



2.0 Admin Guide

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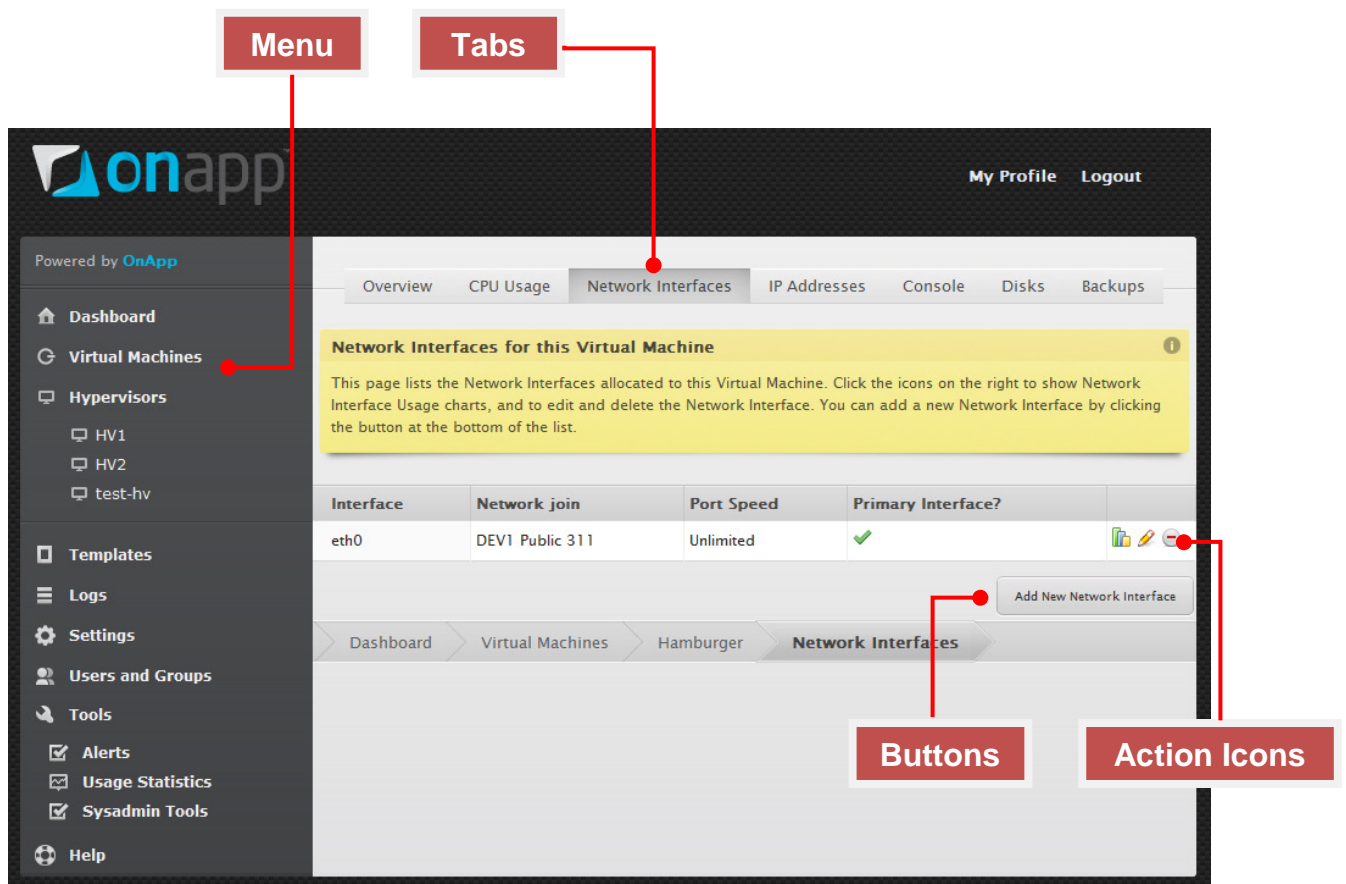
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0. About This Guide







This guide outlines the features of the OnApp 2.0 cloud hosting engine. It describes the basics of the engine’s architecture, and explains how to configure and manage OnApp.

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:



These are the specific action icons referred to in this guide:

-  *Edit*
-  *Schedules*
-  *Backups*
-  *Statistics*
-  *Trash*
-  *Suspend*

1. OnApp Overview

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

Through a user-friendly Control Panel, you can deploy virtual machines running different operating systems and their applications on the same hardware at the same time; dynamically allocate resources; deploy services; manage users; conduct system administration tasks, and much more.

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

1.1 Servers

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

The hypervisor server is a Xen-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 runs on the hypervisor and controls virtual machines, as well as handling network/disk connectivity, monitoring, IP address anti-spoofing and more. You can configure multiple hypervisors for efficient system use.

The **Hypervisor servers**:

- Provide system resources, such as CPU, memory, and network
- Control the virtual differentiation of entities, such as virtual machines and corresponding 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

The **Control Panel server** manages all the processes happening to OnApp. It:

- 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

We also 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.

