OnApp Cloud v2.2

Admin Guide

An explanation of all Control Panel functions, with tips for cloud admins.

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1. About this guide

This guide provides a brief overview of OnApp's cloud deployment and management software, and explains in detail how to configure and manage your cloud using the OnApp Control Panel interface.

Key to interface and icons

This guide refers to various elements of the OnApp interface, including Menu items, Tabs, Icons and Buttons. These are illustrated below. The specific functions available depend on the permissions assigned to the user currently logged in. Users without full rights will not be able to access all functionality, or may be denied access to functions they can see.
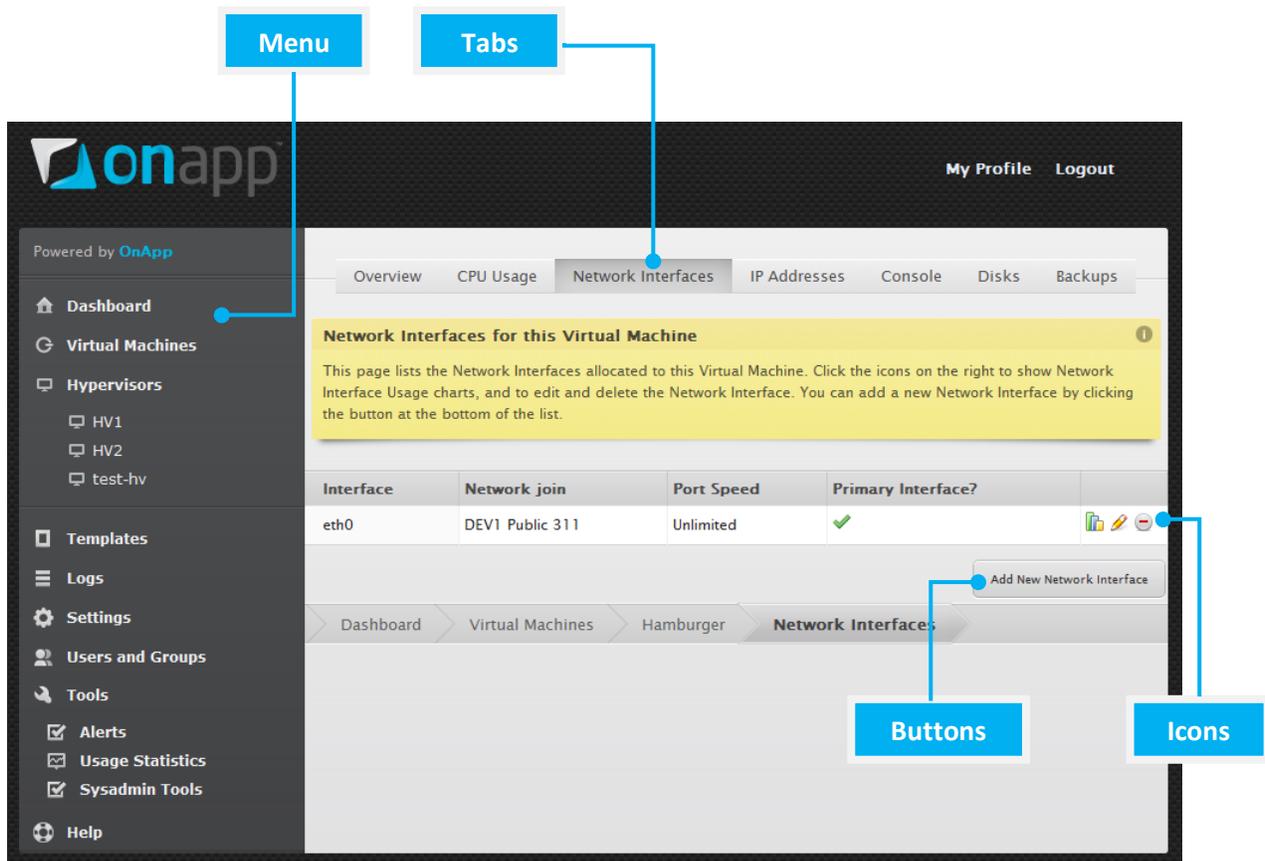
The following icons are referred to in this guide:

Edit	Schedules	Backups
Statistics	Delete	Suspend user
Make public	Add	Activate user
Log in as		

2. OnApp overview

OnApp software enables hosting providers to turn their existing infrastructure (or any commodity hardware) into a single pool of resources ("a cloud") which can then be sold on a utility basis.

2.1   Main components & features

OnApp handles cloud deployment, VM deployment, resource allocation, server and SAN management, failover, user management and billing. Here's a brief description of the main components and features of an OnApp installation:

Servers

There are two required server types in an OnApp configuration – hypervisor servers and the Control Panel server. OnApp also requires storage devices for templates, virtual machines and backups. These may also be servers.

Hypervisor servers

The hypervisor server is a Xen- or KVM-powered hypervisor 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 machines as well as handling network/disk connectivity, monitoring, IP address anti-spoofing and more.

Hypervisor servers:

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

Control Panel server

The Control Panel server (sometimes known as the Base server) hosts the OnApp interface and manages all the processes happening to OnApp.

The Control Panel server:

- Provides a web-based user interface
- Assigns a virtual machine to a hypervisor server

- Creates/starts/stops/deletes virtual machines
- Resizes CPU and storage
- Manages virtual machines through a console session
- Creates backups of virtual machines
- Allows virtual machines to be restored from a backup
- Allows the creation of custom templates from virtual machine backups, for future deployment of new virtual machines
- Displays your CPU usage and network utilization

Storage devices

We recommend that you set up a separate server with SSH (preferred) or NFS (for high end NAS) to store templates and backups. However, in a small installation you can use SSH storage on separate disks in the Control Panel server.

You will also need a server to store your virtual machines. For storage you can use any block based storage, such as local disks in hypervisors, an Ethernet SAN such as iSCSI or AoE, or hardware (fiber) SAN. Storage Area Networks are core segments of the cloud system, and OnApp can control their physical and virtual routing. This control enables seamless SAN failover management, including SAN testing, emergency migration and data backup.

Networks

With OnApp you can create complex networks between virtual machines residing on a single host, or across multiple installations of OnApp. You can configure each virtual machine with one or more virtual NICs, each with its own IP and MAC address, to make them act like physical machines.

OnApp ensures that each customer has their own VLAN – their own 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.

Templates

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

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

Virtual Machines

OnApp gives you complete control of your virtual machines (VMs), and all files and processes running on those machines. You can start, stop, reboot and delete virtual machines. You can move VMs between

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hypervisors with no downtime. OnApp also lets you perform automatic and manual backups, and restore VMs in case of failure.

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

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

Scalability

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

High availability

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

- **Hypervisor failover management system** — If a hypervisor fails, OnApp's self-healing architecture automatically moves virtual machines to another box. Hypervisors 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 hypervisor is selected for a virtual machine to boot there. This process is fully automatic but may take several minutes. When the crashed hypervisor comes online, it will be again available, but virtual machines previously migrated from it will not be migrated back.
- **Virtual machines** — OnApp keeps virtual machines running even if the Control Panel server goes offline. In such an event, you won't be able to perform any actions to virtual machines 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 machine. You can always restore the virtual machine from a backup if needed. There are also emergency 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.

Security

OnApp provides multiple layers of security:

- **Hypervisor** — OnApp is a multi-hypervisor cloud system that currently supports Xen and KVM (support for VMware, Hyper-V and other hypervisors will be added in future releases). The first layer of security is provided by the hypervisor itself. For example, Xen provides full isolation between virtual machines and allows each virtual machine to access its own disk only. When a virtual machine makes a request for data, it gets redirected to its correct disk. Xen dictates which virtual machines and resources are allowed to run or be accessed at any given time.
- **Firewall** — In addition to the hypervisor security mechanism, there is also an anti-spoof firewall which resides on the server where you store virtual machines. The firewall enables the management operating system of the hypervisor to examine packets entering and leaving the virtual machine. It blocks packets that do not belong to the virtual machine and accepts those meeting the rules. The firewall prevents IP spoofing and packet sniffing.
- **Control Panel** — Virtual machines in OnApp are completely controlled by the administrator. Administrators have full root (Linux) or Administrator (Windows) access to accounts and machines. The Control Panel also lets you assign different levels of user access to virtual machines, hypervisors, consoles and disks.
- **Network Security** is provided by completely isolating virtual machines 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.

2.2 API and integrations

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

OnApp integrates with popular billing applications like HostBill, Ubersmith and WHMCS, and with PHP applications via a wrapper (integration modules are available from the OnApp website: http://www.onapp.com/support/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 API, including a guide with code samples, see http://www.onapp.com/support/documentation/

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2.3 Hardware & software requirements

An OnApp installation requires at least two physical machines – one for the Control Panel server, and the other for the Hypervisor server. You can have as many Hypervisor 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.

Hypervisor servers

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

Control Panel server

- Dual or Quad Core 2Ghz+ CPU
- 4GB+ RAM
- 100GB Raid 1
- 2x Gig network interface cards

Backup server

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

Data stores

- 1TB Block Storage (iSCSI, AoE, Fiber — can even be on a shared SAN)

2.4   Architecture

OnApp software transforms your server and storage hardware into a virtual network system that employs a Xen Hypervisor 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.
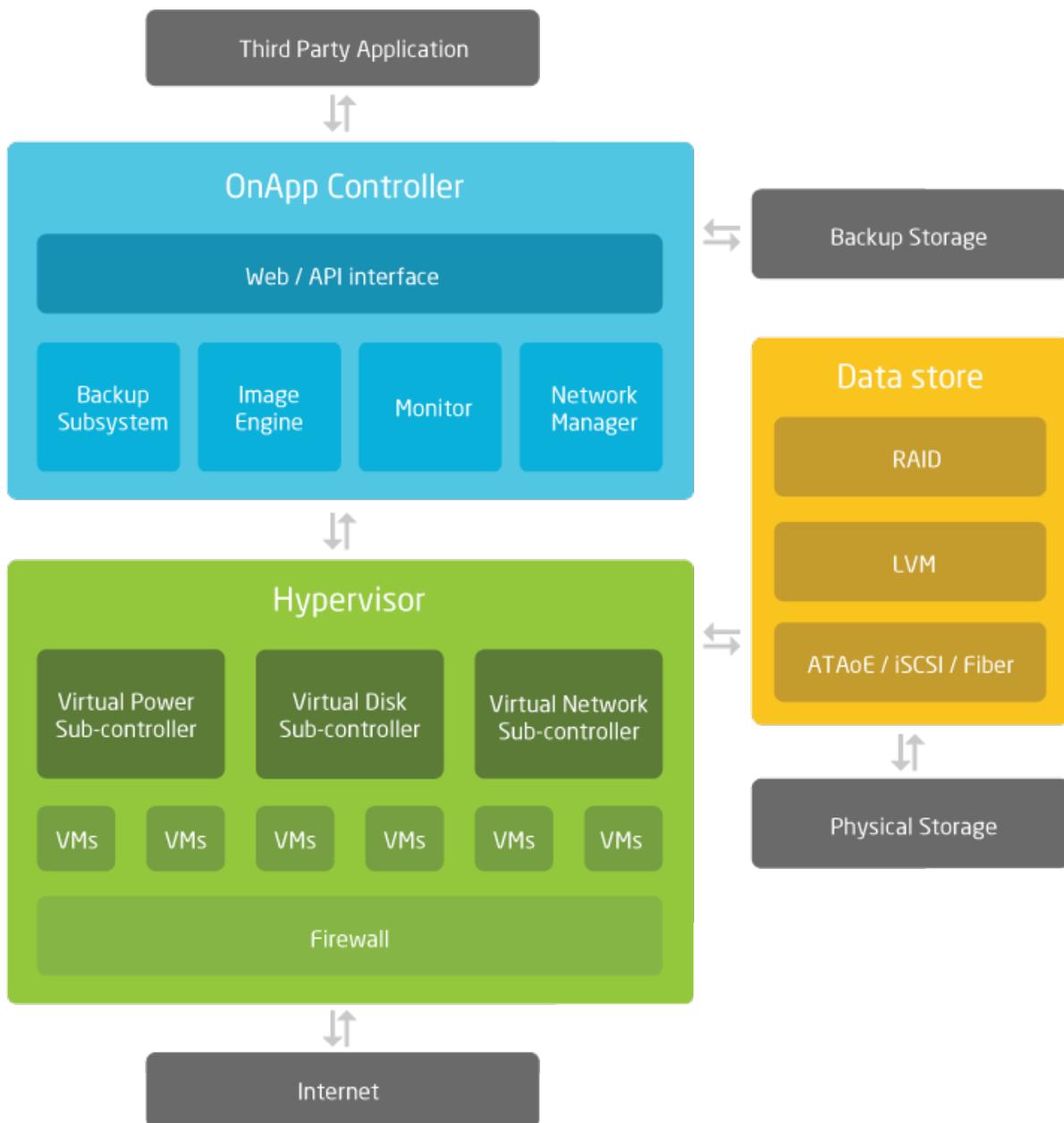
3. Dashboard

