



Virtuozzo Automator 6.1

Administrator's Guide

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CHAPTER 1

Introduction

This chapter outlines the key features and capabilities of Virtuozzo Automator and briefly describes other chapters of this guide.

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About Virtuozzo Automator

Virtuozzo Automator is a flexible and easy-to-use administration tool for managing groups of physical servers running Virtuozzo Containers, Virtuozzo Containers for Windows, Server Bare Metal, and Virtuozzo. With Virtuozzo Automator, you can manage both physical servers and virtual environments hosted on those using a supported Web browser.

Supported Web browsers:

- Internet Explorer 9.x, 10.x or 11.x,
- Firefox 26 or newer,
- Safari 5.x or newer,
- Chrome 31.x or newer.

Note: Other browsers should work as well, but only those listed above have been tested for compatibility with Virtuozzo Automator 6.1.

After Virtuozzo Automator has been installed, you can register available physical servers with it. As physical servers are registered with Virtuozzo Automator, they form a group of physical servers or a group of Nodes (further in this Guide other terms may also be used: Node Group, Nodes registered in Virtuozzo Automator, etc.). For the definitions, see Glossary (p. 300). As an administrator, you can manage both single physical servers and physical server groups. With a group of physical servers, you can perform a number of collective administration tasks, such as:

- creating a logical structure of physical servers and the virtual environments residing on them;
- migrating virtual environments between physical servers;
- copying OS and application templates from one physical server to another;

- making virtual environment template stored on a VM Templates Storage (p. [161](#)) available to other registered physical servers;
- consolidating physical server IP addresses into a network address range.

Virtuozzo Automator user accounts are managed by the administrator. An administrator can add and remove users, and set user access privileges. The access privileges determine what operations a user can or cannot perform on registered virtual environments.

To use the Virtuozzo Automator for administering a physical server and the virtual environments residing on it, you need to install Virtuozzo Containers for Windows on the required physical server. To learn on what operating systems Virtuozzo Automator can be installed, refer to the Virtuozzo Automator installation guide. The Virtuozzo Containers software can be installed on Windows 2003 Server and Linux (Red Hat Enterprise Linux 4, Fedora Core 7, etc.) operating systems. Most of the Virtuozzo Automator working principles are the same, or similar, for both operating systems.

With Virtuozzo Automator, you can perform the following actions:

- Customize the interface of Virtuozzo Automator and define personal settings (p. [20](#))
- View and install licenses (p. [164](#))
- View physical server resource consumption (p. [44](#))
- Migrate a physical server to a Container (p. [95](#))
- Create new Containers and virtual machines (p. [119](#))
- Edit Container configuration (p. [105](#)) and virtual machine configuration (p. [130](#)), network parameters, (p. [226](#)) and other settings
- Manage Virtual Environment backups
- Clone a Container (p. [92](#)) or a virtual machine (p. [141](#))
- Manage Container templates (p. [109](#)) and virtual machine templates (p. [144](#))
- Manage and monitor virtual environment resources (p. [44](#))
- View logs and monitor virtual environment operations
- Manage Container group and perform virtual machine group actions
- Change a virtual environment's status (p. [53](#))
- Reinstall and/or repair a Container
- etc.

About This Guide

This guide is aimed at a wide range of users who are new to Virtuozzo Automator or just want to make sure they are doing everything right. The next two subsections describe the structure of the guide as well as the documentation conventions adopted for the guide.

Organization of This Guide

This guide includes the following chapters:

- **Introduction** (p. [12](#)) provides the basic information about the product and the guide itself.
- **Organizing Virtuozzo Automator Infrastructure** describes how you can use Virtuozzo Automator to manage relationships between different Virtuozzo objects (physical servers, virtual environments, etc.).
- **Managing Physical Servers** (p. [36](#)) explains how to do the following with physical servers:
 - register with Virtuozzo Automator,
 - configure,
 - monitor resources,
 - manage installed OS and application templates,
 - reboot, etc.
- **Managing Virtual Environments** (p. [51](#)) centers on how to do the following with virtual environments:
 - create, clone, configure, start/stop, reinstall, etc.,
 - manage services and running processes,
 - manage and monitor resources,
 - manage virtual environment templates,
 - migrate virtual environments to physical servers and vice versa.
- **Managing Virtual Environment Backups** (p. [148](#)) provides information on the backup hierarchy.
- **Managing Resource Library Tools** (p. [158](#)) explains how to work with file shares, virtual environment templates, IP pools, and virtual networks.
- **Managing Product Licenses** (p. [164](#)) describes how to manage product licenses.
- **Managing Virtuozzo Automator Security** (p. [170](#)) provides instructions on setting up Virtuozzo Automator security policies.
- **Maintaining Virtuozzo Automator Management Tools** (p. [200](#)) explains how to
 - create timetables to automate backup and restarting of virtual environments,
 - monitor virtual environment statuses,
 - view alert and task logs,
 - identify top resource consumers among virtual environments,
 - get technical support from Virtuozzo.

- **Managing Virtuozzo Network** (p. 215) describes Virtuozzo Containers network-related concepts, such as configuring network accounting and shaping for physical servers and virtual environments, etc.
- **Managing Virtuozzo Containers OS and Application Templates** (p. 249) provides information on how to manage Virtuozzo Containers templates.
- **Updating Virtuozzo Software** describes how to check for updates, update system software, etc.
- **Advanced Tasks** (p. 271) explains how to
 - use Virtuozzo Automator command-line utilities,
 - monitor Virtuozzo objects via SNMP,
 - set up the failover clustering service in Linux.
- **Troubleshooting** (p. 291) offers solutions to problems you might encounter while using Virtuozzo Automator.

Getting Help

Virtuozzo Automator offers several options for accessing necessary information:

Virtuozzo Automator Documentation

- *Virtuozzo Automator Administrator's Guide*. Contains extensive information about Virtuozzo Automator, its usage, and troubleshooting. To access the PDF version of the document, go to the **Support** link in the left pane and then click the **Downloads** pane. You can download any document of the Virtuozzo Automator documentation bundle from the Virtuozzo website.
- *Virtuozzo Automator Installation Guides for Linux/Bare Metal and Windows*. Contain extensive information on system requirements for physical computers as well as instructions on how to install Virtuozzo Automator on such computers.
- *Getting Started With Virtuozzo Automator*. Contains the basic information how to install, launch, and manage Virtuozzo Automator.
- *Virtuozzo Power Panel User's Guide*. Contains extensive information about Virtuozzo Power Panel.
- *Virtuozzo Automator Agent XML API Reference*. A complete reference on all Virtuozzo Automator configuration files and physical server command-line utilities.

The documentation is available for download at <https://virtuozzo.com/support/pva/>.

Virtuozzo Knowledgebase

Visit <http://kb.virtuozzo.com/> for helpful articles on Virtuozzo Automator, Virtuozzo Containers, Server Bare Metal, and Virtuozzo.



CHAPTER 2

Getting Started With Virtuozzo Automator

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Logging In

The Virtuozzo Automator administrator logs into Virtuozzo Automator from a browser by using the IP address (or hostname) of the corresponding physical server and the TCP port (4648 by default). If the physical server you wish to manage is a *Slave Server* (p. 300), you should log in to the *Master Server* (p. 300) of this Group. Logging in by the IP address/hostname to a Slave physical server is not allowed. When connecting to the physical server, you should enter the OS administrative credentials ( root/ Administrator and the corresponding password) and click the **Login** button.

The Virtuozzo Automator administrator can endow other users with a certain scope of rights and privileges in Virtuozzo Automator (see **Managing Virtuozzo Automator Security**). These users can be created as Virtuozzo Containers internal users or taken from an external LDAP-compliant database. They log into Virtuozzo Automator by the same IP address/hostname and port as the physical server administrator by using their respective user names and passwords. The set of actions these users will be able to perform in Virtuozzo Automator will be defined by their privileges.

Note: Domain users can log in by providing usernames as follows: `<domain_name>\<username>`.

Whatever way you use, once you have connected to the virtual environment, you are recommended to provide a valid email address on the Editing User's Personal Settings page (p. 20) in order to be able to log into Virtuozzo Automator in case you forgot your password. The **Forgot your password?** link on the login page allows you to enter your user name and the email address provided on the Virtuozzo Automator configuration page in order to receive an URL at this address informing you how to change your password.

Virtuozzo Automator Interface Overview

The Virtuozzo Automator interface has been designed to let the Virtuozzo Containers administrator quickly perform all possible tasks through an intuitive navigation system.

The main components the Virtuozzo Automator interface consists of are:

- The left menu frame lists all your physical servers and virtual environments. You can access main operations to be performed on them by right-clicking the server or virtual environment;
- The toolbar on top of the right frame allows performing most frequent actions on your physical servers and virtual environments. When necessary, the toolbar includes a few more buttons for performing additional actions;
- The content part on the right frame displays the content of the chosen object: a physical server, a virtual environment or any management unit.
- The **My Tasks** pane at the bottom of the right frame allows viewing all operations of the current user that run at the moment or have been finished. The pane is minimized by default.

The actual left menu appearance can be changed by clicking any of the following buttons located at the bottom:

- **Infrastructure** - displays physical servers and virtual environments only. Other sections are folded.
- **Logical View** - looks the same way as the Infrastructure menu, the only difference that the virtual environments can be distributed between all folders or physical servers no matter what physical servers they physically belong to. Other sections are folded.
- **Resource Library** - displays the resource library sub-sections only: **Software**, **Templates**, **IP Pools**, and **Virtual Networks**. Other sections are folded.
- **Management** - shows the Management sub-sections only: **Workflow**, **Updates**, **Scheduler**, **Alerts & Events**, **Tasks**, and **Support**. Other sections are folded.
- **Setup** - displays the Setup sub-sections only: **Network**, **Backups**, **Licensing**, **Security**, and **Virtual Environment templates**. Other sections are folded.
- **Full view** - makes the left menu display all the above as a tree.