1.2 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.

1.3 Templates

An OnApp template is a pre-configured OS image that you can immediately build a virtual machine on. There are two types of templates for virtual machine deployment in OnApp:

- Downloadable templates provided by OnApp
- Templates you create by backing up and duplicating an existing virtual machine

1.4 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 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.

1.5 Scalability

OnApp is a highly scalable cloud engine 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.

1.6 Availability and Reliability

OnApp is designed for high availability and reliability.

You can place virtual machines at multiple geographic locations using Zones. The hypervisor server and data store together make up a Zone. By setting up Zones on hardware in different locations, and deploying virtual machines across those Zones, you can protect against a single location failure, as well as providing faster content delivery.

OnApp has a number of other availability and reliability features. Its self-healing architecture automatically moves virtual machines to another box if a hypervisor fails. 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.

Regular automatic and manual backups also help you to restore virtual machines in case of failure. Finally, database-agnostic replication helps protect you from data loss.

1.7 Security

OnApp is a Xen-based engine, which means multiple virtual machines run their own operating system, on a single physical system, without interfering each other. Xen allows each virtual machine to access its own disk only. When a virtual machine makes a request for data, it gets redirected to the correct disk.

In addition to the Xen security mechanism, there is also an anti-spoof firewall. The firewall enables the hypervisor's management operating system to examine packets entering and leaving the virtual machine, and block packets that do not belong to the virtual machine. The firewall prevents IP spoofing and packet sniffing.

1.8 API and Integration

Our comprehensive RESTful xml and JSON API enables full integration of the OnApp cloud engine into third party applications.

2. OnApp 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.

This section explains the minimum requirements for a small cloud. For a larger scale deployment, our technical team will discuss your requirements and advise on the best possible setup.

2.1 Hypervisor Servers

The Hypervisor server provides physical space for virtual machines. The minimum hardware requirements for the Hypervisor server are as follows:

- **Platform:** x64 platform with AMD-V / VT-x hardware virtualization support enabled
- **Processor:** Quad Core 2Ghz+
- **Memory:** 8GB+ RAM
- **Network:** 3x Gig network interface cards (NIC)
- **Storage:** 30 GB of free disk space (SSD Recommended)

2.2 Control Panel Server

The minimum hardware requirements for the Control Panel server are as follows:

- **Memory:** 4GB+ RAM
- **Processor:** Dual or Quad Core 2Ghz+
- **Storage:** 100GB Raid 1
- **Network:** 2x Gig network interface card (NIC)

2.3 Backup Server

The minimum hardware requirements for a backup server are as follows:

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

2.4 Data Stores

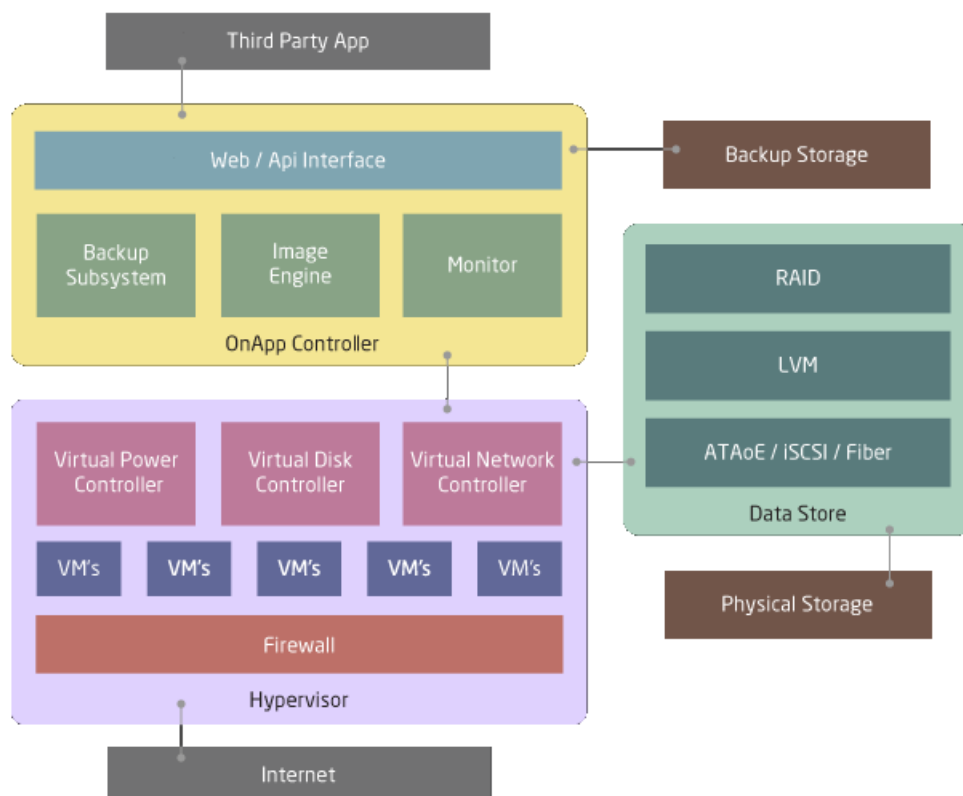
The minimum requirements for a data store are:

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

3. OnApp Architecture

The OnApp Cloud Engine 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.