The OnApp dashboard is displayed after logging into the system. It provides three main views of usage and activity: Statistics, Cloud and Account. Click the icons by the silver dial to change the view.
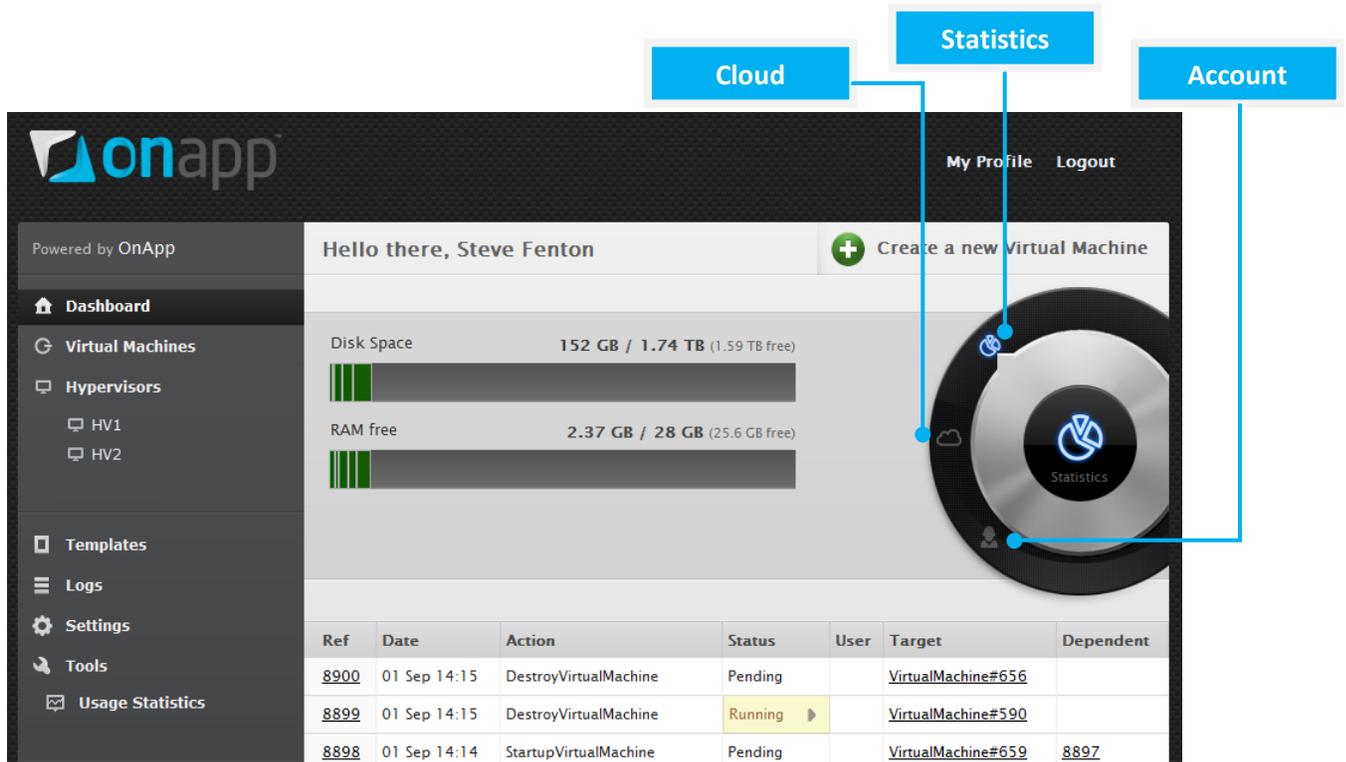
Statistics

This is the default view, showing the total Disk Space and RAM used by virtual machines, along with the space remaining.

- For normal users, the disk and RAM bars are segmented: each segment represents a different virtual machine. Mouse over a segment to see its details.
- For administrators, the bars show the total disk and RAM usage of the entire cloud.

Cloud

Clicking this icon shows details of the entire cloud:

- For normal users, it shows the total number of virtual machines, CPUs, CPU shares, RAM and disk space they're using.
- For administrators, it shows the total number of virtual machines, hypervisors, data stores and IPs used by the entire cloud.

Account

Clicking this icon shows details of that user's account:

• For normal users, it shows their user name, the outstanding amount of payments owed, and payments made.
• For administrators, it shows their user name, license key, the number of cores the license covers, and the license renewal date.

Transaction log

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

• Normal users see recent transactions for their virtual machines.
• Administrators see recent transactions for the entire cloud.

3.1   User profile

Click the My Profile button at the top of the Control Panel screen to view details of the user account you're currently logged in with. This includes details of user name, login, email, billing plans and prices, and the roles currently assigned to this account. It also includes API Key information.

Administrators can view details of all account profiles through the Control Panel's Users & Groups menu.

3.1.1   API Key

The API Key is used instead of the normal username/password login combination 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 Change Key button. A new key will be generated, and you'll be taken back to the main Dashboard screen.

4. Virtual machines

Virtual machines in OnApp are based on templates and are deployed on hypervisors. Hypervisors give them access to CPU, disk and network resources. OnApp provides complete control over the lifecycle of a virtual machine.

4.1 Create a VM

Virtual machines are created from templates. To create a virtual machine:

1. On your Control Panel's dashboard, click the Create New Virtual Machine button (or go to the Virtual Machines menu, and click the Add New Virtual Machine button).
2. Fill in the form that appears:

   Properties

   o Give your virtual machine a label and a hostname.
   o Choose a hypervisor zone to build this VM on.
   o Choose a specific hypervisor to build this VM on.
   o Give your virtual machine a secure password.

   Template

   If there are less than 10 templates available in the system, choose a template from the Templates drop-down box.

   If there are more than 10 templates available in the system:

   o Choose an Operating system from the drop-down box (Windows, Linux or FreeBSD).
   o Choose a Distribution.
   o Choose a specific template.

   Resources

   o Set the resources needed for this VM: RAM, CPU cores, CPU priority.

   ⓘ The amount of CPU resource a VM is given is the CPU priority (you can think of this as its "share percentage") multiplied by the number of cores allocated to that VM. This is a minimum number – clients can burst over it, up to 100% multiplied by the number of cores. For example, on a hypervisor 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 VMs with 100% CPU priority/1 CPU core on a hypervisor with a 4-core CPU. In this example, OnApp would reduce the guaranteed CPU for each VM.

Primary disk

o Choose a data store zone for this VM's primary disk.
o Set the primary disk size.

Swap disk

o Choose a data store zone for this VM's swap disk.
o Set the swap disk size.

ⓘ *There is no swap disk for Windows-based VMs. In all other cases, swap disk size must be greater than zero.*

Network configuration

o Choose a network zone and set the port speed for this VM.

Automation settings

o Tick the Build Virtual Machine Automatically box if you want the system to automatically build the VM. If you leave this box blank, you will have to build your machine manually after it is created.
o Tick the Automatic backup box if you want this VM to be backed up automatically (according to the backup settings configured in the Settings/Autobackup Presets menu)
o Tick the Enable autoscale box if you wish to set autoscaling rules for this VM.

3. Click the Create Virtual Machine button to start the creation process. You will be taken to the virtual machine details screen.

ⓘ *OnApp must be configured properly before VMs 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 hypervisor configured and online (Settings -> Hypervisors -> Add New Hypervisor)*
•   *Have at least one hypervisor assigned to a hypervisor zone (Settings -> Hypervisor Zones -> Choose a zone -> Press "+" sign next to an unassigned Hypervisor)*
•   *Have at least one data store attached to a hypervisor (Settings -> Hypervisors -> [choose a hypervisor] -> Manage Data Stores)*

- *Have at least one network attached to a hypervisor (Settings -> Hypervisors -> [choose a hypervisor] -> Manage Networks)*
- *Have assigned a billing plan to the user creating the VM (Users and Groups -> Edit [user])*

4.2   Build a VM manually

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

To build a virtual machine manually:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. On the screen that appears, scroll down to the Actions section and click Build Virtual Machine.
4. On the screen that pops up, use the drop-down menu to choose a template with which to build the VM.
5. Tick the Required Start Up box to have your VM started automatically after it is built.
6. Click the Build Virtual Machine button to finish.

4.3   View VMs

To view all virtual machines deployed in the cloud:

1. Go to your Control Panel's Virtual Machines menu to see an overview of all virtual machines in the cloud: their name, IP addresses, power status (with on/off buttons), and allocated disk size and RAM.
2. From here you also have quick access to the Statistics screen for each virtual machine, where you can see its CPU usage, and the Backups screen for each machine. Click the relevant icon in each case.

4.4   View VM details

To see detailed information about a specific virtual machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click a virtual machine's label (name) to access its details screen, where you'll see a range information and tools for that machine:

   VM information

   o   Hostname and login

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o Power status & On/Off buttons
o Template this VM is built on
o Resources for this VM
o Hypervisor, network and IP
o Owner
o Prices per hour
o Activity log

Tabs with additional tools

o **CPU Usage** - access usage charts
o **Network Interfaces** - shows the interfaces associated with that machine, and provides tools to add, edit and delete those interfaces from the machine, and to see bandwidth usage charts
o **IP Addresses** - Shows the address allocated to that machine, and provides tools to add and delete addresses
o **Console** - Provides a tool to open a VNC console to that machine
o **Disks** - Lists the disks allocated to that machine, and provides tools to add, delete and edit disks, and handle disk backups and schedules
o **Backups** - Lists the backups taken of that virtual machine, and provides tools to restore a backup, delete backups, and convert backups to templates.

ⓘ To make backups, use the tools on the Disks tab.

Actions (the exact list shown depends on VM status):

o **Startup Virtual Machine** - Queues a start-up action for a VM that's currently powered off.
o **Startup on Recovery** - Starts the VM in Recovery mode with a temporary login ("root") and password ("recovery").
o **Reboot Virtual Machine** - Powers off and then restarts the VM.
o **Shut Down Virtual Machine** - Terminates the VM forcefully.
o **Delete Virtual Machine** - Removes the VM from the system.
o **Suspend Virtual Machine** - Stops a VM, and changes its status to suspended.
o **Migrate Virtual Machine** - Pops up the VM migration dialogue, enabling you to move the VM to a different hypervisor.
o **Reset Root Password** - Resets the root password for this VM.
o **Rebuild Virtual Machine** - Pops up the VM rebuild dialogue, where you can rebuild the VM on the same (or another) template. All data will be lost!
o **Manage Disks** - Shortcut to the VM's Disks tab.
o **Manage Network Interfaces** - Shortcut to the VM's Networks tab.
o **Adjust Resource Allocation** - Opens the Adjust Resource Allocations screen for this VM.

o **Change Owner** - Pops up a dialogue box with a drop-down of all users on the system, enabling you to change ownership of the VM.

4.5   Firewall rules

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

• **ACCEPT** – defines the types of packets which will be accepted by a firewall
• **DROP** – specifies the packets which will be rejected by a firewall

To configure a rule:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the VM for which you want to configure a firewall rule.
3. Click the Networking -> Firewall tab.
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 is effective.
      • Leave the empty field to apply the rule to all ports
      • Enter colon-separated ports to apply the rule to a port range (e.g. 1024:1028)
      • Enter comma-separated ports to apply the rule to the list of ports (e.g. 80,443,21)

   e. Choose the protocol (TCP or UDP).

5. Save the rule.

ⓘ *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.*

To set rule priorities:

Because some rules can override each other, it is important to set the order in which they are processed. Use the up/down arrows next to a rule to set priority.

To edit or delete an existing firewall rule:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the machine to which you want to configure a firewall rule.
3. Click the Networking -> Firewall tab.
4. On the page that appears you'll see the list of all the rules:
   o Click the Edit icon next to a rule to edit its parameters.
   o To delete a rule from a VM, click the Delete icon next to a rule and confirm.

To set default firewall rules:

OnApp allows setting default firewall rules which will be applied to all IP addresses with all ports for all protocols. To set default firewall rules:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the machine to which you want to configure a firewall rule.
3. Click the Networking -> Firewall tab.
4. On the page that appears scroll down to the Default Firewall Rules section and set the following:
   o Choose the interface for which you want to define a rule.
   o Define a rule (Accept or Drop).

