

To edit the OVAs available to you:

1. Go to Control Panel 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.

### 17.8 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.**

#### 17.8.1 Delete OVA Files

To delete the OVA files:
1. Go to **Control Panel** 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.**

#### 17.8.2 Delete OVA

To delete OVA:
1. Go to **Control Panel** 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.**

### 17.9 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.X/YY(ro,no_root_squash)" - where X.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 > Settings > Compute Resources > Label of the required CloudBoot compute resource.

6. Click the Actions icon > Edit next to the Cloudboot Backup Server.

7. Add the following to the Custom Config field:

   ```
   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 Cloudboot Backup Server

   You can also execute the custom config command directly on the Backup Server to apply it withoutreboot.
18 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.

OnApp CP does not update the status of the recipe if it takes longer than 1 hour to complete the transaction, but the task will be displayed as still running. This issue will be fixed in next releases.

Currently, it is not possible to execute recipes using cPanel/CloudLinux template with the /tmp directory mounted.

18.1 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
- VMware Virtual Server Recipes
- Smart Server Recipes
- Baremetal Server Recipes
- Compute Zone Recipes
- Control Panel Recipes

To be able to use recipes in the cloud, you must enable recipe permissions first.

18.2 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** - Compute resource IP address
- **VIRTUALIZATION** - Compute resource virtualization type; Xen, KVM or VMware
- **SERVER_TYPE** - server type: virtual, smart or baremetal

**Virtual Server variables**

- **VM_IDENTIFIER** - virtual server identifier
- **IP_ADDRESS** - virtual server IP address
- **HOSTNAME** - hostname of a virtual server
- **ROOT_PASSWORD** - server root password
- **OPERATING_SYSTEM** - virtual server operating system
- **OPERATING_SYSTEM_DISTRO** - virtual server OS distribution
- **OPERATING_SYSTEM_ARCH** - architecture of the operating system
- **OPERATING_SYSTEM_EDITION** - edition of the OS
- **VM_USER_ID** - ID of the virtual server user
- **VM_USER_FIRSTNAME** - first name of the virtual server user
- **VM_USER_LASTNAME** - last name of the virtual server user
- **VM_USER_EMAIL** - email of the virtual server user

All recipes have access to these variables:

- **CP_ADDRESS** - control panel server IP address
- **RESPONSE_FROM_PREVIOUS** - response from the previous recipe step

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

### 18.3 View List of All Recipes

To view the list of all recipes:

1. Go to your Control Panel’s **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.

### 18.4 View Recipe Details

To view the recipe details:

1. Go to your Control Panel's **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 behavior 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.
18.5 View the List of Assigned Servers

To view the list of servers that use the recipe:

1. Go to your Control Panel's 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.

18.6 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 Administration 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:
Recipe Permissions
Recipe Groups
Recipe Use Examples
Control Panel Recipes Settings

18.6.1 Create Recipe

Adding a recipe consists of two stages:
1. **Creating a recipe**

2. **Creating a recipe step**

18.6.1.1 Create Recipe

To create a recipe:

1. Go to your Control Panel's **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)
   * **Unix compatible** - move this slider to the right to use this recipe for Unix virtual servers.
   * **Windows compatible** - move this slider to the right to use this recipe for 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.

18.6.1.2 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.
   * **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**
   
   Script:
   WScript.Echo "test"
   WScript.Quit 95

   **PowerShell**
   
   Script:
   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.

### 18.6.2 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’s **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.

**18.6.3 Edit Recipe**

To adjust recipe details:

1. Go to your Control Panel's **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.

**18.6.4 Edit Recipe Step**

To edit recipe steps:

1. Go to your Control Panel's **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.

To use exit code in the VBS or PowerShell scripts, you have to specify it directly in the script. For example:

**VBS**
Script:
WScript.Echo "test"
WScript.Quit 95

**PowerShell**
Script:
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 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.

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.

18.6.5 Delete Recipe
To delete a recipe:
1. Go to your Control Panel’s Recipes menu.
2. Click the Delete icon next to the recipe you want to remove.
3. Confirm the deletion.

**18.7 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.

**18.7.1 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

**18.7.2 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

**18.7.3 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

**18.7.4 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

18.7.5 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

18.7.6 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

18.7.7 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

18.7.8 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

18.7.9 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
18.8 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.

18.8.1 View Recipe Groups

To view the list of recipe groups:

1. Go to your Control Panel's 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.

18.8.2 Add Recipe Group

To add a recipe group:
1. Go to your Control Panel's 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.

18.8.3 Add Child Group to Recipe Group

To add a child group to a recipe group:
1. Go to your Control Panel's 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.

18.8.4 Assign Recipe to Recipe Group

To assign a recipe to a recipe group:
1. Go to your Control Panel's 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.

18.8.5 Remove Recipe from Recipe Group

To remove a recipe from a recipe group:
1. Go to your Control Panel's 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.
18.8.6 Edit Recipe Group

To edit a recipe group:
1. Go to your Control Panel's 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.

18.8.7 Delete Recipe Group

To delete a recipe group:
1. Go to your Control Panel's 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.

18.9 Recipe Use Examples

The set of examples aimed to illustrate the recipe utilization.

18.9.1 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.
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
```

**Result source:** Exit code

**Pass values:** 0

**On success:** Stop

**Fail values:** Fail anything else

**On failure:** Fail
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

18.9.2 Recipe 2

RunsonComputeresourcestocheckthevirtualization 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

18.9.3 Recipe 3

Runson Compute resources to check the snmpd and snmpdtrap 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

18.9.4 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

```powershell
$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

18.9.5 Recipe 5

Runs on Windows virtual servers to install Firefox web browser.
Virtual Server variable "VM_IDENTIFIER" is used in this example.

**Step 1**

```powershell
# 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"
    $source = "https://download.mozilla.org/?product=firefox-
    latest&os=win&lang=en-US"
} 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
18.10 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.

18.10.1 View Recipe Settings

To manage Control Panel recipes settings:

1. Go to your Control Panel's 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

18.10.2 Assign Recipe

Drag and drop recipe to assign it to a desired control panel event.

You can assign virtual server 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.

### 18.10.3 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.
19 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.

19.1 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 Settings > Configuration and switch on the Allow users connect to AWS toggle.
   This will enable AWS for the cloud.
2. Go to the 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:
OnApp License
Manage EC2 Instances
Launch New EC2
19.2 Manage EC2 Instances

EC2 Instances menu lists your machines per selected region and lets you Launch New EC2.

OnApp does not cash, store, or change any information regarding the instances and takes it via API from AWS.

19.2.1 View List of EC2 Instances

To view the details of your EC2 Instances:

1. Go to your Control Panel EC2 Instances menu.
2. The page that loads will list your EC2 instances and the following details:
View List of EC2 Instances  
View EC2 Instances Details  
Edit EC2 Instance  
Delete EC2 Instance  
See also:  
Launch New EC2  
Enable/Disable AWS  
OnApp License  

3. You can perform the following actions to your instances:  
   - Start/Stop  
   - 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.  

19.2.2 View EC2 Instances Details  

To view the details of your EC2 Instances:  
1. Go to your Control Panel 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
You can connect to your EC2 instance using the Connect button in the upper left corner, which will provide corresponding instructions.

19.2.3 Edit EC2 Instance

To edit EC2 Instance:

1. Go to your Control Panel 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.

19.2.4 Delete EC2 Instance
To delete EC2 Instance:

1. Go to your Control Panel 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.

19.3 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

19.3.1 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 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. AMIS
3. 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.

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.

4. 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.  
   a. open file `/onapp/interface/config/info_hub.yml`
   b. increase timeout by editing parameter `search_query_timeout`
20 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 VSSs 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.

20.1 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.

20.1.1 View Users

For a quick view of user account details, go to your Control Panel's 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 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.
20.1.2 View User Account Details

To view account details of a particular user:
1. Go to your Control Panel 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. 
   a. Click the ![Connect](#) icon.
   b. On the following page provide your AWS credentials: AWS access key ID and AWS secret access key.
   c. Click **Submit** to connect AWS to your account.

**Yubico info**

This section appears in the profile only if you have either the **Update Yubikey** or the **Update own Yubikey** permission enabled.

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

- **Use Yubikey** - move the slider to the right to enable logging in 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 Yubileys, this option will be disabled automatically.
- **Manage YubiKeys** - click this button to add or delete YubiKey to your profile. The window that pops up shows the list of your YubiKeys and when each of them was last used. You can add up to five YubiKeys.
  - To add a new YubiKey:
    a.i.1. Enter a label for your YubiKey in the **Enter label** field.
    a.i.2. Click on the **Touch your yubikey** field.
    a.i.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 ![Delete](#) 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 appears 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.
- 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.

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.

20.1.3 Create User

To add a new 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 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.

20.1.4 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 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.

20.1.5 Manage User Payments

To view, add and edit payments for a user:
1. Go to your Control Panel's 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.

20.1.6 View User Billing 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's Users menu.
2. You'll see a list of all user accounts in your cloud. Click the name of appropriate user.
3. Go to billing details and click the User Statistic link next to a user in question.
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 account existence period. On the page that appears:

The Costs parameters for resources do not take into consideration the free limits for resources set in the bucket. The Free amount displays the cost of entities within the bucket's free limits for each resource. The Free amount will be subtracted from the total cost of the resources.

- Daily - particular date and time for the generated statistics.
- Backups - the price for the amount of backups taken by the user during the chosen period on the compute resource.
- **Autoscaling monitor Fee** - the price for using the autoscaling monitor during the selected period.
- **Storage Disks Size Costs** - the price for the storage disk size for the predefined period.
- **ISOs** - the price for the amount of ISOs uploaded by the user during the chosen period.
- **Templates** - the price for the templates made 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 amount 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 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** - the price for the amount of templates of the backup zones made during the chosen period.
- **Backup Zones Template Disk Size** - the price for the disk size taken by templates stored on the backup zones during the predefined period.
- **Acceleration** - the price for the amount of accelerated VSs for the selected period.
- **OVAs count** - the price for the amount of OVAs uploaded by the user during the chosen 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 Cost** - the sum of Used resources cost and Virtual Servers cost for the selected period.
- **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.

**User Statistics:**

- **Resources cost** – the money owed per virtual server for the following resources:
  - CPU
  - CPU Priority
  - Disk Size
  - Memory
  - IP Address
  - Virtual Server
  - Template&Backup Storage
  - Disk size
• IP Address

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

- **Usage cost**— the money owed per virtual server for the following resource usage:
  
  - Data read/written
  - Input/Output requests
  - Port speed
  - Data received
  - Data sent

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

- **Total**— the total due per virtual server for Resources and Usage cost. The prices in this section do not take into consideration the free limits for resources set in the bucket.

### 20.1.7 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’s **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.

### 20.1.8 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's **Users** menu. You'll see a list of all user accounts in your cloud.

2. Click the **Actions** button next to the user you'd like to log in as, then select **Login as** option.

3. Your screen will refresh and you should now be logged in as that user.

   **To return to your original view of the cloud, click the **Back to Admin Area** link at the top of the screen.**

### 20.1.9 Edit User

To edit a user 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 **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.

### 20.1.10 Add SSH Key

To add an SSH key to a user profile:
1. Go to your Control Panel's 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 VVs the user creates.

To assign keys to existing VVs, go to the VS Overview > Properties menu.

**20.1.11  Delete User**

Completely deleting a user from the system is a two-step process.

**20.1.11.1  Step 1. Deleting users and their resources**

To delete a 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 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.

**20.1.11.2  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.

### 20.1.12 Suspend and Activate Users

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).

### 20.1.13 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.
20.1.14 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.

20.2 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:

- 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

See also:
Permissions List
Create and Manage User Accounts
Users with Config Problems

20.2.1 Drop All Sessions

To drop sessions:

1. Go to your Control Panel's Users menu.
2. On the Users tab, click the Drop all sessions tab in the lower left corner of your screen.

20.2.2 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.
20.3 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's Users menu.
2. Click the Users with Config Problems tab, and then choose one of the following:
   - Users without roles - shows the list of those users who do not have the roles assigned.
   - Users without time zones - shows the list of users who do not have the time zones set.
   - 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:
   - Log in as User
   - Edit User
   - Delete User
   - Suspend and Activate Users
   - Whitelist IPs

See also:
Create and Manage Users
Manage Sessions
Tools
21 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 (Settings > Look&Feel menu)
- 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:

21.1 View User Group

To view user groups:
1. Go to your Control Panel's 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
Delete User Group

See also:
Restrictions Sets
Permissions
Create and Manage User Accounts
Create and Manage Roles

21.2 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's 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:
1.
21.3 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’s 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:
1. roles - assign role(s) which will be available to resellers with the appropriate restrictions set
2. buckets - assign bucket(s) which will be available to resellers with the appropriate restrictions set
5. Click Save.

21.4 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’s 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.

21.5 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's 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.

### 21.6 Delete User Group

To delete a user group:

1. Go to your Control Panel's Groups menu.
2. Click Delete in the Actions list next to a user group/organization to delete a specific group.
22 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**

Additionally, a user and user role "IMC" may appear in your cloud. This user and role are reserved for future functionality.

For details on user permissions, see Permissions List.

22.1 Transaction Approvals

- You need additional licensing for the Transaction Approval functionality. Please contact your account manager for details.
- 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.

See also:

Create New Role
List of all OnApp Permissions
Logs
Sysadmin
22.1.1 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 > Infrastructure tab.
2. Move the Transaction a slider to enable approvals.
3. Click the Save Configuration button.

Next you can proceed to setting up approver user roles.

22.1.2 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.

22.1.3 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
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- **destroy data store** - deleting an existing data store
- **destroy disk** - deleting an existing disk that was created without the **Hot attach** option selected
- **delete vApp** - deleting an existing vApp
- **destroy resource pool** - deleting an existing resource pool
- **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
- **recompose vApp** - recomposing a vApp
- **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.
- **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.

### 22.1.4 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 your 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.
     
     For successful notification configuration for requesters, the name of the gateway should be **System SENDMAIL Gateway**.
   - **From** - the email address from which emails will be sent
   - **Host** - the server IP or URL

   For the SMTP delivery method:
   - **Name** - the name for your new gateway.
     
     For successful notification configuration for requesters, the name of the gateway should be **System SMTP 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

6. Click Save to finish the creation process

After the above configuration, the requester users will automatically be sent an email after their transaction has been approved or declined.

For detailed information on notifications refer to Notifications Setup.
22.1.5 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.

22.2 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.

22.2.1 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. 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* both if required. If the user does not have any of these permissions enabled, they will not be able to create virtual servers.

**On this page:**
- Create New Role
- Edit Role
- Clone Role
- Delete Role

**See also:**
- Permissions List
- Transaction Approvals
- List of Default Permissions for Admin Role
- List of Default Permissions for User Role

### 22.2.2 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.

### 22.2.3 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.

### 22.2.4 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.
23 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 bucket (e.g. See all data store zones in the cloud, edit own recipes only, etc.).

The restrictions sets add 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.

- 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**
### 23.1 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.

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<tr>
<th>Resource</th>
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<td>Nameservers</td>
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<td>Network zones</td>
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<td>Networks</td>
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<td>OAuth providers</td>
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<td>Recipes</td>
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<td>Virtual servers</td>
<td>by user group</td>
</tr>
<tr>
<td>Virtual machine statistics</td>
<td>by user group</td>
</tr>
</tbody>
</table>
23.2 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.

23.2.1 Create Restrictions Sets

To create a restrictions set:
1. Go to the Control Panel > 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:
   o Label - choose a name for the restrictions set
   o Roles - select the roles that will be limited under the restrictions set
   o 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.
23.2.2 Edit Restrictions Sets

To edit a restrictions set:
1. Go to Control Panel > 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.

23.2.3 Delete Restrictions Sets

To delete a restrictions set:
1. Go to Control Panel > 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.
24 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

24.1 Create Reseller Role

The cloud administrator creates a reseller role. 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
24.2 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.

24.3 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.

If the restrictions for the reseller role are set based on the bucket approach, then the bucket of the reseller works differently from typical OnApp buckets. In typical ones, if the resources are not added, users assigned to such a bucket will have access to unlimited resources. In case of a reseller, if some resources are not added to the bucket, the reseller will have no access to that resource.

24.4 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.

During the user group creation process, the cloud administrator:

- Adds the reseller role and the roles requested by the reseller to the group
- Adds the reseller's bucket to the group

For more information on how to create a role, see Create New Role.

24.5 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.
24.6 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.

24.7 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 controled 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)
25 Buckets

Before users can create virtual servers in your cloud, it is important to give the 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:

- 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
- **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 vCloud 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 [vCloud Director Buckets](#) section of the OnApp and vCloud Director Configuration Guide.

### 25.1 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.

#### 25.1.1 Create Bucket

To create a bucket:

1. Go to your Control Panel's **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:**

- Bucket Prices and Resource Limits
- Bucket 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.

### 25.1.2 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 > 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 > 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.

25.1.3 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 > 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 > 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.

25.1.4 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 > 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.

25.1.5 Edit Bucket

To edit a bucket:

1. Go to your Control Panel's **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, assing it to this user and then edit the bucket.**

25.1.6 Copy Bucket

To copy a bucket:

1. Go to your Control Panel's **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 > Buckets** with a label consisting of 'Bucket clone of' and the name of the original bucket, e.g. 'Bucket Clone of Test.Bucket'.

25.1.7 Delete Bucket

To delete a bucket:

1. Go to your Control Panel's **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 Users menu and edit the bucket in the user profile.

25.2 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 box 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
25.2.1 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 > Buckets menu.
2. Click the bucket label. You will be redirected to the Access Control of the bucket.
3. Go through the required icons indicating the server type and add resources. For this:
   a. Click the + in the appropriate section.
   b. When the new windows pops up, set the value for the limit (see the table below for reference).
   c. Do not tick the Duplicate to Rate Card box if you do not plan to set prices for the resources.

25.2.1.1 Virtual Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Value(s)</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>Template, 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>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Templates Max</td>
<td>The maximum number of templates which users can create in the cloud. The disk space available for templates is defined by the Templates, ISO's &amp; Backups Storage 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>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoscaling Max</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>
<td></td>
<td></td>
</tr>
<tr>
<td>Backups 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>
<td></td>
</tr>
<tr>
<td>ISO templates Max</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 Templates, ISO's &amp; Backups Storage limit. Leave the '-' value to let a user create an unlimited amount of ISO templates under this bucket.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceleration Max</td>
<td>The maximum number of VSs a user can accelerate under this bucket. Acceleration is available if there is a CDN Accelerator in your cloud. Note that if there are accelerated virtual servers in the cloud, these VSs will be still billed for acceleration even if you delete the accelerator. Leave the '-' value to let a user accelerate an unlimited amount of VSs.</td>
<td></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 max limit** in the Miscellaneous section of the Access Control to 0 to prevent creating both manual and auto-backups on compute resources.
<table>
<thead>
<tr>
<th>Compute Zone Limits</th>
<th>Containe r Server</th>
<th>Max</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applicati on Servers</td>
<td>Max</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></td>
<td>Compute Zone Limits</td>
<td>CPU Priority</td>
<td>Min</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. • 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></td>
<td>RAM</td>
<td>Min</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. • the maximum amount of RAM that users can request for all their VSs 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>CPU</td>
<td>Min</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. • 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. 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></td>
<td>CPU Cores</td>
<td>Max</td>
<td>The maximum amount of CPU cores that users can request for all their VSs within this compute zone under</td>
</tr>
<tr>
<td>Feature</td>
<td>Setting</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>CPU Units</strong></td>
<td><strong>Max</strong></td>
<td>The maximum amount of CPU units that users can request for all their VSs within this compute zone under the bucket. This parameter 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. Leave the '-' value to provide an unlimited amount of CPU units within the compute zone to a user under this bucket.</td>
<td></td>
</tr>
<tr>
<td><strong>Use default CPU</strong></td>
<td><strong>Yes/No</strong></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. You can set the default amount of CPU cores using the <em>Default CPU</em> limit. It is only possible to enable the <em>Use default CPU</em> option when resource prices and max limit are not set.</td>
<td></td>
</tr>
<tr>
<td><strong>Use default CPU shares</strong></td>
<td><strong>Yes/No</strong></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. You can set the default amount of CPU shares using the <em>Default CPU shares</em> limit. It is only possible to enable the <em>Use default CPU shares</em> option when resource prices and max limit are not set.</td>
<td></td>
</tr>
<tr>
<td><strong>Use CPU Units</strong></td>
<td><strong>Yes/No</strong></td>
<td>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 <em>Max CPU Units</em> limit.</td>
<td></td>
</tr>
<tr>
<td><strong>Data Store Zone Limits</strong></td>
<td><strong>Disk Size</strong></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>
<td></td>
</tr>
<tr>
<td><strong>Network Zone Limits</strong></td>
<td><strong>IP Addresses</strong></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>
<td></td>
</tr>
<tr>
<td><strong>Port Speed</strong></td>
<td><strong>Max</strong></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><strong>Backup Server Zone Limits</strong></td>
<td><strong>Backup</strong></td>
<td>The maximum amount of backups users can create in this backup server zone under the bucket. The <em>Backup</em> limit applies only to manual backups. Auto-backups are limited only using the <em>Backup Disk Size</em> limit. 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><strong>Backup</strong></td>
<td><strong>Max</strong></td>
<td>The maximum amount of disk space (GB) users get for...</td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disk size</td>
<td>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>
<td></td>
</tr>
<tr>
<td>Template 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>
<td></td>
</tr>
<tr>
<td>Template disk size 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>
<td></td>
</tr>
<tr>
<td>OVA Max</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>
<td></td>
<td></td>
</tr>
<tr>
<td>OVA disk size Max</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>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed minIOPS Requests Max</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>
<td></td>
<td></td>
</tr>
<tr>
<td>Instance Packages 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>
<td></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.