Here and after, we use the full view of the left menu for description.

The upper most element on the menu is the **Infrastructure** link. If expanded, it displays your hierarchical structure of physical servers and virtual environments hosted on them as lower levels. Each of the physical servers and virtual environments that make up your Virtuozzo Automator infrastructure displays its name on the Infrastructure-oriented left menu, which, if clicked, leads to its dashboard.

The content of the right frame always depends on what option you have clicked on the left menu frame. If you have clicked a physical server, the right frame will show the physical server relating

information and operations, for a virtual environment the right frame will display the virtual environment relating sections and operations, and so on. See the **Using Context-menu** section (p. 19).

Extending Standard Browser Functionality

Virtuozzo Automator extends the basic functionality of standard web browsers by providing you with the following facilities:

- support for the drag-and-drop operation within certain Virtuozzo Automator components;
- support for the use of the Virtuozzo Automator context menu with certain Virtuozzo Automator objects.

Using Drag-And-Drop

Virtuozzo Automator allows you to drag-and-drop elements in the left menu frame by selecting them with a mouse and moving them to another place in this frame. The list of main operations for which Virtuozzo Automator provides the drag-and-drop support is given below:

- Moving any physical servers under the **Infrastructure** view to any folders available under this view or within the **Logical View** item;
- Moving any virtual environments listed under the corresponding physical servers in the **Infrastructure** view to any folders available under this view or under the **Logical View** item;
- Moving physical servers and virtual environments between folders under the **Infrastructure** view;
- Moving a folder under the **Infrastructure** view to another folder within this view;
- Moving physical servers and virtual environments between folders under the **Logical View** mode;
- Moving a folder under the **Logical View** mode to another folder within this view;

To perform a drag-and-drop operation, do the following:

- 1** Place the cursor over the object (e.g. a virtual environment) you wish to drag-and-drop and press the mouse button.
- 2** Hold down the mouse button and drag the object (e.g. to some folder under the **Logical View** item).
- 3** Release the mouse button to drop the object.

Upon the successful operation, the object will be shown in the place where it was dropped.

Using Context Menu

Virtuozzo Automator supports quick access to the main features through the context-menus. You can use context-menus to manage physical servers and virtual environments. Below are some common uses for the context menus in Virtuozzo Automator:

- Right-click the **Infrastructure** view to create a new virtual environment on any of your physical servers, create a new folder under the **Infrastructure** view, or configure the security policy for all the physical servers currently registered in Virtuozzo Automator.
- Right-click a physical server to perform the most common operations on your physical servers: create a new virtual environment, install a new OS or application template, reboot the physical server, configure the security policy for the physical server, etc. The same menu is also available if you right-click a physical server on the **Hardware Nodes** tab of the **Infrastructure** window.
- Right-click virtual environment to perform such operations as starting, stopping, or restarting the virtual environment, creating virtual environment clones, migrating the virtual environment to another physical server, etc. The same menu is also available if you right-click a virtual environment on the **Virtual Environments** tab of the **Infrastructure** window.
- Right-click the **Logical View** to create a new folder, physical server, or virtual environment under this item and to configure the security policy for all the physical servers currently registered in Virtuozzo Automator.

If you work with Virtuozzo Automator via the Mozilla Firefox browser, you may encounter the following problem: after right-clicking any of the aforementioned items, you will see the Virtuozzo Automator and the browser context menus displayed. To display only the Virtuozzo Automator context menu, perform the following operations:

- 1 In the Mozilla Firefox browser, open a new tab, type `about:config` in the address field, and press the `Enter` key.
- 2 Double-click the `dom.event.contextmenu.enabled` parameter to change its value from `false` to `true`.

Now, if you right-click any of the aforementioned items, you will see only the Virtuozzo Automator context menu.

Customizing User Profile

Defining Interface Settings

On the **Interface Settings** tab of the **User Profile** screen, you can set a number of parameters related to the Virtuozzo Automator interface.

You can access the **User Profile** section by clicking the login name in the upper part of the screen.

The options provided on the **Interface Settings** tab are grouped into three sections: **Navigation Settings**, **Regional Settings** and **Visual Settings**.

Option	Description
Home Page	One of the ways to tweak Virtuozzo Automator is to choose the first screen to be loaded when you log in to Virtuozzo Automator from the Home Page drop-down menu.
Interface Language	As Virtuozzo Automator is localized into a number of languages, this drop-down menu lets you choose the default interface language for Virtuozzo Automator. This setting affects the language of both your current Virtuozzo Automator session and all future sessions if User Default is chosen as the interface language on the Virtuozzo Automator login screen.
Local Time Zone	This setting affects the date and time information found on such Virtuozzo Automator pages as Tasks Log , Alerts and Events . Choose the time zone you wish to be used when viewing different kinds of logs.
GUI Elements Style	You may set the Virtuozzo Automator toolbar buttons to represent the operations which can be performed by clicking them with only icons, or only text, or with both visual and verbal elements.
Interface Skin	Here you may choose a suitable interface colour for your Virtuozzo Automator affecting such elements as the Virtuozzo Automator general layout (framed or non-framed), icons and images, and the colour palette.
Menu Details Level	You can choose what items will be displayed under the Infrastructure and the Logical View on the left Virtuozzo Automator menu: folders, the physical servers distributed over them, virtual environments - those that run on the physical servers, in the Infrastructure , and sent to appropriate folders, in the Logical View .
Enable Tooltips	Selecting or clearing this check box defines whether you will see short descriptions of the elements of the Virtuozzo Automator interface when pointing them with the cursor.
Show Top Right Buttons Pane	Selecting this check box makes a button pane always appear at the top right corner of Virtuozzo Automator. You can also call up this pane by clicking an arrow in this corner.
Allow Dynamic Status Updates	Selecting this check box enables the statuses of virtual environments to be updated automatically on the left Virtuozzo Automator menu, the virtual environment dashboard screen and the Tasks pane without refreshing the current page manually. If you have problems with the connection to the Master Server (e.g. the bandwidth is low or the connection is unstable), enabling this function might make your work in Virtuozzo Automator inconvenient and slow. In this case it is better to clear the check box.

After you decide on the suitable configuration and click the **Submit** button, the settings will be remembered for the current browser and user only. If you change the browser or the current user within the same browser, the default settings will be used until you perform a new customization.

Defining Personal Settings

On the **Personal Settings** tab of the **User Profile** screen, you can configure some personal data.

You can access the **User Profile** section by clicking the login name in the upper part of the screen.

As a Virtuozzo Automator user, on this page you can revise, change or add the following personal data:

- The **Login** field is for information purposes only, you cannot change it.

- To change your password, enter the current password to the **Old Password** field, and a new password into the **Password** and **Retype the password** fields. Please make sure it is difficult enough to pick up, so using birthdays and relatives' names for a password is not probably the best approach to ensuring your security.

Follow the VA requirements to set up a reliable and secure password:

- Passwords must be at least six characters long.
- Passwords must contain elements from three of the four following types of characters:
 - English uppercase letters (A, B, C, ... Z);
 - English lowercase letters (a, b, c, ... z);
 - Westernized Arabic numerals (0, 1, 2, ... 9);
 - Non-alphanumeric characters (special characters) (\$,!,%,^).

If your user information is taken from an external authentication database registered in Virtuozzo Automator, you cannot change your password as it is taken from this database.

- The **Full Name** and **Description** fields are editable only if your user information is stored in the regular Virtuozzo database. If you are a user of the host OS (including root/Administrator) or of an external authentication database having access to Virtuozzo Automator, you cannot change your full name as it is taken from the corresponding database.
- The **Email** field should be filled in with a correct email address to enable the functionality of restoring your password, if you forgot it. If your user information is taken from an external authentication database registered in Virtuozzo Automator, you cannot edit your email address as it is taken from this database.

To submit the changes, click **Submit**, otherwise click **Cancel**.

Organizing Logical Structure

Virtuozzo Automator allows you to organize all your registered physical servers and with virtual environments on them in the following ways:

- All of them present a logical and easily manageable structure (with as many levels as you like).
- The other Virtuozzo objects, like OS, and application templates, and Container backups, are automatically filtered to conform to the current level of the object hierarchy.
- The Virtuozzo Automator security policies can be set up not on the physical server or virtual environment level, but on the level of an arbitrary group of objects, provided these objects are united into a folder.

There are two independent ways to design the structure organization. They are called **Infrastructure** and **Logical View** and presented as top-level elements in the Virtuozzo Automator left menu. You can use either one of them or, better, both at once, as their functions are different:

The **Infrastructure** view allows you to display the physical organization of the VA infrastructure. For example, all the physical servers will take place one level lower than the datacenter, and all the virtual environments running on a certain physical server will be shown under it. You can create your own folders in the **Infrastructure** group, but you cannot violate the order of nesting objects. As a way to help with the visual representation of physical objects, the folders you create here can also be called Datacenters and Racks.

Logical View allows you to group your physical servers and virtual environments in your own way independently of the physical infrastructure. For example, by grouping all the financial department activities under a common 'FinDep' folder, your organization will be able to manage them as a single entity by collectively managing permissions, scheduling backups, applying system updates, and more. Additionally, physical server or virtual environment may simultaneously appear in any number of folders.