4. OnApp Security and Reliability

4.1 Security

Security within OnApp is provided at different layers:

Xen hypervisor — OnApp is a Xen-based engine, which means multiple virtual machines run their own operating system, on a single physical system, without interfering with each other. 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 Xen 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. You can apply the following rules to the users:

- Perform any action on virtual machines
- See all virtual machines
- Create/update/delete own or all virtual machines
- Console to own/any virtual machine
- Create/update/delete own or any disk
- Create/update/view own or any hypervisor

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.

4.2 Reliability

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

Hypervisor failover management system — If a hypervisor fails, the 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.

5. OnApp Templates

5.1 What Templates Are

At its core, an OnApp template is a tar + gzip archive that contains the root directory (/ directory) of an operating system.

The standard templates include basic packages necessary for the minimum OS installation. OnApp templates go with the recommended disk size/memory/CPU values. Windows 2008 templates require 20GB of free disk space. Windows 2003 templates require 10GB. Most Linux templates require 2–10GB.

Your Control Panel's *Templates* menu lists all templates available on your system, and provides tools to delete templates and download new templates. Click a template's label to list the virtual machines on the system based on that template.

5.2 What Templates Do

Templates in OnApp are fully pre-configured operating system environments on which you can build virtual machines. Templates help cut down on the installation, configuration and maintenance costs associated with running complex software. You can set up new virtual machines extremely quickly using libraries of pre-configured templates.

5.3 Types of Templates

OnApp supports two types of templates:

System templates are provided by the OnApp team and can be downloaded from the online library. A system template is an operating system with the latest set of packages installed.

Custom templates are templates you create by converting a backup of an existing virtual machine. Custom templates allow you to pre-configure virtual machines and use the same configuration over and over again.

5.4 Template OSs Supported

OnApp currently supports the following Operating Systems as templates:

Operating System	Supported OS Version
Microsoft Windows	Server 2003 x86, Server 2003 x64, Server 2008 x64, Server 2008 x86
Ubuntu Linux	8.04, 8.04 x64, 10.04.1 LTS
Gentoo Linux	2008.0 x64, 2010 x64
Debian GNU/Linux	5.0 x64
CentOS	5.2 x64, 5.5 x64

The list is likely to change as OnApp is enhanced further. For the latest list of supported Operating Systems, please visit:

<http://www.onapp.com/onapp-faq#OSSupport>.

5.5 Templates Available in OnApp

5.5.1 Linux Templates

The following Linux system templates are provided by OnApp:

- Ubuntu 8.04 LTS 64-bit Basic Installation
- Ubuntu 9.10 (Karmic) x64 Basic installation
- Ubuntu 10.04 (Lucid) x64 Basic Installation
- Gentoo 2008.0 x64 Basic Installation
- Basic Installation of Debian 5.0 (Lenny) x64
- CentOS 5.4 x64
- CloudLinux Server 5.5 x64
- CentOS 5.5 x64
- Slackware 13.0 x64

5.5.2 JumpBox Virtual Appliance Library

OnApp integrates with the commercial JumpBox virtual appliance library, which contains more than 55 different applications spanning all major product categories. It is the world's most complete selection of "ready to use" Open Source server software.

The following JumpBox virtual appliances are available as OnApp templates:

- JumpBox for the PunBB Discussion Forums Software
- JumpBox for the Elgg Social Networking Platform
- JumpBox for LimeSurvey Online Surveys
- JumpBox for the Foswiki Wiki System
- JumpBox for the Jasper Business Intelligence system
- JumpBox for the DSpace Open Source Repository
- JumpBox for Tomcat Java Web Application Deployment
- JumpBox for Ruby on Rails Deployment
- JumpBox for the Joomla! Content Management System Version 1.5.x
- JumpBox for the Cacti Network Graphing System
- JumpBox for the Movable Type Blogging Platform
- JumpBox for the Silverstripe Content Management System
- JumpBox for the SugarCRM 4.5.x CRM System
- JumpBox for the Asterisk Telephony System
- JumpBox for the PmWiki Wiki Software
- JumpBox for the Redmine Project Management and Issue Tracking System
- JumpBox for the Alfresco Content Management System
- JumpBox for the Wordpress Blogging System
- JumpBox for the Bugzilla Bug Tracking System
- JumpBox for the PostgreSQL Relational Database Management System
- JumpBox for the Mantis Bug Tracking System
- JumpBox for DokuWiki Wiki System