### 25.2.1.2 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>Compute zone limits</td>
<td></td>
<td></td>
<td>Select a zone from the dropdown menu.</td>
</tr>
<tr>
<td>Network zone limits</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>

### 25.2.1.3 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Leave the '-' value to let a user create an unlimited amount of smart servers under this bucket.</td>
</tr>
<tr>
<td></td>
<td>Templates, ISO's &amp; Backup 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>
</tr>
<tr>
<td></td>
<td>Backup Storage</td>
<td>Max</td>
<td>The maximum number of backups users can create under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The disk space available for backups is defined by the Templates, ISO's &amp; Backup 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>
</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 & Backup Storage max limit in the Miscellaneous section of the Access Control to 0 to prevent creating backups on compute.
### Compute Zone Limits

<table>
<thead>
<tr>
<th>Resource</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<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>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. If you enable the Use CPU Units option while adding/editing a compute zone in the Access Control, the CPU Shares parameter will not apply to the users under this bucket. Instead, the Max CPU Units parameter will be used.</td>
</tr>
<tr>
<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>RAM</td>
<td>Max</td>
<td>The maximum amount of RAM (MB) 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>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>
</tbody>
</table>

### Data Store Zone Limits

<table>
<thead>
<tr>
<th>Resource</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<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>
</tbody>
</table>

### Network Zone Limits

<table>
<thead>
<tr>
<th>Resource</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<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>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>
</tr>
</tbody>
</table>

### Backup

<table>
<thead>
<tr>
<th>Resource</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup</td>
<td>Max</td>
<td>The maximum amount of backups users can create in this</td>
</tr>
</tbody>
</table>
backup server zone under the bucket. The Backup limit applies only to manual backups. Auto-backups are limited only using the Backup Disk Size limit.

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.

- **Backup disk size**

  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.

Please also set the Backups and Templates, ISO's & Backups Storage max limit to 0 in the Miscellaneous section of the bucket to prevent creating backups on compute resources.

- **Template Max**

  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.

- **Template disk size**

  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.

### 25.2.1.4 Other Resources

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Resource Zone Limits</td>
<td>Select which backup resource zones will be available to users under this bucket.</td>
</tr>
<tr>
<td>Edge Group Limits</td>
<td>Select which edge groups will be available to users under this bucket.</td>
</tr>
<tr>
<td>CDN Bandwidth Limits</td>
<td>Specify the maximum CDN bandwidth limit in Gb per month available for each user under this bucket.</td>
</tr>
<tr>
<td>Template Store Limits</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>Recipe Group Limits</td>
<td>Select which groups of recipes will be available to users under this bucket.</td>
</tr>
<tr>
<td>Service Add-On Group Limits</td>
<td>Select which service add-on groups will be available for users to assign to virtual servers.</td>
</tr>
</tbody>
</table>
25.2.2 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).

To manage pricing for the resources:

1. Go to your Control Panel > Buckets menu.
2. Click the bucket label. You will be redirected to the Access Control of the bucket.
3. Select the Rate Card tab.
4. Go through the required icons indicating the server type and add resources. For this:
   a. Click the + in the appropriate section.
   b. When the new window pops up, set the value for the free limit and the price (see the table below for reference).
   c. Tick the Duplicate to access control box if you want to add the resource not only to the Rate Card but to the Access Control too.

<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, Price</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></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>Template, ISO's &amp;</td>
<td>Free, Price</td>
<td></td>
<td>• the amount of free disk space (in GB) users can allocate to storing backups, ISOs and templates together.</td>
</tr>
<tr>
<td>Backups Storage</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>
</tbody>
</table>
| Backups | Free Price | • 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. |
|----------|------------|---|
| Template s | Free Price | • the number of templates a user under this bucket can create for free.  
• 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. |
| ISO Template s | Free Price | • the number of ISOs a user under this bucket can create for free.  
• 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. |
| Acceleration | Free Price | • the amount of virtual servers for which the user can enable acceleration for free under this bucket.  
• 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. |
| DRaaS | Price Disk Size | The additional price for disk size (GB/hr) that applies to a virtual server with enabled DRaaS. |
| | Price RAM | The additional price for RAM (MB/hr) that applies to a virtual server with enabled DRaaS. |
| | Price CPU Cores | The additional price for CPU (core/hr) that applies to a virtual server with enabled DRaaS. |
| | Price CPU Shares | The additional price for CPU shares (%/hr) that applies to a virtual server with enabled DRaaS. |
| | Price CPU Units | The additional price for CPU units (unit/hr) that applies to a virtual server with enabled DRaaS. |
| | Price Nodes | The additional price for nodes (node/hr) that applies to a virtual server with enabled DRaaS. |
| Pricing for Compute Zones | CPU Price on Price off | • the price per CPU core per hour, charged for powered on VSs which are built in this compute zone under this bucket  
• the price per CPU core per hour, charged for |
<table>
<thead>
<tr>
<th>RAM</th>
<th>Price on</th>
<th>Price off</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RAM MB/hr, charged for powered on VSs which are built in this compute zone under this bucket</td>
<td>RAM MB/hr, charged for powered off VSs which are built in this compute zone under this bucket</td>
<td>the amount of RAM (MB/hr) users can request for free for the total number of their VSs built in this compute zone under this bucket</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU Shares</th>
<th>Price on</th>
<th>Price off</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPU shares %/hr, charged for powered on VSs which are built in this compute zone under this bucket</td>
<td>CPU shares %/hr, charged for powered off VSs which are built in this compute zone under this bucket</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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU Units</th>
<th>Price on</th>
<th>Price off</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPU unit per hour, charged for powered on VSs which are built in this compute zone under this bucket</td>
<td>CPU unit per hour, charged for powered off VSs which are built in this compute zone under this bucket</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>
</tbody>
</table>

These parameters 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.

<table>
<thead>
<tr>
<th>CPU Cores</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pricing for Data Store Zones</th>
<th>Price on</th>
<th>Price off</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></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>
<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>
<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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pricing for Data Store Zones</th>
<th>Free per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 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.

### Data Read
- **Price**
  - the price per GB of read data per hour, charged for VSs which are built in this data store zone under this bucket
- **Free**
  - set the amount of read data (GB/hr) users can request for free either per hour or per month:
- **Free per month**
  - set the amount of read data (GB/hr) users can request for free either per hour or per month:

### Data Written
- **Price**
  - the price per GB of written data per hour, charged for VSs which are built in this data store zone under this bucket
- **Free**
  - set the amount of written data (GB/hr) users can request for free either per hour or per month:
- **Free per month**
  - set the amount of written data (GB/hr) users can request for free either per hour or per month:

### Input Requests
- **Price**
  - the price per 1M input requests per hour, charged for VSs which are built in this data store zone under this bucket
- **Free**
  - set the amount of input requests (1M requests/hr) users can request for free either per hour or per month:
- **Free per month**
  - set the amount of input requests (1M requests/hr) users can request for free either per hour or per month:
**Input Requests** 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 **monthly** free amount using the **Free Input Requests 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.

<table>
<thead>
<tr>
<th>Output Requests</th>
<th>Price Free</th>
<th>Fee per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the price per 1M output requests per hour, charged for VSs which are built in this data store zone under this bucket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>set the amount of output requests (1M requests/hr) users can request for free either per hour or per month:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When setting <strong>hourly</strong> 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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When setting <strong>monthly</strong> 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>
<td></td>
</tr>
</tbody>
</table>

**Pricing for Network Zones**

<table>
<thead>
<tr>
<th>Port Speed</th>
<th>Price on</th>
<th>Price off</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IP Addresses</th>
<th>Price on</th>
<th>Price off</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td></td>
<td>set the amount of IP address (IP/hr) users can request for free either per hour or per month:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When setting <strong>hourly</strong> free amount using the <strong>Free IP Addresses</strong> parameter, the user will be billed only for the amount of IP addresses that exceeds the hourly</td>
<td></td>
</tr>
</tbody>
</table>
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 IP addresses 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.

<table>
<thead>
<tr>
<th>Data Sent</th>
<th>Price Free per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>
</tr>
<tr>
<td></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>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Received</th>
<th>Price Free per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>
</tr>
<tr>
<td></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>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pricing for Backup Server Zones</th>
<th>Backup Price Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>the amount of backups (backup/hour) users can store in this backup server zone for free under this bucket</td>
</tr>
</tbody>
</table>

The Backup prices apply only to manual backups. Auto-backups are billed only using the Backup Disk Size.
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Backup Disk Size</strong></td>
<td>Price</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>Free</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></td>
<td><strong>Template</strong></td>
</tr>
<tr>
<td></td>
<td>Price</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>Free</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></td>
<td><strong>Template Disk Size</strong></td>
</tr>
<tr>
<td></td>
<td>Price</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>Free</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></td>
<td><strong>OVA</strong></td>
</tr>
<tr>
<td></td>
<td>Price</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>Free</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></td>
<td><strong>OVA Disk Size</strong></td>
</tr>
<tr>
<td></td>
<td>Price</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>Free</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></td>
<td></td>
<td><strong>Pricing for Instance Packages</strong></td>
</tr>
<tr>
<td></td>
<td>Price</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>on</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></td>
<td>Price</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</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>package under this bucket</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 25.2.2.2 Baremetal Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
</table>
| Pricing for Network Zones     | IP Addresses           | Free Price   | • 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                                                                                                                     |

### 25.2.2.3 Smart Server Type

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
</table>
| Miscellaneous                 | Backups                           | Free Price   | • 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.                                                                                   |
|                               | Templates, ISO's & Backups Storage | Free Price   | • 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 & Backups Storage limit set in the bucket's Rate Card. |
| Pricing for Compute Zones     | CPU                               | Price on Price off | • 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                                                                                           |
|                               | CPU Shares                        | Price on Price off Free | • 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                                                                                  |

If you enable the *Use CPU Units* option while adding/editing a compute zone in the Access Control, the *CPU Shares* parameter will not apply to the users under this bucket. Instead, the *CPU Units* parameter will be used.
### Pricing Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
</table>
| **CPU Units**             | - 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 *Use CPU Units* option when adding/editing a compute zone in the Access Control. |
| **RAM**                   | - the price for RAM MB/hr, charged for powered on smart servers which are built in this compute zone under this bucket  
                           - the price for RAM MB/hr, charged for powered off smart servers which are built in this compute zone under this bucket  
                           - the amount of RAM (MB/hr) users can request for free for the total number of their smart servers built in this compute zone under this bucket |                                                                                                                                         |
| **CPU Cores**             | 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.                                                                  |                                                                                                                                         |
| **Pricing for Data Store Zones** | - 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 the amount of disk space (GB/hr) users can request for free per hour  
                           When setting 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. |                                                                                                                                         |
| **Data Read**             | - 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 *Free Data 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. |                                                                                                                                         |
<table>
<thead>
<tr>
<th>Data Written</th>
<th>Price Free</th>
<th>the price per GB of written data per hour, charged for smart servers which are built in this data store zone under this bucket</th>
</tr>
</thead>
<tbody>
<tr>
<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>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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input Requests</th>
<th>Price Free</th>
<th>the price per 1M input requests per hour, charged for smart servers which are built in this data store zone under this bucket</th>
</tr>
</thead>
<tbody>
<tr>
<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>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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Requests</th>
<th>Price Free</th>
<th>the price per 1M output requests per hour, charged for smart servers which are built in this data store zone under this bucket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>set the amount of output requests (1M requests/hr) users can request for free per hour</td>
</tr>
<tr>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pricing for Network Zones</th>
<th>Port Speed</th>
<th>Price on Price off Price Free</th>
<th>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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></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></td>
<td></td>
<td>the amount of port speed (Mbps/hr) users can request for free for the total number of their smart servers built in this network zone under this bucket</td>
</tr>
</tbody>
</table>

<p>| IP Addresses | Price on Price Free | the price per IP address per hour, charged for powered on smart servers which are built in this network zone under this bucket |</p>
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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&lt;br&gt;• set the amount of data sent (GB/hr) users can request for free per hour&lt;br&gt;When setting free amount using the <em>Free Data Sent</em> 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>
</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&lt;br&gt;• set the amount of data received (GB/hr) users can request for free per hour&lt;br&gt;When setting free amount using the <em>Free Data Received</em> 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>
</tr>
<tr>
<td>Backup Price</td>
<td>• the price per backup per hour, charged for the backups stored in this backup server zone under this bucket&lt;br&gt;• the amount of backups (backup/hour) users can store in this backup server zone for free under this bucket&lt;br&gt;The Backup prices apply only to manual backups. Auto-backups are billed using only the <em>Backup Disk Size</em> parameters.</td>
</tr>
<tr>
<td>Backup Disk Size</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&lt;br&gt;• 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>Templates</td>
<td>• the price per template per hour, charged for the backups stored on this backup server zone under this bucket&lt;br&gt;• the amount of templates (template/hour) users can request for free to store their backups in this backup server zone under this bucket</td>
</tr>
</tbody>
</table>
### Template Disk Size

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Value/Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template Disk Size</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</td>
</tr>
<tr>
<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>
</tbody>
</table>

#### 25.2.2.4 Other Resources

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Value/Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing for Backup Resource Zones</td>
<td>Price Free</td>
<td>• the price per backup per hour charged for backups stored in this backup resource zone under this bucket</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• the amount of backups (backup/hour) users can store in this backup resource zone for free under this bucket</td>
</tr>
<tr>
<td>Pricing for Edge Groups</td>
<td>Price</td>
<td>Set the price per GB of CDN bandwidth that will be available to users under this bucket in the selected CDN edge group.</td>
</tr>
<tr>
<td>Pricing for Template Store</td>
<td>Price</td>
<td>Select the template store for the templates in which you wish to set a price and enter the cost for each individual template.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tick the <strong>Apply to all buckets</strong> checkbox to set the price you have configured for the templates in the store to all buckets that contain this template store.</td>
</tr>
<tr>
<td>Pricing for Service Add-On Groups</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></td>
<td>CPU</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>Memory</td>
<td>The additional price for RAM (MB/hr) that applies to VSs to which a service add-on is added.</td>
</tr>
<tr>
<td></td>
<td>Disk size</td>
<td>The additional price for disk size (GB/hr) that applies to VSs to which a service add-on is added.</td>
</tr>
</tbody>
</table>
25.3 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.

25.3.1 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.

25.3.2 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 50 GB 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).

25.3.3 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>
<tr>
<td>Network zones</td>
<td>Data received</td>
</tr>
<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.

25.3.4 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 disk size 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 disk size 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 ≥1, so this IP address is not charged (0 IP of free disk size 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.

### 25.3.5 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 disk’s 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 Settings menu > Configuration > Max network interface port speed field.

The port speed billing calculation is the following:

\[(\text{NIC 1 port speed} - \text{free port speed value}) + (\text{Disk 2 port speed} - \text{free port speed value})\ldots\text{etc}\]
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.

25.3.6 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:
\[(\text{Disk 1 IOPS} - \text{free IOPS value}) + (\text{Disk 2 IOPS} - \text{free IOPS value})...\text{etc.}\]

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.

25.3.7 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:

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, 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.

25.3.8 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: \((2+3) - 3 = 2\)

25.3.9 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.

25.3.10 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, up to 100% multiplied by the number of cores. 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.

25.3.11 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:
1. CPU Mhz
2. Passmark Score (http://www.cpubenchmark.net/)

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 resource1 a score of 1000 and Compute resource2 the score of 500 is the same as giving Compute resource1 a score of 2 and Compute resource2 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
Currently, you cannot change from Cores to Units or Units to Cores in an existing Compute Zone.

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.

### 25.3.12 Instance packages

To set up billing for the instance packages, at first configure the amount of available resources in the package at the **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.

### 25.3.13 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 MB 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.

25.4 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.

25.4.1 View user payments

To view payments:

1. Go to your Control Panel's Payments menu.
2. 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.
25.4.2 Create payment

1. Go to your Control Panel's Payments menu.
2. On the screen that appears, you will see the list of all user payments. Click the New Payment button or the + button.
3. 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
4. Click Save.

You can also create and manage payments for a particular user at Control Panel > Users and Groups menu > User's name > Payments tab.

25.4.3 Edit payment

1. Go to your Control Panel's Payments menu.
2. 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.
3. 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
4. Click Save.
25.4.4 Delete payment

To delete a payment:

1. Go to your Control Panel's Payments menu.
2. 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.
3. Confirm the deletion.
26 Instance Packages

Instance packages are preconfigured CPU/RAM/Disk/Bandwidth packages that can be selected during the VS creation process. 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.

26.1 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.

26.1.1 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:

1. Go to your Control Panel's Instance Packages menu.
2. 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
3. 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
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

### 26.1.2 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**

#### 26.1.2.1 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** 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 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 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.

26.1.2.2 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:

1. Go to your Control Panel's Instance packages menu.
2. The screen that appears, shows the list of all instance packages. Click the "+" button at the top of the screen.
3. 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)
4. 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.

26.1.2.3 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:

1. Go to the **Buckets** list and click the label of the bucket to which you want to add instance or create a new bucket.
2. Click the "+" button in the upper right corner of the Limits for Instance packages box.
3. 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**.
4. 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:

1. Go to the **Buckets** list and click the label of the bucket you are interested in.
2. Click the **Actions** button next to the instance package you are interested in and select **Edit**.
3. 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:

1. Go to the **Buckets** list and click the label of the bucket you are interested in.
2. 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 VSs.

After you add instance packages to the user's bucket, they will be available in the virtual server creation wizard at the **Resources** step.

### 26.1.2.4 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:

1. Go to your Control Panel's **Settings** menu, and click the **Configuration** icon.
2. 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.
3. Click **Save Configuration**.

26.1.2.5 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 system will set the resources from the Create Your Own tab even if you did not configure any resources there.

Virtual servers created using instance packages do not support autoscaling.

The virtual servers you create using the Instance packages tab will be billed according to one of your preconfigured instance packages.

26.1.3 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.

26.1.3.1 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 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*3600(seconds in one hour)/(1000*8)=900 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)
26.1.3.2 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>Limits for Compute Zones</td>
<td>CPU Priority</td>
<td>100</td>
<td>CPU priority is automatically set to 100.</td>
</tr>
<tr>
<td>The Free bucket limits for compute zones</td>
<td>N/A</td>
<td>The Free bucket limits for compute zones do not apply to Instance package VSs.</td>
<td></td>
</tr>
<tr>
<td>The Max bucket limits for compute zones</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 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>
<td></td>
</tr>
<tr>
<td>Limits for Data Store Zones</td>
<td>The Free bucket limits for data store zones</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>The Max bucket limits for data store zones</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>
<td></td>
</tr>
<tr>
<td>Data Read/written</td>
<td>N/A</td>
<td>The VSS disk size will be defined by the disk size indicated in the selected instance package.</td>
<td></td>
</tr>
<tr>
<td>Input/output Requests</td>
<td>N/A</td>
<td>The VSS disk size will be defined by the disk size indicated in the selected instance package.</td>
<td></td>
</tr>
</tbody>
</table>
| Swap Disk Size | 1/2/3 GB | 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 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
### Limits for Network Zones

<table>
<thead>
<tr>
<th>IP Address</th>
<th>the first available IP address is assigned</th>
</tr>
</thead>
</table>
| One IP address is assigned to the Instance package VS for free. If a user wants to assign an additional IP address to such a VS:
|   |   |
| - | In case there are available units according to the Free IP address limit in the bucket, the additional IP address will be assigned for free. |
| - | In case the Free IP address limit is exhausted the additional IP address will be added and billed according to the On/Off bucket price per IP/hour. |

If there are no available IP addresses during VS creation, all instance packages will be grayed out in the wizard.