ⓘ Example: if you choose the network interface Int1 with the ACCEPT rule, it means that firewall set to Int1 network interface will accept all requests and packet types from all IPs. If you define the Int2 network interface with the DROP rule, the firewall of the Int2 will block all requests and packets addressed to it.

4.6   Back up & restore VMs

To back up a virtual machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the machine you want to back up.
3. Click the Disks tab. You'll see a list of the disks allocated to that virtual machine.
4. Click the Backups icon next to a disk. You'll see a list of all the backups taken and pending for that virtual machine, along with tools to restore backups, delete them, and convert them to templates.
   o To make a backup, click the Take Backup button at the end of the list.
   o To restore a backup, click the Restore link next to the backup you want to revert to.

4.7   Schedule VM backups

In addition to OnApp's autobackup presets, you can schedule backups of VMs (VM disks) as required. For example, you can set up a schedule to backup your disks once a week.

To add a backup schedule:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you want to schedule a backup for.
3. Click the Disks tab.
4. On the screen that appears, click the Schedules icon next to the disk you want to backup.
5. On the screen that follows, click the Add New Schedule button.
6. Next, enter a duration and choose a period from the drop-down menu: daily, weekly, monthly or yearly. The duration determines how frequently the backup will take place according to the period set. For example, a duration of 2 and a period of days will take a backup every 2 days.
7. Click the Save button to finish.

Editing and deleting backup schedules is handled through the Control Panel's Settings menu, in the Schedules section.

ⓘ The combination of Scheduled VM backups and Autobackup Presets (see Settings/Autobackup Presets) provide a great deal of flexibility in the way backups are handled for the cloud, and for individual VMs. Autobackup Presets can be applied to all new VMs added to the cloud. Scheduled VM backups enable specific backups to be scheduled for individual VMs, outside of the autobackup pattern.

4.8   VM storage (disks)

Virtual machine storage is provided by disks. A disk is a partition of a data store that is allocated to a specific virtual machine. 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 virtual machines are managed through the Control Panel's Virtual Machines menu.

4.9   Add disks to a VM

Adding a disk to a virtual machine will require that VM to be rebooted. If a VM 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 machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click a VM's label to open its details screen.
3. Click the Disks tab.
4. Click the Add New Disk button.
5. Fill in the details:

o Choose the Data Store to create a disk on from the drop-down menu.

o Set the desired disk size.

o Specify if this disk is swap space, and requires formatting.

o Specify whether the disk should be added to Linux FSTAB, and its mount point.

6. Click the Add Disk button.

ⓘ When you add a new disk to a virtual machine it will automatically become available to that machine. However, no configuration is changed on the virtual machine itself, so you may need to manually mount the drive.

4.10 Resize VM disks

You can easily resize disks when needed. The resize will fail if your current usage is greater than the new size you request.

To change disk size:

1. Go to your Control Panel's Virtual Machines menu.
2. Make sure your virtual machine is powered off, then click its label to open its details screen.
3. Click the Disks tab.
4. Click the Edit icon next to the disk you want to change.
5. Enter a new disk size in GB in the field provided.
6. Click the Save Disk button.

4.11 Adjust (resize) VM resources

You can adjust CPU and RAM resources for all VMs. Depending on the OS it is built on, some VMs can have their CPU and RAM resized without needing to be powered off ("resize without reboot").

ⓘ Windows 2008 and Windows 7 VMs can be resized without rebooting: Windows 2003 requires a reboot. 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 VM CPU & RAM resources:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the machine you want to resize, to show its details screen.
   Click the Adjust Resource Allocation link in the Actions section of the details screen.
3. Change CPU core/priority and RAM values , and click the Save Virtual Machine button:
   o If the VM template allows resize without reboot, the resize should be completed automatically: you will be returned to the VM details screen and see a message indicating the resize was successful.

o   If the template does not allow this, you will be asked to confirm that the VM will need rebooting so that the resize can take place.

4.12 Autoscale a VM

VM autoscaling allows you to automatically increase the RAM, CPU and disk size of a virtual machine. VM resources are scaled based on rules you specify. For example, you can set up a rule that will add 1000MB of memory to a VM if RAM usage has been above 90% for the last 10 minutes - but add no more than 5000MB in total in 24 hours.

ⓘ *For Linux-based VMs only.*

If the VM template allows resizing without reboot - see the "Adjust (resize) VM resources" section – then virtual machine RAM and CPU will be increased without VM reboot. Disk space autoscaling requires a VM reboot.

To configure autoscaling:

1.   Go to your Control Panel's Virtual Machines menu.
2.   Click the label of the appropriate VM.
3.   On the page that follows, click the Autoscaling tab.
4.   Add autoscaling rules, explained below:
   - If RAM usage exceeds X% for a specific time period, add Y MB – but no more than Z MB in a 24 hour period.
   - If CPU usage exceeds X % for a specific time period, add Y% - but no more than Z% in a 24 hour period.
   - If disk usage exceeds X % for a specific time period, add Y GB - but no more than Z GB in a 24 hour period.
5.   Click Apply.

To delete an autoscaling rule:

1.   Go to your Control Panel's Virtual Machines menu.
2.   Click the label of the appropriate VM.
3.   On the page that follows, click the Autoscaling tab.
4.   Click Delete. This will delete all autoscaling rules.

4.13 Delete VM disks

To delete a disk:

1.   Go to your Control Panel's Virtual Machines menu.
2.   Make sure your virtual machine is powered off, then click its label to open its details screen.

3. Click the Disks tab.
4. Click the Delete icon next to the disk you want to delete.

4.14 Migrate VMs

OnApp allows hot and cold migration of virtual machines between hosts that share common data stores. Hot migration means moving virtual machines that are running, while cold migration means moving virtual machines that are shut down.

ⓘ Hot migration is not available for virtual machines based on Windows 2003. They must be cold migrated (that is, once they have been shut down).

To hot migrate a virtual machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you want to migrate.
3. In the Actions section, click the Migrate Virtual Machine link.
4. In the window that appears, choose the target hypervisor from the drop-down menu.
5. Click the Start to Migrate button.

After migration, the Power status of your virtual machine remains as it was before the move. If you migrate a virtual machine that's running, the whole process is almost unnoticeable.

OnApp administrators can control user access over virtual machine migration. Using OnApp permissions, you can allow/forbid users to perform migration of all virtual machines, or their own machines only. This is handled in the Control Panel's Users and Groups menu.

4.15 View VM CPU utilization

OnApp tracks CPU usage for virtual machines and generates charts that help analyze VM performance.

The charts show the total CPU usage for all the cores of this particular VM for a specified time period. The vertical axis has a scale of 0.0-X.0, where 0.0 is 0% and X.0% is 100% of CPU utilization - X depends on the total number of cores used by the VM. The horizontal axis defines a time period.

To see CPU usage statistics:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. Click the CPU Usage tab.
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. 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 hypervisor CPU resource a VM takes, go to your Control Panel's Virtual Machines menu and click the label of the VM you're interested in. On the screen that appears, the CPU Priority will show the amount of CPU resource given to this VM.

4.16 View VM network utilization

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

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. Click the 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.

4.17 View VM IOPS

OnApp tracks IOPS (Input/Output Operations per Second) for virtual machines and generates charts that help analyze VM disk performance. To see IOPS for a virtual machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. Click the Disks tab.
4. Click the Statistics (chart) icon next to the disk you're interested in. 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
5. 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.

4.18 VM integrated console

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

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

4.19 Segregate a VM

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

To isolate one VM from another:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you want to segregate.
3. On the screen that appears, scroll down to the Actions section and click Segregate Virtual Machine.
4. On the screen that pops up, use the drop-down menu to choose a VM you want to keep away from.
5. Click the Segregate VM button to finish.

4.20 VM Billing Statistics

OnApp has a record of all the charges applied to your VMs for the last three month period. If a virtual machine was created less than three months ago, statistics are recorded for the VM'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 machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. Click the Billing Statistics tab.
4. Set Start and End time. By default the statistics are generated for the last three months or the actual VM existence period.
5. On the page that appears:
   o **Date** – particular date and time for the generated statistics
   o **Users** – the virtual machine owner. Click the owner name to see the User Profile (user details)

- o **Virtual Machines** – the virtual machine name with the total due of the VM resources (CPU shares, CPUs, memory and template resources) for the point of time specified in the Date column.
- o **Network Interfaces** – the total due for the network interfaces used by this VM for the point of time specified in the Date column.. Click the network interface name to see its details.
- o **Disks** – the list of disks assigned to this VM 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.
- o **Costs** – the total due for the Virtual Machines, Network Interfaces and Disks resources for the point of time specified in the Date column.
6. Scroll down to see Total Amount (the total due for the whole billing statistics period).

4.21 VM transactions and logs

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

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

To view transactions for a virtual machine:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. The details screen for that virtual machine shows recent transactions in the VM Activity Log section.
4. To view transactions for the whole system:
   - o Go to your Control Panel's Logs menu.

- o The screen displayed lists all recent transactions, their status, what they relate to and any dependencies they have.
- o Click a transaction Ref number to see its details.

You can also search for transactions, clean logs, cancel tasks and clean all pending backups.

4.22 VM states

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

- o **Created** - A machine is created when you successfully Add New Virtual Machine from the Virtual Machines menu, having selected its template and set its properties, resources and network requirements.
- o **Build** - A Virtual Machine 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 machine automatically box during the creation process.
- o **Powered on** - A power on starts the virtual machine, its operating system and processes. You have to manually start a virtual machine after it has been created and built. To do this, click the Power On button for that machine on the Virtual Machines menu, or the details screen for that machine.
- o **Powered off** - A power off will attempt to gracefully shut down a virtual machine and its operating system, which typically involves terminating all running applications. If the operating system cannot be stopped, it will be forcefully terminated ("shut down"). To power off a machine, click its Power On button on the Virtual Machines menu, or the details screen for that machine.
- o **Shut down** - The VM has been terminated forcefully.
- o **Rebooted** - Rebooted means a virtual machine has been powered off, and then powered on again.
- o **Deleted** - When a virtual machine is deleted, its backups are still stored on the server and can be restored if required. By default, users can delete their own virtual machines. Administrators can delete any virtual machine. You can delete a machine using the Delete Virtual Machine link on its details screen.
- o **Re-built** - To rebuild a virtual machine means to reinstall the template and reconfigure the resources and network. All data will be lost.
- o **Failed** - A failed virtual machine is one that is down, for example because of hardware or network problems. You will have to start the machine manually when those problems have been solved.

4.23 Add an Administrator's note to a VM

You can add notes to your virtual machines with brief comments or reminders. For example, you can add a note indicating the first template from which this VM was built, or the date of VM creation.

To add (or edit) an administrator's note:

1. Go to your Control Panel's Virtual Machines menu.
2. Click the label of the virtual machine you're interested in.
3. On the screen that appears, scroll down to the Actions section and click Edit Administrator's note.
4. On the screen that pops up, enter your note and click Save Note.

5. Load Balancers

Load balancing aids application availability and scalability. There are two load balancing options in OnApp:

- **Load balancing clusters**
  With this option, you specify which VMs (nodes) will participate in a load balancing cluster. Incoming traffic is distributed evenly between all the VMs added to a cluster – you still present a single host name to end users, but they actually access the cluster of VMs rather than a single end point. This helps application availability: if one VM fails, traffic is automatically routed to another in the cluster. You can add and remove cluster VMs as required.

- **Virtual Machine Autoscaling**
  VM Autoscaling increases or decreases your VM 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.

5.1 Add a 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 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.)

   Load Balancer Instance

   - **Label** – give a name to your load balancer instance
   - **Hostname** – specify a host name that will identify your load balancer
   - **Port Speed** – use the slider to set a port speed or tick the Unlimited box if required

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Load Balancer Type

- o Choose the **Cluster** option

Cluster Nodes

This is where you add and configure the nodes in this load balancing cluster. A node is a combination of a VM and an IP address. Please note that you can only add VMs which are located in the same IP range to a cluster.

- o **Virtual Machines** – select a virtual machine from the drop-down box.

4. Click Save.

5.2   Add an 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.
3. On the page that follows, fill in the form that appears:

Cluster Configuration

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

Load Balancer Instance

- o **Label** – give a name for your load balancer instance.
- o **Hostname** – specify a host name which will identify your load balancer.
- o **Port Speed** – use the slider to set a port speed or tick the Unlimited box if required.

Load Balancer Type

- o Choose the **Autoscaling** option.

Cluster Node Template

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

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

Cluster Node Parameters

These are the settings for each node of a cluster. Each node added to a cluster will have the following parameters:

- o **Memory** – set the amount of memory allocated per node in MB.
- o **CPUs** – the number CPUs which will form each node.
- o **CPU Priority** – the node's CPU priority. For more info on CPU priority, refer to the *Create VMs* section.
- o **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.