- JumpBox for the OpenEMM Email Marketing System
- JumpBox for Tracks Task Management
- JumpBox for the OpenVPN Networking Platform
- JumpBox for LAMP Deployment
- JumpBox for the MySQL Relational Database
- JumpBox for the Nagios 2.x Network Monitoring System
- JumpBox for Gallery Photo Management
- JumpBox for LAPP Deployment
- JumpBox for Omeka Web Publishing
- JumpBox for the OpenLDAP Directory Server
- JumpBox for KnowledgeTree Document Management
- JumpBox for rSmart Sakai Collaborative Learning Environment
- JumpBox for OrangeHRM Human Resources Management
- JumpBox for the MediaWiki Wiki System
- JumpBox for the StatusNet Microblogging System
- JumpBox for the ProjectPier Project Management System
- JumpBox for the SugarCRM 5.x CRM System
- JumpBox for the Nagios 3.x Network Monitoring System
- JumpBox for the OTRS Trouble Ticketing System
- JumpBox for Trac/Subversion Software Project Management
- JumpBox for phpBB Discussion Forums
- JumpBox for TikiWiki CMS/Groupware
- JumpBox for the Drupal 5.x Content Management System
- JumpBox for Zenoss IT Management
- JumpBox for the GLPI IT and Asset Management System
- JumpBox for the MoinMoin Wiki Software
- JumpBox for Magento eCommerce Software

- JumpBox for MindTouch Core Enterprise Collaboration
- JumpBox for Liferay Enterprise Portal
- JumpBox for OpenFire Instant Messaging and Real-time Collaboration
- JumpBox for Dimdim Web Conferencing
- JumpBox for SnapLogic Data Integration

5.5.3 Windows Templates

Windows templates include Windows 2003 OS with the software pack. The following Windows templates are available with OnApp:

- Windows 2003 64 bit with IIS, MS SQL 2005 Express with Advanced Services, Windows Sharepoint 3.0
- Windows 2003 86 bit with IIS, MS SQL 2005 Express with Advanced Services, Windows Sharepoint 3.0
- Windows 2003 x64 with IIS, MS SQL 2005 Express with Advanced Services
- Windows 2003 x86 with IIS, MS SQL 2005 Express with Advanced Services
- Windows 2003 x64 with IIS, Windows Sharepoint 3.0
- Windows 2003 x86 with IIS, Windows Sharepoint 3.0
- Windows 2003 x64
- Windows 2003 x64 with IIS
- Windows 2003 x86
- Windows 2003 x86 with IIS
- Windows 2008 64 bit with IIS, MS SQL 2008 Express with Advanced Services, Windows Sharepoint 3.0
- Windows 2008 86 bit with IIS, MS SQL 2008 Express Windows with Advanced Services, Sharepoint 3.0
- Windows 2008 x64 with IIS, MS SQL 2008 Express with Advanced Services
- Windows 2008 x86 with IIS, MS SQL 2008 Express with Advanced Services

- Windows 2008 x64 with IIS, Windows Sharepoint 3.0
- Windows 2008 x86 with IIS, Windows Sharepoint 3.0
- Windows 2008 x64 with IIS, DNS
- Windows 2008 x64
- Windows 2008 x64 with IIS
- Windows 2008 x86
- Windows 2008 x86 with IIS
- Windows 2003 x64 with IIS, DNS
- Windows 2008 64 bit with IIS, DNS
- Windows 2008 86 bit with IIS, DNS
- Windows 2008 64 bit with IIS, DNS with ISP manager
- Windows 2008 86 bit with IIS, DNS with ISP manager

5.8 Managing Templates

You can perform the following operations with OnApp templates:

- Download system templates
- Create any number of virtual machines from a template
- Create custom templates
- View virtual machines based on a template
- Remove templates and appliance images that are no longer needed

5.8.1 Downloading System Templates

To download system templates:

1. Go to your Control Panel's *Templates* menu.
2. You'll see a list of templates on your system.
3. Click the *Download New Template* button at the end of the list.
4. The page that appears will list all the templates available for download.
5. Click *Download* next to the template you are interested in.

The template will be added to your system so you can create virtual machines based on it.

5.8.2 Viewing Template Details

The Control Panel's *Templates* 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 resize the disk space/swap disk allocated without rebooting your virtual machine.

To see which virtual machines are based on a template, click the template's label (name) in the list.

5.8.3 Deleting System Templates

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

5.8.4 Creating 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. Click *Ok* to proceed.
4. On the next page, enter a label for your template/backup, then click the *Convert Backup* button.
5. The backup will be scheduled for creation. When conversion is complete, it will be then listed on the *Templates* tab, from where you can edit it.

Administrator users in OnApp can set permissions that control whether other users can convert their backups into templates, use those templates and delete them. 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*

5.8.5 Editing and Deleting 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 page that follows, and click *Save Template*.
3. Click the Trash icon next to a template if you want to delete it.