<table>
<thead>
<tr>
<th>Data Received/Written</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>These limits do not apply to Instance package virtual servers. 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 bucket's Overused Bandwidth price in the <em>Limits for Instance packages</em> section.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port Speed</th>
<th>depends on the bucket limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the port speed <em>Max</em> limit in the bucket is set to unlimited, the port speed in the instance package will also be set to <em>unlimited</em>.</td>
<td></td>
</tr>
<tr>
<td>If the port speed <em>Max</em> limit in the bucket is set to a certain value, the port speed in the instance package will be set to that same value.</td>
<td></td>
</tr>
</tbody>
</table>

### 26.1.4 Edit Instance Package

You can edit all the resources set for an instance package.

To edit an instance package:

1. Go to your Control Panel's **Instance packages** menu.
2. 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.

3. 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.

4. 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)

26.1.5 Delete Instance Package

To delete an instance package:

1. Go to your Control Panel's 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.
27 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.

27.1 Compute Resource 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>

27.1.1 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 refer to the section of this guide.

On this page:
- View Compute Resource Details
- Create Compute Resource
- Edit Xen/KVM Compute Resource
- Delete Compute Resource
27.1.1.1 View Compute Resource Settings

To view compute resource settings:

1. Go to your Control Panel Settings menu.
2. Click the Compute Resources icon.
3. 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
   - **CPU Cores** - number of CPU cores
   - **RAM** - total/free RAM
   - **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.

27.1.1.2 View Compute Resource Hardware Info

To view compute resource hardware info:

1. Go to your Control Panel Settings menu.
2. Click the Compute resources icon.
3. On the screen that appears, you will see the list of all compute resources in the cloud.
4. 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.
5. 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.

6. If hardware information is empty or incomplete, click the Update Hardware Info button in the right upper corner.

7. 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.

27.1.1.3 Create Compute Resource

You can add more physical Compute resources at any time. To add a Compute resource:

1. Go to your Control Panel Settings menu.
2. Click the Compute resources icon.
3. Press "+" button or click the Add a new Compute resource button underneath the list of Compute resources on the screen.
4. 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.
   • 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 CentOS5 and 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 VSs 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 VSSs.
   • 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).
   • 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 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. 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.

27.1.1.4 Edit Xen/KVM Compute Resource

To edit a Xen or KVM Compute resource:
1. Go to your Control Panel's Settings menu.
2. Click the Compute resources icon.
3. Click the Actions button next to the Compute resource you want to edit, then click Edit.
4. On the screen that follows, change details as required:
   - Label - the Compute resource's name
   - IP Address - IP address of the Compute resource
   - Compute resource Type - Compute resource type (Xen, KVM)
   - 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 use automatic failover with write-back caching you may lose some data in the event of a failover.

   - 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.

5. Click the **Save** button to save your changes.

27.1.1.5 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:
1. Go to your Control Panel's **Settings** menu.
2. Click the **Compute resources** icon.
3. Click the **Actions** button next to the Compute resource you want to delete, then click **Delete**.

27.1.2 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.

27.1.2.1 Create CloudBoot Compute Resources
CloudBoot compute resources are created in Control Panel's **Settings** menu. To add a compute resource:

1. Configure the IP range which the Control Panel will assign to compute resources.
2. 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 **Types**.

On this page:
- Create CloudBoot Compute Resources
- 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

27.1.2.2 Create IP Range
To create an IP range:

1. Go to your Control Panel’s **Settings** menu and click the **Compute resources** icon.
2. 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
OnApp Cloud 5.8 Administration Guide

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.

3. 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)
   4. 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.

27.1.2.3 Create CloudBoot Compute Resource
To create a CloudBoot compute resource:
1. Go to your Control Panel's **Settings > Compute Resources** menu.
2. Click the **Add New CloudBoot Compute Resource** button at the bottom of the screen.
3. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
4. Click the **Create CloudBoot Compute Resource** button to start the creation process.

27.1.2.3.1 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
- **Backup** - CloudBoot Provisioning and Backup Resource, for backups maintenance, based on CentOS 7
- Smart - KVM CloudBoot Compute Resource, where you can deploy a smart server
- Baremetal - XEN CloudBoot Compute Resource, where you can deploy a baremetal server, based on CentOS 6

Click Next to proceed to the following step of the wizard to specify the MAC Address.

**27.1.2.3.2 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.

**27.1.2.3.3 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 brake 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:
  o Backup IP address - add a provisioning network IP address
  o CPU Units - set the number of CPU units which will be assigned to the compute resource
  o Collect Stats - move the slider to the right to collect statistics for this compute resource
  o 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
- **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 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.

### 27.1.2.3.4  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 (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.

#### 27.1.2.3.4.1 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.

27.1.2.3.4.2 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

27.1.2.3.4.3 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.

27.1.2.4 Edit CloudBoot Compute Resource

To edit a CloudBoot compute resource:

1. Go to your Control Panel's Settings menu.
2. Click the Compute Resources icon.
3. Click the Actions button next to the CloudBoot compute resource you want to edit and then click Edit.
4. On the screen that follows, change details as required:

   Properties
   
   o Label - the compute resource's name
   o MAC - the MAC address of the compute resource
   o Backup IP address - provisioning network IP address
   o CPU Units - set the amount of CPU units assigned to this compute resource
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- **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
  
  - 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.

- **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_conf` after changing the Pxe IP address.

Advanced

Move the Advanced slider to the right to edit advanced Compute resource settings:

1.

- **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.
- **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 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**.
27.1.2.5 Edit Baremetal CloudBoot Compute Resource

To edit a Baremetal CloudBoot compute resource:

1. Go to your Control Panel's Settings menu.
2. Click the Compute resources icon.
3. Click the Actions button next to the CloudBoot compute resource you want to edit and then click Edit.
4. 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.

   - 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
   - **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 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.
5. Click the **Save** button to save your changes.

27.1.2.6 Edit Smart CloudBoot Compute Resource

To edit a Smart CloudBoot compute resource:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Compute resources** icon.
3. Click the **Actions** button next to the CloudBoot compute resource you want to edit and then click **Edit**.
4. 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 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.

- **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 enabled automatically during the smart CloudBoot Compute resource creation if the Compute resource does not support interrupt remapping.

- **Storage VLAN** - select VLAN for Integrated Storage Network

**Note:**

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 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.

**27.1.2.7 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:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Compute resources** icon.
3. Click the **Actions** button next to the Compute resource you want to delete, then click **Delete**.

**27.1.3 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:

1. Go to Control Panel's **Settings** menu > **Compute Resources** > label of compute resource > **Tools** > **Manage devices**.
2. 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
3. Click the **Edit Device Configuration** button.
4. 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

5. 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

6. 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.

7. Click **Next**.

8. After devices are successfully reconfigured, click **Finish**.

### 27.1.4 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:

1. Go to your Control Panel's **Settings** menu and click the **Compute resources** icon.
2. Click the label of the Compute resource you want to manage data stores for.
3. On the screen that appears, click the **Tools** button, then click **Manage Data Stores**.
4. 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.

### 27.1.5 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](#).

To add/remove network joins:

1. Go to your Control Panel's **Settings** menu and click the **Compute resources** icon.
2. Click the label of the Compute resource you want to manage networks for.
3. On the screen that appears, click the **Tools** button, then click **Manage Networks**.
4. 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.

### 27.1.6 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.
27.1.6.1 Enable Maintenance Mode

To enable maintenance mode for a particular compute resource:

1. Go to your Control Panel's Settings menu.
2. Click the Compute Resources icon.
3. Click the label of the compute resource you are interested in.
4. Click Tools > Enable Maintenance Mode.
5. 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.
6. 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.

27.1.6.2 Disable Maintenance Mode

To bring a compute resource back online, switch maintenance mode off:

1. Go to your Control Panel's Settings menu.
2. Click the Compute Resources icon.
3. Click the label of the compute resource you are interested in.
4. Click **Tools > Disable Maintenance Mode**.

If you want to return VSSs to the compute resource, from which they were migrated, you should **manually bring VSSs back** to this compute resource.

Disabling maintenance mode initiates automatic reboot of a compute resource.

27.1.6.3 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.

27.1.7 Compute Resource Extended CPU Configuration

OnApp provides a possibility to use extended CPU configuration to group compute resources with similar CPU performance characteristics into compute zones. The extended CPU configuration is implemented on a per-compute-zone basis. The compute zone with the extended 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.

For more information on the extended CPU configuration 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
27.1.7.1 Prerequisites

The extended CPU 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 the extended CPU configuration:

1. Move the **Extended CPU Flags** switcher to the right while creating or editing a compute zone. After this functionality is enabled for the compute zone, 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.

2. Manage the extended CPU configuration for a compute zone. For more information, refer to the **Compute Zone Extended CPU Configuration** section of this guide.

27.1.7.2 Compute Resource CPU Flags

To view the list of extended CPU flags of a compute resource:

1. Go to your Control Panel > **Settings** menu and click the **Compute Resources** icon.
2. Click the label of the compute resource you are interested in.
3. On the screen that appears, click **Tools** > **Extended CPU Configuration**.
4. 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
27.2 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.

27.2.1 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.

27.2.1.1 View Compute Zones

To view Compute zones:
1. Go to your Control Panel’s Settings menu and click the Compute Zones icon.
2. 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
3. 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.

On this page:

View Compute Zones
To view details of a compute zone:

1. Go to your Control Panel's **Settings** menu and click the **Compute Zones** icon.
2. 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 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.
27.2.1.3 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.

To create a new compute zone:

1. Go to your Control Panel's Settings menu and click the Compute Zones icon.
2. Press "+" or click the Create Compute Zone button.
3. 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
4. After you fill in all the parameters click the Save button.

27.2.1.4 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 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 the zones which have KVM compute resources running on CentOS5 and baremetal servers.

- **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.

- **Run sysprep** - move the slider to enable Windows virtual server deployment without running sysprep. If 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.

- **Extended CPU Configuration** - move the slider to the right to enable extended CPU flags for all compute resources added to this compute 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). 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.

27.2.1.5 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 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 without running sysprep. If 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.

- **Extended CPU Configuration** - move the slider to the right to enable extended CPU flags for all compute resources added to this compute zone.
- **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.

27.2.1.6 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 without running sysprep. If 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.

- **Extended CPU Configuration** - move the slider to the right to enable extended CPU flags for all compute resources added to this compute zone.

- **Custom Config** - specify any custom commands you want to run when a compute zone is booted.

27.2.1.7 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:
1. Go to your Control Panel's Settings menu and click the Compute Zones icon.
2. 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.
3. 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.

27.2.1.8 Remove Compute Resource from Compute Zone
To remove a Compute resource from a zone:
1. Go to your Control Panel's Settings menu and click the Compute Zones icon.
2. 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.
3. 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.

27.2.1.9 Delete Compute Zone
To delete a Compute zone:
1. Go to your Control Panel's Settings menu, and click the Compute Zones icon.
2. The screen that appears will show all zones currently set up in the cloud.
3. 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.

27.2.2 Edit Compute Zone
To edit Compute zones:
1. Go to your Control Panel's Settings menu, and click the Compute Zones icon.
2. The screen that appears will show all zones currently set up in the cloud.
3. Click the Actions button next to the required Compute zone, then click Edit. You can edit the following Compute zone details:

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.
- **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.
- **Disable failover** - Compute resource failover means VS migration to another Compute resource if the Compute resource on which it is running goes offline.

When you assign 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.

1. **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 a sysprep.

- **Extended CPU Flags** - move the slider to the right to enable CPU flags functionality for all compute resources added to this computer 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). 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.

#### 27.2.3 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 data store belongs to a data store zone of the same type as the compute zone. For more information refer to [Zone Types](#).

1. Go to your Control Panel's **Settings** menu and click the **Compute Zones** icon.
2. Click the label of the Compute zone you want to manage data stores for.
3. On the screen that appears, click the **Manage Data Stores** link in the **Tools** section.
4. 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.

#### 27.2.4 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.

1. Go to your Control Panel's **Settings** menu and click the **Compute Zones** icon.
2. Click the label of the Compute zone you want to manage data stores for.
3. On the screen that appears, click the **Manage Networks** link in the **Tools** section.
4. 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](#).
27.2.5 Manage Compute Zone Recipes

To manage Compute zone recipes:
1. Go to your Control Panel's Settings menu and click the Compute Zones icon.
2. Click the label of the zone you're interested in.
3. On the Compute zone details page click the Tools button, then select Manage Recipes.
4. 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

The 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 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. 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.
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.

**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.

27.2.6 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

27.2.6.1 View Compute Zone Backup Servers

![Image](image1)

To view compute zone backup servers:

1. Go to your Control Panel's Settings menu and click the Compute Zones icon.
2. Click the label of the Compute zone.
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 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

27.2.6.2 Add Backup Server to Compute Zone

![Image](image2)

You can add backup servers to a compute zone only if 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:
1. Go to your Control Panel's **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. Choose one from the drop-down menu and click the **Add Backup Server** button.

**27.2.6.3 Remove Backup Server from Compute Zone**

To remove a backup server from the compute zone:
1. Go to your Control Panel's **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.

**27.2.7 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. To run virtual server backups on the integrated system, add a backup resource zone to the destination compute zone. 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.

**27.2.7.1 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 > **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.

6. Select the required backup resource zone from the drop-down menu and click the **Submit** button.

**On this page:**
- **Attach Backup Resource Zone to Compute Zone**
- **Remove Backup Resource Zone from Compute Zone**

**See also:**
- **Backup Resources**
- **Backup Resources**
- **Backup Resource Zones**
- **Auto Backup Presets**

27.2.7.2 Remove Backup Resource Zone from Compute Zone

To remove a backup resource zone from a compute zone, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Compute Zones** icon.
3. Click a label of a compute zone you want to remove a backup resource zone from.
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 added to the compute zone.
6. Click the '-' button next to the required backup resource zone to remove it from the compute zone.
### 27.2.8 Compute Zone Extended CPU Configuration

OnApp provides a possibility to use the extended CPU configuration to group compute resources with similar CPU performance characteristics into compute zones. The extended CPU configuration allows to ensure consistent CPU performance within similar compute resources in the compute zone. The hot migration inside compute zones with the extended CPU configuration is more reliable. Moreover, you can set different prices in buckets for compute zones according to their CPU performance.

The extended CPU configuration is implemented on a per-compute-zone basis. The compute zone with the extended CPU configuration is automatically assigned 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 all compute resources assigned to one compute zone. The default CPU flags are assigned to the zone automatically and you cannot edit them; the additional flags are optional and you can enable or disable them. In this document, you can find information on how to enable and manage the extended CPU configuration.

The extended CPU configuration is applicable only to KVM compute resources. For better performance, it is not recommended to create mixed KVM/Xen compute zones.

### 27.2.8.1 Enable Extended CPU Configuration

You can enable the extended CPU configuration functionality while creating or editing a compute zone. After this functionality is enabled for the compute zone, 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.

To view and manage the list of CPU flags available for a compute zone, proceed to the following section.

### See also:

- Buckets
- Maintenance Mode for Xen/KVM Compute Resources
- Create and Manage Compute Zones
- Create Virtual Servers
- Compute Resource Extended CPU Configuration
After the extended CPU configuration is enabled for a compute zone, you can view and manage CPU configuration of this zone as follows:

1. Go to your Control Panel > Settings menu and click the Compute Zones icon.
2. Click a label of the required compute zone.
3. Expand the Tools menu and click the Manage CPU Configuration button.
4. 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.

- 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.
- Be careful when adding new compute resources to a compute zone with extended CPU configuration. For more information, refer to the following section.

27.2.8.3 Adding New Compute Resources to Compute Zone 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 configurations as 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.

- 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 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.

27.2.8.4 Additional Considerations for Virtual Servers

There are some additional considerations that you should take into account while creating VSs on compute resources with the 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.
28 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.

28.1 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>
<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>vCloud Director</td>
<td>VPC</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
</tbody>
</table>

28.1.1 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.

28.1.1.1 View Data Store Zones

To view data store zones:

1. Go to your Control Panel's Settings menu, and click the Data Store Zones icon.
2. 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.
28.1.1.2 View Data Store Zone Details

To view details of a data store zone:
1. Go to your Control Panel's Settings menu and click the Data Store Zones icon.
2. 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

28.1.1.3 Create Data Store Zone

To create a new data store zone:
1. Go to your Control Panel's Settings menu and click the Data Store Zones icon.
2. Click the Create Data Store Zone button.
3. 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.
   - 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).
4. Click the Save button.

28.1.1.4 Create Solidfire Data Store Zone

To create a new data store zone:
1. Go to your Control Panel's Settings menu and click the Data Store Zones icon.
2. Click the Create Data Store Zone button.
3. 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.

4. Click the **Save** button.

5. 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.

6. Click the "+" icon to assign a required SolidFire Data Store(s).

7. Afterwards click the "edit" icon to proceed with SolidFire Data Store zone settings.

8. 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.

9. Click the **Save** button.

28.1.1.5 Edit Data Store Zone

To edit data store zones:

1. Go to your Control Panel's **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.

2. 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**.

3. 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).

4. Click **Save**.

28.1.1.6 Attach Data Stores to Data Store Zone

To add a data store to a zone:

1. Go to your Control Panel's Settings menu and click the **Data Store Zones** icon.

2. Click the label of the zone you want to add a data store to.

3. 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.

28.1.1.7 Remove Data Stores from Data Store Zone
To remove a data store from a zone:
1. Go to your Control Panel’s Settings menu and click the Data Store Zones icon.
2. Click the label of the zone you want to remove a data store from.
3. On the screen that appears, click the "−" icon next to the data store you want to remove, to delete it.

28.1.1.8 Delete Data Store Zone
Delete data store zones:
1. Go to your Control Panel’s 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.
2. 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.

28.2 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:
1. Traditional logical volume data stores based on a centralized SAN.
2. ESXi datastores used under VMware (refer to vCenter Implementation Guide for details)
3. Integrated storage data stores (the core Integrated Storage functionality). See Integrated Storage chapter for details.
The basic management tools are the same for all data store types, but the creation process differs.

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:

<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>vCloud Director</td>
<td>VPC</td>
</tr>
<tr>
<td>VMware</td>
<td>Virtual</td>
</tr>
</tbody>
</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.

28.2.1 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:
1. Go to your Control Panel Settings menu.
2. 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
Create SolidFire Data Store
Edit Data Store
Edit Data Store IO Limits
Delete Data Store

See also:
Integrated Storage
Data Store Zone Settings
Zone Types
Manage Compute Zone Data Stores

28.2.1.1 Create LVM Data Store
To create a data store:

1. Go to your Control Panel Settings menu.
2. Click the Data Stores icon.
3. Click the Create Data Store link at the bottom of the screen.
4. 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.

5. When you've finished configuring the store, click the Create Data Store button.
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.

28.2.1.2 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:
1. Go to your Control Panel Settings menu.
2. Click the Data Stores icon.
3. Click the Create Data Store link at the bottom of the screen.
4. 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.

5. When you’ve finished configuring the store, click the **Create Data Store** button.

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**.

28.2.1.3 **Edit Data Store**

To edit a data store:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Data Stores** icon. You'll see a list of the data stores on your system.
3. Click the **Actions** button next to the store you want to change, then click **Edit**.
4. On the following page the appropriate data store details:
   a.
   a.i.
   - **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** - choose the data store type.

If you have 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. Be aware that epochs functionality is currently in beta.
- **Integrated Storage Cache enabled** - move the slider to the right to enable caching

5. Click the **Save Data Store** button to finish.

### 28.2.1.4 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:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Data Stores** icon. You'll see a list of the data stores on your system.
3. Click the **Actions** button next to the store you want to change, then click **Edit IO Limits**.
4. On the following page edit the appropriate data store details:
   a.
- **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)

5. Click the **Save** button to finish.

To disable IOPS limiting:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Data Stores** icon. You'll see a list of the data stores on your system.
3. Click the **Actions** button next to the store you want to change then click **Edit IO Limits**.
4. On the following page set all parameters to Unlimited.
5. Click the **Save** button to finish.
6. 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.