The main operations related to organizing the VA infrastructure are available with the top toolbar buttons visible if you are currently located in the **Infrastructure/Logical View** context (i.e. not in the physical server or virtual environment context). Below are the ways to set about:

- Adding a folder. On the left Virtuozzo Automator menu, click the folder in which you want to create a new folder. Then, if you are in the **Infrastructure** context, click the **Add New Subfolder** button on the top toolbar. In the **Logical View** context, click the **Add to Folder** button on the top toolbar, then click **New Subfolder**.
- Renaming a folder. On the left Virtuozzo Automator menu, click the folder you wish to rename. On the top toolbar, click the **Manage Folder** button, then click **Configure**.
- Moving a folder. On the left Virtuozzo Automator menu, click the folder you wish to move. On the top toolbar, click the **Manage Folder** button, then click **Move**.
- Deleting a folder. On the left Virtuozzo Automator menu, click the folder you wish to delete. On the top toolbar, click the **Manage Folder** button, then click **Delete**.
- Including a physical server in a folder. Click on **Infrastructure** on the left Virtuozzo Automator menu and go to the **Hardware Nodes** tab. Select the physical server(s) you wish to include in a certain folder and click **Move** on top of the **Hardware Nodes** table. If you are working with **Logical View**, the course of actions is a bit different, because any physical server can belong to any number of folders. On the left Virtuozzo Automator menu, click the folder where you wish to include the physical server. Then click the **Add to Folder** button on the top toolbar, and select **Hardware Node**.
- Including a virtual environment in a folder. In the **Infrastructure** view, the virtual environments always go with the physical server on which they are hosted, so you cannot include them separately in folders. In **Logical View**, any virtual environment can belong to any number of folders. On the left Virtuozzo Automator menu, click the folder where you wish to include the virtual environment. Then click the **Add to Folder** button on the top toolbar, and select **Container**.
- Moving a physical server or a virtual environment to another folder. These actions do not essentially differ from including these objects in folders, so you should be guided by the explanations given above.

- Removing a physical server or a virtual environment from the **Infrastructure** view. Unregister the corresponding physical server (the **Unregister** button on The **Hardware Nodes** tab) or delete the virtual environment (the **Delete** button on the **Containers** tab).
- Removing a physical server or a virtual environment from a **Logical View** folder. On the left Virtuozzo Automator menu, click the folder from which you wish to delete a physical server/virtual environment, then go to the **Hardware Nodes/Containers** tab. Select the object(s) you want to remove and click **Remove** on top of the table.

Using the built-in Virtuozzo Automator functionality, you can create a logical structure of your own:

- create new folders (p. 23) and edit them (p. 23);
- change the structure hierarchy by moving folders (p. 24) and physical servers (p. 24);
- change the hierarchy by adding physical server (p. 24) and virtual environment (p. 25) to folders, i.e. you can group the physical and virtual environments according to your needs.

Adding New Folder

The new folder you are creating will be placed directly under the currently selected folder in the Infrastructure or Logical View hierarchies (p. 26).

Folders created are assigned a **Folder Type**. The default folder type is **Folder**. Folders created in the Infrastructure hierarchy can be of type **Folder**, **Datacenter**, or **Rack**. Folders created in the Logical View hierarchy can be of type **Folder** or **Datacenter**.

The **Folder Title** field is mandatory, as it sets the name of the folder. Duplicate folder names are not allowed.

For detailed information on working with **Infrastructure** of Virtuozzo Automator and **Logical View** trees, refer to **Organizing Management Infrastructure**.

Editing Folder Properties

On the **Configure** screen, it is possible to change the name of a folder and the icon representing the folder type.

To change the name of the folder, enter a new folder name in the text box in the **Title** section. To change the folder icon, select the radio button next to the desired icon in the **Folder Type** section. Click the **Submit** button to apply any changes, otherwise click **Cancel**.

Any changes made to the folder name or folder type will not affect any physical server or virtual environment settings.

For detailed information on working with **Infrastructure** of Virtuozzo Automator and **Logical View** trees, refer to **Organizing Management Infrastructure**.

Moving Folder

Folders under the **Infrastructure** and **Logical View** level can be moved to other locations within their corresponding hierarchies. You cannot change the location of the following folders:

- the parent folder - a folder is already a child of its parent;
- the current folder - a folder cannot be a child of itself;
- any child folder - this would break the hierarchical structure by disconnecting any links to the hierarchy (one or more folders directly under the folder being moved would have to become the root physical server(s) in a new detached folder hierarchy).

In the drop-down within the **Destination Folder** section, select the folder you want to move the currently selected folder to. Invalid destinations cannot be selected and are grayed out. Click the **Move** button to commit the folder move operation, or **Cancel** to discard it.

For detailed information on working with **Infrastructure** of Virtuozzo Automator and **Logical View** trees, refer to **Organizing Management Infrastructure**.

Moving Physical Servers to Another Folder

Physical servers can be moved from folder to folder in the **Infrastructure** view only, because the **Logical View** mode allows one and the same object to be simultaneously included in different folders, so this mode deals with objects inclusion, and not their moving.

For the selected physical server(s) to be included in the folder of your choice, select this folder from the **Destination Folder** drop-down menu and click **Submit**. The physical server(s) will be displayed on the Virtuozzo Automator left menu as sub-levels of the selected folder.

For detailed information on working with **Infrastructure** of Virtuozzo Automator and **Logical View** trees, refer to **Organizing Management Infrastructure**.

Adding Physical Servers to Folders

On the **Add Hardware Node(s)** screen you can include any registered physical server in the current folder of the **Logical View** hierarchy. To do that, press the **Add** button below the **Hardware Nodes** section, select the physical servers to belong in the folder, click **Use Selected**, and finally click **Save**.

For detailed information on working with **Infrastructure** of Virtuozzo Automator and **Logical View** trees, refer to **Organizing Management Infrastructure**.

Adding Virtual Environments to Folder

On the **Add Virtual Environment(s)** screen you can include any of the existing virtual environments in the current folder of the **Logical View** hierarchy. To do that, press the **Add Virtual Environments** button below the **Virtual Environments** section, select the virtual environments to belong to the folder, click **Use Selected**, and finally click **Save**.

CHAPTER 3

Organizing Virtuozzo Automator Infrastructure

This chapter describes the Infrastructure tabs and management commands available on them.

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Viewing Summary Information

The **Summary** tab of the **Infrastructure** section provides you with general information of all the physical servers and virtual environments. It allows you to quickly and timely assess the current situation and, if necessary, take the required actions. The tab is available by clicking the **Infrastructure** submenu in the **Navigation** tree.

The **Overall Status** section shows the virtual environments that have signaled resources consumption alerts or those physical servers whose licenses have expired or are going to expire.

Note: You can configure Virtuozzo Automator to not show alerts for specific mount points on your system even if disk usage on them is close to or exceeds the set limit. For detailed information on how you can do this, see **Base Types and Interfaces > System Interface and Special Packets > system > Calls > configuration** in the *VA Agent XML API Reference* guide.

Virtual Environment

The section displays information on all virtual environments registered in the VA infrastructure.

Section	Description
Status	The column displays the number of running and stopped virtual environments. Upon clicking one of the statuses, you are redirected to the Virtual Environments tab, with the virtual environments grouped according to the chosen status.
OS	The column displays types of operating systems running on virtual environments. Upon clicking an OS name, you are redirected to the Virtual Environments tab, with the virtual environments grouped according to the chosen OS.

Technology	The column displays virtualization technologies running on the virtual environments. Upon clicking an OS name, you are redirected to the Virtual Environments tab, with the virtual environments grouped according to the chosen technology.
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Hardware Nodes

The section displays information on all physical servers registered in the VA infrastructure.

Section	Description
Status	The column displays the number of online, offline, and requiring attention physical servers. Upon clicking one of the statuses, you are redirected to the Hardware Nodes tab, with the servers grouped according to the chosen status.
OS	The column displays types of operating systems running on physical servers. Upon clicking an OS name, you are redirected to the Hardware Nodes tab, with the servers grouped according to the chosen OS.
Node Type	The column displays virtualization products running on the physical servers. Upon clicking an OS name, you are redirected to the Hardware Nodes tab, with the servers grouped according to the chosen type.

The **Tasks** section includes a number of links:

- The **New Virtual Environment** and **Migrate Server to Container** links enable you to create another virtual environment and/or migrate a physical server to a Container.
- The **New Hardware Node** link opens the Virtuozzo Automator screen where you can connect to a physical server and register it in Virtuozzo Automator.
- The **New Backup** link brings about the **New Virtual Environment Backups** screen allowing you to define the Container to be backed up and to configure various backup options.
- The **New Subfolder** link allows creating a new folder under the **Infrastructure** or **Logical View** levels.

If you are on the **Infrastructure** level, the **Manage Infrastructure** section allows you to perform the following operations:

- Manage Power Panel policies on the global level by following the **Global Policies** link. The policies set on this level will be applied to all virtual environments that reside on all physical servers registered in Virtuozzo Automator.
- View detailed information on the Management Server by following the **Management Node** link.

If you are on the **Logical View** level, the **Add Existing Objects to This Folder** section allows you to perform the following operations:

- Add more virtual environments to the main level of the **Logical View** hierarchies. To do this:
 - Follow the **Virtual Environments** link and click **Add Virtual Environments**.
 - In the displayed table, select the check boxes of the virtual environments you want to add to **Logical View**, click **Use Selected**, and then click **Save**.

The chosen virtual environments will be displayed on the **Logical View** main level.

- Add more physical servers to the main level of the **Logical View** hierarchies. To do this:

- Follow the **Hardware Nodes** link and click **Add**.
- In the displayed table, select the check boxes of the physical servers you want to add to **Logical View**, click **Use Selected**, and then click **Save**.

The chosen physical servers will be displayed on the **Logical View** main level.

If the **Logical View** level contains a folder and you want to add a virtual environment or a physical server to the main level of this folder, go to the folder **Summary** tab and perform the aforementioned operations.

Viewing Physical Servers Information

Hardware Nodes is a common term for physical servers running Virtuozzo Containers, Server Bare Metal or Virtuozzo. Physical servers can be of the following types:

- a Windows computer with Virtuozzo Containers for Windows;
- a Linux computer with Virtuozzo Containers for Linux;
- a bare metal computer with Server Bare Metal or Virtuozzo;

The Virtuozzo Automator functionality enables you to register, group under logical units, and manage a number of such servers.

If you deal with a large number of registered physical servers (and virtual environments), it can be convenient to organize them into multiple logical units divided by architecture, virtual environment type or other principles. For details on how to do this, consult **Organizing Logical Structure** (p. 21).