5.8.6 Making 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.

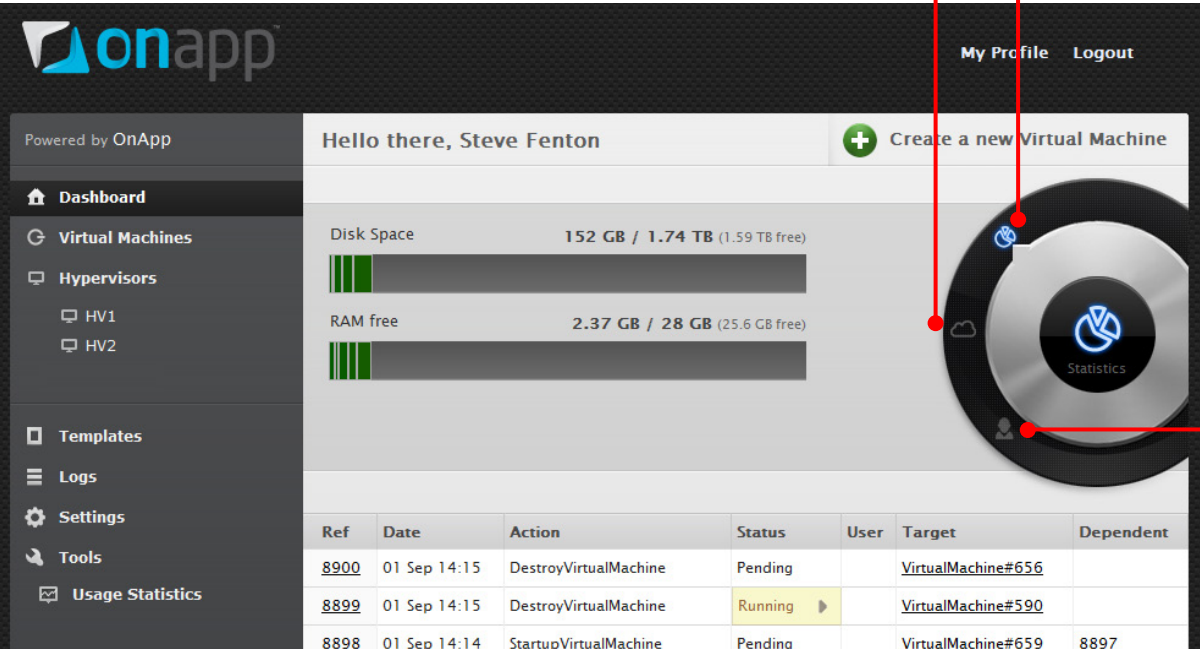
To do so, edit the user role you would like to assign permissions to:

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 page that follows, check the box next to the *Make own template public* permission.

6. Managing OnApp

6.1 The OnApp Dashboard

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



The screenshot shows the OnApp dashboard interface. At the top right, there are links for 'My Profile' and 'Logout'. The main content area is titled 'Hello there, Steve Fenton' and includes a '+ Create a new Virtual Machine' button. Below this, there are two progress bars: 'Disk Space' (152 GB / 1.74 TB (1.59 TB free)) and 'RAM free' (2.37 GB / 28 GB (25.6 GB free)). A silver 'wheel' navigation menu is positioned on the right side of the dashboard, with three icons: a cloud, a statistics icon, and a person icon. Red boxes labeled 'Cloud', 'Statistics', and 'Account' are placed above the wheel, with red lines pointing to their respective icons. Below the progress bars is a table with the following data:

Ref	Date	Action	Status	User	Target	Dependent
8900	01 Sep 14:15	DestroyVirtualMachine	Pending		VirtualMachine#656	
8899	01 Sep 14:15	DestroyVirtualMachine	Running ▶		VirtualMachine#590	
8898	01 Sep 14:14	StartupVirtualMachine	Pending		VirtualMachine#659	8897

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.

6.2 Administrator and 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.

Users are created by administrators and only have access to those actions which are specified by the administrator.

To add a new user:

1. Go to your Control Panel's *Users and Groups* menu. You'll be taken to a page that lists all users set up on your system.
2. Click the *Add New User* button at the bottom of the list.
3. Complete the form on the page that appears: provide user details, set a password, assign the user to a billing group and select a role for them.
4. Click the *Save* button.

You can also delete and suspend users from the *Users and Groups* menu, using the relevant icons.

6.3 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.

6.3.1 Adding a New Role

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 page.
4. On the page that follows, give the role a description (label) and use the checkboxes to set its permissions.
5. Click the *Save* button.

On the Add New Role page 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 in OnApp) and to Deselect All permissions, if you want to start from scratch.

6.3.2 Editing and Deleting Roles

To edit or 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. To edit, click the *Edit* icon next to the relevant role. Change the role's description and permissions, then click the *Save* button.
4. To delete a role, click the *Trash* icon next to the role you want to delete.

6.4 Limiting Resources

OnApp lets you assign resource limits to users. This prevents users from exceeding the resources you specify. For example, if you set the limit of 100GB Disk Size for the user, they will not be able to exceed this quota.