28.2.1.5 Delete Data Store

To delete a data store:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Data Store** icon. You'll see a list of the data stores in your system.
3. 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.

28.3 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.

28.3.1 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.
28.3.1.1 View Disks

To view a disk:

1. Go to your Control Panel's Settings > Disks menu.
2. 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
Delete Disks

See also:

Migrate Virtual Server
Edit Data Store IO Limits
Virtual Servers

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.
28.3.1.2 Enable Disk Auto-Backups

To enable disk auto-backups:
1. Go to your Control Panel's Settings > Disks menu.
2. 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.

28.3.1.3 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:
1. Go to your Control Panel's Settings > Disks menu.
2. Click the Actions > Backup button next to the required disk.
3. Click Take a Backup button.

28.3.1.4 Migrate Disks

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.

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:
1. Go to your Control Panel's Settings > Disks menu.
2. Click the Actions button next to the disk you want to change, then click the Migrate link.
3. Choose a target data store.
4. Click the Start Migrate button.

28.3.1.5 View Disk IOPS

To see IOPS for a disk:
1. Go to your Control Panel's Settings > Disks menu.
2. Click the Actions button next to the required disk, then click the IOPS link.
3. There are four charts on the screen that appears:
   o Instant IOPS - IOPS for the last hour
   o Hourly IOPS - IOPS for the last 24 hours
   o Instant data written/read - data written/read for the last 24 hours
   o Hourly data written/read - data written/read for the last hour
4. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

### 28.3.1.6 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.
- IO limits are not supported for Xen3 compute resources running CentOS 5.

To edit a disk IO limits:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Disks** icon. You'll see a list of the disks on your system.
3. Click the **Actions** button next to the disk you want to change, then click **Edit IO Limits**.
4. On the following page move the **Override DataStore IO Limits** slider to the right to edit the appropriate details:
   a.  
      - **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)

5. Click the **Save** button to finish.

To disable IOPS limiting:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Disks** icon. You'll see a list of the disks on your system.
3. Click the **Actions** button next to the disk you want to change, then click **Edit IO Limits**.
4. On the following page set all parameters to Unlimited.
5. Click the **Save** button to finish.
6. 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.

### 28.3.1.7 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:
1. Go to your Control Panel's Settings > Disks menu.
2. Click Actions > Schedule for backups button next to a disk to schedule a backup for.

28.3.1.8 Delete Disks
To delete a disk:
1. Go to your Control Panel's Settings > Disks menu.
2. 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.

28.3.1.8.1 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:
1. Log in as root on your OnApp Control Panel server.
2. Edit the following configuration file: /onapp/interface/config/on_app.yml and set the wipe_out_disk_on_destroy parameter to true.

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.
29 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 (Settings > Configuration menu).

The location group specified per server predefines 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.

29.1 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.

29.1.1 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:

1. Go to your Control Panel's Settings menu.
2. Click the Location Groups icon. The page that appears will show all the location groups in your cloud.
3. Click the location group name to see its details:

•
  o country and city
  o 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

29.1.2 Add Location Groups

To add a location group:
1. Add and properly configure a location in OnApp Dashboard.
2. Go to your Control Panel Settings > Location Groups screen.
3. The page that loads will show the groups of all available locations.
4. 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:
1. Add resources to the zones. For example, attach data stores to the data store zones.
2. 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!

29.1.3 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:
- Edit Compute Zone
- Edit Data Store Zone
- Edit Network Zone
- Edit Backup Server Zone
29.1.4 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:

1. Log in to your OnApp Control Panel.
2. Go to your Settings > Location Groups menu.
3. Click the Country or City of the Location Group in question.
4. 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.
5. In the window that pops up, choose a particular location or zone and click Attach.
6. 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

29.1.5 Unassign Zones from Location Groups

To unassign a Compute resource/Data store/Network/Backup server zone from a location group:

1. Log in to your OnApp Control Panel.
2. Go to your Settings > Location Groups menu.
3. Click the Country or City of the Location Group in question.
4. 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.
5. 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
30 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.

30.1 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:
1. Go to your Control Panel's Settings menu
2. 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.
3. To change a preset, click its Actions icon, then click Edit to change the following auto-backup preset details:
   - Duration
   - Period
   - Rotation period
   - Enabled
4. Click the Save button to finish.
5. 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 VVs. Auto-backup Presets can be applied to all new VVs added to the cloud. Scheduled VS backups enable specific backups to be scheduled for individual VVs, outside of the auto-backup pattern.

30.2 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:
1. Basic backup scheme
2. Advanced backup scheme
3. CloudBoot backup scheme
Only one Backup Scheme can be used per cloud.

### 30.2.1 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 **Settings > Configuration > Backups/templates**

OnApp SANlty can only use the Basic Backup Scheme.

### 30.2.2 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 Settings > Configuration > Backups/templates.

### PLEASE NOTE:
- The use of dedicated backup servers is available for non-local data stores only.
- Volume groups of each data store based on SAN must be shared with the backup server.
- If your cloud uses a combination of local storage and SANs, you will only be able to use the new backup method for virtual servers that have been allocated SAN-based storage.
- If only local storage is used, you shouldn't define any dedicated backup servers – instead, configure your SSH or NFS settings in the Settings > Configuration > Backups/templates menu.

### 30.2.3 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.
30.2.4 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.

30.2.4.1 View Backup Servers

To view information on all backup servers available on the system:

1. Go to the Control Panel > Settings menu.
2. Click the Backup Servers icon.
3. 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.

On this page:
- View Backup Servers
- View Backup Server Details
- View Hardware Info
- Create Backup Server
- Edit Backup Server
- Delete Backup Server

See also:
- Backup Server Zone Settings
- Schedules Settings
- Auto-backup Presets Settings
- Hardware Info

30.2.4.2 View Backup Server Details

To view details for a particular backup server:

1. Go to the Control Panel > Settings menu.
2. Click the **Backup Servers** icon.

3. 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](#).

30.2.4.3 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:

1. Go to the Control Panel > **Settings** menu and click the **Backup Servers** icon.

2. 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.

3. 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**)
30.2.4.4 Create Backup Server

To create a backup server:

1. Go to your Control Panel's Settings menu, then press Backup Servers icon.
2. Click the Create Backup Server button.
3. 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. 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.

30.2.4.5 Edit Backup Server

To edit a backup server:
1. Go to your Control Panel's Settings menu and click the Backup Servers icon.
2. 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.
   - Enabled – move this slider to the right to enable the backup server.
3. Click the Save Backup server button to save changes.

Disabling backup servers

Be aware, that if you switch off 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.

30.2.4.6 Delete Backup Server

To delete a backup server:
1. Go to your Control Panel's Settings menu and click the Backup Servers icon.
2. Click the backup server's label.
3. On the screen that appears, you'll see the list of all backup servers currently set up in the cloud.
4. 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!

30.2.5 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.

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**On this page:**

- Normal Backups
- Incremental Backups
- Manage Backups for Backup Server

**See also:**

- Backup Server Settings
- Backup Server Zones Settings
- Schedules Settings

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### 30.2.5.1 Normal Backups

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
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

### 30.2.5.2 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:

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
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.

### 30.2.5.3 Manage Backups for Backup Server

To manage backups for a backup server:

1. Go to your Control Panel's **Settings** menu and click the **Backup Servers** icon.
2. 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).

30.3 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.

30.3.1 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.

30.3.1.1 View Backup Server Zone Details

To view details of a backup server zone:

1. Go to your Control Panel's Settings menu and click the BackupServer Zones icon.
2. On the screen that appears, you'll see all backup server zones currently set up in the cloud.
3. 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
30.3.1.2 Create Backup Server Zone

To create a new backup server zone:

1. Go to your Control Panel's Settings menu and click the Backup Server Zones icon.
2. On the screen that appears, click the Create New Backup Zone button at the bottom of the list.
3. 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.
4. Click the Save button.

30.3.1.3 Edit Backup Server Zone

To edit a backup server zone:

1. Go to your Control Panel's Settings menu.
2. Click the Backup Server Zones icon.
3. 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.
4. Click Save.

30.3.1.4 Add Backup Server to Backup Server Zone

To attach a backup server to the backup server zone:

1. Go to your Control Panel's Settings menu and click the Backup Server Zones icon.
2. 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.
3. 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
30.3.1.5 Remove Backup Server From Backup Server Zone
To remove a backup server from the backup server zone:
1. Go to your Control Panel's **Settings** menu and click the **Backup Server Zones** icon.
2. 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.
3. In the assigned list, find the backup server you want to remove, and click the **Delete** icon next to it.

30.3.1.6 Delete Backup Server Zone
To delete a backup server zone:
1. Go to your Control Panel's **Settings** menu.
2. Click the **Backup Server Zones** icon.
3. Click the **Actions** button next to the zone you want to remove, then click **Delete**. You will be asked to confirm deletion.

30.4 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**

30.4.1 Create and Manage Backup Schedules
Schedules settings screen provides 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.

30.4.1.1 View Schedules
To view the list of all schedules:
1. Go to your Control Panel's **Settings** menu.
2. 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
- View Smart Server Backup Schedules

#### 1.

- **Date** - time when the schedule was created
- **Target** - server or disk for which the schedule was created (depending on the backup type)
- **Action** - scheduled action
- **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
- **Period** - backup period: days, weeks, months or years
- **Rotation period** - number of backups after which the first backup will be deleted

This parameter is applicable to incremental backups only! Despite of the input value, for normal backups (when Disk is the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

- **Next Start** - time of the next backup
- **User** - 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

30.4.1.2 Edit Schedules

To edit a schedule:

1. Go to your Control Panel's Settings menu.
2. Click the Schedules icon to see a list of all schedules on the system.
3. Click the Edit icon next to a schedule to change its details:

- **Frequency** - how frequently the backup will take place according to the period set. For example, duration of 2 and a period of days will take a backup every 2 days
- **Period** - backup period: days, weeks, months or years
- **Rotation period** - number of backups after which the first backup will be deleted. This parameter is for incremental backup schedules only.

Despite of the input value, for normal backups (when Disk is
the target) rotation period is always 1. Thus, only 1 normal auto-backup with specific frequency, period and target will be stored in the system.

- **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 schedule once again.

4. Click the **Save** button to save your changes.

### 30.4.1.3 Delete Schedules

To delete a schedule:

1. Go to your Control Panel’s **Settings** menu.
2. Click the **Schedules** icon to see a list of all schedules on the system.
3. Click the **Actions** icon next to the schedule you want to remove, then choose **Delete**.
31 Backup Plugin System

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.

The Backup Plugin System enables you to integrate OnApp with the 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 plugin for R1Soft Server Backup Manager 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.

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 plugin for R1Soft that was developed by OnApp.

Install Backup Plugin

Install your custom or R1Soft-based 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.

31.1 What's Next?

- Backup Plugin System
- Backup Resources
- Resource Zones
- Auto Backup Presets
- Billing for Backup Resource Zones
- Recovery Points

31.2 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. In this section, you can find information on how to view, create, edit and delete backup resources.

31.2.1 View Backup Resources
To view backup resources available in your cloud, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. 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
4. 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.

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.

On this page:
- View Backup Resources
- View Backup Resource Details
- Create Backup Resource
- Edit Backup Resource
- Manage Advanced Options
- Delete Backup Resource

See also:
- Manage Virtual Server Backup Resources
- Create and Manage Backup Resource Zones
- Create and Manage Auto Backup Presets
- Billing for Backup Resource Zones

### 31.2.2 View Backup Resource Details
To view details of a particular backup resource, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. 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**.

### 31.2.3 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:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. 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.
31.2.4 Edit Backup Resource

To edit a backup resource, follow the next steps:

1. Go to your Control Panel > 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
   - **Primary host** - enter the primary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol type before the primary host, that is http://{address} or https://{address}.
   - **Secondary host** - enter the secondary address (either hostname or IP address) used to connect to the third-party backup system. Specify a protocol type before the secondary host, that is http://{address} or https://{address}.
   - **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
4. Click the Save button to apply new settings for the backup resource.
31.2.5 Manage Advanced Options

The advanced options for a backup resource are automatically fetched from the *config.xml* file of the backup plugin. You can edit the advanced options for the backup resource as follows:

1. Go to your Control Panel > **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 **Advanced options**.
4. Change the advanced options that are fetched from the *config.xml* file of your backup plugin.
5. Click the **Save** button to apply changes.

For the R1Soft backup plugin, there are no options that require an advanced management. To provide advanced options for your custom plugin, please refer to the [Create Backup Plugin](#) guidance.

31.2.6 Delete Backup Resource

To delete a backup resource, follow the next steps:

1. Go to your Control Panel > **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 **Delete**.
4. 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.
31.3 Create and Manage Backup Resource Zones

When you 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 with a compute resource on which run virtual servers that should be backed up. In this document, you can find information on how to manage backup resource zones in OnApp CP.

31.3.1 View Backup Resource Zones

To view backup resource zones available in your cloud, follow the next steps:

1. Go to your Control Panel > 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.

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.

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:
- Create and Manage Backup Resources
- Manage Virtual Server Backup Resources
- Create and Manage Compute Zones
- Create and Manage Auto Backup Presets

31.3.2 View Backup Resource Zone Details
To view details of a backup resource zone, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resource Zones** icon.
3. The page that appears will show all backup resource zones 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.

### 31.3.3 Create Backup Resource Zone

To create a new backup resource zone, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resource Zones** icon.
3. Click the '+' or **New Backup Resource Zone** button.
4. 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...
5. 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**.

### 31.3.4 Edit Backup Resource Zone

To edit a backup resource zone, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resource Zones** icon.
3. Click the **Actions** button next to the required backup resource zone and then click **Edit**.
4. 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.

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

### 31.3.5 Attach Backup Resource to Backup Resource Zone

To attach a backup resource to a backup resource zone, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resource Zones** icon.
3. 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.

4. In the Unassigned Backup Resources box, click the '+' button next to the backup resource that you want to add to this zone.

### 31.3.6 Remove Backup Resource from Backup Resource Zone

To remove a backup resource from a backup resource zone, follow the next steps:

1. Go to your Control Panel > Settings menu.
2. Click the Backup Resource Zones icon.
3. 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.
4. 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.

### 31.3.7 Delete Backup Resource Zone

To delete a backup resource zone, follow the next steps:

1. Go to your Control Panel > Settings menu.
2. Click the Backup Resource Zones icon.
3. On the page that appears, click the Actions button next to the required backup resource zone and then click Delete.
4. In the pop-up box, click the Ok button to confirm your action.

You cannot delete a backup resource zone if there are backup
31.4 Create and Manage 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.

31.4.1 View Auto Backup Presets

To view auto backup presets for a particular backup resource, follow the next steps:

1. Go to your Control Panel > Settings menu.
2. Click the Backup Resources icon.
3. Click the Actions button next to the required backup resource and then click Auto backup presets.
4. 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.

To create, edit, and delete auto backup presets, refer to the following sections.

Backup Plugin System is available in preview mode and is subject to change in the future OnApp releases.
31.4.2 Create Auto Backup Preset

For 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.

To create an auto backup preset, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. Click the **Actions** button next to the required backup resource and then click **Auto backup presets**.
4. Click the ‘+’ or **New Auto Backup Preset** button.
5. 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

![Auto Backup Preset Interface](image)

- **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

![Weekly Auto Backup Preset Interface](image)

- **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

![Monthly Auto Backup Preset Interface](image)

- **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 Monday, 1 - Tuesday, 2 - Wednesday, 3 - Thursday, 4 - Friday, 5 - Saturday, or 6 - Sunday.

- **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

When you are finished, click the **Create** button.

### 31.4.3 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:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. Click the **Actions** button next to the required backup resource and then click **Auto backup presets**.
4. 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:

- **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
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- **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 Monday, 1 - Tuesday, 2 - Wednesday, 3 - Thursday, 4 - Friday, 5 - Saturday, or 6 - Sunday.

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

### 31.4.4 Delete Auto Backup Preset

To delete an auto backup preset, follow the next steps:

1. Go to your Control Panel > **Settings** menu.
2. Click the **Backup Resources** icon.
3. Click the **Actions** button next to the required backup resource and then click **Auto backup presets**.
4. On the page that appears, click the **Actions** button next to the required auto backup preset and then click **Delete**.
5. Click the **Ok** button to confirm your action.

### 31.5 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.
31.5.1 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:

1. Go to your Control Panel > Buckets menu.
2. Click a label of a destination bucket and open the Other tab from the Access Control section.
3. Click the Add New Backup Resource Zone (+) button in the Limits for Backup Resource Zones box.
4. Select a backup resource zone that you want to add to the bucket 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:
Configure Access Control
Configure Rate Card

See also:
Buckets
Resource Allocation and Prices
Backup Resource Zones

Select the Duplicate to rate card checkbox before clicking Submit to add a backup resource zone to the 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 will have access to none of the backup resource zones available on the system.

31.5.2 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:

1. Go to your Control Panel > Buckets menu.
2. Click a label of a destination bucket and open the Other tab from the Rate Card section.
3. Click the Add New Backup Resource Zone (+) button in the Pricing for Backup Resource Zones box.
4. Select a backup resource zone that you want to add to the bucket and enter the following settings:
   - **Free Limit** - the amount of recovery points (recovery point/hour) users can store in this backup resource zone for free under this bucket
   - **Price** - set the price per recovery point per hour charged for recovery points stored in this backup resource zone under this bucket
5. When you are finished, click the Submit button.

If you only add a price and free limit for a backup resource zone in Rate Card but not add the backup resource zone to Access Control, users under the bucket will not have 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.
32 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:
1. Create a network zone of the virtual type.
2. Create a network and specify the network zone which you wish to assign it.
3. Add an IP net to the new network.
4. Add IP ranges to the new IP net.

32.1 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>

32.1.1 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.

32.1.1.1 Create Network Zone
To create new network zone:
1. Go to your Control Panel's Settings menu and click the Network Zones icon.
2. Click the Create Network Zone button.
3. 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
Firewalls

- 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.

4. **The zone's type cannot be changed after the zone is created.**

1. o Location group - select from the drop-down list the location group you wish to assign this network zone to.
   
o 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.

32.1.1.2 View Network Zone

To view network zones:

1. Go to your Control Panel's 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:

   o Label - the name of the zone
   
o Zone type - type of the zone: Virtual, Smart, Baremetal or VPC
   
o Location group - the location group with which the zone is associated

2. 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.

32.1.1.3 View Network Zone Details

To view details of a network zone:

1. Go to your Control Panel's Settings menu and click the Network Zones icon.
2. 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

32.1.1.4 Edit Network Zone
To edit network zones:
1. Go to your Control Panel's Settings menu, and click the Network Zones icon.
2. 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.
3. 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).
4. Click Save.

32.1.1.5 Add Networks to Network Zone
To add a network to a zone:
1. Go to your Control Panel's Settings menu and click the Network Zones icon.
2. 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.
3. 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.

32.1.1.6 Remove Networks from Network Zone
To remove a network from a zone:
1. Go to your Control Panel's Settings menu and click the Network Zones icon.
2. 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.
3. In the assigned list, find the network you want to remove, and click the Delete icon next to it.

32.1.1.7 Delete Network Zone
To delete network zones:
1. Go to your Control Panel's Settings menu, and click the Network Zones icon.
2. The screen that appears will show all network zones currently set up in the cloud.
3. 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.

### 32.2 Firewalls

Firewalls are used to route VS networking traffic in and out of OnApp. Because all customer VSs are running inside network, firewalls are required as the VS gateway.

#### 32.2.1 Create and Manage Firewalls

Firewalls are used to route VS networking traffic in and out of OnApp. Firewalls process incoming and outgoing traffic and decide to allow or block it based on a specific set of security rules. Because all customer VSs are running inside network, firewalls are required as the VS gateway. This section provides the information on how you can manage the firewalls for the virtual servers.

