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This guide outlines the features of the OnApp 5.1 cloud hosting engine. It describes the basics of the engine architecture and explains how to create virtual machines and work with OnApp.

The OnApp User Guide includes the following chapters:

1. **Document Conventions** - describes the formatting conventions used in this guide.
2. **Default Permissions for User Role** - covers the list of default permissions set for the user role.
4. **Control Panel Overview** - familiarizes with the OnApp Control Panel Dashboard and briefs you on how you can deal with User Profile.
5. **Appliances** - describes the utilization of virtual and physical devices that can be provisioned in the cloud.
7. **Templates** - provides details on what an OnApp template is, types of templates, as well as how you can create a custom template and build a VS based on it. Besides, it includes **ISOs** chapter, which describes how to upload your custom bootable ISOs for recovery purposes.
8. **Recipes** - describes the use if recipes for adding new functionalities to the cloud.
10. **AWS** - describes possibility to manage Amazon EC2 instances from OnApp Control Panel using AWS API.
11. **Users** - outlines the Users section of the OnApp Control Panel.
12. **Groups** - provides an overview of organization of the OnApp users into user groups.
13. **Logs** - provides the list of transactions available with OnApp and tells how to view them.
14. **Statistics** - outlines the statistics on the resources used by your virtual machines.
15. **Billing Plans** - familiarizes with the OnApp billing system and explains how the base resource limits and prices are set in the Control Panel.

This guide describes the OnApp Cloud functionalities available for the user with the default **User** role permissions. Users are created by administrators and only have access to those actions which are specified by the administrator. Cloud administrator may edit permissions for the **User** role, therefore the availability of some features may vary. Contact your administrator for more information.
1 DOCUMENT REVISIONS

5.1 version

- Added Container Servers chapter
- Added info about vCloud Director functionality
- Control Panel's Roles&Sets and Users&Groups menu now are split into separate sections - Users, Groups, Roles, Sets.
- Updated Edit Virtual Server Disks section: added warning about cancelling disk resize transaction
- Updated Create Custom Templates section: added info about error message during converting backup into template
- Updated Default Permissions for User Role section: added container server related permissions

5.0 version

- Updated Create Virtual Server, Create ISO Virtual Server, Create Smart Server, Create Baremetal Server sections: added information about VS summary at the confirmation step of creation wizard; added password auto-generation if password field is left blank
- Updated Create Smart Server, Create Baremetal Server sections: compute resource and compute zone steps are moved from properties to resource step in creation wizard

4.3 version

- The following terminology changes have been made in the 4.3 version of the OnApp Cloud: instance types have been renamed as instance packages.

4.2 version

- Updated Create Virtual Server section
- Updated Create Smart Server section
- Updated User Profile section
- Updated Default Permissions for User Role section
- Updated Virtual Server Transactions and Logs section
5.1 User Guide

DOCUMENT REVISIONS - MAIN COMPONENTS & FEATURES

- Updated View Compute Resources section
- Updated CDN Setup Wizard section
- Updated Virtual Server Backups section
- Updated Smart Server Backups section
- Updated View Virtual Servers section
- Updated View Virtual Server Details section
- Updated View Compute Resource Details section
- Updated Edit Virtual Server Disks section
- Updated Autoscale Virtual Server and Autoscale Smart Server sections

4.1 version
August, 2015
- Added Raw Logs section
- Updated Delete Virtual Server section
- Updated User Profile section
- Updated View User Account Details section
- Updated Step 3 of 6. Virtual Server Properties section
- Updated Edit Virtual Server section
- Updated Create Smart Server section
- Updated Edit Smart Server section

4.0 version
April, 2015
- Added CDN SSL Certificates chapter
- Added Step 1 of 6. Cloud Locations section
- Added VCloud Compute Resources section
- Added ISOs chapter
- Updated Default Permissions for User Role section

3.5 version
17th March, 2015
- Added AWS chapter
- Updated User Profile section.
- Updated User Billing Statistics section.
- Updated Default Permissions for User Role
## 2 DOCUMENT CONVENTIONS

The following document conventions are used in this guide.

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

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

In some cases, code examples can be preformatted. For example:  
Run the following commands:  
echo "cp <LOCATION OF vnc.xml> /etc/vmware/firewall/vnc.xml" >> /etc/rc.local  
echo "localcli network firewall refresh" >> /etc/rc.local  
echo "esxcli network firewall refresh" >> /etc/rc.local

| **A menu selection** | For example: Go to **Settings -> Networks -> Add New Network** |

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

### Info

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

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

### Note

A Note message contains information essential for the task completion.
The maximum length of a Mount Point is 256 characters.

**Warning**

A warning message informs you of something you should not do or be cautious.

You won’t be able to restore a VS after deleting it.
3 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

Billing Plans
- See own billing plan - the user can only see own billing plan

CDN Resources
- Create a new CDN resource - the user can create a new CDN resource
- Destroy own CDN resources - the user can only delete their own CDN resources
- See own CDN resources - the user can only see their own CDN resources
- Update own CDN resources - the user can only edit their own CDN resources

CDN SSL Certificates
- Create a new CDN SSL Certificate - the user can create new CDN SSL certificates
- Destroy own CDN SSL Certificate - the user can only delete their own CDN SSL certificates
- See own CDN SSL Certificates - the user can only see their own CDN SSL certificates
- Update own CDN SSL Certificates - the user can only edit their own CDN SSL certificates

CDN Usage Statistics
5.1 User Guide

**DEFAULT PERMISSIONS FOR USER ROLE - MAIN COMPONENTS & FEATURES**

- *User can see own CDN usage statistics* - the user can only see own CDN usage statistics

**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

**Customer Networks**
- *Create own customer network* – the user can create own customer networks
- *Destroy own customer network* – the user can delete own customer networks
- *See own customer networks* – the user can view own customer networks

**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
• *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

**DNS Zones**
• *Create a new DNS zone* - the user can create a new DNS zone
• *Destroy own DNS zone* - the user can only delete their own DNS zones
• *See own DNS zones* - the user can only see their own DNS zones
• *Create a new DNS record* - the user can create a new DNS record
• *See own DNS records* - the user can see all DNS records
• *Update own DNS records* - the user can update own DNS records

**Edge Groups**
• *See all edge groups* - the user can see all edge groups

**Firewall Rules**
• *Create own Firewall Rules* - the user can only create own firewall rules
• *Destroy own Firewall Rules* - the user can only delete own firewall rules
• *Read own Firewall Rules* - the user can only read own firewall rules
• *Update own Firewall Rules* - the user can only edit own firewall rules

**Groups**
• *See all groups* - the user can see all groups

**Compute resources**
• *See all compute resources* - the user can see all compute resources
• *Show compute resources on Virtual Server creation* - display compute resources on Add New Virtual Server screen

**Template Groups**
• *See details of any template group* (image_template_groups.read) - the user can view template group details

**IO Statistics**
• *See own IO Statistics* - the user can see own IO Statistics

**Virtual Server’s IP Addresses**
5.1 User Guide

- **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

**Mounting ISO**
- **Mount own ISO** - the user can only mount own ISO
- **Unmount own mounted ISOs** - the user can only unmount own mounted ISOs
- **See own mounted ISOs** - the user can only see own mounted ISOs

**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

**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
- *See own company payments* - the user can only see their own company payments (applicable for vCloud users)

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.

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 billing plan* – the user can see users’ billing plans
- *See user hourly prices* – the user can see users’ hourly prices
- *See user monthly prices* – the user can see users’ monthly prices
5.1 User Guide

DEFAULT PERMISSIONS FOR USER ROLE - MAIN COMPONENTS & FEATURES

- **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
- **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
4 ONAPP BASICS

The OnApp cloud hosting engine enables hosting providers to set up and manage private and public cloud servers, and virtual servers, quickly and easily using commodity hardware.

Basically, virtualization is the partitioning of a physical server into smaller virtual servers. Through a user-friendly Control Panel, you can deploy virtual machines running different operating systems and their applications on the same hardware at the same time, dynamically allocate resources, deploy services, save on resource consumption, and much more.

With flexible control of your cloud environment, OnApp lets you make best use of your hardware and create efficient, cost-effective server clusters for development, staging, and production environments.

4.1 Main Components & Features

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

4.1.1 Servers

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

4.1.1.1 Control Panel server

The Control Panel server (sometimes known as the Base server) hosts the OnApp user interface and manages all the processes controller 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

4.1.1.2 Compute resources

Compute resources are Xen, KVM, or VMware ESXi/vSphere 5.0-powered servers running on bare metal, with CentOS Linux as the management operating system. This ensures highly efficient use of available hardware, and complete isolation of virtual server processes. The management OS controls virtual servers as well as handling network/disk connectivity, monitoring, IP address anti-spoofing and more.

Compute resources:

- Provide system resources such as CPU, memory, and network
- Control the virtual differentiation of entities such as virtual servers and application data being delivered to cloud-hosted applications
- Take care of secure virtualization and channeling of storage, data communications and server processing
- Can be located at different geographical zones
- Can have different CPU and RAM

OnApp Cloud supports three compute resource virtualization platforms:

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

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.

4.1.1.3 CloudBoot Compute resources

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

4.1.1.4 Virtual Servers

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

4.1.1.5 Smart Servers

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

4.1.1.6 Baremetal Servers

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

4.1.2 Storage devices

For VS template and backup storage we recommend that you set up a separate server with SSH (preferred) or NFS (for high end NAS). However, in a CloudBoot environment or for a small scale installation you can use the Control Panel server to host the templates and backups. You will also need a storage platform for virtual server disk storage. From OnApp 3.0 onwards, there is 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.

4.1.3 Networks

With OnApp you can create complex networks between virtual servers residing on a single host, or across multiple installations of OnApp. You can configure each virtual server with one or more virtual NICs, each with its own IP and MAC address, to make them act like physical servers. OnApp ensures that each customer has their own dedicated virtual network, isolated and secure. They can only see their traffic, even if they share the same physical server as another customer. OnApp enables you to modify network configurations without changing actual cabling and switch setups.
4.1.4 Templates

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

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

4.1.5 Scalability

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

4.1.6 High availability

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

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

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

- **Database replication (planned feature)** — OnApp will feature database replication which includes the creation and maintenance of multiple copies of the same database. Database replication improves availability: when your main database becomes unavailable, the slave copy will take over.
4.1.7 Security

OnApp provides multiple layers of security:

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

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

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

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

4.2 Architecture

The OnApp Cloud Engine transforms your server and storage hardware into a virtual network system. Virtualization is realized by means of a compute resource which is also sometimes called a VMM (Virtual Machine Monitor). A compute resource is essentially hardware platform virtualization software using which one can run different OS on the same hardware at the same time. OnApp employs a Xen or KVM 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.
4.3 Hardware & Software Requirements

An OnApp installation requires at least two physical machines – one for the Control Panel server, and the other for the Compute resource server. You can have as many Compute resource servers as you need. You will also need storage for your virtual machines (a data store), and we recommend that you set up a separate server for storing backups and templates. These are the minimum requirements for a small cloud. For a larger deployment, OnApp’s technical team will advise you on the best possible setup.

Server Requirements
ONAPP BASICS - HARDWARE & SOFTWARE REQUIREMENTS

5.1 User Guide

Compute resource servers
- x64 platform with AMD-V/VT-x hardware virtualization support enabled
- Quad Core 2Ghz+ CPU
- 8GB+ RAM
- 3x Gig network interface cards (4 recommended)
- 30 GB of free disk space (SSD Recommended)

Control Panel server
- Dual or Quad Core 2Ghz+ CPU
- 8GB RAM (16GB+ recommended)
- 100GB Raid 1
- 2x Gig network interface cards

Additional Server Recommendations

Backup server
- 1GB RAM
- 2TB+ NAS (alternatively, a large hard disk can be used on the Control Panel server for backups)

Storage Requirements

<table>
<thead>
<tr>
<th>Integrated Storage Platform</th>
<th>Local Storage Only</th>
<th>Enterprise SAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any number of integrated storage drives can be grouped together across any Compute resource</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>SSD drives <em>recommended</em> for best performance</td>
<td>separate disk from the primary OS drive <em>recommended</em></td>
<td>at least 1 dedicated 1GBit/s NIC assigned per Compute resource for the SAN</td>
</tr>
<tr>
<td>at least 1 dedicated NIC assigned per Compute resource for the SAN</td>
<td></td>
<td>multiple NICs bonded or 10GBit/s ethernet <em>recommended</em></td>
</tr>
<tr>
<td>multiple NICs bonded or 10GBit/s ethernet <em>recommended</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### 4.4 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 and support and billing systems. For more detail on the OnApp API, refer to the [API guide](#).
5 CONTROL PANEL OVERVIEW

The OnApp dashboard is displayed after logging into the system. The left pane navigates you to the list of Virtual Servers, Appliance details, Templates available on your system, and Usage Statistics showing resources used by your virtual servers. The Activity log shows a record of recent transactions for your virtual servers. To view details of a transaction, click its Ref number.

5.1 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. If permissions allow, the tab with a custom name can be displayed as an iFrame. This is configured by administrator. Administrators can view details of all account profiles through the Control Panel’s Users menu.

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

- Overview
- Payments
- Billing Plan
- Backups
- Customer Networks
- iFrame
5.1 User Guide

5.1.1 Overview
This tab contains information on the user's login, user roles, billing plan, prices and other.

5.1.1.1 Profile

User Details
- **Full name** - user's name and surname.
- **Email** - user's email.
- **Login** - user's screen name.
- **User Roles** - the role set for the user.
- **User Group** - the group to which this user is assigned.
- **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).
- **Last Access Log** - click this button to see information on the IP addresses that logged in to your account, and the time and date of access.

Amazon Web Services
- **Status** - the status of the Amazon Web Services: disconnected or connected.

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.

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.
API Info

- **API key** - click the Regenerate Key button to generate a new API key.

For more information, see API Key.

Yubico info

- **Use Yubikey** - move the slider to the right to enable logging in using a Yubikey for this user. Enter the Yubikey in the form that appears:
  
a. Insert the Yubikey into your computer's USB port. If the Yubikey is connected correctly, its status light will turn green.
  
b. Click in the Enter your Yubikey field.
  
c. Press your finger to the gold Yubikey button. A long line of characters will appear in the field.

Billing Details

- **Price per hour** - shows the price for VSs, Load Balancers, and other resources per hour.

- **Billing plan** - the billing plan this user is assigned to. Click the plan 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 billing plan.

- **Total cost** - the sum of used resources cost and virtual servers cost.

- **Payments** - the total amount of payments made.

- **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: VS powered ON and VS powered OFF.
Backups

- **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.
- **Backups/Templates Disk Size** - the price per hour for the disk space user's 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.

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.

5.1.2 Payments

This tab contains the list of your paid invoices.

5.1.3 Billing Plan

This tab contains the details of the billing plan assigned to the user. The following sections are displayed:

- **User VS limit**
- **Limits for Template Store**
- **Limits for Recipe Groups**
- **Limits & Pricing for Compute zones**
- **Limits & Pricing for Data Store Zones**
- **Limits & Pricing for Network Zones**
- **Limits for Edge groups**
- **Limits & Pricing for Backup server Zones**
- **Limits for guaranteed minIOPS**
- **Limits for Instance Packages**
5.1.4 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 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.

5.1.5 Customer Networks

This tab contains the list of user’s customer networks. Customer networks are used for isolation of customer’s virtual servers from other customers’ VSs via VLAN.

For each customer network, the following details are displayed:

- **Name** - the name of the customer network.
- **Network address** - the network address of this customer network.
- **Default outside IP address** - the default outside IP address of this customer network.
- **VLAN** - a group of virtual servers functioning as if they’re connected to a single network (even if they are not, in fact).
- **Actions** - you can delete the customer network.

You can add new customer networks to the profile:

1. Click **New Customer Network** or +.
2. On the following page provide the following details of the new customer network:
   - **Label** - the label of the new customer network.
   - **Compute resource** - select the VMware compute resource to associate the customer network with.
   - **IP Address Pool** - a range of NAT IP addresses.
5.1 User Guide

5.1.6 iFrame

This tab is iFrame show page. The title of this tab is set by the administrator when configuring this option. If permissions allow, this option displays a web page within the user OnApp Control Panel.

5.1.7 API Key

The API Key is used instead of the normal username/password credentials during API operations. A key is generated for each user by the system when the user account is created. To change the key, click the Regenerate Key button. A new key will be generated, and you’ll be taken back to the main Dashboard screen.

5.2 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.
6 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
- ISO Virtual Servers
- vCloud Director Virtual Servers
- Container Servers
- VMware Virtual Servers
- Smart Servers
- Baremetal Servers
- Load Balancers
- Compute Resources
- Assets

6.1 Virtual Servers

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

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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.
5.1 User Guide

- **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.

6.1.1 View Virtual Servers

To view all virtual servers deployed in the cloud:

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

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

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

   1. 
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:

6.1.2 View Virtual Server Details

To view details of a specific virtual server:

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

6.1.2.1 VS Properties

VS properties page gives general overview of the VS details:

- Template this VS is built on
- 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.

- Hostname
- 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.
- Price per hour

Please pay attention that when you edit a VS, the price is changed, and the new price is not applied immediately. It takes about 5 minutes to take effect.

- Memory
- CPU(s)/shares
- 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 billing plan (or the max is set as 0).

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

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

- Accelerate - move the Accelerate slider to the right to enable acceleration for this VS or move this slider to the left to disable acceleration for this VS. This option is available if the cloud
administrator has CDN enabled for the cloud and has added and configured an Accelerator. For more information, refer to CDN Accelerator section.

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

6.1.2.3 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.

6.1.3 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.

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

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 (Settings -> Data)
Stores -> Add New Data Store

- Have at least one network configured and assigned to a network zone (Settings -> Networks -> Add New Network)
- Have at least one compute resource configured and online (Settings -> compute resources -> Add New compute resource)
- Have at least one compute resource assigned to a compute zone (Settings -> compute resource Zones -> Choose a zone -> Press "+" sign next to an unassigned compute resource)
- Have at least one data store attached to a compute resource (Settings -> compute resources -> [choose a compute resource] -> Manage Data Stores)
- Have at least one network attached to a compute resource (Settings -> compute resources -> [choose a compute resource] -> Manage Networks)
- Have assigned a billing plan to the user creating the VS (Users and Groups -> Edit [user])

See also:

- Virtual Servers - the information on managing virtual servers
- Billing Plans - the information on billing plan
- Recipes - recipes creation and management
- Virtual Servers (API) - the list of available API requests

6.1.3.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the Add Google Map API Key section of Administrator guide.

At this 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.

If compute resources of your billing plan do not have assigned location groups (or have only one assigned location group), this step of the wizard will be missing.

### 6.1.3.2 Step 2 of 6. Templates

At this step, specify the template from which your virtual server will be built. Grayed out templates mean that there are not enough resources to build a VS from this template.

To choose a template:

1. Click the required *Operating system* label (Windows, Linux or FreeBSD) to expand the list of template groups

2. **Distribution** - choose a template Distribution

3. **Template** - select the template

4. Click **Next**

**Windows Licensing Type**

This option only appears if your billing plan 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

6.1.3.3 Step 3 of 6. Virtual Server Properties

At this step you need to indicate your virtual server's properties, such as label, Compute resource, 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 [(,)]

- **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.

6.1.3.4 Step 4 of 6. Resources

At this step, you can set your virtual server’s resources, such as disk size, network configuration and other.

**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.
- **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 billing plan 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.

  - *Show only my IP address* - tick this checkbox to view only own IP addresses in the IP addresses dropbox.
  - *Show IP address selection for new VS* - 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

*Show IP address selection for new VS* option is enabled via the "Specify a network address on new VS page" checkbox 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 billing plan.

Click **Next** to proceed to the following step of the wizard where you can specify the virtual server recipes.

### 6.1.3.5 Step 5 of 6. 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.

### 6.1.3.6 Step 6 of 6. Confirmation

At this step, configure the automation settings. This is the final step of the virtual server creation wizard.
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- 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 billing plan (or the max is set as 0).

- Move the **Accelerate** slider to the right to enable acceleration 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.

### 6.1.4 Edit Virtual Server

You can edit CPU and RAM 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").

Windows virtual servers cannot be resized without reboot.

To adjust VS CPU & RAM 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 VS** link.
4. Change CPU core/priority and RAM values. 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).

Please pay attention that when you resize a VS, the price is changed, and the new price is not applied immediately. It takes about 5 minutes to take effect.

5. Click the Save button.
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.

6.1.5 Rebuild/Build Virtual 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 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.

Currently 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 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.
6.1.6 Migrate Virtual Server

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

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

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 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 virtual server remains the same as before the migration. If you migrate a virtual server that's running, the whole process is almost unnoticeable. 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 andSets** menu.

### 6.1.7 Autoscale Virtual Server

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

- For Linux-based VSs only.
- Disk usage autoscaling is applicable for VS primary disk only.
- If the VS is based on a template that allows resizing without reboot - see the **Edit Virtual Server** section – then virtual server RAM and CPU will be increased without rebooting the VS. 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.

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.
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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.

6.1.8 Set VIP Status for Virtual Server

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

To set or remove VIP status for a VS:
1. Go to your Control Panel’s **Virtual Servers** menu.
2. Use the **VIP** button next to a required virtual server to change its VIP status.

6.1.9 Segregate Virtual Server

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

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 VS** button to finish.
6.1.10 Delete Virtual Server

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

To remove the virtual server from the cloud:

1. Go to your Control Panel's Virtual Servers menu.
2. On the screen that appears, you'll see the list of all virtual servers in the cloud. Click the label of the virtual server you want to delete.
3. On the virtual server's screen, click the Tools button, then select Delete Virtual Server.
4. Move the Move Last Backup to My Templates if it is present slider to the right if you want to save the last VS's backup as a template.
5. Move the Destroy All Existing Backups slider to the right if you want to remove all existing backups of this virtual server.
6. Click 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. To save the data stored on the virtual server, back up your virtual server and tick the **Destroy All Existing Backups** box when following the instructions described in this section.
- To delete a virtual server together with its backups, the user needs to have the *Destroy any backup or Destroy own backup* permission enabled. Otherwise, the backups of the VS deleted by the user will remain in the system.

### 6.1.11 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.

  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* - 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.
- *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.

  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.

- Currently, OnApp supports only Linux ISOs.
- If you boot a VS from an ISO with the RAM requirement larger than the VS's RAM, the transaction will fail.
6.1.12 Virtual Server Administrative Options

To manage a virtual server administrative options:
1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Tools button on the VS’s screen to expand the VS Tools menu.
4. The Tools menu enables you to perform the following administrative action 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 [<,>]
- vertical bar [|]
- caret [^]
- ampersand [&]
- parentheses [(,)]

6.1.13 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.

6.1.13.1 Configure Virtual Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this VS. Network interfaces join the physical network to the VS.

When you create a VS a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default. 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.
6.1.13.2 Rebuild Virtual Server Network

To rebuild a network join, added to the virtual server (required after allocating new IP addresses):

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of a required VS.
3. On the screen that appears, click the Tools button, then click Rebuild Network.
4. In the pop-up window, move the Force Reboot slider to the right, then select the VS shutdown type.

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

5. Move the **Required Startup** slider to the right to start up a VS when you’re rebuilding network of a powered off VS.

6. Click the **Rebuild Network** button.

![Rebuild Network Interface](image)

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.

### 6.1.13.3 Set Virtual Server Firewall Rules

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

- **ACCEPT** – defines the packets that will be accepted by the firewall
- **DROP** – define 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 can not apply firewall rules to virtual servers which are parts of a blueprint.

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 will be 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 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.

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.
6.1.13.4 Virtual Server IP Addresses

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

To allocate a new IP Address to the VS:

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. Click the Networking tab, then click IP Addresses.
4. Click the Allocate New IP Address Assignment button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the VS 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 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 Assignment 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 **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.

6.1.13.5 **Display Network Speed for Network Interfaces on Virtual Server Page**

The main **Virtual Servers** screen displays the network speed of each VS's primary network interface. To see the speed of all interfaces assigned to a VS:
1. Go to your Control Panel’s **Virtual Servers** menu.
2. Click the label of the virtual server you are interested in.
3. Click the **Networking > Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.
6.1.13.6 Edit Virtual Server Network Speed

To edit a virtual server’s network speed:

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

### 6.1.14 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 the [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

• Virtual Server Disk IOPS Statistics

• Delete a disk

• Back up disks

• View disk backup schedules

• Schedule disk for backups

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

6.1.14.1 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.

The disk size should not exceed 2 TB when a new disk is added. You can later resize the disk if you need it to be larger than 2 TB.
Move the Hot Attach slider to the right if you want to enable disk hot attaching. In this case virtual server will not be stopped when adding a disk. Hot attach option is only available for KVM 6/ CentOS 6 virtual 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 Add to Linux FSTAB slider to the right if the disk should be added to Linux FSTAB (for Linux 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}

Tick the Add to FreeBSD FSTAB checkbox if the disk should be added to FreeBSD FSTAB (for FreeBSD virtual servers).

Indicate the file system - ext3 or ext4 - 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.
- 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.

6.1.14.2 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.
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>• Add to Linux fstab</td>
<td></td>
<td>• Add to FreeBSD fstab</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>

6.1.14.3 Migrate 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
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 billing plan.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- Thin provisioning disks become thick provisioned after a disk migration. For example, if you use thin storage and 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.
6.1.14.4 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.

### 6.1.15 Virtual Server Backups

Backups are used for copying and archiving target data (target is either a disk or a virtual server as a single whole of all disks used).

- **Images** menu lists normal backups of a virtual server
- **Incremental** menu list virtual server's incremental backups
- **Schedules** menu allows you to schedule automatic for virtual 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 full copy of target data and storing it in an archive.

  Ensure that you do not use XFS or other filesystems not supported by OnApp for Linux backups as OnApp will address them as ext3/4 filesystems.

- **Incremental** - advanced method of taking backups. During the incremental backup, only the changes made after the last backup are archived instead of backing up the whole target. You must have dedicated backup servers configured in your cloud to be able to utilize the incremental backups functionality. Incremental backups are enabled via **Settings > Configuration > Backups/Templates** menu.

  It is not possible to take incremental backups if you are using location group functionality.
Without a backup server added to the group, the following error message will appear:

"Backup cannot be made at this time: This disk cannot be backed up, check Location Group settings."

This issue will be fixed in next releases. As a workaround, add an empty backup server zone to your location group.

Each backup type can be taken in two ways:

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

If you are using incremental backups option, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your compute resources. SSH file transfer option will be skipped for virtual servers using incremental backups. Existing full backups will be still accessible via **Backups > Images** menu.

### 6.1.15.1 How do incremental backups work?

For example, we have a disk with three files:

- File1 - 4Gb
- File2 - 2Gb
- File3 - 3Gb

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

Then:

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

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

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

Backups can be saved either to a compute resource or to a dedicated backup server. When saving a backup, the system calculates if user has enough physical/billing plan 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 billing plan limits.

When saving a backup to a dedicated backup server, the system checks both disk space and billing plan 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’s 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.

### 6.1.15.2 Backup Support by VM / Virtualization / OS

<table>
<thead>
<tr>
<th></th>
<th>Normal backup</th>
<th>Incremental backup</th>
<th>Convert to template</th>
</tr>
</thead>
<tbody>
<tr>
<td>BaremetalServer</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>EdgeServer</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>StorageServer</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<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>
6.1.15.3 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:

6.1.15.4 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.
PLEASE NOTE: 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 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

6.1.15.5 Take Virtual Server Disk Backup

To back up a virtual server:
1. Go to your Control Panel’s **Virtual Servers** menu.
2. Click the label of the server you want to back up.
3. Click the **Storage tab -> Disks**. You’ll see a list of the disks allocated to that virtual server.
4. Click the **Actions** icon next to a disk you want to take a backup of, then click **Backup**.

You’ll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.

- To make a backup, click the **Take a Backup** button at the end of the list. You may add a note and also **Force Windows Backup**

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

    Select “Yes” to proceed

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

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.
6.1.15.6 **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**).

6.1.15.7 **Restore Virtual Server Backup**  
To restore a backup:  
1. Go to your Control Panel’s **Virtual Servers** menu.  
2. Click the label of the required virtual server.  
3. Click the **Backups** tab, then select the appropriate backup type:  
   - **Images** - full backups  
   - **Files** - incremental backups  
4. On the screen that appears, click the **Actions** icon next to the backup you want to revert to and choose **Restore**.

6.1.15.8 **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**.

6.1.15.9 **Edit 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 **Edit**
   **Note**. Make necessary changes and click **Save**.

### 6.1.16 Virtual Server Backup Schedules

Schedules screen lists virtual servers' scheduled backup. 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**.

#### 6.1.16.1 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
   - **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

6.1.16.2 Create Virtual Server Backup Schedule

In addition to the system auto-backup presets, you can schedule backups of virtual servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of Scheduled VS backups and Auto-backup Presets 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.

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. 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).
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. 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).
6. Click the **Save** button to finish.
6.1.16.3 Edit Virtual Server Backup Schedule

To edit a normal backup schedule:

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the virtual server you want to schedule a backup for.
3. Click the Storage tab, then select Disks.

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

5. Click the Edit icon next to a schedule to change its details.

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

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.
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.
6.1.16.4 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.

6.1.17 Virtual Server Statistics

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

6.1.17.1 Virtual Server CPU Utilization

OnApp tracks CPU usage for virtual servers and generates charts that help analyze VS performance.
The charts show the total CPU usage for all the cores of this particular VS for a specified time period.
The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:
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. Tick the **Show in My Timezone** box to show bandwidth statistics according to your profile’s timezone settings.

![Image of CPU Usage](image)

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.

### 6.1.17.2 Virtual Server Billing Statistics

OnApp has a record of all the charges applied to your VSs for the last three month period. If a virtual server was created less than three months ago, statistics are recorded for the VS’s existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

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.

```
<table>
<thead>
<tr>
<th>Date</th>
<th>Users</th>
<th>Virtual Servers</th>
<th>Network Interfaces Usage</th>
<th>Disks Usage</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 May 00:00</td>
<td>Vladimir Lukashkin</td>
<td>qvi2 CentOSS</td>
<td>$5.00</td>
<td></td>
<td>$5.00</td>
</tr>
<tr>
<td>1 May 01:00</td>
<td>Vladimir Lukashkin</td>
<td>qvi2 CentOSS</td>
<td>$5.00</td>
<td></td>
<td>$5.00</td>
</tr>
<tr>
<td>1 May 02:00</td>
<td>Vladimir Lukashkin</td>
<td>qvi2 CentOSS</td>
<td>$5.00</td>
<td></td>
<td>$5.00</td>
</tr>
<tr>
<td>1 May 03:00</td>
<td>Vladimir Lukashkin</td>
<td>qvi2 CentOSS</td>
<td>$5.00</td>
<td></td>
<td>$5.00</td>
</tr>
<tr>
<td>1 May 04:00</td>
<td>Vladimir Lukashkin</td>
<td>qvi2 CentOSS</td>
<td>$5.00</td>
<td></td>
<td>$5.00</td>
</tr>
</tbody>
</table>
```

Scroll down to see Total Amount (the total due for the whole billing statistics period).

### 6.1.17.3 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.

### 6.1.17.4 Virtual Server Disk IOPS Statistics

The system tracks IOPS (Input/Output Operations per Second) for virtual servers and generates charts that help analyze VS disk performance. 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:
   o IOPS for the last hour
   o IOPS for the last 24 hours
   o Data written/read for the last 24 hours
   o 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.

6.1.18 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.

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

### 6.1.19 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:
6.1.20 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 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 virtual server recipes to the following events:

- **VM provisioning** - run the recipe during VM provisioning
- **VM network rebuild** - run the recipe when rebuilding a network
- **VM disk added** - run the recipe when adding a disk
- **VM network interface added** - run the recipe when adding a network interface
- **VM disk resized** - run the recipe when resizing a VM disk
- **VM resize** - run the recipe when resizing a VM

**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.

### 6.1.21 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.

### 6.2 ISO Virtual Servers

OnApp introduces ability to build a virtual server from ISO. Such virtual servers are based on specific ISO templates which you upload to the cloud.

- It is required that you perform additional network configuration during ISO installation. For more information refer to **Confirmation** step of ISO VS creation wizard.
- Creating a server from ISO is applicable for virtual and smart servers only.
- Upload the required ISO first to the cloud before creating a server based on it.

**On this page:**
- View ISO Virtual Servers
- View ISO Virtual Server Details
- View ISO Virtual Server Transactions and Logs

**See also:**
- ISOs
- Create ISO Virtual Server
- Manage ISO Virtual Servers
- ISO Virtual Server Networks
6.2.1 View ISO Virtual Servers

To view all virtual servers deployed in the cloud:

1. Go to your Control Panel's **Virtual Servers** menu to see an overview of all virtual servers in the cloud.
2. The page that loads will show the list of VSs together with their details on OS, Disk size, RAM as well as the following:
   - **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.
   - **user.** The owner of this VS. Click the user name to see the owner details.
   - **power status.** Click the on/off buttons to change the status.
3. Click the **Actions** button next to the VS for the quick access to the list of VS actions (the list of actions displayed depends on the VS status):
   1. **Reboot a VS**
   2. **Recovery reboot**
   3. **Power off a VS**
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- 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.