To set resource limits:

1. Go to your Control Panel's *Users and Groups* menu.
2. You'll see a list of all users on your system. Click the *Set Limits* link next to the relevant user.
3. On the page that appears, set the following limits:
 - Memory (in MB)
 - CPUs
 - CPU Priority
 - Disk Space (in GB)
4. Click the *Update Limits* button.

6.5 Billing Groups

Before creating a virtual machine, it is important to set prices for the resources it uses. In OnApp, setting prices is a three-step process which includes creating billing groups, setting the prices for those groups, and assigning users to them.

To create a billing group:

1. Go to your Control Panel's *Users and Groups* menu.
2. Click the *Billing Groups* tab.
3. On the page that appears, click the *Add New Billing Group* button.
4. On the page that follows, give a name to your Billing Group, and set prices for resources per unit, per hour:
 - Memory per MB per hour
 - CPU per CPU core per hour
 - CPU Priority per CPU priority per hour
 - Disk Size per GB per hour
5. Click the *Save* button.

After creating a billing group, you can assign users to this group so that they know how much they will be charged for resources. Users are assigned to billing groups during the user creation process.

6.6 Virtual Machines

Your Control Panel's *Virtual Machines* menu lists all machines set up on the system, their name, IP addresses, power status (with on/off buttons), and allocated disk size and RAM.

Click the *Statistics* icon next to a virtual machine to see its CPU usage. Click the *Backups* icon next to a virtual machine to show all backups taken of that machine.

Click a virtual machine's label to see its details page, which contains a range of...

Information:

- Hostname and login
- Power status and on/off buttons
- The template the machine was built from
- RAM, CPU and Disk resources
- Hypervisor, network and IP
- Owner and price per hour
- Activity log for transactions

Actions:

- Reboot Virtual Machine
- Shut Down Virtual Machine
- Migrate Virtual Machine
- Reset Root Password
- Re-Build Virtual Machine
- Manage Disks
- Adjust Resource Allocation

Tab navigation:

- *CPU Usage* – access usage charts
- *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
- *IP Addresses* – shows the address allocated to that machine, and provides tools to add and delete addresses
- *Console* – provides a tool to open a VNC console to that machine
- *Disks* – lists the disks allocated to that machine, and provides tools to add, delete and edit disks, and handle disk backups and schedules
- *Backups* – lists the backups taken of that virtual machine, and provides tools to restore a backup, delete backups, and convert backups to templates. NB: to make backups, use the tools on the *Disks* tab

6.6.1 Virtual Machine Lifecycle

Administrators in OnApp have full control over the lifecycle of Virtual machines.

Virtual Machines can be in the following states:

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.

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.

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 page for that machine.

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. To power off a machine, click its *Power On* button on the *Virtual Machines* menu, or the details page for that machine.

Rebooted — Rebooted means a virtual machine has been powered off, and then powered on again.

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 page.

Re-built — To rebuild a virtual machine means to reinstall the template and reconfigure the resources and network. All data will be lost.

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.

6.6.2 Creating Virtual Machines

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:
 - Give your virtual machine a label and a hostname.
 - Choose a template from the drop-down box.
 - Select the hypervisor.
 - Give your virtual machine a secure password.
 - Set the resources needed (please note, swap disk must be greater than zero)
 - To have the system build your machine automatically, tick the *Build Virtual Machine Automatically* box. If you leave this box blank, you will have to build your machine manually after it is created.
 - Choose the primary network.
 - Tick the *Automatically Assign an IP* box. If you leave this box blank, you will have to manually assign IPs to your virtual machine.
3. Click the *Create Virtual Machine* button.
4. You will be taken to the virtual machine details screen, which will show information about your machine as well as the root password and the transactions happening to it.

6.6.3 Migrating Virtual Machines

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.

To 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. On the page that appears, click the *Migrate Virtual Machine* link in the Actions section.
4. 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.

6.6.4 Backing up Virtual Machines

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 all 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.
5. To make a backup, click the *Take Backup* button at the end of the list.

6.7 CPU Usage and Network Statistics

OnApp can generate charts showing CPU Usage for virtual machines, and bandwidth usage for network interfaces. The charts indicate the loads placed on your virtual machines and can help diagnose performance issues with your network.

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 page that appears, the top chart shows CPU usage for the last 24 hours. The bottom chart shows usage for the last three months.
5. Click and drag in a chart to zoom into a time period. Click the *Show all* button to zoom out again.

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 page that appears, the top chart shows bandwidth usage for the last 24 hours. The bottom chart shows usage for the last three months.
6. Click and drag in a chart to zoom into a time period. Click the *Show all* button to zoom out again.

6.8 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.

6.9 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:

- Build disk
- Configure Operating System
- Convert backup
- Destroy backups
- Destroy disk
- Destroy template
- Destroy virtual machine
- Download template
- Format disk
- Provision virtual machine
- Resize disk
- Resize virtual machine without reboot
- Restore backup
- Startup virtual machine
- Stop virtual machine
- Take backup
- 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 page for that virtual machine shows recent transactions in the VM Activity Log section.