4. Click Save.

5.3   View load balancer details

Load balancers are also virtual machines, so you can perform the same basic actions on them as for other VMs. To view load balancer details:

1. Go to your Control Panel's Load Balancers menu.
2. On the screen that appears, click the label of the Load balancer required.
3. You'll see the information on the load balancers with the range of tools available for the balancer:

LB information

- o Hostname and login
- o Power status & On/Off buttons
- o Template this LB is built on
- o Resources allocated to this LB
- o Hypervisor and IPs
- o Owner
- o Prices per hour
- o Administrator's note
- o Activity log

Tabs with additional tools

- o **Billing Stats** – Shows costs due for this LB for a specified time period
- o **Monitis monitors** – Shows the cluster load

Actions (the exact list shown depends on Balancer status):

- o **Startup Balancer** - Queues a start-up action for a Balancer that's currently powered off.
- o **Reboot Balancer** - Powers off and then restarts the Balancer.
- o **Shut Down Balancer** - Terminates the Balancer forcefully.
- o **Delete Balancer** - Removes the Balancer from the system.
- o **Suspend Balancer** - Stops a Balancer, and changes its status to suspended.
- o **Migrate Balancer** - Pops up the Balancer migration dialogue, enabling you to move the Balancer to a different hypervisor.
- o **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!
- o **Edit Administrator's Note** – Add a brief comment or reminder for a Balancer.
- o **Monitis Monitors -** Shows the cluster load.

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

5.4   Edit/delete a load balancer

To edit a load balancer:

1. Go to your Control Panel's Load Balancers menu.
2. Click the Edit icon next to a required load balancer.
3. When the page loads, edit necessary parameters and click Save.

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. When the confirmation window pops up, click OK.

6. Hypervisors

Hypervisors provide hardware resources for virtual machines. Each virtual machine in the cloud is hosted by a specific physical hypervisor server, from which it receives CPU time, RAM and storage capacity from the Data Stores attached to that hypervisor.

Hypervisors can also be organized into Hypervisor zones, which make it easy to offer tiered service levels and create private clouds for specific users.

6.1   View hypervisors

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

1. Click your Control Panel's main Hypervisors menu to see a list of all hypervisors in your cloud, and a quick overview of their:
   o   Name (label)
   o   Type (Xen, KVM etc)
   o   IP address
   o   Zone
   o   CPU cores
   o   CPU resources used/available
   o   Total VMs hosted
   o   Total RAM/free RAM
   o   CPU speed

   You can also see the hypervisors assigned to a specific hypervisor zone, by clicking the hypervisor zone name underneath the main Hypervisors menu.

6.2   View hypervisor details

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

1. Go to your Control Panel's Hypervisors menu (or click a hypervisor zone name underneath it). On the screen that appears you'll see a list of hypervisors.
2. Click a hypervisor's name (label) to see its hypervisor details screen:
   o   You'll see a list of all virtual machines hosted on that hypervisor, along with their IP address, power status, disk and RAM resources.

o   You have quick access to VM power on/off buttons, and can click the relevant icons to see VMs' backup schedule and CPU usage screens. You can also drill into a specific VM by clicking its label.

o   Finally, the Actions section of the hypervisor details screen offers buttons to Edit and Reboot that hypervisor.

6.3   Edit hypervisor details

You can edit hypervisor details (its type, IP address and so on) via the hypervisor details screen, or through the Control Panel's Settings/Hypervisors menu (see the relevant section under Settings in this guide for details: the editing functionality is the same whichever method you choose.)

To edit hypervisor details:

1.   Go to your Control Panel's Hypervisors menu (or click a hypervisor zone name underneath it). On the screen that appears you'll see a list of hypervisors.
2.   Click a hypervisor's name (label).
3.   Scroll down to the Actions section.
4.   Click the Edit Hypervisor link.
5.   On the screen that follows, change details as required:
     o   The hypervisor's name (label)
     o   Its type (Xen, KVM etc)
     o   Whether it's enabled or not (hypervisors that are not enabled cannot be used to host VMs)
     o   Its IP address
     o   Memory overhead
6.   Click the Save Hypervisor button to save your changes.

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

6.4   Reboot hypervisors

To reboot a hypervisor:

1.   Go to your Control Panel's Hypervisors menu (or click a hypervisor zone name underneath the main hypervisor menu link).
2.   Click the label (name) of the hypervisor you want to reboot.
3.   On the hypervisor details screen that follows, scroll down to the Actions section and click the Reboot Hypervisor button.
4.   A new screen will open asking for confirmation (via two checkboxes) before reboot:
     o   **Stop all virtual machines that cannot be migrated to another hypervisor?** Check this box if you want VMs that cannot be migrated to be powered off. When a hypervisor is scheduled for a reboot, OnApp will first attempt to hot migrate all VMs it hosts. If hot migration is not

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possible for a VM, OnApp will attempt to cold migrate that VM. With this box checked, if cold migration fails, the VM 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 VMs hosted by the hypervisor being rebooted – but will stop the migration process if any VM cannot be migrated.

- o **Are you sure you want to reboot this hypervisor?** A simple confirmation to confirm that you want the hypervisor to reboot.

5. When you're certain you want to proceed with the reboot, click the Reboot button.

6.5 Other hypervisor settings

Access to detailed hypervisor and hypervisor zone settings is handled in the Control Panel's Settings menu. These are explained in the Settings section of this guide.

7. Templates

OnApp templates are used to deploy virtual machines in your cloud. A template is a fully pre-configured 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.

There are two different kinds of template:

- **System templates**
  These are provided by the OnApp team and downloaded from the 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.

- **Custom/user templates**
  These are templates you create by backing up an existing virtual machine, and converting that backup to a template. This allows you to pre-configure virtual machines (for example with specific OS settings, or pre-installed applications) and use the same configuration time after time.

  The OnApp template library includes over 100 VM templates based on various 32-bit and 64-bit flavours of Windows and Linux operating systems. OnApp customers can also access a large number of JumpBox virtual appliances and deploy them as templates in OnApp. For the latest list see: http://onapp.com/how-it-works/vm-templates

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

7.1   View template details

The Control Panel's Templates List menu lists 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 machine based on that template ("resize without reboot").

The templates are organized into three tabs:

- **System templates** - the OS images provided by OnApp.
- **Custom/User templates** - the templates converted by users from VM backups.
- **Inactive templates** - the templates that are currently unavailable to build VMs on.

To see which virtual machines are based on a specific template:

1. Click the main Templates menu in the control panel to bring up the list of templates.
2. Click the template's label (name) in the list.

7.2   Edit template details

You can edit a range of template details through the Control Panel, including minimum disk size required, version number, filename and label. To do so:

1. Go to your Control Panel's Templates menu. You'll see a list of templates on your system.
2. Click the Edit icon next to the template you want to change. On the screen that follows, enter template details as required:
   - Label – change the template name
   - Filename – edit the template filename
   - Version – the template version
   - Min disk size – the minimum VM disk size required to build a VM on this template (in Gb)
   - Min memory size – the minimum VM RAM required to build a VM on this template (in Mb)
3. Click the Save button to finish.

7.3   Delete system templates

To delete a template, go to the Control Panel's Templates menu and click the delete icon next to the template you wish to delete. When templates are deleted the virtual machines built from them will continue to run.

7.4   Create custom templates

You can create custom templates by making a backup of an existing virtual machine and saving it as a template for future use. To create a custom template:

1. Create a new virtual machine and configure it as you would like for your template.
2. Click the Backups icon for this virtual machine.
3. In the list of backups, click Convert to Template next to the backup you want to convert.
4. Click Ok to proceed.
5. On the next screen, enter a label for your template/backup, then click the Convert Backup button.
6. The backup will be scheduled for creation. When conversion is complete, it will be then listed on the Templates tab, from where you can edit it.

ⓘ If you update a custom template (by converting a more recent backup of a VM, for example) it will not update existing VMs built on the previous version. Only new VMs, or those that are rebuilt, will use the new template.

7.5   User template permissions

Administrators can set permissions that control whether other users can convert their backups into templates, use those templates and delete them. This is handled in the Control Panel's Users and Groups menu. To do so:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab.
3. Click the Edit icon next to the user type you want to manage.
4. Check or uncheck the box next to Create and Manage Templates.

7.6   Edit and delete custom templates

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

1. Go to your Control Panel's Templates menu. Your custom templates will be listed there.
2. Click the Edit icon next to the template you wish to edit, make your changes on the screen that follows, and click Save Template.
3. Click the Delete icon next to a template if you want to delete it.

7.7   Make templates public

The template list is divided into two sections. The "not active" templates at the end of the list can be moved into the public (visible) section at the top, as follows:

1. Go to your Control Panel's Templates menu.
2. Click the Make public icon next to the template you want to make public.

7.8   Allow users to make templates public

All custom templates are private by default, which means they are only available to the users who created them. As administrator, you can give users the right to create templates that are available to all users – i.e. to create public templates. This is handled through the Control Panel's Users and Groups menu:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab.
3. Click the Edit icon next to the role you want to edit.
4. On the screen that follows, check the box next to the Make own template public permission.

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7.9　Template groups

You can order all your templates into separate template groups. For this you have first create a group and then assign desired templates, which are available within your cloud, to this group. When you create template groups, you can use them as a paid resource for your billing plans.

To add a template group:

1. Go to your Control Panel's Template Store menu.
2. On the page that follows, click Add new template group button.
3. Give a name to your group.
4. Click Save.
5. On the page that appears, you'll be prompted to assign a template to a group.

To assign a template to a template group:

1. Go to your Control Panel's Template Store menu.
2. Click the name of the template group to which you wish to assign a template.
3. Choose the template from the drop-down box at the Add a template section.
4. Click Add a template to a group button to confirm.

To remove a template from a template group:

1. Go to your Control Panel's Template Store menu.
2. Click the name of the template group from which you wish to remove a template.
3. On the page that follows, click the Delete icon next to a necessary template.
4. Confirm.

To view/edit/delete a template group:

1. Go to your Control Panel's Template Store menu.
2. On the page that follows, you'll see the list of all template groups created within your cloud:
   o Click the template group label, to see the list of templates assigned to this group.
   o Click the Edit icon next to a questioned group to edit its name.
   o Click Delete icon to delete a group.

7.10　Template software licenses

To create a virtual machine from a template which is based on paid software, e.g. MS Windows OS, you must have a valid license first. The system verifies if you have a license, so you must first upload the licenses which you have earlier bought from a software vendor to OnApp and then create a VM.

To add a license to OnApp:

1. Go to your Control Panel's Software Licenses menu (Templates section).
2. Click Add new License button.

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

To view license details:

1. Go to your Control Panel's Software Licenses menu (Templates section). The page that follows will list all the licenses you've added to your OnApp installation with their details:
    o **Label** – the license name specifying the OS distribution, architecture and edition, e.g. Windows 2008 R2 x64 STD/ENT
    o **License** - the license code
    o **Total** - the number of VMs allowed by the license
    o **Count** - the number of licenses used

To edit/delete an existing license:

1. Go to your Control Panel's Software Licenses menu (Templates section). The page that follows will list all the licenses you've added to your OnApp installation.
2. Click the edit/delete icons next to the license you're interested in.

8. Logs

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

To access and manage logs:

1. 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 end of the list.
   - Click Clean Logs to completely clear the log.
   - Click Cancel All Pending Tasks to cancels all tasks scheduled for completion.
   - Click Clean All Pending Backups to remove all pending backups from the log.

9. Settings

The Control Panel's Settings menu is where you get detailed control over low-level cloud settings for hypervisors, data stores, disks, networks, resolvers, schedules, backups and the configuration of OnApp itself.

9.1   Hypervisor settings

Hypervisors are a critical part of the cloud. You should only change hypervisor settings if you're absolutely sure you know what you're doing.

9.1.1   Add hypervisors

You can add more physical hypervisors at any time. To add a hypervisor:

1. Go to your Control Panel Settings menu.
2. Click the Hypervisors icon.
3. Click the Add New Hypervisor button underneath the list of Hypervisors on the screen.
4. Add the IP and label on the screen that appears.
5. Specify a memory overhead (MB) (see ⓘ note below).
   Choose a hypervisor type and whether the hypervisor is enabled or not (hypervisors that are not enabled cannot be used to host VMs).
6. Click the Add Hypervisor button. The hypervisor will be added to the system. You can view it under the Hypervisor menu.

ⓘ A memory overhead is the amount of memory that a hypervisor itself is using besides the memory allocated to virtual machines. Its size depends on the number of virtual CPUs, VMs guest memory, and includes memory allocated to Xen Dom0.