6.2.2 View ISO Virtual Server Details

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

VS properties page gives general overview of the VS details:
- Template this VS is built on
- VIP status (on/off). Click the icon to change the status.
- Power status & On/Off/Reboot buttons.

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

- Compute resource. Click the Compute resource name to see its details
- Location group. Click the location to view the details of the location group with which the VS is associated.
- Owner. Click the owner name to see its details.
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- **IP Addresses.** Only the first five IP addresses are displayed on the virtual server properties page. To view the list of all virtual server IP addresses, mouse over IP addresses area or go to the Networking > IP addresses tab.

- **Boot from CD** - move the slider to the right to boot a VS from the location where ISOs are stored. If this slider is disabled, then VS will be booted from the disk where VS is provisioned.

6.2.3 View ISO Virtual Server Transactions and Logs

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

- Provision virtual server
- Startup virtual server
- Stop virtual server
- Resize virtual server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Destroy virtual server
- Destroy template
- Download template
- Update firewall

To view transactions for a virtual server:

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the virtual server you're interested in.
3. The details screen for that virtual server shows recent transactions in the Activity Log section.
To cancel pending tasks, click the **Cancel All Pending Tasks for this virtual server** button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- **date** - time in the [YYYY][MM][DD][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.

### 6.2.4 Create ISO Virtual Server

ISO virtual servers are created from the ISOs uploaded to the Control Panel and saved as specific ISO templates. The ISOs are uploaded at the **Control Panel > Templates** menu. For more information, refer to the [ISO section of this guide](#).

To create a virtual server from the ISO:

1. Go to your Control Panel’s **Virtual Servers** menu and click the “+” button, or click the **Create Virtual Server** button at the bottom of the screen. This will start a VS creation wizard.
2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.
3. Click the **Create Virtual Server** button to start the creation process. You will be taken to the virtual server details screen.

It is required that you perform additional network configuration during ISO installation. For more information refer to [Confirmation step](#) below.
6.2.4.1 Step 1 of 4. Templates

6.2.4.2
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.
6.2.4.3 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.

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

6.2.4.4 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 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 VSs in such zones. The reason is that CPU priority for instance package VSs in this configuration cannot be set to 100%, which is the default value for such virtual servers.

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

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

For each of the instance packages the following details are displayed:

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

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

Virtual servers created using instance packages do not support autoscaling.

**Create Your Own**

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

**Compute Resources**

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

**Resources**

- **RAM** - set the amount of virtual server’s RAM. The maximum RAM depends on your billing plan's settings. The maximum RAM that can be assigned to a VS is 168 GB regardless of the
Max RAM value set in the billing plan. 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 billing plan 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.
- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropbox.

- **Show IP address selection for new VS** - 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

  - **Show IP address selection for new VS** option is enabled via the "Specify a network address on new VS page" checkbox 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 billing plan.

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

### 6.2.4.5 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.

After you set up these parameters, click the **Create Virtual Server** button to start the creation process.

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.

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).

### 6.2.5 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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</table>

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

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

**On this page:**
- Edit ISO Virtual Server
- Segregate ISO Virtual Server
- Migrate ISO Virtual Server
- Delete ISO Virtual Server
- ISO Virtual Server Power Options
- Change Owner of ISO Virtual Server
See also:
- ISOs
- ISO Virtual Server Networks
- ISO Virtual Server Disks
- ISO Virtual Server Statistics

6.2.5.1 Edit ISO Virtual Server

You can edit resources for all VSs. Depending on the OS it is built on, some VSs can have their CPU and RAM resized without needing to be powered off ("resize without reboot"). If the VS template allows resize without reboot, the resize should be completed automatically: you will be returned to the VS details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to confirm that the VS will need rebooting so that the resize can take place.

Windows virtual servers cannot be resized without reboot.

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

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the server you want to resize, to show its details screen.
3. Click the Tools button and select the Edit Virtual Server link.
   
   For virtual servers built by selecting resources manually:
   
   o Change CPU cores, CPU priority/units and RAM values.

   For virtual servers built using instance packages:

   o 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.

### 6.2.5.2 Segregate ISO Virtual Server

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

To isolate one VS from another:

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

### 6.2.5.3 Migrate ISO Virtual Server

OnApp allows cold migration of ISO virtual servers between compute resources that share common data stores (or data store zones). Cold migration means moving virtual servers that are shut down.

To migrate a virtual server:

1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the virtual server you want to migrate.
3. Click the Tools button and press the Migrate Virtual Server link.
4. In the window that appears, choose the target compute resource from the drop-down menu.

5. Click the **Start Migration** button.

After migration, the power status of your virtual server remains the same as before the migration. OnApp administrators can control user access over virtual server migration. Using OnApp permissions, you can allow/forbid users to perform migration of all virtual servers, or their own servers only. This is handled via the Control Panel's **Roles** menu.

**6.2.5.4 Delete ISO Virtual Server**

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

To remove the virtual server from the cloud:

1. Go to your Control Panel's **Virtual Servers** menu.

2. On the screen that appears, you'll see the list of all virtual servers in the cloud. Click the label of the virtual server you want to delete.

3. On the virtual server's screen, click the **Tools** button, then select **Delete Virtual Server**.

4. Confirm by clicking the **Destroy** button.

**IMPORTANT:**
- You won't be able to restore a virtual server after deleting it.
- Deleting a virtual server removes all data stored on that virtual server.

**6.2.5.5 ISO Virtual Server Power Options**

To manage a virtual server power options:

1. Go to your Control Panel's **Virtual Servers** menu.

2. Click the label of the required virtual server.

3. Click the **Tools** button on the VS's screen to expand the **Tools** menu.

4. The **Tools** menu enables you to perform the following power actions on VSs (the exact list shown depends on the VS status):

   - **Reboot Virtual Server** - powers off and then restarts the VS.
   - **Reboot in Recovery** - powers off and then restarts the VS in the recovery mode.
5.1 User Guide

- **Suspend** - stops a VS, changes its status to suspended and disables all the other actions on VS, unless unsuspended.

- **Shut Down Virtual Server** – pops up a dialogue box, where you can either Shut Down VS (terminates the VS gracefully), or Power Off VS (terminates the VS forcefully).

- **Startup Virtual Server** - queues a start-up action for a VS that's currently powered off.

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

- **Startup on Recovery** - starts the VS in recovery mode.

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

As soon as you boot a VS from the installation ISO, OnApp may lose control of any components (networks, disks etc.)!!! The only available actions will be start and stop a VS. Be aware, that all the contents of the disk may be also deleted.

6.2.5.6 **Change Owner of ISO Virtual Server**

To change owner of ISO virtual server:

1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Tools** button on the VS's screen to expand the VS Tools menu.
4. Click the **Change Owner** link.
5. Choose a user to whom you want to pass ownership of the VS from the drop-down list.
6. Click the **Change Owner** button.

If you want to change an owner of the VS, which was built using an instance package, ensure that the new owner has permission to create VS using instance package and appropriate instance package in the billing plan. Otherwise you will not be able to change the ownership of this VS.
6.2.6 ISO Virtual Server Networks

The Networking menu in the Virtual Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers.

On this page:
- Configure ISO Virtual Server Network Interface
- Set ISO Virtual Server Firewall Rules
- ISO Virtual Server IP Addresses
- ISO Virtual Server Network Speed

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

6.2.6.1 Configure ISO Virtual Server Network Interface

The Networking > Network Interfaces menu shows the virtual network interfaces allocated to this VS. Network interfaces join the physical network to the VS. When you create a VS a network interface is added automatically. This network interface will be assigned to the existing physical network using a spare IP (IPv4) and will be set primary by default. OnApp supports IPv4 and IPv6. Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS’s primary network interface.

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

1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of the virtual server you’re interested in.
3. Click the Networking tab, then click Network Interfaces.
4. On the page that follows you will see the following fields:

- **Interface** – optional label of the network interface.
- **Network join** – name of the network and a Compute resource or Compute zone this network is joined to.
- **Port speed** – the speed set to the interface.
- **Primary interface** – indication whether the interface is primary or not.

Here you can also view **Interface Usage**, Edit and Delete network interface (using icon controls) and Add a new network interface using the button at the bottom of the screen.

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.
- When managing Network Interfaces in OnApp, make sure to reflect all the changes in the ISO VS configuration manually.

### 6.2.6.2 Set ISO Virtual Server Firewall Rules

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

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.

**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.

### 6.2.6.3 ISO Virtual Server IP Addresses

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

To allocate a new IP Address to the VS:

1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Networking** tab > **IP Addresses**.
4. Click the **Allocate New IP Address Assignment** 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 Assignment** button.

After Allocating New IP address(es) for ISO virtual server, configure this IP Address manually for ISO in console.

To remove an IP address from a VS:

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

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

**6.2.6.4 ISO Virtual Server Network Speed**

The main **Virtual Servers** screen displays the network speed of each VS's primary network interface. To see the speed of all interfaces assigned to a VS:
1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the virtual server you are interested in.
3. Click the **Networking > Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.

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

**6.2.7 ISO Virtual Server Disks**

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

Managing disks for the entire cloud is handled through the Control Panel's Settings menu. Disks for individual virtual servers are managed through the Control Panel's **Virtual Servers** menu.
Creating multiple partitions on one disk is forbidden for all virtual servers.

**On this page:**
- Add Disks to ISO Virtual Servers
- Edit ISO Virtual Server Disks
- Migrate ISO Virtual Server Disks
- Delete ISO Virtual Server Disks

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

### 6.2.7.1 Add Disks to ISO Virtual Servers

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

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

The disk size should not exceed 2 TB when a new disk is added. You can later
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.

### 6.2.7.2 Edit ISO Virtual Server Disks

For primary and swap (Linux, FreeBSD) disks you may only change the label and the size. You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your VS.

To change disk size:
1. Go to your Control Panel's **Virtual Servers** menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab -> **Disks**.
4. Click the **Actions** button next to the disk you want to change, then click the **Edit** link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the **Save Disk** button.

- You cannot decrease disk size. Only the increase disk size option is available.
- You cannot resize the primary disk for FreeBSD-based virtual servers.

### 6.2.7.3 Migrate ISO Virtual Server Disks

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

To migrate a disk:
1. Go to your Control Panel's **Virtual Servers** menu.
2. Make sure your virtual server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab > **Disks**.
4. Click the **Actions** button next to the disk you want to move to another data store, then click the **Migrate** button.
5. On the screen that appears, select a target data store from a drop-down box.
6. Click **Start Migrate**.

- You can only migrate disks to data stores in data store zones assigned to your billing plan.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- Thin provisioning disks become thick provisioned after a disk migration. For example, if you use thin storage and 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.

### 6.2.7.4 Delete ISO Virtual Server Disks

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

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

7. Click the **Destroy Disk** button.

This will schedule the "destroy disk" transaction.
6.2.8 ISO Virtual Server Statistics


On this page:
- ISO Virtual Server CPU Utilization
- ISO Virtual Server Billing Statistics
- ISO Virtual Server Network Interface Statistics
- ISO Virtual Server Disk IOPS Statistics

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

6.2.8.1 ISO Virtual Server CPU Utilization

OnApp tracks CPU usage for virtual servers and generates charts that help analyze VS performance.
The charts show the total CPU usage for all the cores of this particular VS for a specified time period.
The vertical axis shows the CPU usage percentage (CPU percentage is the core-independent quantity). The horizontal axis defines a time period.

To see CPU usage statistics:
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.

### 6.2.8.2 ISO Virtual Server Billing Statistics

OnApp has a record of all the charges applied to your VSs for the last three month period. If a virtual server was created less than three months ago, statistics are recorded for the VS’s existence to date. You can view all statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for a virtual server:

1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of the virtual server you’re interested in.
3. Click the **Overview** -> **Billing Statistics** tab.
4. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button. By default the statistics are generated for the last three months or the actual VS existence period.
5. Move the **Show in my Timezone** slider to the right if you want to view billing statistics according to your profile’s timezone settings. By default, billing statistics is shown in UTC.
6. On the page that appears:

   - **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)
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- **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).

6.2.8.3 **ISO Virtual Server Network Interface Statistics**

OnApp tracks network usage for virtual servers and generates charts that help analyze network performance. To see network utilization statistics for a virtual server:

1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the virtual server you're interested in.
3. Click the **Networking -> Network Interfaces** tab.
4. Click the **Statistics** (chart) icon next to the network you're interested in.
5. On the screen that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.
6. To zoom into a time period, click and drag in a chart. Click the **Reset zoom** button to zoom out again.
7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button.

6.2.8.4 **ISO Virtual Server Disk IOPS Statistics**

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

### 6.3 vCloud Director Virtual Servers

Virtual servers, built on a guest operating system, can be used to install and run software compatible with that operation system. Below you can view the list of the current functions you can perform with vCloud Director virtual servers by means of OnApp Control Panel:

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<tr>
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<tr>
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<td>Insert/Eject Media</td>
<td>Integrated console</td>
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<td></td>
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</table>
6.3.1 Manage vCloud Director VSs

vCloud Director virtual servers, built on a guest operating system, can be used to install and run software compatible with that operation system. Below you can view the list of the current functions you can perform with vCloud Director virtual servers by means of OnApp Control Panel:

This document provides the information on how you can manage the virtual servers imported from your vCloud Director.

On this page:
- List of Available Actions
- View Virtual Servers
- Edit Virtual Server
- Insert/Eject Media
- Virtual Server Power Options
- Virtual Server Console
- Delete Virtual Servers

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator

See also:
- Virtual Server Disks
- vCloud Director VS Network Interfaces
- Virtual Server Statistics
- vCloud Director VS Snapshots
- Create and Manage vApps
- Virtual Servers (API)
6.3.1.1 List of Available Actions

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<td></td>
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</tr>
</tbody>
</table>

6.3.1.2 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* - the OS on which the virtual server is based
   - *label* - the name of the virtual server. Click the label to see the VS details.
   - *IP addresses* - IP addresses assigned to the virtual server
   - *disk size* - disk size assigned to the virtual server in GB
   - *RAM* - RAM assigned to the virtual server in GB
   - *backups* - the number of snapshots and the space these snapshots occupy
   - *power status* - whether the VS is powered ON or OFF. Click the on/off buttons to change the status.
5.1 User Guide

- actions - click the Actions button next to the VS for the quick access to the list of VS actions:
  - reboot - click this action to reboot the virtual server
  - shutdown - click this action to shutdown the virtual server

You can access the details page of a vApp to which the virtual server is assigned from the VS's Overview page. To view the details of the vApp with which the VS is associated, click the Tools button on the VS Overview screen at Dashboard > Virtual Servers > VS label > Tools > Go to vApp.

To be redirected to the vCD user interface from VS Tools menu: go to Dashboard > Virtual Servers > VS label > Tools > Go to vCD UI.

You can install VMWare tools for your VSs to customize the guest operation system. To install VMWare tools go to Dashboard > Virtual Servers > VS label > Tools > Install VMWare Tools. After that you can find VMWare tools version at VS's Overview page. A VS must be powered on to install VMware Tools.

Ensure that Install VMWare Tools permission is on before managing VMWare tools.

6.3.1.3 Edit Virtual Server

You can edit label, CPU and RAM resources for all vCD VSs.

To adjust VS CPU & RAM resources:
1. Go to your Control Panel's Virtual 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 VS link.
4. Change the VS label, RAM, CPU cores and cores per socket values as appropriate.
5. Click the Save Virtual Server button.

You can hot add RAM and CPU resources depending on the VS settings in vCloud Director. If the Memory hot add and Virtual CPU hot add checkboxes are enabled in vCloud Director, then you can add RAM and CPU without rebooting a VS. If only one parameter is enabled in VS settings, but you change both, the VS will be rebooted.
6.3.1.4 Insert/Eject Media

This option allows you to attach an ISO file from the media library to the VS allowing you to utilize the contents of the ISO.

To attach ISO to VS:
1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the appropriate virtual server.
3. Click the Tools button and select the Insert Media link.
4. Choose the ISO file from the drop-down list.
5. Click Insert.

To remove ISO from VS:
1. Go to your Control Panel's Virtual Servers menu.
2. Click the label of the appropriate virtual server.
3. Click the Tools button and select the Eject Media link.
4. Confirm by clicking the Eject button.

- Maximum one ISO can be inserted per VS at a time.
- Ensure that the Media permissions are on before enabling this option.
- Use only unique media file names. When you copy media file from public catalogs, rename it (use a unique name) to avoid problems with media ejection.

6.3.1.5 Virtual Server Power Options
To start, stop or reboot a virtual server:
1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of a required virtual server.
3. Click the appropriate icon at the Properties page to change virtual server’s power status.

6.3.1.6 Virtual Server Console

This functionality is available also for users with the vCloud Console Access Only role.

You can use the virtual server console to manage your virtual servers in command line mode. vCloud Director virtual servers support two console types: MKS and Vmrc. To use VS console:
1. Go to Control Panel > Virtual Servers menu.
2. Click the Label of appropriate Virtual Server.
3. Go to Console tab and click on it.
4. Select the required console type: MKS or Vmrc.

To view Vmrc console, make sure you have the required plug-in installed. If the console uses internal IP address, then only the users of this network can view VSs’ console.

VMware Tools support shared folders and cut and paste operations between the guest operating system and the server from which you launch the vCloud Director Web console. vCloud Director depends on VMware Tools to customize the guest OS. Using VMware Tools, you can move the pointer in and out of the virtual server console window. A virtual server must be powered on to install VMware Tools.

To add VMware tools:
1. Go to Control Panel > Virtual Servers menu.
2. Click the Label of appropriate Virtual Server.
3. Click the Tools button > Add VMware Tools. You will be redirected to the vCD user interface, where you can install or upgrade VMware Tools.
6.3.1.7 Delete Virtual Servers

Shut down the virtual server before destroying it. 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.

6.3.2 Manage vCloud Director VS 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. This section provides the information on all the actions supported for disks imported from your vCloud Director.

**On this page:**
- Create Disks
- Edit Disks
- Delete Disks

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud Organization Administrator

**See also:**
Manage vCloud Director VSs
6.3.2.1 Create Disks

Adding a disk to a virtual server will require that VS to 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 Add New Disk button.
5. Fill in the details:
   - Data Store - select the data store to which the disk will be assigned from the drop-down list
   - Size - indicate the desired disk size
   - Bus Sub Type - choose the sub type of ‘scsi controller’ to create a disk on from the drop-down list. For more information refer to VMware documentation.
6. Click the Add Disk button to finish.

When you add a new disk to a virtual server it will automatically become available to that server.

6.3.2.2 Edit Disks

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. Select a new label and size in GB in the fields provided.
6. Click the Save Disk button.

- If fast provisioning is enabled for the disk’s vDC, the data store cannot be edited.
- You cannot decrease the size of disk(s).
• If you resize the disk of a VS that is powered on, the virtual server will be rebooted. You will be asked for confirmation before the VS is rebooted.

6.3.2.3 Delete 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. You will be asked for confirmation.

This will schedule the 'destroy disk' transaction.

6.3.3 View vCloud Director VS Statistics

This section provides the info on how you can manage statistics of virtual servers imported from your vCloud Director.

On this page:
- Virtual Server CPU Usage Statistics
- Virtual Server Disk IOPS Statistics
- Virtual Server Network Interface Statistics

You can set the vcloud_stats_batch_size parameter in the onapp.yml file. This parameter defines the number of VSs in a batch during statistics collection.

By default, only CPU usage statistics is delivered to OnApp. If you want to have network
interface and disk IOPS statistics delivered to OnApp, you need to set the vCenter password(s):

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 set vCenter password(s) for.
3. On the screen that appears, click the Tools > vCenter passwords.
4. On the page that loads, fill in the vCenter password and Save. If valid vCenter password is entered and connection is successful, you will see green dot in Connection status under vCenter password field. If connection fails, the dot is red.

This functionality is available for users with the following roles:

- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

See also:

- Manage vCloud Director VSs
- vCloud Director VS Network Interfaces
- vCloud Director VS Snapshots
- Virtual Server Disks
- Get VS CPU Usage Statistics (API)

6.3.3.1 Virtual Server CPU Usage Statistics
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 less data available, the chart will show utilization for the time available.
5. Tick the Show in My Timezone box 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 Show All button to zoom out again.

To see what percentage of compute resource’s 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.

### 6.3.3.2 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. Click the Statistics (chart) icon next to the disk you're interested in. 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 Show All button to zoom out again.
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.

6.3.3.3 **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 **Show all** button to zoom out again.

6.3.4 **vCloud Director VS Network Interfaces**

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 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.
- The maximum number of networks that can be added to a virtual server is 10.
On this page:

- View Virtual Server Network Interfaces
- Create Virtual Server Network Interface
- Edit Virtual Server Network Interface
- Delete Virtual Server Network Interface

See also:

Manage vCloud Director VSs
Virtual Server Statistics
vCloud Director VS Snapshots
Virtual Server Disks
vCloud Director vApp Networks
Edge Gateways
Firewall Rules
Network Interfaces (API)

6.3.4.1 View Virtual Server Network Interfaces

This functionality is available for users with the following roles:

- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only
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.

### 6.3.4.2 Create Virtual Server Network Interface

This functionality is available for users with the vCloud Organization Administrator role.

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, select the Physical Network from the drop-down menu, which lists network joins assigned to vApp.
6. Click the Submit button.
The maximum number of networks that can be added to a virtual server is 10.

6.3.4.3 Edit Virtual Server Network Interface

This functionality is available for users with the vCloud Organization Administrator role.

To edit 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 Edit icon next to the interface you want to edit.
5. On the page that appears, you can change the following network interface details:
   - **Label** - enter a new network interface label
   - **Primary interface?** – tick this checkbox to indicate that this interface is primary
   - **Connected** - tick this checkbox to indicate that the network interface is connected to VS
   - **Physical network** - choose a network join from the drop-down menu, which lists network joins assigned to vApp
6. Click the Submit button.

6.3.4.4 Delete Virtual Server Network Interface

This functionality is available for users with the vCloud Organization Administrator role.
To delete 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 Delete icon next to the interface you want to delete.

6.3.5 vCloud Director VS Snapshots

Snapshots lock the file system disk and create a new disk with the changes made alongside. There can be only one snapshot per VS: when a new snapshot is created for the VS, the previous one is deleted. You can view, create and delete virtual server snapshots. This section provides information on how to view, create, build and restore VS snapshots.

On this page:
- View VS Snapshots
- Delete VS Snapshot

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator

See also:
- Manage vCloud Director VSs
- vCloud Director VS Network Interfaces
- Virtual Server Statistics
Virtual Server Disks
Virtual Server Snapshots (API)

6.3.5.1 View VS Snapshots

To view the list of VS Snapshots:

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 Tools button > Snapshots.
4. On the screen that appears, you'll see the list of all VS snapshots together with their details:

- Snapshot - the number of snapshot
- Name - timestamp, which shows when snapshot was taken
- Built - whether snapshot is built or not
- Note - text, added to the snapshot
- Actions icon - the actions you can perform with snapshot (restore, delete, add note).

6.3.5.2 Delete VS Snapshot

To delete a snapshot:

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 Tools button > Snapshots.
4. Click the Actions button next to the snapshot you want to use and select Delete.
6.4 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.

Container server functionality is currently in beta.

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

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<td>Transactions and logs</td>
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</tr>
</tbody>
</table>

The following options are not available for container servers:

- Convert backup to template
- Backups
- Backup schedules
- Auto-scaling
- Setting SSH keys
6.4.1 View Container Servers

Container server functionality is currently in beta.

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):
   1. Reboot
   2. Recovery reboot
   3. Shutdown
   4. Startup
   5. Recovery startup
   6. 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.
6.4.2 View Container Server Details

Container server functionality is currently in beta.

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.

6.4.2.1 Container Server Properties

Container server properties page gives 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 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.

Hostname

Compute resource. Click the Compute resource name to see its details

Login credentials

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.

Price per hour

Please pay attention that when you edit a Container Server, the price is changed, and the new price is not applied immediately. It takes about 5 minutes to take effect.

CPU(s)

CPU priority or CPU units

Disk Size

Memory

CPU Usage (%)

Data Sent

Data Received

6.4.2.2   Notes

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

6.4.2.3   Container Server Management

Click the Tools button to expand the Tools menu with the container server management options.

Use the top menu to manage your container servers’ statistics/networking/storage options.
6.4.3 Create Container Server

Container server functionality is currently in beta.

Container server creation process is similar to virtual server creation. The difference is that a specific default template is used automatically during container server creation. You also need to set the cloud-config for your container server. To create a container server:

1. Go to your Control Panel's **Container Servers** menu and click the “+” button, or click the **Create Container Server** button at the bottom of the screen. This will start a container server creation wizard.

2. Fill in the wizard step by step. Each of these steps is described in the corresponding sections below.

3. Click the **Create Container Server** button to start the creation process. You will be taken to the container server details screen.

On this page:
- Step 1 of 6. Cloud Locations
- Step 2 of 6. Properties
- Step 3 of 6. Resources
- Step 4 of 6. Recipes
- Step 5 of 6. Cloud-Config
- Step 6 of 6. Confirmation

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

6.4.3.1 Step 1 of 6. Cloud Locations

If you face the problem with viewing the maps, refer to the Add Google Map API Key section of this guide.

The Cloud Locations step applies to those users who have Compute zones assigned to location groups in their billing plan. 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 billing plan 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.

### 6.4.3.2 Step 2 of 6. Properties

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

Specify the following container server properties:

• **Label** - the label of the container server. The required parameter.

• **Hostname** - the hostname of the container server. The required parameter. The hostname should consist of letters [A-Z a-z], digits [0-9] and dash [ - ]. For more info on hostname validation, refer to [RFC standard documentation](https://tools.ietf.org/html/rfc1123).

• **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.

### 6.4.3.3 Step 3 of 6. Resources

**Compute Resources**

• **Compute Zone** - the Compute zone to build the container server on

• **Compute Resource** - the specific Compute resource to build the container server on. Compute resource may be selected automatically according to the set provisioning type.
Resources

- **RAM** - set the amount of container server's RAM. The maximum RAM depends on your billing plan's settings. The maximum RAM that can be assigned to a container server is 168 GB regardless of the Max RAM value set in the billing plan. 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 billing plan for this user, then CPU priority is replaced with CPU units. Refer to Billing Calculation section for details on CPU units and CPU priority.

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

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

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

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

  You may face the following problems when setting CPU topology:
  - Currently you cannot set CPU sockets and threads parameters for existing container servers.
  - After setting, the new parameters won't be shown at the container server details screen.
  - Some container servers fail to boot up.
  - When sockets and threads are set incorrectly, you may face huge load on Compute resource's under CentOS 5.x.

Primary Disk

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

- **Primary disk size** - set the primary disk size.

Swap Disk

- **Data Store Zone** - choose a data store zone for container server's swap disk.

- **Swap disk size** - set the swap disk size. Swap disk size must be greater than zero.

Network Configuration
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- **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
- **Show only my IP address** - tick this checkbox to view only own IP addresses in the IP addresses dropdown.
- **Port Speed** - set the port speed for this VS

- Since not every application supports IPv6, at least one IPv4 address must be allocated to a VS's primary network interface.
- You can't select unlimited port speed if the Network Zone is not selected. In this case the port speed will be 1 by default.
  It's possible to create a container server with unlimited network speed without selecting a network zone only if you have only one Network Zone assigned to your billing plan.

Click **Next** to proceed to the following step of the wizard where you can specify the container server recipes.

6.4.3.4 **Step 4 of 6. Recipes**

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

1. Choose a recipe you want to assign to this container server by dragging the required recipe to the **Assigned recipes** pane.
2. To add a custom variable, click the "+" button next to the **Custom recipe variables** title bar, then specify variable details:
   - Specify the recipe name and its value.
   - Move the **Enabled** slider to the right to allow use of this variable.
3. Click **Next** to proceed to the next step of the wizard where you will set the cloud-config file.

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

6.4.3.5 **Step 5 of 6. Cloud-Config**

The cloud-config enables you to customize different OS elements, such as network configuration, user accounts, etc. This file uses the YAML format and is processed after each reboot. Adding a cloud-config at this step is optional, you can later add or edit the cloud-config via OnApp API or UI. However, you should not change the cloud-config file inside the container server as changes will be lost after the server is rebooted. For the full list of items that can be configured in the cloud-config file, refer to CoreOS documentation.
To set the cloud-config for your container server:

- You can fill in the cloud-config in the Cloud-Config field.
- You can insert a cloud-config file from your local computer at the File tab by clicking the Choose File button. After the file is uploaded, cloud-config will appear in the Cloud-Config field.
- You can add an URL to your cloud-Config file in the File url field at the File url tab.

### 6.4.3.6 Step 6 of 6. Confirmation

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

- Move the Build Container Server slider to the right if you want the system to automatically build the container server. If you leave this box blank, you will have to build your server manually after it is created.
- Move the Boot Container Server slider to the right if you want the container server to be started up automatically.

At the Confirmation step you can find the configuration summary of the container server, which will be created. You can view RAM size, primary disk and swap disk size, number of cores.

After you set up all parameters, click the Create Container Server button to start the creation process.

### 6.4.4 Edit Container Server

Container server functionality is currently in beta.
You can edit label, CPU and RAM resources for container servers. To edit the 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.

### 6.4.5 Container Server Cloud Config

**Container server functionality is currently in beta.**

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.

