OnApp Cloud
5.6
Administration Guide
# OnApp Cloud 5.6 Administration Guide

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OnApp 5.6 Administration Guide

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.

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

Document Revisions

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Added
Added Manage Suspended Virtual Server section
Updated

- Updated the Billing Plans chapter: it has been renamed to Buckets and now includes the information on the new buckets functionality.
- Updated Service Add-ons, Virtual Server Service Add-ons, Manage Service Add-on Store, Templates and Template Store sections: added information on new billing for templates and service add-ons, setting prices for individual templates and service add-ons has been moved to buckets.
- Updated OVA Virtual Servers, View Virtual Server Details, View Smart Server Details, View Baremetal Server Details, View Application Server Details, View Load Balancers and View Container Server Details sections: changed the Price per hour parameter to Estimated price per hour.
- Updated Smart Server Billing, Baremetal Server Billing, Container Server Billing and Application Server Billing sections: added information on billing these servers using buckets.
- Updated User Billing Statistics: added information on the Free amount and Total Cost with Discount parameters.
- Updated License section: added information on the Isolated Licensing model.
- Updated Add New ID Provider and Attributes Mapping Configuration sections: added new keys for attributes mapping.
- Updated Edit CloudBoot Compute Resource and Edit Smart CloudBoot Compute Resource sections: added the Storage VLAN parameter.
- Updated Create Compute Zone and Edit Compute Zone sections: added ability to apply custom config when a compute zone is booted.
- Updated User Profile and View User Account Details sections: updated the description of the Total cost parameter, added Total cost with discount and Discount due to free parameters.
- Updated migration_rate_limit and simultaneous_migrations_per_hypervisor parameters in the Edit Defaults Configuration section.
- Updated the Edit Virtual Server and View Virtual Server Details sections: removed the note on the delay between resizing a VS and the change of its pricing.
- Updated OVAs section: added information on increasing upload size.
- Added information that a compute zone custom config is applied before a CloudBoot compute resource custom config to the following docs:
  - Edit Xen/KVM Compute Resource
  - Edit CloudBoot Compute Resource
  - Edit Baremetal CloudBoot Compute Resource
  - Edit Smart CloudBoot Compute Resource
- Added information on the Target ID in Logs to the following docs:
  - Logs
  - View Compute Resource Details
- Replaced Hostname parameter with FQDN parameter on VS overview page in the following docs:
  - View Virtual Server Details
  - OVA Virtual Servers
  - View Smart Servers Details
  - View Baremetal Server Details
  - View Application Server Details
  - View Container Server Details

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What's New in OnApp Cloud 5.6

The OnApp Cloud 5.6 release contains the following changes and new features:

**Buckets**

Implemented the Buckets functionality to merge user and company billing plans into one logical unit:

- Added Access Controls to manage resources allocation
- Added Rate Card to manage free limits and pricing
- Removed master bucket and master template for compute/data store/network zones
- Moved prices from the Service Add-ons Store page to the Buckets
- Moved prices from the Templates Store page to the Buckets section.

**WCAG AA and AAA Compliancy**

OnApp 5.6 makes content more accessible to a wider audience by complying with Web Content Accessibility Guidelines (WCAG) 2.0 AA and AAA (highest) levels of conformance.

**Attributes Mapping Configuration**

The current release provides a possibility to add new attributes to users who access OnApp using SAML authentication. The Identity Providers can import users with a wider set of properties, including the bucket, localization, system theme, auto-suspending options and much more.

**Isolated Licensing Model**

OnApp 5.6 introduces a new licensing model that is designed for use in an isolated environment. The Isolated License is applicable to a Control Panel that is run in a secure environment that allows no external access from the public Internet.

**Custom Config for Compute Zones**

Added possibility for you to provide custom configuration while creating Virtual, Smart and Baremetal compute zones.

**Documentation Changes**

- CDN administration information now resides within the CDN Administration Guide
- vCD administration information now resides within the vCloud Director Administration Guide

**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 Tools button, then select Delete Virtual Server.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Italics</strong></td>
<td>Parameters and field labels in the UI. For example: Password - set password for remote Vyatta management.</td>
</tr>
</tbody>
</table>
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/](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.

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.

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.

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

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.

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.
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.

**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.

**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.

**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.

**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.

**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.

**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.

**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 to 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 enhance scalability of the whole infrastructure. At this stage OnApp introduces high availability for the following components:

- UI
- Background services
- Cloudboot
- Load Balancer
- Redis
- Message Queue
- Database

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.

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 5.6 API Guide.

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.

Suggested Specifications

<table>
<thead>
<tr>
<th>OnApp License</th>
<th>Professional Package</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Number of Control Panel (CP) Servers</strong></th>
<th>1</th>
</tr>
</thead>
</table>

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<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<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 1Gbps 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 Interfaces**: 4 x 10Gbps eg.

### iSCSI SAN
- **Type**: Optional Dual-Controller Hardware SAN
- **HDDs**: 12+ x SSD
<table>
<thead>
<tr>
<th>RAID Configuration</th>
<th>RAID10</th>
</tr>
</thead>
</table>

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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>• centralised Block Storage SAN (iSCSI, ATA over Ethernet or Fibre Channel) accessible to every compute resource</td>
</tr>
<tr>
<td></td>
<td>• At least 1 dedicated NIC assigned per compute resource for the storage network (SAN)</td>
<td>• at least 1 dedicated 1Gbit/s NIC assigned per compute resource for the SAN</td>
</tr>
<tr>
<td></td>
<td>• IGMP snooping must be disabled on storage switch for storage network</td>
<td>• multiple NICs bonded or 10Gbit/s ethernet recommended</td>
</tr>
</tbody>
</table>

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.

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.
Network Configurations

There are several supported network configurations:
Cloud Only (Xen & KVM)
Basic Backup Scheme
Advanced Backup Scheme

*Cloud only Network Diagram (BBS)*
Cloud only Network Diagram (ABS)
Cloud & Storage
This allows you to use OnApp Integrated Storage.
Data Protection is restricted to Basic Backup Scheme

Cloud and Storage Network Diagram (BBS)
Cloud Only (VMware)

Cloud only Network Diagram (VMware)
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

See also:

Data Stores Settings
Data Store Zones Settings
Compute Zones Settings
Compute Resource Settings
Backup Server Zones Settings
Network Zones Settings
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.
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:** backups server zones can have either the Virtual or the Smart 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.

**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.

**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:
### Resource

<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>Points on the graph show daily peaks of used CPU (in cores)</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>Points on the graph show daily peaks of used memory (in MB)</td>
</tr>
<tr>
<td>Storage</td>
<td>Total amount of storage currently used.</td>
<td>Sum total of all VS disks unused capacities + orphan disks capacities</td>
<td>Points on the graph show daily peaks of used storage (in GB)</td>
</tr>
<tr>
<td>IOPS /h usage</td>
<td>The amount of input/output requests for the entire cloud (blue part of the bar - data read, dark blue - data written) for the last hour</td>
<td></td>
<td>Points on the graph show the total sum of all hourly statistics for a given day</td>
</tr>
<tr>
<td>Baremetal servers</td>
<td>The amount of running baremetal servers in the cloud</td>
<td>The amount of baremetal servers created in the cloud</td>
<td>Points on the graph show daily peaks of amount of created baremetal servers</td>
</tr>
<tr>
<td>Smart servers</td>
<td>The amount of running smart servers in the cloud</td>
<td>The amount of smart servers created in the cloud</td>
<td>Points on the graph show daily peaks of amount of created smart servers</td>
</tr>
</tbody>
</table>

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

### 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.

### 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.

### 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.
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.

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.

Two Factor Authentication

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

1. Enable the Use Yubico login option at Dashboard > 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.

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.

This chapter contains information on the following tabs that comprise the user profile:

- Overview
- Payments
- Bucket
- White List
- Backups
- Service Insertion Framework
Overview
This tab contains information on the user's login, user roles, bucket, prices and other.

**Profile**

**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.

**Amazon Web Services**

Shows the 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](https://example.com/connect.png)
   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:
    1. Enter a label for your YubiKey in the *Enter label* field.
    2. Click in the *Touch your yubikey* field.
    3. Press your finger to the gold Yubikey button. A long line of characters will appear in the field and the new Yubikey will be added to your profile.
  
  - To delete a YubiKey click the button next to the YubiKey you want to delete.

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

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 VVs, 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.
- **Templates, ISOs & Backups Disk Size** - the price per hour for the disk space user's ISOs/backups/templates occupy.
- **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.
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.

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.

White List

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

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

To add a white list IP:

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

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

For more information, see User Whitelist IPs.

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.

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.
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.

Service Catalog

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
- Balancer
- Smart Server
- Baremetal Server
- EC2 Instance

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.

Appliances

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

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

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

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</table>
Virtual Servers

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

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<td>Set VIP status</td>
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</table>

OnApp supports two kinds of storage for virtual servers: traditional centralized SANs, and the new distributed block storage functionality introduced with OnApp Storage, in which local disks in Compute resources provide the physical storage space allocated to virtual servers. In each case, the OnApp platform creates virtual data stores from the physical resources and uses these to provide virtual servers with virtual disks.

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

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

**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):

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

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

Column selection is currently set for one browser. If 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 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:

**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.
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)
- 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...
• 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.

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.

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.

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.

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

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.

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
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.

### Step 2 of 6. Templates

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:
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.

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.

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

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**
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 off

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.

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

**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.

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 [CDN Accelerator section](#).
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.

**Virtual Server Creation Workflow**

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

1. **User wants to create a virtual server**
2. **User fills in the VS creation form**
3. **Step 1: Cloud Locations**
   - Choose the country, where the cloud is located
   - Specify the city where the cloud is located
4. **Step 2: Templates**
   - Choose the required OS
   - For Windows-based templates, specify the licensing details
5. **Step 3: VS Properties**
   - Specify the VS label and hostname

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.
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:
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).

4. Click the Save button.

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!

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
**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 hot migration failure.
7. 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.

**Cold migration for VSs and disks**

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 only).
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. Click the Start Migration button.

- Cold migration is not applicable for federated VSs, which are built on 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, migrated from one LVM data store to another, will be renamed at 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.
**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.

**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.

**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.

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.

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. Click the label 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.
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.

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

   For VSs with password encryption disabled, the VS root password will be used to reboot in recovery.

   Windows virtual 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.

   - **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.

   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.

   - **Startup on Recovery** - starts the VS 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 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.

Virtual Server Administrative 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 VS Tools menu.
4. The Tools menu enables you to perform the following administrative actions on VSs:
   - **Reset Root Password** - resets the root password for this VS (the password is displayed in VS Information).

   Particular characters are not allowed for Windows-based virtual servers:
   - percent sign [%]
   - double quotation marks ["]
   - brackets [<,>]

   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 per mission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.
• **Change Owner** - pops up a dialogue box with a drop-down of all users on the system, enabling you to pass ownership of the VS to the user selected from the list. 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.

• 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.

---

**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.

**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.

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.

- 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.

**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

### 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
      - 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.

### 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:

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>Transmission Control Protocol</td>
</tr>
<tr>
<td>UDP</td>
<td>User Datagram Protocol</td>
</tr>
<tr>
<td>DCCP</td>
<td>Datagram Congestion Control Protocol</td>
</tr>
<tr>
<td>SCTP</td>
<td>Stream Control Transmission Protocol</td>
</tr>
<tr>
<td>ICMP</td>
<td>Internet Control Message Protocol</td>
</tr>
</tbody>
</table>
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 > 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:

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Protocol</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>RDP</td>
<td>TLSP</td>
</tr>
<tr>
<td>HOPOPT</td>
<td>IRTP</td>
<td>SKIP</td>
</tr>
<tr>
<td>ICMP</td>
<td>ISO-TP4</td>
<td>SAT-EXPak</td>
</tr>
<tr>
<td>IGMP</td>
<td>NETBLT</td>
<td>KRITYOLAN</td>
</tr>
<tr>
<td>GGP</td>
<td>MFE-NSP</td>
<td>RVD</td>
</tr>
<tr>
<td>IP-ENCAP</td>
<td>MERIT-NSP</td>
<td>Ipv</td>
</tr>
<tr>
<td>ST</td>
<td>DCCP</td>
<td>MFTP</td>
</tr>
<tr>
<td>TCP</td>
<td>3PC</td>
<td>SAT-MON</td>
</tr>
<tr>
<td>CST</td>
<td>IDPR</td>
<td>VISA</td>
</tr>
<tr>
<td>EGP</td>
<td>XTP</td>
<td>IPV</td>
</tr>
<tr>
<td>IGP</td>
<td>DDP</td>
<td>IPCV</td>
</tr>
<tr>
<td>BBN-RCC-MON</td>
<td>IDPR-CMTP</td>
<td>CPNB</td>
</tr>
<tr>
<td>NVP-II</td>
<td>TP</td>
<td>WSN</td>
</tr>
<tr>
<td>PUP</td>
<td>IL</td>
<td>PVP</td>
</tr>
<tr>
<td>ARGUS</td>
<td>SDRP</td>
<td>BR-SAT-MON</td>
</tr>
<tr>
<td>EMCON</td>
<td>IDR</td>
<td>SUN-NID</td>
</tr>
<tr>
<td>XNET</td>
<td>RSVP</td>
<td>WB-MON</td>
</tr>
<tr>
<td>CHAOS</td>
<td>GRE</td>
<td>WB-EXPak</td>
</tr>
<tr>
<td>UDP</td>
<td>DSR</td>
<td>ISO-IP</td>
</tr>
<tr>
<td>MUX</td>
<td>BNA</td>
<td>ISO-IP</td>
</tr>
<tr>
<td>DCCN-MEAS</td>
<td>ESP</td>
<td>VMT</td>
</tr>
<tr>
<td>HMP</td>
<td>AH</td>
<td>SECURE-VMT</td>
</tr>
<tr>
<td>PRM</td>
<td>i-NLSP</td>
<td>VINES</td>
</tr>
<tr>
<td>XNS-IDP</td>
<td>SWIPE</td>
<td>TTP</td>
</tr>
<tr>
<td>TRUNK-1</td>
<td>NARP</td>
<td>NSP</td>
</tr>
<tr>
<td>TRUNK-2</td>
<td>MOBILE</td>
<td>OSPF</td>
</tr>
<tr>
<td>LEAF-1</td>
<td>HIP</td>
<td>Sprite-RPC</td>
</tr>
<tr>
<td>LEAF-2</td>
<td>manet</td>
<td>LARP</td>
</tr>
<tr>
<td>RSVP-E2E-IGNORE</td>
<td>MPLS-IP</td>
<td>MTP</td>
</tr>
<tr>
<td>FG</td>
<td>UDPLite</td>
<td>SPS</td>
</tr>
<tr>
<td>SCTP</td>
<td>PIPE</td>
<td>CRUDP</td>
</tr>
<tr>
<td>IPLT</td>
<td>SSCOPMCE</td>
<td></td>
</tr>
</tbody>
</table>

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.
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 reboot the VS additionally.

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

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.

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.

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.

See also:
- Virtual Server Networks
- Network Settings
- Firewalls
4. Click the **Save Default Firewall Rules** button to apply changes.
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 ! -j MASQUERADE
private_network_interface_name -j ACCEPT
iptables -I FORWARD -i private_network_interface_name -o public_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
df 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 ! -s IP_range -d IP_range -m physdev --physdev-in gateway_VS_identifier -j ACCEPT gateway_VS_identifier
```

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:

- See the list of disks allocated to this VS
- Add a new disk
- Resize a disk
- Migrate a disk
- Edit disk IO limits
- Check disk usage statistics (IOPS)
- Delete a disk
- Back up disks
- View disk backup schedules
- Schedule disk for backups
- Assign disk to VS

---

**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.

---

**Add Disks to 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.
   - 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.
   - 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. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

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

   - Indicate the **file system** - ext3, ext4 or xfs - for Linux based VS.
6. Click the **Add Disk** button to finish.

---

**Restrictions:**

- If you choose a Solidfire data store, the minimum disk size will be regulated by Solidfire Data Store Zone settings.
- If virtual server and the control panel server belong to different networks, the hot attach transaction will fail.
- If an additional disk has been created without the **require format disk** option and formatted/partitioned in another way, resize disk action may work incorrectly. Use the **require format disk** option when creating an additional disk, otherwise use disk resize option at your own risk.
- Make sure to enable **require format disk** option when you add a new VS disk. Otherwise taking normal backups for your additional disk might fail.
- To be able to take incremental backups for virtual server's disk, you must mount this disk to FSTAB (either Linux or FreeBSD) and specify the proper mount point manually.
- You cannot back up Swap disks.
- When you add a new disk to a virtual server, it automatically becomes available to that server.
Edit Virtual Server Disks

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 store 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.

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>

Migrate 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 the 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.

- It is recommended to take a backup of a virtual server before migrating the VS disk. In case of any issues during VS disk
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.

Go to your Control Panel's Virtual Servers menu. Click the label of a virtual server to open its details screen. Click the Storage tab > Disks. Click the Actions button next to the disk you want to assign to another VS, then click the Assign to VS button. On the screen that appears, select a target VS from a drop-down box. Click Assign. Be aware, that the source VS will be automatically powered off after assigning a disk to another 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.

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-asssign a disk to a source VS.

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.

Virtual Server Backups

This document provides the information how backups are implemented in OnApp, and aims at helping to design 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.

Types of backups

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

<table>
<thead>
<tr>
<th>Normal</th>
<th>Incremental</th>
</tr>
</thead>
<tbody>
<tr>
<td>The full copy of target data that is stored in an archive, whether it has changed or not.</td>
<td>Only the changes made after the last backup are archived instead of backing up the whole target.</td>
</tr>
<tr>
<td>Accessed at <strong>Dashboard &gt; Virtual Servers &gt; VS label &gt; Backups &gt; Images</strong></td>
<td>Accessed at <strong>Dashboard &gt; Virtual Servers &gt; VS label &gt; Backups &gt; Files</strong></td>
</tr>
<tr>
<td>Auto-backups are created per disk.</td>
<td>Auto-backups are created per virtual server.</td>
</tr>
</tbody>
</table>

The backup type is configured at **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.

**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 be 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).

### Backup Support by VS / Virtualization / OS

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

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

**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.

```
* - 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.

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- Auto-backup Presets Settings

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- 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.

Backup server balancing

Backup 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

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 the following doc:
- Configure Resource Allocation And Prices

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:

![Backup List](image)

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 a virtual server. To view the list of user backups, refer to View User Backups section.

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

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 a backup after VS shutdown. Otherwise, proper template provisioning is not guaranteed.

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:
OnApp Cloud 5.6 administration Guide

- **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**.

**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**.

**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**.

**Virtual Server Backup Schedules**

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**.

**View Virtual Server Backup Schedules**

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

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:
   - **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

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* - time when the schedule was created
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

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.
   - **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.

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:
   - **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.

Edit Virtual Server Backup Schedule

To edit a normal backup schedule:

- 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.
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.
   - Enabled - move the slider to enable or disable the schedule
7. Click the Save button to finish.

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

Delete Virtual Server Backup Schedule

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.

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.

Virtual Server Statistics

For your convenience, the system tracks VS performance and generates statistics on:
- Virtual Server CPU Utilization
- VServer Billing statistics
- Interface Usage
- Virtual Server Disk IOPS Statistics
- Accelerated Virtual Server Statistics

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:
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.

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).

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 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.
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. 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.

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.

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.

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.

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.

Virtual Server Recipes

To manage 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. Click the arrow button next to event to expand the list of
recipes assigned to it.

Assign recipe
Use drag and drop feature to assign recipe to a 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

**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.

**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.

**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.
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.

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.

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.

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

See also:
- Virtual Server Details
- Virtual Server Statistics
- Virtual Server Recipes
- Virtual Server Service Add-ons
- Virtual Server Networks
- Virtual Server Disks
- Virtual Server Backups
- Firewall Rules
- Disks
- Backups
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.

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.

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.

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 > Recipe Variables tab. For other operations related to recipes, you need to unsuspend your virtual server.

For more information on recipes and custom recipe variables, refer to the linked pages.

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.

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.
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.

**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.

**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.

**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.

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

**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:
   - **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.
compute resource. The label of compute resource with which VS is associated. Click a compute resource label to see its
details.
- \textit{user}. The owner of this VS. Click the user name to see the owner details.
- \textit{power status}. Click the on/off buttons to change the status.

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

- Reboot a VS
- Recovery reboot
- Power off a VS
- CPU usage
- Shutdown
- Start up
- Recovery start up
- Unlock

To search for a particular virtual server, type the text you want to find in the search box and click the \textbf{Search} button.

\section*{View ISO Virtual Server Details}

To view details of a specific virtual server:

1. Go to your Control Panel's \textbf{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
- \textit{VIP status} (on/off). Click the icon to change the status.
- \textit{Power status} & On/Off/Reboot buttons.

Clicking the \textit{OFF} button performs graceful shutdown and then powers off the virtual server after the timeout set in \textit{Configuration settings}.

- \textit{Built from ISO}. Green tick indicates that this VS is built from ISO.
- \textit{Compute resource}. Click the Compute resource name to see its details.
- \textit{Location group}. Click the location to view the details of the location group with which the VS is associated.
- \textit{Owner}. Click the owner name to see its details.
- \textit{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 \textbf{Networking > IP addresses} tab.
- \textit{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.
- \textit{Auto-backups} - move the slider to enable or disable auto-backups for this server. For more information refer to \textit{ISO Virtual Server Backup Schedules}.

\section*{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.

### 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.

**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.

**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:
• **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 [_]. 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 [()]

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

### 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.

**Resources**

**Instance packages**

Note that instance package VSs can only be created on compute resources within compute zones where all compute resources are assigned the same amount of CPU units. If there are compute resources with different amount of CPU units set in a zone, it will not be possible to create instance package VSs in such zones. The reason is that CPU priority for instance package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.

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

From this tab, you can choose one of the predefined **Instance Packages** for your virtual server. If you select a compute zone that does not not
have enough resources during virtual server creation, you will see all instance packages available to you, but those that have resources incompatible with the chosen compute zone will be grayed out. Grayed out instance packages cannot be selected.
For each of the instance packages the following details are displayed:

- **Memory** - the RAM size (GB) available in the instance package
- **CPUs** - the number of CPU cores available in this instance package
- **Disk Size** - the disk size available in this instance package
- **Bandwidth** - the bandwidth available in this instance package
- **Price per Hour**:
  - *Mode ON* - hourly instance package price for the VS powered on
  - *Mode OFF* - hourly instance package price for the VS powered off
- **Price per Month**:
  - *Mode ON* - monthly instance package price for the VS powered on
  - *Mode OFF* - monthly instance package price for the VS powered on

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

Virtual servers created using instance packages do not support autoscaling.