Example calculation:

XEN memory overhead consists of the following parts:

- o *Dom0 memory (400 Mb).. This is a standard value.*
- o *64 Mb for Xen itself.*
- o *1 Mb for each virtual CPU.*
- o *8 Kb for each 1 Mb of virtual machine RAM.*

If we have 1 VM with 2 Gb Ram and 4 virtual CPUs, then:

- o *Dom0 memory = 400Mb +64Mb (this is a standard minimum value, though you can allocate more)*

o 1Mb x 4 vCPUs = 4

o 2048 x 8/1024 = 16

XEN memory overhead = 464 + 4 + 16 = 484 Mb

The calculation is the same for KVM hypervisors.

9.1.2 Edit hypervisors

To edit a hypervisor:

1. Go to your Control Panel's Settings menu.
2. Click the Hypervisors icon.
3. Click the Edit icon next to the Hypervisor you want to edit.
4. On the screen that follows, change details as required:
   o The hypervisor's name (label).
   o Its IP address.
   o Its type (Xen, KVM etc).
   o Whether it's enabled or not (hypervisors that are not enabled cannot be used to host VMs).
5. Click the Save Hypervisor button to save your changes.

9.1.3 Delete hypervisors

Hypervisors can be removed from your cloud if required. A hypervisor cannot be removed until all of the virtual machines assigned to it are migrated to another hypervisor.

To remove a hypervisor:

1. Go to your Control Panel Settings menu.
2. Click the Hypervisors icon.
3. Click the Delete icon next to the hypervisor you want to delete.

9.1.4 User hypervisor permissions

OnApp administrators can control users' ability to manage hypervisors. This is handled through the Control Panel's Users and Groups menu. You can set the following hypervisor permissions for user roles:

o Any action on hypervisors
o Create a new hypervisor
o Remove any hypervisor
o See all hypervisors
o Update any hypervisor

o   Reboot any hypervisor
o   Hide hypervisors on VM creation

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions, then click the Save button.

9.2 Hypervisor zone settings

Hypervisor zones can be used to create different tiers of service - for example, by setting up different zones for high-performance hypervisor servers, with different prices for virtual machines deployed on that zone.

Hypervisor zones can have data stores and networks attached to them. The combination of hypervisor, data store and network groups can be used to create private clouds for customers.

9.2.1 Create hypervisor zones

To create a new hypervisor zone:

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the Add New Hypervisor Zone button.
3. On the screen that follows, give your hypervisor zone a name (label) and then click the Save button.

9.2.2 View, edit and delete hypervisor zones

To view hypervisor zones:

1. Go to your Control Panel's Settings menu, and click the Hypervisor Zones icon.
2. The screen that appears will show all zones currently set up in the cloud. These zones will also show under the main Hypervisors menu in the Control Panel.
3. Click a zone's label (name) to see details of the zone and to access the functions for adding/removing hypervisors to/from the zone.
    o   Click the Edit icon next to a zone to change its name.
    o   Click the Delete icon next to a zone to remove it from the cloud. You'll be asked for confirmation before the zone is removed.

9.2.3 View hypervisor zone details

To view details of a hypervisor zone:

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the label of the zone you're interested in. The screen that follows shows details of that zone:
   o Its name
   o Actions to Edit Hypervisor Zone (change its name), Manage Data Stores and Manage Networks
   o A list of hypervisors assigned to the zone
   o A list of hypervisors in the cloud that are not assigned to the zone

9.2.4 Add hypervisors to a hypervisor zone

To add a hypervisor to a zone:

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the label of the zone you want to add a hypervisor to. The screen that appears will show you all hypervisors in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the unassigned list, find the hypervisor you want to add to the zone, and click the Add icon next to it.

9.2.5 Remove hypervisors from a hypervisor zone

ⓘ You can only remove a hypervisor from a hypervisor zone if it currently hosts no virtual machines.

To remove a hypervisor from a zone:

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the label of the zone you want to remove a hypervisor from. The screen that appears will show you all hypervisors in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the assigned list, find the hypervisor you want to remove, and click the Delete icon next to it.

9.2.6 Manage data stores for hypervisor zones

Data stores can easily be attached and removed from hypervisor zones.

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the label of the hypervisor zone you want to manage data stores for.
3. On the screen that appears, click the Manage Data Stores link in the Actions section.

4. On the screen that follows you'll see a list of all data stores currently associated with this hypervisor zone.
    o To remove a data store from the zone, click the Delete icon next to it. You'll be asked for confirmation before the store is removed.
    o To add a new data store, choose one from the drop-down menu and click the Add Data Store button.

9.2.7 Manage networks for hypervisor zones

Networks can easily be attached and removed from hypervisor zones.

1. Go to your Control Panel's Settings menu and click the Hypervisor Zones icon.
2. Click the label of the hypervisor zone you want to manage data stores for.
3. On the screen that appears, click the Manage Networks link in the Actions section.
4. On the screen that follows you'll see a list of all networks currently associated with this hypervisor zone.
    o To remove a network, click the Delete icon next to it. You'll be asked for confirmation before the network is removed.
    o To add a new network, choose one from the drop-down menu, enter its interface name (eth0, eth1) and click the Add Network button.

9.2.8 User hypervisor zone permissions

OnApp administrators can control users' ability to manage hypervisor zones. This is handled through the Control Panel's Users and Groups menu. You can set the following hypervisor zone permissions for user roles:

o Any action on hypervisor zones
o See the list of all hypervisor zone
o See details of any hypervisor zone
o Create a new hypervisor zone
o Delete any hypervisor zone
o Update any hypervisor zone
o Hide Hypervisors on VM creation

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role. Change the role's permissions, then click the Save button.

9.3   Data store settings

Data stores provide disk space for your virtual machines and operating systems. Data stores are attached to hypervisors. Use caution when changing data store settings!

9.3.1   Add data stores

To add a data store:

1. Go to your Control Panel Settings menu.
2. Click the Data Stores icon.
3. Click the Add New Data Store link at the bottom of the screen.
4. On the screen that appears enter a label and IP address for your data store, and set the capacity.
   - If required, you can also disable the data store. When disabled, OnApp will not allow new disks to be created automatically on that data store. This is useful to prevent an established data store from becoming too full. It also lets you prevent the automatic creation of root disks on 'special' data stores (high speed, etc).
   - If required, you can also bind the data store with a local hypervisor. This is helpful if you wish that the data store and a hypervisor were located on the same physical server thus decreasing the time needed for a hypervisor-data store connection.
   - If required, you can also assign the data store to a data store zone. The drop-down menu lists all data store zones set up in the cloud (to add or edit data store zones, see the section on Data store zones in the Settings section of this guide)
5. When you've finished configuring the store, click the Add Data Store button.

9.3.2   View data stores

To view all data stores on your cloud:

1. Go to your Control Panel Settings menu.
2. Click the Data Store tab. The screen that appears lists all data stores currently available.

9.3.3   Edit data stores

To edit a data store:

1. Go to your Control Panel's Settings menu.
2. Click the Data Store icon. You'll see a list of the data stores on your system.
3. Click the Edit icon next to the store you want to change.
4. As required, change the data store's label, IP address, disk capacity and data store zone, and whether the store is enabled or disabled.

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5. Click the Save Data Store button to finish.

9.3.4 Delete data stores

To delete a data store:

1. Go to your Control Panel's Settings menu.
2. Click the Data Store icon.
3. You'll see a list of the data stores on your system.
4. Click the delete icon next to the data store you want to delete. You'll be asked for confirmation before the store is deleted.

9.3.5 User data store permissions

OnApp administrators can control user access to data store management. To do so:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role. Change the role's permissions as required to allow or forbid users to:
   o Perform any action on data stores
   o See all data stores
   o Create a new data store
   o Update any data store
   o Delete any data store
4. Click the Save button to finish.

9.4 Data store zone settings

Data store zones can be used to create different tiers of service – for example, by setting up different zones for ordinary and high-performance SANs in the cloud. Zones can also be used to create private clouds for specific users.

9.4.1 Create a data store zone

To create a new data store zone:

1. Go to your Control Panel's Settings menu and click the Data store zones icon.

2. Click the Add New Data store zone button.
3. On the screen that follows, give your data store zone a name (label) and then click the Save button.

9.4.2 View, edit and delete data store zones

To view/edit/delete data store zones:

1. Go to your Control Panel's Settings menu, and click the Data store zones icon.
2. The screen that appears will show all data store zones currently set up in the cloud.
   o Click a zone's label (name) to see details of the zone and to access the functions for adding/removing data stores to/from the zone.
   o Click the Edit icon next to a zone to change the zone's name.
   o Click the Delete icon next to a zone to remove it from the cloud. You'll be asked for confirmation before the zone is removed.

9.4.3 View data store zone details

To view details of a data store zone:

1. Go to your Control Panel's Settings menu and click the Data store zones icon.
2. Click the label of the zone you're interested in. The screen that follows shows details of that zone:
   o Its name
   o A list of data stores assigned to the zone
   o A list of data stores in the cloud that are not assigned to the zone

9.4.4 Add data stores to a data store zone

To add a data store to a zone:

1. Go to your Control Panel's Settings menu and click the Data Store Zones icon.
2. Click the label of the zone you want to add a data store to. The screen that appears will show you all data stores in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the unassigned list, find the data store you want to add to the zone, and click the Add icon next to it.

9.4.5 Remove data stores from a data store zone

To remove a data store from a zone:

1. Go to your Control Panel's Settings menu and click the Data Store Zones icon.
2. Click the label of the zone you want to remove a data store from. The screen that appears will show you all data stores in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the assigned list, find the data store you want to remove, and click the Delete icon next to it.

9.4.6 User data store zone permissions

OnApp administrators can control user access to data store zones management. To do so:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role. Change the role's permissions as required to allow or forbid users to:
   o Create a new data store zone
   o See details of any data store zone
   o Delete any data store zone
   o See all data store zones
   o Perform any action on data store zones
   o Update any data store zone
4. Click the Save button to finish.

9.5 Disk settings

The disk settings screen lets you view, edit and delete every disk in the cloud, and provides quick access to their backup and schedule functions.

9.5.1 View and edit disks

The main disk settings screen shows all disks in the cloud, their ID number, size, the data store they're configured on, the virtual machine they're assigned to, their type, status and backup status.

o Use the Yes/No buttons to change their autobackup status.
o Click the Edit icon next to a disk to change its size.
o Click the Backups icon next to a disk to view its backups, and to take a new one.
o Click the Schedules icon next to a disk to view its scheduled backups and to add a new schedule.
o Click the Delete icon next to a disk to delete it. You'll be asked for confirmation before the disk is removed.

9.5.2 User disk permissions

OnApp administrators control user access to disk management. This is handled through the Control Panel's Users and Groups menu. You can set the following disk management permissions for user roles:

Allow/forbid users to perform any action on disks

- o See all disks
- o See own disks
- o Autobackup any disk
- o Autobackup own disk
- o Create a new disk
- o Update any disk
- o Update own disk
- o Unlock any disk
- o Delete any disk
- o Delete own disk

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions for disks as required, then click the Save button.

9.6 Resolver settings

OnApp Resolvers work like DNS servers – they translate a hostname to an IP address.

ⓘ You should specify at least 2 resolvers for each network in OnApp. When a new VM is provisioned, these resolvers are injected into the resolver configuration automatically.

9.6.1 View resolvers

To view the resolvers on your system:

1. Go to your Control Panel's Settings menu.
2. Click the Resolvers icon. The screen that appears lists all resolvers set up for your cloud.

9.6.2 Edit resolvers

To edit an existing resolver:

1. Go to your Control Panel's Settings menu.

2. Click the Resolvers icon.
3. Click the Edit icon next to the resolver you want to change.

9.6.3 Deleting resolvers

To delete an existing resolver:

1. Go to your Control Panel's Settings menu.
2. Click the Resolvers icon.
3. Click the Delete icon next to the resolver you want to change. You will be asked for confirmation before the resolver is removed.

9.6.4 User resolver permissions

OnApp administrators control how users can manage resolvers. This is handled through the Control Panel's Users and Groups menu. You can set the following resolver permissions for user roles:

- o Create a new resolver
- o Perform any action on resolvers
- o Remove any nameserver
- o Update any nameserver settings
- o See all nameservers

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions for resolvers as required, then click the Save button.

9.7 Network settings

OnApp enables you to modify network configurations quickly and easily. Use caution when changing network settings.

9.7.1 View networks

To view the networks currently available in your cloud:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon.
3. The screen that appears shows every network available in your cloud.

o   Click a network's label to show details of IPs assigned to that network, and to add new IP addresses.

o   Click the Edit icon to change the network's label, VLAN and network zone settings.