Cloud config example:

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

coreos:
  etcd2:
    name: master1
    initial-cluster:
      master1=http://master1_IP:2380,master2=http://master2_IP:2380
      initial-advertise-peer-urls: http://$public_ipv4:2380
      advertise-client-urls:
      listen-client-urls: http://0.0.0.0:2379,http://0.0.0.0:4001
      listen-peer-urls:
      fleet:
        public-ip: $public_ipv4
        metadata: "role=master"
      flannel:
        interface: $public_ipv4
      units:
        - name: etcd2.service
          command: start
        - name: fleet.service
          command: start
        - name: flanneld.service
          command: start
```
6.4.6 Rebuild/Build Container Server Manually

Container server functionality is currently in beta.

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

To build a container server manually or rebuild the application server on the same (or another) template:
1. Go to your Control Panel's Container Servers menu.
2. Click the label of the container server you're interested in.
3. On the screen that appears, click the Tools button and then click Rebuild Container Server.
4. On the screen that pops up, enter the encryption passphrase.
5. Move the Start CS after rebuild slider to the right if you want to have your container server started automatically after it is built.
6. Click the Rebuild Container Server button to finish.

After you rebuild your container server all data will be lost.

6.4.7 Migrate Container Server

Container server functionality is currently in beta.

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.

6.4.8 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 server functionality is currently in beta.
- Container servers can only be segregated from other container servers built by its owner.
- Container servers can only be segregated from container servers within the same compute zone.
- Container servers cannot be segregated from container servers running on the same compute resource.
- The segregated container server is not automatically migrated to another compute resource.

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

To remove segregation:
1. Go to your Control Panel's Container Servers menu.
2. Click the label of the container server you want to segregate.
3. On the screen that appears, click the Tools button, then click Desegregate Container Server.
4. In the dialogue box that pops up, click the OK button to finish.
6.4.9  Delete Container Server

Container server functionality is currently in beta.

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.

6.4.10  Container Server Power Options

Container server functionality is currently in beta.

To manage container server power options:

1. Go to your Control Panel's Container Servers menu.
2. Click the label of the required server.
3. Click the Tools button on the container server's screen to expand the Tools menu.
4. The Tools menu enables you to perform the following power actions on container servers (the exact list shown depends on the container server status):

- Reboot Container Server - powers off and then restarts the container server.
- Reboot in Recovery- powers off and then restarts the container server in the recovery mode.
  For container servers with enabled encryption the temporary login is "root" and password is "recovery".
  For container servers with password encryption disabled, the server root password will be used to reboot in recovery.
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- **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.

- **Start up 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.

6.4.11 Container Server Networks

Container server functionality is currently in beta.

The Networking menu in the Container Servers menu enables you to manage network interfaces, allocate IP addresses and set firewall rules for virtual servers.

6.4.11.1 Configure Container Server Network Interface

Container server functionality is currently in beta.

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.

### 6.4.11.2 Rebuild Container Server Network

Container server functionality is currently in beta.
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.

### 6.4.11.3 Set Container Server Firewall Rules

Container server functionality is currently in beta.

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.

To configure a firewall rule:
1. Go to your Control Panel's **Container Servers** menu.
2. Click the label of the servers for which you want to configure a firewall rule.
3. Click the **Networking** tab, then click **Firewall**.
4. On the page that appears, set the following:
   a. Choose the network interface.
   b. Specify if the rule defines requests that should be accepted or dropped.
   c. Set the IP address for which this rule is active.
      - Leave the empty field to apply this rule to all IPs
      - Enter hyphen-separated IPs to apply the rule to an IP range (e.g. 192.168.1.1-192.168.1.10)
      - Enter the IPs with slash to apply the rule to CIDR (e.g. 192.168.1.1/24)
   d. Set the port for which this rule is effective.
      - Leave the empty field to apply the rule to all ports
      - Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      - Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)
   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.

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

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

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

1. Go to the `/onapp/interface/config/network_protocols.yml` file.
2. The list contains all protocols available (IPv4). Set ‘true’ for the required protocols.
3. Restart httpd by running one of the following commands:

```
    service httpd restart
```

or

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

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

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

<table>
<thead>
<tr>
<th>IP</th>
<th>RDP</th>
<th>TLSP</th>
<th>AX.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOPOPT</td>
<td>IRTP</td>
<td>SKIP</td>
<td>IPIP</td>
</tr>
<tr>
<td>ICMP</td>
<td>ISO-TP4</td>
<td>CFTP</td>
<td>MICP</td>
</tr>
<tr>
<td>IGMP</td>
<td>NETBLT</td>
<td>SAT-EXPAK</td>
<td>SCC-SP</td>
</tr>
<tr>
<td>GGP</td>
<td>MFE-NSP</td>
<td>KRYPTOLAN</td>
<td>ETHERIP</td>
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<tr>
<td>IP-ENCAP</td>
<td>MERIT-INV</td>
<td>RVD</td>
<td>ENCAP</td>
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<tr>
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<td>IPPC</td>
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<td>SAT-MON</td>
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</tr>
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<td>ARIS</td>
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<tr>
<td>BBN-RCC-MON</td>
<td>IDPR-CMTP</td>
<td>CPLEX</td>
<td>SCPS</td>
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<td>NVP-II</td>
<td>TP</td>
<td>WSN</td>
<td>QNX</td>
</tr>
<tr>
<td>PUP</td>
<td>IL</td>
<td>PVP</td>
<td>A/N</td>
</tr>
</tbody>
</table>
6.4.11.4 Container Server IP Addresses

Container server functionality is currently in beta.

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 Assignment 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 Assignment 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.

6.4.11.5 Display Network Speed for Network Interfaces on Container Server Page

Container server functionality is currently in beta.

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.

### 6.4.11.6 Edit Container Server Network Speed

Container server functionality is currently in beta.

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.

### 6.4.12 Container Server Disks

Container server functionality is currently in beta.

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

### 6.4.12.1 Add Disks to Container Servers

Container server functionality is currently in beta.

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

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

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

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

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

   - Indicate the **file system** - ext3 or ext4.

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

**Restrictions:**
- If you choose a Solidfire data store, the minimum disk size will be regulated by Solidfire Data Store Zone settings.
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- 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.

### 6.4.12.2 Edit Container Server Disks

Container server functionality is currently in beta.

**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

6.4.12.3 Migrate Container Server Disks

Container server functionality is currently in beta.

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 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 billing plan.
- You cannot migrate a disk to a data store with less capacity than the disk size.
- Thin provisioning disks become thick provisioned after a disk migration. For example, if you use thin storage and 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.
6.4.12.4 Delete Container Server Disks

Container server functionality is currently in beta.

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 "destroy disk" transaction.

6.4.13 Container Server Statistics

Container server functionality is currently in beta.

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

6.4.13.1 Container Server CPU Utilization

Container server functionality is currently in beta.
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.

### 6.4.13.2 Container Server Billing Statistics

Container server functionality is currently in beta.

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.

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 billing plan. 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).

6.4.13.3 Container Server Network Interface Statistics

Container server functionality is currently in beta.
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.

### 6.4.13.4 Container Server Disk IOPS Statistics

Container server functionality is currently in beta.

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.

6.4.14 Container Server Integrated Console

Container server functionality is currently in beta.

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.
6.4.15 Container Server Transactions and Logs

Container server functionality is currently in beta.

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

- Provision container server
- Startup container server
- Stop container server
- Resize container server without reboot
- Configure Operating System
- Build disk
- Resize disk
- Format disk
- Destroy disk
- Destroy container server
- Destroy template
- Download template
- Update firewall

To view transactions for a container server:
1. Go to your Control Panel's Container Servers menu.
2. Click the label of the container server you're interested in.
3. The details screen for that container server shows recent transactions in the Activity Log section.

To cancel pending tasks, click the Cancel Pending button.

You can also view the details of a particular log item by clicking its Ref number. The page that loads shows the log output and the following details:

- date - time in the [YYYY][MM][DD][hh][mm][ss]Z format
5.1 User Guide

- 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.

6.4.16 Container Server Recipes

Container server functionality is currently in beta.

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 disk added - run the recipe when adding a disk
- VS network interface added - run the recipe when adding a network interface
- VS disk resized - run the recipe when resizing a container server disk
- VS resize - run the recipe when resizing a container server
To use drag and drop:
1. Click the arrow button in front of the required event to unfold it.
2. Select the required recipe in the left pane and hold it down with the left mouse button.
3. Drag the recipe up to the right pane and release the mouse button to drop the recipe and add it to the required event.

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.

### 6.4.17 Container Server Recipe Custom Variables

Container server functionality is currently in beta.

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.
6.5 **VMware Virtual Servers**

Virtual servers running on VMware compute resources are managed almost the same as normal virtual servers. The only difference is that publishing rules are used instead of firewall rules and backups are replaced by snapshots. Also, as the VMware cluster is displayed as a pool of resources rather than per compute resource.

OnApp Cloud gives you high-end cloud management features including:

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</tbody>
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Certain VS operations are unavailable in OnApp with VMware:

- *Reboot in recovery*
- *Segregate*
- *VIP status*
Autoscaling

Migrate VS. VMware utilizes vMotion to ensure that the VSs are optimally placed on the compute resources.


Firewall for VMware VSs is presented with publishing rules. See Publishing Rules section for details.

It is not possible to gather IOPS statistics for VMware virtual servers.

Use of IPv6 is not supported for VMware virtual servers.

NOTE: Performing the following VS operations at vCenter may lead to performance inconsistencies. Please, do not execute the following actions in vCenter:

- Power VSs ON and OFF
- Pause and Unpause VSs
- Edit the Properties for any VS
- Create and delete Snapshots
- Make changes to the distributed VSwitch
- Remove templates from the data store
- Rename templates
- Delete the services account on the virtual server
- Remove or stop VMWare tools on the virtual server

Performing the following actions in vCenter will not affect OnApp:

- Migrate VSs between compute resources using VMotion
- Migrate VSs between data stores using Storage VMotion
- Place compute resources into maintenance mode
- Make changes to compute resources when in maintenance mode
- Back up VSs using third party tool (e.g. Veeam)
- Enable, Disable or make changes to DRS
6.5.1 View VMware Virtual Server Details

To view details of a specific VMware 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 virtual server.

6.5.1.1 VS Properties

VS properties page gives general overview of the VS details:

- Template this VS is built on
- 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.

- Hostname
- Compute resource. Click the compute resource name to see its details
- Login credentials
- Owner. Click the owner name to see its details.
- VIP status (on/off). Click the icon to change the status.
- Price per hour
- Memory
- CPU(s)/shares
- 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.
- Auto-backups - move the slider to enable/disable automatic backups for this VS.

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

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

6.5.1.3 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.

6.5.2 Create VMware Virtual Server

To create a VMware virtual server:

Go to your Control Panel's Virtual Servers menu and press the "+" button, or click the Create New Virtual Server button at the bottom of the screen. Fill in the VS creation form step by step:

Step 1 of 5. Templates

1. Click the required Operating system label (Windows, Linux or FreeBSD) to expand the list of template group.
2. Distribution - choose a template Distribution
3. Template - select the template
4. Click Next.
1. You can use RHEL, Windows and Debian templates to create VMware virtual servers. For details how to create VMware templates, refer to Create Template for VMware Virtual Server section.

2. To be able to use Ubuntu templates later than 9 version for VMware virtual server creation, you need to remove the absolute pathnames in /etc/pam.d/vmtoolsd file. For example: /lib/security/pam_unix.so > pam_unix.so

3. Please make sure that the Windows password policy defined inside the template is compliant with the password policy set in the OnApp CP. This will ensure that there are no password related issues when provisioning Windows.

Windows Licensing Type
This option only appears if your billing plan 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.

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.

It is not possible to set VS password when creating a Windows-based VMware virtual server without running a sysprep.

Step 2 of 5. Properties
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.
- **Compute zone** - the compute zone to build the VS on.
- **Compute resource** - the specific VMware compute resource to build the VS on.
- **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.
- **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

- **RAM** - set the amount of virtual server's RAM.
- **CPU Cores** - set the amount of virtual server's CPU cores.
- **CPU Priority** - set virtual server's 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 running CentOS5, the CPU priority settings will be disabled and CPU priority value will be 100 by default.

### Primary disk

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

### Swap disk

- **Data Store Zone** - choose a data store zone for this 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** - choose a customer network from the drop-down list.
- **Port Speed** - set virtual server port speed.
- Click **Next**.
Step 4 of 5. Recipes

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 the variable's details:
   - Enter the recipe's name and its value.
   - Move the Enabled slider to the right to allow use of this variable.

3. Click Next.

Step 5. Confirmation

- 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.

OnApp must be preconfigured, before VMware VSs can be created. A Vyatta firewall must be configured and available for the cloud before creating any virtual server. As all customer virtual servers are organized into VLAN’s, with Vyatta acting as the VS gateway.

Click the Create Virtual Server button to start the creation process. You will be taken to the virtual server details screen.

6.5.3 Edit VMware Virtual Server

You can edit CPU and RAM 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").

Windows 2008 and Windows 7 VSs can be resized without rebooting. With Linux, it depends on kernel. E.g. CentOS with kernel 2.6.18 can be resized; Ubuntu cannot. Whether a template allows resize without reboot is shown on the main Templates menu screen.

To adjust VS CPU & RAM 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 core/priority and RAM values, and click the **Save Virtual Server** button:

- 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.

6.5.4 **Delete VMware Virtual Server**

Shut down the VS 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 VS's screen, click the Tools button, then select **Delete Virtual Server**.

4. Move the **Move the 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.

6. Click the **Destroy** button.
• You won’t be able to restore a VS after deleting it.
• Deleting a virtual server removed all data stored on that VS. To save data, saved on the VS, back up your virtual server and move the Move the Last backup to my templates if it is present slider to the right when following the instructions described in this section.
• Backups are deleted automatically when the virtual server is deleted. To prevent backups from deletion, please contact the support. This will fill up your disk over time and requires administrator assistance to change the current behavior.

6.5.5 Build VMware Virtual 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 Virtual Server Automatically 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:
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.
5. Tick the Required Start Up box to have your VS started automatically after it is built.
6. Click the Build Virtual Server button to finish.

6.5.6 VMware Virtual Server Power Options

To manage VMware virtual server power options:
1. Go to your Control Panel’s **Virtual Server** 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 power actions on VSs (the exact list shown depends on the VS status):

- **Reboot Virtual Server** - powers off and then restarts the VS.
- **Suspend Virtual Server** - 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.
- **Startup on Recovery** - starts the VS in 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 start in recovery.

### 6.5.7 VMware Virtual Server Administrative Options

To manage a virtual server power options:
1. Go to your Control Panel’s **Virtual Server** menu.
2. Click the label of the VS in question.
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).
- **Set SSH keys** – assigns SSH keys of the admin and a VS owner to the VS. If a VS owner does not have any SSH keys, the system will only assign admin keys.
- **Edit Administrator's note** - makes an optional note, which will be displayed in VS information.

### 6.5.8 VMware 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.
The console connects the user’s browser to the VNC port made available via the compute resource for the guest console. The end user web UI offers 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.

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

In case the console is not connected, perform the following steps to fix this problem:
1. Check if MySQL is configured with the enough `max_connections` option.
   Run "SHOW PROCESSLIST" to get number of current connections and "SHOW VARIABLES LIKE 'max_connections'" to check the configured connection limit.
   If the `max_connections` value is deficient, increase it.
2. Open the `/etc/httpd/conf.d/onapp.conf` file and check the `DBDPersist` variable value in (normally, the DBDPersist is set to On). Change the `DBDPersist` value to "DBDPersist Off".

**PLEASE NOTE:** Disabling the DBDPersist make result in slower connection to VNC console.

### 6.5.9 VMware 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 view more transactions, click the More Logs button.

To cancel pending tasks, click Cancel All Pending Tasks for this virtual server.

6.5.10 VMware Virtual Server Networks

The Networking menu in the Virtual Servers menu enables you to manage network interfaces, allocate IP addresses and set publishing rules for VSs.

6.5.10.1 Configure VMware 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 **Add Network Interface** 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.

### 6.5.10.2 Rebuild VMware Virtual Server Network

To rebuild network join, added to the virtual server (required after allocating new IP addresses):

1. Go to your Control Panel’s **Virtual Servers** menu.
2. Click the label of a required VS.
3. On the screen that appears, click the **Tools** button, then click **Rebuild Network**.

4. In the pop-up window that appears, move the **Force Reboot** slider to the right, then select the VS shutdown type:
   - Power OFF virtual server
   - Shutdown virtual server
   - Gracefully shutdown virtual server

5. Move the **Required Startup** slider to the right to start up the VS automatically after the network is rebuilt.

6. Click the **Rebuild Network** button.

### 6.5.10.3 Publishing Rules

If the VMware virtual server is running within a customer network, it is necessary to enable Internet access to this virtual server. Virtual servers running within customer network are invisible, as customer networks utilize local IP addresses and Vyatta is used to reroute/NAT traffic.

To publish a VS port, you have to configure a publishing rule for the VS. Publishing rules function as destination NAT, making virtual servers accessible from outside. When creating a publishing rule for a virtual server, you select a new public IP for this VS, where the Vyatta will NAT incoming requests from this public IP to the private address of the server.

**View the List of Publishing Rules**

To see the list of all publishing rules allocated to the VS:

1. Go to your Control Panel's **Virtual Servers** menu.
2. Click the label of the required virtual server.
3. Click the **Networking** tab, then click **Publishing Rules**.
4. On the page that follows, you will see the list of all publishing rules allocated to this virtual server, along with their details:

- Rule
- Outside IP Address
- Port
- Protocol
5.1 User Guide

Create Publishing Rule

To create a new publishing rule:
1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Networking tab, then click Publishing Rules.
4. On the page that follows, fill in the form that appears:
   - Set the port for which this rule will is effective.
   - Select the protocol type - TCP or UDP.
   - Specify the outside IP address - this can be a compute resource’s IP, virtual server’s public IP or a free public IP address.
   - Tick the Use customer network address check box to use IP address from the customer network this VS is assigned to.
   - If the customer network is not selected, choose an external IP address from the drop-down box.
   - Click Save.

Delete Publishing Rule

To delete a publishing rule:
1. Go to your Control Panel’s Virtual Servers menu.
2. Click the label of the required virtual server.
3. Click the Networking tab, then click Publishing Rules.
4. On the page that follows, click the Actions button next to the publishing rule you want to delete, then choose Delete.

6.5.10.4 Allocate/Remove VMware 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, then click IP Addresses.
4. Click the Allocate New IP Assignment button.
5. Select a network interface from the drop-down menu (only the network interfaces you added to the VS 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 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 Assignment 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 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.

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

6.5.10.5 Display Network Speed for Network Interfaces on VMware 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.
6.5.10.6 Edit VMware Virtual Server Network Speed

To edit a VMware virtual server's network speed:
1. Go to your Control Panel's Virtual Servers menu.
2. Select the virtual server you want to change.
3. Go to the Network tab -> Network Interfaces, and edit the network speed accordingly.
4. Click the Save Network Interface button to save changes.

6.5.11 VMware 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, where you can:

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

6.5.11.1 Add Disks to VMware Virtual Servers

Adding a disk to a virtual server will require that VS to 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 Add New 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.

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

When you add a new disk to a virtual server it will automatically become available to that server.

6.5.11.2 **Edit VMware Virtual 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 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.

6.5.11.3 **Migrate VMware Virtual Server Disks**

You can migrate disks of your virtual servers to other data stores, which are allocated to the same compute resource or compute zone. 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 **Import** link.
5. On the screen that appears, select a target data store from a drop-down box.
5.1 User Guide

6. You can only migrate disks to data stores in data store zones assigned to your billing plan.

6. Click **Start Migrate**.

You cannot migrate a disk to a data store with less capacity than the disk size!

PLEASE NOTE: Thin provisioning disks become thick provisioned after a disk migration. For example, if you use thin storage and 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.

6.5.11.4 **Delete VMware 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**.

6.5.12 **Manage VMware Virtual Server Backups**

Under VMware backups utilize the VMware snapshot tools and are performed by simply locking the filesystem disk (vmdk) and creating a new VMware disk with the changes made alongside. So the backup procedure for virtual servers running under VMware looks like: vmdk + vmdk(1) + vmdk(#).

6.5.12.1 **VMware Virtual Server Snapshots**

VMware snapshot tools are used to perform snapshots by simply locking the filesystem disk (vmdk) and creating a new VMware disk with the changes made alongside, so the backup procedure for virtual servers running under VMware looks like: vmdk + vmdk(1) + vmdk(#).

To view the list of VS Snapshots:
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 -> Snapshots.
4. On the screen that appears, you'll see the list of all VS snapshots.

To create a snapshot for VMware VS:
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 -> Snapshots.
4. Click the Create New Snapshot button.
5. Give your snapshot a name.
6. Click Create Snapshot button.

To delete a VS snapshot, click the Actions button next to the required snapshot, then click Delete.

6.5.13 VMware Virtual Server Statistics
For your convenience, the system tracks VS performance and generates statistics on:

- VS CPU Utilization
- VS Billing statistics
- Interface Usage
- Disk IOPS

6.5.13.1 VMware 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 less data available, the chart will show utilization for the time available.
5. Tick the **Show in My Timezone** box to show bandwidth statistics according to your profile's time zone 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.

## 6.5.13.2 VMware 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. Tick the **Show in my Timezone** box 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 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).

6.5.13.3 VMware 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.

6.5.13.4 VMware Virtual Server Disk IOPS

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. 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
5. To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
6. 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.

**6.5.14 Manage VMware Virtual Server Recipes**

SSH connection is not required for running recipes on VMware virtual servers.

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 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 assign a recipe to a desired event.

You can assign virtual server recipes to the following events:

- **VM provisioning** - run the recipe during VM provisioning
- **VM network rebuild** - run the recipe when rebuilding a network
- **VM disk added** - run the recipe when adding a disk
- **VM network interface added** - run the recipe when adding a network interface
- **VM disk resized** - run the recipe when resizing a VM disk
- **VM resize** - run the recipe when resizing a VM

**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 right pane and hold it down with the left mouse button.
3. Drag the recipe up to the left 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.

6.5.15 Manage VMware Virtual Server 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. Virtual server custom variables will always overlay template custom variables.

6.6 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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</table>
The following options are not available for smart servers:

- hot migration
- segregation
- VIP status
- firewall rules

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 billing plan.

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 resource.

### 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
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 a 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.

---

### 6.6.2 View Smart Server Details

To view details of a specific smart server:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the smart server you're interested in.
3. The screen that appears loads the **Smart server properties**, **notes**, **activity log** and **tools for managing** your smart server.

#### 6.6.2.1 Smart Server Properties

Smart server properties page gives 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 graceful shutdown and then powers off the virtual server after the timeout set in Configuration settings.

- Hostname
- Smart compute resource
- Login credentials
- Owner
- Price per hour
- Memory
- CPU(s)
- Disk Size
- Disk backups
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- Network Speed
- IP Addresses
- AutoBackups
- Notes
- Activity log

Autoscaling and VIP status options are not available for smart servers.

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

6.6.2.3 Smart Server Management
- Click the Tools button to expand the Tools menu with the Smart Server management options.
- Use the top menu to manage your smart servers’ networking/storage options.

6.6.3 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.

Starting with the OnApp Cloud v3.1 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 the smart server will be built on. 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.

To create a smart server:
1. Go to your Control Panel's Smart Servers menu.
2. On the screen that appears, press "+" button or click the Add New Smart Server button underneath the list of servers on the screen.
3. Complete the smart server creation form:
   - **Step 1 of 5. Templates**
     - Choose a template to build a smart server on, then click Next. You can use any KVM templates for smart server creation.
Before creating a Windows-based smart server, make sure that the appropriate drivers were added to the /data folder on CP.

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 [-].
- **Time zone** - set the time zone set for the smart server. This parameter is applicable only to Windows smart 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 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.

- **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

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.
- **CPU Cores** - set the amount of virtual server’s CPU cores.
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.

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

   - **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.
   - **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**

a. 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.

b. 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.

c. 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 billing plan (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.

4. Click **Submit** button. The smart server will be added to the system. You can view it under the **Smart Servers** menu.

### 6.6.4 Edit Smart Server

To edit smart compute resource settings:

1. Go to your Control Panel's **Smart Servers** menu.

2. Click the label of the server you want to edit.

3. Click the **Tools** button and select the **Edit smart server** link. You can edit the label, pricing, CPU and RAM resources for all smart servers. You can also edit the time zone for Windows smart servers.

After you edit the server's time zone, you need to stop and then start up the smart server.
Currently, the time zone is set at the Compute resource side only. Therefore, users need to set the target time zone inside a Windows smart server manually. Setting correct time zone at the Compute resource side helps to keep correct time inside a smart server after starting it if time synchronization is not completed for some reason.

Depending on the OS it is built on, some smart servers can have their CPU and RAM resized without needing to be powered off ("resize without reboot").

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

If the smart server template allows resize without reboot, the resize should be completed automatically: you will be returned to the server details screen and see a message indicating the resize was successful. If the template does not allow this, you will be asked to confirm that the smart server will need rebooting so that the resize can take place.

### 6.6.5 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.

### 6.6.6 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!

### 6.6.7 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/orbid users to perform migration of all smart servers, or their own servers only. This is handled in the Control Panel's **Roles** menu.

### 6.6.8 Autoscale Smart Server

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

- For Linux-based smart servers only.
- If the smart server is based on a template that allows resizing without reboot - see the **Edit smart server** section – then smart server RAM and CPU will be increased without rebooting the server. Disk space autoscaling requires a smart server reboot.
If you autoscale a smart server's memory to a value greater than current smart server RAM x 16 (which is a max_memory parameter in a configuration file and database), the smart server will be rebooted anyway, regardless of the template it is built on.

Make sure a VS can be reached via SSH. Otherwise, the autoscaling client installation will fail.

Starting with version 4.2, OnApp uses Zabbix for autoscaling. Monitis will be used for autoscaling of servers built using OnApp versions previous to 4.2 until you switch autoscaling off for such server(s). If you decide to switch autoscaling back on, autoscaling will be implemented using Zabbix. Zabbix also will be used for autoscaling of newly created VSSs.

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 **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.

### 6.6.9 Smart Server Power Options

To manage a smart server power options:
1. Go to your Control Panel’s **Smart Server** menu.
2. Click the label of the smart server in question.
3. Click the **Tools** button on the Smart server's screen to expand the Tools menu.
4. The **Tools** menu enables you to perform the following power actions on smart servers (the exact list shown depends on the smart server status):

- **Reboot Smart Server** - powers off and then restarts the smart server.
- **Reboot in Recovery** - powers off and then restarts the Smart Server Recovery mode with a temporary login ("root") and password ("recovery") for servers where password encryption is enabled. For servers with password encryption disabled, the root password will be used to reboot in recovery.

Windows smart servers boot from the Linux-based recovery template in a recovery mode. You need to log in as admin via SSH or VNC console, then mount a Windows system disk manually.

PLEASE NOTE: 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 splitted 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).
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- **Startup Smart Server** - queues a start-up action for a SS that's currently powered off.
- **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.

6.6.10 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 a SS owner to the SS. If a SS owner does not have any SSH keys, the system will only assign admin keys.

6.6.11 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
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 **Cancel All Pending Tasks for this Smart Server** button.

### 6.6.12 Smart Server Integrated Console

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

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

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

We recommend to use Java 1.7, since OnApp VNC console was not tested with Java 1.8.
6.6.13 Smart Server Networks

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

6.6.13.1 Configure Smart Server Network Interfaces

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

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

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 also 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).
   - **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 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.

### 6.6.13.2 Rebuild Smart Server Network

To rebuild a network join, added to the smart server (required after allocating new IP addresses):

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the required smart server.
3. On the screen that appears, click the **Tools** button, then click **Rebuild Network**.
4. In the pop-up window, move the **Force Reboot** slider to the right, then select the smart server shutdown type:
   - Power OFF smart server
   - Shutdown smart server
   - Gracefully shutdown smart server

   Smart servers are rebooted by default after rebuilding the network.

5. Move the **Required Startup** slider to the right to start up the smart server automatically after the network is rebuilt.
6. Click the **Rebuild Network** button.

### 6.6.13.3 Allocate/Remove Smart Server IP Addresses

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

To allocate a new IP Address to the smart server:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the server you're interested in.
3. Click the **Networking** tab, then click **IP Addresses**.
4. Click the **Allocate New IP Address Assignment** 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 Assignment** 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 the reboot the smart server additionally.

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

**6.6.13.4 Display Network Speed for Network Interfaces on Smart Server Page**

The main **Smart Servers** screen displays the network speed of each smart server primary network interface. To see the speed of all interfaces assigned to a smart server:
1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the smart server you are interested in.
3. Click the **Networking > Network Interfaces** tab.
4. On the screen that appears, the **Port Speed** column shows the network speed of the network interface.

**6.6.14 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.

6.6.14.1 Add Disks to Smart Server

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

1. Go to your Control Panel’s Smart Servers menu.
2. Click a smart server label to open its details screen.
3. Click the Storage tab -> Disks.
4. Click the "+" button or the Create Disk button.
5. Fill in the details:
   - Specify disk's label
   - Choose the data store to create a disk on from the drop-down menu.
   - Set the desired disk size.

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

   - 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.

### 6.6.14.2 Edit Smart Server Disks

You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request. Note, that any changes on disk size will lead to reboot of your smart server.

To change disk size:

1. Go to your Control Panel’s **Smart Servers** menu.
2. Make sure your smart server is powered off, then click its label to open its details screen.
3. Click the **Storage** tab - > **Disks**.
4. Click the **Actions** button next to the disk you want to change, then click the **Edit** link.
5. Enter a new disk label and size in GB in the fields provided.
6. Click the **Save Disk** button.

### 6.6.14.3 Migrate Smart Server Disks

You can migrate disks of your smart servers to other data stores, which are allocated to the same smart compute resource or smart compute zone. Disk migration requires reboot of the smart server.
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 billing plan.
   - You cannot migrate a disk to a data store with less capacity than the disk size.
   - Thin provisioning disks become thick provisioned after a disk migration. For example, if you use thin storage and 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.

**6.6.14.4 Delete Smart Server Disks**

To delete a disk:
1. Go to your Control Panel's **Smart Servers** menu.
2. Make sure your smart server is powered off, then click its label to open its details screen.
3. Click the **Storage -> Disks** tab.
4. Click the **Actions** button next to the disk you want to delete, then click **Delete**.

**6.6.15 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 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.

Each backup type can be taken in two ways:

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

If you are using incremental backups option, you should either enable dedicated backup servers in your cloud or share the backups and templates folders (paths) between your compute resources. SSH file transfer option will be skipped for virtual servers using incremental backups. Existing full backups will be still accessible via Backups > Images menu.

6.6.15.1 How do incremental backups work?
For example, we have a disk with three files:
- File1 - 4Gb
- File2 - 2Gb
- File3 - 3Gb
The first incremental backup will be 9 GB (sum of all files). If you decide to take another incremental backup soon thereafter, the backup size will be equal to 0, as the files have not been changed since the first backup (if your backup has complicated directory structure, it could be more than 0, as file system could store some system data).

Then:

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

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

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

Backups can be saved either to a compute resource or to a dedicated backup server. When saving a backup, the system calculates if user has enough physical/ billing plan 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 billing plan limits.

When saving a backup to a dedicated backup server, the system checks both disk space and billing plan 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’s 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.

### 6.6.15.2 Backup Support by VM / Virtualization / OS

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

### 6.6.15.3 View Smart Server Backups
To view the list of smart server's backups:

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

### 6.6.15.4 Take Smart Server Backup
To take an incremental backup:

1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the server you want to back up.

3. Click the Backups tab, then select Files. You’ll see a list of the disks allocated to that smart server.

4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You’ll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.

5. To take a backup, click the Take a Backup button at the end of the list.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with 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

6.6.15.5 Take Smart Server Disk Backup

To back up a smart server:

1. Go to your Control Panel's Smart Servers menu.

2. Click the label of the appliance you want to back up.

3. Click the Storage tab -> Disks. You’ll see a list of the disks allocated to that smart server.

4. Click the Actions icon next to a disk you want to take a backup of, then click Backup. You’ll see a list of all the backups taken and pending for that disk, along with the tools to restore backups, delete them, and convert them to templates.

5. To take a backup, click the Take a Backup button at the end of the list.

Backups in the OnApp Control Panel are associated with a particular user instead of being associated with a smart server. To view the list of user backups, refer to View User Backups section.
6.6.15.6 Convert Smart Server Backup to Template
To convert smart server backup to template:
1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the required smart server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup and choose the **Convert to Template** (see Create custom templates).

6.6.15.7 Restore Smart Server Backup
To restore a backup:
1. Go to your Control Panel's **Smart Servers** menu.
2. Click the label of the required smart server.
3. Click the **Backups** tab, then select the appropriate backup type:
   - **Images** - full backups
   - **Files** - incremental backups
4. On the screen that appears, click the **Actions** icon next to the backup you want to revert to and choose **Restore**.

6.6.15.8 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**.
6.6.15.9 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**.

6.6.16 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**.

6.6.16.1 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,
5.1 User Guide

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

**6.6.16.2 Create Smart Server Backups Schedule**

In addition to the system auto-backup presets, you can schedule backups of Smart Servers (VS disks) as required. For example, you can set up a schedule to back up your disks once a week.

The combination of Scheduled VS backups and **Auto-backup Presets** 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.

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. 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).

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. Period must be unique for each backup target (disk or server).
   - **Rotation period** - number of backups after which the first backup will be deleted.
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6.6.16.3 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:
   - **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).
   - **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.

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:
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- **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.

6.6.16.4 **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**.

6.6.17 **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 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.

**6.6.18 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.

### 6.6.19 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 billing plan** and set the CPU/CPU share/memory limits.

4. **Assign user to this billing plan**.

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 billing plan.

Smart servers are also charged for IP addresses and the maximum port speed value (set in **Settings > Defaults** configuration).

### 6.6.20 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
6.6.20.1 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. Tick the Show in my Timezone box 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.
   - **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).

6.6.20.2 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 less data available, the chart will show utilization for the time available.

5. Tick the **Show in My Timezone** box to show bandwidth statistics according to your profile’s timezone settings.

6. To zoom into a time period, click and drag in a chart. Click the **Reset Zoom** button to zoom out again.

7. You can filter the statistics by date and time - select the time period from the drop-down menu and click the **Apply** button.

To see what percentage of compute resource CPU resource a smart server takes, go to your Control Panel’s **Smart Servers** menu and click the label of the smart server you’re interested in. On the screen that appears, the CPU(s)/Shares parameter displays the amount of CPU resource given to this smart server.

### 6.6.20.3 Smart Server Disk IOPS Statistics

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

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...
6.7 Baremetal Servers

Baremetal compute resources are physical servers, reside directly on the hardware without the virtualization layer. Baremetal compute resources are hosted on dedicated baremetal compute resources, deployed for a single user. Utilization of baremetal servers allows to locate 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 billing plan.

You can enable recovery mode for baremetal servers. For details, see Enable Recovery Mode for Baremetal Servers. For 3.2.0 version, see Baremetal Server Recovery Mode Patch Guide.

- 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.

6.7.1 View the List of Baremetal Servers

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

1. Go to your Control Panel’s Baremetal servers menu to see an overview of all baremetal servers in the cloud with their details: OS, label, IP addresses, etc.
2. Click the Actions button next to the server for the quick access to the list of available actions (the list of actions displayed depends on the server status).
3. To view 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.

### 6.7.2 View Baremetal Server Details

To view details of a specific baremetal server:

1. Click the label of the server you’re interested in.

2. On the screen that appears, you’ll see the baremetal server properties and activity log:
   - Hostname
   - Baremetal compute resource group the server belongs to.
   - Login credentials
   - Owner
   - Price per hour
   - IP Addresses
   - Notes
   - Activity log

3. To removes all transactions related to pending backups from the log, click the **Clean all pending tasks for this Baremetal Server** button at the bottom of the screen.

### 6.7.3 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.

The management network should be disconnected during the bare metal server deployment.

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 [- ].
- 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.
- Show only my IP addresses - tick this checkbox to view only own IP addresses in the IP addresses dropbox.
- Selected IP address - the Baremetal Server's selected IP address.
- Click Next.

Step 4. Recipes

- Choose a recipe you want to assign to this baremetal server by dragging the required recipe to the Assigned recipes 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 the Confirmation step you can find the configuration summary of the 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.

4. Click **Submit** button. The baremetal server will be added to the system. You can view it under the **Baremetal Servers** menu.

You can use the following templates for baremetal server creation:

<table>
<thead>
<tr>
<th>Template Name</th>
<th>Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS 6.4 x6</td>
<td></td>
</tr>
<tr>
<td>Debian 6.0 x64</td>
<td></td>
</tr>
<tr>
<td>Debian 7.0 x64</td>
<td></td>
</tr>
<tr>
<td>Fedora 16 x64</td>
<td></td>
</tr>
<tr>
<td>Gentoo 12.0 x64</td>
<td></td>
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<tr>
<td>Gentoo 12.1 x64</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.3 x64</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.4 x64</td>
<td></td>
</tr>
<tr>
<td>Ubuntu 12.04 x64</td>
<td></td>
</tr>
<tr>
<td>Windows 2008 x64 Dc R2 Ver3.2</td>
<td></td>
</tr>
<tr>
<td>Windows 2008 x64 Std R2 Ver3.2</td>
<td></td>
</tr>
</tbody>
</table>

The image templates for provisioning the baremetal servers are stored in the following locations depending on the configuration:

1. If *Use SSH File transfer* CP configuration option is enabled in **Control Panel Settings > Configuration menu**, then the image template will be fetched from the specified server.

2. If *Use SSH File transfer* option is disabled, the image templates are located at `/onapp/templates`, which is mounted from server specified in *Static Config target* CP configuration option (Control Panel’s **Settings > Configuration** menu). Usually this is set to Control Panel server IP, but you can change it to be any other server.

### 6.7.4 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.

### 6.7.5 Delete Baremetal Server

To remove a baremetal server from the cloud:

1. Go to your Control Panel's **Baremetal Servers** menu.

2. On the screen that appears, you'll see the list of all baremetal servers in the cloud. Click the label of the server you want to delete.

3. On the baremetal server screen, click the **Tools** button, then choose **Delete Baremetal Server**.

After a user has been deleted a baremetal server, OnApp administrator receives an email notification. After that, administrator must reclaim a baremetal compute resource by manually rebooting it, to make it available for new baremetal server creation.

### 6.7.6 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:

- o The left pane shows the list of available recipes organized into recipe groups.

- o 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.

6.7.7 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.
6.7.8  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 billing plan and set the monthly fee for it.
3. Add this compute zone (baremetal server type) to the billing plan.
4. Add a network zone to the billing plan.
5. Set the IP address limits for VSs powered off. Each server deployed will take an IP from the network zone added to the billing plan, and will be billed for each IP address taken. For more information, see Set Billing Plan Prices And Resource Limits.
6. Go to Template Store menu and set the template prices. 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. Add the required template store to the billing plan.
8. Assign user to this billing plan.
9. 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 billing plan.

Do not set any other limits except the ones described above.

6.7.9  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.
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.

---

6.8.1 **View Load Balancer Details**

Load balancers are also virtual servers, so you can perform the same basic actions on them as for other VSs. 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.

6.8.1.1 **Load balancer overview**

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

- **Compute resource**
• Owner
• Prices per hour
• 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):

### 6.8.1.2 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.

### 6.8.2 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/UDP transport protocols. To add an LB cluster:

1. Go to your Control Panel's **Load Balancers** menu.
2. Click the **Add a New Balancer** button.
3. On the page that follows, fill in the form that appears:

   **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.
The only VSs you can add to a cluster are those which are based on the selected compute resource/compute zone, have an IP in the defined network zone and are located in the same IP range.

Enabled anti-spoofing would prevent adding Windows-based virtual servers as nodes to the load balancer cluster. To disable anti-spoofing reboot windows-based nodes from Control Panel after they are added to the cluster.

4. Click **Save**.

6.8.3 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:

   **Cluster Configuration**
   
   - **Port** - specify the port for this load balancer to run on (e.g. 9090, 8080)

   **Load Balancer Instance**
   
   - **Label** – give a name for your load balancer instance.
   - **Hostname** – specify a host name which will identify your load balancer.
   - **Compute zone** – choose a compute zone.
   - **Compute resource** – select a compute resource that will be enabled for the cluster.
   - **Network zone** – choose a network zone for this load balancer.
   - **Port Speed** – use the slider to set a port speed or tick the Unlimited box if required.

   **Load Balancer Type**
   
   - **Load balancer type** - choose the **Autoscaling** option and click **Next**.

   **Cluster Nodes**

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

   **Nodes network**
5.1 User Guide

- **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.

Example: if you set Min node amount = 2 and Max node amount = 5, then the system will scale out the cluster up to 5 nodes, and scale in to 2 nodes if required.

The only templates you can add to a cluster are those based on the selected compute resource/compute zone.

**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.

3. Click **Save**.
6.8.4  Edit Load Balancer
To edit a load balancer:
1. Go to your Control Panel’s **Load Balancers** menu.
2. Click the **Actions** icon next to a required load balancer, then choose **Edit Cluster**.
3. When the page loads, edit necessary parameters and click **Save**.

When you increase the RAM of the nodes of a load balancer (autoscaling type) to a value greater than the current node RAMx16 (which is a max_mem parameter in a configuration file and database), the load balancer will be cold resized.
When deleting load balancer ports, you can remove all but the first port.

6.8.5  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.

6.8.6  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. Tick the **Show in my Timezone** box 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)
5.1 User Guide

- 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).

6.8.7 View Load Balancer Autoscaling Monitors

Autoscaling monitors provide information about the cluster load.

To view the load balancer’s autoscaling monitors:

1. Go to your Control Panel's Load Balancers menu.
2. Click the label of the balancer you're interested in.
3. Click the Autoscaling Monitors tab.
4. On the screen that appears, you will see the list of autoscaling monitors along with the following details:

   - monitor name
   - virtual server label

Click the label of a monitor you are interested in to view its details:

Depending on the monitor type, the monitor details screen page will show the following info:

- memory monitor details screen
- CPU monitor details screen

6.8.7.1 Memory monitor

Memory monitor info:

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

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

### 6.8.7.2 CPU Monitor

**CPU monitor info**

*Name of the CPU test* - CPU test label

*IP of the device agent* - virtual server IP address

*Max value for kernel* - maximum CPU value for kernel

*Max value for iowait* - maximum CPU value for iowait

*Platform* - virtual server OS

*Max allowed value for user* - maximum CPU value for user processes

*The name of the agent* - virtual server identifier

*Tag of the CPU test* - CPU test tag

*Min allowed value for idle* - minimum CPU value for idle mode

*Max allowed value for nice* - maximum CPU value for nice

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

**CPU last results**

*CPU index* - CPU number

*User Value* - percentage of CPU used in user mode

*Kernel Value* - percentage of CPU used by kernel

*Nice Value* - percentage of CPU time occupied by processes with positive CPU value

*Idle Value* - percentage of CPU used in idle mode

*IO Wait Value* - percentage of time the CPU was idle during the IO request
Status - monitor status: OK, if the monitor is correct or NOK, if the autoscaling configuration does not match. Monitor status is refreshed once in 5 minutes.

6.9 Compute Resources

Compute resources are Xen or KVM platforms running on bare metal with CentOS Linux as the management operating system, or VMWare ESXi servers. They are used to provide hardware resources for virtual servers, ensuring highly efficient use of available hardware, and complete isolation of virtual server processes. Each virtual server in the cloud is hosted by a specific physical compute resource server, from which it receives CPU time, RAM and storage capacity from the data stores attached to that compute resource. OnApp supports multiple compute resource platforms including Xen, KVM and VMware.

We strongly recommend that you avoid adding CloudBoot and static boot compute resources to one compute zone.

6.9.1 Compute resource features

Compute resources:

- Provide system resources such as CPU, memory, and network to virtual servers
- Control the virtual differentiation of entities such as virtual servers and application data being delivered to cloud-based applications
- Take care of secure virtualization and channelling of storage, data communications and server processing
- Can be located at 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.

6.9.2 Compute resource management

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

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

- View Compute resource Settings
- Create Compute resource
- Create VMware Compute resource
- Create CloudBoot Compute resource
- Edit Compute resource
- Manage Compute resource Data Stores
- Manage Compute resource Networks
- Delete Compute resource

6.9.3 Compute Resource Matrix

<table>
<thead>
<tr>
<th>Virtualization Software</th>
<th>Xen 3</th>
<th>Xen 4</th>
<th>KVM 5</th>
<th>KVM 6</th>
<th>VMware</th>
<th>vCloud</th>
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<tr>
<td><strong>Feature</strong></td>
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<td>CentOS 6 64bit</td>
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<tr>
<td>Hot RAM resize without reboot**</td>
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<td>Y</td>
<td>Y**</td>
<td>Y**</td>
<td>Windows 2008 and Windows 7 VSs</td>
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<tr>
<td>Hot CPU cores resize without reboot</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Windows 2008 and Windows 7 VSs. Some Linux distributions</td>
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<td>Y</td>
<td>Y</td>
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**Note:**
- **Y** indicates availability.
- **N** indicates unavailability.
- **Y** and **N** indicated for specific conditions or distributions.
<table>
<thead>
<tr>
<th></th>
<th>Available for Linux VSs.</th>
<th>Available for Linux VSs.</th>
<th>Available for Linux VSs.</th>
<th>Available for Linux VSs.</th>
<th>Y - Increase only. Reboot is required.</th>
<th>Y - cold</th>
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</thead>
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<td>Available for FreeBSD - increase only is available. Disk resize is not available for primary FreeBSD disks.</td>
<td>Available for FreeBSD - increase only is available. Disk resize is not available for primary FreeBSD disks.</td>
<td>Available for FreeBSD - increase only is available. Disk resize is not available for primary FreeBSD disks.</td>
<td>Disk size decrease is not available for Integrated Storage.</td>
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<tr>
<td>IPv6 support ***</td>
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<tr>
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<td></td>
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<td></td>
<td><em>presented with publishing rules</em></td>
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<td>Backups</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td><a href="#">see VMware VS Snapshots</a></td>
<td><a href="#">see Virtual Server Snapshots</a></td>
</tr>
</tbody>
</table>

**Note:**
IPv6 support is limited to certain configurations. Please refer to the documentation for detailed instructions and requirements.
** Detailed info about RAM resize without reboot and hot-migrate abilities per template is available at:

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

### 6.9.4 CloudBoot Compute Resources

CloudBoot functionality is a method of compute resource installation without the presence of a local disk or other local storage, utilizing the PXE and DHCP servers. This allows users to both lower their hardware requirements on the compute resources (no local storage is required to boot a compute resource) as well as make the process of adding new compute resources to the cloud more efficient:

- No manual admin work required to boot compute resources
- No local storage needed to boot compute resources
- Self discovery of new compute resources added to the cloud
- Ability to move compute resources quickly between zones
- Ability to move quickly between compute resource KVM and XEN types

To start using CloudBoot, you must enable CloudBoot and Storage in the system configuration first ([Settings > Configuration > CloudBoot](Configuration Settings)). Visit [Configuration Settings](Configuration Settings) chapter for more details.

It’s recommended to use 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 available in the 3.0 version (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.
6.9.5 VMware Compute Resources

VMware compute resource is a combination of all ESXi compute resources at the vCenter displayed as a single combined compute resource with a sum of the CPU, RAM and Disk resources rather than individual compute resources.

VMware compute resources behave differently from Xen or KVM: with Xen/KVM the control is made directly upon the compute resources, while with VMware OnApp directly controls the VMware vCenter. This allows vCenter to control the VSs with the full range of VMware functionality including DRS and vMotion to ensure that the operation is optimal.

For details how to create a VMware compute resource, refer to the Create VMware Compute resource section.

6.9.6 VCloud Compute Resources

VCloud compute resource is used to integrate OnApp and VMware vCloud director so that enable existing vCloud Director installations to use the OnApp CP as their front-end UI.

For details how to create a vCloud compute resource, refer to the Create vCloud Compute resource section of the OnApp and vCloud Director Configuration Guide.

6.9.7 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
Click the compute resource's label to view the list of virtual servers controlled by that compute resource.

6.9.8 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
   - User
   - Power
   - Actions
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.

6.9.9 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 resources 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.

   - Power Cycle command

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.

### 6.9.10 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 **Actions** button, then click **Reboot Compute resource**.

4. A new screen will open asking for confirmation (via three checkboxes) before reboot:

   ![Reboot Compute Resource Screen]

   - **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
   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
   ```