Create Your Own

Using this tab you can define the resources for your virtual server manually:

**Compute Resources**

- **Compute Zone** - the Compute zone to build the VS on
- **Compute Resource** - the specific Compute resource to build the VS on. Compute resource may be selected automatically according to the set provisioning type.

**Resources**

- **RAM** - set the amount of virtual server's RAM. The maximum RAM depends on your bucket's settings. The maximum RAM that can be assigned to a VS is 168 GB regardless of the Max RAM value set in the bucket. The maximum RAM that can be assigned to a VS built on a XEN 32bit (x86) template is 16 GB.
- **CPU Cores** - set the amount of virtual server's CPU cores. For KVM Compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.
- **CPU Priority (or CPU Units)** - set virtual server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

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 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.

### 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).

### Manage ISO Virtual Servers

OnApp Cloud gives you high-end cloud management features for virtual servers that are built from ISOs including:

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

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.
Migrate ISO Virtual Server
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.

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.

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.
   - 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
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.

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.

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.

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.

---

**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

**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.
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.

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 reboot the VS additionally.

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

ISO Virtual Server Network Speed
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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.

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.

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.

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.

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.

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.

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** tab -> **Disks**.
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.
7. Click the **Destroy Disk** button.

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

This will schedule the “destroy disk” transaction.

ISO Virtual Server Statistics

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:

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.

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.
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

The price parameters on this page do not take into consideration the free limits for resources set in the bucket.
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.
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.

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. 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.

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.

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.

View ISO Virtual Server Backups

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.

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 Back up. 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.

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.

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.

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.

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 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 ISO virtual servers, which include all the data from from the server's disk.

View ISO Virtual Server Backup Schedules

To view the list of backup schedules for an ISO virtual server:
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
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.

Edit ISO 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 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. Click the Save button to finish.

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.

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

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):
   - Reboot a VS
   - Recovery reboot
   - Power off a VS
   - CPU usage
   - Shutdown
   - Start up
   - Recovery start up
   - Unlock

To search for a particular virtual server, type the text you want to find in the search box and click the Search button.

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.

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][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.
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.

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:

1. Click the OVA template group.
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 Flags 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.

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-Za-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`.

  - **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.

**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 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.

**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.
Manage OVA Virtual Servers

OnApp Cloud gives you high-end cloud management features for virtual servers that are built from OVAIs including:

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Ensure that OVA permissions are on before managing OVA virtual servers. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

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

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.

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.

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/orbid users to perform migration of all virtual servers, or their own servers only. This is handled via the Control Panel's Roles menu.

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.

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.

### 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.

### 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.

### 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.

### 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.
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.

**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:

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.

**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
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

### 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.

### 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.

### 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.

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.

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.

Add Disks to OVA Virtual Servers

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.
   - 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.

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.

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 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.
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.

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.

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:
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.
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:
   - **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).

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.

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. 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.

### 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.

#### 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.

#### 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 Back up. 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.

#### 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**.
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.

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.

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 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.

OnApp supports only normal backups for OVA virtual servers, which include all the data from from the server's disk.

View OVA Virtual Server Backup Schedules

To view the list of backup schedules for an OVA virtual server:

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:
   - **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

See also:
- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates
- Configuration
- **Actions** - click the *Actions* icon to edit or delete the backup schedule
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:
   - 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
7. Click the Save button to finish.

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
7. Click the Save button to finish.

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
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schedule, then select Schedule for Backups.
5. Click the Actions icon next to the schedule you want to remove, then choose Delete.

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 can only be collectively assigned to the same guest. PCIe devices do not have this restriction.
- limits and prices are specified individually for each smart appliance zone assigned to the bucket.

If the smart Compute resource (where the smart server will be deployed) has a NIC device that features multiple ports, make sure the appliance NIC can perform a FLR reset:
1. Log in as root to a Compute resource where it is deployed
2. Run the following command:
   
   # lspci -vv|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.
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.

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.

**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.

**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.
**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.

**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 the "+" 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.

**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.

**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**.

**Step 3 of 5. Resources**

- Before creating a Windows-based smart server, make sure that the appropriate drivers were added to the /data folder on CP.

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.
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.**

**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.**

**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.

**Smart Server Creation Workflow**

The following scheme describes the steps required to create a smart server:

**CPU topology (CPU sockets and CPU threads)** is the Labs feature preview.

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.
User wants to create a smart server

User completes the smart server creation form

Step 1: Templates
- Choose any KVM template

Step 2: VS Properties
- Specify the smart server label and hostname
- Choose a compute zone and a compute resource
- Set the password

Step 3: Resources
- Set RAM, CPU cores, and CPU priority
- Set the disk space
- Choose a data store and network zones
- Set the port speed

Step 4: Recipes
- Choose a recipe
- Assign a custom variable

Step 5: Confirmation
- If required:
  - Enable Automated Backup
  - Build Smart Server
  - Boot Smart Server
  - Primary disk file system
  - Enable Autoscale

Click the Submit button to start the creation process
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!

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.
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.

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.

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.
<p>| | |</p>
<table>
<thead>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Linux-based smart servers only.</td>
</tr>
</tbody>
</table>
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 **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.

**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 checksums 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.

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.

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.
   - **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.

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.

**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.

**Smart Server Networks**

The **Networking** menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for smart servers.

**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.

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.

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.
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.

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 -> IP Addresses tab.
4. Click the Delete icon next to the IP address you want to delete.
5. In the pop-up window that appears:
   - Choose Delete and rebuild the network option if you want to reboot a smart server and rebuild the network immediately after deleting the IP address. After choosing the Delete and rebuild the network option you will be redirected to the smart server Overview page.
   - Choose Delete without rebuilding the network option if you don't want to reboot a smart server. In this case to apply the changes, you will have to reboot the smart server additionally.

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

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.
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:

- See the list of disks allocated to this Smart Server
- Add a new disk
- Resize a disk
- Migrate a disk
- Set backup schedules
- Delete a disk
- Back up disks
- View disk backup schedules

PLEASE NOTE: Creating multiple partitions on one disk is forbidden for Windows-based virtual servers.

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:
   - Specify disk's label
   - Choose the data store to create a disk on from the drop-down menu.
   - Set the desired disk size.
   - Specify if this disk is swap space, and requires formatting.
   - Specify whether the disk should be added to Linux FSTAB, and its mount point. The maximum length of a Mount Point is 256 characters. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

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

To be able to take incremental backups for virtual server’s disk, you must mount this disk to FSTAB (either Linux or FreeBSD) and specify the proper mount point manually.

Swap disks are not backed up.

6. Click the Add Disk button to finish.

When you add a new disk to a smart Compute resource it will automatically become available to that Compute resource.
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.

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 'd' space which may not be able to be recovered.

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.

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.
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.

Backup Support by VM / Virtualization / OS

<table>
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<th>Normal backup</th>
<th>Incremental backup</th>
<th>Convert to template</th>
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<td>SolidFire</td>
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</tbody>
</table>

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:

![Backup screen]

**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 a 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 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

**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.**
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).

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.

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.

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.

Smart Server Backup Schedules

Schedules screen lists smart servers' scheduled backup. 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.

View Smart Server Backup Schedules

To view the list of backup schedules for a particular Smart Server:

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

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
- **Status** - schedule status

### 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

### 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 of 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.
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:
   - **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.

### Edit Smart Server Backup Schedule

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:
   - **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).
   - **Enabled** - move the slider to enable or disable the schedule
7. Click the Save button to save your changes.

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

### Delete Smart Server Backup Schedule

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.
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.

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**Smart Server Statistics**

For your convenience, the system tracks smart server performance and generates statistics on:

- Smart Server CPU Utilization
- Smart Server Billing Statistics
- Smart Server Disk IOPS Statistics

**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.

---

**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:

   - **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.

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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.

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The price parameters on this page do not take into consideration the free limits for resources set in the bucket.
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).

**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. 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 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.

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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.

**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.

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

**Smart Server Transactions and Logs**

The system records a detailed log of all the transactions happening to your smart servers. The list of transactions logged by the system includes:

- Provision smart server
- Startup smart server
- Stop smart server
- Resize smart server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Take backup
- Convert backup
- Restore backup
- Destroy backups
- Destroy virtual server
- Destroy template
- Download template
- Update firewall

To view transactions for a smartserver:

1. Go to your Control Panel'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.
Smart Server Recipes

To manage 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 an event to expand the list of recipes assigned to it.

**Assign recipe**

Drag and drop recipe to assign it to a 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

**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** icon next to the recipe you want to remove.

**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.

**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
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 for Baremetal Servers.

- Autoscale, Segregate and VIP status options are not available for baremetal servers. Also, it’s not possible to wipe disks, as OnApp cloud administrators do not have access to baremetal server disks.
- VLANs are not configured automatically on baremetal servers. You need to configure them manually in accordance with your OS and hardware settings.

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 a particular baremetal server details, click the label of a required server.
4. To add new baremetal server, press “+” or click the Add New Baremetal Server button.

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.

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:

   **Step 1 of 4. Templates**

   Choose a template to build a baremetal server on, then click **Next**.

   **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 is
   - **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**.

   **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**.

   **Step 4. Recipes**

   - The management network should be disconnected during the baremetal server deployment.
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)

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**Baremetal Server Creation Workflow**

The following scheme describes the steps required to create a baremetal server:

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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.
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.

**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.

**Manage Baremetal Server 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 event to expand the list of recipes assigned to it.

**Assign recipe**
Drag and drop recipe to assign it to a 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.

**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.

**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.

### 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.

### Baremetal Server Recovery Mode

To reboot 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**.

### 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 > From**.
Application Server gives you high-end cloud management features including:

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The following options are not available for application servers:

- Reset Root Password
- Set SSH keys
- Integrated console
- Convert backup to template
- Recipes
- Recipe Custom Variables

**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:
   - 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):
   - Reboot
   - Recovery reboot
   - Shutdown
   - Startup
   - Recovery startup
   - Unlock

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

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

To search for a particular application server, click the Search icon at the top of the application server list. When the search box appears, type the text you want to search for and click the Search button:
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.

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).

Applications

In this section, you can see the list of all applications deployed on this server.

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.
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.

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:

   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.

   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.

   Particular characters are not allowed in hostnames for Windows-based application servers: percent sign [%] double quotation marks ['"] brackets [<>] vertical bar [|] caret ['^'] ampersand [&] parentheses [()]
Click **Next** to proceed to the following step of the wizard to specify the application server resources.

**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.

---

**Step 4. Confirmation**

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 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 "S how 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 application server with unlimited network speed without selecting a network zone only if you have only one Network Zone assigned to your bucket.
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.

### 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.

### 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!**

### 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.

### 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.
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.

**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.

**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.

**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 a 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.

### 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.

### 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.
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.

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.
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.

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

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.

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.

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.
7. 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.
8. Click the Add IP Address button.
9. Click the Rebuild Network button to rebuild the network.

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:
   - Choose Delete with Reboot option if you want to reboot an application server and rebuild the network immediately after deleting the IP address. After choosing the Delete with Reboot option you will be redirected to the application server's Overview page.
   - Choose Delete without Reboot option if you don't want to reboot an application server. In this case to apply the changes, you will have to the reboot the application server additionally.

You must rebuild the network after making changes to IP address allocations.

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

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.
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.

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:

- See the list of disks allocated to this application server
- Add a new disk
- Resize a disk
- Migrate a disk
- Check disk usage statistics (IOPS)
- Delete a disk
- Back up disks
- View disk backup schedules
- Schedule disk for backups

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

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:
   - 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.
   - Move the Hot Attach slider to the right if you want to enable disk hot attaching. In this case application server will not be stopped when adding a disk. Prerequisite: virtual server template should support virtio virtualization and Linux OS. Hot attach option is only available for KVM 6/ CentOS 6 application servers.
   - Move the Swap Space slider to the right if this disk is swap space.
   - Move the Require Format Disk slider to the right if this disk requires formatting.
   - Move the Mounted slider to the right if the disk should be added to Linux FSTAB (for Linux application servers).
   - Specify its mount point. The maximum length of a Mount Point is 256 characters. Spaces are not allowed. No more than one slash is allowed. If the mount point is not specified the default mount point will be used:

\[
/mnt/onapp-disk-#{disk.identifier}
\]

Indicate the file system - ext3 or ext4 - for Linux based application server.
6. Click the **Add Disk** button to finish.
Edit Application Server Disks

**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.

**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>
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<tr>
<td>• File system</td>
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</tbody>
</table>

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**.
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.

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).

- Images menu lists normal backups of an application server
- Files menu list application server's incremental backups
- Schedules menu allows you to schedule automatic backups for an application server. See Schedules Settings section of this guide for details.

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:
Each backup type can be taken in two ways:

- **Manually** - the user logs into OnApp CP and clicks the "Take backup" button.
- **Automatically** - the user enables backup schedule (daily, weekly, monthly, yearly). To enable auto-backups for application servers that support incremental backups which used auto-backups option before the upgrade, re-enable automatic backups by switching them off and on again.

  - If you are using incremental backups option, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your compute resources. SSH file transfer option will be skipped for application servers using incremental backups. Existing full backups will be still accessible via **Backups > Images** menu.
  - If required, you can change the block size which is used during backup creation at **Control Panel > Settings > Configuration** by editing the **Block Size (MB)** parameter.

### 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.

### 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:
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

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.

**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.

**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.

**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.

**Application Server Backup Schedules**

Schedules screen lists application servers’ scheduled backup. 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.

**View Application Server Backup Schedules**

To view the list of backup schedules for a particular application server:
If normal backup options 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:
   - 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

6. Next Start - the date and the hour of the next backup
7. Status - schedule status

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

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

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 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.

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.
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.

Edit Application Server Backup Schedule

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.
   - Enabled - move the slider to enable or disable the schedule
7. Click the Save button to finish.

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
5. Click the Save button to save your changes.

Delete Application Server Backup Schedule

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**.
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.

Application Server Statistics

For your convenience, the system tracks application server performance and generates statistics on:

- Application Server CPU Utilization
- Application Server Billing Statistics
- Interface Usage
- Application Server Disk IOPS Statistics

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:

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.

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:

   - 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

   The price parameters on this page do not take into consideration the free limits for resources set in the bucket.
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).

**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.

**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. 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 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.

**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:

- **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

If you want to see only the detailed output, you can hide log info with the arrow button in the upper right corner.

### 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.

### 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

**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):
   - 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.

**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.

**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 Container Server Backup Schedules.
- Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.

- CPU(s)
- CPU priority or CPU units
- Disk Size
- Memory
- CPU Usage (%)
- Data Sent
- Data Received

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.

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.

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.

Step 1 of 6. Cloud Locations

See also:
- Container Servers - the information on managing container servers

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.

**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**.
- **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.

**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.

**Resources**

- **RAM** - set the amount of container server's RAM. The maximum RAM depends on your bucket settings. The maximum RAM that can be assigned to a container server is 168 GB regardless of the Max RAM value set in the bucket. The maximum RAM that can be assigned to a container server built on a XEN 32bit (x86) template is 16 GB.
- **CPU Cores** - set the amount of container server's CPU cores. For KVM compute resources, this parameter sets CPU sockets by default, unless CPU topology is enabled.
- **CPU Priority** (or **CPU Units**) - set container server's CPU priority. If the CPU units are switched on in the bucket for this user, then CPU priority is replaced with CPU units. Refer to **Billing Calculation** section for details on CPU units and CPU priority.

The following options are available for container servers based on KVM Compute resources only, providing the **Enable CPU topology** permission is switched on for the user.

- **Use CPU Topology** - move the slider to the right, to set the following parameters:
  - **CPU Sockets** - set the amount of sockets
  - **CPU Threads** - set the amount of threads per core.

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 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

**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.

**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
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.

Edit Container Server

You can edit label, CPU and RAM resources for container servers. To edit the a container server:

1. Go to your Control Panel'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.

Container Server 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 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:
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.
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 S 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.
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.

**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 container server.

**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".

- **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.

**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 container server.

### 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.

### See also:

- Virtual Servers
- Smart Servers
- Application Servers
- Backup Settings
- Edit Backups/Templates
- Configuration

### View Container Server Backups

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.

### 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.
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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.

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.

Add Container Server Backup Note

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.

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 from the server's disk.

View Container Server Backup Schedules

To view the list of backup schedules 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, 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

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.
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

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.

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.
Start time - set the exact time of creating the transaction for backups scheduling. The transaction will be created at the
specified time but run according to the queue (the transactions created earlier or with higher priority will be launched first).

- **Enabled** - move the slider to enable or disable the schedule

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

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**.

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.

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:

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.

- 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.
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 can not 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.

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

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.
      i. Leave the empty field to apply this rule to all IPs
      ii. Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      iii. 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.
      i. Leave the empty field to apply the rule to all ports
      ii. Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      iii. 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 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.
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:

   ```bash
   service httpd restart
   ```

   or

   ```bash
   /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:
## Container 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 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.
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.

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.

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, where you can:

- See the list of disks allocated to this container server
- Add a new disk
- Resize a disk
- Migrate a disk
- Check disk usage statistics (IOPS)
- Delete a disk

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

Add Disks to Container Servers

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.
   - 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:

   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.
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.

Edit Container Server Disks

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.

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

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 ‘d’ space which may not be able to be recovered.

### 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**.

### Container Server Statistics

For your convenience, the system tracks container server performance and generates statistics on:

- **Container Server CPU Utilization**
- **Container Server Billing statistics**
- **Interface Usage**
- **Container Server Disk IOPS Statistics**

### 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:

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.
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).

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.

Container Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for container servers and generates charts that help analyze container server disk
performance. 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 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.

**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.

**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][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.

**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.

**Assign recipe**

Use drag and drop feature to assign recipe to a 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 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.

**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.

**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.

## 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.

## View Load Balancers

In the Control Panel's Load Balancers section you can find the list of load balancer and autoscaling clusters in your cloud with their details.

<table>
<thead>
<tr>
<th>Load Balancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Load Balancer Cluster</td>
</tr>
<tr>
<td>Create Autoscaling Cluster</td>
</tr>
</tbody>
</table>

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:

- **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
- **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.
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 overview

Load balancer properties page gives general overview of the load balancer details:

- Compute resource
- Owner
- Estimated Price per hour. This sum does not take into consideration the free limits for resources set in the bucket. Therefore, the final price for the server might differ from the sum indicated here.
- Power status & On/Off buttons
- Allocated memory
- CPUs
- Disk size
- IP addresses
- Network speed
- IPs
- Hostname and login
- Administrator's/user's notes
- List of cluster nodes
- Activity log

Add admin's or user's note to create a brief comment or reminder.

To expand the load balancer Tools menu, click the Tools button on the load balancer's details screen. Tools menu enables you to perform the following actions on load balancers (the exact list shown depends on the load balancer status):

Tools

The exact list of load balancer tools shown depends on the load balancer status:

Power options:

- **Startup Balancer** - queues a start-up action for a balancer that's currently powered off.
- **Reboot Balancer** - powers off and then restarts the balancer.
- **Shut Down Balancer** - terminates the balancer forcefully.
- **Suspend Balancer** - stops a balancer, and changes its status to suspended.

LB options:

- **Delete Balancer** - removes the balancer from the system.
- **Edit Balancer** - redirects to the edit load balancer details page.
- **Migrate Balancer** - pops up the balancer migration dialogue, enabling you to move the balancer to a different Compute resource.
- **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.

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:

**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.

**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.

**Create Autoscaling 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:

**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**.

**Cluster Nodes**

These settings configure the nodes that will be added to your cluster.

**Nodes network**

- *Nodes network group* - the nodes network group for the cluster nodes.

**Cluster Node Template**

- *Image template* – choose a template from the drop-down box: nodes will be built on this template.
- *Min node amount* – the minimum number of nodes in this cluster.
- *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.

**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 RAM\times16 (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.

### 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.

### 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:
   - **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).

### 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 the following info:

- memory monitor details screen
- CPU monitor details screen

### Memory Monitor

**Memory monitor info:**
- Name of the memory test - test label
- IP of the device agent - IP address of the agent running on the server
- **Platform** - OS platform
- **The name of the agent** - virtual server identifier
- **Free memory limit** - free memory limit in MB
- **Free swap limit** - free swap limit in MB

**Memory last results:**
- **Free memory** - free virtual server memory in MB
- **Total memory** - total virtual server memory in MB
- **Free swap** - free swap disk size in MB
- **Total swap (MB)**
- **Buffered memory (MB)**
- **Cached memory (MB)**
- **Status** - monitor status: OK, if the monitor is correct or NOK, if the autoscaling configuration does not match. Monitor status is refreshed once in 5 minutes.

**CPU Monitor**

**CPU monitor info**

- **Name of the CPU test** - CPU test label
- **IP of the device agent** - virtual server IP address
- **Max value for kernel** - maximum CPU value for kernel
- **Max value for iowait** - maximum CPU value for iowait
- **Platform** - virtual server OS
- **Max allowed value for user** - maximum CPU value for user processes
- **The name of the agent** - virtual server identifier
- **Tag of the CPU test** - CPU test tag
- **Min allowed value for idle** - minimum CPU value for idle mode
- **Max allowed value for nice** - maximum CPU value for nice

Max value is a CPU priority set during the server creation.

**CPU last results**

- **CPU index** - CPU number
- **User Value** - percentage of CPU used in user mode
- **Kernel Value** - percentage of CPU used by kernel
- **Nice Value** - percentage of CPU time occupied by processes with positive CPU value
- **Idle Value** - percentage of CPU used in idle mode
- **IO Wait Value** - percentage of time the CPU was idle during the IO request

**Status** - monitor status: OK, if the monitor is correct or NOK, if the autoscaling configuration does not match. Monitor status is refreshed once in 5 minutes.

**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>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>

**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.

**Compute resource management**

The main Compute resources section in the left Control Panel menu provides access to basic tools for viewing, editing and rebooting Compute resources.

Tools for advanced Compute resource management and controlling Compute zones are located in the Control Panel's Settings menu (Settings > Compute resources, and Settings > Compute resource Zones). For details, refer to the Compute Resource Settings section of this guide.

- View Compute Resource Details
- Create Compute Resource
- Create VMware Compute Resource
- Create CloudBoot Compute Resource
- Edit Xen/KVM Compute Resource
- Edit VMware Compute Resource
- Edit CloudBoot Compute Resource
- Edit Smart CloudBoot Compute Resource
- Edit Baremetal CloudBoot Compute Resource
- Manage Compute Resource Data Stores
- Manage Compute Resource Networks
- Delete Compute Resource

**Compute Resource Matrix**
<table>
<thead>
<tr>
<th>Feature / Virtualization Software</th>
<th>Xen 3</th>
<th>Xen 4</th>
<th>KVM 5</th>
<th>KVM 6</th>
<th>KVM 7</th>
<th>VMware</th>
<th>AWS</th>
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<table>
<thead>
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<th>Self Service via UI</th>
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<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
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<td>CentOS 6 64bit (roadmap)</td>
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<td>Autoscaling</td>
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<td>Y</td>
<td>Y**</td>
<td>Y**</td>
<td>Y**</td>
<td>Windows 2008 and 7 VSs</td>
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<td>Hot RAM resize without reboot*</td>
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<td>Y</td>
<td>Y</td>
<td>Y**</td>
<td>Y**</td>
<td>Y**</td>
<td>Windows 2008 and 7 VSs</td>
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<td>Hot CPU cores resize without reboot</td>
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<td>Y</td>
<td>Y</td>
<td>Windows 2008 and 7 VSs. Some Linux distributions</td>
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<td>Cold migration</td>
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<td>Y</td>
<td>Y</td>
<td>VMware utilizes vMotion to ensure that the VSs are optimally placed on the Compute resources</td>
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<td>Available for Linux VSs (Virtio templates)</td>
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<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>
<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>
<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>
<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>
<td>Y - Increase only. Reboot is required.</td>
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<td>Reboot in recovery</td>
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<td>Power on/off/reboot vApp</td>
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</table>

*If not specified, default is always True.
**If not specified, default is always False.
***IPv6 support is not available for Integrated Storage.
****Windows 2008 and 7 VSs.
*****If not specified, default is always True.
******Reboot is required.
*******If not specified, default is always True.
### Power on/off/reboot

<p>| | | | | | | | |</p>
<table>
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<td>Build vApp from template</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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</tr>
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</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.

**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.

**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.

**View Compute Resources**

The Control Panel provides a quick way to see compute resources and compute zones in the cloud, along with a summary of their resources.

Click your Control Panel's main Compute resources menu to see a list of all Compute resources in your cloud, and a quick overview of their details:

- Status
- Label
- IP address
- Type (Xen, KVM etc)
- Zone
- Location Group
- Failover
- VS - number of total VS hosted
- CPU
  - Cores
  - Used
  - Available
  - MHZ
- RAM
  - Total
  - Free

Click the Compute resource's label to view the list of virtual servers controlled by that Compute resource.

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. Note that by default the VS, Used and MHZ 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.

**View Compute Resource Details.**

You can drill into a specific Compute resource to see details of all virtual servers controlled by that Compute resource, and their resources. To do so:

1. Go to your Control Panel's Compute resources menu (or click a Compute zone's name underneath it). On the screen that appears you'll see a list of Compute resources.
2. Click a Compute resource's name (label) to see its details screen.
3. On the screen that appears, you'll see a list of all virtual servers hosted on that compute resource, along with their details:
   - OS
   - Label
   - Type - VS (virtual server), AS (application server), Fed VS (federated virtual server) etc.
   - VIP
   - IP Addresses
   - Disk size
   - RAM
   - Backups
4. To drill into a specific VS, click its label.
5. To edit or reboot the Compute resource, click the **Tools** button next to required Compute resource and select the proper action.

**Edit Compute Resource Details**

You can edit Compute resource details (its label, type, IP address and so on) via the Compute resource details screen, or through the **Control Panel's 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. Go to your Control Panel's **Compute resources** menu (or click a Compute zone name underneath it). On the screen that appears you'll see a list of Compute resources.
2. Click a Compute resource's name (label).
3. Click the **Tools** button, then click **Edit Compute resource**.
4. On the screen that follows, change details as required:
   - The Compute resource's name (label)
   - Compute resource type
   - Its IP address
   - Backup IP address
   - CPU units
   - Whether it's enabled or not (Compute resources that are not enabled cannot be used to host VSs)
   - Move the slider to the right to collect statistics for the Compute resource.
   - Move the slider to the right to 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.**

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

You can also edit your Compute resources in the Control Panel's **Settings** menu. Refer to the **Settings** section of this guide for more details.

**Reboot Compute Resource**

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

2. If you current array is detected as /dev/sda1 and currently everything is located in /onapp within templates and backup directories within:
   mkdir -p /onapp
   mount /dev/sda1 /onapp
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.

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

The List of Available Applications

Below you can find the full list of applications available for deployment using application server.

- Forums
- phpBB
Blogs

WordPress
- Simple Machines Forum
- MyBB
- Advanced Electron Forums
- Vanilla
- PunBB
- XMB
- FluxBB
- Phorum
- bbPress
- FUDforum
- miniBB
- Beehive
- my little forum
- ElkArte
- Open Blog
- Serendipity
- Dotclear
- b2evolution
- Textpattern
- Ghost
- Nibbleblog
- LifeType
- PiXie
- Nucleus
- Chyrp
- eggBlog
- PivotX
- Movable Type
- FlatPress
- HTMLy

CMS

- Joomla 2.5
- Joomla Drupal 7
- Drupal
- PHP-Fusion
- Concrete5
- MODX
- CMS Made Simple
- Open Real Estate
- e107
- Zoop
- Zikula
- Drupal 6
- Website Baker
- PHP-Nuke
- ocPortal
- Subrion
- Typo3 4.5
- Pligg
- PyroCMS
- Typo3 6
- Typo3
- Tiki Wiki CMS Groupware
- 9
- Contao
- Mambo
- Geeklog
- SilverStripe
- sNews
- jCore
- ImpressPages
- ProcessWire
- QuickCMS
- 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
- xBilling Avactis
- LiteCart
- Quick.Cart
- X-Cart
- SimpleInvoices
- ShopSite

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<th>E-commerce</th>
<th>OpenCart</th>
<th>Open Cart 1.5</th>
<th>Magento</th>
<th>Hosting</th>
<th>WHMCS</th>
<th>Cubecart</th>
<th>osCommerce</th>
<th>Bogo</th>
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<td>Bogo</td>
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- Hotaru CMS
- Fiyo CMS
- Concrete5 5.6
- Cotonti
- Zenario
- Anchor
- appRain
- ClipperCMS
- CMSimple
- Typesetter
- Bludit
- GRAV
- Open Business Card
- PopojiCMS
- PluXml
- Precurio
- Koken

**Social networking**

- Dolphin
- Oxwall
- Jcow
- Elgg
- Open Source Social Network
- Beatz
- pH7CMS
- Etano
- PeoplePods
- Family Connections

**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

**Video**

- ClipBucket
- VidiScript
- videoDB
- CumulusClips
- Prismotube Express
- Ampache

**Admanager**

- OpenClassifieds
- Prosper202
- OSClass
- Revive Adserver
- GPixPixel

**Galleries**

- Gallery
- Piwigo
- Coppermine
- Zenphoto
- TinyWebGallery
- phpAlbum
- 4images
- Pixelpost
- Plogger
- iGalere
- Gallery 2
- Lychee

**Projectman**

- qpPM
- Feng Office
- eyeOS
- Collatlive
- dotProject
- ProjectPier
- Mantis Bug Tracker
- The Bug Genie
- PHPProjekt
- TaskFreak
- todoyu
- Fliespray
- phpCollab
- Traq
- SiteDove
- Admidio
- Eventum
- Trac
- Burden

-
OnApp Cloud 5.6 administration Guide

Files
- ownCloud
- ProjectSend
- PHPfileNavigator
- Pydio
- eXplorer
- Arfoo
- LetoDMS
- OpenDocMan
- eSyndiCat
- MONSTA Box

Wikis
- MediaWiki
- DokuWiki
- PmWiki
- WikkaWiki
- MediaWiki 1.19

Frameworks
- CodeIgniter
- Laravel
- yii
- Bootstrap
- Zend
- CakePHP
- Symfony2
- Kohana
- Symfony
- Smarty
- PHPDevShell
- FuelPHP
- HTML Purifier
- PRADO
- Uikit
- DIY
- Webasyst
- WideImage
- Symfony3

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

Mail
- Roundcube
- phpList
- WebMail Lite
- SquirrelMail
- poMMo
- Webinsta Maillist
- OpenNewsletter
- ccMail
- Dada Mail
- Postfix Admin
- RainLoop Webmail

ERP
- SQLiteManager
- Chive
- phpLiteAdmin

DBtools
- SIDU
- phpMyAdmin
- MyWebSQL
- Adminer
RM
- Zurmo
- Group Office
- Tine 2.0
- SuiteCRM
- webERP
- EspoCRM
- OpenBiz Cubi
- YetiForce CRM

Music
- kPlaylist
- Podcast Generator
- AmpJuke
- Impleo
Polls
- LimeSurvey
- Piwik
- LittlePoll
- phpESP
- Aardvark Topsites
- Advanced Poll
- EasyPoll
- Simple PHP Poll
- Open Web Analytics
- CJ Dynamic Poll
- Logaholic
- Little Software Stats

Guestbook
- Advanced Guestbook
- Lazarus
- BellaBook
- phpBook
- PHPKode Guestbook
- VX Guestbook
- RicarGBooK
- PHP Address Book

Calendars
- WebCalendar
- Booked
- phpicalendar
- ExtCalendar
- LuxCal

Games
- BlackNova Traders
- Shadows Rising
- Multiplayer Checkers
- Word Search Puzzle

RSS
- Gregarius
- Tiny Tiny RSS
- Feed On Feeds
- selfoss
- SimplePie

Microblog
- phpDocumentor
- XCloner Comments

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
View Applications

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. Click the Applications tab > Applications.
4. The page that loads will show the list of applications together with their:
   - application name - the name of the application installed on this application server
   - software version - the version of the application software
   - software URL - this URL is a link to the application itself
   - Admin URL - this URL is a link for administrator, where he can enter credentials to log into application
   - Actions - click the Actions icon to perform the following procedures with the application:
     - backup application
     - remove application

There is one more possibility to view an application:

1. Go to your Control Panel'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.

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

In this section you can see the logos of the most popular applications. Choose one of them by clicking the appropriate logo.

Application catalog

*Category* - choose the application category from the drop-down list (cms, blogs, ecommerce, forums etc.)

*Application* - choose the application from the drop-down list

Application Description

The following page will provide you with the description of the application, which you have chosen from the catalog, its features and screenshots.
6. Click **Proceed**.
7. On the screen that appears the following application settings will be specified:

Settings are filled in automatically. In case you want to change automatic settings, fill in the appropriate field with your alternative settings.

Settings vary depending on every application. The field **Directory** will be present in every case, while the field **Database**, for example, is relevant only for those applications, which require databases for their functioning.

**Software Setup**
- **Directory** - the name of directory, where the application is stored. Only lowercase letters can be used (for example, "drupal" for Drupal application).
- **Database** - the name of database, used by application

**Site Settings**
- **Site name** - name of the application site
- **Site description** - description of the application site

**Database Settings**
- **Table prefix** - prefix, that is used for database tables
- **Import sample data** - choose language type from the drop-down list

**Admin account**
- **Admin username** - username of administrator
- **Admin password** - password of administrator
- **Real name** - real name of administrator
- **Admin email** - email of administrator

**Choose language**
- **Select language** - choose application language from the drop-down list

**Advanced Options**
- **Auto upgrade** - tick the checkbox to enable auto upgrade for the application
8. Click the **Install** button.
There is one more possibility to create an application:

1. Go to your Control Panel'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.

**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.

**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 backup.

**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, remove)

**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.

**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.

**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.

**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.

**See also:**

- **Applications** - the information on managing applications
- **Application Backups** - the information about application backups
- **Application Servers** - the information on managing application servers

**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
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.

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.

Manage Domains

You can add domains to resolve the Application Servers IP address. You can view, create and delete application domains.

See also:
Applications - the information on managing applications
Application Backups - the information about application backups
Application Servers - the information on managing application servers

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
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
     - Addon - enter domain path manually
     - Parked - /home/onapp/public_html directory is chosen by default
6. Click the Submit button.

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.

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.

See also:
Application Servers - the information on managing application servers
Applications - the information on managing applications
Application Backups - the information about application backups

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:

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,
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).

### 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 the "+" button.
5. Complete the creation form:
   - *Database name* - specify database name
6. Click the **Submit** button.

### 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 the "+" 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.

## 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.

## 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.

## 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.

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.

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:
   - 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

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 from the drop-down menu and click **Switch**.
Manage Email Accounts

Now you can create an email account for your domains. Also the email server deployment is needed before creating email accounts.

View email accounts

To view email accounts for your application servers:

1. Go to your Application server > Applications > Email Accounts.
2. You will get the list of email accounts with their details:

3. You can filter email accounts for a specific domain by choosing it from the drop-down menu and clicking the Apply button.
   - Space - the disk space amount (in KB), occupied by email
   - Count - the number of email messages
   - Clicking the Actions icon will show actions which you can perform with the email account (remove)

If email server is not deployed, you will get a warning with the link to System apps, where you can download email services.

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.

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.
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.

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**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.

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**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)

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**Start/Stop/Rerstart 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.

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**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...
Utilization of blueprints allows you to create sets of different types of servers: for example, web servers, database, etc. based on imported vApps templates.
SolidFire Integration

OnApp is integrated with the SolidFire storage management system. With the Solid Fire integration it is possible to utilize the SF SAN directly within the OnApp cloud and manage the SolidFire cluster via the SolidFire API.

You can perform the following options with SolidFire:

- Allocate dedicated LUNs from the SF cluster per virtual server disk, when creating a VS. (LUN is created per each VS disk, with a separate lun per swap disk.)
- Manage SolidFire LUNs automatically via API.
- Create virtual servers without the swap disk.
- Implement backups / snapshots using SF CloneVolume method.

To be able to utilize SolidFire in the cloud, you need to install the SolidFire storage system first.

There is a disk dependency between OnApp and SolidFire - when a new disk is created on the OnApp side, a new LUN is created automatically on the SF side, using the CreateVolume API call.

As the SolidFire data store has two interfaces (OnApp and SolidFire) you have to specify two IP addresses when creating a Solidfire Data Store Zone.

To be able to use the SF volume, you have to enable export to this device (Compute resource or a data store). To do that, you need to send an account username and initiator password to the iscsi_ip address. You will be able to use this device after the authorization.

The following options are not available under SolidFire:

- It is not possible to migrate SolidFire disks, as SF virtualises the storage layer.
- SolidFire does not support live disk resize. To resize disk, you need to shut down the virtual server first and use the CloneVolume functionality to increase the disk size. After the disk resize operation is complete, the original volume will be replaced with the new one and deleted, after that the VS will be booted.

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.

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 [Solid Fire 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

### 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.

### 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

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OnApp Cloud 5.6 administration Guide
Service Add-ons

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.

Create service add-on

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.

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 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.

Service add-on store

After you have created the service add-ons and properly configured events for them, proceed to arranging the service add-ons into a groups of services. A Service add-on store enables you to organize individual service add-ons into groups that can be further added to a plan to control user access. Only those groups which are added to a bucket will be available to a user. You can arrange the service add-ons into groups depending on their type, price, or whatever other attribute.

The prices for the individual service add-ons are also set in the Service add-ons store per service add-on per hour. This is the additional price that will be calculated for the VS besides the resources cost.

For detailed instructions, refer to Manage Service Add-on Store section of this guide.

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.

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.

Assign service add-on to VS

Service add-ons can be assigned to the VS during its creation or later.

Service add-ons in VS creation wizard

Ensure that the following requirements are met to be able to assign service add-on to VS during its creation:

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

If the requirements are met, you will get Service Add-ons step in VS creation wizard, where you should fulfill the following steps:

1. Click the service add-on group icon on the left to expand the list of service add-ons on the right. Every service add-on contains the following info:
   • Label
   • VS’s types, with which this service add-on is compatible
   • description of the service add-on
   • Price per hour
2. Select the service add-on by clicking on it. You can select several add-ons from different service add-on groups. Click View Selected Add-ons to see the list of selected service add-ons. You can remove the selected service add-on from the list by clicking the button near the add-on.
3. Click Next to proceed to the next step of the wizard that completes the virtual server creation process.

Service add-on assignment to already created VS

When the events and the prices are configured for service add-ons, you can assign a service add-on to any of their VSs.

To assign service add-on to a VS:

1. Go to your Control Panel’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 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.

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.

Ensure that Service Add-ons permissions are on before managing service add-ons. For more information about permissions refer to the Permissions section of this guide.
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:

- **All service add-ons** - the list of all the service add-ons created in the cloud.
- **Unix service add-ons** - the service add-ons that have been created as compatible with Unix virtual servers only.
- **Windows service add-ons** - the service add-ons that can be assigned to Windows VSSs only.
- **Unix/Windows service add-ons** - the service add-ons that are compatible with both Unix and Windows-based virtual servers.

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)

   ![Create Service Add-on](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.
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:

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 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 button next to the recipe you want to delete. Confirm the deletion.
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.
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 addon event from the drop-down list.
   - Recipients list - select the recipients list which you have configured in the second step on this instruction.
   - Notification template - select the notifications template which you have configured in the third step on this instruction.
   - Gateway - select the gateway which you have configured in the fourth step on this instruction.
6. Click Save.

For more information about subscriptions and messages configuration refer to the Notifications Setup.

Then you have to create a Raise Event action. For this:

1. Go to your Control Panel'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.

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.

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.

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.

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.

Service add-on group management

The service add-on groups have hierarchical (tree) structure:

- service add-on group
- Child group
- service add-ons

See also:
- Service Add-ons
- Manage Service Add-ons
- Virtual Server 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.
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.

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.

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.

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.

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.

What templates are

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.

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 Flags for Compute Zone.

The above limitations do not apply to XEN compute resources.

**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>CentOS 6 64 bit</td>
</tr>
</tbody>
</table>
## 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:

![Flowchart demonstrating template storage locations](image_url)

### 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.
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.

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 Control panel install/upgrade process, the following values are set by default:

- Template server URL - http://templates-manager.onapp.com
- Path to Templates - /onapp/templates
- Path to Recovery templates - /onapp/tools/recovery

Templates and backups can be stored on a remote server or a mounted disk. If you wish to store templates and backups remotely, you should also configure the following settings:

- Template/backup server IP, user login and SSH options
- Whether to use SSH file transfer for your template/backup server or not

For more information, refer to Edit Backups/Templates Configuration.

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.
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 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.

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

Refer to the following sections for details.

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.

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.
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.

**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.

**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.

**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.

**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.

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.

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_fransfer 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.

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.
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**.

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.

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 the 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 the **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.

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 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.

Manage Template 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 manage 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.

Assign recipe

Use drag and drop feature to assign recipe to assign a recipe to a desired event.

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 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.

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.

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
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).
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).

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:
   - **Label** – Windows OS distribution (2003, 2008, 7)
   - **R2** – tick this parameter if your license is for the second edition of Windows OS distribution
   - **x64 or x86** - specify the architecture
   - **Specify the Edition** – STD (Standard), ENT (Enterprise), WEB (web), PRO (Professional), DC (Data center)
   - **License** – enter the license code, e.g. TZXTC-R4GGG-9TT3V-DYDY4-T628B
   - **Total** - the total number of servers allowed by the license (the amount of licenses you bought from Microsoft)

4. Click Save.

To view MAK license details:

1. Go to your Control Panel'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.

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.

Template group management
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.

---

**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**.

---

**Add OVA to template store**

After the OVA file is uploaded, an OVA template is automatically created. Before creating a VS from an OVA template, you should add an OVA template to the Template store. 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 OVA from the drop-down menu.
4. Click **Save**.

---

**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.

**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
   - 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.

**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.

**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*.

**To assign a template to a template group / 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**.

**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.

**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.

**View 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 the ISOs uploaded by your users

For each ISO listed, you see the following details displayed:

- **log status** - the status of the last log item of the ISO (complete/pending/failed). Click the status to view the log details for the ISO (available to the ISOs that were uploaded through an URL).
- **OS** - the icon that indicates the operating system of the ISO
- **Label** - the name of the ISO
- **Min memory size** - the minimum RAM size required for the ISO
- **Operating systems** - the operating system on the ISO
- **Virtualization** - the virtualization type chosen for the ISO
- **Actions** - click the Actions icon to perform the following procedures with the ISO:
  - Edit ISO
  - Delete ISO
  - Make Public - only for the images from the My ISOs and User ISOs tabs
Boot from ISO
To enable booting virtual and smart servers from ISO in your cloud, you need to perform the following configurations:

- Share the location where the ISOs are stored
- Enable ISO Permissions
- Upload ISO(s) into the cloud
- Make ISO(s) public
- Boot virtual or smart server from ISO

Share the location where the 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.

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](#).

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.

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.

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.

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.

- **Upload ISO(s) into the Cloud**
- **Make ISO(s) Public**

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 panel.
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.
ad 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.

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.

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

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.

OVAs

Starting with version 5.2, OnApp allows you to import VSs created at other virtualization platforms into OnApp. The OVA is the OVF folder contents all zipped into a single file. Open Virtualization Format (OVF) is an open-source standard for packaging and distributing software applications for virtual servers. The OVA import functionality includes OVA files upload and VSs deployment. This process consists of several steps:

1. Upload of the OVA file
   When you upload the OVA archive, a special template is created in OnApp with the predefined configuration of VS from the OVA file.

2. Adding the OVA template to the template store
   It is required to add a template to any group in template store so that it was available to build VSs on it.

3. Billing configuration for OVA
   You can also add a template group created at step 2 to a bucket, so that provide different levels of accessibility for different customers.

4. VS creation from the OVA template
   To complete the import, build a VS based on the OVA template.

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 only for KVM compute resources.
Converting OVF to OVA

You can import virtual servers from OVA only. If you want to import from OVF, you should create an OVA 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) in Linux via command line, run the following:

```
[root@OVA OVA]# tar -cvf centos6.ova centos6ovalvm-disk1.vmdk
centos6ovalvm.ovf
centos6ovalvm-disk1.vmdk
centos6ovalvm.ovf
```

View OVAs

To view the OVAs available to you:

1. Go to Control Panel and click Templates.
2. Select OVA list from the menu that expands.
3. The page that loads, will show the list of OVAs available to you 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 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 an URL).
- **OS** - the icon that indicates the operating system of the OVA (Linux, Windows or Other)
- **Label** - the name of the OVA
- **Min memory size** - the minimum RAM size required for the OVA.
- **Operating system** - the operating system of the OVA
- **Backup server** - the backup server, where the OVA is stored
- **Virtualization** - the virtualization type - for the OVA it is always KVM
- **Actions** - click the Actions icon to perform the following procedures with the OVA:
  - Edit OVA
  - Delete OVA
  - Delete OVA files

### Upload OVAs

OVA upload is the first step of the OVA import functionality. After OVA is uploaded, you should add OVA template to the template store, and only then you will be able to build OVA VS from this template.

To upload OVAs into your cloud:

1. Go to your **Control Panel** and click the **Templates** menu from the left navigation pane.
2. Select **OVA list** from the menu that expands.
3. On the page that loads, click the **Upload OVA** button at the bottom of the screen.
4. Fill in the following details:
   - **Make public** - move the slider to the right if you want to make the OVA available to all users of the cloud
   - **Allowed hot migrate** - move the slider to the right if you want to be able to hot-migrate VS created from this OVA
   - **Label** - choose a name for the OVA
   - **Backup server** - choose the backup server where the OVA will be stored

   - It is required to select a backup server where the OVA should be stored. If the backup server is not selected, it will not be possible to upload an OVA.
   - For information on how to use OVA with CloudBoot backup servers refer to **Using OVA on CloudBoot Backup Servers**.

   - **Version** - fill in the version of the 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 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 the RAM in OVA file, the settings will be applied.
   - **Operating system** - choose the operating system of the OVA (Linux, Windows or Other ). Choose the Other operating system if you want to upload OVA with any other operating system (FreeBSD, Debian etc.).

   If operating system of the OVA is Linux and incremental backups are activated on your CP, you will not be able to upload OVA file. To solve this issue, go to your Control Panel's **Settings** menu > **Configuration** > **Backups/Template**s > **Store extended attributes** slider.

   - **Operating system distro** - choose the operating system distribution of the OVA
   - **Virtualization** - tick the required virtualization type (KVM, vCenter)

   If you choose vCenter virtualization type, the additional fields will appear. For more information refer to the **vCenter OVA Upload to OnApp**.

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 OVA file from your file system. The yellow infobox will show the maximum file size for OVAs. The max upload size is pre-configured at **Settings > Configuration** (the Max upload size field). Click the **Upload OVA** button.
   - **File Url** - select this tab if you want to upload the OVA from URL and specify the link from which the OVA will be uploaded.

6. Click **Save** to upload the OVA. After that several transactions are run automatically to convert OVA file into specific OVA template. OVA file is locked for this time period. You can unlock it to make the following actions available instantly: make public, edit OVA, delete
OVA or delete OVA files. To unlock the OVA file, go to Templates > OVA List and click the Unlock button next to specific OVA file.

After you upload an 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.

When OVA template is created from the uploaded OVA file, you can proceed to **VS creation wizard** to build a VS from this OVA template.

### Edit OVAs

To edit the OVAs available to you:

1. Go to **Control Panel** and click **Templates**.
2. Select **OVA list** from the menu that expands. The page that loads shows the list of OVAs available to you.
3. Click the **Actions** button next to the required OVA and choose **Edit OVA**.
4. On the page that loads you can edit the following OVA details:
   - **Allowed hot migrate** - move the slider to the right if you want to be able to hot-migrate VS created from this OVA
   - **Label** - specify the name for the OVA
   - **Backup server** - choose the backup server, where the OVA will be stored
   - **Version** - fill in the version of the OVA
   - **Min memory size** - specify the minimum required RAM for the 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 OVA file, the settings will be applied.
   - **Operating system** - choose the operating system of the OVA
   - **Operating system distro** - choose the operating system distribution of the OVA
   - **Virtualization** - tick the required virtualization type (KVM only at the moment)
5. Click **Save**.

### Using 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
   
   
   
   ```bash
   /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.

4. Go to **Control Panel > Settings > Compute Resources > Label** of the required CloudBoot compute resource.
5. Click the **Actions** icon > **Edit** next to the Cloudboot Backup Server.
6. Share the `/data` directory among all servers in OnApp. This step is required for CloudBoot backup servers and compute resources.

   ```bash
   ln -s /onapp/tools/recovery /data
   ```

7. Add the following to the Custom Config field:

   - **For CentOS 6 backup servers:**
For CentOS 7 backup servers:

```bash
chown -cR 0:0 /onapp/templates/libguestfs-tmp
chown -cR 0:0 /onapp/templates/libguestfs-cache
```
8. Click **Save**.
9. Go to **Control Panel > Settings > Compute Resources** > **Label** of the required CloudBoot compute resource.
10. Click the **Tools** button and select **Edit Compute Resource**.
11. Add the following to the **Custom Config** field:

```bash
cp /etc/lvm/lvm.conf /etc/lvm/lvm.conf.orig
sed -i '/^[[:space:]]*filter = .*/s/\(.*\)/filter = \[ "r|\[/dev\]/nbd\]/g' /etc/lvm/lvm.conf
mkdir /boot
    mount -t nfs -o vers=3 10.63.0.20:/tftpboot/images/centos7/ramdisk-kvm /boot
mkdir -p /onapp/templates/libguestfs-tmp
mkdir -p /onapp/templates/libguestfs-cache
    echo -e "LIBGUESTFS_TMPDIR=/onapp/templates/libguestfs-tmp
    LIBGUESTFS_CACHE=/onapp/templates/libguestfs-cache" >> /etc/environment
chown -cR 0:0 /onapp/templates/libguestfs-tmp
chown -cR 0:0 /onapp/templates/libguestfs-cache
```

You need to indicate the IP of your Control Panel server on line 4 (instead of ‘10.63.0.20’ which is an example).

12. Click **Save**.
13. Reboot your Cloudboot Backup Server

You can also execute the custom config command directly on the Backup Server to apply it without reboot.

**Delete OVAs**

You can delete uploaded OVA files, so that the billing will not calculate 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 an OVA: in this case OVA template, created from the OVA file, will also be deleted.

To delete an OVA files:

1. Go to **Control Panel** and click **Templates**.
2. Select **OVA list** from the menu that expands. The page that loads shows the list of OVAs available to you.
3. Click the **Actions** button next to the required OVA and choose **Delete OVA files**.

When deleting OVA files, the OVA disk size (backup server limits section of buckets) will not be calculated, but the OVAs limit will still be charged.

To delete an OVA:

1. Go to **Control Panel** and click **Templates**.
2. Select **OVA list** from the menu that expands. The page that loads shows the list of OVAs available to you.
3. Click the **Actions** button next to the required OVA and choose **Delete OVA**.

You can delete an OVA template only if there are no VSs running on it.

**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. As a result, cPanel will complete the installation, 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 mounted as noexec.

### 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.

### Recipe variables

The recipes run when the appropriate events are triggered on the Compute resources, virtual servers or CP server. Depending on the object where the event occurs, the recipe runs on Compute resource/Virtual Server/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 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

All recipes have access to these variables:
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- 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

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.

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 behaviour on failure

For information how to see the list of servers to which the recipe is assigned, see View the List of Assigned Servers section.
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.

Create Recipe

You can create and use recipes for Unix (Linux and FreeBSD) and Windows virtual servers, smart servers, baremetal servers, virtual server templates, Compute zones and the control panel server. For details, refer to the relevant sections of the Admin guide:

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

Adding a recipe consists of two stages:

1. creating a recipe
2. creating a recipe step

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.

Create steps

To create a new recipe step:

1. Click the "+" button in the upper right corner of the Steps screen.
2. In the pop-up window, specify step details as required:

   *Script* - input the recipe code.
   *Result source* - specify the step result source.
Exit Code - an exit code, for example, 0 is the default value returned on success.
To use exit code in the VBS or PowerShell scripts, you have to specify it directly in the script. For example:

**VBS**

Script:
```
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:

a. Select the required step and hold it down with the left mouse button.

b. Drag the recipe up to the required position and release the mouse button to drop it.

**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.

### 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 for details.

### 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.
     - **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.

---

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

**VBS**

```vbscript
WScript.Echo "test"
WScript.Quit 95
```

**PowerShell**

```powershell
get-date -displayhint date
exit 227
```

- **STDOUT** - standard output.
- **STDERR** - standard error
- **STDOUT and STDERR** - standard output and standard error.

---

You cannot specify both pass and fail values for one recipe step.

You can specify multiple recipe values. In this case you have to specify each value from a new line.
On success- the recipe behavior on success:

- Proceed - proceed to the next step.
- Fail - terminate the recipe and mark it as failed.
- Stop- terminate the recipe and mark it as successful.
- Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

In case you have already specified the recipe pass values, you will get the Fail anything else slider enabled automatically, as you cannot specify both pass and fail values for one recipe step. Move this slider to the left if you want to set set fail values (Pass anything else slider will be enabled automatically).

Fail values - specify the pass output value.

On failure - the recipe behaviour on failure

- Proceed - proceed to the next step.
- Fail - terminate the recipe and mark it as failed.
- Stop- terminate the recipe and mark it as successful.
- Go to step - specify the step to proceed to. If you specify the nonexistent step, the recipe will be stopped.

5. Press Save.

---

Drag and drop steps to change their order. To do so:

a. Select the required step and hold it down with the left mouse button.

b. Drag the recipe up to the required position and release the mouse button to drop it.

---

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.

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.

**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

**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
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

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

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

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

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

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

Templates
• Add recipe to any template (templates.recipe_add) - the user can add 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

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.

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.

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.
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.

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.

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.

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.

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.

Recipe Use Examples

The set of examples aimed to illustrate the recipe utilization.

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
```
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Step 2

```bash
```

Step 3

```bash
service httpd restart
```

Step 4

```bash
echo "Can not write to file" > /var/log/recipes.log
```

Step 5

```bash
```
Result source: Exit code
Recipe 2

Runs on Compute resources to check the virtualization type.
Can be used for the following events:

- When Xen/KVM Compute resource goes online

Step 1

```
if rpm -qa |grep -q $qayd ; then
    ps aux |grep -q xend || exit 1
else
    ps aux |grep libvirt || exit 1
fi
```

Result source: Exit code

Pass values: 0
On success: Proceed
Fail values: Fail anything else
On failure: Fail

Recipe 3

Runs on 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

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
Result source: Exit code

Pass values: 0
On success: Proceed
Fail values: Fail anything else
On failure: Fail

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

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.

**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.

**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.

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.
View the 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:
   - ID
   - Name
   - Instance type
   - Availability zone
   - Status
   - Public DNS name
   - Public IP address
3. You can perform the following actions to your instances:
   - Start/Stop
   - 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.

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
   - Subnet
   - Image
   - Launch time
   - Actions buttons: Start, Stop, Reboot
   - Public dns name
   - Public IP address
   - Private dns name
   - Private IP address
   - Virtualization type
   - Ebs optimized
   - Root device type
   - Root device name

You can connect to your EC2 instance using the **Connect** button in the upper left corner, which will provide corresponding instructions.

**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.

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.

Launch New EC2

Launching a new instance is a process similar to the creation of a new virtual server.

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

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 key words or using the AMI ID. Please note, that search timeout is 30 seconds. If your request times out - try shortening the search time by making it more specific.
Instance Type

Select the instance type. It must be compatible with the AMI. If not - a corresponding error message will be displayed after the EC2 instance creation wizard completes.

![Instance Type Selection](image)

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.

![Instance Details](image)

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.

![Review and Launch](image)
3. Click **Launch EC2 Instance** button.

- Some of the templates from the marketplace are not free of charge and require a subscription at AWS. Unfortunately, this information cannot be obtained via API in the process of AMI selection. So, in case a paid AMI is selected, an error message will be displayed, requesting you to accept the terms and conditions and subscribe to the selected AMI at the Amazon website.
- If during the search in AWS Marketplace you get an error message about request timeout, perform the following:
  
  a. open file `/onapp/interface/config/info_hub.yml`
  
  b. increase timeout by editing parameter `search_query_timeout`

**Users**

OnApp provides very fine control over cloud users and what they’re allowed to do. You can set up as many different types of user as you need, and customize their access to cloud resources and Control Panel functions as required. For example, standard, VIP and reseller users can have different capabilities and resource limits. You might provide basic cloud management functionality to L1 support staff (e.g. reboot virtual servers but not destroy them) while your L3 admins have full rights. Your development teams will probably need to deploy test VSs in the cloud just as a customer would, only without being charged for them. Meanwhile, your billing staff need a “billing only” view with no access to customer resources.

This fine control is enabled by a combination of user accounts, roles, permissions, and buckets.

**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.

The following user related actions are available via OnApp:

- view users
- create user
- edit user
- delete user

**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:
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- **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.

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

You can scroll through the list of users with the **Previous/Next** buttons at the bottom of the screen, as well as use search tool to search for a specific user.
Click the **Actions** button next to the required user to edit, suspend or delete them, view the list of whitelist IPs or login as a user.
Click **Drop All Sessions** button to terminate all sessions.

Every user including you will be logged out.

To get the list of additional fields, click the **User Additional Fields** button.
To view detailed information about a user's account, click user's full name.

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

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

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

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.
- Templates, ISOs & Backups Disk Size - the price per hour for the disk space user's /ISOs/backups/templates occupy.
- 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.

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.

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 account existence 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:

   - Daily Stats – particular date and time for the generated statistics.
   - Backups cost - 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 cost - the price for the amount of ISOs uploaded by the user during the chosen period.
   - Templates Costs - the price for the templates made by the user during the chosen period.
   - Templates, ISOs & Backups Storage Costs - 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 Cost - 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 Backup cost record will apply.
   - Backup Zones Backup Disk Size Cost - 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 Cost - the price for the amount of templates of the backup zones made during the chosen period.
   - Backup Zones Template Disk Size Cost - the price for the disk size taken by templates stored on the backup zones during the predefined period.
   - Acceleration Cost - the price for the amount of accelerated VSs for the selected period.
   - OVA count Cost - the price for the amount of OVAs uploaded by the user during the chosen period.
   - OVAs size Cost - the price for the disk size taken by OVA files stored on the backup server during the predefined period.
   - Virtual Servers Cost – 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
<table>
<thead>
<tr>
<th>CPU Priority</th>
<th>Disk Size</th>
<th>Memory</th>
<th>IP Address</th>
<th>Virtual Server</th>
<th>Template&amp;Backup Storage</th>
<th>Disk size</th>
<th>IP Address</th>
</tr>
</thead>
</table>

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.

### 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.

### 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.

### 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.

**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.

**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.

You can also view and change the following settings when editing a user:

• User Payments
• Buckets
• User Whitelist IPs
• View User Backups
• Add SSH Key

**Add SSH Key**

To add a 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 VSs the user creates.
To assign keys to existing VSs, go to the **VS Overview > Properties** menu.

**Delete User**

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

**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.**
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.

### 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).

### View User Backups

Backups in OnApp clouds are associated with 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 template, click the Actions button next to template and then select the required action.

### 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.

### Drop Session

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 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.

### 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.

To be able to use drop session functionality, you should have the following permissions enabled for your user role:

- Drop all the existing sessions (sessions.drop_all)
- Drop all the user sessions but the current (sessions.drop_others)

For details on permissions, refer to the **Permissions List** section.

**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

**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:

- view organizations
- create organizations
- edit organizations
- delete organizations

**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.

**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:
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:

- roles - assign role(s) which will be available to resellers with the appropriate restrictions set
- buckets - assign bucket(s) which will be available to resellers with the appropriate restrictions set

5. Click Save.

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.

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.

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.

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.
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 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.

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.

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.

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.

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

See also:
Create New Role
List of all OnApp Permissions
Logs
Sysadmin
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.

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.

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.

Configure the List of Actions that Require Approval

Once you enable the permissions for the approver user role(s), you can configure which transactions require approval for each of the user roles.

To set the list of transaction that will require approval for a user role:

1. Go to Control Panel > Roles > Actions icon next the required user role and select Set approvals.
2. On the page that loads set Yes for the action(s) which should require approval:
   - attach disk - adding a disk to a server with the Hot attach option selected
   - build disk - adding a disk to a server without the Hot attach option selected or adding a disk during virtual server creation
   - compose vApp - composing a new vApp
   - create data store - adding a new data store
   - create resource pool - adding a new resource pool from the Control Panel > Resource Pools page
   - destroy data store - deleting an existing data store
   - 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 Cloud 5.6 administration Guide

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.

Configure Approval Notifications

You can configure the system to send notifications to the approver users when there is a transaction pending approval. Requester users can also be sent emails after there has been a decision regarding the transaction they have initiated.

To set up notifications for the approver users:

1. Enable notifications for you cloud at Control Panel > Notifications > Configuration.
2. Configure gateways at Control Panel > Notifications > Gateways. You can configure to send either internal notifications in OnApp or emails.
3. Add notification templates at Control Panel > Notifications > Notification Templates. These templates are the messages that are sent to the approvers. You can add any text to the messages. Add the %{message} text to the template for the messages to automatically include the link to the transaction that is pending approval.
4. Create the approver recipients list at Control Panel > Notifications > Recipients Lists and add the approver users to it.
5. Set up subscriptions at Control Panel > Notifications > Subscriptions. Add the gateway (step 2), the notification template (step 3), the recipients list (step 4) and select the Pending approval event for the new subscription.

After the above configuration, the approver users will receive notifications when there is a transaction pending approval in the cloud.

To set up notifications for the requester users:

1. Go to Control Panel > Notifications > Gateways
2. Click the New gateway button
3. On the page that loads select the SENDMAIL delivery method for the gateway
4. Click Select to proceed to the next gateway creation step
5. Depending on the selected delivery method fill in the following details:
   - For the SENDMAIL delivery method:
     - Name - the name for your new gateway.
     - From - the email address from which emails will be sent
     - Host - the server IP or URL
     - For successful notification configuration for requesters, the name of the gateway should be System SENDMAIL Gateway.
   - For the SMTP delivery method:
     - Name - the name for your new gateway.
     - From - the email address from which emails will be sent
     - Host - the server IP or URL
     - Smtp address - address of the SMTP server
     - Smtp port - port of the SMTP server
     - Smtp domain - associated domain
     - For successful notification configuration for requesters, the name of the gateway should be System SMTP Gateway.
- 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.

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.

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
Configure 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.

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

Further, the resellers can adjust the cloud “Look and Feel” to their preferences.

Create a reseller role

The cloud administrator creates a reseller role. This process is similar to creating other roles in OnApp. For more information, see Create New Role.

We recommend that the cloud administrator grants the reseller full access to all resources excluding the following permissions:

- Restrictions Resources group
- Restrictions Sets group
- Create/update/destroy role
- Create new zones or resources

Create a 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 will be further assigned with the limitations configured in this set. Refer to the Create Restrictions Sets section for details on how to create restrictions sets.

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 were not added, the reseller will have no access to that resource.

Create a 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, refer to Create New Role section.

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, refer to Create User section.

Create other roles required by the 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.

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:
- label - choose a name for the restrictions set
- roles - select the roles that will be limited under the restrictions set
- resources - choose the resources you want to limit for the resellers assigned to the role specified above. You can restrict users by bucket and user group or both:
  - 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 to a bucket, 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.
  - both - if the resource is restricted both by user group and bucket, the restrictions overlap.

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.

List of Restrictions Resources

Restrictions sets can limit the following resources:

<table>
<thead>
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<th>Resource</th>
<th>Restriction Type</th>
<th>Description</th>
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</thead>
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<td>The reseller can see the activity log of those users, who are members of the user group to which this reseller is assigned.</td>
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<td>Autoscaling configuration</td>
<td>by user group</td>
<td>The reseller can manage only those autoscaling configurations, which are created for VSSs created by users who are members of the user group to which this reseller is assigned.</td>
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<tr>
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<td>The reseller can manage autoscaling configurations for VSSs which are created on Compute resources in Compute zones added to reseller bucket.</td>
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<td>Backups server zones</td>
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<td>The resellers can manage backup server zones within the limits set in their bucket.</td>
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<td>by bucket resources</td>
<td>The reseller can see and use only those backup servers, which are set in his bucket.</td>
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<tr>
<td>Backups</td>
<td>by user group</td>
<td>The reseller can configure only those backups, which are created by users, who are members of the user group to which this reseller is assigned.</td>
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<tr>
<td></td>
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<td>The reseller can manage backups created on backup server zones added to the reseller bucket.</td>
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<tr>
<td>Base resources</td>
<td>by user group</td>
<td>The reseller can manage only those base resources of buckets which are assigned to users, who are members of the user group to which this reseller is assigned.</td>
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<tr>
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<td>by user group</td>
<td>The reseller can manage only those buckets, which are assigned to users, who are members of the user group to which this reseller is assigned.</td>
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<td>The reseller can manage blueprints stored on data store zones which are added to reseller bucket.</td>
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<td>The reseller can see and use only those blueprints, which were created by users, who are members of the user group to which this reseller is assigned.</td>
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<td>Data store zones</td>
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<tr>
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<td>by bucket</td>
<td>The reseller can manage data stores added to data store zones specified in their bucket. Without this restriction the reseller will be able to see all the data stores in the cloud (if permissions allow).</td>
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<td>resources</td>
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<td>Disks</td>
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<td>The reseller can manage only those disks, which are used by customers, who are members of the user group to which this reseller is assigned.</td>
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<td>DNS zones</td>
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<td>The reseller can manage only those DNS zones, which are created by users, who are members of the user group to which this reseller is assigned.</td>
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<td>The reseller can manage edge groups within the limits set in his bucket.</td>
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<tr>
<td>Edge servers</td>
<td>by user</td>
<td>The reseller can manage only those edge servers, which are created by users, who are members of the user group to which this reseller is assigned.</td>
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<td>by bucket</td>
<td>The reseller can manage edge servers within the limits set in his bucket.</td>
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<td>by user</td>
<td>The reseller can manage only those iFrames, which are created by users, who are members of the user group to which this reseller is assigned.</td>
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<td>Template groups</td>
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<td>The reseller can manage template groups within the limits set in his bucket.</td>
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<td>The reseller can monitor only IO statistics of those users, who are members of the user group to which this reseller is assigned.</td>
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<td>The reseller can manage IP addresses for VSs running on Compute resources assigned to Compute zones which are added to reseller bucket.</td>
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<td>by user</td>
<td>The reseller can view only the last access log of those users, who are members of the user group to which this reseller is assigned.</td>
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<td>The reseller can manage only those load balancers that were created by users, who are members of the user group to which this reseller is assigned.</td>
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<td><strong>Load balancing clusters</strong></td>
<td>The reseller can manage load balancers running on Compute resources attached to Compute zones which are added to reseller bucket.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Log items</strong></td>
<td>The reseller can view only the log items of users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
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<td><strong>Nameservers</strong></td>
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<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Network zones</strong></td>
<td>The reseller can see and manage only networks attached to network zones which are added to reseller bucket.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Networks</strong></td>
<td>The reseller can see and manage only networks attached to network zones which are added to reseller bucket.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>OAuth providers</strong></td>
<td>The reseller can configure only those OAuth identity providers that are used by customers, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Payments</strong></td>
<td>The reseller can view only the payments made by users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Recipe groups</strong></td>
<td>The reseller can see and manage recipe groups within the limits set in his bucket.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Recipes</strong></td>
<td>The reseller can manage only those recipes, that were created by users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Roles</strong></td>
<td>The reseller can see and manage only those roles that are assigned to his user group.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>SAML identity providers</strong></td>
<td>The reseller can see and manage only those SAML identity providers that were configured by users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Schedule logs</strong></td>
<td>The reseller can view only the schedule logs of the users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Schedules</strong></td>
<td>The reseller can see and manage only those schedules, that were created by users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Storage servers</strong></td>
<td>The reseller can see and manage only those storage servers, that were created by users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
<tr>
<td><strong>Transactions</strong></td>
<td>The reseller can view only the transactions of those users, who are members of the user group to which this reseller is assigned.</td>
<td>The reseller can see and manage only those load balancing clusters that were created by users, who are members of the user group to which this reseller is assigned.</td>
</tr>
</tbody>
</table>
**User groups by user group**
The reseller can see and manage only those user groups, that were created by users, who are members of the user group to which this reseller is assigned.