You can also set up a convenient and automated structure of IP pools. The IP addresses within these pools can be automatically assigned to the certain groups of virtual environments, thus eliminating possible IP conflicts between virtual environments and physical servers. Doing this will also let you save time on manual IP assignment. For details, see **Managing IP Pools** (p. 235).

To distribute workload, you can migrate virtual environments between physical servers registered in the Virtuozzo Automator infrastructure.

Linux-based Containers can be migrated to Server Bare Metal physical servers or to Linux-based physical servers with Virtuozzo Containers installed. Windows-based Containers can be migrated between Windows-based physical servers. Virtual machines can be migrated between Server Bare Metal and Mac OS physical servers.

On the **Hardware Nodes** screen, you can review the list of physical servers currently registered in Virtuozzo Automator and see the physical server details shown as the following table:

Column Name	Description
Hostname	The hostname of the physical server.
Description	The description of the physical server.

Default IP Address	The IP address of the physical server used to connect to Master Server (the physical server with the VA Management Server component of Virtuozzo Automator installed).
Hosted VDI Pools	Parallels VDI only. Desktop pools hosted on the physical server.
Product	The name of the product the physical server is based on.
VT	The virtualization solution used on the physical server.
OS	The operating system installed on the physical server.
Operating System	The name and version of the operating system installed on the physical server.
Arch	The microprocessor architecture of the physical server.
CPU	The percentage of the current CPU load on the physical server. Updated every 10 seconds.
Disk	The percentage of the current disk space usage of the physical server. Updated every 10 seconds.
Memory	The percentage of the current memory consumption of the physical server. Updated every 10 seconds.
Alert	The level of the physical server resources usage signaled by a corresponding alert.
Alerted	The number of virtual environments which reside on the physical server and whose level of the resources usage is signaled by a corresponding alert.
Running	The current number of running virtual environments residing on the physical server.
Stopped	The current number of stopped virtual environments residing on the physical server.
Total	The total number of virtual environments residing on the physical server.
Status	The status of the physical server.

Note: If this screen is loaded in the **Logical View** mode, the physical servers displayed in this table are those which have been added to the **Logical View**, otherwise the physical servers list is empty. To add a physical server to the **Logical View**, click **Add To Folder** on the Virtuozzo Automator toolbar, select **Hardware Nodes** from the menu, and click **Add**, choose the physical server(s) in the displayed window, and click **Use Selected**, then **Save**.

To manage any of the physical servers registered in Virtuozzo Automator, click its hostname in the leftmost column of the table. To display a certain physical server from a long list, click the **Show Search** link on top of the table, enter the name of the physical server and click **Search**; to restore the list of the physical servers, click **Reset Results**.

To stop managing a physical server via Virtuozzo Automator, tick its check box and click **Unregister**; to add a new physical server to the list of the servers managed via Virtuozzo Automator, click **New > Hardware Node** on the Virtuozzo Automator toolbar. Selecting one or more physical servers in the table and clicking the **Move** button opens the screen where you can sort the selected physical server(s) by distributing them across Virtuozzo Automator folders.

Viewing Virtual Environments Information

The table contains all virtual environments hosted on physical servers registered in Virtuozzo Automator. You can access it from the **Infrastructure > Virtual Environments** screen. Here you

can create new virtual environments and delete existing ones, perform various management operations on them.

The **Virtual Environments** table comprises the following information:

Column	Description
ID	The ID assigned to the virtual environment. An ID is a Container characteristic only. It can be set manually or automatically generated.
Name	The name of the virtual environment.
Hostname	The hostname of the virtual environment.
Description	The description of the virtual environment, if any.
IP Address	The IP addresses assigned to the virtual environment.
Hardware Node	The hostname or IP address of the physical server where the virtual environment is hosted.
VT	The virtualization solution the virtual environment is based on. Currently, VirtuoZZo Automator allows you to manage Containers and virtual machines.
OS	The operating system installed on the host physical server.
Architecture	The microprocessor architecture of the host physical server.
Operating System	The OS template the virtual environment is based on.
Original Template	The virtual environment template the virtual environment is based on.
CPU	Presents a visual representation showing how much host physical server CPU time the virtual environment is consuming at the moment.
Disk	Presents a visual representation showing the current host physical server disk space consumption by the virtual environment.
Memory	Presents a visual representation showing the current consumption of the memory resources allocated to the virtual environment.
Alert	Every time a virtual environment consumes more of a resource than is specified by the limit on that resource, or is coming close to that limit, an alert is generated and logged. The green, yellow, or red circle in this column indicates the cumulative resource consumption by the virtual environment.
Enabled	A green tick opposite a virtual environment indicates that this virtual environment is enabled and can be started, a red cross means that the virtual environment is disabled and cannot be started.
Status	The current status of the virtual environment.

Notes:

1. The **CPU**, **Disk**, and **Memory** columns provide a simplified representation that gives you a very general idea of the current resource consumption. The information is retrieved every 10 seconds and VirtuoZZo Automator displays the latest values. To have a more comprehensive resource consumption report for a virtual environment, click its name to open the virtual environment dashboard and open the **Resources** tab to view a minute resource consumption description.
2. Information such as IP addresses, hostnames, or statuses of all virtual environments presented in the **Virtual Environments** table is displayed according to the settings made on the **Select Columns** drop-down menu.

To facilitate working with virtual environments residing on your physical servers, you may have the **Virtual Environments** table display only those virtual environments that conform to particular parameters. Above the table, click the **Show Search** link to display the fields where you can specify the parameters the virtual environments should meet; you can also customize these fields by clicking **Customize**. Then click on the **Search** link. To view all the virtual environments residing on your physical servers, click on the **Reset Results** link to the right of the parameter fields.

Viewing Resource Consumption

Knowing how virtual environments consume host resources may help you prevent physical servers from overusing resources and reducing the performance of virtual environments.

The **Resource Consumers** table keeps track of the resource usage on the physical servers. Access the **Resources** page by going to **Infrastructure** -> **Resources** tab.

In the **List Settings** section, you can specify the time interval for which you want to view the resource consumption statistics. To specify the time interval, choose one of the following items from the corresponding drop-down menu:

- Last Hour
- Last Day
- Last Week

In the **Resource Consumers** section, you can see information such as disk usage, memory usage, incoming and outgoing traffic of all the virtual environments. This information is presented in the **Virtual Environments** table and displayed according to the settings made on the **Select Columns** drop-down menu. If all the columns are selected, this table presents the following:

Column	Description
Virtual Environment	The virtual environment name.
Hardware Node	The physical server that hosts the virtual environment.
CPU Usage	The host CPU time consumed by the given virtual environment for the selected time frame.
Disk Host Usage	The host disk space consumed by the given virtual environment, in percents.
Disk Quota Usage	The percentage of the disk space usage compared to the total amount of disk space allocated to the virtual environment.
Disk Usage	The usage of the disk space by the virtual environment.
Memory Host Usage	The host memory consumed by the virtual environment, in percents.
Memory Quota Usage	The percentage of the memory usage compared to the total amount of memory allocated to the virtual environment.
Memory Usage	The usage of the memory by the virtual environment.
Incoming Traffic	The amount of the virtual environment incoming traffic, in bytes.
Outgoing Traffic	The amount of the virtual environment outgoing traffic, in bytes.

If you click a column name, you will see an upward triangle displayed to the right of the column name and virtual environments consuming the corresponding resource in ascending order. If you click the column name once again, you will see a downward triangle displayed to the right of the column name and virtual environments consuming this resource in descending order.

Viewing Infrastructure Logs

This section provides information on the Infrastructure level logs.

Viewing Infrastructure Task Logs

You may turn to the **Tasks** subtab to check the status of any Virtuozzo Automator operation recently performed.

By default, 20 records are shown, but you may have more records displayed by pressing the appropriate link on top of the table. You may also have the Tasks table display only those log records that have a particular date or refer to a specific operation status. On top of the table, click the **Show Search** link to display the fields where you can specify the boundaries of the time interval and the status of the operation you are interested in; then click on the **Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not. Click the **Reset Results** button to check all the operations performed.

The tasks list is presented as the following table:

Column Name	Description
Time	The date and time when the execution of the task was started.
Hardware Node	The physical server or the Master Server where the task is performed. This option is available only at the Infrastructure level.
Object	The name of the virtual environment or other object that is performing the task.
Task	The kind of the task.
User	The user who initiated the process.
Status	Indicates whether the task was successful or failed.
Details	The detailed information on a particular task. Click the Details link opposite the needed task to view the details.

Viewing Infrastructure Alert Logs

The **Alerts** subtab enables you to view the physical and virtual environment resource consumption.

Every time a physical server or any of its virtual environments consumes more of a resource than is specified by the limit on that resource, or is coming close to that limit, an alert is generated and logged. You shall pay attention to the problem resource and correct the situation.

You may have the **Alerts** table display only those alerts that have a particular date, relate to a particular category or parameter, are logged for the particular physical or virtual environment. Over the table, click the **Show Search** link to display the fields where you can specify the parameters that the log should meet; then click the **Search** link.

The **Alerts** table provides you with the following data:

Column Name	Description
Time	The date and time when the alert was generated.
Object	The physical server the alert was logged for.
Category	One of the two alert categories: <i>Resource</i> (alert on a single virtual environment's resource consumption) or <i>Group</i> (alert on the whole Group's resource consumption).
Details	The problem description.
Type	The alert sign displays the type of alert for the given virtual or physical server. See the detailed description below.
Parameter	The type of the resource that required the consumption value alert due to its overusage.

There are three alert types in total that have a visual representation in the **Type** column and correspond to the three resource consumption zones. A green circle with a white tick means the green zone, an orange circle with a white exclamation mark points to the yellow zone, and a red circle with a white exclamation mark refers to the red zone.