6.10 Assets

Assets are the compute resources that are connected to the Control Panel server, but are either not configured or not assigned to the 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 the 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.
7 VCloud Director

This section provides information on how you can manage vCloud Director functionality imported into OnApp:

- Catalogs
- Orchestration Models
- vApp Templates
- vApps
- Edge Gateways
- NAT Rules
- Organization Networks
- VPN Service
- Resource Pools
- Firewall Rules

For other vCloud Director components in OnApp, refer to one of the following sections:

- vCD Virtual Servers
- Users
- User Groups (Organizations)
- vApp Networks
- Company Payments
- Billing plans

7.1 Create and Manage Catalogs

A vCloud Director catalog is a container for vApp templates and media files. Users can access vApp templates and media files that they own or that are shared with them.

In vCloud Director there is a possibility to make a catalog public. When catalog is public all organizations will see the catalog to deploy vApps from. Administrators can access a published catalog and copy its vApp templates to a catalog in their organization. They can then share the
organization catalog with other members of their organization so that they can use the vApp templates and media files.

OnApp provides an ability to import vApp catalogs from vCloud Director and use them for vApp creation.

You can create or delete a vApp catalog via the OnApp Control Panel. The action will be synchronized with vCloud Director and a new catalog will be created or deleted in vCloud Director. Also you can save a vApp to a catalog as a vApp template.

On this page:
- View Catalogs
- Create Catalog
- Delete Catalog
- Media Library

The catalogs functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud Organization Administrator

See also:
Create and Manage vApps
vApps (API)
Manage vCloud Director VSs

7.1.1 View Catalogs
To view your list of vApp catalogs:

1. Go to your Control Panel > Catalogs menu.
2. On the screen that appears, you will see the catalogs imported from the vCloud Director and their details:

- **Label** - the name of the catalog
- **User group** - the organisation, to which the catalog is assigned
- **Published** - whether this catalog is published or not
- **Actions** - processes which you can perform with the catalog which is not published (delete and update). By **Update** button you will be redirected to the vCD user interface, where you can update the catalog.

Click the catalog label to view the list of assigned templates. By clicking the **Edit** icon you will be redirected to the vCD user interface, where you can edit the catalog.

### 7.1.2 Create Catalog

To create a new vApp catalog:

1. Go to your Control Panel Catalogs menu.
2. Click the **New Catalog** button.
3. Set the following parameters:
   - **Label** - specify the label of a new catalog
   - **User Group** - choose the organization, this catalog will be added to
4. Click the **Submit** button.

### 7.1.3 Delete Catalog

To delete a vApp catalog:

1. Go to your Control Panel **Catalogs** menu.
2. Click the **Actions** button next to the catalog you want to delete and click **Delete**.
3. Confirm the deletion.

### 7.1.4 Media Library

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

Media Library is a part of catalog, which contains different file types (ISO, FLP, IMG, VFD) for their further usage. Media library is imported during the import process for the catalog and is synchronized with vCloud Director via RabbitMQ.

- Currently only ISO files are imported to OnApp from vCloud Director.
To view Media library:

1. Go to your Control Panel **Catalogs** menu.
2. Click the label of a catalog you are interested in. You will see the catalog details (label, user group, amount of vApp templates and media files which this catalog contains).
3. Click the **Media** tab.
4. You will see the list of available media files together with their details:

- **Label** - the name of media file
- **Status** - the status of media file
- **Image type** - the type of media file (ISO)
- **Resource Pool** - the label of resource pool where media file is stored
- **Size** - the size of media file
- **Created on** - the date of media file creation
- **Actions** - you can either edit media file (change label) or delete file

You can attach an ISO file from the media library to the VS. For details refer to the Manage vCloud Director VSs section of this guide.

### 7.2 Create and Manage Orchestration Models

vCloud Director orchestration models let you provide your customers with a ready environment which they can use to deploy virtual servers. The administrator creates and deploys orchestration models. In their turn, customers receive a vCloud Director environment with configured resource pool(s), network(s) and data store(s). This page describes how you can add orchestration models using OnApp.

Using OnApp you can view create, deploy and delete orchestration models. When you deploy an orchestration model you create a new vCD on the vCloud Director side. CPU, memory, network and data store resources associated with the new vCD will be configured according to the parameters you set during orchestration model creation and deployment.
Ensure that *Orchestration Models* permissions are on before managing orchestration models.

**On this page:**

- View orchestration models
- Deploy orchestration model

This functionality is available for users with the vCloud Organization Administrator role.

**See also:**

- Manage vCloud Director VSs
- Create and Manage vApps
- Manage User Restrictions and Resources
- Resource Pools
- Manage Organization Networks

### 7.2.1 View orchestration models

To view orchestration models, go to the **Control Panel > Orchestration Models** in the vCloud Director section. The page that loads shows the list of orchestration models with their labels and the particular vCloud Director to which each template is associated.

Click the vCloud Director label next to the template you are interested in to view the details of the vCloud Director compute resource associated with it.

Click the label of an orchestration model to view its details:
Properties

- **Label** - the name of the orchestration model
- **Compute Resource** - the compute resource associated with the orchestration model
- **Provider vdc** - select from the drop-down list the provider vDC that will be used when an organization vDC will be deployed from the orchestration model.

Compute Options

- **Vdc model type** - the resource pool type: Allocation Pool, Reservation Pool or Pay-As-You-Go

There are three types of resource pools:

- **Allocation Pool** - a percentage of the resources you allocate from the provider virtual datacenter are committed to the organization virtual datacenter. You can specify the percentage for both CPU and memory.
- **Pay-As-You-Go** - resources are committed only when users create vApps in the organization virtual datacenter.
- **Reservation Pool** - all of the resources you allocate are immediately committed to the organization virtual datacenter.

The array of resources with the minimum, maximum and default values the end client can order and information on whether the end client can change and see the values. The parameters apply to a certain vDC model type selected previously. For details see the table below.

Network Options

- **Default network** - the network pool for the selected compute resource
- **Deploy edge gateway** - whether an edge gateway will be deployed or not.
- **Edge gateway name** - the label for the new edge gateway. The default name is MyEdgeGateway. This field appears only when the Deploy edge gateway option is enabled.
- **Networks to create** - the networks that will be created during orchestration model deployment with their details:
  - **Default Name** - the label for the network
  - **Type** - the type of the network: direct, routed or isolated.
  - **Network Address** - the network address.
  - **DNS** - DNS for the network.
Storage

- **Enable thin provisioning** - whether thin provisioning is enabled
- **Enable fast provisioning** - whether fast provisioning is enabled
- **Data store option choices** - the settings for data stores:
  - **Label** - the name of the data store zone(s) in which data stores will be created during orchestration model deployment.
  - **Minimum** - the minimum data store size (GB) that can be requested during orchestration model deployment.
  - **Maximum** - the maximum data store size (GB) that can be requested during orchestration model deployment.
  - **Default** - the default data store size (GB) that will be set during orchestration model deployment. If the data store options are not set as customizable and/or visible, the default data store size will be applied during orchestration model deployment.
  - **Customizable** - whether the data store size can be altered during orchestration model deployment.
  - **Visible** - whether the data store zone will be listed during orchestration model deployment. If the data store zone is not visible, a data store will still be created in it.

7.2.2 Deploy orchestration model

To deploy an orchestration model:

1. Go to the **Control Panel > Orchestration Models** in the vCloud Director section.
2. Click the **Actions** button next the template you want to deploy and select **Deploy**.
3. On the page that loads, configure the resources assigned to the vCloud Director created from this vCD template:
General

- User group - select the organization with which the orchestration model will be associated
- Resource pool label - enter a label for a resource pool that will be created after the template is deployed

CPU Resources

- CPU allocation - amount of CPU resources (GHZ) that will be allocated after the template is deployed
- CPU guaranteed - amount of guaranteed CPU allocation (%)
- vCPU speed - the vCPU speed that can be consumed after the template is deployed

Memory Resources

- Memory - the amount of memory(MB) that will be allocated after the template is deployed
- Memory guaranteed - amount of guaranteed memory allocation (%)
- VS number - the number VSs that can be created after the template is deployed

Storage

- Default storage policy - select the default storage policy
- Set the disk size for the data stores that will be allocated after the template is deployed

Network

- Edge gateway uplink networks - select one or several external networks

The networks that will be assigned to the newly created vCD with their details:

- Default name - the label for the network
- Type - the type of the network: routed, isolated or direct
- Network Address - the network address
- DNS - DNS for the network

Click Next to proceed.
Confirmation
Review the details of the vCloud Director you are going to deploy.

If you are satisfied with the configurations, click the **Submit** button to deploy the orchestration model.
If you want to change any of the resources click the **Previous** button and make the necessary changes.

7.3 Create and Manage vApps

A vCloud Director vApp consists of one or more virtual servers that communicate over a network and use resources and services in a deployed environment. A vApp can contain multiple virtual servers.

This document provides the information on how you can manage the vApps imported from your vCloud Director.

On this page:
- View vApps
  - vApp Details
- Create vApps
  - Deploy New vApp
  - Compose vApp
- Recompose vApp
- Add vApp to Catalog
- Edit vApp
- Start/Stop vApps
- Delete vApps

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
7.3.1 View vApps

To view all vApps in the cloud:
1. Go to your Control Panel's **vApps** menu to see an overview of all vApps in the cloud.
2. The page that loads will show the list of vApps together with their details:
   - **Name** - the name of the vApp
   - **User** - the owner of the vApp. Click the user name to see the owner details. The owner of the vApp can be changed in vCloud Director. These changes are synchronized with OnApp and can be seen in **Control Panel > vApps** menu.
   - **Resource pool** - the label of the resource pool of this vApp
   - **Number of virtual servers** - the number of virtual servers within the vApp
   - **Number of networks** - the amount of vApp networks associated with this vApp
   - **Power** - the power status of the vApp. Click the on/off buttons to change the status. After the vApp is created or imported, its status will be **Building**, until the creation/import process is finished. On the overview screen of a specific vApp, its status will be shown as **Pending**. The user cannot perform any actions to the pending vApp except for deleting it.
   - **Actions** - click the **Actions** button to perform one of the following processes on the vApp:
     - Edit
     - Recompose
     - Add to Catalog
     - Spin up Network
     - Stop/Start
7.3.1.1 vApp Details

Click the name of the vApp to view its details:

- **Name** - the name of the vApp
- **Status** - the status of the vApp. A vApp can have the following statuses:
  - FAILED_CREATION - the vApp could not be created
  - UNRESOLVED - the vApp is damaged and cannot be controlled by vCloud
  - RESOLVED - the vApp has been created but it does not contain VSs
  - SUSPENDED - the vApp has been suspended
  - Powered_ON - all the VSs in the vApp are on
  - WAITING_FOR_INPUT - the vApp is waiting for user input
  - UNKNOWN - the vApp is in a state that is identified but is not known to the system
  - UNRECOGNIZED - the vApp is in a state that cannot be identified by the system
  - POWERED_OFF - all the VSs in the vApp are off
  - INCONSISTENT_STATE - the vApp is in an inconsistent state. This status appears when the vApp was edited from the vSphere associated with the vCD in which the vApp resides, therefore, the vSphere and vCD databases are not yet fully synchronized.
  - MIXED - the VSs in the vApp have different power statuses: some are on and some are off

- **Virtual servers** - the number of virtual servers within the vApp
- **Number of CPUs** - the number of CPUs used by the vApp
- **Virtual Servers** - the list of VSs associated with this vApp and their details. By pressing the "+" button you can recompose this vApp.
- **vApp Networks** - the list of vApp networks associated with this vApp and their details: label, status, network address. Click the **Actions** button to delete a vApp network. Removing the network will restart the vApp.
- **Activity log** - the list of log items associated with this vApp. Click the Ref number of a log item to view its details (data, action, status, initiator of transaction etc.)

Alternatively, you can access the details page of a particular vApp from the Overview page of a VS assigned to this vApp. To view the details of the vApp with which the VS is associated, click the **Tools** button on the VS Overview screen at **Dashboard > Virtual Servers >** label of the VS you are interested in > **Tools > Go to vApp.**

7.3.2 Create vApps
You can create a new vApp based on a vApp template stored in a catalog to which you have access. Alternatively, you can compose a new vApp using virtual servers from vApp templates, new virtual servers, or a combination of both.

You cannot add vApps when being logged in as a non vCloud Director user.

7.3.2.1 Deploy New vApp

To create a new vApp:

1. Go to your Control Panel's vApps menu to see an overview of all vApps in the cloud.
2. Click the Deploy New vApp button. If a new vApp template is created and added to catalog in vCloud Director, it will be synchronized with OnApp. This vApp template will be added to the list of all vApp templates.
3. On the screen that appears, fill in the vApps creation form:
   
   vApp Template and Location
   o name - specify the vApp label
   o vApp Template - select the vApp template
   o vDC - select the virtual data center
   o Network - the network(s) that will be associated with the vApp
   o Click Next.

   Configure resources
   o Label - the name of template
   o Virtual cores - use the slider to set the number of virtual cores
   o Cores per socket - set the number of cores per socket for vApp
   o Total memory - use the slider to set the total memory for vApp
   o Data Store - choose data store from the drop-down list
   o Hard disk 1 Size - set the size in GB
   o NIC 0 Connection - the network to which the NIC will be connected

4. Click Submit to finish the vApp creation process.
7.3.2.2 Compose vApp

To compose a new vApp:

1. Go to your Control Panel’s vApps menu to see an overview of all vApps in the cloud.
2. Click the Compose vApp button.
3. On the screen that appears, fill in the form:
   - Create Blank vApp - move the slider to the right if you want to create a blank vApp. Such a vApp will not contain any virtual servers. You need to fill in only the Name and vDC fields for a blank vApp.
   - Name - specify the vApp label
   - vDC - select the virtual data center
   - vApp Templates - select one or several vApp templates from the drop-down list. All VSs, built on those templates, will be copied to your new vApp.
   - VApps - select one or several vApps from the drop-down list. All VSs within selected vApps will be copied to your new vApp.
4. Click the Compose button.

7.3.3 Recompose vApp
Unlike a Compose vApp option, which helps you to create a new vApp, the Recompose vApp option allows you to modify an existing vApp.

To recompose vApp:
1. Go to Control Panel > vApps menu.
2. Click the Actions button next to the vApp you want to change, then click Recompose.
3. On the screen that appears, select an option from drop-down menu in field vApp Template.
4. Click the Recompose button.

7.3.4 Add vApp to Catalog

To add a vApp to catalog:
1. Go to Control Panel > vApps menu.
2. Click the Actions button next to the vApp you want to add to catalog, then click Add to Catalog.
3. Fill in the following fields:
   - Catalog - choose the catalog from the drop-down menu
   
   You can add vApp to a public catalog, which belongs to the same organization as vApp does.
   - Overwrite Catalog Item - move the slider to the right to save this vApp as template instead of another vApp template. In the Target vApp Template field choose the appropriate vApp template, which will be replaced, from the drop-down menu.
   - Label - specify the name of the vApp. This option is missing if the Overwrite catalog item slider is enabled.
   - Description - add the appropriate vApp description
4. Click **Add vApp to Catalog**.

After you add a vApp to catalog, you will be able to create a new vApp with the same configuration as the original one.

### Prerequisites

Ensure that *Convert vApp* permission is on before adding vApp to catalog.

7.3.5 **Edit vApp**

To edit a vApp:

1. Go to **Control Panel > vApps** menu.
2. Click the **Actions** button next to the vApp you are interested in, then click **Edit**.
3. On the screen that appears, you can edit the name of the vApp.
4. Click **Save**.

7.3.6 **Start/Stop vApps**

To start or stop a vApp in the cloud:

1. Go to your Control Panel's **vApps** menu to view all vApps.
2. Click the **Actions** button next to the required vApp, then choose **Start** or **Stop** action.
7.3.7 Delete vApps

To delete a vApp in the cloud:
1. Go to your Control Panel's vApps menu to view all vApps.
2. Click the Actions button next to the required vApp.
3. If the vApp is running, then choose the Stop action.
4. When the vApp is stopped, click Delete.

7.4 Create and Manage vApp Templates

A vCloud Director vApp template is a virtual server image that is loaded with an operating system, applications, and data. These templates ensure that virtual servers are consistently configured across an entire organization.

vApp templates are added to vApp catalogs.

You can add a vApp template to a vApp catalog via the OnApp Control Panel. It will be synchronized with vCloud Director and a new vApp template will be added to corresponding vApp catalog in vCloud Director.
7.4.1 View vApp Template

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

To view vApp templates:
1. Go to your Control Panel Catalogs menu.
2. Click the label of vApp catalog.
3. On the screen that appears, you will see the list of vApp templates added to this vApp catalog.
7.4.2 Create vApp Template

This functionality is available for users with the following roles:

- vCloud Catalog Author
- vCloud Organization Administrator

To create vApp template:

1. Go to your Control Panel **Catalogs** menu.
2. Click the label of vApp catalog.
3. On the screen that appears, click the "+" button or the **New Template** button.
4. Specify the following parameters:
   - **Label** - choose a name for vApp template
   - **OVF URL** - indicate the route, from where the template will be uploaded or
   - **File** - click the **Choose File** button to upload a template. Make sure to select all the files in the archive for the template.
5. Click **Submit**.

7.4.3 Delete vApp Template

This functionality is available for users with the vCloud Organization Administrator role.
To delete vApp template:
1. Go to your Control Panel **Catalogs** menu.
2. Click the label of vApp catalog.
3. On the screen that appears, you will see the list of vApp templates added to this vApp catalog.
4. Click the **Actions** button next to the template you want to delete and click **Delete**.
5. Confirm the deletion.

### 7.5 Edge Gateways

A vCloud Director edge gateway is a virtual router for organization vDC (virtual Data Center) networks. An Edge Gateway provides a routed connection between an organization vDC network and an external network.

An Edge Gateway can support up to ten interfaces. These interfaces are categorized as uplinks when they connect to an external network and internal interfaces when they connect to an organization vDC network.
7.5.1 View Edge Gateways

To view edge gateways:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Choose the specific **Edge Gateways's** label. Click the **Overview** tab to see the following information:
   - **Label** - the name of the edge gateway
   - **Description** - additional info about the edge gateway
   - **Edge Gateway Configuration** - configuration type of the edge gateway
   - **High Availability** - whether high availability option is enabled for this edge gateway or not
   - **Use default route for dns relay** - whether default route for dns relay is used or not
3. Also at this page you will see the following information about external network interfaces, to which this edge gateway is connected:
   - **Label** - the label of the network
   - **Gateway address** - the IP address of the gateway
4. Click the **Firewall Service**, **Nat service**, **VPN service** tabs for the respective actions.

7.5.2 Create Edge Gateways
To create an edge gateway:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Click the **New Edge Gateway** button. Indicate the following parameters:
   - **vDC** - choose the appropriate vDC from the drop-down list
   - **Label** - indicate the label of the edge gateway
   - **Description** - write additional info about edge gateway
   - **Edge Gateway Configuration** - choose configuration type of edge gateway from the drop-down list
   - **High Availability** - tick the checkbox to enable high availability option for this edge gateway
   - **External Networks** - select the external network from the drop-down list
   - **Use default route for dns relay** - tick the checkbox to use default route for dns relay
3. Click the **Submit** button.

### 7.5.3 Edit Edge Gateways

To edit edge gateway:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Click the **Actions** icon next to the edge gateway you want to edit, then choose **Edit**.

3. Edit the necessary parameters:
   - **Label** - change the label of edge gateway
   - **Description** - specify additional info about edge gateway
   - **Edge Gateway Configuration** - this field cannot be edited, it is set during edge gateway creation
   - **High Availability** - tick the checkbox to enable high availability option for this edge gateway
   - **External Networks** - select the external network from the drop-down list
   - **Use default route for dns relay** - tick the checkbox to use default route for dns relay

4. Click the **Submit** button.

### 7.5.4 Delete Edge Gateways

To delete edge gateway:
1. Go to your Control Panel's **Edge Gateways** menu.
2. Click the **Actions** icon next to the edge gateway you want to remove, then choose **Delete**.
3. Confirm the deletion.

### 7.6 Manage NAT Rules

vCloud Director NAT (Network Address Translation) service translates source or destination IP addresses and port numbers. In the most common case, you associate a NAT service with an uplink interface on an Edge Gateway so that addresses on organization VDC networks are not exposed on the external network.

You can view/create/delete NAT rules using OnApp Control Panel.
On this page:
- View NAT Rules
- Create NAT Rules
- Delete NAT Rules

This functionality is available for users with the vCloud Organization Administrator role.