9.7.2   Add new networks

To add a new network:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon: the screen that appears shows every network available in your cloud.
3. Click the Add New Network button at the end of the list.
4. On the screen that follows, give the new network a name (label), a VLAN number, and assign it to a network zone if required.
5. Click the Add Network button to finish.

ⓘ The network label is simply your choice of a human-readable name – "public", "external", "1Gb", "10Gb" etc. The VLAN field only needs to be given a value if you are tagging the IP addresses you will add to this network with a VLAN ID (IEEE 802.1Q). If you plan to tag IP addresses in this way, you need to make sure the link to the public interface on the hypervisors is a trunked network port. If you are not VLAN tagging addresses, this field can be left blank and the public port on the hypervisor can be an access port

ⓘ Once you have added a network to OnApp you will need to add an IP address range to the new network.

9.7.3   Add IP address(es) to a network

Once a network has been added you need to add IP addresses to that network. To do so:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon: the screen that appears shows every network available in your cloud.
3. Click the name (label) of the network you want to add addresses to.
   On the screen that follows you'll see a list of all IP addresses currently assigned to this network.
4. Click the Add New IP Address button at the bottom of the screen, and complete the form that appears:
   o   IP Address - To add a range or a subnet, use the format 192.168.0.2-254, or 192.168.0.15/29
   o   Netmask
   o   Gateway - Enter a single IP to specific a gateway. If you leave this blank the address will be added without a gateway.
   o   Don't use on guest during build - If you tick this box, the IP addresses you add will never be assigned as primary IPs. Primary IPs are only allocated to VMs when the VM is built, so with this box ticked, the address range will never be assigned to a newly built VM.
5. Click the Add Network button to finish.

9.7.4 Edit networks

To change the name, VLAN or network zone of an existing network:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon.
3. Click the Edit icon next to the network you want to change.
4. Change its details on the screen that follows, then click the Save Network button.

ⓘ The network label is simply your choice of a human-readable name – "public", "external", "1Gb", "10Gb" etc.

The VLAN field only needs to be given a value if you are tagging the IP addresses you will add to this network with a VLAN ID (IEEE 802.1Q). If you plan to tag IP addresses in this way, you need to make sure the link to the public interface on the hypervisors is a trunked network port. If you are not VLAN tagging addresses, this field can be left blank and the public port on the hypervisor can be an access port.

9.7.5 Delete networks

To delete an existing network, so it is no longer available as a cloud resource:

1. Go to your Control Panel's Settings menu.
2. Click the Networks icon.
3. Click the Delete icon next to the network you want to remove. You will be asked for confirmation before the network is deleted.

9.7.6 User network permissions

OnApp administrators control how users can manage network resources. This is handled through the Control Panel's Users and Groups menu.

You can set the following network management permissions for user roles:

- o Perform any action on networks
- o See all networks
- o Create a new network
- o Update any network settings
- o Remove any network

To do so:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.

4. Change the role's permissions for networks as required, then click the Save button.

9.8 Network zone settings

Network zones can be used to create different tiers of service – for example, by setting up different zones for different network resources in the cloud. Zones can also be used to create private clouds for specific users.

9.8.1 Create network zones

To create a new network zone:

1. Go to your Control Panel's Settings menu and click the Network zones icon.
2. Click the Add New Network zone button.
3. On the screen that follows, give your network zone a name (label) and then click the Save button.

9.8.2 View, edit and delete network zones

To view network zones:

1. Go to your Control Panel's Settings menu, and click the Network zones icon.
2. The screen that appears will show all network zones currently set up in the cloud.
3. Click a zone's label (name) to see details of the zone and to access the functions for adding/removing networks to/from the zone.
   o Click the Edit icon next to a zone to change the zone's name.
   o Click the Delete icon next to a zone to remove it from the cloud. You'll be asked for confirmation before the zone is removed.

9.8.3 View network zone details

To view details of a network zone:

1. Go to your Control Panel's Settings menu and click the Network zones icon.
2. Click the label of the zone you're interested in. The screen that follows shows details of that zone:
   o Its name
   o A list of networks assigned to the zone
   o A list of networks in the cloud that are not assigned to the zone

9.8.4   Add networks to a network zone

To add a network to a zone:

1. Go to your Control Panel's Settings menu and click the Network Zones icon.
2. Click the label of the zone you want to add a network to. The screen that appears will show you all networks in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the unassigned list, find the network you want to add to the zone, and click the Add icon next to it.

9.8.5   Removing networks from a network zone

To remove a network from a zone:

1. Go to your Control Panel's Settings menu and click the Network zones icon.
2. Click the label of the zone you want to remove a network from. The screen that appears will show you all networks in the cloud, organized into two lists – those assigned to the zone already, and those that are unassigned.
3. In the assigned list, find the network you want to remove, and click the Delete icon next to it.

9.8.6   User network zone permissions

OnApp administrators control a user's ability to manage network zones. This is handled through the Control Panel's Users and Groups menu.

You can set the following network zone management permissions for user roles:

o   Allow/forbid users to perform any action on network zones
o   See all network zones
o   Create a new network zone
o   See details of any network zone
o   Remove any network zone
o   Update any network settings

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions for network zone as required, then click the Save button.

9.9   Schedule settings

The schedules settings screen lets you view, edit and delete all backups scheduled for virtual machines in the cloud. When a schedule is no longer needed, we recommend deleting it so that the task will no longer run.

9.9.1   View, edit and delete schedules

To view, edit and delete schedules:

1. Go to your Control Panel's Settings menu.
2. Click the Schedules icon to see a list of all schedules on the system.
o   Click the Delete icon next to a schedule to remove it.
o   Click the Edit icon next to a schedule to change its frequency.

9.9.2   User schedules permissions

OnApp administrators control users ability to manage schedules. This is handled through the Control Panel's Users and Groups menu. You can set the following schedule management permissions for user roles:

o   Create a new schedule
o   See all schedules
o   Perform any action on schedules
o   See own schedules
o   Remove any schedule
o   Update any schedule
o   Remove own schedules
o   Update own schedules

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions for schedules as required, then click the Save button.

9.10   Autobackup preset settings

Autobackup presets are a simple way to set up an automatic backup schedule when Virtual Machines are created. Once configured, they can be applied to a VM automatically when the Automatic Backups Required box is checked during VM creation.

A number of preset backup time periods are available (daily, weekly, monthly and annual backups) which are configured further by specifying how often each backup is taken. So, for example, you can set up automatic backups every 2 days, or every 1 month, or even every 12 months (the same as every 1 year). Each type of backup can be enabled or disabled.

To view and edit autobackup presets:

1. Go to your Control Panel's Settings menu
2. Click the Autobackup Presets icon. You'll see a list of the presets available on the following screen, and whether they are enabled or not.
3. To change a preset, click its Edit icon, change the period and frequency, and decide whether that preset is enabled or not.
4. Click the Save button to finish.

ⓘ *The combination of Autobackup Presets and Scheduled VM backups provides a great deal of flexibility in the way backups are handled for the cloud, and for individual VMs. Autobackup Presets can be applied to all new VMs added to the cloud. Scheduled VM backups enable specific backups to be scheduled for individual VMs, outside of the autobackup pattern.*

9.11 Configuration settings

The configuration settings screen lets you change various aspects of your OnApp installation. To edit these OnApp configuration settings:

1. Go to your Control Panel's Settings menu.
2. Click the Configuration icon. Click the tabs to edit the relevant config settings (System, Backups/Templates, Interface) – these are explained in the subsections that follow.

9.11.1 Edit system configuration

1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. Click the System tab to change the following application settings:

Hypervisor

o **Number of requests before marked as failed** - determines how many times the Control Panel server will attempt to contact a hypervisor before failover is initiated.

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

Application updates

o **Update server URL** - the location OnApp software updates are downloaded from.

License info

- o **[key]** - the key for your OnApp installation. **Virtual machine console ports**

These are the ports used to remotely connect to virtual machines using the integrated VNC console.

- o Set the port range using the first and last port fields.

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

Email

This is where you configure OnApp to send email alerts for failed transactions and changes of hypervisor status.

- o **Send notification** - tick this to enable email alerts.
- o **System host** - enter a server IP or URL. Email alerts link to transaction logs for alert events, and those logs are opened from the server configured here.
- o **From** - enter an email address. This is the address from which help requests and email alerts are sent.
- o **To** - the email address to which the system will send alerts about failed transactions and change of hypervisor status.

Miscellaneous

- o **Config comment** - this text is added by OnApp to system configuration files, such as resolv.conf

CPU guarantee

- o Tick this box to make sure there is enough CPU on the system to create a new VM.

ⓘ *This prevents the system from creating VMs with more CPU than there is available for a hypervisor. For example, on a hypervisor with 4 CPU cores, with CPU guarantee enabled, you will only be able to create 4 VMs with 100% CPU priority. The system will not allow you to create a 5th VM.*

3. Click the Save Configuration button to finish.

9.11.2 Edit Backup/Template configuration

1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. Click the Backups/Templates tab to manage the following settings:

Paths

Sets paths for various OnApp files (shown here with default path examples)

- o **Templates** - /data/templates

o **Recovery templates** - /onapp/tools/recovery
o **Backups** - /data/backups
o **Data** - /onapp/data

Backup/template server

Backups and templates can be stored on a remote server or a mounted disk. To store backups & templates remotely, configure the following settings:

o **Use ssh file transfer** - tick this to allow secure file access, transfer and management to a remote server.
o **Server IP** - The address of the remote server.
o **User name** - The login used for remote server authentication. A password is not required, as it is required that you store a host key.
o **Options** - The ssh protocol options that set the rules and behavior of how to log into the remote server. By default, the options are set to omit adding new host keys to the host file, and skip password authentication. They also specify the path where the host key is stored. For a detailed list of configuration options, refer to ssh protocol man pages (under the -o option description. See http://unixhelp.ed.ac.uk/CGI/man-cgi?ssh+1).

Backup processes

o **Total number allowed** - the maximum number of hypervisor and data store backup processes allowed at once.
o **Total per data store** - if this number exceeds the overall total, the overall total limit will be enforced.
o **Total per hypervisor** - if this number exceeds the overall total, the overall total limit will be enforced.

ⓘ For example: if Total number allowed is 10, and Total per data store and Total per hypervisor are set to 5, then up to 10 backups can be taken at once is 10 – 5 per data store, and 5 per hypervisor.

3. Click the Save Configuration button to finish.

9.11.3 Edit Interface configuration

1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. Click the Interface tab to change the following application settings:

AJAX update rates (ms)

o **VM status** - how often VM status is refreshed on the Virtual Machines screen.
o **Dashboard/logs/other** - how often the dashboard, logs and other items are refreshed.
o **Number per page for** - set how many entries the Control Panel will display for the following:

- o Virtual Machines
- o Hypervisors
- o Logs (how many log entries the Logs page will display)
- o Transactions (how many entries the API request will output)
- o Templates
- o Network
- o IP Addresses
- o Billing Plans
- o Permissions
- o Disks
- o Schedules
3. Click the Save Configuration button to finish.

9.11.4 Edit defaults configuration

1. Go to your Control Panel's Settings menu, and click the Configuration icon.
2. Click the Defaults tab to change the following application settings:

New Virtual Machines

- o **Default VM OS** - choose the default OS used for VM creation, shown on the Add a new virtual machine page.
- o **Default VM Template** - choose a particular OS template as the default for VM creation. A new virtual machine will be created using this template, unless otherwise set in the wizard.

Firewall

- o **Default firewall policy** – choose Accept or Drop as the default setting for a VM's Networking > Firewall tab.

3. Click the Save Configuration button to finish.

10. Localization and customization

You can easily adapt the Control Panel to your requirements by translating to different custom languages, adding new currencies and currency formats, and changing images, colors, names and titles. You can also assign differently localized/customized Control Panel views to different users. This chapter explains all of this functionality.

10.1 Languages

OnApp uses a standard Rails I18n internationalization system. You can add any language to your Control Panel and translate all the interface labels, error messages and other texts into a single custom language or several languages.

10.1.1 Add custom languages

You can add custom languages in two ways:

- Translate the .yml language files of your installation.
- Translate the phrases using Control Panel UI.