Note: The alert threshold cannot be changed or adjusted according to your needs.

The meaning of these zones differs slightly depending on the parameter under alert.

For CPU-related parameters the meaning of the three zones is the following:

Zone	Description
Green	The physical server (or virtual environment) consumes less than 90% of the CPU time allowed to it. This means that you can run more applications inside the physical server (or virtual environment) without violating the performance of the current ones. If the physical server consumes more than 90% of the allowed CPU time, but for an insignificant time, the color remains green as this situation is not dangerous.
Yellow	The physical server (or virtual environment) consumes between 90% and 100% of the CPU power allowed to it for a relatively long while. Usually this means that the running processes consume too much CPU power. It is up to you to decide whether this situation suits you, but you should bear in mind that additional applications launched inside the physical server might experience shortage of available CPU power. You may need to consider the possibility of cutting down the number of processes.

Red	<p>The physical server (or virtual environment) consumes 100% of the CPU power allowed to it, i.e. all the available CPU power, for a long time. Usually this means that currently there is some CPU-intensive process inside the physical server caused by a temporary task. For example, this may happen if you are compiling a package in the physical server (or virtual environment) or in similar cases. In this case you should simply wait for this task to complete.</p> <p>However, if you do not know the reason for the CPU overconsumption, turn to the VirtuoZZo Automator System processes page to determine which processes are causing the problem and take the corresponding measures. For example, you might want to terminate or kill the offending process. Otherwise, the system performance may continue low for a long while.</p>
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For disk-related parameters the meaning of the three zones is the following:

Zone	Description
Green	The physical server (or virtual environment) consumes less than 90% of disk resources allowed to it. This means that the physical server has currently no problem with disk resources.
Yellow	The physical server (or virtual environment) is using between 90% and 100% of the disk resources available to it on the physical server. The situation is rather dangerous since the next disk resource allocation request can be refused by the physical server (or virtual environment). Therefore, you should erase unnecessary data from the physical server immediately. On a Linux physical server, a physical server (or virtual environment) is allowed to consume more than 100% of its disk quota only during the grace period (see the <code>quota time</code> parameter in the resources consumption details). If you do not solve the problem during this time, the physical server will be denied some of the disk resources and you might lose valuable data.
Red	The physical server (or virtual environment) has exceeded the soft limit and a disk resource allocation has been refused by it. This might have resulted in a loss of some valuable data or other problems inside the physical server. To discontinue this very serious situation, you should erase unnecessary data from the physical server immediately.

For memory-related parameters the meaning of the three zones is the following:

Zone	Description
Green	The physical server (or virtual environment) consumes less than 90% of the memory-related resource allowed to it.
Yellow	The physical server (or virtual environment) consumes between 90% and 100% of the memory-related resource allowed to it. It is up to you to decide whether this situation suits you, but you should bear in mind that additional applications launched inside the physical server might experience shortage of the corresponding resource. Judging by the offending resource, you might determine the reason for its shortage and take the corresponding measures.
Red	The physical server (or virtual environment) has been denied this memory-related resource due to its overusage. This might have resulted in application crashes or other problems inside the physical server (or virtual environment).

Viewing Infrastructure Event Logs

The **Events** subtab keeps track of all the changes in the statuses of all the virtual environments registered on VirtuoZZo Automator physical servers. These changes may happen due to the virtual environment routine management via VirtuoZZo Automator, command line operations, or due to the operation of some programs.

The **Status Changes** table on the **Events** subtab displays the information on the physical server and virtual environment changes as follows:

Column Name	Description
Time	The time when the status of a physical server or virtual environment was changed.
Object	The name of a physical server or virtual environment whose status was changed.
Old Status	The previous status of a physical server or virtual environment. The description of all possible physical server and virtual environment statuses is provided in the Physical Server, Container and Virtual Machine Statuses section.
Status Obtained	The current status of a physical server or virtual environment. The description of all possible physical server and virtual environment statuses is provided in the Physical Server, Container and Virtual Machine Statuses section.

By default, the table shows 20 records, but you may have more records displayed by clicking the appropriate link above the table.

You may also have the **Status Changes** table display only those log records that have a particular date and time. On top of the table, click the **Show Search** link to display the fields where you can specify the boundaries of the time interval for which you wish to view the log; then click the **Search** link. To view all the status changes again, follow the **Reset Results** link.

CHAPTER 4

Managing Physical Servers

This chapter describes ways to register and manage physical servers.

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Backing Up and Restoring the Master Server

In the VirtuoZZo Automator 6.1 infrastructure, Master Server is a uniting element that ensures successful communication between all Slave physical servers in the system and their virtual environments. It also serves as a storage for management, security and other sorts of data. Just as you make a backup of any physical server or virtual environment in VirtuoZZo Automator, you can back up the Master Server and store this backup for the case of emergency.

You can learn how to download the backup script from the VirtuoZZo Knowledgebase at <http://kb.virtuozzo.com/en/6830>.

Backing Up Physical Server

The VA backup script `pvabackup.vbs`, after default download, is stored in the `C:\Program Files\Parallels\Parallels Virtual Automation\Management Server\bin\location`. To back up a Master Server with the help of the VA script, start it with the following parameters:

```
cscript.exe pvabackup.vbs BACKUP c:\mn_backups
```

Where "c:\mn_backups" is an automatically generated location for the target backup. The backup name consists of the year, month, day, hour, minute, and second when the backup was made, for example 20091027222544. To give a backup a specific name, use the script with a concrete backup name:

```
cscript.exe pvabackup.vbs BACKUP c:\mn_backups b1
```

Where "b1" stands for the concrete backup name, and the storage location will be c:\mn_backups b1.

Restoring Physical Server

To restore the Master Server, the script should look as follows:

```
cscript.exe pvabackup.vbs RESTORE c:\mn_backups 20091027222544
```

Where 20091027222544 is the name of the target backup you want to restore from.

Note: The Master Server will be restored with all the values overwritten from the backup. The changes in the Master Server made after the date of this backup will be lost after the server has been restored.

Registering Physical Server in VirtuoZZo Automator

The following physical servers can be registered in the VA infrastructure system:

- a Windows computer with Containers for Windows or VirtuoZZo Containers for Windows installed;
- a Linux computer with VirtuoZZo Containers for Linux software installed;
- a bare metal computer with Server Bare Metal installed;

To register a hardware node in VirtuoZZo Automator, the following firewall ports should be opened:

- VA Slave physical server: 4433, 4434, 4435;
- VA Management server: 4533, 4534;

Important: For the proper functioning of the registered server, you may need to open more ports. To learn information on other ports, refer to <http://kb.virtuozzo.com/en/9516>.

The newly registered physical server will be displayed in the physical server list on the **Hardware Nodes** screen (p. 28) and accessible via VirtuoZZo Automator for all the usual managing and monitoring VA operations. Besides, physical servers registered in VirtuoZZo Automator form a joint physical servers pool which provides with the following collective actions:

- creating a logical structure of physical servers and the virtual environments residing on them;
- migrating virtual environments between physical servers;

- copying OS and application templates from one physical server to another;
- making virtual environment templates stored on a Virtual Manager Server available to other registered physical servers;
- reserving pools of IP addresses and organizing IP ranges inside them;

Registering a new physical server to be managed through Virtuozzo Automator is a simple action and all it takes is entering the following information on the new Node:

- The valid IP address of the physical server that will be used by Virtuozzo Automator to connect to this physical server. The physical server's IP address can be either of version 4 or of version 6. Enter this IP address to the **Node Address** field in the **Connection to Hardware Node** section. Note, that once you have added the hardware node under its current hostname, you cannot change it. If you want to change the hostname of a registered physical server, you should first unregister it from Virtuozzo Automator. After you have edited the hostname, you can re-register it in the VA system again.
- In the **Administrative Login to Hardware Node** section, you need to indicate the login name and the password which are used to connect to the physical server as the administrator. Write the login name in the **User Name** field and the password in the **Password** field.

Selecting the **Force registration even if Node is already registered in another Server Group** checkbox is the option to choose when the physical server you are registering has already been and is still registered on another physical server and you need this physical server to be registered from your physical server. If you forcibly register the physical server, this physical server will be removed from the cluster it currently belongs to.

Clicking the **Register** button initiates the registering procedure.

When the registration procedure is over, the physical server is added to the list of registered servers. You can view the list by clicking the **Infrastructure** in the left menu and switching to the **Hardware Nodes** tab.

Managing Disk Images

If you have any file shares registered in Virtuozzo Automator, the CD/DVD disk images available on these shares will be displayed on the **CD/DVD Images** tab of the **Software** screen.

The information, such as the name, size, status of all the disk images, presented in the **Disk Images** table is displayed according to the settings made on the **Select Columns** drop-down menu. If all the columns are selected, this table presents the following:

Column Name	Description
Name	The name of the disk image.
Description	The description of the disk image.
Full Path	The full path to the place where the disk image is stored.
Share	The name of the file share hosting the corresponding disk image.

Size	The size of the corresponding disk image.
Enabled	A green tick opposite a disk image indicates that this disk image is enabled and can be used, a grey circle means that the disk image is disabled and cannot be used.
Status	The current status of the disk image.

To facilitate working with CD/DVD disk images available on the file shares registered in Virtuozzo Automator, you may have the **Disk Images** table display only those disk images that conform to particular parameters. Above the table, click the **Show Search** link to display the fields where you can specify the parameters the disk images should meet; you can also customize these fields by clicking **Customize**. Then click on the **Search** link. To view all the CD/DVD disk images available on the file shares registered in Virtuozzo Automator, click on the **Reset Results** link to the right of the parameter fields.

To manage several disk images at once, make use of the Virtuozzo Automator toolbar right above the table. You are able to execute the following operations on disk images groups:

- Enabling any number of disk images (the **Enable** button).
- Disabling any number of disk images (the **Disable** button). You may need to disable a disk image because of the following reasons:
 - the CD/DVD disk image has become corrupted
 - you want other users not to use the CD/DVD disk image.