If there is a restriction set by user group, then the counter for Users under the **Roles menu** will specify only the amount of users within the user group.

**White IPs by user group**
The reseller can see and manage only those white IPs that were added by users, who are members of the user group to which this reseller is assigned.

**Users by user group**
The reseller can see and manage only those users who are members of the user group to which this reseller is assigned.

**Virtual server snapshots by user group**
The reseller can see and manage only those virtual server snapshots, that were created by users, who are members of the user group to which this reseller is assigned.

**Virtual servers by user group**
The reseller can see and manage only those virtual servers, that were created by users, who are members of the user group to which this reseller is assigned.

**Virtual machines statistics by user group**
The reseller can view only the virtual server statistics of those users, who are members of the user group to which this reseller is assigned.

**Create restrictions sets**

To create 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 create, then click **Create**.
4. On the screen that appears, you can change the following parameters:
   - **Label**
   - **Roles**
   - **Resources**
5. Click the **Submit** button.

**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 delete, then click **Delete**. You'll be asked for confirmation before the restrictions set is removed.

**Buckets**

Before users can create virtual servers in your cloud, it is important to 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 amount of free resources are set.

The bucket contains only the resources present 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, e.g. compute zones, that have a certain server type, selection of that resource will not be available for that server type.
- 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 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.

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.

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 template stores, edge groups, recipes 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 with 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 Buckets section of the OnApp and vCloud Director Configuration Guide.

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.

See also:

- Bucket Prices and Resource Limits
- Bucket Calculation

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 $10^{13}$.

   **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
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.

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 VVs 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 VVs is left for the rest of users in the group even if they have not reached the VS limit set in their individual bucket. To provide the exact number of VVs to specific users, you need to specify the VS limit in the individual bucket. 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.

**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.

**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.

**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.
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.

Create User Billing Plan

5.6 To create a billing plan:

1. Go to your Control Panel’s **Billing Plans** menu.
2. On the screen that appears, press “+” button or click the **Create Billing Plan** button at the bottom of the screen.
3. Complete the form on the screen that follows:
   - **Label** - give your billing plan a name.
   - **Monthly price** – set a monthly price for the billing plan. This price will be applied regardless of the actual prices for used resources.
   - **Currency** - set a currency to charge in.
4. Specify Windows licensing support settings:
   - Tick the **MAK licensing** box to enable MAK licensing for a user signed up for this plan
   - Tick the **KMS licensing** box to allow using KMS service
   - Choose **User license** to allow inserting custom licenses
5. Click **Save** to finish.

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 template stores, edge groups, recipes and service add-on groups.
For convenience, you can duplicate resources from the Access Control to the Rate Card and vice
versa. When adding a resource to the Access Control tick the **Duplicate to rate card** checkbox and the resource will be added to the Rate Card with no prices and free limits by default. Similarly, when adding a resource to the Rate Card tick the **Duplicate to access control** checkbox and the resource will be added to the access control with no limits by default.

## 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.

To manage 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.

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
</table>
| Miscellaneous | Virtual Servers | Max | 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.  
Tick the **Unlimited** check box to let a user create an unlimited amount of VSs under this bucket. |
| Templates, ISO’s & Backups Storage | Max | The total amount of disk space (GB) users can request for storing their backups, ISOs and templates under this bucket.  
The **Templates, ISO’s & Backup Storage** limit will apply only if you use Compute resources for disk-related actions in your cloud.  
Tick the **Unlimited** check box to provide an unlimited amount of disk space for storing backups, ISOs and OVAs under this bucket. |
| Templates | Max | 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 & Backups Storage** limit.  
You can set prices per template per hour in the bucket’s Rate Card.  
Tick the **Unlimited** check box to let a user create an unlimited amount of templates under this bucket. |
| Autoscaling | Max | 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.  
Tick the **Unlimited** check box to let a user apply autoscaling to an unlimited amount of VSs under this bucket. |
| Backups | Max | The maximum number of backups users can create under this bucket.  
The disk space available for backups is defined by the **Templates, ISO’s & Backups Storage** limit.  
The **Backups** limit will apply only if you use compute resources for disk-related actions in your cloud.  
Tick the **Unlimited** check box to let a user create an unlimited amount of backups under this bucket. |

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 backups on compute resources.
<table>
<thead>
<tr>
<th>ISO templates</th>
<th>Max</th>
<th>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. Tick the Unlimited check box to let a user create an unlimited amount of ISO templates under this bucket.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>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. Tick the Unlimited check box to let a user accelerate an unlimited amount of VSs under this bucket.</td>
</tr>
<tr>
<td>Container Server</td>
<td>Max</td>
<td>The maximum number of container servers in the cloud that the users can create under this bucket. Tick the Unlimited check box to let a user create an unlimited amount of container servers under this bucket.</td>
</tr>
<tr>
<td>Application Servers</td>
<td>Max</td>
<td>The maximum number of application servers in the cloud that the users can create under this bucket. Tick the Unlimited check box to let a user create an unlimited amount of application servers under this bucket.</td>
</tr>
<tr>
<td>Compute zone limits</td>
<td>CPU Priority</td>
<td>Min</td>
</tr>
<tr>
<td>CPU Shares</td>
<td>Max</td>
<td>Default</td>
</tr>
<tr>
<td>RAM</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>CPU</td>
<td>Min</td>
<td>Default</td>
</tr>
<tr>
<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 the bucket. Tick the Unlimited check box to provide an unlimited amount of CPU cores within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td>CPU Units</td>
<td>Max</td>
<td>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 Use CPU Units option when adding/editing a compute zone in the Access Control. Tick the Unlimited check box to provide an unlimited amount of CPU units within the compute zone to a user under this bucket.</td>
</tr>
<tr>
<td>Use default CPU</td>
<td>Yes/No</td>
<td>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 Default CPU limit. It is only possible to enable the Use default CPU option when resource prices and max limit are not set.</td>
</tr>
<tr>
<td>Use default CPU shares</td>
<td>Yes/No</td>
<td>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 Default CPU shares limit. It is only possible to enable the Use default CPU shares option when resource prices and max limit are not set.</td>
</tr>
<tr>
<td>Use CPU Units</td>
<td>Yes/No</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>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
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### Data Store Zone Limits

<table>
<thead>
<tr>
<th>Disk Size</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum amount of disk space (GB) users can request in the data store zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box 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>IP Addresses</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum amount of IP addresses users can request in this network zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box 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>
</tr>
<tr>
<td></td>
<td>The maximum port speed (Mb) users can request in this network zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box to provide an unlimited port speed within the network zone to a user under this bucket.</td>
</tr>
</tbody>
</table>

### Backup Server Zone Limits

<table>
<thead>
<tr>
<th>Backup</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum amount of backups users can create in this backup server zone under the bucket.</td>
</tr>
<tr>
<td>Backup disk size</td>
<td>Max</td>
</tr>
<tr>
<td></td>
<td>The maximum amount of disk space (GB) users get for storing their backups in this backup server zone under the bucket. When the backup space is exceeded, users can take backups, but they cannot restore from them unless the size is freed up.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box to provide an unlimited amount of disk space for storing backups within the backup server zone to a user under this bucket.</td>
</tr>
</tbody>
</table>

### Template Zone Limits

<table>
<thead>
<tr>
<th>Template</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum amount of templates users can create in this backup server zone under the bucket.</td>
</tr>
<tr>
<td>Template disk size</td>
<td>Max</td>
</tr>
<tr>
<td></td>
<td>The maximum amount of disk space (GB) users get for storing their templates in this backup server zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box to provide an unlimited amount of disk space for storing templates within the backup server zone to a user under this bucket.</td>
</tr>
</tbody>
</table>

### OVA Zone Limits

<table>
<thead>
<tr>
<th>OVA</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum amount of OVAs users can create in this backup server zone under the bucket.</td>
</tr>
<tr>
<td>OVA disk size</td>
<td>Max</td>
</tr>
<tr>
<td></td>
<td>The maximum amount of disk space (GB) users get for storing their OVAs in this backup server zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box to provide an unlimited amount of disk space for storing OVAs within the backup server zone to a user under this bucket.</td>
</tr>
</tbody>
</table>

### Guaranteed miniIOPS Limits

<table>
<thead>
<tr>
<th>Requests</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The maximum number of IOPS requests users can request in this data store zone under the bucket.</td>
</tr>
<tr>
<td></td>
<td>Tick the <strong>Unlimited</strong> check box to provide an unlimited amount of IOPS requests within the data store zone to a user under this bucket.</td>
</tr>
<tr>
<td></td>
<td>This parameter is SolidFire related.</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Edge Groups</th>
<th>Specify which CDN edge groups from which CDN bandwidth will be available to users under this bucket.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template Store</td>
<td>Specify which template stores from which templates will be available for users to select during virtual server creation.</td>
</tr>
<tr>
<td>Service add-on groups</td>
<td>Specify which service add-on groups will be available for users to assign to virtual servers.</td>
</tr>
<tr>
<td>Recipes</td>
<td>Add the groups of recipes which should be available to users.</td>
</tr>
</tbody>
</table>

### 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.
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 windows 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</td>
<td>• the amount of virtual servers for which the user can enable autoscaling for free under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price</td>
<td>• the price per VS per hour for VSs for which the user enables autoscaling. This price applies to servers that exceed the free Autoscaling limit set in the bucket's Rate Card.</td>
</tr>
<tr>
<td></td>
<td>Templates, ISO's &amp; Backups Storage</td>
<td>Free</td>
<td>• the amount of free disk space (in GB) users can allocate to storing backups, ISOs and templates together.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price</td>
<td>• the price per GB per hour of disk space the user allocates to storing backups, ISOs and templates. This price applies once the user exceeds the free Templates, ISO's &amp; Backups Storage limit set in the bucket's Rate Card.</td>
</tr>
<tr>
<td>Backups</td>
<td>Free</td>
<td>Price</td>
<td>• the number of backups users can create for free under this bucket. The price per backup created by the user under this bucket per hour. This price applies once the user exceeds the amount of free backups available in the bucket's Rate Card.</td>
</tr>
<tr>
<td>ISO Templates</td>
<td>Free</td>
<td>Price</td>
<td>• 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.</td>
</tr>
<tr>
<td>Acceleration</td>
<td>Free</td>
<td>Price</td>
<td>• 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.</td>
</tr>
<tr>
<td>DRaaS</td>
<td>Price Disk Size</td>
<td></td>
<td>The additional price for disk size (GB/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price RAM</td>
<td></td>
<td>The additional price for RAM (MB/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Cores</td>
<td></td>
<td>The additional price for CPU (core/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Shares</td>
<td></td>
<td>The additional price for CPU shares (%/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price CPU Units</td>
<td></td>
<td>The additional price for CPU units (unit/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td></td>
<td>Price Nodes</td>
<td></td>
<td>The additional price for nodes (node/hr) that applies to a virtual server with enabled DRaaS.</td>
</tr>
<tr>
<td>Compute Zone Prices</td>
<td>CPU</td>
<td>Price on</td>
<td>• the price per CPU core per hour, charged for powered on VSs which are built in this compute zone under this bucket.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price off</td>
<td>• the price per CPU core per hour, charged for powered off VSs which are built in this compute zone under this bucket.</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>RAM</th>
<th>Price on</th>
<th>the price for RAM MB/hr, charged for powered on VSs which are built in this compute zone under this bucket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price off</td>
<td>the price for RAM MB/hr, charged for powered off VSs which are built in this compute zone under this bucket</td>
</tr>
<tr>
<td></td>
<td>Free</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>
Zone Limits

CPU Shares | Price on | Price off | Free | the price for CPU shares %/hr, charged for powered on VSs which are built in this compute zone under this bucket
| the price for CPU shares %/hr, charged for powered off VSs 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 VSs built in this compute zone under this bucket

CPU Units | Price on | Price off | Free | the price per CPU unit per hour, charged for powered on VSs which are built in this compute zone under this bucket
| the price per CPU unit per hour, charged for powered off VSs 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 VSs built in this compute zone under this bucket

CPU Cores | Free | Free per month | The amount of CPU cores users can request for free for the total number of VSs built in this compute zone under this bucket

Data Store Zone Limits

Disk Size | Price on | Price off | Free | Free per month | 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
| 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
| set the amount of disk space (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Disk Size parameter, the user will be billed only for the disk size that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.
| When setting monthly free amount using the Free Disk Size per month parameter, the free limits for resources are set per month rather 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 | Price on | Price off | Free | Free per month | the price per GB of read data per hour, charged for VSs which are built in this data store zone under this bucket
| set the amount of read data (GB/hr) users can request for free either per hour or per month: When setting hourly 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.
| When setting monthly free amount using the Free Data Read 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 Written | Price | Price on | Price off | Free | Free per month | the price per GB of written data per hour, charged for VSs which are built in this data store zone under this bucket
| set the amount of written data (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Data Written parameter, the user will be billed only for the amount of data written that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.
| When setting monthly free amount using the Free Data Written 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.

Input Requests | Price on | Price off | Free | Free per month | the price per 1M input requests per hour, charged for VSs which are built in this data store zone under this bucket
| set the amount of input requests (1M requests/hr) users can request for free either per hour or per month.
| When setting hourly free amount using the Free 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.

Output Requests | Price on | Price off | Free | Free per month | the price per 1M output requests per hour, charged for VSs which are built in this data store zone under this bucket
| set the amount of output requests (1M requests/hr) users can request for free either per hour or per month.
| When setting hourly free amount using the Free Output Requests parameter, the user will be billed only for the amount of output requests that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources.
| When setting monthly free amount using the Free Output 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>Network Zone Limits</th>
<th>Port Speed</th>
<th>Price on</th>
<th>Price off</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>the price per Mbps of port speed per hour, charged for powered on VSs which are built in this network zone under this bucket</td>
<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>the amount of port speed (Mbps/hr) users can request for free for the total number of their VSs built in this network zone under this bucket</td>
</tr>
<tr>
<td>IP Addresses</td>
<td>Price on</td>
<td>Price off</td>
<td>Free</td>
<td>Free per month</td>
</tr>
<tr>
<td>--------------</td>
<td>----------</td>
<td>-----------</td>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>the price per IP address per hour, charged for powering on VSs which are built in this network zone under this bucket</td>
<td>the price per IP address per hour, charged for powering off VSs which are built in this network zone under this bucket</td>
<td>set the amount of IP address (IP/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free IP Addresses parameter, the user will be billed only for the amount of IP addresses that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. 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.</td>
<td></td>
</tr>
<tr>
<td>Data Sent</td>
<td>Price</td>
<td>Free</td>
<td>Free per month</td>
<td></td>
</tr>
<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>
<td>set the amount of data sent (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Data Sent parameter, the user will be billed only for the amount of data sent that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting monthly free amount using the Free Data Sent per month parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Received</td>
<td>Price</td>
<td>Free</td>
<td>Free per month</td>
<td></td>
</tr>
<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>
<td>set the amount of data received (GB/hr) users can request for free either per hour or per month: When setting hourly free amount using the Free Data Received parameter, the user will be billed only for the amount of data received that exceeds the hourly free limit. The next hour, the user will again have the free hourly limit available and will pay only for the overused resources. When setting monthly free amount using the Free Data Received per month parameter, the free limits for resources are set per month rather than per hour. After the free limit is exceeded, all the units overused during the month will be billed hourly according to the set price.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup Server Zone Limits</td>
<td>Backup</td>
<td>Price</td>
<td>Free</td>
<td>Free per bucket</td>
</tr>
<tr>
<td></td>
<td>the price per backup per hour, charged for the backups stored in this backup server zone under this bucket</td>
<td>the amount of backups (backup/hour) users can store in this backup server zone for free under this bucket</td>
<td>The Backup prices apply only to manual backups. Auto-backups are billed only using the Backup Disk Size parameters.</td>
<td></td>
</tr>
<tr>
<td>Backup Disk Size</td>
<td>Price</td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per GB per hour, charged for the disk size occupied by the user's backups stored in this backup server zone under this bucket</td>
<td>the amount of disk space (GB/hr) users can request for free to store their backups in this backup server zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Template</td>
<td>Price</td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per template per hour, charged for the backups stored on this backup server zone under this bucket</td>
<td>the amount of templates (template/hour) users can store in this backup server zone for free under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Template Disk Size</td>
<td>Price</td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per GB per hour, charged for the disk size occupied by the user's templates stored in this backup server zone under this bucket</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>
<td></td>
<td></td>
</tr>
<tr>
<td>OVA</td>
<td>Price</td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per OVA per hour, charged for the backups stored on this backup server zone under this bucket</td>
<td>the amount of OVA (OVA/hour) users can store in this backup server zone for free under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVA Disk Size</td>
<td>Price</td>
<td>Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the price per GB per hour, charged for the disk size occupied by the user's OVs stored in this backup server zone under this bucket</td>
<td>the amount of disk space (GB/hr) users can request for free to store their OVs in this backup server zone under this bucket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>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>
<td></td>
</tr>
<tr>
<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>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tick the Apply to all buckets checkbox to set the price you have configured for the templates in the store to all buckets that contain this template store.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td>The additional price for CPU (CPU core/hr) that applies to VSs to which a service add-on is added.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## User Billing Plan Configuration Workflow

5.6 The following scheme describes how to configure a billing plan:

![Diagram](image.png)

## 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
- Calculation for the missing period
- Hourly and monthly resource limit types
- 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.
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.

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:

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.

Hourly and monthly resource limit types
It is possible to choose hourly or monthly billing when adding a data store or network zone resources to the OnApp billing plan.

When setting hourly resource type, the limits for resources are 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 monthly resource type, the limits for resources are 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 monthly resource 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 hourly resource to the billing plan and sets free data read limit per hour to 50 GB:

- During the first hour, 5 GB are used. As the free limit is 50GB the user is not charged (all the free limit).
- During the second hour, 52 GB are used. The user is charged for 2 GB over free limit per hour.
- During the third hour, 55 GB are used. The user is charged for 5 GB per hour overusage (previous 2 GB over the limit are not taken into account since they are already billed).

When a data store or a network zone is added to the master template, its limit type (hourly or monthly) is overridden by the master template. If a zone is removed from the master template, it's limit type will become the same as it was before the master template was applied to the zone.

**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.
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, \((10 - 20) + (25 - 20) + (10 - 20) + (30 - 20) = 15\text{ MB will be charged.}\)
Since the first and the third NICs are less than the free amount, they are not charged.

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:

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

Example
In this example, free IOPS = 45

Disk 1 has 50 IOPS
Disk 2 has 45 IOPS
Disk 2 has 60 IOPS
Disk 4 has 20 IOPS
Then: \((50-45) \cdot (45-45) \cdot (60-45) \cdot (20-45) = 20\) IOPS which is billed.

Since the second and the fourth disks' IOPS values are less than the free
Disk size

When calculating disk size billing for a particular resource, each virtual server's disk size is compared to the free disk size limit in a linear queue (starting with the first added disk), then each next disk is compared to the free disk size limit remainders.

The disk size billing calculation is:

Example

Free disk size is 50 GB.

We have two virtual servers assigned to the same data store.

VS 1
The first virtual server has two disks.
Disk 1 = 15 GB
Disk 2 = 20 GB

According to the billing algorithm, the first disk checks if there are disks added before it and then gets compared to the free disk size limit:
15 < 50, so it is not charged (35 GB of free disk size limit left).

Then, the second disk is compared to the remaining free disk size limit:
20 < 35 (15 GB of free disk size limit left).

So, the second disk is also not charged.

After that, the second virtual server's disks are processed. The third disk is compared to the remaining free disk size limit:
20 > 15 (20 - 15 = 5, so 5 GB of the disk’s size will be charged).
Finally, the fourth disk is charged for the whole disk size, as the free disk size limit is already reached.

**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:

\[
(VS_1 \text{ CPUs}) + (V2 \text{ CPUs}) + (VS\# \text{ CPUs}) - \text{free CPU limit}
\]

**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: 

\[
(2+3) - 3 = 2
\]

**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.
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.

### 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.

### 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 VSSs.
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 resource 1 Compute resource to 2000 in this Compute resource Z zone, set the CPU Units option of this Compute resource 1 to 2000. For example, giving Compute resource 1 a score of 1000 and Compute resource 2 the score of 500 is the same as giving Compute resource 1 a score of 2 and Compute resource 2 a score of 1. However, the first case gives you more flexibility in spreading the resources between VSs.