32.2.1.1 Create Firewalls  
To configure firewall settings:

1. Go to your Control Panel's **Settings** menu and click the **Firewalls** icon.
2. On the page that loads, you can see the list of available firewalls. To create a firewall click **Add Firewall**.
3. Specify the following settings:

   **On this page:**
   - Create Firewalls  
   - View/Edit/Delete Firewalls

   **See also:**
   - Virtual Servers
   - Network Settings
   - Network Zones Settings
   - Manage Virtual Server Networks

   - **IP Address for CP communication** - IP address used to manage firewall via CP
   - **CIDR to CP link** - internal IP address prefix size
   - **VLAN Interface Name** - interface used for managing the firewall via CP
   - **External IP Address** - external firewall IP
   - **External CIDR** - external IP address prefix size
   - **External Interface Name** - external firewall interface
   - **External Gateway** - external gateway address
   - **Default Rule** - default firewall settings for new virtual servers (INSIDE_OUT)
   - **User Name** - specify username for the remote firewall management
   - **Password** - set password for remote firewall management
4. Click **Add firewall** button.
32.2.1.2 View/Edit/Delete Firewalls
To view the list of firewalls:

1. Go to your Control Panel's **Settings** menu and click the **Firewalls** icon. On the screen that appears, you'll see the list of all firewalls.
2. To edit a firewall, click the **Actions** button next to the required firewall, then choose **Edit**.
3. To delete a firewall, click the **Actions** button next to the firewall you want to remove, then choose **Delete**.

32.3 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.

32.3.1 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.

32.3.1.1 View Resolvers
To view the resolvers on your system:

1. Go to your Control Panel's **Settings** menu.
2. 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
Firewalls
Network Settings

32.3.1.2 Create Resolver

To add a new resolver:
1. Go to your Control Panel's **Settings** menu.
2. Click the **Resolvers** icon.
3. On the screen that appears, click the **Create Resolver** button.
4. Specify resolver details:
   - **Address** - the resolver IP address
   - **Network** - the ID of the network to which this resolver should belong
5. Click **Create Resolver** button.

### 32.3.1.3 Edit Resolver

To edit an existing resolver:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Resolvers** icon.
3. Click the **Actions** icon next to the resolver you want to change, then click **Edit** to change the resolver's address and network.
4. Click **Save Resolvers** to save changes.

### 32.3.1.4 Delete Resolver

To delete an existing resolver:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Resolvers** icon.
3. 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.

### 32.4 Network 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
- Firewalls
32.4.1 View Networks

To view the networks currently available in your cloud:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon.
3. 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.

32.4.2 View Network IP Nets

To view details of a network:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon. The page that loads shows the shared networks in your cloud.
3. 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/VSS 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.

32.4.3 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.

32.4.3.1 Create Network
To add a new network:

1. Go to your Control Panel's Settings menu.
2. 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*.

3. Click the **Add New Network** button at the end of the network list.

4. On the screen that follows, specify the following network details:

   - **Label** - choose a name for the network

   - **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 turn 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.
32.4.3.2 Edit Network

To change the name, VLAN or network zone of an existing network:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon. The page that loads shows the shared networks in your cloud.
3. Click the Actions icon next to the network you want to change, then click Edit.
4. 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.
5. Click the Update button to save the changes.

32.4.3.3 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:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon. The page that loads shows the shared networks in your cloud.
3. 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.

32.4.4 Assign/Unassign IP Address to User

You can assign and unassign IP addresses to users from the network overview page.

You can assign and unassign IP addresses from shared networks only.
32.4.4.1 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:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon. The page that loads shows the shared networks in your cloud.
3. Click the name (label) of the network from which you wish to assign an IP address to a user.
4. Click the Assign IP addresses button.
5. 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.

6. Click the Assign button.

32.4.4.2 Unassign IP Address to User

You can unassign an IP Address from a particular user at any time:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon.
3. Click the name (label) of the network from which you wish unassign an IP address.
4. Click the **Unassign IP addresses** button.
5. On the window that pops up, select the IP address you wish to unassign from a user.
6. Click **Unassign**.

### 32.4.5 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.

32.4.5.1 Create IP Net

#### See also:
- Network Settings
- Create and Manage Networks
- Create and Manage IP Ranges
- Virtual Servers
- OnApp Configuration
- Firewalls

32.4.5.2 To add an IP net to a network:

1. Go to Control Panel > Settings > Networks. The page that loads shows the shared networks in your cloud.
2. Click the label of the network to which you want to add an IP net.
3. On the page that loads click the **New IP Net** button.
4. 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
   - **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.
5. Click **Submit** to finish.

32.4.5.3 Edit IP Net

To edit an IP net:

1. Go to Control Panel > Settings > Networks. The page that loads shows the shared networks in your cloud.
2. Click the label of the network which contains the IP net you wish to edit.
3. Click the **Actions** icon next to the IP net you want to modify and select **Edit**.
4. Edit the details of the IP net:
   - *label* - the name of the IP net
     If the IP net does not contain any IP ranges, you can also edit the following parameters:
     - *network address* - the network address of the IP net
     - *network mask* - the network mask

5. Click **Submit** to save changes.

### 32.4.5.4 Delete IP Net

**You can delete only those IP nets that do not contain any IP ranges.**

To delete an IP net:

1. Go to **Control Panel > Settings > Networks**. The page that loads shows the shared networks in your cloud.
2. Click the label of the network to which you want to add an IP net.
3. Click the **Actions** icon next to the required IP net and select **Delete**.

### 32.4.6 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/and 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.**

### 32.4.6.1 Add IP Range to IP Net

**See also:**

- Network Settings
- Create and Manage IP Nets
- Create and Manage Networks
- Virtual Servers
- OnApp Configuration
- Firewalls
To add an IP range to an IP net:

1. Go to Control Panel > Settings > Networks. The page that loads shows the shared networks in your cloud.
2. Click the label of the network to which you want to add an IP net.
3. Click the Actions icon next to the required IP net and select Add New IP Range.
4. Fill in the the start and end address and the default gateway of the new IP range.
5. Click Add to save the new IP range.

The Add New IP Range button is not displayed if there are no IP addresses that can be added to the IP net.

32.4.6.2 Edit IP Range
To edit an IP range in an IP net:

1. Go to Control Panel > Settings > Networks. The page that loads shows the shared networks in your cloud.
2. Click the label of the required network.
3. Click the IP net in which you want to edit an IP range.
4. Click the Actions icon next to the required IP net and select Edit.
5. 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.
6. Click Submit to save the changes.

32.4.6.3 Delete IP Range

1. Go to Control Panel > Settings > Networks. The page that loads shows the shared networks in your cloud.
2. Click the label of the required network.
3. Click the IP net in which you want to edit an IP range.
4. Click the Actions icon next to the required IP net and select Delete.

32.5 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:

1. Install and configure ODL controller.
2. Create SDN Manager.
3. Add SDN Manager’s connection options, used to connect SDN nodes.
4. Add SDN nodes to the created SDN Manager.

### 32.5.1 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 Carbon 0.6.2 ODL controller 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](#).

### 32.5.1.1 View SDN Manager

To view SDN manager on your system:

1. Go to your Control Panel’s **Settings** menu.
2. Click the **SDN Management** icon.

Currently, only one SDN manager per cloud is available.
On this page:
View SDN Managers
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.

32.5.1.2 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:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. Click the Actions button next to the SDN manager and then click Edit.
4. On the screen that follows, change details as required:
   - Label - the name of the SDN manager
32.5.1.3 Delete SDN Manager
To delete an SDN manager:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. 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.

32.5.1.4 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.

32.5.1.4.1 View Connection Options
To view connection options:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. Click the Actions button next to the SDN manager and then click Connection Options.

32.5.1.4.2 Add Connection Options
To add new connection option:
1. Go to your Control Panel's Settings menu and click the SDN Management icon.
2. Click the Actions button next to the SDN manager and then click Connection Options.
3. Insert the new connection option using the format: tcp:ipv4_address:port OR tcp:ipv6_address:port.
4. Click the "+" button.
32.5.1.4.3 Delete Connection Options

To delete a connection option:

1. Go to your Control Panel's Settings menu and click the SDN Management icon.
2. Click the Actions button next to the SDN manager and then click Connection Options.
3. To delete a connection option, click the Delete button next to the connection option you want to remove.

32.5.2 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 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.

On this page:

View SDN Nodes
Add SDN Nodes
Delete SDN Nodes

See also:

Manage SDN Manager
Create and Manage SDN Networks
Network Settings

32.5.2.1 View SDN Nodes

You can view both nodes assigned to your managers and the compute resources without nodes.

To view SDN nodes:

1. Go to your Control Panel’s Settings menu.
2. Click the SDN Management icon.
3. Click the label of the SDN manager.
4. Click the Nodes tab.
5. 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
32.5.2.2 Add SDN Nodes

You can add and remove SDN nodes.

To add SDN nodes:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. Click the label of the SDN manager.
4. Click the Nodes tab.
5. 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.

32.5.2.3 Delete SDN Nodes

To delete your SDN nodes:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. Click the label of the SDN manager.
4. Click the Nodes tab.
5. 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.

32.5.3 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 few clicks. Like other networks, using SDN network requires adding IP nets and IP ranges.

32.5.3.1

32.5.3.2 View SDN Networks

To view SDN networks:
1. Go to your Control Panel's Settings menu.
2. Click the SDN Management icon.
3. Click the label of the manager.
4. Click the **Network management** tab.

**On this page:**
- View SDN Networks
- Create SDN network
- Manage Bridges
- Delete SDN Network

**See also:**
- Manage SDN Manager
- Manage SDN Nodes
- Create and Manage IP Nets
- Create and Manage IP Ranges

4. Click the label of an SDN network to view its details:

1.  
   - **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 > Settings > Networks, although without the possibility to edit or delete them.

32.5.3.3 Create SDN network

To add a new SDN network:

1. Go to your Control Panel’s **Settings** menu.
2. Click the **SDN Management** icon.
3. Click the label of the manager.
4. Click the **Network management** tab.
5. Click the **Add SDN Network** button.
6. On the page that loads fill in the following details:
7. Click the button to add an SDN node.

8. 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

9. Click **Add** to save the parameters.

10. 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](#).

### 32.5.3.4 Manage Bridges

SDN network is created along with the required OVS bridges and tunnels between bridges. If a transaction failed you can try to recreate the bridges.

To recreate bridges:

1. Go to your Control Panel's **Settings** menu.
2. Click the **SDN Management** icon.
3. Click the label of the manager.
4. Click the **Network management** tab.
5. Click the label of the SDN network you want to edit.
6. Click the **Tools** button and then click **Manage bridges**.
7. Click the **Actions** button next to the SDN bridge you want to recreate and then click **Recreate**.

### 32.5.3.5 Delete SDN Network

To delete an SDN Network:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Networks** icon.
3. Click the **Actions** button next to the SDN network you want to delete and then click **Delete**.

### 32.5.4 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 0.6.2-Carbon version.

#### 32.5.4.1 Prerequisites

<table>
<thead>
<tr>
<th>Minimum System Requirements</th>
<th>Recommended System Requirements</th>
<th>OS Requirements</th>
</tr>
</thead>
<tbody>
<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 1.7 or 1.8</td>
</tr>
<tr>
<td>Storage: 16 GB</td>
<td>Storage: 64 GB</td>
<td></td>
</tr>
</tbody>
</table>

On this page:
- Prerequisites
- Install ODL Controller

**See also:**
- Manage SDN Manager
- Manage SDN Nodes
- Create and Manage SDN Networks

#### 32.5.4.2 Install ODL Controller

To install ODL controller, follow the next procedure:

1. Switch to the root home directory and download an archive with ODL:

   ```bash
   # cd
   # wget https://nexus.opendaylight.org/content/repositories/public/org/opendaylight/integration/distribution-karaf/0.6.2-Carbon/distribution-karaf-0.6.2-Carbon.tar.gz
   ```

2. Unpack the archive by running the following command:

   ```bash
   # tar -zxf distribution-karaf-0.6.2-Carbon.tar.gz
   ```

3. Install JVM by running the following command:

   ```bash
   # yum install java
   ```
4. Set `JAVA_HOME` by running the next command:

```
# export JAVA_HOME=/usr/lib/jvm/jre-1.8.0/
```

5. Start controller and install the required tools with the following command:

```
# cd /root/distribution-karaf-0.5.3-Boron-SR2
# bin/karaf
```

6. After the ODL console is opened, perform the refresh of repositories with the next command:

```
# feature:repo-refresh
```

7. Install the required features:

```
```

After the features are installed, log out from the `karaf` using `ctrl+d` combination. Optionally, you can access the UI at `http://your-server-ip-address:8080/index.html`

8. Create a service to be run at startup:

```
# ln -s /root/distribution-karaf-0.6.2-Carbon /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
# service opendaylight start
```

9. Change the default password for the admin account. For details, refer to Changing Passwords.

10. Ensure that ODL listens to OnApp on 8080 and 6640 ports:

```
# netstat -nap | grep java
tcp6  0 0 :::1099 :::*
LISTEN  31004/java
tcp6  0 0 :::6640 :::*
LISTEN  31004/java
tcp6  0 0 :::8080 :::*
LISTEN  31004/java
tcp6  0 0 :::8181 :::*
LISTEN  31004/java
tcp6  0 0 127.0.0.1:2550 :::*
```
| LISTEN | 31004/java |
| tcp6   | 0          | 0       | :::8185 | :::*   |
| tcp6   | 0          | 0       | :::4444 | :::*   |
| tcp6   | 0          | 0       | :::6653 | :::*   |
| tcp6   | 0          | 127.0.0.1:43133 | 0 | 0       | 0       | 127.0.0.1:43133 | 0 | 0       | 0       |
| tcp6   | 0          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| LISTEN | 31004/java |
| tcp6   | 0          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| tcp6   | 0          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| LISTEN | 31004/java |
| tcp6   | 0          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| tcp6   | 0          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       |
| LISTEN | 31004/java |
33 OnApp Configuration

The Control Panel's OnApp Configuration menu is where you get detailed control over the configuration of OnApp itself.

33.1 Authentication

OnApp offers you a possibility to log in using the credentials from a third-party Identity Provider. This section contains information on SAML and OAuth authentication possibilities.

33.1.1 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

33.1.1.1 Enabling OAuth for the cloud

1. Go to OnApp Dashboard > Settings > Authentication page
2. Select OAuth Providers tab
3. Move the Enable slider next to the required OAuth providers.

33.1.1.2 Facebook

1. Select an icon to be displayed during the login
2. 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:

1. 
   a. Log in as Facebook developer at [https://developers.facebook.com/](https://developers.facebook.com/)
   
   b. 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

33.1.1.3 Google
1. Select an icon to be displayed during the login
2. Fill in the app key and app secret from the Google application

Configure Google application*
1. Go to the [Google Developers Console](https://console.developers.google.com).

2. 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.
   a. In the Project name field, type in a name for your project.
   b. 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.
   c. 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.

3. In the left sidebar, select APIs & auth. A list of Google web services appears.

4. Find the Google+ API service and set its status to ON—notice that this
action moves the service to the top of the list.

5. Enable any other APIs that your app requires.

6. In the sidebar, select **Credentials**.

7. 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.

   a. In the **Application type** section of the dialog, select **Web application**.
   
   b. 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.

   
   ![Example Origins](http://onapp.cp  
   ![Example Origins](https://myproductionurl.example.com)

   c. In the **Authorized redirect URI** field, enter your redirect URI callback:

   ![Example 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

   ![Default Callback](http://onapp.cp/callback)

   d. Select **Create Client ID**.

8. Go into the **Consent Screen** and add your email address and a product name. The other fields are optional.

9. 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 Google instructions "Step 1: Create a client ID and client secret".

---

33.1.1.3.1 Connecting the enabled OAuth provider to user profile

To connect a user profile to either of above OAuth providers and be able to log in with it, the user has to:


2. 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.

3. In the **Oauth Authentication** section press the **Connect** button next to the required provider.

4. 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.

33.1.2 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.

Selecting a SAML IdP on OnApp login screen, 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 > Settings > Configuration > System.
33.1.2.1 Add New ID Provider

Enabling the possibility to log into OnApp through Identity Provider involves two stages:

1. **Add the Identity Provider (IdP) instance to Service Provider (SP)**
2. **Configure Service Provider at Identity Provider**

Add the IdP instance on the OnApp 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:

1. Go to your Control Panel’s **Settings > Authentication** tab.
2. Click **New SAML Id Provider** or a "+" icon.
3. Fill in the fields in the new window:

   - **Idp sso target url**, **Idp cert fingerprint**, and **Idp cert** are given by the Identity Provider.
   - **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 fingerprint** - the SHA1 fingerprint of the certificate, e.g. "90:CC:16:F0:8D:...
   - **Idp cert** - the identity provider's certificate in PEM format
   - **Encrypted assertion** - move the slider to the right to enable the encrypted assertion. Then add a certificate in the **Private key** box that appears when this option is enabled.
   - **Nameid format** - specify a format of name identifier according to the Oasis SAML specification

- Either **Idp cert** or **Idp cert fingerprint** must be present. If both are provided, **Idp cert** will take precedence over **Idp cert fingerprint**.
- 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.

1. 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

5. 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:

1. 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.
2. Copy this link and submit it to the Identity Provider in the Select Data Source menu.
3. 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.

33.1.2.2 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.

The table below lists the mandatory and optional keys for attributes mapping.

<table>
<thead>
<tr>
<th>Mandatory keys for attributes mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OnApp key</strong></td>
</tr>
<tr>
<td>The key that enables the import and synchronization of user attributes during every login to OnApp Cloud will not be created without this key.</td>
</tr>
<tr>
<td><strong>User bucket</strong></td>
</tr>
<tr>
<td>The key to assign the user to a particular bucket under which this user will be billed.</td>
</tr>
</tbody>
</table>
key

**User email key**  
The email of the user.

**User name key**  
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.

Optional keys for attributes mapping

**First name key**  
The first name of the user.

**Last name key**  
The last name of the user.

**Locale key**  
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 > Configuration > Interface page.

**System theme key**  
The default system theme that is available in OnApp. There are light and dark system themes.

**Display infoboxes key**  
The option that enables or disables the display of infoboxes for the user.

**Disable auto suspend key**  
The option that enables or disables auto-suspending of the user.

**Suspend after key**  
The period of time in hours after which the user will be suspended.

**Suspend at key**  
The date and time when the user will be suspended.

**User group key**  
The attribute to assign the user to a particular user group.

**Roles key**  
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.

**Time zone key**  
The key of the time zone with which the user will be associated.

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
- **OnApp_UserGroup** - the string type with the value corresponding to the user group label
- **OnApp_Roles** - the string type with the value corresponding to the role label that may contain several values separated by a semicolon
- **OnApp_TimeZone** - the string type with the value corresponding to the time zone label
"OnApp_Enabled" => "TRUE" / "false",
"OnApp_Bucket" => "somebucket",
"OnApp_UserEmail" => "someemail",
"OnApp_UserName" => "somename",
"OnApp_FirstName" => "Somefirstname",
"OnApp_LastName" => "Somelastname",
"OnApp_Locale" => "en",
"OnApp_SystemTheme" => "light",
"OnApp_DisplayInfoboxes" => "TRUE" / "false",
"OnApp_DisableAutoSuspend" => "TRUE" / "false",
"OnApp_SuspendAfter" => "90",
"OnApp_SuspendAt" => "2017-10-19 13:10:00",
"OnApp_UserGroup" => "Test user group",
"OnApp_Roles" => "Administrator";
"Advanced user",
"OnApp_TimeZone" => "Baghdad"

33.1.2.3 Manage Identity Providers

To see the list of Identity Providers and manage them:

1. Go to your Control Panel's 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
   - **IdP Cert Fingerprint** - the SHA1 fingerprint of the certificate
   - **Status** - either "Active" or "Disabled"
   - **Action** - click the "gear" button to Edit, Delete or access Metadata of this Identity Provider

2. To see more detailed description of the Identity Provider - click its label.

3. To enable or disable IdP - go to Edit screen.

33.1.2.4 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.

33.2 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
33.2.1 View License Details

To view your OnApp license details:

1. Go to your Control Panel's Settings menu.
2. Click the License icon.
3. 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
- **Software Defined Storage** - shows whether Integrated Storage is enabled for the license
- **Infiniband** - shows whether InfiniBand is enabled for the license
- **AWS** - indicates whether AWS is enabled for the license
- **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
- **Accelerator** - shows whether the accelerator server for CDN is enabled for the license
- **Service Add-Ons** - shows whether service add-ons are enabled for the license
- **Software-Defined Networking** - shows whether SDN Management 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.