To perform anything of the above, select the check boxes opposite the corresponding disk images and press the appropriate link on the Virtuozzo Automator toolbar.

Clicking the disk image name in the **Name** column will lead you to the **Configure Disk Image** screen described in the following subsection.

Configuring Disk Image Parameters

The **Configure Disk Image** screen allows you to do the following:

- In the **General Settings** group, you can:
 - Review the disk image name, the network path to the place where the disk image is stored, and the disk image size.
 - Add some description to the disk image or modify the existing one.
 - Specify whether the disk image is enabled or not by selecting or deselecting the **Enabled** check box.
- In the **File Share Information** group, you can:
 - Review the name of the file share storing the disk image and the network path to the share.

Click the **Save** button to save the changes, otherwise, click **Cancel**.

Rebooting Physical Server

You may want to reboot your physical server. For example, this may happen if you have installed a new Linux kernel on the physical server and wish to start using it.

Before rebooting the physical server, keep in mind that usually this process takes 3-5 minutes. During this time, the physical server and all virtual environments residing on it will be unavailable. To reboot the physical server, click the **Reboot Node** button on the Physical server dashboard pane.

Note: When a physical server is accidentally powered off, the VA system generates an alert message and notifies that the physical server resources are not available. The alert is generated after 10-15 minutes after the physical server failure.

Physical Server Dashboard Overview

The Physical Server **Summary** page provides an overview of the configuration and the current status of the given physical server and enables you to quickly launch the most typical server management tasks.

Depending on the physical server virtualization technology, the set of the commands and the configuration information differ. However, the tables below provide you with the joined description. A command or information, being specific for a concrete product, has the corresponding notice.

The **Server State** section informs you on everything related to resources and updates:

Field	Description
Status	Shows if the physical server is running (online) or not (powered off, offline). If the physical server goes offline, the status is changed automatically.
License	Refers to the state of the license. If your current license status (a red circle) suggests that you install the license, you can do it on the Licensing page (the Licensing option in the left menu).
Alerts	Informs you if any of the virtual environment on this Server consumes more of some resource than is specified by the limit on that resource (a red circle) or is coming close to the limit (a yellow circle). To see the resource alerts logs, click the Show link.
RAM + Swap Usage	The total percentage of the current physical server utilization in terms of both allocated memory and, if swapping is on, swap space.
Disk Usage	The percentage of the available disk space currently in use by the Server.
CPU Usage	The percentage of the CPU power used by the physical server at the moment the current VirtuoZZo Automator page was generated.
CPU Load Average	The last 1, 5, and 15 minutes system load averages.
Uptime	The time that has passed from the last Physical Server start.

The **Server Configuration** section displays the configuration of the physical server:

Field	Description
Software	
Automation Product	The automation software installed on the physical server. As long as you have Virtuozzo Automator installed, this field shows you the product version as well.
Virtualization Product	The virtualization product installed on the physical server.
Host OS Info	The name of the operating system installed on the physical server.
Host OS Kernel	The version of the OS kernel installed on the physical server.
Hardware	
Architecture	The description of the processor model(s) installed on the server.
CPU	The Physical server CPU power. If the physical server has several processors, the column shows the summation of their powers.
Cores per CPU	The number of cores per one CPU.
CPU Hyperthreads	The number of hyper-threads per all CPU cores.
Network	
Hostname	The hostname of the physical server.
IP Address	Enumerates all the IP addresses the server has on all its network interfaces.

In the **Virtual Environments** section, you can quickly see such information as the number of running and stopped virtual environments, check how many of those are depleting the physical server resources and how many virtual environments you can have on the physical server according to your license.

The **Tasks** section lets you quickly access some of the common server maintenance tasks.

Depending on the technologies installed on this physical server, the range of options can change.

If the physical server runs Server Bare Metal, options related to both server and Containers will be listed. If the physical server has Virtuozzo Containers installed, only related and general options will be available.

Operate subsection

Option Name	Description
New Virtual Environment	Create a new virtual environment. The option is available on the physical server with Server Bare Metal technology installed.
New Container	Create a new Container. The option is available on the physical server with Virtuozzo Containers technology installed.
New Virtual Machine	Create a new virtual machine. The option is available on the physical server with Server Bare Metal installed.

Support Channel	Install a new certificate or establish a support channel (p. 298). The option is available on the physical server with Server Bare Metal installed.
Register Virtual Machine	Register the virtual machine on the physical server. Only virtual machines can be registered on the physical server. Server Bare Metal only.
Terminal Login	Connecting to the physical server via SSH. The option is available on the physical server with Server Bare Metal installed.
Migrate Server to virtual Machine	Migrate a physical server to a virtual machine with the help of Virtiozzo Transporter tool. The option is available on the physical servers with Server Bare Metal installed.
Migrate Server to Container	Migrate a physical server to a Container with the help of the Virtiozzo Transporter tool. The option is available on the physical servers with Virtiozzo Containers or Server Bare Metal technology installed.
Reboot Node	Reboot the physical server. Note that rebooting can take considerable time during which the virtual environment hosting on this server won't be available.
Remote Desktop	Connect to the physical server via the remote desktop.

Configure subsection

Option Name	Description
General Settings	Configure general settings, such as physical server description.
Container Backup Settings	Configuring the default backup settings that will be used for all the Containers on this physical server. These settings can be overridden individually for each Container on the corresponding screens.
Virtiozzo Virtual Machines Host Settings	Manage the general server settings for Virtiozzo virtual machines.
Proxy Settings	Changing the SMTP relay server IP address and the proxy server address or hostname of the current physical server. The physical server uses the SMTP mail server to send emails. The reasons to establish an email connection may be different, a password reminder or an alert notification among them.
Virtiozzo Containers Host Settings	Manage the general server settings for Virtiozzo Containers.
Logging	Changing the periodicity of refreshing the resources consumption information in the logs.

Manage subsection

Option Name	Description
Virtual Machine Templates	Virtiozzo host specific. Manage virtual machine templates.
Container Templates	Manage Container templates.
Software Updates	Check for software updates.
Install App/OS Templates	Upload and install new templates on the physical server.
Virtual Networks	Create and manage virtual networks.
Offline Services	Create new and configure the offline management policies (p. 48).
Power Panel Policies	Assign new policies and manage the existing policy rules for Power Panel usage.
Unregister Node	Unregister the physical server from Virtiozzo Automator 6.1.

The **Disk Partitions** and **Memory** sections inform you about the respective resources consumption on the physical server.

The information on the **Disk Partitions** size usage in all the Linux partitions or Windows logical disks existing on your physical server is presented in the following tables (corresponding to the number of partitions/logical disks):

Column Name	Description
Mount Point	The name of the partition/logical disk using the resource.
Used	Used amount of disk size in the partition/logical disk
Free	Free amount of disk size in the partition/logical disk.
Total	The total amount of disk size allocated for the partition/logical disk.

The information on the **Memory** usage is displayed in the following way:

Field	Description
Physical memory	The percentage of the current physical server utilization in terms of allocated memory.
Swap Space	The percentage of the current physical server utilization in terms of allocated swap space. The bar is not displayed if swapping is not configured on the physical server.
RAM+Swap	The simple average of the resources above.

The **Resources Commitments** section provides summarized information on the disk and memory resources promised to all the virtual environments hosted on the physical server. The **Value** column displays how much resources have been promised; the **Percentage** column shows how much of them are currently being used by virtual environments. If at least one virtual environment is promised unlimited resources, the **Value** column shows "Unlimited", and the **Percentage** column - "n/a" for the corresponding resource.

For more details on the physical server resource consumption, see **Monitoring Physical Server Resources Consumption** (p. 44).

Managing Physical Server General Settings

The **Configure General Settings** page allows specifying some general configuration settings.

In the **Hardware Node Description**, you can add some details on the physical server.

When finished, click **Submit** to save the changes.

Monitoring Physical Server Resources Consumption

The **Hardware Node Monitor** subtab shows the graphical statistics on the resource consumption of the virtual environments on this physical server, i.e. the physical server resources consumed by all virtual machines or Containers on this physical server and by the host system itself. The resource consumption is shown in percentage.

Note: The consumption changes are shown with regards to your time zone. If time is incorrect, check **User Profile** settings (p. 19).

Select Graph subsection

- **CPU, Disk and Memory Usage.** Each of the three resources has its own colour on the chart. If you need to monitor the changes only for one resource, whatever it is, you can disable the others.
- **Disk I/O Usage.** The chart shows the density of Hard Drive usage, i.e. the amount of read/write kilobytes.
- **Traffic Usage.** The chart shows the volume of the incoming/outgoing traffic through the network. If you view a daily, monthly or annual chart, the history changes are shown per hour, day and month, accordingly.

Graph Period subsection

The chart can show the changes for the defined period. The chart can include the data for a particular date, month, year or for any other period of time. To implement the changes, click **Apply**. The chart will change its appearance.

Partially, the information on memory and disk resource consumption is available on the physical server dashboard (p. 40).

Operations subsection

The **Export Data** link allows you to save the graphical data in the format of a plain text (.csv file) on your computer.


Viewing Resource Consumers

Knowing how virtual environments consume host resources may help you prevent physical servers from overusing resources and reducing the performance of virtual environments.

To view resource consumption of the selected physical server, click **Infrastructure** > physical server > **Resources** tab > **Resource Consumers** subtab. For detailed information on monitored resources, see **Viewing Resource Consumption** (p. 31).

Logging into Physical Server

Accessing Physical Servers via SSH

 If you are managing a physical server with the Linux operating system installed, you can use Secure Shell (`ssh`) to remotely connect to the physical server you are operating and work inside its directory tree using standard Linux command line tools. To connect to the physical server by `ssh`, you should make sure that you are launching Virtuozzo Automator in Internet Explorer. SSH connection to the physical server is supported by other browsers only if you have a Java virtual machine on your computer.