To translate the .yml language files:

1. Go to the /onapp/interface/config/locales directory of your OnApp installation.
2. Translate the files that are located in this directory:
    - en-currency.yml – currency details
    - en-flash.yml – error messages and warnings
    - en-helpers.yml - some interface labels of several templates
    - en-models.yml – the attributes of the models (for VM model it is CPU, RAM, shares etc.)
    - en-permission.yml – user role permissions
    - en.mailer.yml – email alerts
    - en.yml – all other interface labels
3. Save the translated files as *your_language_code*.yml at /onapp/interface/config/locales. For example for German they will be de.yml, de.mailer.yml or de-flash.yml

Alternatively, you can translate the language files through your Control Panel UI:

1. Go to your Control Panel's Settings menu.
2. Click the appropriate custom language name.
3. On the screen that appears:
    - **Subset name** – the names correspond to the .yml files located at /onapp/interface/config/locales directory
    - **English Items** – the number of phrases in the original language files

- **Custom Language Items** – the number of translated phrases in the custom language files
- **Missing Items** – the number of phrases which haven't been translated yet to a custom language
- **Out of Date Items** – the number of phrases which have changed in English since the translation was made.

4. Click a subset name. On the screen that follows:
   - Provide a translation in the *Custom Language* Phrase field next to an appropriate English value. Click Update.
   - To copy the English value to a target custom language, click the arrow in the Copy column next to a required value.
   - Red rows indicate phrases that exist in English but are missing in your custom language.
   - Yellow rows indicate phrases that exist in English and your custom language, but where the English phrase has been changed since the last translation.
   - Green rows indicate phrases that exist in both English and your custom language, where the English version is still the same as when it was translated.

You can scroll through the list of phrases with the Previous/Next buttons at the bottom of the screen.

10.1.2 Enable a custom language for a specific user

Now that you have added one or more custom languages, you can specify which language a particular user will see in their view of the Control Panel. For this:

1. Go to your Control Panel's Users and Groups menu.
2. Click a user's name.
3. On the page that appears, click the Edit Profile tab.
4. Choose your custom language from the Locales drop-down list.
5. Click Save.

10.2 Currencies

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

10.2.1 Add currencies

To add a currency:

1. Go to your Control Panel's Settings menu.
2. Click the Currencies icon.
3. On the page that follows, click the Add New Currency button.

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4. Fill in the form that appears:
   - **name** - give the label to your currency
   - **unit** - insert a currency symbol
   - **code** - three-character currency code that is generally used to represent the currency you wish to add
   - **separator** - a character used to format decimal numbers, e.g 100.99.
   - **delimiter** - a grouping character used to separate thousands, e.g: 100,000,000.
   - **precision** - the number of digits after the delimiter.
   - **format** - set how the currency will be displayed in the control panel. Use the following parameters:
     - **%n** - for the digits
     - **%u** - for the currency symbol
5. Click Save.

ⓘ For example, the currency form for US Dollars might look as follows…

- *Name:*   *US Dollar*
- *Unit:*   *$*
- *Code:*   *USD*
- *Separator:*   *.*
- *Delimiter:*   *,*
- *Precision:*   *5*
- *Format:*   *%n %u*

…and the prices will be displayed in the following way: $7,000.00000

10.2.2 Edit/delete currencies

To edit and delete existing currencies:

1. Go to your Control Panel's Settings menu.
2. Click the Currencies icon.
   - To edit a currency, click the Edit icon next to it, edit its details on the screen that appears, then click the Save button.
   - To delete a currency, click the Delete icon next to the currency you want to remove. You will be asked for confirmation before the currency is deleted.

10.3 Look & feel

You can skin various aspects of the Control Panel's look & feel, including the logo displayed, background colors and other graphics. To do so:

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1. Go to your Control Panel's Settings menu and click the Look & Feel icon.
2. Click the Add a new theme button.
3. Use the fields provided to skin the UI, as explained below.

ⓘ Changes, including disabling and deleting UI elements, will not be applied unless the Enable Skin checkbox is ticked, and you click the Save Skin button at the bottom of the screen.

Theme properties

- o **Label** - give a name to your theme.
- o **Active** – use this checkbox to specify whether the theme is displayed or not. If this box is not checked, the default colors and graphics are used, irrespective of other settings.
- o **User Group** - check the groups of users for whom you wish to apply the theme.

General

- o **Application title** - enter the desired title which will be displayed at the top left corner of the browser window.

- o **Logo** - click the Browse button to choose a custom logo.
    - o Check the Disable box to prevent a logo from displaying.
    - o Check the Delete box to remove a custom logo.

- o **Favicon** - click the Browse button to choose a custom logo.
    - o Check the Disable box to prevent the favicon from displaying.
    - o Check the Delete box to remove a favicon.

- o **Images Folder** - this is name of the folder which you create to store alternative images (e.g. icons, buttons, breadcrumbs, etc).
    - o The folder should be created at the /public/images/custom location.
    - o Make sure the structure of the folder you created is the same as the structure of the images folder: the names and number of the folders should stay the same, except the custom folder.

- o **Powered by** - check the Hide box to remove the Powered by OnApp message at the top of the navigation pane.
    - o Enter an URL you wish to link to instead of http://www.onapp.com/.
    - o Specify the text which will be added after Powered by instead of OnApp.

- o **Background color** - this is the color displayed in the main body of the page (e.g. behind the fields you're currently editing).
    - o To change the color, click the field to pop up a palette chooser, or enter a CSS color code.

o To revert to the default color, leave this field blank.
o The color will not be displayed unless any full screen Background Image you're using is disabled.

o **Top background image** - click the Browse button to choose a custom image.
 o Check the Disable box to prevent the top background image displaying.
 o Check the Delete box to remove a custom image.

o **Footer background image** - click the Browse button to choose a custom image.
 o Check the Disable box to prevent the footer image displaying.
 o Check the Delete box to remove a custom image.

Wrapper

o **Background color** - this is the color displayed around the rest of the UI.
 o To change the color, click the field to pop up a palette chooser, or simply enter a CSS color code To revert to the default color, leave this field blank.
 o The color will not be displayed unless any full screen Background Image you're using is disabled.

o **Background image** - click the Browse button to choose a custom image.
 o Check the Disable box to prevent the top background image displaying.
 o Check the Delete box to remove a custom image.

o **Enable Skin -** this controls whether the skin is displayed or not. If this box is not checked, the default colors and graphics are used, irrespective of other settings.

o **Header&Footer HTML** - enter the html codes to display instead of default header and footer.

10.4 User customization and localization permissions

System administrators can control each user's ability to customize and localize the application. This is handled through the Control Panel's Users and Groups menu.

To set these permissions:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system on the following screen.
3. Click the Edit icon next to the relevant role.
4. Change the role's permissions as required, then click the Save button.

You can set the following permissions for user roles:

Internationalization

- o Enable internationalization locales (i18n.manage)

Currencies

- Any action with Currencies (currencies)
- The user can take any action on currencies
- Create new Currency (currencies.create)
- Delete any Currency (currencies.delete)
- See list of all Currencies (currencies.read)
- Update all Currencies (currencies.update)

Look & feel

- Any action on Themes (themes)
- User can make any action on themes
- Create Theme (themes.create)
- Destroy Theme (themes.delete)
- Read Theme (themes.read)
- Update Theme (themes.update)

11. Users and user groups

OnApp provides very fine control over cloud users and what they're allowed to do. You can set up as many different types of user as you need, and customize their access to cloud resources and Control Panel functions as required.

For example, standard, VIP and reseller users can have different capabilities and resource limits. You might provide basic cloud management functionality to L1 support staff (e.g. reboot virtual machines but not destroy them) while your L3 admins have full rights. Your development teams will probably need to deploy test VMs 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 and permissions and billing plans.

11.1 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 machines and hypervisors, 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.

11.1.1 View user account details

For a quick view of user account details, go to your Control Panel's Users and Groups menu. You'll see a list of all user accounts in your cloud, along with a brief summary of their account:

- o **Login/email**
- o **User role and group** - to edit a group, click its label. When a drop-down box appears, choose a desired group and press Enter.
- o **Virtual machines** – shows the list of all VMs owned by this user.
- o **Payments** - click to see the list of paid invoices.
- o **Billing plans** - click to see billing plan details.
- o **Monthly bills** - click to see the total amount of charges applied to this user for each month during the year specified in the drop-down box.
- o **Usage statistics** - click to see the billing details for a user. Refer to the View user account billing statistics chapter for details.

You can scroll through the list of users with the Previous/Next buttons at the bottom of the screen, as well as searching for a specific user.

To view detailed information about users account, click a user's name. The user details screen that appears shows the following information:

User details

- o **API key** - click Change key to generate a new key.

Billing details

- o **Billing plan** - click the plan label to see its details.
- o **Monthly price** - a set monthly price for a billing plan.
- o **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.
  - o Click the Details link to see the hourly billing statistics for all VM resources (CPU, CPU Share, Disk Size, Memory, IP Address, Virtual Machine, Template&Backup Storage, Disk size and IP Address) and Network interface usage (Data read/written, Input/Output requests, Port speed, Data received and Data sent), as well as total amount due for this user.
  - o Click the Monthly bills list to show the total due per each month of the year specified in the drop-down list.
- o **Payments** - the total amount of payments made.
- o **Hourly price** - shows the price for VMs, Load Balancers, and other resources per hour.

User role

User group

User payments - the list of payments with their details.

11.1.2 View, add & edit user payments

To view, add and edit payments for a user:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Payments link next to a user in the list to view all payments on the system for that user.
3. Click the Edit icon to change details of a specific payment.
4. Click the Add New Payment button at the end of the list to add a new payment.

11.1.3 View user account billing statistics

The system has a record of all the charges applied to your user account for the last three months period. If the account was created less than three months ago, the statistics is 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 and Groups 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. Set Start and End time. 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/Templates Cost** – the total due for the backups/templates used for all virtual machines
   - **Virtual Machines** cost – the total due for all the VMs minus Backups/Templates Cost (if any)
   - **Total cost** – the sum of Backups/Templates cost and Virtual Machines cost
   - **Resources cost** – the money owed per virtual machine for the following resources:
     - CPU
     - CPU Share
     - Disk Size
     - Memory
     - IP Address
     - Virtual Machine
     - Template&Backup Storage
     - Disk size
     - IP Address
   - **Usage cost** – the money owed per virtual machine for the following resource usage:
     - Data read/written
     - Input/Output requests
     - Port speed
     - Data received
     - Data sent
   - **Total** – the total due per virtual machine for Resources and Usage cost.

9.1.4 Whitelist IPs

An OnApp White List is a list of IPs from which a particular user has an access to control panel. By entering an IP to the white list, you thus restrict an access for this user from any other IPs that are not in the list.

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To whitelist an IP:

1. Go to your Control Panel's Users and Groups menu.
2. Click the name of the required user. You will see the User Profile page.
3. Click the White List tab.
4. On the page that appears, click Add new IP button.
5. Fill in the form that appears:
   o **IP** - an IP you wish to enter to the white list.
   o **Description** - any description (this may be a reason why you entered an IP to the list, etc.)
6. Click Add new IP.
7. Repeat steps 4-6 if you need to add more IPs to the white list.

To edit/delete a whitelisted IP, go to your Control Panel's Users and Groups -> User Profile page, click the White List tab and use the corresponding icons next to the questioned IPs.

11.1.4 Log in as a user

Administrators can log in as a user to see their view of the cloud. To do so:

1. Go to your Control Panel's Users and Groups menu. You'll see a list of all user accounts in your cloud.
2. Click the Login as user icon next to the user you'd like to log in as.
3. Your screen will refresh and you should now be logged in as that user.

ⓘ To return to your original view of the cloud, you'll need to log out and log back in with your own details.

11.1.5 Add new users

To add a new user:

1. Go to your Control Panel's Users and Groups menu. You'll see a list of all user accounts in your cloud.
2. Click the Add New User button at the bottom of the list.
3. Provide details on the screen that appears:
   o Login name
   o Password
   o Email address
   o User role
   o Billing plan
   o User group
   o First/Last names

4. Specify Auto-suspending options if any. You can configure the system to suspend a user at a definite time or in several hours after creation.
5. Click the Save button to finish.

11.1.6 Edit users

To edit a user account:

1. Go to your Control Panel's Users and Groups 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.
4. Click the Save button to finish.

11.1.7 Delete users

To delete a user account:

1. Go to your Control Panel's Users and Groups menu. You'll see a list of all user accounts in your cloud.
2. Click the Delete icon next to the user you want to remove. You'll be asked for confirmation before the user is deleted.

11.1.8 Suspend and activate users

Suspending a user account makes it inactive, but still present on the system. A suspended user will not be able to log into the Control Panel. To suspend an account:

1. Go to your Control Panel's Users and Groups menu. You'll see a list of all user accounts in your cloud.
   o Click the Suspend icon next to the user you want to suspend. You'll be asked for confirmation before the user is suspended.
   o To activate a suspended user, click the Activate user button next to their entry in the Users and Groups menu.

ⓘ You can also set a user to auto-suspend at a certain time/date, at a user's Edit Profile page (Users & Groups > [user name] > Edit Profile tab).