### 33.2.2 Online License

If you use an online license, use the following procedure to change your license key:

1. Go to your Control Panel's **Settings** menu.
2. Click the **License** icon.
3. 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.
4. To accelerate the license validation after changing the license key, click the **Restart License Client** button.
33.2.3 Isolated License

To use an isolated license for your CP, run the following steps:

1. Go to your Control Panel's Settings menu.
2. Click the Configuration icon.
3. In the System tab, move the Enable isolated license slider to the right.
4. Click the Save Configuration button.

When the isolated license functionality is enabled, you can go to Control Panel > 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.

33.3 Configuration Settings

The configuration settings screen lets you change various aspects of your OnApp installation. To edit these OnApp configuration settings:

1. Go to your Control Panel's Settings menu.
2. 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.

33.3.1 Edit System Configuration

This section contains information on how to edit Yubico, CloudBoot, OnApp Storage and other application settings.

To edit system configuration, do the following:

1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. 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

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**33.3.1.1 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.

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**33.3.1.2 File Upload configuration**

- **Max upload size** - the maximum file size for ISOs that can be uploaded to boot a VS.

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**33.3.1.3 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.

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**33.3.1.4 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/).

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**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.

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**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.

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, such as resolv.conf. This prevents the system from creating VSs with more CPU than is available for a Compute resource. For example, on a Compute resource with 4 CPU cores, with CPU guarantee enabled, you will only be able to create 4 VSs with 100% CPU priority. The system will not allow you to create a 5th VS.

• **Enable huge pages** - move this slider to the right to enable huge pages utilization. Huge pages are the memory pages of size 2MB. The use of huge pages allows you to reduce the number of page walks as compared to a standard method of translation from a virtual address to the physical 4-KB page.

If you have KVM compute resources that are based on CentOS 7, please do not **Enable huge pages** in your cloud. If this option is already enabled, please disable it before the upgrade to OnApp 5.8.

• **Show IP address selection for new VS** – move this slider to the right to enable IP address assignment during VS creation.

• **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.

• **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

• Allow users connect to AWS - move this slider to the right to enable AWS for the cloud

CloudBoot

• 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

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 /nw/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.

**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.

**DRAas**

- **Enable DRAas** - enable DRAas locally on your Control Panel.

**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.
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.

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.

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.

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.

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.

33.3.2 Edit Backups/Templates Configuration

This section contains information on how to edit backup or template server, backup processes, incremental backups and other application settings.

To edit backups or templates configuration, do the following:

1. Go to your Control Panel's **Settings** menu, and click the **Configuration** icon.
2. 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:
- Edit Interface Configuration
- Edit Defaults Configuration
- Edit Infrastructure Configuration
- Edit System Configuration

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!

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`

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](http://unixhelp.ed.ac.uk/CGI/man-cgi?ssh+1)).

**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.

**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.

**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.

### 33.3.3 Edit Interface Configuration

This section contains information on how to edit locales, pagination, system themes, and other application settings.

To edit interface configuration, do the following:

1. Go to your Control Panel's **Settings** menu, and click the **Configuration** icon.

2. 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](#)
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.

Dashboard Statistics

- **Dashboard stats** – select the statistics, which will be shown on a **dashboard**, from a drop-down menu.

Google API

- **Google API Token** – insert [Google API key](#), if you face the problem with viewing the maps on VS/Smart/Application server creation wizard.

3. Click the **Save Configuration** button to finish.

### 33.3.4 Edit Defaults Configuration

This section contains information on how to edit password complexity, new virtual servers, firewall, and other application settings.

To edit defaults configuration, do the following:

1. Go to your Control Panel's **Settings** menu, and click the **Configuration** icon.
2. Click the **Defaults** tab to change the following application settings:
   
   Please note, the system will restart OnApp services automatically.
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.

Firewall

- 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, which will be created after these changes.
- Enable KVM anti spoofing - move this slider to the right to run the anti-spoofing mechanism for IP addresses of the network interfaces attached to KVM-based virtual servers. To apply the anti-spoofing, it is necessary to restart the Control Panel and OnApp Daemon.
Antispoofing option does not support IPv6 addresses. It is applicable for VSs based on Centos5 KVM compute resource only.

- *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 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.

**Migration options**

- **Migration rate limit** – the maximum rate limit used for migrating the VS. The default value is 10 Mbps.
- **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.

### 33.3.5 Edit Infrastructure Configuration

This section contains information on how to edit delay between executing background tasks, background processes, RabbitMQ, and other application settings.

To edit infrastructure configuration, do the following:

1. Go to your Control Panel's **Settings** menu, and click the **Configuration** icon.

2. Click the **Infrastructure** tab to change the following application settings:

<table>
<thead>
<tr>
<th>See also:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit System Configuration</td>
</tr>
<tr>
<td>Edit Backups/Templates Configuration</td>
</tr>
<tr>
<td>Edit Interface Configuration</td>
</tr>
<tr>
<td>Edit Defaults Configuration</td>
</tr>
</tbody>
</table>

Delay in seconds between executing background tasks

1.  
   - *Backup taker* - this process schedules auto-backups
   - *Billing event processor* - this process generates billing statistics
   - *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:

```bash
service onapp-engine stop
service onapp-engine start
```

### Background processes

- **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 requeuing 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

1. Click the **Save Configuration** button to finish.

### 33.4 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:

1. Go to your Control Panel's **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.

**Assign recipe**

Drag and drop recipe to assign it to a desired control panel event.

You can assign virtual server 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

**NOTE:** 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.

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.

### 33.5 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 **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 by the **servers** and **Update any compute resource/Update any backup server** permissions. For more information, refer to

---

**On this page:**

- View Hardware Info
- Add Custom Field
- Edit Custom Field
- Delete Custom Field

**See also:**

- Create and Manage Compute Resources
- Create and Manage Backup Servers
To view the hardware information:

1. Go to **Control Panel > Settings** menu and click the **Hardware Info** button.
2. 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.
3. 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.
33.5.2 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:
1. Go to the Control Panel > Settings menu and click the Hardware Info button.
2. Click the Edit button next to a label of a compute resource/backup server.
3. 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.
4. 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
5. When you have finished, click the Save button.
6. To view the custom field, hover over the icon that appeared next to the default field, to which the custom field was added.

33.5.3 Edit Custom Field

To edit the custom field added to the hardware info:
1. Go to the Control Panel > Settings menu and click the Hardware Info button.
2. Click the Edit button next to a label of a compute resource/backup server.
3. 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.
4. 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
5. When you have finished, click the Save button.
6. To view the custom field, hover over the icon that appeared next to the default field, to which the custom field was added.

33.5.4 Delete Custom Field

To delete the custom field added to the hardware info:
1. Go to the Control Panel > **Settings** menu and click the **Hardware Info** button.

2. Click the **Edit** button next to a label of a compute resource/backup server.

3. 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.

4. Click the **OK** button to confirm the deletion.
34 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 information on managing subscriptions, gateways and other elements of notifications refer to

**See also:**
- OnApp Configuration
- Logs
- Sysadmin
- Alerts
- Manage Notifications

### 34.1 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:

1. Go to Control Panel > Notifications > Configuration
2. Move the Enable notifications slider to enable notifications. By default, this option is disabled.
3. Specify the number of unread notifications to show. It is set to 5 by default.
4. Specify the notification subject prefix. By default, this value is ‘OnApp.’
5. Click the Save Configuration button
34.2 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 > 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:
1. Go to Control Panel > Notifications > Gateways
2. Click the New gateway or the button
3. 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
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 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

6. Click Save to finish the creation process

For information on how to edit and delete gateways refer to Manage Notifications.

34.3 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 > 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:

1. Go to Control Panel > Notifications > Notification Templates

2. Click the New notification template or the button

3. 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.

4. 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\}
- federation templates changed - \{label\}

For custom events you can only set the \%{message} and \%{name} placeholders.
34.4 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 > Notification > 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 > Notification > 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 > 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

34.4.1 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 > Notifications > Event Types > Custom Event types tab.
2. Click the Actions icon next to the event type you want to trigger and select Trigger.
3. Enter a text which will be included into your notification.
4. Click Trigger to send the notifications.
For information on how to delete event types for a particular period of time refer to Manage Notifications.

### 34.5 Create Recipients Lists

Recipient lists determine to whom of your users notifications will be sent. If required, you can add different recipient lists for different events. One recipient list can be used in multiple subscriptions and you can create multiple recipient 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. Recipient lists can include both OnApp users and external recipients.

#### 34.5.1 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 recipient lists of users who will receive notifications about certain events.

To view the list of external recipients go to Control Panel > Notifications > External Recipients. The page that loads shows the added external contacts with their name and email.

To add a new external recipient:
1. Go to Control Panel > Notifications > External Recipients
2. Click the New External Recipient or the button
3. 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
4. Click Submit to save the recipient

#### 34.5.2 Recipients Lists

The Recipients Lists section lets you create lists of users whom you want to notify about certain events. Recipient 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 recipient lists go to Control Panel > Notifications > Recipients Lists. The page that loads shows all your recipient lists.

Click the label of the recipient list to view its list of users with their emails.

To add a new recipients list:
1. Go to Control Panel > Notifications > Recipients Lists
2. Click the New Recipients List or the button
3. 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
4. Click Create to save the new recipients list

For information on how to edit and delete recipient lists refer to Manage Notifications.
34.6 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 > 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.

34.6.1 Create New Subscription

To add a new subscription:

1. Go to Control Panel > Notifications > Subscriptions
2. Click the New Subscription or the + button
3. 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.
4. Click the + button to add an event
5. 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 subscriptions.

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**.

6. Click the **Add** button
7. 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 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
- **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' 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.

### 34.7 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 > 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.
34.8 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 > Notifications. The notification count includes only unread notifications. You can configure the amount of unread notifications at Control Panel > 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.

34.9 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 notifications system:

- **Gateways** define what type of notifications will be send: 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 Manage Gateways.
- You can also disable notifications for your cloud and delete for a period of time.
- For information on configuring notifications for you cloud refer to Notifications Setup.
34.9.1 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 > Notifications > Gateways. The page that loads shows your gateways with their names and the types of the gateways: SMTP, SENDMAIL or INTERNAL.

34.9.1.1 Edit Gateway

1. Go to Control Panel > Notifications > Gateways
2. Click the Actions icon next to the required gateway and select Edit
3. 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
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- **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

4. Click **Save** to apply changes

### 34.9.1.2 Delete Gateway

To delete a gateway:

1. Go to **Control Panel > Notifications > Gateways**
2. Click the Actions icon next to the gateway you want to edit and select **Delete**

   A gateway that is associated with at least one subscription cannot be deleted.

### 34.9.2 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 > 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.

#### 34.9.2.1 Edit Notification Template

To edit a notification template:

1. Go to **Control Panel > Notifications > Notification Templates**.
2. Click the Actions icon next to the required template and select **Edit**.
3. 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.
4. 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 > 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.
34.9.2.2 Delete Notification Template

To delete a notification template:

1. Go to Control Panel > Notifications > Notification Templates
2. 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.

34.9.3 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 > Notifications > External Recipients. The page that loads shows the added external contacts with their name and email.

34.9.3.1 Edit External Recipients

To edit an external recipient:

1. Go to Control Panel > Notifications > External Recipients
2. Click the Actions icon new to the recipient you want to edit and select Edit.
3. On the page that loads edit the recipient’s name and email. The name of the recipient should not contain any special characters.
4. Click Submit to save changes

34.9.3.2 Delete External Recipients

To delete an external recipient:

1. Go to Control Panel > Notifications > External Recipients.
2. Click the Actions icon new 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.
34.9.4 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 > 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.

34.9.4.1 Edit Recipients List

To edit a recipients list:

1. Go to Control Panel > Notifications > Recipients Lists
2. Click the Actions icon next to the list you want to edit and select Edit. Or just click the name of the required list.
3. 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.
4. Click Update to save changes

34.9.4.2 Delete Recipients List

To delete a recipients list:

1. Go to Control Panel > Notifications > Recipients Lists
2. Click the Actions icon next to the list you want to edit and select Delete

A recipients list that is associated with at least one subscription cannot be deleted.

34.9.5 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 > Notifications > Subscriptions.

Click the name of the subscription to view the gateways, recipients lists, events and templates associated with it.

34.9.5.1 Edit Subscriptions

To edit a subscription:

1. Go to Control Panel > Notifications > Subscriptions.
2. Click the name of the subscription you want to edit.
3. Click the Edit Subscription button.
4. 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.

5. Click **Update** to save changes.

34.9.5.2 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:

1. Go to **Control Panel > Notifications > Subscriptions**
2. Click the Actions icon next to the required subscription and select **Delete**

34.9.6 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.

34.9.7 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:

1. Go to **Control Panel > Notifications > Configuration**
2. Move the **Enable notifications** slider to enable/disable notifications. By default, this option is disabled.
3. Click the **Save Configuration** button
35 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:
1. Go to your Control Panel's Roles and Sets menu.
2. On the screen that follows, you'll see a list of all roles on your system on the following screen.
3. Click the Actions button next to the relevant role, then click Edit.
4. Change the role's permissions for users as required, then click the Save button.

The Permissions chapter comprises the complete list of OnApp cloud permissions as well as the default permissions for the Admin and User roles.

35.1 List of all OnApp Permissions

35.1.1 A

Activity Logs

OnApp administrators can control users' ability to manage activity logs configuration through the Control Panel's Roles menu. The following activity logs permissions 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

35.1.2 A

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
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- **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.

35.1.2.3

35.1.2.4 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.

35.1.2.5

35.1.2.6 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:

- **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.
- 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 autoscaling monitors. You can set the following autoscaling monitors permissions for user roles:

- Any Actions on relation autoscaling monitors - the user can perform any actions on relation autoscaling monitors
- View autoscaling monitor information - the user can view autoscaling monitor information

For details, refer to the View Load Balancer Autoscaling Monitors section.

### 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.

### Availability

OnApp administrators can control users' ability to manage availability configuration through the Control Panel's Roles menu. The following availability permission for user roles can be set:

- Any action on Availability settings - user can take any actions on Availability settings

### B

#### 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.

### 35.1.3.2 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.

### 35.1.3.3 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.

### 35.1.3.4 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.
Currencies
Custom Fields

D
Dashboard
Data Stores
Data Store Joins
Data Store Zones
Disks
DRaaS

F
Federation
Federation Failed Action
Firewall Rules

G
Global Search
Groups

H
Hardware Info
Help
HTTP Caching Rules

I
Instance Packages
Internationalization
IO Limiting
IO Statistics
IP Addresses
ISOs

L
Last Access Log
Load Balancers
Load Balancing Clusters
Location Groups
Log Items

M
Media
Messaging: Deliveries
Messaging: Events
Messaging: External Recipients
Messaging: Gateways
Messaging: Notifications
Messaging: Notification Templates
Messaging: Recipients Lists
Messaging: Subscriptions
Monthly User Billing Statistics
Monthly User Group Billing Statistics

N
Nameservers
Networks
Network Zones

O
OnApp Storage
OAuth Providers
OVAs

P
Payments
35.1.4 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.

35.1.4.1

35.1.4.2 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
• See own base resources - the user can only see own base resources
• Update any resource - the user can edit any base resource
For details, refer to the Buckets section.

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 blueprints
• Create a new blueprint - the user can create a new blueprint
• Destroy any blueprint - the user can delete any blueprint
• Destroy own blueprint - the user can delete own blueprints
• See all blueprints - the user can see list of all blueprints
• Read own blueprint - the user can see details of own blueprint
• Update any blueprint - the user can edit own blueprint
• Update own blueprint - the user can edit any blueprint
For details, refer to the Blueprint Servers section.

35.1.4.3 Blueprint Templates
• Any action on blueprint templates - the user can take any action on blueprint templates
• Create a new blueprint template - the user can create a new blueprint template
• Destroy any blueprint template - the user can delete any blueprint template
• Destroy own blueprint template - the user can delete own blueprint templates
• See all blueprint templates - the user can see list of all blueprint templates
• Read own blueprint template - the user can see details of own blueprint template
• Read own blueprint template - the user can see details of own blueprint template
• Update any blueprint template - the user can edit any blueprint template
• Update own blueprint template - the user can edit own blueprint template
For details, refer to the Blueprint Templates section.

35.1.4.4 Blueprint Template Groups
• Any action on blueprint template groups - the user can take any action on blueprint template groups
• Create a new blueprint template group - the user can create new blueprint template groups
• Destroy any blueprint template group - the user can delete any blueprint template group
• See list of all blueprint template groups - the user can see list of all blueprint template groups
• See all blueprint template groups - the user can see all blueprint template groups
• Update any blueprint template group - the user can update any blueprint template group
For details, refer to the Blueprint Template Groups section.

Blueprint Template Group Relations
• Any action on blueprint template group relations - the user can take any action on blueprint template group relations
• Create a new blueprint template group relation - the user can create a new blueprint template group relation
• Destroy any blueprint template group relation - the user can delete any blueprint template group relation
• See list of all blueprint template group relations - the user can see list of all blueprint template group relations
• See all blueprint template group relations - the user can see details of all blueprint template group relations
• Update any blueprint template group relation - the user can edit any blueprint template group relations group
For details, refer to the Blueprint Template 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.
35.1.5 C

35.1.5.1 CloudBoot
- Manage CloudBoot configurations - the user can manage Cloud Boot settings

35.1.5.2

35.1.5.3 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 Integrated Storage - the user can enable/disable Integrated Storage for any Compute resource
- Update any Compute resource - the user can edit any Compute resource

For details, refer to the Compute Resource Settings section.

35.1.5.4

35.1.5.5 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

35.1.5.6

35.1.5.7 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.

### 35.1.5.8 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.

### 35.1.5.9

### 35.1.5.10 Control Panel

• **Manage recipes for Control Panel** - the user can manage recipes for any Control Panel

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**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.**

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### 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.

### 35.1.5.11 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.
35.1.6 D

35.1.6.1 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
- **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 the [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
• Update any data store zone - the user can edit any data store zone

For details, refer to the Data Store Zones Settings section.

35.1.6.2 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.

35.1.6.3 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

35.1.7 E

35.1.8 F

35.1.8.1 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](#).

### 35.1.8.2 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 the VSs 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 the VSs they have built

### 35.1.8.3 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

Be aware that additionally the following permissions should be enabled before setting firewall rules for your virtual server:

- **Update own virtual server** – the user can only edit their own virtual servers
- **Read own virtual servers** – the user can only read their own virtual servers

For details, refer to the [Set Virtual Server Firewall Rules](#) section.
35.1.9 G

35.1.9.1 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.

35.1.9.2 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.

35.1.10 H

35.1.10.1 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.

35.1.10.2 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.

35.1.10.3 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.

35.1.11 I

35.1.11.1 Instance Packages
- **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.

35.1.11.2 Internationalization
• Edit Internationalization Locales - the user can view and edit all non-English language phrases
For details, refer to the Localization and Customization section.

35.1.11.3 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.

35.1.11.4

35.1.11.5 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.

35.1.11.6 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.

35.1.11.7 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.

35.1.12 J

35.1.13 K

35.1.14 L

35.1.14.1 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

35.1.14.2 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

For details, refer to the Load Balancers section.
35.1.14.3 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 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.

35.1.14.4 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
- **See details of own location group** - the user can only see details of their own location group
- **Refresh location groups** - the user can refresh location groups

For details, refer to the [Location Groups](#) section.

35.1.14.5 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.
35.1.15 M

35.1.15.1 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

35.1.15.2 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.

35.1.15.3 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.

35.1.15.4 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.

35.1.15.5 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.

### 35.1.15.6 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.

### 35.1.15.7 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.

### 35.1.15.8 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.

### 35.1.15.9 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 the [Notifications Setup](#) section.

### 35.1.15.10 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

35.1.15.11 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

35.1.16 N
35.1.16.1 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

35.1.16.2 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
• Create a new network - the user can create a new network. This permission also controls the user's ability to create IP nets and IP ranges.
• Destroy any network - the user can delete any network
• See all networks - the user can see all networks
• Update any network - the user can edit any network

35.1.16.3
35.1.16.4 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
• 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.

### 35.1.17 O

#### 35.1.17.1 OnApp Storage
- **Manage OnApp storage** - the user can access the OnApp storage settings

#### 35.1.17.2 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.

#### 35.1.17.3 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 OVA(s) 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

For details, refer to the [OVAs](#) section.
35.1.18  P

35.1.18.1 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.