See also:
Edge Gateways
Edge Gateways (API)
vCloud Director Firewall Rules
vCloud Director vApp Networks
vCloud Director VS Network Interfaces

7.6.1 View NAT Rules

To view NAT service of a specific edge gateway:
1. Go to your Control Panel's Edge Gateways > Edge gateway's label > Nat Service tab.
2. On the page that appears you will see the list of NAT rules together with their details:

- Rule type - the type of the NAT rule (DNAT, SNAT)
- Network - the name of vCloud Director network
- Original IP - the original IP address to apply this rule on
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7.6.2 Create NAT Rules

To create a NAT rule:

1. Go to your Control Panel's Edge Gateways > edge gateway's label > Nat Service tab.
2. Click the Add New Rule button or "+" button.
3. On the page that appears specify the following parameters:
   - **Enabled** - tick the checkbox to enable this NAT rule
   - **Rule type** - choose the type of the NAT rule from the drop-down menu:
     - **SNAT** - source network address translation. This kind of rule translates the packet's source address and, optionally, source IP port to the values you specify.
     - **DNAT** - destination network address translation. This kind of rule translates the packet's destination address and, optionally, destination IP port to the values you specify.

1. **Network** - choose the vCloud Director network from the drop-down menu
2. **Original IP** - specify the original IP address to apply this rule on
3. **Original port** - specify the port of original IP address (applies only for DNAT rule type)
4. **Translated IP** - specify the IP address to translate the addresses of outgoing packets to
5. **Translated port** - specify the port of translated IP address (applies only for DNAT rule type)
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- Protocol - choose the type of protocol from the drop-down menu (applies only for DNAT rule type)

4. Click Create.

7.6.3 Delete NAT Rules

To delete a NAT rule:

1. Go to your Control Panel’s Edge Gateways menu > specific edge gateway’s label > Nat Service tab.
2. Click the Delete icon next to the NAT rule you want to delete.
3. Confirm the deletion.

7.7 Manage Organization Networks

vCloud Director organization networks enable communication between vApps within a vCloud Director organization. You can view, create, edit and delete vCloud Director Organization networks using OnApp. Any changes that you make via OnApp regarding Organization networks are synchronized with vCloud Director and vice versa.

On this page:
- View Organization Networks
- Create Organization Network
- Edit Organization Network
- Delete Organization Network

This functionality is available for users with the vCloud Organization Administrator role.

See also:
- vCloud Director vApp Networks
7.7.1 View Organization Networks

To view the list of Organization networks, go to Control Panel left navigation pane vCloud > Org Networks menu. The page that loads shows the list of vCloud Director Organization networks and their details:

- **Label** - the name of the network
- **Edge Gateway** - the edge gateway associated with the network. Click this label to view the details of the edge gateway.
- **Gateway Address** - the IP address of the gateway
- **Network Mask** - mask of the network
- **Resource Pool Owner** - the resource pool associated with the network. Click this label to view the details of the resource pool.
- **User Group** - the organization associated with the organization network

Click the "+" button at the top of the screen, and you will be redirected to the vCD UI, where you can add the organization network.

Click the Organization network label to view its details:

- **Label** - the name of the network
- **Status** - the status of the network, whether it is switched on or not.
- **Type** - the type of the network. It can be routed, isolated or direct.
- **Edge Gateway** - the edge gateway associated with the network. Click this label to view the details of the edge gateway.
- **Gateway address** - the IP address of the gateway
- **Network mask** - IP of the network mask
- **Use gateway DNS** - whether gateway DNS is applied to the network or not
- **Primary DNS** - IP address of the primary domain name system (DNS) server
- **Secondary DNS** - IP address of the secondary domain name system (DNS) server
- **Shared** - whether this organization network is shared or not
- **Owner** - the resource pool associated with the network. Click this label to view the details of the resource pool.

### 7.7.2 Create Organization Network

Ensure that *Org Networks* permissions are on before creating an org network.

To create an organization network:

1. Go to **Control Panel** left navigation pane *vCloud > Org Networks* menu.
2. Click the + button.
3. On the screen that appears, fill in the organization network creation form:
   a. 
      - **Label** - specify a name for the organization network
      - **Organization** - an organization to which the network will be connected (appears by default and can not be changed)
      - **Resource Pool** - choose a resource pool to which the network will be connected
      - **Network Type** - choose a type of the organization network. Depending on the type selected, the options will differ:

### Direct

a. 
   - **Shared** - move the slider to the right to make this network shared
   - **External Network** - choose an external network from the drop-down list
5.1 User Guide

4. Click the Submit button.

Routed

a. 
- **Shared** - move the slider to the right to make this network shared
- **Edge Gateway** - choose an edge gateway to which the network will be connected
- **Network Address** - specify a network address (CIDR address format with gateway address)
- **User Gateway DNS** - move the slider to the right if the selected edge gateway has configured DNS. Otherwise, fill in **DNS Addresses** and **DNS Suffix** fields.
- **DNS Addresses** - specify DNS IP Address
- **DNS Suffix** - specify DNS suffix
- **Static IP Pools** - specify start/end IP addresses. To add more than one line, click the + button

Isolated

a. 
- **Shared** - move the slider to the right to make this network shared
- **Network Address** - specify a network address (CIDR address format with gateway address)
- **DNS Addresses** - specify DNS IP Address
- **DNS Suffix** - specify DNS suffix
- **Static IP Pools** - specify start/end IP addresses. To add more than one line, click the + button
7.7.3 Edit Organization Network

To edit an organization network:

1. Go to Control Panel left navigation pane vCloud > Org Networks menu.
2. Click the Actions button next to the organization network you want to edit, then click Edit.
3. On the screen that appears, edit the necessary parameters:
   - Label - specify a name for the organization network
   - Shared - move the slider to the right to make this network shared
   - DNS Addresses - specify DNS IP Address
   - DNS Suffix - specify DNS suffix
4. Click the Submit button.

7.7.4 Delete Organization Network

To delete an Organization network:

1. Go to Control Panel left navigation pane vCloud > Org Networks menu.
2. The page that loads shows the list of vCloud Director Organization networks.
3. Click the Actions button next to the network you want to delete and click Delete. You will be asked for confirmation before the network is deleted.
7.8 Manage VPN Service

A vCloud Director edge gateway configuration can define an IPsec virtual private networking (VPN) service to provide secure virtual private networking within an organization, between organization VDC networks, or between an organization VDC network and an external IP address.

VPN Service allows you to create VPN tunnels for current Edge Gateway using OnApp Control Panel.

- Ensure that Tunnels permissions are on before managing VPN tunnels.
- This functionality is available for users with the vCloud Organization Administrator role.

On this page:
- View VPN Tunnels
- Create VPN Tunnel
- Delete VPN Tunnel

See also:
- Edge Gateways
- Edge Gateways (API)
- Manage NAT Rules
- vCloud Director Firewall Rules
- vCloud Director vApp Networks
- vCloud Director VS Network Interfaces
7.8.1 View VPN Tunnels

To view VPN service of a specific edge gateway:

1. Go to your Control Panel’s **Edge Gateways > edge gateway’s label > VPN Service** tab.
2. On the page that appears, you will see the list of VPN tunnels together with their details:

   - **Name** - the label of the VPN tunnel
   - **Enabled** - whether VPN tunnel is enabled or not
   - **Description** - the description of the VPN tunnel
   - **Peer** - the ID for the peer end point
   - **Local** - the ID for local end point
   - **Local network** - the name of the local network in the VPN tunnel
   - **Peer network** - the name of the peer network in the VPN tunnel
   - **Operational** - whether this VPN tunnel is operational or not
   - **Actions** - processes which you can perform with the VPN tunnel

7.8.2 Create VPN Tunnel

To create VPN tunnel of a specific edge gateway:

1. Go to your Control Panel’s **Edge Gateways** menu > specific edge gateway’s label > **VPN Service** tab.
2. Click the "+" button.
3. On the page that appears specify the following parameters:
   - **Name** - specify the label of VPN tunnel
   - **Enabled** - move the slider to the right to enable this VPN tunnel
   - **Description** - provide the description of the VPN tunnel
   - **Local Native Address** - specify the IP address of the local network
   - **Local Network** - choose the local network from the drop-down list
   - **Peer Address** - specify the IP address of the peer endpoint. The Peer IP cannot be the same for multiple IPSec VPNs
   - **Peer Behind NAT** - move the slider to the right to enable specifying peer native Address
   - **Peer Native Address** - if Peer Behind NAT slider is enabled, enter peer native IP address
   - **Peer Network** - specify the peer network. Peer Network cannot be the same as the local network.
   - **Shared secret encrypted** - move the slider to the right to encrypt the shared secret
   - **Encryption protocol** - specify the type of encryption protocol (default protocol is AES-236)
   - **Prehashed Key** - the key used for authentication. Shared secret key should be from 32 to 128 characters in length and have at least one uppercase letter, one lowercase letter and one number. Special characters are not allowed.
   - **MTU Size** - specify the size of maximum transmission unit (default value is 1500)
4. Click **Create**.

### 7.8.3 Delete VPN Tunnel

To delete VPN tunnel of a specific edge gateway:

1. Go to your Control Panel's **Edge Gateways > edge gateway's label > VPN Service** tab.
2. Click the Delete icon next to the VPN tunnel you want to delete.
3. Confirm the deletion.
7.9 Resource Pools

A vCloud Director resource pool is an allocation model which determines how and when the provider virtual data center compute and memory resources are committed to the organization virtual data center.

There are three types of resource pools:

- **Allocation Pool** - a percentage of the resources you allocate from the provider virtual data center are committed to the organization virtual data center. You can specify the percentage for both CPU and memory.

- **Pay-As-You-Go** - resources are committed only when users create vApps in the organization virtual data center.

- **Reservation Pool** - all of the resources you allocate are immediately committed to the organization virtual data center.

You can view, create, edit and delete resource pools using OnApp Control Panel.

**On this page:**
- View Resource Pool
- Create Resource Pool
- Edit Resource Pool
- Delete vCloud Director Resource Pool
- Resource Pool Data Stores
  - Add Resource Pool Data Stores
  - Edit Resource Pool Data Stores
  - Delete Resource Pool Data Stores
- Resource Pool Billing Statistics
  - View and generate statistics
  - Archive statistics

This functionality is available for users with the vCloud Organization Administrator role.

**See also:**
*Create and Manage vApps*
Manage vCloud Director VSs
Manage Catalogs
vCloud Director vApp Networks

7.9.1 View Resource Pool

To view vCloud Director resource pools:

1. Go to your Control Panel’s **Resource Pools** menu to see an overview of all resource pools in the cloud.

2. The page that loads will show the list of resource pools with their details:
   - **Label** - the name of the resource pool
   - **Status** - whether the resource pool is enabled or not. When a resource pool is disabled, the memory and compute resources of the resource pool are no longer available.
   - **Type** - the type of the resource pool: Allocation Pool, Pay-As-You-Go or Reservation Pool.
   - **CPU (GHz)** - the used and total CPU reservations for the resource pool, in GHz.
   - **Memory(GB)** - the used and total memory reservations for the resource pool, in GB.
   - **Actions** - click the **Actions** button to delete the resource pool.

To view vCloud Director resource pool details:

1. Go to your Control Panel’s **Resource Pools** menu to see an overview of all resource pools in the cloud.

2. Click the label of a specific resource pool.

3. The page that loads will show the following details of the resource pool:
   - **Label** - the name of the resource pool.
   - **Owner** - the user group to which this resource pool is assigned. Click the name to view the user group details.
   - **Allocation Model** - the type of resource pool.
5.1 User Guide

[Image 71x272 to 236x398]

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- VS Quota - the quota of VSs
- Network Quota - the quota of networks
- Enabled - whether this resource pool is enabled or not
- Fast Provisioning - whether the fast provisioning is enabled for this resource pool or not
- Thin Provisioning - whether the thin provisioning is enabled for this resource pool or not
- CPU - the amount of Allocated CPU, Reserved CPU, Used CPU and percentage of guaranteed CPU
- vCPU Speed - the speed of vCPU (in MHz)
- Memory - the amount of Allocated Memory, Reserved Memory, Used Memory and percentage of guaranteed Memory
- Data Stores - the list data stores within the resource pool. The following parameters are displayed for each of the data stores: label, disk usage, disk capacity, whether the data store is enabled or not. You can edit/delete the existing data stores.

7.9.2 Create Resource Pool

To create a vCloud Director resource pool:

1. Go to your Control Panel’s Resource Pools menu to see an overview of all resource pools in the cloud.
2. Click the + button.
3. On the screen that appears, fill in the resource pool creation form:
   - Label - specify a name for the resource pool
   - User group - choose the user group to which this resource pool will be assigned
   - Provider vdc - choose the provider resource pool from the drop-down list

   Ensure that Provider resource pools permissions are on.
5.1 User Guide

- Allocation Model - choose the type of resource pool. Depending on the type selected, the compute resource options will differ:

Compute resources

Pay-As-You-Go

- Guaranteed CPU - specify the amount of guaranteed CPU allocation (%)
- Guaranteed memory - specify the amount of guaranteed memory allocation (%)
- VS Quota - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)
- CPU limit - specify the maximum amount of CPU (in GHz) that can be requested (or tick the check box below to set CPU limit to unlimited)
- vCPU Speed - specify the vCPU speed that can be consumed after the resource pool is created (in MHz)
- Memory limit - specify the maximum amount of memory (in GB) which can be used (or tick the check box below to set Memory limit to unlimited)

- CPU limit is equal to CPU quota in company billing plan (memory limit - to memory quota respectively).
- Min/max amounts of CPU and memory quotas in company billing plan influence boundaries, within which you can set CPU and memory limits.
- If min/max amounts of CPU and memory quotas are set to unlimited in company billing plan, you can set unlimited CPU and memory limits by ticking the check box. Otherwise unlimited option will not be available.

AllocationPool

- CPU allocated - specify the amount of CPU resources (GHz) that will be allocated after the resource pool is created
- Guaranteed CPU - specify the amount of guaranteed CPU allocation (%)
- Memory allocated - specify the amount of memory (in GB) allocated to this resource pool
- Guaranteed memory - specify the amount of guaranteed memory allocation (%)
- VS Quota - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)

ReservationPool

- CPU allocated - specify the amount of CPU resources (GHz) that will be allocated after the resource pool is created
- **Memory allocated** - specify the amount of memory (in GB) allocated to this resource pool
- **VS Quota** - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)

**Network Options**

- **Default network pool** - choose the default network pool from the drop-down list. This network pool is used when adding isolated and routed networks to the resource pool. If there is no network pool associated with a resource pool, you will not be able to add isolated and routed networks to the resource pool.

**Datastore Options**

- **Thin Provisioning** - move the slider to the right to enable thin provisioning for this resource pool
- **Fast Provisioning** - move the slider to the right to enable fast provisioning for this resource pool
- **Data Store Zone** - choose the data store zone which is a provider's storage policy in vCloud Director from the drop-down list. The selection will be limited by the company plan's resources.
- **Capacity** - the size of the data store that will be created. The capacity range depends on the company plan's limits. After you create a resource pool, a new data store (storage policy) will be automatically created with the capacity set during resource pool creation in the selected data store zone.

4. Click the **Submit** button.

**7.9.3 Edit Resource Pool**
To edit a vCloud Director resource pool:

1. Go to your Control Panel's **Resource Pools** menu to see an overview of all resource pools in the cloud.

2. Click the **Actions** button next to the resource pool you want to edit, then click **Edit**.

3. On the screen that appears, edit the necessary parameters depending on the resource pool type:
   - **Label** - specify a name for the resource pool

   **Compute resources**

   *AllocationVApp* (Pay-As-You-Go)
   - **Guaranteed CPU** - specify the amount of guaranteed CPU allocation (%)
   - **Guaranteed memory** - specify the amount of guaranteed memory allocation (%)
   - **VS Quota** - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)
   - **CPU limit** - specify the maximum amount of CPU (in GHz) that can be requested (or tick the check box below to set CPU limit to unlimited)
   - **vCPU Speed** - specify the vCPU speed that can be consumed after the resource pool is created (in MHz)
   - **Memory limit** - specify the maximum amount of memory (in GB) which can be used (or tick the check box below to set Memory limit to unlimited)

   *AllocationPool*
   - **CPU allocated** - specify the amount of CPU resources (GHz) that will be allocated after the resource pool is created
   - **Guaranteed CPU** - specify the amount of guaranteed CPU allocation (%)
   - **Memory allocated** - specify the amount of memory (in GB) allocated to this resource pool
   - **Guaranteed memory** - specify the amount of guaranteed memory allocation (%)
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- **VS Quota** - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)

**Reservation Pool**

- **CPU allocated** - specify the amount of CPU resources (GHz) that will be allocated after the resource pool is created
- **Memory allocated** - specify the amount of memory (in GB) allocated to this resource pool
- **VS Quota** - specify the number of VSs that can be created after the resource pool is deployed (or tick the check box below to set VS quota to unlimited)

**Network Options**

- **Default network pool** - choose the network pool from the drop-down list. This network pool is used when adding isolated and routed networks to the resource pool. If there is no network pool associated with a resource pool, you will not be able to add isolated and routed networks to the resource pool.

**Datastore Options**

- **Thin Provisioning** - move the slider to the right to enable thin provisioning for this resource pool
- **Fast Provisioning** - move the slider to the right to enable fast provisioning for this resource pool

4. Click the **Submit** button.

### 7.9.4 Delete vCloud Director Resource Pool

To delete a vCloud Director resource pool:
1. Go to your Control Panel's **Resource Pools** menu to see an overview of all resource pools in the cloud.

2. Click the **Actions** button next to the resource pool you want to delete and click **Delete**.

3. Confirm the deletion.

### 7.9.5 Resource Pool Data Stores

You can add new data stores and edit or delete existing data stores from the resource pool overview page at **Control Panel > Resource Pools > Label**. For more information refer to vCloud Director Storage Policies.

#### 7.9.5.1 Add Resource Pool Data Stores

To add a data store to a resource pool:

1. Go to your Control Panel's **Resource Pools** menu to see an overview of all resource pools in the cloud.

2. Click the label of the resource pool to which you wish to add a new data store.

3. On the resource pool overview page click the + button in the data stores section.

4. Fill in the form that appears:
   
   - **Data Store Zone** - select the data store zone in which the data store will be created
   - **Enabled** - by default, all newly created data stores are enabled
   - **Disk Capacity** - move the slider to specify the size of the data store

5. Click the **Submit** button to add the data store.

#### 7.9.5.2 Edit Resource Pool Data Stores

To edit a resource pool data store:

1. Go to your Control Panel's **Resource Pools** menu to see an overview of all resource pools in the cloud.
2. Click the label of the required resource pool.
3. In the data stores section, click the Actions button next to the data store you want to update and select Edit.
4. Updated the required fields in the form that appears:
   - Enabled - move the slider to select whether the data store should be enabled or not
   - Disk Capacity - move the slider to edit the size of the data store
5. Click the Submit button to save the changes.

7.9.5.3 Delete Resource Pool Data Stores

To delete a resource pool data store:
1. Go to your Control Panel’s Resource Pools menu to see an overview of all resource pools in the cloud.
2. Click the label of the required resource pool.
3. In the data stores section, click the Actions button next to the data store you want to remove and select Delete.

7.9.6 Resource Pool Billing Statistics

Company billing plan statistics about used vCloud Director resources is gathered from vCloud Director resource pools. Two types of vCloud Director resource pools are used for billing statistics - reservation and allocation pools. Company billing plan for these vCloud Director resource pool types will include charging for the block of resources (CPU, RAM, storage, & network etc.) assigned to your user group.

Statistics are not collected on a resource pool if the compute zone is not added to the billing plan.

7.9.6.1 View and generate statistics

To view vCloud Director resource pool billing statistics:
1. Go to your Control Panel's Resource Pools menu to see an overview of all resource pools in the cloud.
2. Click the label of a specific resource pool.
3. Click the Billing Statistics tab.
4. The page that loads will show the following details of the billing statistics:

- **Date** - particular date and time for the generated statistics
- **User Group** - the label of user group, to which the company billing plan is assigned. Click the user group name to see its details.
- **Resource Pool** - the resource pool name with the total due for vCloud Director resources for the point of time specified in the Date column.
- **Network Usage** - the network name with the total due for vCloud Director resources for the point of time specified in the Date column.
- **Storage Policy Usage** - the storage policy name with the total due for vCloud Director resources for the point of time specified in the Date column.
- **Costs** - the total due for the Resource Pools and Storage Policy Usage at the point of time specified in the Date column.

To generate statistics for a particular time period:

1. Go to your Control Panel's **Resource Pools** menu to see an overview of all resource pools in the cloud.
2. Click the label of a specific resource pool.
3. Click the **Billing Statistics** tab.
4. At the top of the table set Start and End time for which you want to generate the billing statistics.
5. Tick the **Show in my timezone** checkbox if you want to show billing statistics according to your profile’s timezone settings.
6. Click **Apply**.

Also, you can customize resource pool statistics period using the following configuration in `on_app.yml` file:

```yaml
vdc_stats_delay: <period in second>
```

### 7.9.6.2 Archive statistics

If required, you can turn on resource pool statistics archiving. If this feature is enabled, hourly statistics will be converted into monthly and then stored as an archive.

To configure statistics archiving:
1. Go to your Control Panel’s **Settings** menu, and click the **Configuration** icon.

2. Click the **System** tab.

3. Configure the following settings in the **Statistics Management** section:
   - **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 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 database before being converted into monthly statistics. For example, if you set this parameter to 10, the hourly statistics will be stored for the last 10 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 the current month only. Set this parameter at least as 2 to keep the statistics for the previous month available.

4. Click the **Save Configuration** button to finish. Saving the configuration will restart OnApp services.

### 7.10 vCloud Director Firewall Rules

This section provides the information on how you can manage the firewall rules for the virtual servers imported from your vCloud Director.

- Create Firewall Rules
- Edit Firewall Rules
- Delete Firewall Rules

This functionality is available for users with the vCloud Organization Administrator role.

**See also:**

*Firewall Rules (API)*
To add a firewall rule:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Click specific Edge Gateway's label.
3. Click the **Firewall Service** tab > **Firewall Rules**.
4. Click the **Add New Rule** button.
5. Set the following:
   - **Enabled** - whether the firewall rule is enabled or not.
   - **Description** - the description of the firewall rule.
   - **Command** - there are two commands:
     - **ACCEPT** – defines the packets that will be accepted by the firewall.
     - **DROP** – defines the packets that will be rejected by the firewall.
   - **Source** - the source IP address for which this firewall rule is active. This can be an IP address, CIDR, IP range, "any", "internal" or "external". This field is not case sensitive.
   - **Source port** - the source port for which this firewall rule is effective.
   - **Destination** - the destination IP address for which this firewall rule is active. This can be an IP address, CIDR, IP range, "any", "internal" or "external". This field is not case sensitive.
   - **Destination port** - the destination port for which this firewall rule is effective.
   - **Protocol** - there are several types of protocol - TCP, UDP, ICMP, TCP+UDP or any.
   - **Enable logging** - tick this check box to enable logging.
6. Click the **Create** button.

### 7.10.2 Edit Firewall Rules

To edit a firewall rule:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Click specific Edge Gateway's label.
3. Click the **Firewall Service** tab > **Firewall Rules**.
4. On the page that appears you will see the list of firewall rules. Click the **Edit** icon next to the firewall rule you want to edit.
5. Change the following settings:
   - **Enabled** - whether the firewall rule is enabled or not.
   - **Description** - the description of the firewall rule.
   - **Command** - there are two commands:
     - **ACCEPT** – defines the packets that will be accepted by the firewall.
     - **DROP** – defines the packets that will be rejected by the firewall.
   - **Source** - the source IP address for which this firewall rule is active. This can be an IP address, CIDR, IP range, "any", "internal" or "external". This field is not case sensitive.
   - **Source port** - the source port for which this firewall rule is effective.
   - **Destination** - the destination IP address for which this firewall rule is active. The destination IP address for which this firewall rule is active. This can be an IP address, CIDR, IP range, "any", "internal" or "external". This field is not case sensitive.
   - **Destination port** - the destination port for which this firewall rule is effective.
   - **Protocol** - there are several types of protocol - TCP, UDP, ICMP, TCP+UDP or any.
   - **Enable logging** - tick this check box to enable logging.
6. Click the **Save** button.
7.10.3  Delete Firewall Rules

To delete a firewall rule:

1. Go to your Control Panel's **Edge Gateways** menu.
2. Click specific Edge Gateway's label.
3. Click the **Firewall Service** tab > **Firewall Rules**.
4. On the page that appears you can see the list of firewall rules. Click the **Delete** icon next to the firewall rule you want to delete. Confirm the deletion.

7.11  **vCloud Director vApp Networks**

The following network types are imported into OnApp:

- **organization vDC networks** (this network allows virtual servers in the organization vDC to communicate with each other and to access other networks)
- **external networks** (this network provides the interface to the Internet for virtual servers connected to external organization vDC networks)
- **vApp networks** (this network controls how the virtual servers in a vApp connect to each other and to organization vDC networks)

You can view the list of imported vApp networks at OnApp Cloud Control Panel. Also you can add a vApp network in vCloud Director using OnApp Control Panel.

**On this page:**
- View vApp Networks
- Create vApp Network
- Delete vApp Network
This functionality is available for users with the following roles:

- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator

See also:
- Create and Manage vApps
- vApps (API)
- Manage vCloud Director VSs

7.11.1 View vApp Networks

To view the list of your imported networks:

1. Go to your Control Panel's **Settings** menu.
2. Click the **vApp Networks** icon.
3. The screen that appears shows the list of your imported vApp networks and their details.
   - **Label** - the label of the network
   - **Identifier** - the identifier of the network
   - **VLAN** - VLAN number
   - **Network Zone** - the network zone with which this network is associated
   - **Location group** - the location group with which this network is associated
7.11.2 Create vApp Network

Ensure that vApp Networks permissions are on before creating a vApp network.

To add a vApp network:

1. Go to Control Panel > vApps menu.
2. Click the label of the required vApp.
3. On the vApp overview page click the + button above the vApp networks list.
4. On the screen that appears, select the organizational network with which the vApp network will be associated.
5. Click Create vApp Network to finish the process. Adding a new vApp network will restart the vApp.

7.11.3 Delete vApp Network

To delete a vApp network:

1. Go to Control Panel > vApps menu.
2. Click the label of the required vApp.
3. Click the Actions button next to the required network in the vApp networks list and select Delete. Deleting a network will restart the vApp.
7.12 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. There are two types of payments in OnApp: user payments and company payments. User payments are those which you charge for the resources created on XEN/KVM compute resources. Company payments are those for the vCloud Director integration resources. If you do not have the vCloud Director integration, the Company Payments tab will be missing.

- Ensure that Payments permissions are on before managing payments.
- Ensure that See own company payments and Monthly user group billing statistics permissions are on before managing a company payment and monthly bills.

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

On this page:
- View user payments
- View company payments

This functionality is available for users with the following roles:
- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

7.12.1 View user payments
To view payments:

1. Go to your Control Panel's Payments menu.

2. On the screen that appears, you will see the list of all payments together with their details:
   - User – the name of a user, who made the payment
   - Payment Date – the date when the payment was done
   - Amount – the money amount which was paid
   - Invoice Number – the serial number of a paid invoice
   - Actions – click the Actions button to edit or delete a payment

You can filter the list of payments by user - select the user from the drop-down menu and click the Apply button.

7.12.2 View company payments

To view payments:

1. Go to your Control Panel's Payments menu.

2. Click the Company Payments tab.

3. On the screen that appears, you will see the list of all payments together with their details:
   - Payment Date – the date when the payment was done
   - Company – the name of a user group, whose user conducted the payment
   - Invoice Number – the serial number of a paid invoice
   - Amount – the money amount which was paid
   - Actions – click the Actions button to perform one of the following processes on the payment: edit or delete.

You can filter the list of payments by user group - select the user group from the drop-down menu and click the Apply button.

To view monthly bills:

1. Go to your Control Panel's Users and Groups menu.

2. Click the User Groups tab.

3. Click the label of a specific user group.
4. On the screen that appears, you will see the details of this user group. Click the **Monthly Bills** link.

5. On the page that appears you will get the list of bills which shows the total due per each month of the year selected from the drop-down menu. To view billing statistics, select a year from the drop-down menu and click the **Apply** button.
8  DNS

The full version of OnApp Cloud (with CDN enabled) now gives you access to our free Anycast DNS service. Instead of managing your own DNS servers you can use our fully redundant global DNS, hosted at multiple datacenters around the world, and manage it through your OnApp Control Panel.
You can use our DNS service with domains registered anywhere on a third party domain registrar. The Control Panel lets you set up hostnames, manage DNS records, aliases, Mail Exchange, TXT and SRV records.
Using DNS has two main steps: setting up DNS hostnames, and managing DNS zones.

8.1  DNS Setup

DNS setup allows you to create a DNS hostname. After you create a DNS hostname, you get access to creating and managing DNS zones. To set up a new DNS, make sure that:

- CDN is enabled
- You have dns_zone or dns_zone.setup permission to access this page.

You can create only one DNS domain. Once created, a DNS domain can't be deleted, only updated.

If an administrator uses the same license for two different Control Panels, they can use the same DNS domain for CP1 and CP2. To do this, administrator should set the same DNS domain settings for both Control Panels.

To add a DNS domain:
1. Go to your Control Panel's Settings menu.
2. Click the DNS Setup button.
3. On the screen that appears, type your fully qualified domain name. Mind that you won't be able to use a domain name that is already registered with OnApp DNS.

The domains of the following kind are forbidden:
- google
- microsoft
- domain.com
- onapp.com
- facebook.com
5.1 User Guide

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4. Click the Save button.
After the DNS domain is added, the DNS service will be available to users. If you have added a domain, but still face some issues or the "Unable to get DNS Zone Setup: CDN service is temporarily unavailable" error occurs, contact support.

Make sure your domain name registrar has designated your domain to the appropriate glue records displayed in the infobox at Control Panel > Settings > DNS Setup.

8.1.1 Edit DNS Domain
To edit your DNS domain:
1. Go to your Control Panel's Settings menu, and click the DNS Setup icon.
2. Type a new fully qualified domain name to replace your existing domain.
3. Click the Save button to save changes.
If DNS domain is updated, all NS records for all DNS zones under this user will be updated.

8.2 DNS Zones
OnApp DNS Zone feature allows you to manage your and your clients' domain DNS. Each time DNS zone, record or setup settings are refreshed, the DNS configuration is immediately updated on the DNS vendor server.

8.2.1 Create DNS Zone
To add a new DNS zone:
1. Go to your Control Panel's DNS menu.
2. Click the Create DNS Zone button.
3. Fill in your domain name. At the domain registrar, point your domain to the following name servers:
   o ns1.yourdomain.com
   o ns2.yourdomain.com
   o ns3.yourdomain.com
   o ns4.yourdomain.com
Where yourdomain.com is your fully qualified domain name, which you have specified at DNS setup.

1. Tick the **Auto Populate With Existing DNS record** box to automatically import your existing DNS settings, or skip this step to start from scratch. Note that this option may not import all existing settings, so you should check your new record for any missing entries.

2. Click the **Submit** button.

3. On the page that appears, click the **Add** icons next to the DNS records you want to add. You can add and manage the following DNS records:
   - **SOA** (Start of Authority) – change the start of authority time to live value (TTL). To change a SOA TTL, click the TTL cell next to the SOA record and type a new value.
   - **NS** (Name Server) – change the TTL of the existing name servers or add new name servers. To change a name server’s TTL, click the TTL cell next to the name server record and type a new value.
   - **A** (Host) — point your domain name to a static IP address. To create a new A record, enter the following parameters into the cells:
     - **Host** – enter a host name or use the "@" sign to represent your current host.
     - **Point to** – enter the IP address to which the user would be sent for this host name.
     - **TTL** – set the time to live value for this record.

   A record example: ftp 192.168.0.1 86400
   Where: ftp is the host; 192.168.0.1 - IP, 86400 is TTL value.
   So your ftp.yourdomain.com will resolve to 192.168.0.1 IP address and the TTL value = 86400 seconds.

   - **AAAA** (Host)
     - To create a new AAAA record, fill in the following cells:
     - **Host** – enter a host name or use the "@" sign to represent your current host.
     - **Point to** – enter the IP address to which the user would be sent for this host name.
     - **TTL** – set the TTL value for this record.

   AAAA record example: ftp 2a00:1450:400b:c00::68 86400
   Where: ftp is the host, 2a00:1450:400b:c00 – IPv6 address, 86400 is the TTL value.
   So your ftp.yourdomain.com will resolve to 2a00:1450:400b:c00 IPv6 address.

   - **CNAME** (Alias) – alias domain records to your domain.

   It is possible to use underscore character in the CNAME records.

   To add a CNAME record, fill in the following cells:
   - **Host** – enter the host name or use the "@" sign to represent your current host.
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Point to – enter an alias you want to assign to your domain.

TTL – set the TTL value.

CNAME record example:
www example.com 86400
Where: www is an alias, example.com is a valid domain name, 86400 is TTL value.

To add the aliases, make sure an A record is added to this domain.

- **MX** (Mail Exchange) - identify the mail server for your domain name.
  To add a MX record, fill in the following cells:
  * **Priority** – set the MX priority to specify the routing order (lower value means higher priority).
  * **Host** – enter the hostname to which the emails should go
  * **Goes to** – enter the valid domain name.
  * **TTL** – set the TTL value.