Notes:

1. If you are managing a Windows-based physical server, please see **Accessing Physical Servers via RDP** (p. 45) to learn to manage the physical server by means of the Remote Desktop Protocol.
2. To learn the port numbers that should be open to ensure a successful SSH connection, refer to <http://kb.virtuozzo.com/en/9516>.


The **Terminal Login** window is opened upon clicking on the **Terminal Login** icon on the physical server toolbar or dashboard. You are presented with the **Login** and **Password** fields where you should enter the relevant information (`root` or any other user name you might have created for this physical server and this user's password) to be passed to the `ssh` server inside the physical server.

After you have filled in these two fields, click the **Login** button. If you are doing this for the first time, the system may ask you to install additional components.

Note: if you establish an SSH connection to the physical server using the a browser other than Internet Explorer, this window does not appear. The SSH connection through browsers on the Mozilla engine is provided by the Java technology.

Click **Yes** and wait for the `ssh` terminal window to appear, whereupon you get connected to the physical server and may start sending commands to it via `ssh`.

Accessing Physical Servers via RDP

 You can use Remote Desktop Connection, a standard Windows tool, to connect to a physical server via the Remote Desktop Protocol (RDP). The feature is only available for the Internet Explorer.

Notes:

1. If you are managing a Linux-based physical server, see [Accessing Physical Servers via SSH \(p. 45\)](#) to learn to manage the physical server by means of Secure Shell.
2. To learn the port numbers that should be open to ensure a successful RDP connection, refer to <http://kb.virtuozzo.com/en/9516>.

The **Remote Desktop** window is opened upon clicking on the **Remote Desktop** icon on the physical server toolbar or dashboard. You are presented with the **Login** button that you should click to open a Remote Desktop session. If you are doing this for the first time, the system may ask you to install additional components.

Click **Yes** and wait for the Remote Desktop terminal window to appear, whereupon you will be presented with the **Login** and **Password** fields. After entering the necessary information (Administrator or any other user name you might have created for this physical server and this user's password) in the fields provided, click **Enter** to get connected to the physical server and working with Remote Desktop.

Viewing Physical Server Logs

Viewing Physical Server Task Logs

The **Tasks** subtab lists recent operations on virtual environments hosted on the selected physical server. For more details on information shown, see [Viewing Infrastructure Task Logs \(p. 32\)](#).

Viewing Physical Server Alert Logs

The **Alerts** subtab lists resource consumption alerts for the selected physical server and virtual environments hosted on it. For more details on information shown, see [Viewing Infrastructure Alert Logs \(p. 32\)](#).

Viewing Physical Server Event Logs

The **Events** subtab lists status changes of the selected physical server and virtual environments hosted on it. For more details on information shown, see [Viewing Infrastructure Event Logs \(p. 34\)](#).

Managing Physical Servers Running Virtuozzo Virtual Machines Technology

This section contains the information specific for the physical servers running Virtuozzo Virtual Machines.

Configuring Virtuozzo Virtual Machines Host Settings

The **Virtuozzo Virtual Machines Host Settings** page enables the administrator or the user that has enough rights to change the physical servers general settings, for example, to add the physical server description or to set the memory limits.

To change the settings, you can use the following subsections:

VM Default Settings

In this section, you can specify the following:

- **VM Folder.** The folder where newly created virtual machines will be stored by default. When you change the location, the virtual machines that were earlier placed to a different location won't be moved to the new one. If you want to have them in a new location, you should manually move them.
- **VM Backup Folder.** The folder where virtual machine backups will be stored by default.

To specify the location, you can either type it in the field or use the **Select** button.

Virtuozzo Service Settings

In this subsection, you can specify the memory limit that will be true to every virtual machine stored on this Virtuozzo host.

- **Auto.** The memory will be automatically allocated to a virtual machine depending on its needs.
- **Manually.** Specify the amount of the memory that any virtual machine will use. Irrespective of the virtual machine needs, it won't be able to exceed the memory limit.

VM Remote Console Service Settings

With the help of these settings, you can establish a remote control of the virtual machine using the VNC protocol.

- In the **Default Service Address** field, specify the IP address for the VNC protocol to connect to the virtual machine. You may need to do it if the Server has several IP addresses, out of which you need only one for connection.

- In the **Service Base Port** field, specify the base port starting from which the running virtual machines will be assigned with port numbers.

When finished, click **Submit** to save the changes.

Managing Templates on a Physical Server

The **VM Templates** page enables you to monitor and manage the state of all the templates stored on this physical server. The templates are listed in the table that can have up to three columns: a **Name**, **OS**, and **Description** column. To add or remove any of the columns, use the **Select Columns** button above the table.

The **Search** section also comprises three fields: **Name**, **OS**, and **Description**. This allows you to search the templates according to any of these parameters. If you use only some of these fields, you can add or remove them according to your needs with the help of the **Customize** button. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

On the VM Templates page, you can perform any of the following actions:

- Create a clone of the template and store it in the Library (the **Clone to Library** button);
- Convert the template into a virtual machine (the **Convert to VM** button);
- Create a clone of the template and store it on the same physical server (the **Clone** button);
- Delete a template (the **Delete** button).

To perform an action, you should select one or more templates by enabling the check box in the left column.

If you click a template name, the template properties page will open.

Managing Offline Services Configuration

The **Offline Services** subtab available on clicking the **Network** tab on the corresponding physical server dashboard allows you to configure the offline services parameters that will be applied to all virtual environments on your physical server. Offline services ensure the manageability of your virtual environments from any browser at their IP addresses. Configuring the offline services is supported for the virtual environments with IPv4 and IPv6 addresses.

By default, the **vzpp** service (for managing Containers by means of VirtuoZZo Power Panel) and the **vzpp-plesk** service (for managing Containers by means of the Plesk control panel integrated with VirtuoZZo Power Panel) are enabled for all Containers on the physical server, which means that you can start using these offline services for managing Containers right after their creation. All offline services currently available on your physical server are listed in the **Offline Services** table:

Column Name	Description
Name	The name of the service.
Destination Container ID	The ID of the destination Container where the requests to/from virtual environments are redirected.
Redirected Port	The port number inside the Container where the requests to/from virtual environments are redirected.
Global	Shows if the service is enabled or disabled globally.

By default, 20 services are shown on the screen, but you may have more services displayed by clicking the appropriate link on top of the table. You may also have the **Offline Services** table display only those services that have a particular name or conform to some other criteria. On top of the table, press the **Show Search** link to display the fields where you can specify the name or any other parameters of the service you wish to view; then click on the **Search** link. To view all the services, click on the **Reset Results** link to the right of the **Search** link.

You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

Note: Before you can start managing your virtual environments using certain offline services, make sure that the offline service is globally enabled on the physical server.

On the **Offline Services** subtab, you can manage your offline services as follows:

- To subscribe all virtual environments on the physical server to an offline service, select the check box next to this service and click **Enable Globally**.
- To unsubscribe all virtual environments on the physical server from an offline service, select the check box next to this service and click **Disable Globally**.
- To create a new offline service on the physical server, click **New Offline Service**.
- To edit an existing offline service, click its name in the table.
- To remove an offline service that you do not need anymore from the physical server, select the check box next to this service and click **Delete**.

Creating Offline Service

To create a new offline service on the physical server, provide the following information on the service:

- In the **Name** field, specify an arbitrary name for the service.
- In the **Destination Container ID** field, specify the ID of the destination Container where the requests to/from your Containers will be redirected.
- In the **Redirected Port** field, specify the port number inside the Container where the requests to/from your Containers will be redirected.

- If necessary, enable the service for all virtual environments on the physical server by selecting the **Use Globally for All Containers** check box.

When you are ready, click the **Submit** button to create the offline service.

Editing Offline Service

To edit an offline service on the physical server, provide the following information on the service:

- In the **Destination Container ID** field, specify the ID of the destination Container where the requests to/from your Containers will be redirected.
- In the **Redirected Port** field, specify the port number inside the Container where the requests to/from your Containers will be redirected.
- If necessary, enable the service for all virtual environments on the physical server by selecting the **Use Globally for All Containers** check box.

When you are ready, click the **Submit** button to update the configuration of the offline service.

Managing Physical Servers Running Virtuozzo Containers Technology

This section contains the information specific for the physical servers running Virtuozzo Containers software.

Configuring Virtuozzo Physical Server Settings

The **Virtuozzo Containers Host Settings** page enables the administrator (or a user with enough rights) to specify paths to Container's private area and root directory as well as change its file system type.

To change the settings, you can use the following fields:

Private Area. The default location of Container private area on the physical server. The default folder name is Container's unique ID.

Root Directory. The path to the mounted Container contents. The default folder name is Container's unique ID.


File System Type. Container file system type, if a choice is available: `VZFS` or `ploop`.

When finished, click **Submit** to save the changes, otherwise click **Cancel**.

Managing Virtual Environments

Virtual environment is a generic term for Containers and virtual machines. A virtual environment is created on the basis of a virtualization technology and can be managed via Virtuozzo Automator. Physical servers running Containers for Windows or Virtuozzo Containers for Windows can host Containers while physical servers running Server Bare Metal can host both Containers and virtual machines.