To view transactions for the whole system:

1. Go to your Control Panel's *Logs* menu.
2. The page displayed lists all recent transactions, their status, what they relate to and any dependencies they have.
3. Click a transaction Ref number to see its details.

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

6.10 Hypervisors

Hypervisors are a vital part of the system. They present a virtual platform for the guest operating systems and provide virtual machines with hardware resources. In OnApp you can have multiple hypervisors to increase efficiency. You can also improve availability by locating hypervisors at geographically different zones.

Your Control Panel's *Hypervisors* menu lists all hypervisors configured on the system, along with information on their CPU and RAM resources and the number of virtual machines they control.

Click a hypervisor's label to show the details page for that hypervisor. The hypervisor details page lists all virtual machines controlled by that hypervisor, along with their IP address, power status (and power on/off buttons), disk and RAM resources.

6.10.1 Adding 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* tab.
3. Click the *Add New Hypervisor* button underneath the list of Hypervisors on the page.
4. Add the IP and label on the page that appears.
5. Click the *Add Hypervisor* button.

The hypervisor will be added to the system. You can view it under the *Hypervisor* menu.

6.10.2 Removing Hypervisors

Hypervisors can be removed from the system as needed. A hypervisor cannot be removed from a Zone 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* tab
3. Click the *Trash* icon next to the hypervisor you want to delete.

6.10.3 User Hypervisor Permissions

OnApp administrators can control users' ability to manage hypervisors. You can set the following hypervisor permissions for user roles:

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

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 page.
3. Click the *Edit* icon next to the relevant role. Change the role's permissions, then click the *Save* button.

6.11 Data Stores

Data stores provide disk space for your virtual machines and operating systems. Data stores are attached to hypervisors, and together they make up a Zone.

6.11.1 Adding Data Stores

To add a data store:

1. Go to your Control Panel *Settings* menu.
2. Click the *Data Store* tab
3. Click the *Add New Data Store* link at the top of the page.
4. On the page that appears give a label to your data store and set the capacity.
5. Click the *Add Data Store* button.

6.11.2 Attaching and Detaching Data Stores

To attach a data store to a hypervisor:

1. Go to your Control Panel *Settings* menu.
2. Click the *Hypervisors* tab.
3. Click the Label of the hypervisor you want to attach a data store to.
4. Click the *Manage Data Stores* link in the Actions section.
5. Select a data store from the drop-down menu and click the *Attach Data Store* button.

You can also detach a data store when needed:

1. Go to your Control Panel *Settings* menu.
2. Click the *Hypervisors* tab.
3. Click the Label of the hypervisor you want to detach a data store from
4. You'll see a list of data stores attached to that hypervisor. Click the *Trash* icon next to the one you want to detach.

6.11.3 Deleting Data Stores

To delete a data store:

1. Go to your Control Panel's *Settings* menu
2. Click the *Data Store* tab

3. You'll see a list of the data stores on your system
4. Click the trash icon next to the data store you want to delete

6.11.4 User Data Store Permissions

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

- Allow/forbid users to perform any action on data stores
- See all data stores
- Create a new data store
- Update any data store
- Delete any data store

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 page.
3. Click the *Edit* icon next to the relevant role. Change the role's permissions, then click the *Save* button.

6.12 Disks

Disks are partitions of data stores that are allocated to virtual machines. There are two types of disks in OnApp: standard and swap. You can also set a disk as primary (that is, the virtual disk from which an OS will boot).

6.12.1 Adding Disks

To add a disk:

1. Go to your Control Panel's *Virtual Machines* menu.
2. Make sure the virtual machine is powered off, then click its label to open its details screen.
3. Click the *Disks* tab.
4. Click the *Add New Disk* button.

5. Fill in the details:
 - Choose the Data Store to create a disk on from the drop-down menu
 - Set the desired disk size
 - Specify if this disk is swap space, and requires formatting
 - Specify whether the disk should be added to Linux FSTAB, and its mount point
6. Click the *Add Disk* button.

6.12.2 Resizing 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 page.
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 box.
6. Click the *Save Disk* button.

6.12.3 Deleting 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 page.
3. Click the *Disks* tab.
4. Click the *Trash* icon next to the disk you want to delete.

6.12.4 User Disk Permissions

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

- Allow/forbid users to perform any action on disks
- See all disks
- See own disks
- Create a new disk
- Update any disk
- Update own disk
- Delete any disk
- Delete own disk

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 page.
3. Click the *Edit* icon next to the relevant role.
4. Change the role's permissions, then click the *Save* button.

6.13 Scheduling Tasks

Task scheduling lets you perform unattended jobs regularly over a set period of time. OnApp currently supports scheduling of automatic disk backups. For example, you can set up a schedule to perform automatic backup of your disks once a week.

To add a backup schedule:

1. Go to your Control Panel's *Virtual Machines* menu. Click the label of the virtual machine you want to schedule a backup for.
2. Click the *Disks* tab.
3. On the page that appears, click the *Schedules* icon next to the disk you want to backup.