  MX record example:
  10 mail example.com 86400
  Where: 10 is priority, mail is the host, example.com is a domain, 86400 is TTL.

- **TXT** – add additional information about the DNS zone.
  * **Host** – enter the valid host name
  * **Value** – any free text you want within a TXT record.
  * **TTL** – TTL value.

  TXT record example:
  @ v=spf1 a mx ptr ip4:192.168.1.1 ~all 86400
  Where: @ is the host name, v=spf1 a mx ptr ip4:192.168.1.1 ~all is value, 86400 is TTL.

- **SRV** (Service) – specify services that you have on your domain.
  To add a SRV record, enter the following cells parameters:
  * **Host** – type the host for which this record is valid.
  * **Priority** – set the host priority. Lower value means more preferred.
  * **Weight** – the approximate weight for relative records with the same priority.
  * **Port** – the port on which the service can be found.
  * **Points to** – enter the domain name.
  * **TTL** – set the time to live value.

  SRV record example:
xmpp._tcp 0 1 5222 jabber.example.com 86400
Where: xmpp._tcp is a host, 0 is priority, 1 is weight, 5222 is port, jabber.example.com is a points to value, 86400 is TTL.

8.2.1.1 Wildcards
In the OnApp version 3.0 it is possible to use wildcards in all DNS records. The table below explains the rules of wildcard use.

<table>
<thead>
<tr>
<th>DNS record type</th>
<th>Allowed</th>
<th>Disallowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>*.example.com</td>
<td>abc.*example.com</td>
</tr>
<tr>
<td></td>
<td>**.example.com</td>
<td>*.example.com</td>
</tr>
<tr>
<td></td>
<td><em>.</em>.example.com</td>
<td>sub.*.example.com</td>
</tr>
<tr>
<td></td>
<td><em>sub</em>.*.example.com</td>
<td>abc.<em>.</em>.example.com</td>
</tr>
<tr>
<td></td>
<td>Note: multiple '<em>' will be changed to single '</em>'. E.g. ****.example.com will be changed to *.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can only be prefixed for domain.</td>
<td></td>
</tr>
<tr>
<td>AAAA</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td>MX</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td>CNAME</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td></td>
<td>Note: CNAME wildcard record can not coexist with A record.</td>
<td></td>
</tr>
<tr>
<td>TXT</td>
<td>*.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>.</em>.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sub.*.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sub.<em>.</em>.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>sub</em>.*.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note: Wildcards are valid in any position , as long as the domain remains DNS zone's subdomain.</td>
<td></td>
</tr>
</tbody>
</table>

It is not possible to use wildcards for NS, SOA and SRV records because of PowerDNS limitations.

8.2.1.2 Underscore characters
In the OnApp version 3.0 it is possible to use wildcards in all DNS records. The table below explains the rules of underscore use.
<table>
<thead>
<tr>
<th>DNS Record type</th>
<th>Allowed</th>
<th>Disallowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>_abc.example.com</td>
<td>abc._example.com</td>
</tr>
<tr>
<td></td>
<td>__abc.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>abc_abc</em>.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note: Multiple ‘_’ e.g. ‘_____’ will not be changed to a single underscore, unless stated.</td>
<td></td>
</tr>
<tr>
<td>AAAA</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td>MX</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td>CNAME</td>
<td>Same to A record</td>
<td>Note: CNAME record with underscore can not coexist with A record.</td>
</tr>
<tr>
<td></td>
<td>Note: CNAME record with underscore can not coexist with A record.</td>
<td>Same to A record</td>
</tr>
<tr>
<td>NS</td>
<td>Same to A record</td>
<td>Same to A record</td>
</tr>
<tr>
<td>SRV</td>
<td>__xmpp._tcp.example.com</td>
<td>All except examples in the Allowed column.</td>
</tr>
<tr>
<td></td>
<td>__xmpp.__tcp.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>__xmpp._tcp._example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>__xmpp._tcp._abc.example.com</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note: Multiple ‘_’ e.g. ‘_____’ will be changed to a single underscore character.</td>
<td></td>
</tr>
<tr>
<td>TXT</td>
<td>All except examples in the Disallowed column.</td>
<td>_example.com</td>
</tr>
<tr>
<td></td>
<td>Note: underscores are valid in any position , as long as the domain remains DNS zone’s subdomain.</td>
<td>abc._example.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>example.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>example.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>example_.com</td>
</tr>
</tbody>
</table>

### 8.2.2 Edit DNS Zone

When you edit a DNS Zone, you manage the records assigned to this zone. The changes are instantly updated on DNS.

To edit a DNS zone:

1. Go to your Control Panel’s DNS menu. On the screen that appears, the list of DNS zones will be displayed.
2. Click the Actions button next to the domain zone you want to change, then choose Edit.
3. On the screen that appears, edit the DNS records as required:
   - **SOA** (Start of Authority) – change the start of authority TTL.
   - **NS** (Name Server) – change the TTL of the existing name servers or add a new name server.
   - **A** (Host) – change the A host record properties:
     - In the *Host* text box, type the name for a host.
     - In the *Point to* text box, type the IP address for the new host.
     - Set the TTL value.
   - **AAAA** (Host) – change the AAAA record properties as described for the A record.
   - **CNAME** (Alias) – canonical name properties.
   - **MX** (Mail Exchange) - change the mail server properties for your domain name.
   - **SRV** (Service) - specify services that you have on your domain.

**8.2.3 Delete DNS Zone**

To delete a domain zone:
1. Go to your Control Panel's **DNS** menu.
2. Click the **Actions** button next to the domain zone you want to delete, then click **Delete**.
3. Click **OK** to confirm the deletion.

**8.2.4 User DNS Zones**

User DNS zones tab allows you to manage your clients' DNS zones. Use the **Actions** button next to the required user DNS zone to edit/delete it. The changes will be instantly updated on our DNS.

**8.2.5 Set End-User Access to DNS Service**

To set end-users' access to DNS service:
1. Go to your Control Panel's **Roles** menu.
2. Click the **Actions** button next to the required user, then click **Edit**.
3. On the screen that follows, choose the **DNS Zone** group in the **Groups** field.
4. The following list of DNS permissions will appear:
   - **Any action on DNS zone**
   - **Create a new DNS zone**
   - **Destroy any DNS zone**
   - **Destroy own DNS zone**
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5. DNS - DNS ZONES

- See all DNS zones
- See own DNS zones
- Any action on DNS record
- Create a new DNS record
- Destroy any DNS record
- See all DNS records
- Update any DNS record
- DNS Setup

5. Tick the required boxes.
6. Click the Save button.

8.2.6 View/Edit/Delete User DNS Zones

To view, edit and delete existing clients' DNS zones:
1. Go to your Control Panel's DNS menu.
2. Click the User DNS Roles tab. On the screen that appears, you'll see a list of all clients' DNS zones.
3. To edit a clients' DNS zone, click the Actions button next to it, then click Edit. On the screen that appears, edit its details and click the Save button.
4. To delete a clients' DNS zone, click the Actions button next to the DNS zone you want to delete, then click Delete. You'll be asked to confirm deletion.
9 TEMPLATES

9.1 What templates are

OnApp templates are used to deploy virtual servers in your cloud. 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.

9.2 Windows templates version 4.0

OnApp version 4.0 introduces new Windows templates version 4.x with Cygwin as SSH server (instead of CopSSH as in versions 3.x). These templates are currently in beta.

- 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.

Windows Server 2003/XP OSs come to their end-of-life on July 14th, 2015 and will no longer be supported.

9.3 Types of templates

There are two different kinds of template:

- **System templates** These are provided by OnApp and downloaded from an online library. They comprise an operating system with the latest set of packages installed. Windows 2008 templates require 20GB of free disk space. Windows 2003 templates require 10GB. Most Linux templates require 2–10GB.

Some Windows Templates with additional software may require minimum disk size of 30 GB - e.g. win12_x64_std-sqlweb-ver3.2-kvm_virtio.

Minimum disk size for new 4.0 Windows templates is 30 GB (40 GB for templates with MS SQL).
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- **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.

### 9.4 Miscellaneous

You can use the following templates for smart servers and baremetal server creation:

<table>
<thead>
<tr>
<th>OS</th>
<th>Baremetal Servers</th>
<th>Smart Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>2008 R2 Standard Edition</td>
<td>Windows 2008 x64 STD R2 XEN 3.1</td>
</tr>
<tr>
<td></td>
<td>2008 R2 Data Center Edition</td>
<td></td>
</tr>
<tr>
<td>Linux</td>
<td>CentOS 5 64 bit</td>
<td>Debian 6.0 x64</td>
</tr>
<tr>
<td></td>
<td>CentOS 6 64 bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Redhat 6 64 bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debian 6 64 bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ubuntu 12 64 bit</td>
<td></td>
</tr>
</tbody>
</table>

- It is not possible to change or reset the password if the Windows virtual server with Active Directory Domain Controller is used as a domain controller.

### 9.5 Template List

The Control Panel's Templates List menu displays all of the templates available on your system, their version number, 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"). By clicking on the template you may see what virtual servers are based on that specific template.

The templates are organized into three tabs:
- **All Templates** - all System templates and your templates
- **System Templates** - the OS images provided by OnApp.
- **My Templates** - the list of custom templates you created from backups.

In My Templates tab you will be able to perform a specific action with required template, such as: make it public, edit, or delete it.

### 9.5.1 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. 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.

5. 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.
9.5.2 Delete Custom Templates
You can delete your templates. To do so:

1. Go to your Control Panel’s Templates > Templates List menu and click the My 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 is a virtual server in your system, which was built on that template. To remove such template you will have to destroy the said virtual server first.

9.5.3 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:
   o Label – change the template name
   o Filename – edit the template filename
   o Version – the template version
   o Min disk size – the minimum VS disk size required to build a VS on this template (in GB)
   o Min memory size – the minimum VS RAM required to build a VS on this template (in MB)
4. Click the Save button to finish.

9.5.4 Make Templates Public
By default your custom templates are available only to you, as the user who created them from the backup. To make your custom templates available to all users:

1. Go to your Control Panel’s Templates > Templates List menu.
2. Click My 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.
9.6 Template Store

Template store shows a number of groups, which include different system templates. The template store 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.

Next to every template you will see its price.

9.7 My Template Groups

Template groups enable you to organize your custom templates into your own groups. Also, for Windows based templates, My Template Groups provide the possibility to use your own licensing type regardless of your billing plan.

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
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:

   o 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.
   o 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.
   o 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 against the required group.
3. Select Add Child from a drop-down menu.
4. In the screen that appears fill in:
   o Label – name of the child group
   o 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

   o 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.

### 9.8 ISOs

OnApp allows uploading custom bootable ISOs for recovery purposes. These could be different images for Windows/Linux/FreeBSD or any additional software.

Currently, user can only view public 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 three 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

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
10 RECIPES

The recipe is the plug-in mechanism used for adding new functionalities to the OnApp cloud. Each recipe is a set of instructions that triggers events at certain stages during the execution of certain services/event in the cloud. Essentially, recipes allow to input code into virtual servers, appliances or the Control Panel server for administrator to use it 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.

10.1 Recipe use

Recipes allow 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 of their cloud environment and allows to self-maintain such tasks as custom template creation, etc.

You can utilize 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
Smart Server Recipes
Baremetal Server Recipes

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

10.2 Recipe variables

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

Each user can set custom recipe variables. For details, refer to the Manage Virtual Server Custom Variables section of this guide.

10.3 View List of All Recipes

To view the list of all recipes:
1. Go to your Control Panel’s **Recipes** menu.
2. On the screen that appears, you’ll see the list of all recipes in the cloud.

Use the tabs above to view the particular recipe type:

- **All**
  - To view the list of all recipes, click the **All Recipes** tab.
- **Unix compatible**
  - To view the list of Unix compatible recipes, click the **Unix Compatible** tab.
- **Windows compatible**
  - To view the list of Windows compatible recipes, click the **Windows Compatible** tab.
- **Unowned**
  - To view the list of recipes which owners have been deleted, click the **Unowned Recipes** tab. Recipes that run on other user’s resources are not deleted after their owners are removed. These recipes can be accessed via **Recipes > Unowned** recipes menu. A user with global permissions can become an owner of any of the unowned recipes by choosing **Actions > Become an owner**.

To **view a particular recipe details**, click the label of a required recipe.

### 10.4 View Recipe Details

To view the recipe details:

1. Go to your Control Panel’s **Recipes** menu.
2. On the screen that appears, you’ll see the list of all recipes in the cloud.
3. Click the required recipe label to view the following recipe details, along with the recipe step information:

- **Label** - recipe label
- **Description** - recipe description
- **Unix compatible** - whether the recipe is compatible with Unix virtual servers
- **Windows compatible** - whether the recipe is compatible with Windows virtual servers
- Recipe steps along with their details:
  - **Script** - step code
  - **Result source** - step result source
  - **Pass values** - specify the pass output value, for example, 0
10.5 Create Recipe

10.5.1 Create recipe

To create a recipe:
1. Go to your Control Panel’s Recipes menu.
2. Click the "+" button.
3. Fill in the recipe creation form:

   **Properties**

   - **Label** - give your recipe a label
   - **Description** - provide a short recipe description (optional)
   - **Unix compatible** - move this slider to the right to use this recipe for Unix virtual servers.
Windows compatible - move this slider to the right to use this recipe for Windows virtual servers.

For Windows compatible recipe, specify the script type. You can select the following script types:

- BAT
- VBS
- PowerShell v1.0

4. Click Save.

After that, you'll be redirected to the recipe details screen where you can add steps to this recipe.

10.5.2 Create steps

To create new recipe step:

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

   ![Recipe creation interface]

   **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.

Pass values - specify the pass output value, for example, 0.

You can not 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.

On failure
Specify the recipe behavior on failure.
In case you have already specified the recipe pass value, leave these fields empty and tick the Anything Else checkbox.
You can specify multiple recipe values. In this case you have to specify each value from a new line.

*Pass 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.

3. Press **Save**.

Drag and drop steps to change their order. To do so:
1. Select the required step and hold it down with the left mouse button.
2. Drag the recipe up to the required position and release the mouse button to drop it.

### 10.6 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

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

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.

10.7 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 that appears, 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.
- **Pass values** - specify the pass output value, for example, 0.

  You can not 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.
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- 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.

**On failure**
Specify the recipe behavior on failure.
In case you have already specified the recipe pass value, leave these fields empty and tick the **Anything Else** checkbox.

You can specify multiple recipe values. In this case you have to specify each value from a new line.

**Pass values** - specify the pass output value.

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

5. Press **Save**.

Drag and drop steps to change their order. To do so:
1. Select the required step and hold it down with the left mouse button.
2. Drag the recipe up to the required position and release the mouse button to drop it.
10.8 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.

10.9 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

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 resource Zones
- **Add recipe to compute zone** *(compute_resource_zones.recipe_add)* - the user can add recipes to compute zone
- **Remove recipe from compute zone** *(compute_resource_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
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- 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

### 10.10 Recipe Groups

Recipe groups allow OnApp administrators to organize individual recipes into groups that can be used as a billing plan resource. This allows you to easily create groups of recipes which can be added to the billing plan 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 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 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 **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.

### 10.11 Recipe Use Examples

The set of examples aimed to illustrate the recipe utilization.

#### 10.11.1 Recipe 1

Runs on VSs for Apache server installation and default web page configuration.

Can be used for the following events:

- VS provisioning (starts Apache server during the VS creation)
- Network rebuild
- Network interface added

Consists of 5 steps. Each step depends on the previous step result.

**Step 1**

```bash
#if echo $OPERATING_SYSTEM_DISTRO |grep rhel ; then
  if rpm -qa |grep httpd |grep -v grep ; then
    yum -y update httpd
  else
    yum -y install httpd
  fi
#elif
  # exit 1
#else
  #fi
```

**Result source:** Exit code

**Pass values:** 0

**On success:** Proceed
Fail values: Fail anything else

On failure: Fail

Step 2

```bash
```

Result source: Exit code

Pass values: 0

On success: Go to step 5

Fail values: Fail anything else

On failure: Go to step 4

Step 3

```bash
    service httpd restart
```

Result source: Exit code

Pass values: 0

On success: Stop

Fail values: Fail anything else

On failure: Fail

Step 4

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

Result source: Exit code

Pass values: 0

On success: Stop

Fail values: Fail anything else

On failure: Fail
Step 5

```
+ echo "<p><a href=http://$IP_ADDRESS>$HOSTNAME</a></p>" >>
 /var/www/html/index.html
```

*Result source:* Exit code  
*Pass values:* 0  
*On success:* Go to step 3  
*Fail values:* Fail anything else  
*On failure:* Go to step 4

### 10.11.2 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 libvirtd || exit 1
+ fi
```

*Result source:* Exit code  
*Pass values:* 0  
*On success:* Proceed  
*Fail values:* Fail anything else  
*On failure:* Fail

### 10.11.3 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

### 10.11.4 Recipe 4

Runs on Windows virtual servers to check if the Apache folder is present and deletes it, otherwise installs Apache.

Can be used for Windows virtual server events.

**Step 1**

```powershell
$file = dir 'C:\Program Files (x86)\Apache*' $process = "ApacheMonitor*"
if ($files -ne $null)
{
  "there's installed apache. Removing apache ..."
  $installer = dir 'c:\apache.msi'
  Stop-Process -Name $process
  Start-Sleep -Second 5
  Remove-Item $files -Force -Recurse
  Remove-Item $installer -Force -Recurse
  $files = dir 'C:\Program Files (x86)\Apache*' 
  if ($files -ne $null)
  {
    "Failed to remove apache"
    return 1
  }
  else
  {
    "apache has been removed"
    return 0
  }
}
else
{
  "Apache has not been installed."
}
```
"Downloading installer.."


"silence apache installation.."
  c:\apache.msi /quiet

return 0
}

**Result source:** Exit code  
**Pass values:** 0  
**On success:** Proceed  
**Fail values:** Fail anything else  
**On failure:** Fail
11 CDN

OnApp CDN is a software product that works with OnApp Cloud v2.3 and later. If you enable CDN for your end users, they can get access to a network of global edge servers (yours, and/or those provided by other cloud hosts) and use that network to deliver web content more quickly and reliably to visitors all over the world. Your CDN is managed alongside your cloud using your OnApp Control Panel. See [http://www.onapp.com/cdn](http://www.onapp.com/cdn) for more information.

OnApp provides the following CDN types:

- HTTP Pull
- HTTP Push
- Live Streaming
- On Demand Streaming

**Push**

HTTP Push method is similar to secondary server: the user uploads content to CDN and links to it, so the content is physically stored at CDN storage servers.

**Pull**

With an HTTP Pull CDN, the website owner stores content on their server and rewrites URLs to include a subdomain. Then, when the specific content is requested, it is pulled to the CDN network from the host and delivered to the closest point to the consumer who requested that content (the content is cached on edge server).

**Streaming**

There are two supported streaming types in the OnApp CDN – live streaming and on demand streaming. Only mp4 and flv files are currently supported by VoD streaming.

**Live streaming**

Live streaming CDN allows to deliver the content to end users in a live broadcast mode. When using a live streaming CDN service, end user receive media the same time like a traditional broadcasting.

**Video On Demand streaming**

Video On Demand streaming CDN allows to deliver video on request and makes it repeatedly accessed. Consumers can control content and are able to fast forward or rewind it the same as live streaming.

To utilize CDN streaming service, you have to deploy CDN streaming Edge Server.

Setting up OnApp CDN includes:
5.1 User Guide

- Enabling CDN for your cloud in the OnApp customer dashboard (contact OnApp Support if you don’t have dashboard access)
- Running CDN Setup wizard in your OnApp Control Panel
- Setting up storage servers
- Setting up edge servers
- Adding CDN edge groups and assigning them to billing plans
- Creating CDN resources (when you create a CDN resource, CDN is enabled automatically in the OnApp)
- Assigning the billing plan to a user, and setting their permissions.

Storage servers store web content to be distributed over the Content Delivery Network. The content is then cached by edge servers and delivered to consumers.

Edge servers cache web content and deliver it to website visitors. They are deployed on compute resources and managed just like VSs. You can use edge servers to sell CDN bandwidth to your end users, and/or submit the edge server to the OnApp CDN marketplace and sell your bandwidth to other hosts. You can create as many edge servers as you need and place them on different compute resources in different geographical locations, and easily broaden your CDN by combining your own edge servers with other locations on the CDN marketplace. You can even build a CDN solely with marketplace resources. For details, refer to the Edge servers chapter.

Edge groups are groups of edge servers – your own, and those you subscribe to from the CDN marketplace. They are usually grouped by location, so they represent a pool of servers for a given geographical area.

Edge groups are assigned to billing plans to set the prices for the bandwidth that your end users consume. You can assign several groups to one billing plan at a time, and establish different geographical zones with different pricing. The bandwidth pricing of the billing plan is the price for CDN bandwidth sold to your end users.

CDN resources are specific servers with content an end user wants to distribute via the CDN. CDN resources are assigned to edge groups, which determines the list of servers taking part in distributing/caching of their data.

PLEASE NOTE: Starting from the OnApp Cloud v3.0, CDN is enabled automatically after adding the first DNS record or CDN resource.

11.1 CDN Setup Wizard

This section contains a comprehensive guide through the CDN Setup wizard. The wizard is used to enable and configure the CDN service. Follow the stages of the wizard as instructed on the screen to configure a CDN portal. To make any changes after setup is complete, rerun the CDN wizard.
User should have the following permissions enabled to run the CDN setup wizard:

- Update any Role
- See all Roles
- Create a new edge group

The setup cycle consists of 3 steps:

- Permissions
- CDN edge groups
- Billing

You can rerun the wizard after the initial configuration as many times as you need.

To start the CDN wizard:

1. Go to your Control Panel's CDN Edge Servers menu.
2. Click the CDN Setup Wizard button to begin the CDN setup wizard.
3. Proceed the steps in wizard, as described below.
5.1 User Guide

Step 1 of 3. Permissions

- Set the CDN permissions for the user role to enable CDN for your clients. Select a Client role from the drop-down list to enable the required permissions. You can enable CDN permissions for additional groups later via Users and Groups menu.
- Enable CDN resources permissions for the Administrator role. In case you have multiple roles assigned to your account, select the role from the drop-down list.
- Click Next.

Be careful not to assign Administrator role to a Client shared role. You may skip the permissions section if you have set permissions before. Users will not be able to purchase and manage their CDN resources unless they are enabled for their role.

Step 2 of 3. CDN edge groups

- Give your edge group a unique label. For example, you can create an Edge group called "North America" and add to it your North American POPs. You will be able to define additional groups later under the Users and Groups menu.
- Choose the available locations from the Available Locations list. To add a location, click the '+' button next to the location you wish to add to the group.
- Click Next.

Step 3 of 3. Billing

- Assign the CDN edge group to the billing plan from the drop-down list.

You can't add two edge groups with the same location to one billing plan.

- Specify the price per GB of CDN usage (traffic used by your clients on the locations within the edge group). You will be able to assign additional edge groups with different prices to the selected billing plan later, using a Users and Groups menu.

Any customer assigned to the selected billing plan will be able to create a CDN service, powered by the Edge Group locations at the defined price.

- After you have finished configuring the CDN edge group properties, click the CDN Dashboard button to head back to the Dashboard or click Create Edge Group button to quit the CDN setup wizard.

After CDN is set up, synchronization between CDN and OnApp is run every 20 minutes. If synchronization fails because of CDN Sync Runner issues, cloud administrator will receive the notification. To solve this issue cloud administrator can check CDN Sync Runner status.
11.2 CDN Edge Servers

Web content is cached in the network of edge servers on the CDN, distributed across different geographic locations. Currently there are two types of edge servers in OnApp: HTTP and Streaming. HTTP edge servers support both Push and Pull population methods in 80/20 ratio (80% HTTP Pull and 20% HTTP Push). When the edge server is created, its storage limit for HTTP Pull and HTTP Push is automatically assigned by system. Streaming edge server type allow to send a stream to one of the publishing points, or pick up the stream externally and deliver it to the end users. Take note that Operator has to deploy CDN streaming Edge Server to utilize CDN streaming service. Streaming edge server support only streaming services. The following protocols are supported:

- HTTP
- RTMP/RTMPE/RTMPT/
- HDS
- RTSP/RTP
- iPhone
- SilverLight
- MPEG-TS

Streaming service includes the following advanced features:

- Hotlinking protection - protect your media from being hotlinked (linked to website without your permission)
- Geo Blocking - restrict access to your media so that it is accessible only for certain countries/regions
- RMTPE (secure Wowza) – streaming encryption.

You do not have to add the Wowza license key manually to enable streaming edge servers. A third party application - Wowza will be installed automatically when installing an edge server and you will simply be charged for it. Please, contact your account manager for details.

Content is delivered to end users from the server which is closest to the user, or has the best availability. If you have CDN enabled for your cloud, you can use the control panel to set up your own edge servers, and manage them in the same way you manage virtual servers. You can submit your edge server to the locations in marketplace to sell bandwidth across it. To be able to sell CDN
bandwidth through our online marketplace, you must first submit your edge server for assessment.

PLEASE NOTE: CDN edge servers do not support firewall and NAT (network address translation).

You can use smart compute resources for CDN edge server creation.

11.2.1 Create CDN Edge Server

To add new CDN edge server:
1. Go to your Control Panel’s CDN Edge Servers menu.
2. On the screen that appears, click the Create Edge Server button or press the "+" button.
3. Fill in the edge server creation form step by step:

Step 1 of 4. Cloud Locations
The Cloud Locations step applies to those users who have compute zones assigned to location groups in their billing plan.

If the user's billing plan 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. 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.

### Step 2 of 4. Properties

- Give your edge server a label. The label can consist of:
  - Lower- & upper-case letters [A-Za-z]
  - Digits [0-9]
  - Dash [-]
  - Underscore [ _ ]
  - Space character [ ]
  - At sign [@]
  - Brackets [ (){} ]
  - Slashes [/]
  - Caret [^]
  - Dollar sign [$]
  - Asterisk [*]
  - Comma [,]
  - Dot [.]  

- Select an edge server type: HTTP or streaming
  - A third party application - Wowza will be installed automatically when installing a streaming edge server and additional charges will apply. Please, contact your account manager for details.

- **Location** - choose the location group to assign this edge server to.
- Choose a compute zone to build this server on.
- Choose a specific compute resource to build this server on.

- Move the **Add to Marketplace** slider to the right to submit this server to the OnApp CDN marketplace. If the **Add to Marketplace** checkbox is ticked, the minimum required disk size is 1 TB.
Any servers you submit will be assessed before they are accepted into the marketplace. Criteria include geographic location, bandwidth and server specs.

**Step 3 of 4. Resources**

- Set the resources needed for this edge server: RAM, CPU cores and CPU priority.

- Choose a data store zone for this edge server’s primary disk.
  - Set the primary disk size. The disk size is calculated in the following way: 10 GB for OS, the rest of total disk space is estimated 80% per Pull population and 20% per Push population.

  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.

- Choose a network zone and set the port speed for this edge server, or make it unlimited.

**Step 4. Confirmation**

- Move the **Build Edge Server Automatically** slider to the right if you want the system to automatically build the edge server. Otherwise, you will have to build your server manually after it is created.

  4. Click **Create Edge Server**.

**11.2.2 View CDN Edge Server Details**

Edge servers are virtual compute resources that are much like other virtual servers in your cloud. You can perform the same basic actions on them as for VSs.

To view all edge servers in the cloud:

1. Go to your Control Panel’s **CDN Edge Servers** menu to see an overview of all edge servers in your cloud: their label, IP addresses, power status (with on/off buttons), allocated disk size, RAM and backups.
2. To reboot, start up or shut down a CDN edge server, click the **Actions** button next to the required edge server, then select the relevant action.

3. To narrow the list of edge servers by type, click the relevant tab at the top of the list.

To view a particular edge server’s details:
1. Go to your Control Panel’s **CDN Edge Servers** menu.
2. Click the label of the edge server required.
3. On the screen that appears, use the top navigation tabs to manage your edge server.

---

**Edge servers are managed with the same tools you use to manage VSs in your cloud.**

The table below links to the relevant sections of this guide’s Virtual Servers chapter. The exception is that autoscaling, backups and firewall rules are not available for edge servers.

<table>
<thead>
<tr>
<th><strong>Overview</strong></th>
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<td><strong>Properties</strong></td>
<td>CDN edge server’s details page</td>
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<tr>
<td><strong>CPU Usage</strong></td>
<td>CDN edge server’s CPU usage statistics</td>
</tr>
<tr>
<td><strong>Billing Statistics</strong></td>
<td>CDN edge server’s billing statistics information</td>
</tr>
</tbody>
</table>

**Networking**

The Networking tab gives access to the edge server’s Network interfaces and IP addresses.

| **Network Interfaces** | CDN edge server’s network configuration |
| **IP Addresses** | CDN edge server’s IP addresses |

**Storage**

The Storage tab lets you manage your edge server’s disks.

| **Disks** | The Storage tab lets you manage your edge server’s disks. |
4. To expand the Tools menu, click the Tools button on the edge server's screen. The list of available options depends on the edge server's status. For options description, refer to relevant sections of the Virtual Servers chapter.

11.2.3 Edit CDN Edge Server

Editing a CDN edge server means adjusting the resources allocated to it, changing its label and basic properties.

To edit a CDN edge server:

1. Go to your Control Panel's CDN edge server menu.
2. Click the label of an edge server.
3. On the next screen, click the Tools button, then click the Edit Edge Server link:

- Change the edge server label.
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- Edit CPU core/priority and RAM values.

Note that the server will be rebooted if you edit resources allocated.

- Move the **Add to Marketplace** slider to the right to add the edge server to the marketplace. (This option is only available for edge servers that were not added to the marketplace earlier.)

4. Click **Save Edge** server.

### 11.2.4 Delete CDN Edge Server

To delete a CDN edge server:

1. Go to your Control Panel’s **CDN edge servers** menu.
2. Click the label of an edge server.
3. When the page loads, click the **Tools** button, then click **Delete Edge Server**.
4. You will be asked for confirmation before the edge server is deleted.

### 11.2.5 CDN Edge Server Network Interface Usage

Network Interface usage page displays bandwidth used in two charts: statistics for 24 hours and hourly statistics for the period up to three months.

To view the edge server’s network interface usage statistics:

1. Go to your Control Panel’s **CDN Edge Servers** menu.
2. Click the label of the Edge Server required.
3. On the screen that appears, click **Networking tab > Network Interfaces**.
4. Click the **Interface Usage** icon next to the network interface needed.
5. On the screen that appears, set the start time and end time and click **Apply**.

### 11.3 CDN Storage Servers

CDN storage servers are used for storing the content to be distributed over CDN. When the content is requested on the CDN, it is served by the edge server nearest to the customer’s geographical location.

There are two types of CDN storage servers in OnApp: HTTP and Streaming.
11.3.1 View CDN Storage Server Details

To view the list of all CDN storage servers in the cloud:

1. Go to your Control Panel's **CDN Storage Servers** menu to see an overview of all storage servers in your cloud: their label, IP addresses, power status (with on/off buttons), allocated disk size, RAM and backups.

2. To reboot, startup/shutdown a storage server, click the **Actions** button next to the required storage server, then select the relevant action.

3. To narrow the list of storage servers by type, click the relevant tab at the top of the list.

To view a particular edge server’s details:

1. Go to your Control Panel’s **CDN Storage Servers** menu.

2. Click the label of the storage server required.

3. On the screen that appears, use the top navigation tabs to manage your storage server.

Storage servers are managed with the same tools you use to manage VSs in your cloud. The table below links to the relevant sections of this guide’s Virtual Servers chapter. The exception is that autoscaling, backups and firewall rules are not available for storage servers.

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<td>-----------------------------------------</td>
</tr>
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<td>IP Addresses</td>
<td>CDN edge server's IP addresses</td>
</tr>
</tbody>
</table>

### Storage

| Disks               | The Storage tab lets you manage your edge server's disks. |

4. To expand the **Tools** menu, click the **Tools** button on the storage server's screen. The list of available options depends on the edge server's status. For options description, refer to **VS properties** section.

## 11.3.2 Create CDN Storage Server

To create a new storage server:

1. Go to your Control Panel’s **CDN Storage Servers** menu.
2. Click the **Create Storage Server** button at the bottom of the screen.
3. Fill in the storage server creation form step by step:

   ![Image of storage server creation form](image_url)

   **Step 1 of 4. Cloud Locations**
The Cloud Locations step applies to those users who have compute zones assigned to location groups in their billing plan.

If the user's billing plan 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. 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.

### Step 2 of 4. Properties

Specify the storage server details:

- Specify the server's label in a human-recognizable format.
- Select the storage server type: HTTP or Streaming.

A third party application - Wowza will be installed automatically when installing a streaming storage server and additional charges will apply. Please, contact your account manager for details.

- **Location** - choose the location group to assign this storage server to.
- Specify the compute resource and compute zone.
- Click **Next**.

### Step 3 of 4. Resources

- Set the resources needed for this storage server: RAM, CPU cores and CPU priority. The minimum memory capacity is 8 GB.
- Choose a data store zone for this storage server’s primary disk.
- Set the primary disk size (Storage server HDD). The minimum required disk size is 30 GB.
- Choose a network zone from the drop-down box.
- 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. Tick the **Show Only My IP Addresses** checkbox to view only own IP addresses in the IP addresses drop-down box.
- Set the port speed in Mbps or tick it as unlimited.
Step 4. Confirmation

- On the screen that appears, tick the **Build Edge Server automatically** box to build the storage server automatically, otherwise you will have to build your storage server manually after it is created.
- Click the **Create Storage Server** button to start the creation process.

11.3.3 Delete CDN Storage Server

To delete a storage server:
1. Go to your Control Panel's **CDN Storage Servers** menu.
2. On the screen that appears, you'll see the list of all storage servers in the cloud. Click the **HTTP/Streaming** tabs to view storage servers by type.
3. Click the **Actions** button next to the storage server you want to remove, then click **Delete**.

11.3.4 Edit CDN Storage Server

1. Go to your Control Panel's **CDN Storage Servers** menu.
2. Click the label of a required storage server.
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On the next screen, click the **Tools** button, then click the **Edit Storage Server** link under the **Storage Server Options**.

- Change the storage server label.
- Edit CPU core/priority and RAM values.

3. Click **Save**.

### 11.4 CDN Resources

A CDN resource is a host (e.g. a specific web server), the content of which you are going to distribute over the network of edge servers.
There are three types of CDN resources in the OnApp Control Panel:

- **HTTP** CDN resource type supports both Push and Pull population.
- **VoD** CDN resource type (Pull and Push types) allows to use on demand video streaming service - uploading video and streaming to the end users.
- **Live Streaming** CDN resource type allows to broadcast content using CDN.

Only servers added to the edge groups assigned to the resource will distribute/cache the host's content.

To activate the CDN Resources menu, at least one CDN Edge Group with at least one edge server or marketplace location must be available.
Apart from the CDN Resources permissions enabled, the following requirements must be met for the publisher to be able to create respective resources. If the requirements are not met, the publisher will not be able to create the particular resource type:

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>HTTP Pull</th>
<th>HTTP Push</th>
<th>VoD Pull</th>
<th>VoD Push</th>
<th>Live Streaming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements based on user Edge group</td>
<td>User billing plan must include an edge group with at least one location that supports HTTP.</td>
<td>User billing plan must include an edge group with at least one location that supports HTTP Push, and an HTTP storage server.</td>
<td>User billing plan must include an edge group with at least one location that supports VoD Pull.</td>
<td>User billing plan must include an edge group with at least one location that supports VoD Push, and a streaming storage server</td>
<td>User billing plan must include an edge group with at least one location that supports live streaming.</td>
</tr>
</tbody>
</table>

11.4.1 View CDN Resources

Go to your Control Panel's CDN Resources menu. You will see the list of all CDN resources with the following information:

- **CDN Hostname** – hostname of the CDN resource.
- **Origin Sites** – path of the content that will be served from the CDN.
- **Type** - resource type: HTTP Push, HTTP Pull, VoD or Live streaming.
- **Cost** – cost of the resource.

To view HTTP, VoD or live streaming resources only, click the required tab.

You can edit/delete a resource using the relevant icons next to each resource in the list, and add a resource with the CDN Resource Wizard button.

11.4.2 View CDN Resource Details

To view basic settings:

1. Go to your Control Panel's CDN Resources menu.
2. Click the required CDN Hostname.

3. On the page that appears, click **Basic settings** tab. The screen provides you with the following information:

**CDN Resource details**

- **Owner**
- **CDN hostname**
- **Resource type**
- **SSL on** - whether SSL is enabled for the resource or not
- **SNI SSL Certificate** - custom SNI SSL certificate associated with the resource
- **CDN reference** – the ID of the resource in database
- **Resource status** – shows the resource status. Click **Suspend** to terminate.

**Origins**

- The IP of the content that will be served from the CDN.

**DNS settings**

- A CNAME for the CDN Hostname which can then be used to view the contents. Use this for the origin settings.

**Edge Groups**

- Shows to which Edge groups the resource is assigned.

**Last 24 hours cost**

- Cost of the resource for the last 24 hours.

To view advanced details:

1. Go to your Control Panel's **CDN Resources** menu.
2. Click a CDN Hostname.
3. On the screen that appears, click the **Advanced Details** tab.

For details on the Advanced Settings for each resource, refer to the following sections.

**11.4.2.1 View HTTP CDN Resource Details**

To view instructions and basic settings of an HTTP CDN resource:

1. Go to your Control Panel's **CDN Resources** menu.
2. Click the required CDN Hostname.
3. On the page that appears, click **Basic Settings** tab. The screen provides you with the following information:

**CDN Resource details**
- **Owner**
- **CDN hostname**
- **Resource type** - Push or Pull
- **SSL on** - whether SSL is enabled for the resource or not
- **SNI SSL Certificate** - custom SNI SSL certificate associated with the resource
- **CDN reference** – the ID of the resource in database
- **Resource status** – shows the resource status.

**Origins (HTTP Pull only)**
- Path of the content that will be served from the CDN.

**DNS Settings**
- Add a CNAME for the CDN Hostname which can then be used to view the contents.

**Uploaded files (HTTP Push only)**
A list of uploaded files. Click the file name to preview the video file.

**Edge Groups**
- Shows to which Edge groups the resource is assigned.

**Last 24 hours cost**
- Cost of the resource for the last 24 hours.

**Advanced details**
Click the **Advanced details** tab to view advanced details of an HTTP CDN resource. The screen that appears will provide you with the following information:
- **Publisher name** - name of the user who created the CDN Resource record
- **IP Access Policy** - access policy from a range of IP addresses: either NONE (disabled), ALLOWED BY DEFAULT or DISABLED BY DEFAULT
- **Country Access Policy** - access policy to the CDN resource's content for specified countries: either NONE (disabled), ALLOWED BY DEFAULT or DISABLED BY DEFAULT
- **Url Signing** - whether access requires URL signing or not
- **Hotlink Policy** - whether hotlink policy is enabled or not
- **Password On** - whether the password is enabled or not
- **Cache Expiry** - cache expiry time in minutes
- **MP4 Pseudo Streaming** - whether the MP4 pseudo streaming is enabled or not
- **FLV Pseudo Streaming** - whether the FLV pseudo streaming is enabled or not
- **Ignore Set-Cookie** - whether content caching with SetCookie response headers is enabled or not
- **Origin Policy**
- **Nginx Settings**:
  - **Limit rate** - sets speed limit of a response to a client (per request) in KB/s. Maximum limit rate value - 2147483647 KB/s
  - **Limit rate after** - sets the amount after which the speed of a response to a client will be limited in MB. Maximum limit rate after value - 2147483647 KB
  - **Proxy cache key** - key for caching
  - **Proxy read time out** - proxy server response timeout in seconds. Maximum proxy read timeout value - 65535 seconds
  - **Proxy connect time out** - timeout for establishing connection with proxy server in seconds. Maximum proxy connect time out value - 75 seconds.
- **Block search engine crawlers** - whether search engine crawlers are blocked from indexing the CDN content or not (for HTTP Pull CDN resources only)

**Upload instructions (HTTP Push only)**
Click the **Instructions** tab to view the instructions for uploading files and embedding video from HTTP Push CDN resources.

**Prefetch/Purge CDN content (HTTP Pull only)**
To **prefetch** or **purge** the resource content of the HTTP Pull CDN resource, click the required tab respectively.

**View CDN resource billing statistics**
To view the resource billing statistics, click the **Billing Statistics** tab.

### 11.4.2.2 View VoD CDN Resource Details
To view details of a video on demand CDN resource:
1. Go to your Control Panel's **CDN Resources** menu.
2. Click the CDN hostname of a required VOD CDN resource.
3. On the page that appears you will see basic resource settings:
CDN Resource details

- **Owner**
- **CDN hostname**
- **Resource type** - VOD Push or VOD Pull
- **CDN reference** – the ID of the resource in database
- **Resource status** – shows the resource status.

Origins (VOD Pull only)

- Path of the content that will be served from the CDN.

DNS settings

- CNAME for the CDN Hostname which is used to view the contents.

Uploaded files (VOD Push only)

- A list of uploaded files. Click the file name to preview the video file.

Edge Groups

- Shows to which Edge groups the resource is assigned.

Last 24 hours cost

- Cost of the resource for the last 24 hours.

Advanced details

Click the **Advanced details** tab to view advanced details of a VOD CDN resource. The screen that appears will provide you with the following information:

- **Publisher name** - name of the user who created the CDN Resource record
- **Country Access Policy** - access policy to the CDN resource's content for specified countries: either NONE (disabled) or BLOCK BY DEFAULT
- **Hotlink Policy** - whether hotlink policy is enabled or not
- **Secure Wowza** - whether secure Wowza token is enabled or not
- **Token for Edge/Flash player** - whether token for Edge/Flash player is enabled or not
- **Token Authentication Enabled** - whether token authentication is enabled or not
Upload instructions
Click the Instructions tab to view the instructions for uploading files and embedding video from Video On Demand CDN resources.

View CDN resource billing statistics
To view the resource billing statistics, click the Billing Statistics tab.

11.4.2.3 View Live Streaming CDN Resource Details
To view details of a live streaming CDN resource:
1. Go to your Control Panel's CDN Resources menu.
2. Click the CDN Hostname of a required live streaming CDN resource.
3. On the page that appears you will see basic resource settings:
   
   **CDN Resource details**
   - Owner
   - CDN hostname
   - Resource type - Live Streaming
   - CDN Reference the ID of the resource in database
   - Publishing Point - the publishing point type: external or internal
   - Main Internal Publishing Location - main internal publishing point URL address
   - Failover Internal Publishing Location - internal publishing point failover URL
   - Resource status – shows the resource status

   **DNS settings**
   - CNAME for the CDN Hostname which is used to view the contents.

   **Edge Groups**
   - Shows to which Edge groups the resource is assigned.

   **Last 24 hours cost**
   - Cost of the resource for the last 24 hours.

   **Advanced Settings**
   Click the Advanced details tab to view advanced details of a Live Streaming CDN resource. The screen that appears will provide you with the following information:
1. Go to your Control Panel's **CDN Resources** menu.
2. Click a CDN Hostname.
3. On the screen that appears, click the **Advanced Details** tab.
4. This screen provides you with the following information:
   - **Publisher name** - name of the user who created the CDN Resource record
   - **Country Access Policy** - access policy to the CDN resource's content for specified countries: either NONE (disabled) or BLOCK BY DEFAULT
   - **Hotlink Policy** - whether hotlink policy is enabled or not
   - **Secure Wowza** - whether secure Wowza token is enabled or not
   - **Token for Edge/Flash player** - whether token for Edge/Flash player is enabled or not
   - **Token Authentication Enabled** - whether token authentication is enabled or not

**Upload instructions**
Click the **Instructions** tab to view the instructions for uploading files and embedding video from Live Streaming CDN resources.

**View CDN resource billing statistics**
To view the resource billing statistics, click the **Billing Statistics** tab.

### 11.4.3 Create HTTP CDN Resource

To add an HTTP CDN resource:

1. Go to your Control Panel's **CDN Resources** menu. The page that loads shows the list of CDN resources.
2. To create a new CDN resource, click the "+" button in the top right corner or the **CDN Resource Wizard** button.
3. Follow the steps of the CDN resource creation wizard:
   - **Type Select**
4. Select the required resource type - HTTP, by clicking the corresponding button and click **Next** to proceed. **Properties**
   - **CDN hostname** – the hostname from which you will serve static content. E.g. if your site (origin) is onapp.com, and you want to serve static content from the CDN and make it available at static.onapp.com, then static.onapp.com would be the CDN hostname.
○ **Enable SSL** - move the slider to the right to enable the secure socket protocol for your CDN resource.

If the SSL protocol is enabled, you can only have fourth-level domain names. If the CDN hostname ends with '\.worldssl.net', SSL will be enabled automatically.

A CDN resource can only be linked to one SSL certificate - either shared or custom SNI.

- **Shared SSL** - choose this option if you want to apply a shared SSL certificate for the resource
- **Custom SNI SSL** - choose this option if you want to apply a custom SNI SSL certificate for the resource and choose the required certificate from the drop-down menu

○ **Content origin** – specify the content origin type (PULL or PUSH):

- For the PULL type, you can use a custom origin port. Specify a port number using the colon character (":") in the Origins field. If you do not indicate the custom origin port, then system will put it by default depending on origin policy:
  - 80 if origin policy is HTTP
  - 443 if origin policy is HTTPS
  - None if origin policy is AUTO (Origin policy AUTO is not compatible with custom origin port)

  The valid port values include 80, 443, and the range from 1024 to 65535. Values other than mentioned above will be forbidden.

  In case of using multiple origins, the same port number should be specified for all origins using a colon character (":"). Erase the port number from the origin resource field to reset the custom origin port.

- For the PUSH type:
  - **Storage server location** - choose the storage server location from the drop-down menu.
  - **FTP password** - specify the FTP password. It can consist of 6-32 alphanumeric characters.
  - **FTP password confirmation** - confirm the password.

**Edge Locations**

Tick the box next to the group(s) that will share the new resource. Available groups depend on the assigned billing plan limits.
The map displays own, subscribed and available CDN resources:

At this point, you can create the CDN resource or proceed to the Advanced Settings step which is optional in the wizard.

**Advanced Settings**

**Origin Policy**
Choose the type of the connection from the drop-down menu. Select HTTP, HTTPS or Auto.

**Country Access**
Configure a rule to enable/disable access to the CDN resource’s content for specified countries.
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- **Access Policy** – select Disabled to switch off the rule; otherwise choose between Allow by default/Block by default.
- **Except for Countries** – select countries to which the access policy won’t be applied. To select more than one country, hold Ctrl during selection.

**Hotlink Policy**
- **Hotlink Policy** – select Disabled to switch off a hotlink policy; otherwise choose between Allow by default/Block by default.
- **Except for domains** – specify domains to which the hotlink policy won’t be applied

**IP Access**
Configure a rule to enable/disable access to the CDN resource’s content for a range of IP addresses.
- **Access Policy** – select Disabled to switch off the rule; otherwise choose between Allow by default/Block by default.
- **Except for IP Addresses** – fill in IP address(es) to which the access policy won’t be applied.

**Secondary CDN Hostnames**
Submit secondary hostnames apart from the default one for HTTP based CDN sites. With these configured, users will be able to access the CDN site using secondary CDN hostname(s). You can add up to 7 secondary CDN hostnames to your CDN resource.

To be able to use a secondary hostname for the CDN resource with SSL enabled, you require an SSL certificate for your custom hostname. For help with questions about the SSL certificate purchase, please contact OnApp support.

**URL Signing**
Protect your files from unauthorized access with a key. A signed URL looks like `http://example.com/filename?hash=DMF1ucDxtgXwYQ==`.
- **Enable URL Signing** – move the slider to the right to enable it.
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- **URL Signing Key** – fill in the key which will be used for URL signing. The secret key is similar to a password and can contain a minimum of 6 to a maximum of 32 characters. Symbols and spaces are not allowed.

You can also specify the expiration time, that is the time when this URL becomes invalid. The time is passed in the URL itself in a Unix timestamp format and takes part in hash generation.

Here is the example of PHP script used to generate the hash key:

```php
/**
 * Create hash link CDN resource
 * @param string $cdnResourceUrl
 * The CDN resource URL, eg cdn.yourdomain.com
 * @param string $filePath
 * File path of the CDN resource
 * @param string $secretKey
 * The secret key that is obtained from CDN resource property
 * @param int $expiryTimestamp [optional]
 * UNIX timestamp format, specify how long the hash link is accessible to the public
 * By default will be accessible forever.
 * @return string URL with generated hash link
 * URL with designated format to access the resource
 * Example:
 * Generate hash link for resource
 * www.example.com/images/photo.png for next 3 days, assume today is Sun, 01 Apr 2012.
 *
 * <?php
 * $hashLink = generateHashLink('www.example.com', '/images/photo.png', 'l33tf0olol', 1333497600);
 * print $hashLink;
 * ?>
 *
 * http://www.example.com/images/photo.png?secure=kaGd_cu6Iy4LDgfX3jy5Rw==,1333497600
 */
function generateHashLink($cdnResourceUrl, $filePath, $secretKey, $expiryTimestamp = NULL){

    // NOTE [yasir 20110331] + and ? are some of represented chars of based64 encoding (8 bits)
```
// + is 62 and / is 63. and These char should be replaced by other predefined chars.
$searchChars = array('+', '/');
$replaceChars = array('-', '_');

if($filePath[0] != '/'){
    $filePath = '/'.$filePath;
}

if($pos = strpos($filePath, '?')){
    $filePath = substr($filePath, 0, $pos);
}

$hashStr = $filePath.$secretKey;

if($expiryTimestamp){
    $hashStr = $expiryTimestamp.$hashStr;
    $expiryTimestamp = ',_'.$expiryTimestamp;
}

return 'http://'.$cdnResourceUrl.$filePath?secure='.str_replace($searchChars, $replaceChars, base64_encode(md5($hashStr, TRUE))).$expiryTimestamp;

---

Cache expiry

- **Cache expiry** – set the cache expiry time in minutes (min=1, max=3500000).

Password

- **Enable Password** – move the slider to the right to restrict access to the resource (cdn hostname).
- **Unauthorized HTML** – fill in the text which will be displayed for unauthorized login.
- **Username** – choose a username.
- **Password** – select password for the user.

To remove a user, clear both fields.
Pseudo Streaming

- **Enable MP4 pseudo streaming** – move the slider to the right to enable the pseudo streaming support for MP4 file type.
- **Enable FLV pseudo streaming** – move the slider to the right to enable pseudo streaming for FVL file type, respectively.

With pseudo streaming enabled, your viewers can seek around a video even if it has not finished downloading. A Flash player and a prepared video are required for pseudo-streaming.

Ignore Set-Cookie

*Ignore Set-Cookie* - move the slider to the right to enable caching content with Set-Cookie response headers.

Nginx Settings

- **Limit rate** - set speed limit of a response to a client (per request) in KB/s. Maximum limit rate value - 2147483647 KB/s
- **Limit rate after** - the amount after which the speed of a response to a client will be limited in KB. Maximum limit rate after value - 2147483647 KB
- **Proxy read time out** - proxy server response timeout in seconds. Maximum proxy read timeout value - 65535 seconds
- **Proxy connect time out** - timeout for establishing connection with a proxy server in seconds. Maximum proxy connect time out value - 75 seconds.
- **Proxy cache key** - key for caching. Select one of four supported types from the drop-down list:
  - $host$request_uri
  - $host$uri
  - $proxy_host$request_uri
  - $proxy_host$uri

Search Engine Crawlers

- **Block search engine crawlers** - move the slider to the right to block web crawling bots from indexing the CDN content (for HTTP Pull CDN resources only).

5. Click **Create CDN Resource**.
11.4.4 Create Video On Demand CDN Resource

To add a video on demand CDN resource:

1. Go to your Control Panel's CDN Resources menu.
2. Click the "+" button in the top right corner or the CDN Resource Wizard button.
3. Follow the steps of the CDN resource creation wizard:
   - Step 1: Type Select
     - Select the required resource type - VOD, by clicking the corresponding button and click Next to proceed.
   - Step 2: Properties
     - **CDN hostname** – specify the name which will serve as a label only
     - **Content origin** – specify the content origin type PULL or PUSH
   
   If you have selected the PULL type, specify the origin.
   
   If you have selected the PUSH type:
   - **Storage server location** - choose the storage server location from the drop-down menu.
   - **FTP password** - specify the FTP password. It can consist of 6-32 alphanumeric characters.
   - **FTP password confirmation** - confirm the password.

11.4.4.1 Edge Locations

Tick the box next to the group(s) which will share the resource added. Available groups depend on the assigned billing plan limits.

The map displays own, subscribed and available CDN resources:
Map legend:

11.4.4.2 Advanced Settings

**Origin Policy**
Choose the type of the connection from the drop-down box. Select HTTP, HTTPS or Auto.

**Country Access**
Configure a rule to enable/disable access to the CDN resource’s content for specified countries.

- **Access Policy** – select the Disabled option to switch off a rule or Block by default. If the access policy is set to block by default, fill in the Except for Countries field to specify countries to which the access policy won’t be applied. To select more than one country, hold Ctrl during selection.

**Hotlink policy**
5.1 User Guide

Hotlink policy - select the Disabled option to switch off hotlink policy security: otherwise choose Block by default. If the hotlink policy is set to block by default, fill in the Except for domains field to specify the domains to which the hotlink policy won’t be applied.

Cache expiry

- Cache expiry – set the cache expiry time in minutes (min=1, max=35000000).

Ignore Set-Cookie

Ignore Set-Cookie - tick this checkbox to enable caching content with Set-Cookie response headers.

Search Engine Crawlers

- Block search engine crawlers - move the slider to the right to block web crawling bots from indexing the CDN content (for HTTP Pull CDN resources only).

Secure Wowza

- Enable secure Wowza – tick the box to protect your stream with Wowza secure token.
- Token for Edge/Flash player – specify the token authentication code. The authentication code will be then saved on the edge server. The token at the player side and the token at the edge server must match in order to make the video available.

Token Authentication

- Tick the Enable Token Authentication box
- TokenAuth Primary Key - specify the secret key to be used with the scripts which generate token.
- TokenAuth Backup Key - input the backup key which can be used if you want to change the primary key. To make sure the link generated with existing token won’t be broken, the suggested procedure is the following:
  - Copy the existing primary key and paste to backup key.
  - Fill in a new primary key.
- Protected Path - specify the protected path. By default it is "/". Only the Path inserted is allowed to be streamed.

Now proceed with running the .NET or .JAVA scripts to complete the procedure.

4. Click Create CDN Resource.

Only mp4 and flv files are currently supported.
11.4.5 Create Live Streaming CDN Resource

To add a live streaming CDN resource:

1. Go to your Control Panel’s CDN Resources menu.
2. Click the "+" button in the top right corner or the CDN Resource Wizard button.
3. Follow the steps of the CDN resource creation wizard:
   Type Select
4. Select the required resource type - HTTP, by clicking the corresponding button and click Next to proceed. Properties

   - CDN hostname – specify the name which will serve as a label only

   - Publishing point – specify the resource’s publishing point settings - Internal or External. The internal publishing point is one of your storage servers. It is configured at the next step - Edge locations. The external publishing point is simply an URL. Specify its settings here:

     - External publishing location - specify your publishing point’s URL as an RTMP protocol. For example, rtmp://domain.com/xxx.
     - Failover external publishing location - specify the failover URL

11.4.5.1 Edge Locations

Tick the box next to the group(s) which will share the resource added. Available groups depend on the assigned billing plan limits.

The map displays own, subscribed and available CDN resources:
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Map legend:
- Own
- Subscribed

In case of choosing Internal Publishing Point in previous step, specify its settings here:
- Internal publishing location - select any of your edge servers from the drop-down menu
- Failover internal publishing location - specify the failover edge server

11.4.5.2 Advanced Settings

Country Access
Configure a rule to enable/disable access to the CDN resource’s content for specified countries.
- Access Policy – select the Disabled option to switch off a rule or Block by default. If the access policy is set to block by default, fill in the Except for Countries field to specify countries to which the access policy won’t be applied. To select more than one country, hold Ctrl during selection.

Hotlink policy
5.1 User Guide

Hotlink policy - select the Disabled option to switch off hotlink policy security: otherwise choose Block by default. If the hotlink policy is set to block by default, fill in the Except for domains field to specify the domains to which the hotlink policy won’t be applied.

Secure Wowza
- Enable secure Wowza – tick the box to protect your stream with Wowza secure token.
- Token for Edge/Flash player – specify the token authentication code. The authentication code will be then saved on the edge server. The token at the player side and the token at the edge server must match in order to make the video available.

Token Authentication
- Tick the Enable Token Authentication box
- TokenAuth Primary Key - specify the secret key to be used with the scripts which generate token.
- TokenAuth Backup Key - input the backup key which can be used if you want to change the primary key. To make sure the link generated with existing token won’t be broken, the suggested procedure is the following:
  o Copy the existing primary key and paste to backup key.
  o Fill in a new primary key.
- Protected Path - specify the protected path. By default it is "/". Only the Path inserted is allowed to be streamed.

Now proceed with running the .NET or .JAVA scripts to complete the procedure.

4. Click the Create CDN Resource button.

11.4.6 Edit CDN Resource
To edit a CDN Resource:
1. Go to your Control Panel’s CDN Resources menu.
2. Click the Actions button next to a resource and choose Edit.
3. On the screen that appears you can edit all CDN resource parameters (see the Create HTTP CDN Resource section for details).
4. Click the Apply changes button to finish.

11.4.7 Bandwidth Statistics
To see the bandwidth statistics/graphs for CDN resources:
1. Go to your Control Panel’s CDN Resources menu and then click the Bandwidth statistics tab.
2. Select type of filter – either GB or Mbits/s. In MBPS mode you can get statistics for the last 10 days only. The older statistics is removed. There are no limitations for GB mode.

3. Specify the period in the From and To fields.

4. Select a resource or location for which the statistics will be generated.

5. Click the Apply button.

The points in the graph are displayed according to a particular frequency, which depends on the time period specified with From and To parameters:

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Frequency in seconds</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 30 days</td>
<td>86400</td>
<td>1 day</td>
</tr>
<tr>
<td>31 - 93 days</td>
<td>604800</td>
<td>1 week</td>
</tr>
<tr>
<td>equal or more than 93 days</td>
<td>1209600</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

Statistics available in the frequency higher than selected will be accumulated to a single point of such frequency.
E.g. The statistics was requested for the period of 31-93 days, so the frequency of points in the graph is 7 days. If the statistics was generated few times during those 7 days (day1+day2+dayn) it will be added up and displayed as a single point, with a time stamp marked as the first day of such 7 days.

The statistics are displayed in two graphs: Cached and Non Cached.
To zoom into a time period, click and drag in a chart. Click the Reset Zoom button to zoom out again.
11.4.8 Stream Statistics

The CDN streaming statistics screen shows the concurrent viewers report for your CDN streaming sites.

To view the statistics/graphs for your CDN streaming sites:

1. Go to your Control Panel's CDN Resources menu.
2. Click the Streaming statistics tab.
3. Specify the period in the From and To fields.
4. Select type of filter – either by resources or by locations
5. Click the Apply button.

To zoom into a time period drag the chart by holding down the left mouse button and moving the mouse. Click the Reset Zoom button to zoom out again.
11.4.9 View CDN Advanced Reporting

With CDN advanced reporting you can study and review the in-depth analysis of your resources in reports. Currently you can view the reports on Bandwidth Statistics and Status Codes.

To view advanced reporting on Bandwidth statistics:

1. Go to your Control Panel's CDN > Resources menu
2. Click the Actions button next to a required CDN Hostname and choose Advanced Reporting.
3. On the page that appears, set the period for which the reports should be generated. The default period is the last week.
4. Specify the location or several locations to Filter by.
5. Click Apply.

The report that appears will show the total/cached/non-cached statistics.

To zoom into a time period, click and drag in a chart. Click the Reset zoom button to zoom out again.
To view advanced reporting on Status codes:
1. Go to your Control Panel’s CDN > Resources menu
2. Click the Actions button next to a required CDN Hostname and choose Advanced Reporting.
3. On the page that appears, click the Status codes tab.
4. Set the period for which the reports should be generated. The default period is the last week.
5. Specify the location or several locations to Filter by.
6. Click Apply.

The report that appears will show the list of HTTP Status codes together with the number of hits these codes were returned.

11.4.10 Prefetch Content
This tool allows to pre-populate content of an HTTP Pull or HTTP Push CDN resource to the CDN. Recommended only for files which are especially large.

To prefetch the content:
1. Go to your Control Panel’s CDN Resources menu.
2. Click the required resource link.
3. On the page that appears, click the Prefetch tab.
4. In the input field, specify paths on the CDN Resource to prefetch (one per line). You may indicate only one path per line.
5. Click the Prefetch button to finish.

PLEASE NOTE: You can only prefetch content of HTTP Pull and Push CDN resources.

11.4.11 Purge Content
This tool allows instant removal of HTTP Pull and HTTP Push cache content in the CDN, if newly updated content has not been properly replicated.

To purge content:
1. Go to CDN Resources menu.
2. Click the required resource link.
3. On the page that appears, click the Purge tab.
4. In the input field, specify paths on the CDN Resource to purge (one per line). You may indicate only one path per line.
5. Click the Purge button to finish.

Then click the Purge All Contents of this Site button to purge all content.
11.4.12 Billing Statistics

OnApp has a record of all the charges applied to your CDN resources. You can view the resource statistics under the statistics available, or those for a shorter period by setting a Start and End time.

To view billing statistics for a CDN resource:

1. Go to your Control Panel's CDN Resources menu.
2. Click the label of the resource you're interested in and then click the Billing Statistics tab.
3. Set Start and End time.
4. Move the Show in my Timezone slider to the right to show bandwidth statistics according to your profile's timezone settings.
5. Press the Apply button.
6. On the screen that appears, you will see the following billing statistics details:

- **Date** – particular date and time for the generated statistics
- **Edge Group** - the edge group to which the CDN resource belongs to.
- **Traffic** - resource traffic in MB.
- **Cost** – the total due for the CDN resource 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).
11.4.13 Token Authentication

Token authentication helps to protect CDN streams from being snitched. Similar to HTTP URL signing, this feature allows customers to enter a secret key during setting up a CDN resource. Then, customers can use the secret key, along with expiry date and allowed/blocked referrer site to generate the token from a script.

To enable token authentication:

1. Enter your secret key and secure path using OnApp UI.
2. Download .NET or Java token generator.
3. Generate the token with the secret key, allow referrer, deny referrer, and expiry date.
4. Append the token with your stream URL, eg ?token=
   110ea31ac69c09a2db0bddd74238843631cdab498ff7e6e75cbd99cc4d05426ab679a57015d4e48438c97b921652daec62de3829f8ff437e27449cfdfc2f1e5d9fc47f14e91a51ea7
5. Embed with your website.

11.4.13.1 Set up Token Authentication in UI

You can set up token authentication for Video on demand and Live streaming CDN resources. To do so:

2. Now proceed with running the .NET or .JAVA scripts.

11.4.13.2 Run Token Generator

Download the script from the following locations:

- .NET script:
  https://bitbucket.org/onappcore/cdn-wowza-token-tool/src/fd00957110a33a1804b8edc033b254a77aa1d324/dotnet/?at=master

- Java script:
  https://bitbucket.org/onappcore/cdn-wowza-token-tool/src/fd00957110a33a1804b8edc033b254a77aa1d324/java/?at=master

Refer to the following sections on instructions for running the scripts.

Generate Token Using .NET

Prerequisites:
- .NET Framework 4.5
- BouncyCastle C# Crypto library 1.7 (http://www.bouncycastle.org/csharp/)

Build

To build a generator:
1. Go to /cdn-wowza-token-tool/dotnet/src location
2. Run xbuild

Upon success of the build, you will find the .exe (TokenAuthGenerator.exe) file at the 'TokenAuthGenerator/bin/Debug' folder.

Usage

TokenAuthGenerator.exe (encrypt | decrypt) (<primary_key> | <backup_key>) "<security_parameters>"

Security Parameters

expire
- Number of seconds since Unix time (Epoch time)
- UTC based
- Must not be earlier than current time
ref_allow

- Referrer domain (e.g. google.com) or path (e.g. google.com/video/)
- Allow multiple referrers separated by comma (,) without space(s)
- Wildcard (*) allowed only at the beginning of a referrer, e.g. *.DOMAIN
- Do not append space at the start & end of a referrer
- Domain must fulfill RFC 3490
- Path must fulfill RFC 2396
- Should not include port (e.g. google.com:3000/video)
- Should not include protocol(e.g. http) portion

ref_deny

- The same rules as for ref_allow

If both ref_allow & ref_deny are specified, ref_allow will be taking precedence over ref_deny

Allow blank/missing referrer

Both "ref_allow" & "ref_deny" could be configured to allow/deny blank or missing referrer during TokenAuth validation.

The following configuration allows blank or missing referrer:
ref_allow=allow.com,
ref_allow=allow.com,MISSING
ref_deny=deny.com

The following configuration deny blank or missing referrer:
ref_allow=allow.com
ref_deny=deny.com,
ref_deny=deny.com, MISSING

Normally ref_allow & ref_deny should not be used together, but if this happened ref_allow will take precedence over ref_deny.

Generate Token

To generate token, run the following:

TokenAuthGenerator.exe encrypt samplekey
"expire=1598832000&ref_allow=*.TrustedDomain.com&ref_deny=Denied.com"

Sample Output:
token=110ea31ac69c09a2db0bddd74238843631cdab498ff7e6e75cb9d9cc4d05426a
b679a57015d4e48438c97b921652daec62de3829f8ff437e27449cfdfc2f1e5d9fc47
f14e91a51ea7
After generating a token, append the result to the playback URL.

Decrypt token

To decrypt a token, run the following:
```
TokenAuthGenerator.exe decrypt samplekey
110ea31ac69c09a2db0bdd74238843631cdab498ff7e6e75cbd99cc4d05426ab679a57015d4e48438c97b921652daec62de382f8ff437e27449cfdfc2f1e5d9fc47f14e91a51ea7
```

Output example:
```
security
parameters=expire=1598832000&ref_allow=*.TrustedDomain.com&ref_deny=Denied.com
```

Generate Token Using Java

Prerequisites:
- Java 6 or 7
- Maven 2 or 3

Build

To build a generator:
1. Go to /cdn-wowza-token-tool/java/ location.
2. Run the following:
   ```
   mvn clean install
   ```

Upon success of the build, you will find the jar (token-auth-generator.jar) file at the 'target' folder.

Usage