When setting CPU units, the main thing is that the correlation between the CPU Units for each Compute resource should correspond to the correlation of their actual performance. Example of setting CPU units based on CPU speed:

<table>
<thead>
<tr>
<th>Compute resource</th>
<th>Compute resource CPU Mhz</th>
<th>Compute resource Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4000</td>
<td>1000</td>
</tr>
<tr>
<td>B</td>
<td>2000</td>
<td>500</td>
</tr>
<tr>
<td>C</td>
<td>1000</td>
<td>250</td>
</tr>
<tr>
<td>D</td>
<td>500</td>
<td>125</td>
</tr>
</tbody>
</table>

**Limitations**
- CPU Units are available for Xen and KVM Compute resources only.
- Do not apply CPU Units for KVM Compute resources running on CentOS5, VMware, baremetal servers, and load balancers.
- 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.

**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.

**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
### Assign Users to Billing Plan

Assigning a new user to a billing plan takes place 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. Fill in the required details and click **Next**.
4. On the screen that appears, select a billing plan for the user from the billing plan drop-down menu.
5. Complete the other user detail fields, and click the **Save** button.

### Edit User Billing Plan

Changing a user's billing plan takes place on the Edit User screen:

1. Go to your Control Panel's **Users** menu.
2. Click the **Actions** button next to the user in question, then click **Edit**.
3. Select a billing plan for the user from the billing plan drop-down menu.
4. Click the **Save** button.

Editing a billing plan that is associated with more than one user will affect all users attached to it. If you wish to only affect that user then copy the billing plan and associate it only with the single user.

### Copy User Billing Plan

To copy a billing plan:

1. Go to your Control Panel's **Billing Plans** menu. The screen that appears will show all the billing plans currently set up on the cloud.
2. Click the **Actions** icon next to a required billing plan, then click **Copy**.

### Delete User Billing Plan

To delete a billing plan:

1. Go to your Control Panel's **Billing Plans** menu. The screen that appears will show all the billing plans currently set up on the cloud.
2. Click the **Delete** icon next to a billing plan to remove it from the system. You'll be asked for confirmation before the plan is removed.

Deleting a billing plan that is associated with more than one user will affect all users attached to it. If you wish to only affect that user then copy the billing plan and associate it only with the single user.

### 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.
Below you can find instructions on how to create and manage payments.

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.

Create payment

To create 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 **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** – change 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.

Edit payment

To edit 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 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**.
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.

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.

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
   - Bandwidth - the bandwidth available in this instance package
   - Associated Virtual Servers - the number of virtual servers that were created using this instance package. Click this number to view the details of the VSs associated with this instance package.

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

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 creation permission and enable the Select instance package on virtual server creation permission, the user will be able to select VS resources only from the instance package(s) available to that user.
- If you disable the Select instance package on virtual server creation permission and enable the Select resources manually on virtual server 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.

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.
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.

**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.

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.

Billing for Instance Packages

A VS built using instance packages is 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 select the quantity of resources available to a VS built using it.
2. Add the instance package to the bucket and set the price the Instance package VS will be charged.

Add instance packages to your cloud

To set up billing for instance packages, at first configure the amount 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 check box 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 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)

Add instance packages to the bucket

After you create instance packages in your cloud you need to add them to the bucket. There you give the users under the bucket access to the instance package in the Access Control and set the price that will be charged per VS powered on/off for each appropriate instance package in the Rate Card.

There are also a number of VS resources that are not set up during instance package creation but are configured automatically, or differ from 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></td>
<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>
</tr>
<tr>
<td></td>
<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>
</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></td>
<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>
</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td></td>
<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>
</tr>
<tr>
<td></td>
<td>Swap Disk Size</td>
<td>1/2/3 GB</td>
<td>The size is calculated by multiplying the RAM by two. If the calculated value is larger than three, the swap disk size is set to 3. If the calculated value is smaller than three, it is rounded to the closest value from the 1/2/3 range that is larger than the calculated size. If the calculated value is larger than the disk size set for the instance package, the swap disk is not added to the VS.</td>
</tr>
</tbody>
</table>
| Limits for Network Zones | IP Address                            | the first available IP address is assigned | 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. |
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 Limits for Instance packages section.

<table>
<thead>
<tr>
<th>Data Received/Written</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

---

### 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)

---

### 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.

---

### 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.
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>

View Compute Resource Details

Each virtual server in the cloud is hosted by a specific physical compute resource server, from which it receives CPU time, RAM and storage capacity from the data stores attached to that compute resource.

You can view compute resource settings and hardware information.

Ensure that See all compute resources permission is on before viewing compute resource details. For more information about permissions refer to the List of all OnApp Permissions section of this guide.

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.
   - **CPU Cores** - number of CPU cores
   - **RAM** - total/free RAM
   - **VS** - the number of VSs associated to the compute resource
   - **Features** -

   ![features_icon]

   , 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.
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.

View compute resource hardware information

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 press Tools > Hardware Info.
5. You will get the following details:

- **Summary info**
  - This section contains the basic information about the compute resource:
    - current uptime, users, load average
    - compute resource CPU
    - compute resource memory
    - type of virtualization
    - operating system
    - manufacturer and model
    - BIOS and serial number

- **CPU**
  - This section shows CPU manufacturer logo and information about CPU slots. Click the CPU details info 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 hard drive slots, its size etc.

- **Network**
  - This section contains information about network cards. Click the info button next to the specific network to get its 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.

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.
Create CloudBoot Compute Resource

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 Zone Types.

Create an 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 resource management interfaces on a separate subnet with a NIC on the CP server also attached. In this configuration, the management subnet can use private address space and does not need to be externally addressable.
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).
  - 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.

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.

**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 3 - Xen 3 CloudBoot Compute Resource, based on CentOS 5
- Xen 4 - Xen 4 CloudBoot Compute Resource, based on CentOS 6
- 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

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

**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.

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

**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.
OnApp Cloud 5.6 administration Guide

- 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.

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.

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

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.

Step 5 of 5. Finalize

At this step, wait until compute resource devices configuration is applied. Then you will be indicated that compute resource is successfully configured and ready for operation. Click the Complete button. The compute resource will be added to the system. You can view it under the Compute resources menu. You do not need to power cycle the Compute resource manually – the Control Panel handles this remotely, and takes care of the configuration automatically.

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. You will get Storage version details and the list of devices together with their details:
   - 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.

1. Click Next.
2. After devices are successfully reconfigured, click Finish.

**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.
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**
   - **Label** - the compute resource's name
   - **MAC** - the MAC address of the compute resource
   - **Backup IP address** - provisioning network IP address
   - **CPU Units** - set the amount of CPU units assigned to this compute resource
   - **Enabled** - enable or disable the ability to install/boot virtual servers on this compute resource
   - **Collect stats** - enable or disable the ability to collect statistics for this compute resource
   - **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.

   **Advanced**
   Move the Advanced slider to the right to edit advanced Compute resource settings:
   - **MTU** - specify the maximum transportation unit size. You can set the frame size from 1500 to 9000 bytes

   The maximum transportation unit (MTU) is the maximum size of a unit that can be transmitted transferred via ethernet traffic. Any data that exceed the specified MTU value will be divided into smaller units before being transferred. Utilization of jumbo frames allows you to reduce increase throughput and increase CPU utilization during large size file transfers.
   - **SAN bonding mode** - choose bonding mode type from the drop-down menu

   After editing the SAN bonding mode option, it is required to reboot your compute resource to apply the settings.

   Please note that using more than one NIC for SAN subnet requires switch support. Please ensure that your network infrastructure supports the utilized NIC bonding and is configured correctly. By default, the utilized NICs bonding mode is IEEE 802.3ad Dynamic link aggregation which requires grouping appropriate ports together according to the section 5 Switch Configuration of Linux Ethernet Bonding Driver guide.

   - **Storage controller RAM** - specify the storage controller RAM value (minimum 640 MB, maximum 4096 MB)
   - **Storage Controller DB size** - select the storage controller DB size value (minimum 128 MB, maximum 256 MB)
   - **Drives per controller** - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives
   - **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**.

### 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
   - **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 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.

### 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.

   **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**

Advanced slider is used to edit advanced compute resource settings:

• **MTU** - specify the maximum transmission unit size. You can set the frame size from 1500 to 9000 bytes

The maximum transportation unit (MTU) is the maximum size of a unit that can be transmitted via ethernet traffic. Any data that exceed the specified MTU value will be divided into smaller units before being transferred. Utilization of jumbo frames allows you to reduce increase throughput and increase CPU utilization during large size file transfers.

• **Storage controller RAM** - specify the storage controller RAM value (minimum 640 MB)
• **Storage Controller DB size** - select the storage controller DB size value (minimum 128 MB, maximum 256 MB)
• **Drives per controller** - specify the number of disks per controller virtual server. You can specify from 1 to 4 disks. By default, the controller virtual server is created per 4 disk drives.
• **Allow unsafe assigned interrupts** - move this slider to the right to allow/restrict unsafe assigned interrupts. This parameter is 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

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.

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

**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**.

**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.
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.

---

### 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.

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.

---

### 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.** VSs, which are already created on this compute resource, will not be migrated and will be running.

- Maintenance mode is applicable to Xen/KVM compute resources only.
- 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 available also for CloudBoot compute resources. Also you can **disable Integrated Storage for CloudBoot compute resources with Integrated Storage**.

---

### 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 hot migration option enabled, will try to migrate to another compute resource. Also remember that smart servers can only be cold migrated.

move the second slider to the right if you are sure you want to enable maintenance mode for this compute resource.

6. Click **Confirm**. 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. 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 compute zone, to which both of them are assigned. Otherwise you will not be able to activate maintenance mode for this compute resource.

**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 VSs to the compute resource, from which they were migrated, you should manually bring VSs back to this compute resource.

Disabling maintenance mode initiates automatic compute resource reboot.

**Maintenance mode and CPU flags**

If the compute zone has already configured CPU flags, and then one of the compute resources of this compute zone goes to maintenance mode, there are several scenarios when it goes back online:

- if the compute resource after maintenance has the same CPU flags as all other compute resources in a compute zone, the performance stays on the previous level and no problems should occur.
- if the compute resource after maintenance has more flags than other compute resources in a compute zone, the additional flags will not be enabled for this compute zone.
- if the compute resource after maintenance has less flags and worse performance than other compute resources in a compute zone, you will receive the email that there is an inconsistency with the flags and the warning that the current configuration of a compute zone is broken with the recommendation to fix that on CPU Flags page for a compute zone.
Compute Resource Extended CPU Flags

OnApp provides the list of extended CPU flags for each KVM compute resource. The extended CPU flag’s feature provides the possibility to
get the maximum functionality and performance of the new CPUs with latest processor types. The CPU flags are managed per compute zone. The compute resource level provides only the list of flags marked as enabled/disabled/available/unavailable. See further sections for details.

Extended CPU flag's management is available for KVM compute resources only.

Prerequisites

The extended CPU flags are managed per compute zone. So that each compute resource assigned to a zone will inherit the flags enabled per compute zone.

The following steps should be taken to enable CPU flags feature:

1. Set up CPU flags functionality for all compute resources added to a certain compute zone:
   • during compute zone creation
   • while editing compute zone
2. Enable or disable CPU flags for certain compute zone. For more information refer to the Manage Extended CPU Flags for Compute Zone section of this guide.

Compute resource CPU flags

To view the list of extended CPU flags of a compute resource:

1. Go to your Control Panel's 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 the Compute Resource Overview link in the Tools section.
4. You will get the page with compute resource details. Click the Extended CPU flags link in the Tools section.
5. On the screen that follows you'll see the list of CPU flags sorted into several parts:
   • Enabled - those flags which are currently enabled per compute zone to which this compute resource is attached. So each compute resource in this zone has these flags enabled.
   • Disabled - those flags which are currently disabled per compute zone to which this compute resource is attached but you can enable them if required on the Manage CPU Flags page. That means that each compute resource in this zone has these flags, but they are not enabled currently.
   • Available - the list of all CPU Flags detected on this compute resource. This list is shown when the compute resource is not assigned to a compute zone. These flags cannot be enabled for this compute resource individually. At first the compute resource should be assigned to a compute zone, and then the flags can be configured for the whole compute zone.
   • Unavailable - those flags which are available to this particular compute resource only and not available to other compute resources in a compute zone, so they cannot be enabled.

Example

Let's consider the configuration where one compute zone has three compute resources assigned to it. Compute Resource 4 is not assigned to any compute zone.

- Flag1, Flag2 and Flag3 are enabled: they are common for all compute resources in a zone, and switched on for the compute zone. So Compute Resource 1, Compute Resource 2 and Compute
Resource 3 also have these flags enabled.

- Flag 4 is *disabled* for the
compute zone. That means that Compute Resource 1, Compute Resource 2 and Compute Resource 3 have Flag 4, but it is not enabled currently.

- Flag 5 and Flag 6 are available to Compute Resource 3 only and not available to other compute resources in the compute zone, so they cannot be enabled. They are unavailable.
- Flag 7 and Flag 8 are available for Compute Resource 4. But Compute Resource 4 is not assigned to the compute zone, so Flag 7 and Flag 8 cannot be enabled for Compute Resource 4 individually. At first Compute Resource 4 should be assigned to the compute zone, and then Flag 7 and Flag 8 can be configured for the whole compute zone if they are not conflicted.

**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.

**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:
View Compute Zone Details

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** - Compute zone’s name.
   - **Location group** - 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.
   - **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 computer resource that can be assigned to a compute zone of this type, will be shown here. For the details see the Zone Types doc.

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.

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:
   - Create Virtual Compute Zone
   - Create Smart Compute Zone
   - Create Baremetal Compute Zone
4. After you fill in all the parameters click the Save button.

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 Memo
ry 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 Flags - move the slider to the right to enable CPU flags functionality 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 VSSs only. If you enable this option, the zone will not be available in the virtual server creation wizard’s Resources step for custom VSSs (VSSs built by setting resources manually). If this slider does not appear, this zone is inappropriate for creating Instance Package VSSs.

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.

- 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.
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 Flags** - move the slider to the right to enable CPU flags functionality 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.

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 Flags** - move the slider to the right to enable CPU flags functionality 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.

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 CPU flags configured. For more information refer to the Manage Extended CPU Flags for Compute Zone section of this guide.**

### 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.

### 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.

### 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
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.

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 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.

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.

Manage Compute Zone Data Stores

Data stores can easily be attached and removed from Compute zones. This association between a Compute zone and a data store is called a data store join.

You can add data stores to a compute zone only if the the data store belongs to a data store zone of the same type as the compute zone. For more information refer to Zone Types.

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.

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 the network belongs to a network zone of the same type as the compute zone. For more information refer to Zone Types.

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
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- 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.

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.

View compute zone backup servers

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

Add backup server to compute zone

You can add backup servers to a compute zone only if the the backup server belongs to a backup server zone of the same type as the compute zone. For more information refer to Zone Types.

To add backup server to a compute zone:
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.

Remove backup server from compute zone

See also:
Manage Compute Zone Data Stores
Manage Compute Zone Networks
Manage Compute Zone Recipes
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.

Manage Extended CPU Flags for Compute Zone

OnApp introduces a possibility to use extended CPU flags for compute resources. Enabling extended CPU flags will increase performance and functionality of processors. This functionality is implemented on a per compute zone basis. When enabled per compute zone and properly configured, all compute resources in that zone will inherit the specified extended CPU flags. Hot migration inside such compute zones is more reliable. This feature also allows you to set bigger prices for the better CPUs in buckets.

- It is important that you evaluate the risks of CPU flags misconfiguration before enabling the functionality. Make sure that the list of extended CPU flags that you select is reasonable.
- CPU flag's functionality is relevant to KVM compute resources only. We do not recommend creating mixed XEN/KVM compute zones for better performance.
- When switching on extended CPU flags for compute zone, go through the already existing compute resources to switch off conflicting flags.

Below you can find instructions on how to set and use CPU flags.

Enable CPU flags for compute zone

You can enable extended CPU flags functionality for a compute zone:

- during **compute zone creation**
- while **editing compute zone**

After extended CPU flags functionality is enabled for a compute zone, all compute resources in this zone will use the CPU flags set up for the zone. If no CPU flags are set (for example you haven't configured them yet), then no extended CPU flags are enabled for compute resources in this zone.

Now proceed to **Manage CPU flags** page.

Manage CPU flags

After extended CPU flags functionality is enabled for compute zone, configure the list of enabled CPU flags:

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 CPU flags for.
3. On the screen that appears, click the **Manage CPU Flags** link in the **Tools** section.
4. On the screen that follows you'll see the list of CPU flags that are common for all the compute resources. Also you will see the list of conflicted CPU flags (if any).
5. Click the **Edit** icon. The list of all the flags that are common for all compute resources in a zone will be displayed.
6. Click a flag to enable or disable it. Enabled flags are marked in green, disabled
flags are grayed out.
7. Click Submit.
Adding new compute resources to compute zone with already configured set of flags

There are several scenarios when new compute resources are added to compute zone with already configured set of flags:

- If the new compute resource has the same CPU as those which are already in a compute zone, no problems should occur. The new compute resource will inherit the CPU flags set per compute zone.

- If the new compute resource has the CPU with better performance than those which are already in a compute zone, the new compute resource will inherit the CPU flags set per zone. The other flags will be disabled.

- If the new compute resource has the CPU with worse performance than those which are already in a compute zone, the new compute resource cannot inherit all the CPU flags set per zone, as most probably some of them are missing for this new compute resource. In this case you will be alerted on inconsistency and you will have to make a decision if such compute resource should be added to zone. When you add a compute resource to a compute zone a warning pops up with the info that some flags of this new compute resource are missing. You make a decision to cancel the adding a compute resource to a compute zone, or agree despite the current zone configuration may be broken to proceed adding this compute resource anyway. If you agree, the compute resource is added to a compute zone and you are warned that it is required to manage flags to fix. In this case, go to the Settings > Compute zones > compute zone label > Tools > Manage CPU flags page to switch off the redundant flags. The flags managing page will show the list of flags divided into three columns: Enabled/Disabled/Conflict. You decide which flags to switch on/off.

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.

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:
| LVM   | Virtual/Smart |
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.

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

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.
   - 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.

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.
   - 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.
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.

### 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**.

### 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**.

### 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.

### 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.
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.

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 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.
- **Click Next.**

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.

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.

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:
   - **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.

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.
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:
   - 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.

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 loose control of such a disk and the VS associated with it. If required, create additional disks instead.

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

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.

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.

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.

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.

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:
   - Instant IOPS - IOPS for the last hour
   - Hourly IOPS - IOPS for the last 24 hours
- Instant data written/read - data written/read for the last 24 hours
- 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.
**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:
   - **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.

**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.

**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.

**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.

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.

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.

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:
   - country and city
   - CDN locations
   - Compute resource, data store, network, and backup server zones assigned to this location

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:
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

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

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.

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 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.

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.

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 SANity can only use the Basic Backup Scheme.

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.

---

**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.

**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)
4. Move the **Enabled** slider to the right to enable the backup server.
5. Click the **Add Backup server** button.

- **Backup server zone** - select the backup server zone to which this backup server will be assigned.

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**.

### 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.

   It is possible to move backup servers only between backup server zones of the same type. For more information refer to **Zone Types**.

   - **Enabled** – move this slider to the right to enable the backup server.
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.

### Backup Server Balancing

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:

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

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 \textit{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.

**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:
   - \textit{Date} - the date of the backup creation
   - \textit{Target} - the backup target
   - \textit{Status} - the status of the backup
   - \textit{Backup Size} - the backup size
   - \textit{Initiated} - the way how the backup was created
   - \textit{Backup Server} - the label of the backup server, where backup is created
   - \textit{Note} - the text of the additional note
   - \textit{VS} - the label of VS, where backup is created
   - \textit{Customer} - the owner of the VS, where backup is created
   - \textit{Actions} icon - the actions you can perform with the backup (Convert to template, Delete, Edit Note).

**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!

**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.

**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 **Backup Server 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
   - List of unassigned backup servers

**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.

**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.

**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 server inherits the zone's type. For more information refer to Zone Types.

**Remove Backup Server From Backup Server Zone**

To remove 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 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.

**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.

**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. 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**

**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:
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- **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
- **Duration** - 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

**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

4. Click the Save button to save your changes.

**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.

**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.
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>

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:
     - 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.
   - Location group - select from the drop-down list the location group you wish to assign this network zone to.
   - Instance Package VSs - move the slider to the right if you want the zone to be used when creating Instance Package VSs only. If you enable this option, the zone will not be available in the virtual server creation wizard's Resources step for custom VSs (VSs built by setting resources manually).
4. Click the Save button.

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:
   - Label - the name of the zone
   - Zone type - type of the zone: Virtual, Smart, Baremetal or VPC
   - Location group - the location group with which the zone is associated
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.

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

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**.

### 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**.

### 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.

### 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.

### 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.

### 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**.

### Create firewall

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:
- IP Address for CP communication - IP address used to manage firewall via CP
- CIDR to CP link - internal IP address prefix size
4. Click Add firewall button.

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.

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.

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.

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.

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.

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
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.

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: controlled and arbitrary. Controlled IP nets are the regular type of IP net it OnApp, they contain IPs assigned to users/VsS and are available during server creation. For information on arbitrary IP nets refer to Arbitrary IP Nets.

Click an IP net to view the list of IPs in it with the user and/or VS they are assigned to.

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.

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 Manage Organization Networks and vCloud Director 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.

### 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.

### 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.

### 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.

### Assign IP Address to User

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.
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.
   - **IP Addresses** - IPs and ranges that are to be assigned. You can remove the unnecessary addresses or ranges by selecting them and clicking **Remove**.

6. Click the **Assign** button.

**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**.

**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.

**Create IP Net**

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

Currently, assigning multiple IPs to a user works only with IPv4.

See also:
- Network Settings
- Create and Manage Networks
- Create and Manage IP Ranges
- Virtual Servers
- OnApp Configuration
- Firewalls
- 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.

### 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.

### 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**.

### Create and Manage IP Ranges

IP ranges reside inside IP nets and include the IP addresses within your cloud that are either assigned to a user or used by a VS. The IPs that are neither assigned to a user nor a VS, are not shown in the IP range list, but are available during VS creation. You can add new IP ranges and edit and delete the existing ones. To add IP ranges you first need to create a network and then add an IP net to that network.