4. Choose a period from the drop-down menu: daily, weekly, monthly or yearly.
5. Click the *Save* button.

When the schedule is no longer needed, we recommend deleting it so that the task will no longer run. To view, edit and delete schedules:

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

6.14 Networks

OnApp enables you to modify network configurations quickly and easily. To view the networks added to your system:

1. Go to your Control Panel's *Settings* menu.
2. Click the *Networks* icon.
3. The page that appears lists every network, with tools to add, edit and delete networks.
4. Click a network's label to see its details page, which displays the IP addresses in that network, along with tools to add, edit and delete addresses.

6.15 Resolvers

OnApp Resolvers work like DNS servers – they translate a hostname to an IP address. To view the resolvers on your system:

1. Go to your Control Panel's *Settings* menu.
2. Click the *Resolvers* icon.
3. The page that appears lists the resolvers on your system, along with tools to add, edit and delete resolvers.

6.16 System Tools

OnApp provides a number of tools to help you monitor and manage your OnApp system.

6.16.1 Alerts

You will get an alert when Zombie virtual machines appear on your system. Zombie VMs are machines which are currently running on a hypervisor, but which are not in the database.

An alert will be also generated when Zombie Disks, Zombie Data Stores and Zombie Transactions appear on the system. The *Alerts* menu also lists the Background processes running in OnApp.

6.16.2 Usage Statistics

To view information about the resources used by a particular virtual machine:

Go to your Control Panel's *Usage Statistics* menu.

You'll see a list of all virtual machines on the system, and their:

- Owner
- CPU % used (% of resource allocation for this virtual machine)
- CPUs in use
- RAM (the amount of RAM allocated to this virtual machine)
- Disk space & bandwidth
- Hours (uptime for this virtual machine)
- The date these statistics were generated

6.16.3 Sysadmin Tools

OnApp provides tools for a number of system administration tasks. You can stop backups, which will complete backups in progress but not start any more. You can start backups, which starts up the runners and processes the existing pending backups.

You can start, stop, and restart Task Runners. The restart button completes running tasks if their PIDs still exist.

You can also perform tasks on Transactions/Logs. To Clean All Pending Backups, Cancel Pending Tasks for a VM, or Clean the Logs, click the respective buttons.

7. OnApp API

The OnApp API enables integration with third party applications to expand functionality – for example, integrating OnApp with a billing solution like Ubersmith.

OnApp API is RESTful and responds to xml and JSON requests. Most functions need authentication (Basic HTTP).

Through the API you can manage Virtual Machines, Hypervisors, networking, disks and backups.

8. OnApp Partners

OnApp partners with companies all over the world to provide customers with the best service possible.

8.1 Hosting Partners

100TB.com is the latest in high power, high performance dedicated server hosting. The company proposition is to:

- Offer high specification Super Micro dedicated servers
- House them in SoftLayer's powerful network of redundant datacenters
- Give every server an unthrottled 1000Mbit port and 10TB (ten thousand GB!) of unrestricted tier one bandwidth each month
- Provide exceptional 24/7/365 support and service



Virtual Internet (VI) specializes in High Availability Managed hosting for mission critical web sites and applications which demand 100% availability. For 12 years VI has been providing unparalleled hosting and support services, from high availability web hosting to complex application deployment for a diverse mix of clients in the public and private sectors.



UK2.NET offers professional low-cost hosting solutions to a wide range of customers. The UK2.NET product portfolio includes:

- Domain names
- Website hosting
- Dedicated servers
- E-commerce solutions
- Reseller hosting
- Free email and dial-up Internet access



8.2 Technology Partners

Dell is a multinational IT company that develops, sells and supports computers and related products and services. From personal computing to small, medium or large business, *Dell* solutions come fully stocked.



Open-E, Inc. is a pioneering leader and developer of IP-based storage management software. *Open-E* storage management products are known throughout the storage industry for their robust architecture, ease-of-use and affordability.



Microsoft Corporation is a multinational corporation that develops, manufactures, licenses, and supports a wide range of products and services predominantly related to computing through its various product divisions.



JumpBox, the provider of IT infrastructure solutions, delivers Open Source server applications as a service. Whether on-premise, hosted or in the cloud, *JumpBox* allows you to focus on using Open Source server software rather than maintaining it.



Applicure Technologies, Ltd. develops software-based products for Web application security and compliance. The company's Web application firewall can be deployed as a Web server plug-in to identify and stop attacks attempting to exploit application vulnerability.



CloudLinux delivers a unique Linux-based operating system especially designed for hosting providers and datacenters.



HostBill is fast and efficient web-based client management, support and billing software for hosting and online companies. *HostBill* is built to manage online businesses varying from client signup, through domain registration, account management, recurring billing and support to termination.



Übersmith provides data center automation, integrated billing solutions, advanced infrastructure management and customer support for Web Hosts, ISPs, and Corporate IT.