```
java -jar token-auth-generator-1.2.jar (encrypt | decrypt) (<primary_key> | <backup_key>) "<security_parameters>"
```

Security parameters
expire
- Number of seconds since Unix time (Epoch time)
UTC based
Must not be earlier than current time

ref_allow
- Referrer domain (e.g. google.com) or path (e.g. google.com/video/)
- Allowed multiple referrers separated by comma (,) without space(s)
- Wildcard (*) allowed only at the beginning of a referrer, e.g. *.DOMAIN
- Do not append space at the start & end of a referrer
- Domain must fulfill RFC 3490
- Path must fulfill RFC 2396
- Should not include port (e.g. google.com:3000/video)
- Should not include protocol (e.g. http)

ref_deny
- Same rules as in ref_allow

If both ref_allow & ref_deny are specified, ref_allow will be taking precedence over ref_deny

Allow blank/missing referrer
Both "ref_allow" & "ref_den"y could be configured to allow/deny blank or missing referrer during TokenAuth validation. The following configuration allow blank or missing referrer:
ref_allow=allow.com,
ref_allow=allow.com,MISSING
ref_deny=deny.com

The following configuration deny blank or missing referrer:
ref_allow=allow.com
ref_deny=deny.com,
ref_deny=deny.com,MISSING

Normally ref_allow & ref_deny are not to be used together, but if this happened ref_allow will take precedence over ref_deny.

Generate token
To generate token, run the following:
java -jar token-auth-generator-1.2.jar encrypt samplekey
"expire=1598832000&ref_allow=*.TrustedDomain.com&ref_deny=Denied.com"
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Sample Output:

token=110ea31ac69c09a2db0bdd74238843631cdab498ff7e6e75cb99cc4d05426ab679a57015d4e48438c97b921652daec62de3829f8ff437e27449cfdfc2f1e5d9fc47f14e91a51ea7

eroded
code

eroded

code

After generating a token, append the result to the playback URL.

Decrypt token

To decrypt token, run the following:

describe
- jar
describe
- auth
- generator
- 1.2.jar
describe
describe
- decrypt
describe
- samplekey
declare
- 110ea31ac69c09a2db0bdd74238843631cdab498ff7e6e75cb99cc4d05426ab679a57015d4e48438c97b921652daec62de3829f8ff437e27449cfdfc2f1e5d9fc47f14e91a51ea7

eroded
code

eroded
code

Sample Output:

- security
- parameters=expire=1598832000&ref_allow=*.TrustedDomain.com&ref_deny=Denied.com

11.4.14 Raw Logs

The raw logs functionality allows you to send logs associated with your CDN resources to your distant server in real time. The raw log allows customers to understand, analyze, and debug files delivered via OnApp CDN, or can be served as audit trailed. Once the user creates CDN resource(s), the raw logs are enabled for this account and the user can configure and receive raw logs. Logs are sent for all the CDN Resources associated with the user. There are three different types of delivery: Syslog, SFTP and FTP. The frequency of uploading the log to client destination is every 10 minutes for SFTP and FTP protocols. For the Syslog protocol, logs are uploaded instantaneously.

If the user does not have any CDN resources, they cannot configure raw logs.

To view and set the raw log configuration:

1. Go to your Control Panel’s CDN Resources menu.
2. Click the Raw Log tab.
3. The page that loads shows the current raw log configuration. On this page you can also set the raw log configuration:
   - For the FTP/SFTP delivery protocol:
     - Hostname - fill in the hostname of the server to which the log will be delivered
     - Ftp username - specify the user name of the FTP/SFTP client on the server to which the log will be delivered
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- **Ftp password** - fill in the password of the FTP/SFTP client on the server to which the log will be delivered
  - For the **Syslog** delivery protocol:
    - **Hostname** - fill in the hostname of the server to which the log will be delivered
    - **Syslog protocol** - select the protocol that will be used for sending the log: TCP or UDP
    - **Syslog port** - specify the port number of the syslog server to which the log will be delivered
  - Choose **Disabled** to disable raw logs.

4. Click **Save** to save the configuration.

To edit, set new configuration parameters and click **Save**.

To disable, choose **Disabled** from the raw log configuration delivery protocol drop-down.

If the SFTP or FTP protocol is applied, raw logs are delivered as an archive. If the Syslog delivery protocol is selected, user will receive the text of the logs.

### 11.5 CDN Edge Groups

CDN edge groups are groups of edge servers – your own, and those you subscribe to from the CDN marketplace. They are usually grouped by location, so they represent a pool of servers for a given geographical area. Once you have created an edge group containing edge servers in specific locations, you can then assign the group (or groups) to a specific CDN resource.

The CDN edge groups menu enables you to see available edge server locations and form them into CDN Edge groups.

You need to associate CDN Edge groups with billing plans to make them available for users.

#### 11.5.1 View CDN Edge Group Details

To see details of a CDN Edge Group:

1. Go to your Control Panel’s **Edge Groups** menu.
2. Click the label of the edge group you want to see.
3. On the screen that appears you will see the list of assigned locations and available locations with the following information:
   - **ID** – the ID of a location
   - **City** – the city the edge server is in.
   - **Operator** – name of the edge server owner.
   - **Type** - HTTP or streaming
   - **Source** – either Marketplace (locations added from the CDN marketplace) or your Own Edge servers (servers added by you).
   - **Status** - whether edge server is active or not.
   - **Price** – price per GB transferred.

### 11.5.2 Create CDN Edge Group

There are two ways of creating a CDN edge group:

1. Using a **CDN setup wizard**
2. Creating the edge group under the Users and Groups menu

To create a new CDN Edge Group using the Users and Groups menu:

1. Go to your Control Panel's **Edge Groups** menu.
2. On the screen that appears, you will see existing groups with the number of assigned locations and associated billing plans.
3. Click the **Create Edge Group** button.
4. On the screen that appears, give your new group a label and click the **Create Edge Group** button.

5. You will be redirected to the screen where you can assign locations to the group.

For details on CDN setup wizard, refer to **CDN wizard** section.
11.5.3 Edit/Delete CDN Edge Group
To edit the name of a CDN Edge Group, or delete a group:
1. Go to your Control Panel’s **Edge Groups** menu.
2. On the screen that appears you will see the list of existing groups:

   - To edit the group’s label, click the **Actions** button, then click **Edit**.

   ![Actions Button](image.png)

   - To delete the group, click the **Actions** icon, then click **Delete**.

   Be careful when deleting an edge group which is associated with CDN resources.

11.5.4 Assign/Remove CDN Edge Group Locations
1. Go to your Control Panel’s **Edge Groups** menu.
2. Click the label of the **CDN Edge Group** you want to configure.
3. On the screen that appears you may assign or remove locations by clicking the **Actions** button next to the required location.

11.6 CDN Upload Instructions
Here is the list of instructions for uploading files and embedding video to CDN resources. Follow the step-by-step instructions below to upload files or embed video to the required CDN resource type.

- Http Push CDN Resources
- VOD Pull CDN Resource
5.1 User Guide

- VOD Push CDN Resource
- Live Streaming CDN Resource

11.6.1

11.6.2 HTTP Push CDN Resource

To upload files to the HTTP Push CDN resource:

1. Connect to the FTP origin using an FTP client. For example, a browser plug-in like FireFTP or FTP software like FileZilla.
2. Please wait up to 10 minutes until the FTP server configures with the HTTP resource.
3. Specify the following FTP details:
   - **Hostname**: 6789.origin.customercdn.com
   - **Username**: 6789
   - **Password**: The FTP password set at CDN resource creation.

   This is an instruction template. Replace “6789” with the resource id, and “customercdn.com” with the operator’s domain.

4. Upload your files.

11.6.3

11.6.4 VOD Pull CDN Resource

To upload files to the HTTP Push CDN resource, enter the following script into your web page:

```html
<html>
<head>
  <script src="http://video.worldcdn-beta.net/player.js" type="text/javascript"></script>
</head>
<body>
  <div id="my-video-player"/>
  <script type="text/javascript">
    CDNPlayer("my-video-player", 1234, "1234/mystream", {width:640, height:360} );
  </script>
</body>
</html>
```
This is an instruction template. Replace “1234” with the resource id, “customercdn.com” with the operator’s domain, and “mystream.mp4” with the filename or stream name.

resource_id/ must prefix the path with <resource_id>, it is ONLY applicable to VOD PULL playback.

This example provides default values for width and height. You can change them to your own values.

Our easy video embed script automatically detects the browser type (Desktop or Mobile device) and loads the appropriate player. Currently, this is either Flow Player or the browser’s native HTML5 player. The streaming protocol is also set appropriately.

11.6.5 VOD Push CDN Resource

To upload files to the VOD Push CDN resource:

1. Connect to the FTP origin using an FTP client. For example, a browser plug-in like FireFTP, or FTP software like FileZilla.
2. Please allow up to 10 minutes for the FTP server to be configured with the VOD resource.
3. Specify the FTP details:

   o Hostname: 6789.origin.customercdn.com
   
   o Username: 6789
   
   o Password: the password set at creation
4. Upload your files.
5. Enter the following script into your web page:

```html
<html>
<head>
  <script src="http://video.worldcdn-beta.net/player.js" type="text/javascript"></script>
</head>
<body>
  <div id="my-video-player"/>
  <script type="text/javascript">
    CDNPlayer("my-video-player", 1234 "1234/mystream", {width:640, height:360} );
  </script>
</body>
</html>
```

- This is an instruction template. Replace “1234” with the resource id, “customercdn.com” with the operator’s domain, and “mystream.mp4” with the filename or stream name.
- This example provides default values for width and height. You can change them to your own values.

Our easy video embed script automatically detects the browser type (Desktop or Mobile device) and loads the appropriate player. Currently, this is either Flow Player or the browser’s native HTML5 player. The streaming protocol is also set appropriately.
11.6.7 Live Streaming CDN Resource

1. Before you start, make sure your publishing point settings meet the following requirements (to be able to retrieve with the Silverlight Player):
   
   o h.264 Baseline 3
   o AAC or MP3-stereo-44100Hz audio
   o 2 seconds key frame frequency
   o lower bitrate

2. Install and configure the Adobe Live media encoder:
   
   a. Install Adobe Live Encoder.
   b. Once the Adobe Live Encoder is installed, run the application and move on to the next step.
   c. Complete the form:
      
      ▪ FMS URL: rtmp://1234.publishstream.customercdn.com/P1234
      ▪ Backup URL: rtmp://backup.1234.publishstream.customercdn.com/P1234
      ▪ Stream: your stream name

      This is an instruction template. Replace “1234” with the resource id, and “customercdn.com” with the operator’s domain.

   d. Press Connect.
   e. In the password pop up window, enter “P1234” as the username and the resource secret key for the password.
   f. Press Start to start publishing the live stream.
Enter the following script into your web page to embed video to the Live Streaming CDN resource:

```html
<html>
<head>
  <script src="http://video.worldcdn-beta.net/player.js" type="text/javascript"></script>
</head>
<body>
  <div id="my-video-player"/>
  <script type="text/javascript">
    CDNPlayer("my-video-player", 1234, "mystream", {width:640, height:360} );
  </script>
</body>
</html>
```

This example provides default values for width and height. You can change them to your own values.

3. Our easy video embed script automatically detects the browser type (Desktop or Mobile device) and loads the appropriate player. Currently, this is either Flow Player or the browser’s native HTML5 player. The streaming protocol is also set appropriately.

4. Manual Instructions

We support a variety of methods to get the CDN URL to use in your player. **SMIL**

http://video.cdn.qaonapp.net/726128906/_definst_/mystream.smil

The SMIL playlist provides an RTMP URL and should be used with Flash-based players only. Longtail Player and Flow Player are compatible with SMIL redirection. **Apple HTTP Live Streaming**
http://video.cdn.qaonapp.net/726128906/_definst_/mystream.m3u8
This returns a 302 redirect to an Apple HLS manifest and should be used with Apple HLS-compatible players only. **Adobe HTTP Dynamic Streaming**

http://video.cdn.qaonapp.net/726128906/_definst_/mystream.f4m
This returns an Adobe HDS manifest and should be used with Adobe HDS-compatible players only. **Microsoft Smooth Streaming (Silverlight)**

http://video.cdn.qaonapp.net/726128906/_definst_/mystream.ism
This returns a 302 redirect to Smooth Streaming manifest and should be used with Smooth Streaming-compatible players only. **Javascript JSONP**

http://video.cdn.qaonapp.net/726128906/_definst_/mystream.json?callback=MyCallBack
This returns a JSONP document, embeddable using `<script>`

An example of a callback with a successful result:
```
MyCallBack({
  "rtmp":
  "rtmp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream",
  "rtmpe":
  "rtmp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream",
  "apple":
  "http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/playlist.m3u8",
  "adobe":
  "http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/manifest.f4m",
  "rtsp":
  "rtsp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream",
  "silverlight":
  "http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/Manifest"
});
```

An example with an error:
```
MyCallBack({
  "error": "File not found"
});
```

**Javascript JSON**

http://video.cdn.qaonapp.net/726128906/_definst_/mystream.json
This returns a JSON document. Cross-origin resource sharing is enabled to allow XMLHttpRequest from any domains.

An example of a callback with a successful result:
```
{
  "rtmp":
  "rtmp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream",
  "rtmpe":
  "rtmp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream",
  "apple":
  "http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/pla
ylist.m3u8",
  "adobe":
  "http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/Mani
fest" });
```
“http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/manifest.f4m”, “rtsp”:
“rtsp://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream”,
“silverlight”:
“http://609821627.e.726128906.r.cdn.qaonapp.net/726128906/_definst_/mystream/manifest”

An example of a callback with a JSON document with an error thrown:

```json
{
    "error": "File not found"
}
```

11.7 CDN SSL Certificates

OnApp customers can import their own SSL certificates by applying the Subject Name Indication (SNI) extension.

SNI lets the client specify the hostname it is trying to reach at the start of the handshaking process. SNI is supported by most modern browsers, and provides an efficient way to deliver content over HTTPS using your own domain and SSL certificate. Custom SNI SSL relies on the SNI extension of the Transport Layer Security protocol, which allows multiple domains to serve SSL traffic over the same IP address by including the hostname viewers are trying to connect to.

Previously, OnApp applied SAN SSL certificate from a certificate authority to which additional certified domains can be added. This allowed you to host several domains on one IP by sharing the same certificate, and add all domains to this IP. However, the number of domains per SAN certificate is limited. Moreover, the certificate’s size increases as more domains are added. This causes additional bandwidth to be used for the SSL handshake.

Currently, OnApp applies the CloudSSL+SNI solution. Users can import custom SNI SSL certificates into the system or request SSL to be enabled for their CDN resource. One SSL certificate can be associated with several CDN resources, but a resource can only be linked to one SSL certificate. However, some of the older browsers do not support SNI. In this case, users who prefer browsers that do not support SNI can purchase an SSL certificate and the SAN solution will be applied. On questions about the SSL certificate purchase, please contact OnApp support.

For the list of browsers that do not support SNI, kindly refer to the Server Name Indication article.

OnApp currently supports the following types of certificates:

- domain-validated (DV) certificate (example.com)
  - single certificate
    - wildcard certificate (*.example.com)
    - SAN certificate (any domains)
- organization validation (OV) certificates
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- single certificate
- wildcard certificate (*.example.com)
- SAN certificate (any domains)

- extended validation (EV) certificates
  - single certificate
  - wildcard certificate (*.example.com)
  - SAN certificate (any domains)

- high-assurance certificates

- This feature is available for HTTP Pull and HTTP Push resources only.
- To add custom SNI SSL certificates, the user needs to have CDN resources in the cloud and CDN SSL Certificates permissions.
- Custom SNI SSL certificates can be used for secondary hostnames.
- A custom SNI SSL certificate can only be associated with a CDN resource if the certificate and the resource have the same owner. The drop-down list of SSL certificates in the CDN resource creation wizard shows only the certificates of the user who will be the resource owner.
- When a custom SNI SSL certificate is associated with a CDN resource, the certificate applies only to the edge servers subscribed to that resource.

11.7.1 View Custom SNI SSL Certificates

To view the list of available SSL certificates:
1. Log in to your Control Panel.
2. Choose SSL Certificates in the CDN section. The page that loads shows all available custom SNI SSL certificates with their details:

- ID - ID of the custom SNI SSL certificate
- Name - the name of the certificate. Click the name to view the certificates’ properties and associated CDN resources.
- Actions - click the Actions button to edit or delete the certificate
11.7.2 Add Custom SNI SSL Certificates

OnApp version 4.0 introduces the possibility for customers to import their own SSL certificates.

To import a SSL certificate:

1. Log in to your Control Panel.
2. Choose **SSL Certificates** in the CDN section. The page that loads shows all available custom SNI SSL certificates.
3. Click the **Import SSL Certificate** button.

To add custom SNI SSL certificates, the user needs to have CDN resources in the cloud and **CDN SSL Certificates** permissions.

4. On the following page, fill in the required information:

   - **Name** - choose a name for the certificate
   - **Ssl certificate key** - fill in the certificate key, it must be in pem-format
   - **Private key** - fill in the SSL key provided by your SSL provider

   Each line of **Ssl certificate key** and **Private key** should be started from with the new line.

5. Click the **Create SSL Certificate** button to import the certificate.

After you add a custom SNI SSL certificate to the cloud you can associate it with a CDN resource. To do this, proceed to the second step of the CDN resource creation wizard in the Control Panel's **CDN Resources** section. For more information, refer to **Create HTTP CDN Resource**. When a
custom SNI SSL certificate is associated with a CDN resource, the certificate applies only to the edge servers subscribed to that resource.

11.7.3 Edit Custom SNI SSL Certificate

You can edit your custom SNI SSL certificates, by following this procedure:

1. Log in to your Control Panel.
2. Choose **SSL Certificates** in the CDN section. The page that loads shows all available custom SNI SSL certificates.
3. Click the **Actions** button next to the required certificate and choose **Edit**. Alternatively, click the name of the certificate and click the **Edit** button on the page that loads.
4. On the following page edit the certificate's details:

   ![Edit SSL Certificate](image)

   - **Name** - choose a name for the certificate
   - **Ssl certificate key** - fill in the certificate key, it must be in pem-format
   - **Private key** - fill in the SSL key provided by your SSL provider. Private key will not be displayed for security reasons.

   Make sure that **Ssl certificate key** and **Private key** parameters are filled in the same way they are generated - with the line breaks.

5. Click **Save**.
11.7.4 Delete SNI SSL Certificate

To delete a custom SNI SSL Certificate, follow this procedure:

1. Log in to your Control Panel.
2. Choose SSL Certificates in the CDN section. The page that loads shows all available CDN SSL certificates.
3. Click the Actions button next to the required certificate and choose Delete.
12 AWS

OnApp implements the possibility to manage Amazon EC2 instances from OnApp Control Panel using 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.

12.1 Enable/disable AWS

Amazon EC2 support is an opt-in feature that is available for a small additional fee on top of your normal OnApp license. Please contact your account manager before enabling Amazon EC2 support.

To enable AWS for your cloud, follow the procedure below:

1. Go to your OnApp Control Panel Settings > Configuration and switch on the Allow users connect to AWS toggle. This will enable AWS for the cloud.

2. Go to the Users and Groups 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 - either for the cloud or for the user - the above option will disappear from the dashboard, but all users’ credentials will be kept in OnApp DB.

### 12.2 View 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.

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:
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.

### 12.3 Launch New EC2

Launching a new instance is a process similar to 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**
3. Select the AMI template from your list or search the marketplace. The right panel lists the main AMI’s properties.
You may search using one or more 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.
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Instance Details

On this step you need to fill in the following information:

- Indicate the number of instances to be launched. You may launch several identical instances at the same time.
- Specify network configuration. Choose network and subnet.
- Select the key name.
Review and Launch

On this step you can see the information on the EC2 instance you are going to create. You can either initialize the EC2 instance creation process or click the Previous button to change the required details of the instance.
4. Click **Launch EC2 Instance** button.

Some of the templates from the marketplace are not free of charge and require a subscription at AWS. Unfortunately this information cannot be obtained via API in the process of AMI selection. So, in case a paid AMI is selected, an error message will be displayed, requesting you to accept the terms and conditions and subscribe to the selected AMI at the Amazon website.
13 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 users 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 billing plans.

13.1 vCloud Director Users

Users with the following roles can view users of their user group:

- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

Users with the vCloud Organization Administrator role can also manage users within their user group. The following user related actions are available for users with the vCloud Organization Administrator role:

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

The creation process will add a user both to vCloud Director and OnApp. The user creation form is standard for OnApp, the fields that will synchronize user data with vCloud Director are: Login, Password, User Role, User Group, First and Last Name, and Email. After you add a user, the change will be synchronized to vCloud Director. When you assign the vCloud Director user that you add in OnApp to an Organisation (user group), you define the resources the new user will have access to.
13.2 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.

13.2.1 View Users

For a quick view of user account details, go to your Control Panel's Users menu. You'll see a list of all user accounts in your cloud, along with their details:

- **Full name** – user's name and surname
- **Username** – user's screen name
- **User role** – the role set for the user
- **Usergroup** – the group to which the user is assigned
- **Status** – user's status (active or deleted)
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 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.

13.2.2 View User Account Details

To view account details of a particular user:
1. Go to your Control Panel Users menu.
2. On the screen that appears, click the full name of the user to view their account details.
3. The screen that appears will display the following user details:
   The user details screen that appears shows the following information:

User details

   o **Avatar** – user’s avatar (This feature is available if the Use gravatar option is enabled).
   o **Full name** - user's name and surname.
   o **Email** - user's email.
   o **Login** - user's screen name.
   o **User role** – the role set for the user.
   o **User group** – the group to which the user is assigned.
   o **Timezone** - time zone set for this user.
   o **Locale** - locales set for this user.
   o **System theme** - system theme set for this user.
   o **Display infoboxes** – whether info boxes are displayed or not for this user.
   o **Restore infoboxes** - click this button to display info boxes for the user.

Amazon Web Services

   o **Status** - the status of the Amazon Web Services: disconnected or connected.
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API info

- **API key** - click the Generate key button to generate a new API key.

Billing details

- **Price per hour** - shows the price for VSs, Load Balancers, and other resources per hour.

- **Billing plan** - click the plan 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 billing plan.

- **Total cost** - the sum of used resources cost and virtual servers cost.

- **Payments** - the total amount of payments made.

- **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 payments with their details.

**Backups** - the list of user backups with their details.

### 13.2.3 User Payments

To view 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. The page that loads shows the list of user's payments.

13.2.4 User Billing Statistics

The system has a record of all the billing statistics on a user account for the last three months. If the account was created less than three months ago, statistics are generated for the actual period. You can also define a shorter period by setting Start and End time.

To view billing statistics for an account:

1. Go to your Control Panel's **Users** menu.
2. You'll see a list of all user accounts in your cloud. Click the **User Statistics** link next to a user in question.
3. 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 backups taken by the user during the chosen period.
- **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.
- **Templates Costs** - the price for the templates made by the user during the chosen period.
- **Backup Zones Backups Cost** - the price for the backups of the backup zones taken during the selected period.
- **Backup Zones Backup Disk Size Cost** - the price for the backup disk size of backup zones during the predefined period.
- **Backup Zones Templates Cost** - the price for the templates of the backup zones made during the chosen period.
- **Backup Zones Template Disk Size Cost** - the price for the template disk size of backup zones during the predefined period.
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- **Customer Network Cost** - the price for all customer networks for the selected period.
- **CDN Edge Group Costs** - the price for all CDN Edge groups for the chosen period.
- **Virtual Servers cost** – the total due for all the VSs minus Backups/Templates Cost (if any)
- **Total cost** – the sum of Used resources cost and Virtual Servers cost
- **User Statistics**:
  - **Resources cost**– the money owed per virtual server for the following resources:
    - CPU
    - CPU Priority
    - Disk Size
    - Memory
    - IP Address
    - Virtual Server
    - Template&Backup Storage
    - Disk size
    - IP Address
  - **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
- **Total** – the total due per virtual server for Resources and Usage cost.

13.2.5 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.
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4. Click the **Save** button to finish.

### 13.2.6 View User Backups

Backups in OnApp clouds are associated with user accounts. 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 the 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
### John Smith

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Status</th>
<th>Backup Size</th>
<th>Initiated</th>
<th>Backup Server</th>
<th>Note</th>
<th>V3</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-03-24 14:30:53</td>
<td>Virtual Server zaza</td>
<td>Built</td>
<td>780.77 MB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>xxxx</td>
<td>John Smith</td>
<td></td>
</tr>
<tr>
<td>2015-03-27 08:50:12</td>
<td>Virtual Server zaza</td>
<td>Built</td>
<td>54.606 MB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>xxxx</td>
<td>John Smith</td>
<td></td>
</tr>
<tr>
<td>2015-03-31 11:27:15</td>
<td>Virtual Server veloud vs</td>
<td>Built</td>
<td>203.034 MB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>clean veloud vs</td>
<td>John Smith</td>
<td></td>
</tr>
<tr>
<td>2015-04-06 12:18:20</td>
<td>Virtual Server veloud vs</td>
<td>Built</td>
<td>2.421 GB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>onapp 4.0 rpm veloud vs</td>
<td>John Smith</td>
<td></td>
</tr>
<tr>
<td>2015-04-20 12:40:07</td>
<td>Virtual Server zaza</td>
<td>Built</td>
<td>5.000 GB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>xxxx</td>
<td>John Smith</td>
<td></td>
</tr>
<tr>
<td>2015-04-20 13:02:34</td>
<td>Disk #1053</td>
<td>Built</td>
<td>1.738 GB</td>
<td>Manually</td>
<td>BS 162 (Ukraine (LVIV))</td>
<td>xxxx</td>
<td>John Smith</td>
<td></td>
</tr>
</tbody>
</table>
14 GROUPS

You can assign users into different user groups, so you can give different groups of users different cloud experiences. At present you can assign a UI theme to specific user groups (Settings > Look&Feel menu).

14.1 vCloud Director Organizations

In vCloud Director, an organization is a unit of administration for a collection of users, groups, and computing resources. Users authenticate at the organization level, supplying credentials established by an organization administrator when the user was created or imported. vCloud Director organizations are imported into OnApp as user groups. You can view the list and details of user groups, if you are a user with one of the following roles:

- vCloud Catalog Author
- vCloud vApp Author
- vCloud vApp User
- vCloud Organization Administrator
- vCloud Console Access Only

14.2 Assign New User to Group

This happens 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. Select the User group for the user from the user group drop-down menu.
4. Complete the other user detail fields, and click the Save button.

14.3 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.

### 14.4 Create User Group

To add a user group:
1. Go to your Control Panel's **Groups** menu.
2. On the page that follows, click **Create Group** button.
3. When the page loads, enter a user group name (Label) and click **Save**.

![Create User Group](image)

### 14.5 View/Edit/Delete User Group

To view, edit and delete a user group:
1. Go to your Control Panel's **Groups** menu.
2. Click a group's label to see all the users with their details assigned to the questioned group.

3. To edit user group details, click the **Actions** icon next to a user group you want to change, then click **Edit**.

4. To delete a user group, click the **Actions** button next to the user group you are interested in, then click **Delete**.
15 LOGS

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

To access and manage logs:

Click the Control Panel's Logs menu to view the log of all transactions in the cloud.

- To view details of a specific transaction, click its Ref number.
- You can also search for a transaction using the search box at the top.
- You can filter logs by their status by clicking the appropriate button - Complete, Running or Failed at the top.

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 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
LOGS - VIEW/EDIT/DELETE USER GROUP 435
Stats menu unites cloud usage and CDN usage statistics generated by the OnApp Statistics receiver. 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).

The Usage Statistics screen lists every virtual machine 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.

By default, statistics are generated for the last 72 hours. To specify another period, set the **Start** and **End** time and click the **Apply** button. You can sort by all categories except the virtual sever name: click a column label to sort in ascending order (you'll see an arrow appear to show how the data is being sorted). Click it again to sort in descending order. You can also drill into a specific VS, or its owner, by clicking the relevant links in the list.

16.1 CDN Usage

CDN usage report lists the summary of CDN Resources used by CDN with their details:

- **Owner** – the owner's user name. Click the owner's name for details.
- **Edge Group** – the edge group to which the CDN resource belongs to.
- **Location** – CDN edge server's location.
5.1 User Guide

- **Data cached** – cached CDN traffic in a `number_to_human_size` format. (See the table below)
- **Data non cached** – non cached CDN traffic in a `number_to_human_size` format. (See the table below)

The table of formatting the bytes in `number` into a more understandable representation:

<table>
<thead>
<tr>
<th><code>number_to_human_size</code></th>
<th>=&gt;</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>number_to_human_size(123)</code></td>
<td>=&gt;</td>
<td>123</td>
</tr>
<tr>
<td><code>number_to_human_size(1234)</code></td>
<td>=&gt;</td>
<td>1.21</td>
</tr>
<tr>
<td><code>number_to_human_size(12345)</code></td>
<td>=&gt;</td>
<td>12.1</td>
</tr>
<tr>
<td><code>number_to_human_size(1234567)</code></td>
<td>=&gt;</td>
<td>1.18</td>
</tr>
<tr>
<td><code>number_to_human_size(1234567890)</code></td>
<td>=&gt;</td>
<td>1.15</td>
</tr>
<tr>
<td><code>number_to_human_size(1234567890123)</code></td>
<td>=&gt;</td>
<td>1.12</td>
</tr>
<tr>
<td><code>number_to_human_size(1234567, :precision =&gt; 2)</code></td>
<td>=&gt;</td>
<td>1.2</td>
</tr>
<tr>
<td><code>number_to_human_size(483989, :precision =&gt; 2)</code></td>
<td>=&gt;</td>
<td>470</td>
</tr>
<tr>
<td><code>number_to_human_size(1234567, :precision =&gt; 2, :separator =&gt; ',;')</code></td>
<td>=&gt;</td>
<td>1,2 MB</td>
</tr>
</tbody>
</table>

By default, statistics are generated for the last 72 hours. To specify another period, set the **Start** and **End** time and click the **Apply** button. Tick the **Show in my Timezone** box to show CDN usage statistics according to your profile’s time zone settings.

16.2 Cloud Usage

The Usage Statistics screen lists every virtual machine 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.

By default, statistics are generated for the last 72 hours. To specify another period, set the **Start** and **End** time and click the **Apply** button. You can sort by all categories except the virtual machine name: click a column label to sort in ascending order (you’ll see an arrow appear to show how the data is being sorted). Click it again to sort in descending order. You can also drill into a specific VM, or its owner, by clicking the relevant links in the list.
16.3 Top IOPS disks

Top IOPS statistics chart displays 10 disks with top IOPS usage along with the following details:

- **Hostname** - hostname of a virtual server the disk is located at.
- **Disk** - disk ID.
- **Total IOPS** - total number of I/O operations per second.
- **IOPS Read** - number of read I/O operations per second.
- **IOPS Written** - number of written I/O operations per second.
17 BILLING PLANS

The Billing Plans menu provides the details of the billing plan for which you are currently signed up. To view the billing plan details:

1. Go to your Control Panel's Billing Plans menu.
2. Click the billing plan label.
3. The page that loads will show the following details:

- **Label** - your billing plan name.
- **Monthly price** – a monthly price for the billing plan. This price will be applied regardless of the actual prices for used resources.
- **Currency** - a currency you're charged in.

Windows licensing support settings:

- **MAK licensing** - shows if the MAK licensing is enabled
- **KMS licensing** - shows if using KMS service is allowed
- **User license** - shows if inserting custom licenses is possible

17.1 Company Billing Plans

This functionality is available for users with the vCloud Organization Administrator role.

Company billing plan is a set of limits and prices for the resources used by vCloud Director organizations imported as user groups into OnApp. Company billing plan functionality is applicable for three models of resources allocation of **vCloud Director resource pools** - Pay-As-You-Go, reservation pool and allocation pool.

As a user with the vCloud Organization Administrator role, you can only view own company billing plan.
18 HELP

The help menu lets you submit support requests to the OnApp team. All OnApp customers with a full (paid) 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.