You can manage IP ranges only for shared networks.

### Add IP Range to IP Net

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.
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.
6. Click Submit to save the changes.

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.

OnApp Configuration

The Control Panel's OnApp Configuration menu is where you get detailed control over the configuration of OnApp itself.

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.
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

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.

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:

a. Log in as Facebook developer at 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

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.
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.

```
http://onapp.cp
https://myproductionurl.example.com
```

c. In the Authorized redirect URI field, enter your redirect URI callback:

```
http://onapp.cp/users/auth/google/callback
```

It is important to set the configuration indicated in the box above, otherwise the Google will set the default value as http://onapp.cp/callback
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”.

**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.
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.

- Currently, OnApp supports only Windows ADFS identity provider.
- 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.
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:

   - **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

4. Fill in the keys for attributes mapping.

   Either Idp cert or Idp cert fingerprint must be present. If both are provided, Idp cert will take precedence over Idp cert fingerprint.

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 at key** - the key that indicates the period of time in hours after which the user will be suspended
- **Suspend after 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.

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; third-party system users who are not yet registered in OnApp will not be created without this key.</td>
</tr>
<tr>
<td><strong>User bucket key</strong></td>
</tr>
<tr>
<td>The key to assign the user to a particular bucket under which this user will be billed.</td>
</tr>
<tr>
<td><strong>User email key</strong></td>
</tr>
<tr>
<td>The email of the user.</td>
</tr>
<tr>
<td>User name key</td>
</tr>
</tbody>
</table>
### Optional keys for attributes mapping

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First name key</strong></td>
<td>The first name of the user.</td>
</tr>
<tr>
<td><strong>Last name key</strong></td>
<td>The last name of the user.</td>
</tr>
<tr>
<td><strong>Locale key</strong></td>
<td>The language in which OnApp Cloud UI will be available to the user.</td>
</tr>
<tr>
<td></td>
<td>Make sure that the language for this key is selected in the Locales box at the Settings &gt; Configuration &gt; Interface page.</td>
</tr>
<tr>
<td><strong>System theme key</strong></td>
<td>The default system theme that is available in OnApp. There are light and dark system themes that can be used for this key.</td>
</tr>
<tr>
<td><strong>Display infoboxes key</strong></td>
<td>The option that enables or disables the display of infoboxes for the user.</td>
</tr>
<tr>
<td><strong>Disable auto suspend key</strong></td>
<td>The option that enables or disables auto-suspending of the user.</td>
</tr>
<tr>
<td><strong>Suspend after key</strong></td>
<td>The period of time in hours after which the user will be suspended.</td>
</tr>
<tr>
<td><strong>Suspend at key</strong></td>
<td>The date and time when the user will be suspended.</td>
</tr>
<tr>
<td><strong>User group key</strong></td>
<td>The attribute to assign the user to a particular user group.</td>
</tr>
<tr>
<td><strong>Roles key</strong></td>
<td>The key of the role attribute that will create or sync the user's role in OnApp.</td>
</tr>
<tr>
<td></td>
<td>If an irrelevant role attribute is specified for this key, the user will be assigned to a role with no permissions.</td>
</tr>
<tr>
<td><strong>Time zone key</strong></td>
<td>The key of the time zone with which the user will be associated.</td>
</tr>
</tbody>
</table>

The SAML Authentication will work if the optional fields are left blank. Do not fill in these fields if the attributes were not added by the administrator of the Identity Provider.

An example of Attribute Mappings keys may look like the following:

- OnApp key - OnApp_Enabled
- User bucket key - OnApp_Bucket
- User email key - OnApp_UserEmail
- User name key - OnApp_UserName
- First name key - OnApp_FirstName
- Last name key - OnApp_LastName
- Locale key - OnApp_Locale
- System theme key - OnApp_SystemTheme
- Display infoboxes key - OnApp_DisplayInfoboxes
- Disable auto suspend key - OnApp_DisableAutoSuspend
- Suspend after key - OnApp_SuspendAfter
- Suspend at key - OnApp_SuspendAt
- User group key - OnApp_UserGroup
- Roles key - OnApp_Roles
- Time zone key - OnApp_TimeZone

These attributes have to contain values which will be imported or synchronized with corresponding OnApp user entries. The attributes are case insensitive and belong to the following types:
- OnApp Enabled - the boolean type with two possible values that are true or false
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 Uri** - 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.

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
- **Status** - either "Active" or "Disabled"
- **Action** - 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.

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
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

At the bottom of the Licensed Features box, you can see the date of the last sync with the licensing server.

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.

You can control a user's ability to restart license client by enabling or disabling the **Restart Dashboard Client** permission.

### 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.

### 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.

#### Edit System Configuration

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.

- **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.

- **File Upload configuration**
  - **Max upload size** - the maximum file size for ISOs that can be uploaded to boot a VS.

### SAML

You can control a user's ability to restart license client by enabling or disabling the **Restart Dashboard Client** permission.
• *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.

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/.

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.

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

- 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. 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.
- 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.
- 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 /rw/onappstore.conf to /onappstore/onappstore.conf on all Compute resources whenever a change is made.

Please, be aware this is a beta option. We suggest switching to unicast mode only in case you are not able to use multicast. Also, if at least one Virtual Server is running - unicast cannot be turned on.

When the unicast mode is enabled, compute resources must be kept online to maintain full coherency of the database. In the event when a compute resource is offline but still enabled in the Control Panel, any subsequent reboots of other nodes will cause a delay in a convergence of the Integrated Storage database across the nodes that have been rebooted. To avoid this scenario, either:

- Ensure that all compute resources in the unicast group are active and booted (recommended)
- or
- Remove compute resources from the Control Panel if they are inactive for an extended period of time.

- **Enforce datastore redundancy across HVs** - when the slider is enabled, it will be possible to create IS data stores only with the disks that are replicated between different compute resources (in one compute zone). In this case, disks will be created only when there are at least two compute resources in the cloud. If this option is disabled, it will be possible to create data stores with disks that are replicated on hard drives of the same compute resource. In this case, if the compute resource crashes, no failover for disks is possible.

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.

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.

- **Snmptrap port** - port used for snmptrap. This must be greater than 1024.

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.

Edit Backups/Templates Configuration

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

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.

- **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.

**Edit Interface Configuration**

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:
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 Show All button in the list. If the overall number of the items in the list exceeds the number entered herein, Show All button will not be available in the list menu.

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.

Edit Defaults Configuration

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 after you save the new configuration.

**Enable password protection on user deleting** - move this slider to the right to enable confirmation of user deletion by means of administrator password.

**Enforce password complexity** - move this slider to the right to specify the following password complexity configuration settings:

- **Minimum length** - specify minimum required password length (0-99). The default value is 6.
- **Enforce at least one upper and lower case letter** - move this slider to the right to enforce user using both uppercase and lowercase letters in their password.
- **Enforce at least one letter and number** - move this slider to the right to enforce user using both letters and numbers in their password.
- **Enforce symbols** - move this slider to the right to enforce user using symbols in their password.
- **Enforce unique password every time** - move this slider to the right to make user enter unique password each time they change 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.
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.

Anti spoofing 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.

**Page history**

v. 5.6

Updated *Simultaneous migrations per hypervisor* parameter.

**Edit Infrastructure Configuration**

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:

   If you change any settings here and save, the Control Panel server will restart OnApp services.

**Delay in seconds between executing background tasks**

- **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
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- **Snmp stats level2 period** - this process gathers information about the disk usage, network usage, CPU usage statistics and the list of virtual servers
- **Snmp stats level3 period** - this process generates the list of volume groups and logical volumes

If you change any of the **Snmp stats** parameters, you need to restart the OnApp Engine to save changes. To restart the OnApp Engine run the following commands in the console:

```
service onapp-engine stop
service onapp-engine start
```

**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 requeueing to pending queue.. The default value is 30. We recommend increasing this parameter for clouds with thousands of pending long lasting transactions (like backups) in order to decrease CPU/I/O 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

3. Click the **Save Configuration** button to finish.

**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
- **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

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.

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.

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

See also:

- OnApp Configuration
- Logs
- Sysadmin
- Alerts
- Manage Notifications

You need to have messaging permissions enabled to configure notification for the cloud. For more information, refer to List of all OnApp Permissions.

For information on managing subscriptions, gateways and other elements of notifications refer to Manage Notifications.
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. Click the Save Configuration button

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.

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 an SMTP gateway with the System SMTP Gateway label.

   For the SENDMAIL delivery method:
   - Name - 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:
   - Name - the name for your new gateway. The name of the gateway should not contain any special characters.

   For the SMTP delivery method:
   - Name - the name for your new gateway. The name of the gateway should not contain any special characters.
   - From - the email address from which emails will be sent
   - Host - the server IP or URL
   - Smtp address - address of the SMTP server
   - Smtp port - port of the SMTP server
   - Smtp domain - associated domain
   - Smtp user name - user name to login into SMTP server
   - Smtp password - password to login into SMTP server
   - Smtp authentication - select an authentication mechanism from a drop-down menu: plain, login or cram_md5
   - Smtp enable starttls auto - enable the StartTLS extension
6. Click Save to finish the creation process

For information on how to edit and deletegateways refer to Manage Notifications.

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.
To view your notification templates go to Control Panel > Notifications > Notification Templates. The page that loads shows your notification templates with their names 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 name and the text of the template. The name 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 set a "%{message}" text for the template, the notification will contain the full text of the event that is written into logs.

For information on how to edit and delete notification templates refer to Manage Notifications.

Add custom events

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 > System Events. The page that loads shows the lists of event with their details:

- ID - the ID of the event
- Text - the text of the notification that was sent about the event. Click the text to view the whole message.
- Event Type - the type of the event
- Date - the time and date when the event occurred

If required you can add a custom event which can later be selected when setting up a subscription. If you select a custom event a one-time notification will be sent right after the subscription is configured. If you add several custom events, a new one-time notification will be sent when a new custom event is used in a subscription.

To add a custom event:

1. Go to Control Panel > Notifications > Event > Custom Events tab
2. Click the Create new Event button
3. On the page that loads enter a text for you custom event.
4. Click Create to save the new event.

For information on how to delete events for a particular period of time refer to Manage Notifications.

Create recipients lists

Recipients lists determine to whom of your users notifications will be sent. If required, you can add different recipients lists for different events. One recipients list can be used in multiple subscriptions. If you want to send notifications to emails that are not registered in your OnApp cloud, you need to add such contacts as external recipients. Recipients lists can include both OnApp users and external recipients.

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.

To add a new external recipient:

1. Go to Control Panel > Notifications > External Recipients
2. Click the **New External Recipient** or the
   +
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.

For information on how to edit and delete external recipients refer to Manage Notifications.

Recipients Lists

The Recipients Lists section lets you create lists of users whom you want to notify about certain events. Recipients lists are used when setting up a subscription to select whom of the users to notify about which events in the cloud.

To view your recipients lists go to Control Panel > Notifications > Recipients Lists. The page that loads shows your recipients lists with their names and the time when it was created.

Click the name 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 recipients lists refer to Manage Notifications.

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. Click the name of the subscription to view it details.
- **Event** - the event with which the subscription is associated
- **Topic** - the event in case of which notifications will be sent to users
- **Gateway** - the name of the gateway and the means by which the notifications will be sent. Click the gateway to view its details.
- **Template** - the subscription's notification template. Click the template to view its details.
- **Recipients** - the subscription's recipients list. Click the label of the recipients list to view the list of users in it and their emails.

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
   - **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.
   - **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.
   - **Notification template** - select from the drop-down list the notifications template for the subscription. You can use one notification template for several subscriptions.
   - **Gateway** - 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 Save 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
- 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
- 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 add-on 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 > Events > Custom Events. If you select a custom event a one-time notification will be sent right after the subscription is configured.
- 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 delete subscriptions refer to Manage Notifications.

Check if the notifications were delivered

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.

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.
Manage Notifications
OnApp 5.2 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.

### 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.

#### Edit a Gateway

**To edit a 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:**
     - **Name** - 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:**
     - **Name** - the name for your new gateway. The name of the gateway should not contain any special characters.

   - **For the SMTP delivery method:**
     - **Name** - the name for your new gateway. The name of the gateway should not contain any special characters.
     - **From** - the email address from which emails will be sent
     - **Host** - the server IP or URL
     - **Smtp address** - address of the SMTP server
     - **Smtp port** - port of the SMTP server
     - **Smtp domain** - associated domain
     - **Smtp user name** - user name to login into SMTP server
     - **Smtp password** - password to login into SMTP server
     - **Smtp authentication** - select an authentication mechanism from a drop-down menu: plain, login or cram_md5
     - **Smtp enable starttls auto** - enable the StartTLS extension

4. Click **Save** to apply changes

#### Delete a 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.
Manage Notification Templates

Notification templates include message texts that will be sent to your users via email or internal notifications in CP. To view your notification templates go to Control Panel > Notifications > Notification Templates. The page that loads shows your notification templates with their names and the template's text. If a template contains a long message, only the beginning of the text will be displayed.

Edit a 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.
4. Click Save for the changes to take effect

Delete a 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.

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.

Edit External Recipients

To edit an external recipient:

1. Go to Control Panel > Notifications > External Recipients
2. Click the Actions icon next 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

Delete External Recipients

To delete an external recipient:

1. Go to Control Panel > Notifications > External Recipients
2. Click the Actions icon next to the recipient you want to edit and select Delete
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 your recipients lists with their names and the time when it was created.

Click the name of the recipient list to view its list of users with their emails.

Edit a Recipients List

To edit a recipients list:

1. Go to Control Panel > Notifications > Recipients Lists
2. Click the Actions icon new 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

Delete a Recipients List

To delete a recipients list:

1. Go to Control Panel > Notifications > Recipients Lists
2. Click the Actions icon next to the required subscription and select Delete

A recipients list that is associated with at least one subscription cannot be deleted.

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

Delete events, deliveries or notifications for a particular period

You can delete events, deliveries or notifications for a particular time period by using one of the following rake tasks in the console. You need to change the dates in the examples below to the ones you require.

- Delete events for a particular period:

  messaging:clean_notification_element[event,2016-09-21,2016-09-23]

- Delete deliveries for a particular period:
Delete notifications for a particular period:

```plaintext
messaging:clean_notification_element[delivery,2016-09-21,2016-09-23]
```

**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

**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.

**List of all OnApp Permissions**

The list below includes all the permissions that can be set up in OnApp.

- Activity logs
- Application Servers
- Approvals
- Autoscaling Configuration
- Autoscaling monitors
- Auto-backup presets
- Availability
- Backup server zones
- Backup servers
- Backups
- Base resources
- Buckets
- Blueprints
- Blueprint templates
- Blueprint template groups
- Blueprint template group relations
- CloudBoot
- Compute resources
- Compute Resource Devices
- Compute zones
- Container Servers
- Dashboard
- Data stores
- Data store joins
- Data store zones
- Disks
- DRaaS
- Federation
- Federation failed action
- Firewall rules
- Global search
- Groups
- Help
- HTTP Caching Rules
- Instance packages
- Internationalization
- IO Limiting
- IO Statistics
- IP addresses
- ISOs
- Last access log
- Load balancers
- Load balancing clusters
- Location Groups
- Log items
- 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
- Nameservers
- Networks
- Network zones
- OnApp Storage
- OAuth Providers
- OVAs
- Payments
- Permissions
- Provider Resource Pools
- Recipes
- Recipe Groups
- Recipe Group Relations
- Relation group templates
- Resource Diff
- Resource limits
- Restrictions Resources
- Restrictions Sets
- Roles
- SAML Identity Providers
- Schedule logs
- Schedules
- Service Add-ons
- Service Add-on Groups
- Service Catalog
- Service insertion Groups
- Service insertion Pages
- Sessions
- Settings
- Smart Servers
- SSH keys
- Sysadmin tools
- Templates
- Template groups
- Themes
Activity logs

OnApp administrators can control users' ability to manage activity logs configuration through the Control Panel's Roles menu. The following activity logs for user roles can be set:

- **Any action on Activity Logs** - the user can take any action on activity logs
- **Destroy any Activity Logs** - the user can delete activity logs
- **Destroy own Activity Logs** - the user can only delete their own activity logs
- **See list of all Activity Logs** - the user can see list of all activity logs
- **See all Activity Logs** - the user can see all activity logs
- **See all own Activity Logs** - the user can only see their own activity logs

Application Servers

OnApp administrators can control users' ability to manage application servers. This is handled through the Control Panel's Roles menu. You can set the following application servers permissions for user roles:

- **Any action on application servers** – the user can take any action on application servers
- **Change an owner of any application server** – the user can change the owner of any application server
- **Create a new application server** – the user can create a new application server
- **Destroy any application server** – the user can delete any application server. To delete any application server together with its backups, the user needs to have the **Destroy any backup** permission enabled. Otherwise, the backups of the application server deleted by the user will remain in the system.
- **Destroy own application servers** – the user can only delete their own application servers. To delete an application server together with its backups, the user needs to have the **Destroy own backup** permission enabled. Otherwise, the backups of the application server deleted by the user will remain in the system.
- **Migrate any application server** – the user can migrate any application server
- **Migrate own application servers** – the user can only migrate their own application servers
- **Any power action on application servers** – the user can take any power-related action on application servers
- **Any power action on own application servers** – the user can only take power-related actions on their own application servers
- **See all application servers** – the user can view any application server. If this permission is enabled, the user can manage applications deployed on any application server.
- **See own application servers** – the user can only view their own application servers. If this permission is enabled, the user can manage applications deployed on their application servers
- **Read VIP status** - the user can read VIP status of application servers.
- **Rebuild Network on any application server** – the user can rebuild network of any application server
- **Rebuild Network on own application servers** – the user can only rebuild network of own application servers
- **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.

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.
OnApp administrators can control users' ability to manage VS autoscaling configuration through the Control Panel's Roles menu. The following autoscaling permissions for user roles can be set:
Any Actions with Autoscaling Configuration - the user can take any action on autoscaling configuration
Create Autoscaling Configuration - the user can create autoscaling configuration
Destroy any Autoscaling Configuration - the user can delete autoscaling configuration
Destroy own Autoscaling Configuration - the user can only delete own autoscaling configuration
Read all Autoscaling Configuration - the user can read autoscaling configuration
Read own Autoscaling Configuration - the user can only read own autoscaling configuration
Update all Autoscaling Configuration - the user can edit autoscaling configuration
Update own Autoscaling Configuration - the user can only edit own autoscaling configuration

For details, refer to the Autoscale Virtual Server section.

Autoscaling monitors
OnApp administrators can control users' access to monitis monitors. You can set the following monitis monitors permissions for user roles:

- Any Actions on relation autoscaling monitors - the user can perform any actions on relation monitis monitors
- View autoscaling monitor information - the user can view monitis monitor information

For details, refer to 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 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

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 Backup Server Zones Settings chapter.

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 Backup Servers Settings chapter.

**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 Virtual Server Backups section.

**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 Buckets chapter.

**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 Buckets chapter.

**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 Blueprint Servers section.

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
- 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 Blueprint Templates section.

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
- Read own blueprint template group - the user can see details of own blueprint template group
- Update any blueprint template group - the user can edit any blueprint template group
- Update own blueprint template group - the user can edit own blueprint template group

For details, refer to 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

For details, refer to Blueprint Template Groups section.

CloudBoot

- Manage CloudBoot configurations - the user can manage Cloud Boot settings

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 Compute Resource Settings chapter.
**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

**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 chapter.

**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 chapter.

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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

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 Currencies section.

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 Dashboard section.

Data stores

OnApp administrators can control user access to data store 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 Data Stores Settings section.

Data store joins

OnApp administrators can control users’ ability to manage data store joins through the Control Panel's Roles menu. You can set the following data store joins permissions for user roles:

- All actions on datastores on Compute resource - the user can take any action on data stores attached to a Compute resource
- Add Data Store to any Compute resource - the user can add a data store to any Compute resource
- Remove Data Store from any Compute resource - the user can detach a data store from any Compute resource

For details, refer to Manage Compute Zone Data Stores section.

Data store zones
OnApp administrators can control user access to data store zones management. You can set the following data store zone permissions for user roles:
- Any action on data store zones - the user can take any action on data store zones
- Create a new data store zone - the user can create a new data store zone
- Delete any data store zone - the user can delete any data store zone
- See list of all data store zones - the user can see list of all data store zones
- See details of any data store zone - the user can see details of any data store zone
- Update any data store zone - the user can edit any data store zone

For details, refer to Data Store Zones Settings section.

**Disks**

OnApp administrators can control user access to disks management. You can set the following disks permissions for user roles:

- Any action on disks - the user can take any action on disks
- Assign any disk to VS - the user can assign the disks of any users to another VS of that user
- Assign own disk to VS - the user can assign own disks to another own VS
- Auto-backup for any disk - the user can schedule an automatic backup on any disk
- Auto-backup for own disk - the user can only schedule automatic backups on their own disks
- Create a new disk - the user can create a new disk
- Destroy any disk - the user can delete any disk
- Destroy own disk - the user can only delete their own disks
- Migrate any disk - the user can migrate any disk
- Migrate own disks - the user can only migrate their own disks
- See all disks - the user can see all disks
- See own disks - the user can only see their own disks
- Unlock any disk - the user can unlock any disk
- Update any disk - the user can edit any disk
- Update own disk - the user can only edit their own disks

For details, refer to Virtual Server Disks section.

**DRaaS**

OnApp administrators can control users’ ability to manage DRaaS through the Control Panel’s Roles menu. You can set the following DRaaS permissions for user roles:

- Any action related to DRaaS - the user can take any action related to DRaaS

**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.

**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
Firewall rules
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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.

**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.

**Groups**

This set of permissions is reserved for future use and currently is not used. Enabling or disabling those permissions will not effect the system in any way.

**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.

**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.

**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.
Internationalization
Edit Internationalization Locales - the user can view and edit all non-English language phrases

For details, refer to Localization and Customization chapter.

**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 Edit Data Store IO Limits section.

**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 View Disk IOPS section.

**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 Assign/Unassign IP Address to User section.

**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 ISOs section.
**Last access log**

OnApp administrators can control users’ access to log. 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

**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 **Load Balancers** section.

**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 cluster
- **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 **Load Balancers** section.

**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
- **Delete own location group** - the user can only delete own location groups
- **See all location groups** - the user can see details of any location group
- **Refresh location groups** - the user can refresh location groups

For details, refer to **Location Groups** section.