35.1.18.2 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 create a new permission
- **Destroy any permission** - the user can delete any permission
- **See all permissions** - the user can see all permissions
- **Update any permission** - the user can edit any permission

35.1.18.3 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

35.1.19  Q

35.1.20  R

35.1.20.1 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.

35.1.20.2 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.

35.1.20.3 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 of recipe relation groups

• *See all recipe group relations* – the user can view any recipe 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

• *See any recovery point* - the user can see any recovery point

• *See own recovery point* - the user can see their own recovery point

• *Restore any recovery point* - the user can restore any recovery point

• *Restore own recovery point* - the user can restore their own recovery point

For details, refer to the [Recovery Points](#) section.
35.1.20.4 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.

35.1.20.5 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

35.1.20.6 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.

35.1.20.7

35.1.20.8 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)

35.1.20.9

35.1.20.10 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.

35.1.20.11 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.

35.1.21 S

35.1.21.1 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

35.1.21.2 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.

### 35.1.21.3 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.

### 35.1.21.4 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.

### 35.1.21.5 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.

35.1.21.6

35.1.21.7 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.

35.1.21.8

35.1.21.9 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

35.1.21.10

35.1.21.11 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.
35.1.21.12  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.

35.1.21.14  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.

35.1.21.16  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.

35.1.21.17  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
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- **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.

35.1.21.18 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
- **Add ssh keys for own virtual servers** - the user can only add ssh keys for own virtual servers
For details, refer to the Create and Manage User Accounts section.

35.1.21.19 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.

35.1.22 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)

For details, refer to the [Templates](#) section.

### 35.1.22.2 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.

### 35.1.22.3 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.

### 35.1.22.4 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.

### 35.1.22.5 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

### 35.1.23 U

#### 35.1.23.1 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.

For details, refer to the Users section.

35.1.23.2 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.

### 35.1.23.3 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.

### 35.1.24 V

#### 35.1.24.1 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
• **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
- **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 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
- **Replace recipes** - the user can replace Recipes with Service Add-ons in VS creation wizard

For details, refer to the Appliances section.

35.1.24.2 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.

35.1.24.3 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.

35.1.25 W

35.1.25.1 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.

35.1.26 X

35.1.27 Y

35.1.28 Z

35.1.28.1 Zabbix Server
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

35.2 List of Default Permissions for Admin Role

The list below includes the set of default permissions for the Admin role in the OnApp v5.5.
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 monitis 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

35.2.1 Backup Resources
• Any action on backup resources - the user can take any action on backup resources

35.2.2 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

Buckets
• Any action on buckets - the user can take any action on any bucket

Blueprints
• **Any action on blueprints** - the user can take any action on blueprints

**Blueprint templates**
• **Any action on blueprint templates** - the user can take any action on blueprint templates

**Blueprints template groups**
• **Any action on blueprint template groups** - the user can take any action on blueprint template groups

**Blueprints template group relations**
• **Any action on blueprint template group relations** - the user can take any action on blueprint template group relations

**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

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
35.2.3 Messaging: Deliveries
- **Any action on deliveries** - the user can perform any action on deliveries

35.2.4 Messaging: Events
- **Any action on events** - the user can perform any action on messaging events

35.2.5 Messaging: External Recipients
- **Any action on external recipients** - the user can perform any action on external recipients

35.2.6 Messaging: Gateways
- **Any action on gateways** - the user can perform any action on gateways

35.2.7 Messaging: Notifications
- **Any action on notifications** - the user can perform any action on notifications

35.2.8 Messaging: Notification Templates
- **Any action on notification templates** - the user can perform any action on notification templates

35.2.9 Messaging: Recipients Lists
- **Any action on recipients lists** - the user can perform any action on recipients lists

35.2.10 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

- **Any action on log items** - the user can take any action on log items
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

35.2.11 SDN Managers

- Any action on SDN Managers - the user can take any action on SDN manager

35.2.12 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

### 35.3 List of Default Permissions for User Role

The list below includes the set of default permissions for the User role.

**Activity Logs**
- **See details of own activity log** - 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

**Base Resources**
- **See own base resources** - the user can only see own base resources

**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 Stores
• See all data stores - the user can see all data stores

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

Groups
• See all groups - the user can see all groups

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

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 list of own log items - the user can only see their own log items
- See details of own log item - the user can only see details of their own log items

Messaging: Notifications
- See own notifications - the user can see own 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 list of recipe groups - the user can view the list of recipe groups
• Read recipe groups - the user can view recipe group details

Recipe group relations
• See list of recipe group relations - the user can view the list of recipe group relations
• Read recipe group relations - the user can view recipe group relation details

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

Service Insertion Framework
• See all Service Insertion Groups - the user can view all service insertion groups
• See all Service Insertion Pages - the user can view all service insertion pages

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 list of own transactions - the user can only see their own transactions
• 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 their 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 their own snapshots
- Destroy own virtual server snapshot - the user can delete their own snapshots
- See own virtual server snapshots - the user can see the list of their 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 their own virtual server
- Manage recipes joins for own virtual servers - the user can manage recipe joins for own virtual servers
- Reset root password of 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
- See own virtual machine statistics - the user can only see statistics for their virtual machines
- Allow own virtual servers to boot from ISO - the user can boot from ISO their own virtual servers only
36 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 relevant links under the main Tools menu item in the Control Panel.

36.1 Logs

OnApp logs all cloud management actions that take place on cloud resources, including virtual servers, disks, data stores, compute resources, templates, networks.

See Also:
List of all OnApp Permissions
Virtual Servers
Tools

36.1.1 View and Manage Logs

To access and manage logs, click the Control Panel's Logs menu where you can view the log of all transactions in the cloud. The Activity Log table provides the following details:

- **Icon** that indicates the status of an action
- **Ref** number that you can click to view details of a specific transaction
- **Date** when the action was performed
- **Action** name
- **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** or **Failed** 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. For this mouse over the pending status icon of a transaction and then 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 > Configuration > Zombie transaction time parameter.

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

36.1.2 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 the current and the 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
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 > Logs > Ref number

- for a virtual server's resources: go to Control Panel > 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 value 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.

36.2 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
- Resource Diffs

36.2.1 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.
- **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:

a. Level 1 - every 10 seconds. CP gets info about Compute resources uptime/virtual servers’ statuses.

b. Level 2 - every 60 seconds. CP gets info about the disk usage, network usage, CPU usage statistics and the list of virtual servers.

c. 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:

a. Level 1 - every 60 seconds.

b. 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.

### 36.2.2 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.

### 36.2.3 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 > 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

### 36.2.4 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

### 36.2.5 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.

**Be aware, that 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**: Red Hat Enterprise Linux 5.x, Red Hat Enterprise Linux 6.x, CentOS 5.x, CentOS 6.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 VSSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Red Hat Enterprise Linux 5.x, Red Hat Enterprise Linux 6.x, CentOS 5.x, CentOS 6.x.</td>
<td>2 CPU cores/2GB</td>
<td>MySQL InnoDB</td>
<td>500</td>
</tr>
<tr>
<td>Large</td>
<td>Red Hat Enterprise Linux 5.x, Red Hat Enterprise Linux 6.x, CentOS 5.x, CentOS 6.x.</td>
<td>4 CPU cores/8GB</td>
<td>RAID10 MySQL InnoDB or PostgreSQL</td>
<td>&gt;1000</td>
</tr>
</tbody>
</table>
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 will be also used for autoscaling of newly created VSs. Unless you deploy a Zabbix Server, Monitis will be used for autoscaling by default.

- 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`.

### 36.2.5.1 Set Up a New Zabbix Server

1. Go to your Control Panel Sysadmin menu.
2. Switch to the Zabbix setup tab.
3. Indicate the server IP address in the field provided on this tab and 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.

### 36.2.5.2 Add an Existing Zabbix Server to the Cloud

If you already have a Zabbix server, you can connect it to your cloud by using the following procedure:

1. Fill in the following fields at **Control Panel > Settings > Configuration > System 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](#).
2. Configure the existing Zabbix server by pressing the **Reconfigure Existing Zabbix Server** button at **Control Panel > Sysadmin > Zabbix Setup** tab. OnApp will take credentials data, provided in step 1, and schedule a transaction to reconfigure server.

36.2.5.3 Uninstall a Zabbix Server
Refer to a separate doc to **uninstall a Zabbix server** if required. Pay attention that when you uninstall a Zabbix server, you won't be switched to Monitis service again. So that means that autoscaling will stop working.

### 36.2.6 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.

### 36.2.7 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. The list contains the following types of 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
- the 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.

### 36.3 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 support.
- 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.

36.4 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:

1. Go to Control Panel > Logs.
2. 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.
37 Statistics

Stats 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).

37.1 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 presented. Otherwise, the charts will represent daily statistics.

Ensure that 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.

See also:
Cloud Usage
CDN Usage Statistics
Top IOPS disks

37.1.1 View Usage Trends

To view Usage Trends of your cloud:

1. Go to your Control Panel > Statistics menu > User Trends.
2. Click the tab you are interested in (CPU usage, Memory usage, Disk usage, IOPS, Bandwidth, Virtual/baremetal/smart servers).
3. 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 emphasized 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 top 20 VSs are shown according to compute zone selection.

**Top 20 VSs**

Under graphs you can find the list of top 20 VSs, which are shown for the compute zones that are 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 by resource usage for the selected period are displayed together with their details and usage:

<table>
<thead>
<tr>
<th>Details</th>
<th>CPU (cores)</th>
<th>Memory (MB)</th>
<th>Disk (GB)</th>
<th>IOP S (item s)</th>
<th>Bandwidth (KB)</th>
<th>Virtual Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>operating system of VS</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 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</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

745
37.1.2 Usage Trends Statistics Measurement

Below you can find what statistics are 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 |

37.2 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 bytes sent by the VS
  - **Bandwidth received** - the number of bytes received by the VS

To sort 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.

37.3 **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.
38 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.

38.1 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 into a single custom language or several languages.

38.1.1 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:

1. Go to your Control Panel's Settings > i18n Customization menu.
2. Click the + button, select the required language from the list and click Submit.
3. 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.
   - 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.

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 the **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.

### 38.1.2 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 you 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 **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
```

### 38.1.3 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.

1. Make sure that the required locales are added in the **Settings > Configuration > Interface Locales** box.
2. Go to your Control Panel's **Users** menu.
3. Click a user's name.
4. On the page that appears, click the **Edit Profile** tab.
5. Choose your custom language from the Locales drop-down list.
6. Click **Save**.
38.2 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.

38.2.1 Add Currency

To add a currency:
1. Go to your Control Panel's **Settings** menu.
2. Click the **Currencies** icon.
3. On the page that follows, click the **Create New** button.
4. 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
   - **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
5. Click **Save**.
For example, the currency form for US Dollars might look as follows…

- **Name**: US Dollar
- **Unit**: $
- **Code**: USD
- **Separator**: .
- **Delimiter**: ,
- **Precision**: 5
- **Precision per unit**: 8
- **Format**: %u%n

…and the prices will be displayed in the following way: $7,000.00000

### 38.2.2 Edit Currency

To edit existing currencies:

1. Go to your Control Panel's **Settings** menu.
2. Click the **Currencies** icon.
3. Click the **Actions** icon next to it, then click **Edit**. On the screen that appears, edit currency details:
   - **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
   - **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

4. Click **Save**.
38.2.3 Delete Currency

To delete existing currencies:
1. Go to your Control Panel's **Settings** menu.
2. Click the **Currencies** icon.
3. Click the **Actions** icon next to the currency you want to remove, then click **Delete**. You will be asked for confirmation before the currency is deleted.

You cannot delete a currency that is associated with a bucket.

38.3 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

See also:
- Languages
- Currencies
- Look & Feel
- Service Insertion Framework Configuration
- OnApp Configuration

38.3.1 Search Localization & Customization Menu

To search the **Localization and Customization** menu:
1. Log in to your Control Panel.
2. Go to the **Settings** menu.
3. Click the **i18n Customization** icon.
4. Click the required language **Name** (e.g. "English").
5. Type the search phrase into the search box and click **Search**.
6. If required, make changes and click **Apply**.

38.4 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:
38.4.1 Look & Feel

You can manage various aspects of the Control Panel's look & feel, including the logo displayed, background colors and other graphics. To do so:

1. Go to your Control Panel's Settings menu and click the Look & Feel icon.
2. Press the "+" button.
3. 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.
     - Check the Remove logo box to delete a custom logo.
   - **Favicon** - click the Browse button to choose a custom logo.
• Check the **Disable favicon** box to prevent the favicon from displaying.

• 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.
- *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.

**Wrapper**

- *Color* - this is the color displayed around the rest of the UI.
  - To change the color, click the field to pop up a palette chooser, or simply 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.
- *Body image* - click the Browse button to choose a custom image.
  - Check the **Disable** body image box to prevent the top background image displaying.
  - Check the **Remove body image** box to delete a custom image.

**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.

4. Click **Save Theme** button to create and apply a theme.

**38.4.2 Custom CSS Rules**

You can add your own CSS rules to customize OnApp Control Panel.
To add CSS rule:
2. Create `custom.css` file with CSS rule code you want to add. For example:
   ```css
   body *{background-color: lightblue;}
   ```
3. Save the file.
4. Go to OnApp Control Panel and refresh it. The background color will be changed:

38.4.3 Custom Java Scripts

You can add your own Java scripts to customize OnApp Control Panel.

To add a Java script:
2. Create a `custom.js` file with a code you want to add.
3. Save the file.
4. Go to OnApp Control Panel and refresh it.

38.5 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`.

38.5.1 Configure Service Insertion Framework

To configure service insertion framework:
1. Create service insertion group, which is a container for service insertion pages. Service insertion group which is available for a chosen audience.

2. Create service insertion page(s), where you will add an URL, which will be displayed in the frame.

3. When service insertion groups and pages are configured, they will appear at Control Panel left 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

38.5.2 Service Insertion Groups

38.5.2.1 Create Service Insertion Group

To create a Service Insertion Group:

1. Log in to your OnApp Control Panel.
2. Go to Settings > Look & Feel.
3. On the page that loads, click the **Service Insertion Framework > Service Insertion Groups** tab.

4. At the bottom of the screen, click **Add Service Insertion Group** button.

5. Fill in the following fields:
   - **Label** - fill in the name for service insertion group
   - **Weight** - select 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, to which your service insertion group will be available:
     - **Global** - service insertion group will be available to all users
     - **User** - **Users** field appears, where you indicate user(s), to whom your service insertion group will be available
     - **User group** - **User groups** field appears, where you indicate user group(s), to which your service insertion group will be available

6. Click **Submit**.

### 38.5.2.2 Edit Service Insertion Group

To edit a Service Insertion Group:

1. Log in to your OnApp Control Panel.

2. Go to **Settings > Look & Feel**.

3. On the page that loads, click the **Service Insertion Framework > Service Insertion Groups** tab.

4. 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.

### 38.5.3 Service Insertion Pages

#### 38.5.3.1 Create Service Insertion Page

To create a Service Insertion Page:

1. Log in to your OnApp Control Panel.

2. Go to **Settings > Look & Feel**.

3. On the page that loads, click the **Service Insertion Framework > Service Insertion Pages** tab.

4. At the bottom of the screen, click **Add Service Insertion Page** button.

5. 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.

6. 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.

7. Click **Submit**.

---

38.5.3.2 Edit Service Insertion Page

To edit a Service Insertion Page:

1. Log in to your OnApp Control Panel.
2. Go to **Settings > Look & Feel**.
3. On the page that loads, click the **Service Insertion Framework > Service Insertion Pages** tab.
4. 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.
39 Miscellaneous

This chapter describes more sophisticated operations, which help manage different OnApp functionalities. It is highly recommended that only advanced users perform these tasks.

39.1 Reset Control Panel Administrator Password

To generate a new password for an administrator user:

1. Log in to your OnApp Cloud Control Panel using SSH:
   
   ```
   ssh root@your.hostname
   ```

2. Go to the directory where your Control Panel is installed:
   
   ```
   cd /onapp/interface
   ```

3. 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.

39.2 Add IPs in Windows Environment

After you allocate an IP address assignment in your Control Panel, it is necessary to add IPs directly in your Windows environment.

To add an additional IP address in Windows 2003/2008 Server and Windows 7:

1. Locate the *My Network Places* icon on your desktop, right click and select *Properties*.

2. To open the network properties dialogue, right-click on *External* or *Ext. Select Properties*.


4. Click *Advanced*.

5. Click *Add*, enter the IP address and corresponding Subnet mask.

6. Click *Add*.

If you wish to add more IP addresses, repeat steps 5 and 6 until you have added the IP addresses we assigned to you.

See also:
- Create New Linux/Windows Templates
- Transaction Server
- Failover Configuration
- Advanced Configuration Settings
39.3 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.

39.4 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
- 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:

1. If the appliance is associated with a Compute resource with only a local data store, this Compute resource will be selected.
2. 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 cpu_idle parameter)
3. 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 serves will be selected based on the lowest CPU load (highest cpu_idle parameter)
4. 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.

39.5 Failover Configuration

OnApp allows configuring the compute resource failover behaviour. The failover settings are specified per compute zone.

Below you can find instructions on how to manage failover processes for compute resources.
39.5.1 How Failover Works

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 > Settings > Configuration, see the following Failover Settings section for details.

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).

### 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.

39.5.2 Failover Settings

To configure Compute zone failover settings:

1. Go to your Control Panel's Settings menu, and click the Compute resource Zones icon. The screen that appears will show all zones currently set up in the cloud.
2. 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:

1. On provisioning, the round-robin algorithm will be used on Compute resource selection.
   b. 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:
1. Go to your Control Panel's Settings menu.
2. Click the Compute resources icon.
3. Click the Actions button next to the Compute resource you want to edit, then click Edit.
4. 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:
1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. 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.
39.5.3 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

### 39.5.4 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:

1. Go to **Control Panel > Logs**.
2. 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.

### 39.6 Calculate Billing Statistics for the Missing Period

Sometimes customers are experiencing the problem of missing billing statistics because of daemon, delayed jobs, cron, 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:

```
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](#)

### 39.7 Advanced Configuration Settings

Although you can alter 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.
### Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>google_map_token</td>
<td>empty string</td>
</tr>
<tr>
<td>custom.css file</td>
<td>/onapp/interface/public/themes</td>
</tr>
<tr>
<td>log_path</td>
<td>/onapp/interface/log/onapp.log</td>
</tr>
<tr>
<td>background_process_log_path</td>
<td>/onapp/interface/log</td>
</tr>
<tr>
<td>background_process_pid_path</td>
<td>/onapp/interface/tmp/pids</td>
</tr>
<tr>
<td>private_key_path</td>
<td>/onapp/interface/config/keys/private</td>
</tr>
<tr>
<td>public_key_path</td>
<td>/onapp/interface/config/keys/public</td>
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<td>max_memory_ratio</td>
<td>16</td>
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<td>ssh_port</td>
<td>22</td>
</tr>
<tr>
<td>use_ssh_file_transfer</td>
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</tr>
<tr>
<td>ssh_file_transfer_server</td>
<td>127.0.0.1</td>
</tr>
<tr>
<td>ssh_file_transfer_user</td>
<td>root</td>
</tr>
<tr>
<td>ssh_file_transfer_options</td>
<td>-o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null-o PasswordAuthentication=no</td>
</tr>
<tr>
<td>template_path</td>
<td>/onapp/templates</td>
</tr>
<tr>
<td>recovery_templates_path</td>
<td>/onapp/tools/recovery</td>
</tr>
<tr>
<td>backups_path</td>
<td>/onapp/backups</td>
</tr>
<tr>
<td>database_backups_path</td>
<td>/onapp/database_backups</td>
</tr>
<tr>
<td>remove_backups_on_destroy_vm</td>
<td>true</td>
</tr>
<tr>
<td>data_path</td>
<td>/onapp/data</td>
</tr>
<tr>
<td>update_server_url</td>
<td><a href="http://repo.onapp.com/">http://repo.onapp.com/</a></td>
</tr>
<tr>
<td>dashboard_host</td>
<td>127.0.0.1</td>
</tr>
<tr>
<td>license_key</td>
<td></td>
</tr>
<tr>
<td>generate_comment</td>
<td>Automatically generated by OnApp (%)s</td>
</tr>
<tr>
<td>graph_frequencies</td>
<td>[[hourly, 4000], [daily, 100000], [weekly, 800000], [monthly, 3200000], [yearly, 40000000]]</td>
</tr>
<tr>
<td>simultaneous_backups</td>
<td>2</td>
</tr>
<tr>
<td>simultaneous_backups_per_datastore</td>
<td>2</td>
</tr>
<tr>
<td>simultaneous_backups_per_hypervisor</td>
<td>1</td>
</tr>
<tr>
<td>simultaneous_transactions</td>
<td>3</td>
</tr>
<tr>
<td>enable_huge_pages</td>
<td>false</td>
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<tr>
<td>Configuration Parameter</td>
<td>Value</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>schedule_failure_count</td>
<td>100</td>
</tr>
<tr>
<td>remote_access_session_start_port</td>
<td>30000</td>
</tr>
<tr>
<td>remote_access_session_last_port</td>
<td>30099</td>
</tr>
<tr>
<td>ajax_power_update_time</td>
<td>8000</td>
</tr>
<tr>
<td>ajax_pagination_update_time</td>
<td>9000</td>
</tr>
<tr>
<td>hypervisor_live_times</td>
<td>12</td>
</tr>
<tr>
<td>guest_wait_time_before_destroy</td>
<td>60</td>
</tr>
<tr>
<td>disable_hypervisor_failover</td>
<td>false</td>
</tr>
<tr>
<td>allow_hypervisor_password_encryption</td>
<td>false</td>
</tr>
<tr>
<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>
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</tr>
<tr>
<td>kms_server_port</td>
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</tr>
<tr>
<td>ip_range_limit</td>
<td>1000</td>
</tr>
<tr>
<td>same_autoscaleout_nodes_virtualization</td>
<td>true</td>
</tr>
<tr>
<td>system_host</td>
<td></td>
</tr>
<tr>
<td>dns_enabled</td>
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</tr>
<tr>
<td>Parameter</td>
<td>Recommended value</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------</td>
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<tr>
<td>enabled_libvirtAntiSpoofing</td>
<td>false</td>
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<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>
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</tr>
<tr>
<td>password_history_length</td>
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</tr>
<tr>
<td>cloud_boot_enabled</td>
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</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>
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<tr>
<td>system_alert_reminder_period</td>
<td>60</td>
</tr>
<tr>
<td>archive_stats_period</td>
<td>3</td>
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<td>is_archive_stats_enabled</td>
<td>false</td>
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<tr>
<td>wrong_activated_logical_volume_minutes</td>
<td>60</td>
</tr>
<tr>
<td>use_html5_vnc_console</td>
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</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>
</tbody>
</table>

* - these values are recommended for the specified parameters in order to provide more stable daemon workflow.