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11.2 User 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).

11.2.1 Add a user group

To add a user group:

1. Go to your Control Panel's Users and Groups menu.
2. Click the User Groups tab.
3. On the page that follows, click Add a new group button.
4. When the page loads, enter a user group name (Label) and click Save.

11.2.2 Assign a new user to a group

This happens on the Add New User screen, as part of the user creation process:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Add new 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.

11.2.3 Change a user's group

You can change the group a user is assigned to on the Edit User screen:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Edit icon next to the user in question.
3. Select a user group for the user from the user group drop-down menu.
4. Click the Save button.

11.2.4 View/edit/delete user group

To view, edit and delete a user group :

1. Go to your Control Panel's Users and Groups menu.
2. Click the User Groups tab.
   o Click a group label to see all the users with their details assigned to the questioned group.
   o Click the Edit icon next to a user group to change its details.
   o Click the Delete icon next to a user group to delete a specific group.

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12. Billing plans, resource limits and roles

12.1 Billing plans

Before users can create virtual machines in your cloud, it is important to set prices for the resources they use. This is a three-step process: creating a billing plan, setting prices and resources limits for that plan, and then assigning users to that plan.

12.1.1 Create billing plans

To create a billing plan:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Billing plans tab.
3. On the screen that appears, click the Add New Billing plan button.
4. Complete the form on the screen that follows:
   o Label - give your billing plan a name.
   o Type of currency - set a currency to charge in.
   o Monthly fee – set a monthly price for the billing plan. This price will be applied nonetheless the actual prices for used resources.
5. Click Save to finish.

12.1.2 Set billing plan prices and resource limits

You can set pricing and limits for cloud resources for each billing plan. This is a six-step process.

1. Add a resource to a billing plan:
   o Go to your Control Panel's Users and Groups menu.
   o Click the Billing Plans tab.
   o The screen that appears shows all billing plans currently available. Click the Resources (chart) icon next to the plan in question.
   o The screen that appears shows all resources currently assigned to this billing plan.
   o Click the Add New Resource button.
   o A pop-up window will appear: choose the resource you want to add from the drop-down menu, and click the Save button.

2. Set limits and prices for each resource assigned to the plan:
   o On the billing plan resources screen (Users and Groups > Billing Plans tab > Resources icon) you can enter prices and limits for each resource in the table shown.
   o Click the cells next to the required resource, type a value and press Enter.

o   If you leave the limit fields blank, no limit will be applied to that resource. The resource types are explained below.

ⓘ Note that billing plan resource limits are per user, not per VM. So, a user assigned to a plan with a maximum available disk size of 500Gb cannot exceed that limit across all of their VMs.

o   **CPU (Free, Max, On, Off)** - the number of CPU cores that users get for free, and the maximum number of CPU cores they can request under this plan. You can set prices per CPU core, per hour, for VMs powered on and off.

o   **CPU share*(Free, Max, On, Off)** - the CPU share % that users get for free, and the maximum CPU priority they can request under this plan. You can set prices per CPU share %, per hour, for VMs powered on and off.

o   **Disk size (Free, Max, On, Off)** - the disk space users get for free, and the maximum disk space they can request under this plan. You can set prices for disk space for VMs powered on and off. Disk size is measured in GB and priced per hour.

o   **Memory (Free, Max, On, Off)** - the amount of RAM users get for free, and the maximum RAM they can request under this plan. You can set RAM prices for VMs powered on and off. RAM is measured in MB and priced per hour.

o   **IP address (Free, Max, On, Off)** - the number of IP addresses users get for free, and the maximum number of IP addresses they can request under this plan. You can set IP address prices for VMs powered on and off. IP addresses are priced per hour.

o   **Virtual machines (Free, Max)** - the number of virtual machines users can create for free, and the maximum number of VMs they can create.

o   **Template & backup storage (Disk size for free, Disk size, Price)** - the amount of free disk space users get for backup and template storage, and the total amount of disk space they can use for backups and templates. Disk space is measured in GB, and priced per hour.

o   **Backup (Max)** - the number of backups users can create, subject to their maximum template/backup storage space limit. Backups are not priced individually: instead, you can set prices for template and backup storage.

o   **Templates (Max)** - the number of templates a user can create, subject to their maximum template/backup storage space limit. Templates are not priced individually: instead, you can set prices for template and backup storage.

o   **Monitis (Free, Max, Price)** – the number of VMs using Autoscaling a user can create for free as well as total amount of such VMs. You can also set the price for the VMs using Autoscaling (per VM).

3.   Add a template group to the plan.
o   Go to the billing plan resources screen (Users and Groups > Billing Plans tab > Resources icon).
o   Click the Add New Template Group button.

o In the pop-up window that appears, choose a template group from the drop-down menu, and click Save.

ⓘ When you add a template group to a billing plan, you limit the number of preconfigured system templates available to a user signed up for this billing plan – they can only choose from templates available in that template group.

4. Add a hypervisor zone* to the plan.
   o Go to the billing plan resources screen (Users and Groups > Billing Plans tab > Resources icon).
   o Click the Add New Hypervisor Zone button.
   o In the pop-up window that appears, choose a hypervisor zone from the drop-down menu, and click Save.

5. Add data store zone resources*, and set limits/prices per zone
   o Go to the billing plan resources screen (Users and Groups > Billing Plans tab > Resources icon).
   o Click the Add New Data Store Zone button.
   o In the pop-up window that appears, choose a data store zone from the drop-down menu, and click Save.
   o You then need to set limits and prices for the data store zone:
      o **Disk size (Free, Max, On, Off)** - set a maximum amount of disk space users get for free, and total amount of disk space users can allocate to this data store. You can set prices for disk space for VMs powered on and off. Disk space is measured in GB and priced per hour.
      o **Data read (Free, Price over free units)** - set the amount of data users get for free for read operations and the price for each unit over that free limit. Data read is measured in GB, and priced per GB.
      o **Data written (Free, Price over free units)** - set the amount of data users get for free for write operations and the price for each unit over that free limit. Data written is measured in GB, and priced by GB.
      o **Input requests (Free, Price over free units)** - set the amount of simultaneous input requests users get for free, and the price for each request over that free limit.
      o **Output requests (Free, Price over free units)** - set the amount of simultaneous output requests users get for free, and the price for each request over that free limit.

6. Add network zone resources*, and set limits/prices per zone

o   Go to the billing plan resources screen (Users and Groups > Billing Plans tab > Resources icon).
o   Click the Add New Network Zone button.
o   In the pop-up window that appears, choose a network zone from the drop-down menu, and click Save.
o   You then need to set limits and prices for the network zone:
  o   **IP addresses (Free, Max, On, Off)** - set the amount of IP addresses users get for free, and the total amount they may request. You can set prices for VMs powered on and off.
  o   **Port speed (Free, Max, On, Off)** - set the port speed users get for free, and the maximum port speed they can request. You can set prices for VMs powered on and off. Port speed is measured in Mb and priced per hour.
  o   **Data received (Free, Price over free units)** - set the amount of data users can receive for free, and the prices for each unit of data over that limit. Data is measured in GB, and priced per GB.
  o   **Data sent (Free, Price over free units)** - set the amount of data users can send for free, and the prices for each unit of data over that limit. Data is measured in GB, and priced per GB.

ⓘ ** By adding hypervisor, data store and network zone resources to a billing plan, you can add to the overall limits enforced by the billing plan, by limiting what amount of resource is available in different zones of your cloud.*

For example: a user is assigned to a billing plan with a total limit of 10 IP addresses. The plan is associated with 2 network zones: NZ1, a high performance zone, which has a limit of 2 IPs; and NZ2, which has a limit of 8 IPs.

In this case, the user would be able to use a maximum of 10 IPs for all of their VMs - of which, up to 2 may be located in NZ1, and up to 8 located in NZ2.

12.1.3 Assign users to billing plans

Assigning a new user to a billing plan takes place on the Add New User screen, as part of the user creation process:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Add New User button.
3. Select a billing plan for the user from the billing plan drop-down menu.
4. Complete the other user detail fields, and click the Save button.

12.1.4 Change a user's billing plan

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

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

12.1.5 Edit, copy and delete billing plans

To edit, copy or delete a billing plan:

1. Go to your Control Panel's Users and Groups menu. The screen that appears will show all the billing plans currently set up on the cloud:
   o Click a billing plan name to view its details.
   o Click the Add icon next to a required billing plan to copy it.
   o Click the Edit icon next to a required billing plan to change the plan details.
   o Click the Delete icon next to a billing plan to remove it from the system. You'll be asked for confirmation before the plan is removed.

12.2 Roles and permissions

OnApp allows you to assign roles to users. Each role has a set of permissions associated with it. By assigning users to different roles you can control what those users are allowed to do.

Roles are assigned to users during the user creation process. OnApp provides the following pre-configured user roles: Administrator and User.

12.2.1 Add new roles

To add a new role:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab.
3. Click the Add New Role button at the bottom of the screen.
4. On the screen that follows, give the role a description (label) and use the checkboxes to set its permissions.
5. Click the Save button to finish.

ⓘ On the Add New Role screen there are also buttons to give Full Access to the role (this automatically checks all relevant boxes to allow that role to perform any action) and to Deselect All permissions, if you want to start from scratch.

12.2.2 Edit roles

To edit a role:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system.
3. Click the Edit icon next to the role you want to change.
4. On the screen that appears, change the role's description and permissions, then click the Save button.

12.2.3 Delete roles

To delete a role:

1. Go to your Control Panel's Users and Groups menu.
2. Click the Roles tab. You'll see a list of all roles on your system.
3. Click the Delete icon next to the role you want to delete. You'll be asked for confirmation before the role is removed.

13. Tools

OnApp provides a number of tools to help you monitor and manage your OnApp system: Alerts, Usage Statistics and Sysadmin Tools. To access them, click the relevant links under the main Tools menu item in the Control Panel.

13.1 Alerts

Alerts are created when zombies appear on the system. These are listed in the Control Panel's Alerts screen. There are different kinds of zombies:

- o **Zombie virtual machines** - VMs which are detected by the OnApp controller as currently running on a hypervisor, but which are not in OnApp's database.
- o **Zombie disks** - disks which are detected by the OnApp controller as existing on a SAN, but which are not in OnApp's database.
- o **Zombie data stores** - data stores which are detected by the OnApp controller as existing in the cloud, but which are not in OnApp's database.
- o **Zombie transactions** - transactions which exist in OnApp's database, but aren't running in the cloud.

ⓘ In most cases you can remove the zombie elements from the system by clicking the Delete icon next to a zombie. For further help, contact support.

13.2 Usage Statistics

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

- o **Owner** - the owner's user name.
- o **CPU used** - shows how long (in seconds) the VM has been using the CPU for the last 72 hours or during the specified period
- o **Disk reads completed** - the number of read operations performed by the disk.
- o **Disk writes completed** - the number of write operations performed by the disk.
- o **Disk data read** - the amount of data read from a disk.
- o **Disk data written** - the amount of data written to a disk.
- o **Bandwidth sent** - the number of Bytes sent by this VM.
- o **Bandwidth received** - the number of Bytes received by this VM.

By default, statistics are generated for the last 72 hours. To specify another period, set the Start and End time.

You can sort by all categories except 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.

13.3 Sysadmin Tools

The Sysadmin Tools screen provides tools for a number of system administration tasks.

Backups

- o **Start backups** - starts up the runners and processes existing pending backups.
- o **Stop backups** - completes any backups in progress, but prevents any more backups from starting.

Task runners

- o **Start tasks** - starts all pending tasks
- o **Stop tasks** - stops all tasks in progress.
- o **Restart tasks** - restarts task runners, and completes all running tasks if their PIDs still exist.

Transactions/logs

- o **Clean all pending backups** - removes all transactions relating to pending backups from the log.
- o **Cancel all pending tasks** - removes all pending actions from the log.
- o **Clean logs** - completely clears the log.

14. Help

The help menu lets you submit support requests to the OnApp team. All OnApp customers get 24/7 support.

- o Click the Help link in the Control Panel, and complete the form on the screen that follows.
- o Alternatively you can call +1 (888) 876-8666, or email support@onapp.com with your problem.

15. Document revisions

v1.1, 11th August 2011

- Cosmetic changes only

v1.0, 20th July 2011

- Removed "planned feature" status for the following functionality (now released in OnApp v2.2):
  - Load balancers
  - VM Autoscaling
- Minor changes to Create a VM section (supported OS detail, and autoscale automation checkbox)
- Updated Edit templates section
- Updated Set billing plan prices and resource limits section with autoscale limits
- Other detail is unchanged from v 1.4 of the Admin Guide for OnApp 2.1