**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 **Logs** section.
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

**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 **Notifications Setup** section.

**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 **Notifications Setup** section.

**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 **Notifications Setup** section.

**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 **Notifications Setup** section.

**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 **Notifications Setup** section.
**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 [Notifications Setup](#) section.

**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 [Notifications Setup](#) section.

**Messaging: Subscriptions**

OnApp administrators can control users’ access to messaging subscriptions. You can set the following subscriptions permissions for user roles:

- **Any action on recipients subscriptions** - the user can perform any action on messaging subscriptions
- **Add a new subscription** - the user can add new messaging subscriptions
- **Delete subscription** - the user can delete any subscriptions
- **See all subscriptions** - the user can view all subscriptions

For details, refer to [Notifications Setup](#) section.

**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

**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

**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
**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

**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 **Network Zones Settings** section.

**OnApp Storage**

- **Manage OnApp storage** - the user can access the OnApp storage settings

**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 **User Profile** section.

**OVAs**

OnApp administrators can control users' ability to manage OVAs. This is handled through the Control Panel's Roles menu. You can set the following OVA permissions for user roles:

- **Any action on OVAs** - the user can take any action on OVAs
- **Create a new OVA** - the user can create a new OVA
- **Destroy any OVA** - the user can delete any OVA (own, user, and public)
- **Destroy own OVA** - the user can only delete own OVA
- **Destroy user OVA** - the user can delete OVAs created by any user, but not public OVAs
- **Make any OVA public** - the user can make public any OVA available to all users
- **Make own OVA public** - the user can make public own OVAs only
- **Create and manage OVAs** - the user can create and edit/delete/view OVAs
- **Manage public OVAs** - the user can manage public OVAs
- **Create and manage user OVAs** - the user can view/create/edit/delete OVAs created by any user
- **See all OVAs** - the user can view all OVAs in the cloud
- **See own OVAs** - the user can only view the OVAs created by themselves
- **Read all public OVAs** - the user can view all public OVAs
- **See user OVAs** - the user can view the OVAs created by any user in the cloud
- **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 **OVAs** section.
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 [User Payments](#) section.

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

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

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 [Recipes](#) chapter.

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 [Recipe Groups](#) chapter.

Recipe Group Relations
- *Any action on recipe group relations* - the user can take any action on recipe relation group
- *Create a new recipe group relation* - the user can create a new recipe relation group
- *Destroy any recipe group relation* - the user can delete any recipe relation group
• See list of all recipe group relations - the user can view the list recipe relation groups
• See all recipe group relations – the user can see recipe relation group details
• Update any recipe group relation – the user can edit any recipe relation group

For details, refer to Recipe Groups chapter.

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 Template Store and My Template Groups section.

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

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.

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)

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
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 Roles chapter.

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

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 Schedules Settings section.

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 Schedules Settings 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 Service Add-ons section.

### 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 Manage Service Add-on Store section.

### 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

### 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 Service Insertion Framework Configuration section.

### 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 Service Insertion Framework Configuration section.

### 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 View User Account Details section.
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 OnApp Configuration chapter.

Smart Servers

OnApp administrators control how users can manage Smart Servers. This is handled through the Control Panel's Roles menu. You can set the following Smart Servers permissions for user roles:

- Add recipe to any Smart Server - the user can add recipes to any smart server
- Add recipe to own Smart Server - the user can add recipes to own smart servers only
- Remove recipe from any Smart Server - the user can remove a recipe from any smart server
- Remove recipe from own Smart Server - the user can remove recipe from own smart server

For details, refer to Smart Servers chapter.

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 Add SSH Key section.

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 Sysadmin section.

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

For details, refer to Templates section.
• *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
- 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 Templates chapter.

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 Template Store and My Template Groups sections.

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 Look & Feel section.

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 log - 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 Virtual Server Transactions and Logs and Smart Server Transactions and Logs sections.

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
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- 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

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 Users chapter.

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 User Additional Fields section.

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
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:

- 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 Groups section.

Create a new virtual server – the user can create a new virtual server
Migrate an existing virtual server – the user can only migrate their own virtual servers
Migrate own virtual server – the user can only migrate their own virtual servers
Any power action on virtual servers – the user can take any power-related actions on virtual servers
Any power action on own virtual servers – the user can only take power-related actions on their own virtual servers
Allow user to reset or change root password of own virtual server - the user can reset the root password for any virtual server
Change an owner of any virtual server – the user can change the owner of any virtual server
Set VIP status of own virtual server - the user can set VIP status of any virtual server
Add/Remove any virtual server – the user can add or remove any virtual server
Remove any virtual server – the user can delete any virtual server
Consoles for own virtual server – the user can only access their own virtual server via console
Accelerate own virtual server - the user can only accelerate their own virtual server
Accelerate any virtual server - the user can accelerate any virtual server
Set SSH keys - the user can set SSH keys for any virtual server
Set SSH keys for own virtual server - the user can only set SSH keys for their own 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 their own virtual servers
Manage recipes joins for own virtual servers - the user can manage recipes joins for all virtual servers
Manage recipes joins for all virtual servers - the user can manage recipes joins for all virtual servers
Any power action on virtual servers – the user can take any power-related action on virtual servers
Any action on virtual servers – the user can take any action on 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
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
Allow own virtual servers to boot from ISO - the user can boot from ISO their own virtual servers only
Allow to purge content of own virtual servers - the user can purge content of their own virtual servers
Allow to purge content of all virtual servers - the user can purge content of any virtual server.
For details, refer to Appliances section.
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 Virtual Server Statistics section.

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 Virtual Server IP Addresses section.

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 User Whitelist IPs section.

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

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 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

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 action 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 action on ISOs
Last Access Log

- Any action on last access log - the user can perform any action on last access log of any user
Load Balancers
- Any action on load balancer - the user can take any action on load balancer

Load Balancing Clusters
- Any action on load balancing cluster - the user can make any action on relation load balancing

Location Groups
- Any action on location groups - the user can take any action on location groups

Log Items
- Any action on log items - the user can take any action on log items

Messaging: Deliveries
- Any action on deliveries - the user can perform any action on deliveries

Messaging: Events
- Any action on events - the user can perform any action on messaging events

Messaging: External Recipients
- Any action on external recipients - the user can perform any action on external recipients

Messaging: Gateways
- Any action on gateways - the user can perform any action on gateways

Messaging: Notifications
- Any action on notifications - the user can perform any action on notifications

Messaging: Notification Templates
- Any action on notification templates - the user can perform any action on notification templates

Messaging: Recipients Lists
- Any action on recipients lists - the user can perform any action on recipients lists

Messaging: Subscriptions
- Any action on recipients subscriptions - the user can perform any action on messaging subscriptions

Monthly Billing Statistics
- Full access to Monthly Bills Statistics - the user has full access to monthly bills statistics

Nameservers
- Any action on nameservers - the user can take any action on nameservers

Network Zones
- Any action on network zones - the user can take any action on network zones

Networks
- Any action on networks - the user can take any action on networks

OAuth Providers
- Any action on OAuth providers - the user can take any action on OAuth providers

OnApp Storage
- Manage OnApp storage - the user can access the OnApp storage settings
OVAs
• Any action on OVAs - the user can take any action on OVAs

Payments
• Any action on payments - the user can take any action on payments

Permissions
• Any action on permissions - the user can take any action on permissions

Recipes
• Any actions on Recipes - the user can take any action on recipes

Recipe Groups
• Any action on recipe groups - the user can take any action on recipe groups

Recipe Group Relations
• Any action on recipe group relations - the user can take any action on recipe relation groups

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

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

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
• 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 own key
- Update own Yubikey - the user can modify their own Yubikey

Virtual server snapshots

- Create or restore own virtual server snapshot - the user can create/restore own snapshots
- Destroy own virtual server snapshot - the user can delete own snapshots
- See own virtual server snapshots - the user can see the list of own snapshots

Virtual Servers

- Build/rebuild user's own virtual server - the user can build/rebuild their own virtual server's only
- Console to own virtual server - the user can only access their own virtual server via console
- Create a new virtual server - the user can create a new virtual server
- Destroy own virtual server - the user can only delete their own virtual servers
- Manage publications for all virtual servers - the user can manage publications for all virtual servers
- Migrate own virtual server - the user can only migrate their own virtual servers
- Any power action on own virtual servers - the user can only take power-related actions on their own virtual servers
- See own virtual servers - the user can only see their own virtual servers
- Read Virtual Server's root password - the user can read Virtual Server's root password
- Rebuild network of own virtual server - the user can only rebuild network of own virtual server
- Manage recipes joins for own virtual servers - the user can manage recipe joins for own virtual servers
- Reset root password 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

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.

Logs

OnApp logs all cloud management actions that take place on cloud resources, including virtual
servers, disks, data stores, compute resources, templates, networks.
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

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*.

**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**

**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:
OnApp Cloud 5.6 administration Guide

- 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:
1. Level 1 - every 10 seconds. CP gets info about Compute resources uptime/virtual servers' statuses.
2. Level 2 - every 60 seconds. CP gets info about the disk usage, network usage, CPU usage statistics and the list of virtual servers.
3. 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:
1. Level 1 - every 60 seconds.
2. 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.

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.

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
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

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. 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 VSS</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 the SSH keys run the following command:

```
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.

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**.

Set Up a New Zabbix Server

- 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 the SSH keys run the following command:

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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.

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**.

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.

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.

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.

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.

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.
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.

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** - VSSs which are detected by the OnApp controller as currently running on a Compute resource, but which are not in OnApp's database. Also, VSSs 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,
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.

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).

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.

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).

See also:
Cloud Usage
CDN Usage
Top IOPS disks
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>IOPS (items)</th>
<th>Bandwidth (KB)</th>
<th>Virtual Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>operating system of VS</td>
</tr>
<tr>
<td>Label</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>the name of the server</td>
</tr>
<tr>
<td>Disk Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>disk size allocated to VS</td>
</tr>
<tr>
<td>RAM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>the RAM size available to VS</td>
</tr>
<tr>
<td>Compute resource</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>compute resource on which VS is built</td>
</tr>
<tr>
<td>User</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>username of VS owner</td>
</tr>
</tbody>
</table>

Current Usage:
- the used amount of CPU cores for the last hour
- the used amount of Memory for the last hour
- the used amount of Disk for the last hour

Usage:
- 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.

Current Data:
- the latest instant usage data that we have

Data:
- the total for the whole period is displayed

Created at:
- server creation time

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>
</tbody>
</table>
IOPS shows the total of data read/written for the entire cloud per hour

IOPS shows the total of data read/written for each day for the entire cloud

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

Baremetal servers 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

Smart Servers 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

VSs 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

Bandwidth shows the total bytes sent/received for each day for the entire cloud for the time period set

Cloud Usage

The Usage Statistics screen lists every virtual server in the cloud, along with their details:

- Owner - the owner's username.
- CPU used - the average CPU percentage that the VS has been using during the last 72 hours or during the specified period.
- Disk reads completed - the number of read operations performed by the disk.
- Disk writes completed - the number of write operations performed by the disk.
- Disk data read - the amount of data read from a disk.
- Disk data written - the amount of data written to a disk.
- Bandwidth sent - the number of Bytes sent by this VS.
- Bandwidth received - the number of Bytes received by this VS.

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 per second.

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.

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.

Add Custom Languages

You can add custom languages by translating the phrases using Control Panel UI. To do so:
1. Go to your Control Panel's Settings i18n Customization menu.
2. Click Add new locale button and select the required language from the list and click Submit.
3. In the i18n Customization menu click the appropriate custom language name.
4. On the screen that appears:
   - Subset name – the names correspond to the .yml files located at /onapp/interface/config/locales directory
   - English Items – the number of phrases in the original language files
   - Custom Language Items – the number of translated phrases in the custom language files
   - Missing Items – the number of phrases which haven’t been translated yet to a custom language
   - Out of Date Items – the number of phrases which have changed in English since the translation was made
5. Click a subset name. On the screen that follows:
   - Provide a translation in the Custom Language Phrase field next to an appropriate English value. Click Update.
   - To copy the English value to a target custom language, click the >> button in the Copy column next to a required value.
6. Restart the HTTPD service to apply new locale.

Click the Out of date tab to view phrases that exist in English and your custom language, but where the English phrase has been changed since the last translation.

Click the Missing tab to view phrases that exist in English but are missing in your custom language.

Click the Missing or out of date tab to view phrases that either exist in English but not in your custom language or exist in both languages but the English phrase has changed since the last translation.

Make sure that the required locales are added in Settings > Configuration > Interface Locales field. Unless you add the locales in Settings, customers will not be able to switch locale.

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. For this:
1. Make sure that the required locales are added in Settings > Configuration > Interface Locales field. Unless you add the locales in Settings, customers will not be able to switch locale.
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.

Currencies

By default, the system includes three currencies: USD, EUR and GBP. You can add more currencies at any time.

Create 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. 1,000,000.
   - 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.

Be aware, that it is prohibited to set the delimiter and separator which are identical.

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
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

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.

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.

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
To search:

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. On the following page, click the appropriate Subset Name (e.g. “core”).
6. Type the search phrase into the search box and click Search.
7. If required, make changes and click Update.

Look & Feel

You can change look of OnApp Control Panel in several ways:

- using Look & Feel UI options
- adding your custom CSS rules
- adding your custom Java Scripts

Please, be aware that OnApp supports the following:

- Two latest versions of most popular browsers are supported (Google Chrome and Firefox)
- Opera is not supported
- Javascript must be enabled in the browser

Look & Feel menu

You can skin 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 skin 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.
- Url – enter an URL you wish to link to instead of http://www.onapp.com/.
- Color- this is the color displayed in the main body of the page (e.g. behind the fields you're currently editing).
  - To change the color, click the field to pop up a palette chooser, or enter a CSS color code.
  - To revert to the default color, leave this field blank.
  - The color will not be displayed unless any full screen Background Image you're using is disabled.
- Text – specify the text which will be added after Powered by instead of OnApp.
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.

**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:

   ```html
   body *{background-color: lightblue;}
   ```

3. Save the file.
4. Go to OnApp Control Panel and refresh it. The background color will be changed:

![Custom CSS image](image)

**Custom Java scripts**

You can add your own Java scripts to customize OnApp Control Panel.

To add a Java script:

2. Create `custom.js` file with script code you want to add.
3. Save the file.
4. Go to OnApp Control Panel and refresh it.

**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
Take the following steps 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.

### Service Insertion Groups

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 .

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.

### Service Insertion Pages

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 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
7. Click Submit.

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.

**Miscellaneous**

This chapter describes more sophisticated operations, which help manage different OnApp functionalities. It is highly recommended that only advanced users perform these tasks.

**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:
OnApp Cloud 5.6 administration Guide

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.

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.
3. Select Internet Protocol (TCP/IP) and click 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.

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.

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)

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 servers 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.

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.
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.

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:
   a. 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.
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.

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

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.

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 afterwards aggregated into raw hourly statistics (in most of 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']
```

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 to make a copy of the configuration file before making any changes.

<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>
</tr>
<tr>
<td>max_memory_ratio</td>
<td>16</td>
</tr>
<tr>
<td>ssh_port</td>
<td>22</td>
</tr>
<tr>
<td>use_ssh_file_transfer</td>
<td>false</td>
</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>Configuration</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------</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>
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</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>
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<td>simultaneous_backups_per_datastore</td>
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</tr>
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<td>enable_huge_pages</td>
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<tr>
<td>schedule_failure_count</td>
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<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>Configuration</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>app_name</td>
<td>OnApp</td>
</tr>
<tr>
<td>show_ip_address_selection_for_new_vm</td>
<td>false</td>
</tr>
<tr>
<td>backup_taker_delay</td>
<td>300*</td>
</tr>
<tr>
<td>cdn_sync_delay</td>
<td>1200</td>
</tr>
<tr>
<td>billing_stat_updater_delay</td>
<td>5</td>
</tr>
<tr>
<td>zombie_disk_space_updater_delay</td>
<td>300</td>
</tr>
<tr>
<td>cluster_monitor_delay</td>
<td>15</td>
</tr>
<tr>
<td>hypervisor_monitor_delay</td>
<td>5</td>
</tr>
<tr>
<td>schedule_runner_delay</td>
<td>60*</td>
</tr>
<tr>
<td>transaction_runner_delay</td>
<td>300*</td>
</tr>
<tr>
<td>zombie_transaction_time</td>
<td>20</td>
</tr>
<tr>
<td>kms_server_host</td>
<td></td>
</tr>
<tr>
<td>kms_server_port</td>
<td>1</td>
</tr>
<tr>
<td>ip_range_limit</td>
<td>1000</td>
</tr>
<tr>
<td>same_autoscaleout_nodes_virtualization_system</td>
<td>true</td>
</tr>
<tr>
<td>dns_enabled</td>
<td>false</td>
</tr>
<tr>
<td>enabled_libvirt_anti_spoofing</td>
<td>false</td>
</tr>
<tr>
<td>allow_start_vms_with_one_ip</td>
<td>true</td>
</tr>
<tr>
<td>allow_initial_root_password_encryption</td>
<td>false</td>
</tr>
<tr>
<td>wipe_out_disk_on_destroy</td>
<td>false</td>
</tr>
<tr>
<td>password_enforce_complexity</td>
<td>true</td>
</tr>
<tr>
<td>password_minimum_length</td>
<td>12</td>
</tr>
<tr>
<td>password_upper_lowercase</td>
<td>true</td>
</tr>
<tr>
<td>password_letters_numbers</td>
<td>true</td>
</tr>
<tr>
<td>password_symbols</td>
<td>true</td>
</tr>
<tr>
<td>password_force_unique</td>
<td>true</td>
</tr>
<tr>
<td>password_lockout_attempts</td>
<td>3</td>
</tr>
<tr>
<td>password_expiry</td>
<td>1</td>
</tr>
<tr>
<td>password_history_length</td>
<td>12</td>
</tr>
<tr>
<td>cloud_boot_enabled</td>
<td>false</td>
</tr>
<tr>
<td>nfs_root_ip</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>cloud_boot_target</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>storage_enabled</td>
<td>false</td>
</tr>
<tr>
<td>prefer_local_reads</td>
<td>false</td>
</tr>
<tr>
<td>vmware_cluster_name</td>
<td>OnApp</td>
</tr>
<tr>
<td>service_account_name</td>
<td>onapp</td>
</tr>
<tr>
<td>system_alert_reminder_period</td>
<td>60</td>
</tr>
</tbody>
</table>
* - these values are recommended for the specified parameters in order to provide more stable daemon workflow.

**Daemon workflow**

To provide more stable daemon workflow, for deployments with a high load we recommend increasing values for the following parameters in the `/onapp/interface/config/on_app.yml` file:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Recommended value</th>
</tr>
</thead>
<tbody>
<tr>
<td>backup_taker_delay</td>
<td>300</td>
</tr>
<tr>
<td>schedule_runner_delay</td>
<td>60</td>
</tr>
<tr>
<td>transaction_runner_delay</td>
<td>300</td>
</tr>
</tbody>
</table>

**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.

**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>
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>

### 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
```

**Usage:**

```
track -p <PID> -l|--log-folder <log folder> -d|--pid-folder <pid folder>
```

Logs folder structure: `<LOG-FOLDER>/PID`.

**Example:**

```
LOG-FOLDER = /tmp/logs
PID = 4242
Result: /tmp/logs/4242/
```

**Options:**

- **Required:**
  - `-p|--pid`
    - PID of target process
  - `-l|--log-folder`
    - Folder, where logs are stored
  - `-d|--pid-folder`
    - Folder, where pid files are stored

- **Optional:**
  - `-t|--time-interval`
    - Refresh time in seconds. Works only for main log and lsof command
    - Default: 1 second
  - `-m|--memory-alert-step`
    - Memory alert size. In megabytes.
    - Default: 100m
  - `-r|--log-max-size`
    - Max log size, before it rotates. In megabytes.
    - Default: 100m

**Example:**

```
track.sh -p 4242 -l /tmp/logs -d /tmp/pids
```

### Virtual Server Provisioning

Under certain circumstances, your virtual servers that are offline might be implicitly cold migrated to another compute resource within one compute zone. This occurs after manual start up with no additional information in the logs, when the compute resource cannot provide sufficient resources for the VS or is offline. If the compute resource is offline or OnApp considers that there are not enough resources to start the VS,
usually because there is not enough free RAM available, the VS is implicitly cold migrated to a compute resource with sufficient resources and started there.
The mentioned conditions may also appear if a compute resource was rebooted, then came back online, but the information about its free and total RAM has not yet been obtained from the compute resource and you attempt to start up the VS. In such a case, OnApp considers that the compute resource does not have sufficient resources and migrates the VS.

To avoid such behavior, check the compute resources list at **Control Panel > Settings > Compute Resources** to see whether a compute resource you are interested in is online and actual information about its RAM is displaying. If there is enough free RAM for the VS, starting the virtual server will be done on the checked compute resource.

### 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 at the following guide [https://developers.google.com/maps/documentation/javascript/get-api-key](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.

### 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, onapp-vnc-proxy services)
- Background services (onapp-engine, onapp-ssh-agent services)
- Cloudboot (nfs, xinetd, dhcpd services)
- Load Balancer
- Redis
- Message Queue
- Database

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 operates 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 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.

## 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 the **Apply Changes** button at Control Panel > HA Clusters > General for the changes to take effect.

- View Hosts
- Add a Host
- Edit a Host
- Delete a Host

### 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 host in your configuration with their details:
   - **Hostname** - the host name of the host
   - **Nodes** - the quantity of nodes on this host assigned some clusters and the number of clusters in the system
   - **Clusters** - the labels of cluster to which this host is assigned
   - **Options** - the host options
   - **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.
   - **Actions** - click the **Actions** button to edit or delete a host or to add options for it.

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
- **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.

### Add a 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**.

### Edit a 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**.
Delete a 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.

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, the 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.

View Communication Ring

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.

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
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.

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.

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 the Apply Changes button at Control Panel > HA Clusters > General for the changes to take effect.

- View Clusters
- Add Cluster
- Add Node to Cluster
- Edit Cluster
- Deactivate/Activate Cluster

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:
   - 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.

### 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.

### 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 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**.

### 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**.
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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.

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.

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.

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.

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.

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.

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.

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.
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.

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.

**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.

**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

**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.

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.
- Alternatively, you can call +1 (888) 876-8666 or use the OnApp support portal.