### 39.7.1 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:
39.7.2 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.

39.7.3 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>

39.7.4 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>

39.8 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: \texttt{<LOG-FOLDER>/</PID>}.  
Example:  
\begin{verbatim}
LOG-FOLDER = /tmp/logs  
PID = 4242  
\end{verbatim}

Result: /tmp/logs/4242/

Options:  
\textbf{Required}:  
- \texttt{-p|--pid}  
\quad \text{PID of target process}  
- \texttt{-l|--log-folder}  
\quad \text{Folder, where logs are stored}  
- \texttt{-d|--pid-folder}  
\quad \text{Folder, where pid files are stored}  

\textbf{Optional}:  
- \texttt{-t|--time-interval}  
\quad \text{Refresh time in seconds. Works only for main log and lsof command}  
\quad \text{Default: 1 second}  
- \texttt{-m|--memory-alert-step}  
\quad \text{Memory alert size. In megabytes.}  
\quad \text{Default: 100m}  
- \texttt{-r|--log-max-size}  
\quad \text{Max log size, before it rotates. In megabytes.}  
\quad \text{Default: 100m}  

Example:  
\begin{verbatim}
track.sh -p 4242 -l /tmp/logs -d /tmp/pids  
\end{verbatim}

\section*{39.9 Virtual Server Provisioning}

Under certain circumstances, your \textit{virtual servers} that are offline might be implicitly cold migrated to another compute resource within one compute zone. This occurs after \textit{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 \textit{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 \textbf{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 \textit{free RAM} for the VS, starting the virtual server will be done on the checked compute resource.

\begin{tabular}{|l|}
\hline
\textbf{See also:} \\
\hline
Reset Control Panel Administrator Password \\
\textbf{Transaction Server} \\
Advanced Configuration Settings \\
\hline
\end{tabular}
39.10 Add Google Map API Key

If you face the problem with viewing the maps on VS/Smart/Application server creation wizard (Locations step), it might be related to Google Maps authentication. To solve the problem, perform the following steps:

1. Get an API key as described in the following guide
   https://developers.google.com/maps/documentation/javascript/get-api-key
   Make sure you have Google Maps JavaScript API and Google Maps Geocoding API enabled for correct locations representation.

2. Go to `on_app.yml` file and add this API key as `google_map_token` parameter.

   Also you can add Google API key using OnApp Control Panel. Go to your Control Panel's Settings > Configuration > Interface tab > Google API and insert the API key.

3. Perform the restart of OnApp and http services.

See also:
- Reset Control Panel Administrator Password
- Add IPs in Windows Environment
- Create New Linux/Windows Templates
- Advanced Configuration Settings
40 High Availability Control Panel

High availability (HA) is the capability of a system to operate continuously for a desirably long period of time despite the possible failure of one or several of its components. HA significantly decreases the extent of downtime. OnApp High Availability brings new opportunity to deploy more than one Control Panel within one cloud. This allows you to improve cloud load balancing, minimize server downtime in case of CP issues and enhance scalability of the whole infrastructure. High availability keeps virtual servers, daemon, and statistics live even if the physical box where they are running fails. In this case, the required component keeps working on the box which is live in the cluster. This is the optional functionality.

OnApp introduces several possible High Availability configurations depending on your infrastructure and resources. OnApp High availability is based on Pacemaker + Corosync clustering stack, using multicast as a messaging backend. At this stage OnApp introduces high availability for the following components:

- UI (HTTPd and onapp-vnc-proxy services)
- Background services (onapp-engine and onapp-ssh-agent services)
- CloudBoot (NFS, xinetd, and dhcpd services)
- Load Balancer
- Redis
- Message Queue
- Database

See also:

- Disaster Recovery as a Service
- Manage Hosts
- Manage Communication
- Manage Clusters
- Disable High Availability

High availability introduces accessibility for services and communication between OnApp components:

- Compute resources and backup servers are configured to accept connections from any Control Panel.
- UI and CloudBoot operate in Active/Standby or Active/Active mode.
- OnApp Engine, onapp-engine service (onapp daemon) operates in load balancing mode.

If you wish to disable the High Availability Control Panel, please, contact our support team.

In case when service in the active node becomes unavailable, the corresponding virtual IP address is being moved from the active node's to the other node's network interface with the highest priority. The network interface priority defines to which node the virtual IP address will be moved first, if the node where it is running gets broken.

HA Prerequisites

- Make sure to create a dedicated network for control panels and DB/Redis server connection.

- Do not use the control panel server as the backup/template server. Make sure that the Use SSH file transfer option is disabled at Settings > Configuration menu.
• Logs and templates are stored on Database&Transactions server. Ensure that all the required directories are shared correctly.
• It is important that you add the IPs of CP servers into the config files for Compute resources and backup servers.
• Compute resources accept API calls by StorageAPI from multiple IP Addresses only after reconfiguration.
• SNMP Traps are being sent to control panels.

40.1 Manage Hosts

A High Availability cluster is comprised of a number of hosts. You can add new hosts if necessary and edit or delete the existing ones.

If you perform any changes to the hosts configuration, you need to click the Apply Changes button at Control Panel > HA Clusters > General for the changes to take effect.

40.1.1 View Hosts

To the list of hosts in your configuration:

1. Go to your Control Panel Settings menu.
2. Click the HA Clusters > Hosts tab.
3. On the page that appears, you will see the list of hosts in your configuration with their details:
   o Hostname - the hostname of the host
   o Nodes - the quantity of nodes on this host assigned some clusters and the number of clusters in the system
   o Clusters - the labels of cluster to which this host is assigned
   o Options - the host options
   o Modified - whether the host has been altered. If it has been altered, and you want the changes to take effect, you need to click the Apply Changes button at Control Panel > Setting > HA Clusters > General.
   o Actions - click the Actions button to edit or delete a host or to add options for it.

On this page:
View Hosts
Add Host
Edit Host
Delete Host

See also:
High Availability Control Panel
Manage Communication
Manage Clusters
Disable High Availability

To view the list of nodes within a host click the label of the host you are interested in. The page that loads shows the list of nodes with their details:
• Cluster - the cluster to which this node belongs
• IP Address - the physical IP address of the node
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- **Interface** - the network interface of the node
- **Priority** - the priority for the node. The node with the highest priority will take over the virtual IP address when the component of the cluster fails.
- **Options** - the options set for the node
- **Modified** - whether the node has been altered. If it has been altered, and you want the changes to take effect, you need to click the Apply Changes button at Control Panel > Setting > HA Clusters > General.
- **Actions** - click the Actions button to edit or delete a node or to add options for it.

By clicking the Actions button you can edit a node or add options for it.

You cannot delete a cluster node if the cluster to which this node is assigned has only two nodes. The minimum number of nodes in a cluster is 2.

### 40.1.2 Add Host

To add a new host:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters > Hosts tab.
3. Click the New Host button or click the "+" button.
4. On the screen that appears, fill in the hostname and click Submit.

### 40.1.3 Edit Host

To edit a host:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters > Hosts tab.
3. Click the Actions button next to the host you want to edit, then click Edit.
4. On the screen that appears, change the hostname and click Update.

### 40.1.4 Delete Host

You can delete a host only if it has no nodes assigned to any cluster. You can check this at Control Panel > Settings > HA Clusters > Hosts. The Nodes column indicates the number of nodes on the host and the quantity of clusters in the system.

To delete a host:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters > Hosts tab.
3. Click the Actions button next to the host you want to delete, then click Delete.
40.2 Manage Communication

Communication rings ensure that information is successfully transmitted between the nodes of the High Availability clusters. It is advisable to configure two multicast channels in different networks, in case if one of the networks fails.

Please note you are required to add the correct IP address when configuring multicast. Adding incorrect IP address will affect the multicast configuration.

The maximum number of communication rings corresponds to the number of available NICs on hosts. For example, if all hosts have two NICs, you can configure a maximum of two communication rings.

If you edit or delete an existing communication ring or add a new one, you need to:

1. Click the **Apply** button at **Control Panel > Settings > HA Clusters > Communication**.
2. Click the **Apply Changes** button at **Control Panel > Settings > HA Clusters > General**.

40.2.1 View Communication Ring

On this page:

View Communication Rings
Add Communication Ring
Edit Communication Ring
Delete Communication Ring

See also:

High Availability Control Panel
Manage Hosts
Manage Clusters
Disable High Availability

To view the list of configured communication rings:

1. Go to your Control Panel **Settings** menu.
2. Click the **HA Clusters** icon > **Communication** tab.
3. On the screen that appears you will see you configured communication rings with their details:
   - **Network** - the multicast network used by the hosts to communicate with each other
   - **Multicast IP Address** - the multicast IP address
   - **Multicast Port** - the multicast port
   - **TTL** - time to live
   - **Modified** - whether the communication ring has been altered. If it has been altered, and you want the changes to take effect, you need to click the **Apply** button at **Control Panel > Setting > HA Clusters > Communication**.
40.2.2 Add Communication Ring

To add a communication ring:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters icon > Communication tab.
3. Click the Add New Ring button or click the "+" button.
4. Fill in the following parameters:
   - Network - the multicast network used by the hosts to communicate with each other
   - Multicast IP Address - the multicast IP address
   - Multicast Port - the multicast port
   - TTL - time to live
5. Click Save.

40.2.3 Edit Communication Ring

To edit a communication ring:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters icon > Communication tab.
3. Click the Actions button and select Edit.
4. Fill in the following parameters:
   - Network - the multicast network used by the hosts to communicate with each other
   - Multicast IP Address - the multicast IP address
   - Multicast Port - the multicast port
   - TTL - time to live
5. Click Save.

40.2.4 Delete Communication Ring

To delete a communication ring:
1. Go to your Control Panel Settings menu.
2. Click the HA Clusters icon > Communication tab.
3. Click the Actions button next to the communication ring you want to remove and select Delete.

40.3 Manage Clusters

The high Availability configuration includes the following clusters: User Interface, Daemon, Cloud Boot, Load Balancer, Redis, Message Queue. You can edit or deactivate/activate these clusters and add options for them.

If you perform any changes to the cluster configuration, you need to click
40.3.1 View Clusters

To view the list of clusters:

1. Go to your Control Panel Settings menu.
2. Click the HA Clusters icon > Clusters tab.
3. On the screen that appears you will the clusters with their details:

**On this page:**
- View Clusters
- Add Cluster
- Add Node to Cluster
- Edit Cluster
- Deactivate/Activate Cluster

**See also:**
- High Availability Control Panel
- Manage Hosts
- Manage Communication
- Disable High Availability

1. 
   - **Name** - the name of the cluster
   - **Status** - the status of the cluster
   - **IP Address** - the IP address of the cluster
   - **Net Mask** - mask of the network
   - **Ports** - cluster ports
   - **Nodes** - the number of nodes in the cluster
   - **Options** - options set for the cluster
   - **Modified** - whether the cluster has been altered. If it has been altered, and you want the changes to take effect, you need to click the Apply Changes button at Control Panel > Setting > HA Clusters > General.
   - **Actions** - click the Actions button to edit or deactivate a cluster or to add options for it.

To view the list of nodes with a cluster, click the label of the cluster you are interested in. The page that loads shows the list of nodes with their details:

- **Host** - the host to which this node belongs
- **IP Address** - the physical IP address of the node
- **Interface** - the network interface for the node
- **Priority** - the priority for the node. The node with the highest priority will take over the virtual IP address when the component of the cluster fails.
- **Options** - the options set for the node
- **Modified** - whether the node has been altered. If it has been altered, and you want the changes to take effect, you need to click the Apply Changes button at Control Panel > Setting > HA Clusters > General.
- **Actions** - click the *Actions* button to edit or delete a node or to add options for it.

By clicking the *Actions* button you can edit or delete a node or add options for it.

You cannot delete a cluster node if the cluster to which this node is assigned has only two nodes. The minimum number of nodes in a cluster is 2.

### 40.3.2 Add Cluster

To add a cluster:

1. Go to your Control Panel *Settings* menu.
2. Click the *HA Clusters* icon > *Clusters* tab.
3. Choose one of the optional clusters and click the appropriate button: *Add Load Balancer*, *Add Database*, *Add Redis* or *Add Message Queue*.
4. Fill in required information:
   - *Virtual IP* - the virtual IP address of the cluster. This IP address should be unique
   - *Net mask* - mask of the network
   - *Ports* - cluster ports
5. Click *Submit* to add the cluster.

The Load Balancer cluster must be added first, then you will be able to add Database, Redis and Message Queue.

### 40.3.3 Add Node to Cluster

To add a node to a cluster:

1. Go to your Control Panel's *Settings* menu.
2. Click the *HA Clusters* icon > *Clusters* tab.
3. Click the label of the cluster to which you want to add a node
4. The page that loads shows the list of nodes in the cluster. Click the *Add Node* button.
5. Fill in the details of the new node:
   - *Host* - select the host with which the new node is to be associated from the drop-down list
   - *IP address* - fill in the physical IP address of the node
   - *Interface* - fill in the network interface for the node
   - *Priority* - set the priority for the node. Set priority to 100 for ordinary nodes and to a larger value for the node which has an advantage in hardware. The node with the highest priority will take over the virtual IP address when the component of the cluster fails.
6. Click *Submit*.

### 40.3.4 Edit Cluster

To edit a cluster:

1. Go to your Control Panel *Settings* menu.
2. Click the *HA Clusters* icon > *Clusters* tab.
3. Click the **Actions** button next to the cluster you want to edit, then click **Edit**.

4. On the screen that appears, change the following parameters:
   - Virtual IP - fill in the IP address
   - Net mask - indicate the net mask
   - Ports - indicate ports

5. Click **Update**.

### 40.3.5 Deactivate/Activate Cluster

If for a certain reason you do not wish a certain cluster to remain active, you can deactivate it. You can later activate the cluster if necessary.

To deactivate/activate cluster:

1. Go to your Control Panel **Settings** menu.
2. Click the **HA Clusters** icon > **Clusters** tab.
3. Click the **Actions** button next to the cluster you want to edit, then click **Deactivate/Activate**.

### 40.4 Disable High Availability

When you disable High Availability, hosts marked as Master=yes in options at **Control Panel > Settings > HA Clusters > Hosts > Actions** next to the host(s) you want to mark.

If disabling High Availability fails in the process, rollback is not executed. Errors are displayed in the relevant transactions' logs. If faced with such situation, you need to fix any issues in your environment that prevent disabling HA and retry.

If you do not set the **Master=yes** option for any host(s), disabling High Availability will fail.

**See also:**

- High Availability Control Panel
- Manage Hosts
- Manage Communication
- Manage Clusters

To disable high availability apply the following steps:

1. Go to your Control Panel **Settings** menu.
2. Click the **HA Clusters** > **General** tab.
3. Click **Disable**.
4. Click **Apply Changes**.

- When you disable High Availability, all clusters are marked as disabled.
- If there was a configured Load Balancer, the system returns to HTTPd.
41 Disaster Recovery as a Service (DRaaS)

OnApp DRaaS (Disaster Recovery as a Service) is a tool which replicates all of a Virtual Server’s 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
- Your compute resources must be publicly accessible (e.g. via NAT)
- You should have sufficient bandwidth for the replication (recommended > 100Mbps)

DRaaS can be used for compute zone which contains Integrated Storage data stores only (LVM and IS data stores can not be used at once).

Below you can find instructions on how to enable and manage DRaaS for virtual servers.

On this page:
- Prerequisites
- Enable DRaaS for Virtual Server
- Disable DRaaS
- DRaaS Billing

See also:
- High Availability Control Panel
- Permissions
- OnApp Configuration
- Tools
- Resource Allocation And Prices

41.1 Prerequisites

- Update your Control Panel and CloudBoot to DRaaS (OnApp 4.2 version and up)
- Check if DRaaS 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 Settings > Configuration > System tab > Enable DRaaS
- CloudBoot must be enabled (Settings > Configuration > System tab > 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

• 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.)

• 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.

### 41.2 Enable DRaaS for Virtual Server

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.

To enable DRaaS for a virtual server:

1. Go to your Control Panel's Virtual Servers menu.

2. Click the label of the required virtual server.

3. Click the **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 sets up a secure tunnel 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.

41.3 Disable DRaaS

To disable DRaaS for a VS:

1. Log into the DRaaS Dashboard.
2. Go to the details page of the VS.
3. Click the Stop Replication button. This stops the replication to the DRaaS Provider. The process can take a couple of minutes as the Dashboard has to coordinate between three distributed systems and ensure it cleans up state on the DRaaS provider site.
4. Once the replication is stopped click on the Remove Virtual Machine button which shows up near the top of the page. If you made an error and did not mean to disable DRaaS you can instead click the Start Replication button.

41.4 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 MB 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

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 refer to the Configure Resource Allocation And Prices section of this guide.
42 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.

42.1 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

See also:

Disaster Recovery as a Service (DRaaS)
OnApp Configuration
Tools
Miscellaneous
Permissions

42.2 View SSL Certificates

To view the list of SSL certificates:

1. Go to your Control Panel > Settings > SSL Certificate button.
2. The page that loads, shows all available SSL certificates with their details:

   - *Name* - the label of SSL certificate
   - *Path* - the route to SSL certificate

42.3 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:

1. Go to your Control Panel > Settings > SSL Certificate button.
2. Click Upload.
3. Click Choose File to select the required SSL certificate from your file system.
4. Click Submit.

To set up a self-signed SSL certificate:

1. Go to your Control Panel > Settings > SSL Certificate button.
2. 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.
3. Move the Confirm setup self-signed SSL slider to the right to confirm your action.
4. Click Submit.
43 Help

The help menu lets you submit support requests to the OnApp team. All OnApp customers with a full license are entitled to 24/7 support.

- Click the Help link in the Control Panel and complete the form on the screen that follows. If required, you can change the email to which requests are sent from the Help form at Control Panel > Settings > Configuration > Support help email parameter. By default, the email is support@onapp.com.

- Alternatively, you can call +1 (888) 876-8666 or use the OnApp support portal.