You can find the list of all virtual environments hosted on servers registered in Virtuozzo Automator on the **Infrastructure > Virtual Environments** screen (see **Viewing Virtual Environments Information** (p. 29)). On this screen, you can either right-click a virtual environment and select an operation from the context menu or select multiple virtual environments and click an operation button on the toolbar above the list. Available operations include:

- Create one or more virtual environments (**New Virtual Environment**):
- Start/restart/stop the selected virtual environments (**Start/Restart/Stop**).
- Pause the selected virtual environments (**Pause**). Pausing frees up the host CPU resources while the consumption of other resources remains the same.
-  Stop the selected virtual environments without executing shutdown scripts (**Power Off**). This operation is only available to users with administrative privileges in Virtuozzo Automator. It can be used, for example, if a virtual environment has become broken and cannot be shut down properly.
- Suspend the selected virtual machines or Linux-based Containers (**Suspend**). This operation is similar to putting a regular computer to sleep. The current virtual environment state (including the state of all running applications and processes) is saved to a special file on the host. After returning from the suspended mode, the virtual environment resumes operation from the same state it has been in before suspension.
- Back up the selected virtual environments (**Back Up**).
- Migrate the selected virtual environments a physical server registered in Virtuozzo Automator (**Migrate**).
- Clone the selected virtual environments (**Clone**).
- Delete the selected virtual environments (**Delete**).
- Configure the general settings of the selected virtual environments (**Configure**).
- Convert the selected virtual machines to templates (**Convert to template**).
- Clone the selected virtual environments to templates (**Clone to template**).

Notes:

1. You can perform operations on multiple virtual environments only if they are based on the same virtualization technology.
2. You can also perform operations on a single virtual environment from its summary screen accessible by clicking that virtual environment's name.

The sections of this chapter describe operations on multiple virtual environments in more detail. For operations specific to Containers or virtual machines, see **Managing Containers** (p. 56) and **Managing Virtual Machines** (p. 117), respectively.

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Starting to Create Virtual Environments

First of all, you should decide on the virtual environment type. You can create either a Container, or a virtual machine.

If you need to have virtual environments with guest OS different from the hosting physical server OS, create and use virtual machines. Using Virtuozzo virtual machines, you can have a wide range of guest OSs installed in them. At the same time, you can create Virtuozzo Containers. Their operating system should always coincide with the operating system of the hosting server. But they are less resource consuming than virtual machines.

Hardware Node Selection

Select the physical server where the created virtual environment is to reside. You can choose one of the following options:

- **Select Hardware Node Automatically.** Check this option to let the wizard automatically choose a physical server from the list of servers registered in VA Control Center. If you are going to make a Container, you should additionally indicate the server platform in the **Specify a Platform** list.

- **Select Hardware Node Manually.** Check this option if you wish to select the physical server yourself. In this case, you will be able to select the desired physical server in the **Select Node** list.


Virtual Environment Configuration

Specify the number of virtual environments you wish to create. By default, only one virtual environment is created. You can additionally select the template to be used as the basis for the virtual environment creation in the **Virtual Environment Template** (p. 163) list. If you create a virtual environment on the basis of a template, a new MAC address, different from the template's MAC, will be generated.

To proceed with the virtual environment creation, click **Next**. Your further steps will differ depending on whether you are creating a Container (p. 60) or virtual machine (p. 119).

Starting, Stopping, Pausing and Restarting Virtual Environments

A virtual environment may be started up, restarted, paused, and shut down like an ordinary computer. Depending on the virtual environment state, only those operations are accessible that comply with its current state. For example, a running virtual environment cannot be started for obvious reasons, and so on. The following virtual environment states can be characterized as stable:

Status	Description
Running	The virtual environment is running; therefore, it may only be restarted or stopped.
Down	The virtual environment is stopped; therefore, it may only be started.
 Repairing	The virtual environment is being repaired. You cannot perform any action on the virtual environment until you click the Finish Repair button on the Start Container in Repair Mode page (p. 102).

The current status of the virtual environment is available in the **Status** table of the virtual environment dashboard. The history of the status changes can be viewed from the **Logs -> Tasks** page of the virtual environment.

Note: Some operations are available either for virtual machines or Containers. For example, only virtual machines can be paused.

Besides these states, during virtual environment operations a virtual environment may be in one of the transitional states: mounting, starting, stopping, etc. When in a transitional state, you cannot perform any action on the virtual environment until the operation is finished. For descriptions of all possible virtual environment statuses, see **Physical Server, Container and Virtual Machine Statuses**.

Click the **Start Virtual Environment**, **Stop Virtual Environment**, or **Restart Virtual Environment** button to perform the corresponding action. On clicking one of these buttons, this action is logged.



If you are managing a virtual environment residing on the physical server with the Linux operating system installed and wish to stop your virtual environment, bear in mind that there is a two-minute timeout for the virtual environment shutdown scripts to be executed. If the virtual environment is not stopped in two minutes, the system forcibly kills all the processes in the virtual environment. The virtual environment will be stopped in any case, even if it is seriously damaged. To avoid waiting for two minutes if you are operating a virtual environment that is known to be corrupt, you may use the **Power Off** link, that is situated in the **Tasks** section of the virtual environment dashboard.

Suspending and Resuming Virtual Environments

A virtual environment can be suspended or resumed like an ordinary computer. Depending on the virtual environment state, only those operations are accessible that comply with its current state. For example, a running Container cannot be resumed for obvious reasons, and so on.

You may temporarily suspend the virtual environments if you need to restart the physical server hosting them. After the restart, the virtual environments can be easily resumed.

To suspend a virtual environment, you can do one of the following:

- Expand the name of any physical server listed under the **Infrastructure** or **Logical View** items in the left Virtuozzo Automator pane and choose **Suspend** from the Virtuozzo Automator context menu.
- Click the **Suspend** button in the **Tasks** section on the virtual environment **Summary** tab.
- Click the **Infrastructure** item, go to the **Virtual Environments** tab, select the check box to the left of the virtual environment you want to suspend, and click the **Suspend** button.
- Select a physical server, go to the **Containers** or **Virtual Machines** tab (it depends on the virtualization software installed on the physical server), select the check box to the left of the virtual environment you want to suspend, and click the **Suspend** button.

To resume a virtual environment, you can do one of the following:

- Expand the name of any physical server listed under the **Infrastructure** or **Logical View** items in the left Virtuozzo Automator pane and choose **Start** from the Virtuozzo Automator context menu.
- Click the **Start** button in the **Tasks** section on the virtual environment **Summary** tab.
- Click the **Infrastructure** item, go to the **Virtual Environments** tab, select the check box to the left of the virtual environment you want to resume, and click the **Start** button.
- Select a physical server, go to the **Containers** or **Virtual Machines** tab (it depends on the virtualization software installed on the physical server), select the check box to the left of the virtual environment you want to resume, and click the **Start** button.

Changing Virtual Environment Root/Administrator Password

A virtual environment(s) administrator can benefit from the **Change Password** option on the screen where, to perform this operation, you should enter a new root/Administrator password for the current virtual environment into the fields provided and click **Change**.

Note that Virtuozzo Automator does not check the entered password as to its length and non-conformity to dictionary entries, so choosing a simple password rests entirely at your own risk. It is recommended to use a chaotic set of lowercase (a-z) and uppercase (A-Z) letters, digits (0-9), and punctuation marks as root/administrator password. The following punctuation marks are allowed: ! " \$ % & , () * + - . / ; : < = > ? [\] ^ _ { | }. The space character, #, and @ symbols are not allowed. The password should not be less than 5 or more than 14 characters.

Note: The password of the Virtuozzo hosts administrator proper can be changed on the **Personal Settings** tab of the **User Profile** screen which is displayed through the **User Profile** link on the right of the Virtuozzo Automator toolbar.

Setting Power Panel Access for Customers

Providing a particular customer with an access to a particular virtual environment stands for sending the customer the virtual environment Administrator/root login and password after the virtual environment has been created. The privacy of this information ensures the customer being the only user of the subject virtual environment.

Virtuozzo Automator does not provide any built-in instruments for binding a specific customer to a concrete virtual environment.

When creating a virtual environment, please be aware of the notes concerning the control panels functionality - that is Virtuozzo Power Panel and Plesk Control Panel. Thus, the Virtuozzo Power Panel is susceptible to the network adapter type and can be used only with the **Bridges** or **Host-Only** network adapters.

After the virtual environment creation, provide the customer with the IPv4 or IPv6 address (or hostname) and TCP port of the virtual environment proper.

Additionally, the **Power Panel Policy** (p. 194) functionality is aimed at creating a set of rules (i.e. a policy) that restrict users access to certain functionality in Virtuozzo Power Panel or set limitations on performing certain operations in the virtual environment context. You can create a Power Panel policy to be assigned deliberately to a concrete virtual environment or use one and the same policy for numerous virtual environments.

Managing Containers


This section contains information on how to create, use, and manage Virtuozzo Containers.


Container Dashboard Overview

The Container dashboard is divided into five sections, each reflecting the following Container details:

Status section


The section provides the following information:

- The current status of the Container.
- The information on the resources consumption by the Container: coming close to, reaching, or going beyond the limits set for the Container generates a resources alert.
- The current status of the templates and packages. The Container software which does not suggest updating is marked as **Up-to-date**.
- The hostname of the physical server where the Container is hosted (it is possible to migrate the Container to another one).
-  The Container last 1, 5, and 15 minutes system load averages.
- The last performed and next scheduled backups.
- The total period of time during which the Container has been on without rebooting or stopping.

With the  icon, you can migrate the Container from one physical server to another, create a backup or schedule a backup task.

Configuration section

The data to be found in the **Container Configuration** section have to do with the Container identity - you can see its name and ID (you can set a new Container ID by clicking **Change**). Additionally, you may learn what sample defines the settings of the Container (and apply another one by clicking **Change**), and see what OS template the Container is based on (and update the OS template by clicking **Update**), and which application templates are currently installed in it (and add a new application template or remove an installed one by clicking **Add/Remove**).

With the  icon, you can change the container name or ID, update the OS software, manage Container applications or apply a new template.

Network Configuration section

The section allows you to see:



- the Container hostname (if set);
- the information on the IP addresses of the Container `eth` (bridged) and `venet0` (routed) interfaces. The information is available only if the IP addresses were set during the Container creation.

With the  icon, you can change the Container hostname.

Tasks section

The section provides quick access to performing the following operations:



Operate

- Starting or stopping the Container (the **Start/Stop** link). Depending on the Container state, only that operation is accessible that complies with its current state.
- Restarting the Container (the **Restart** link).
-  If you are managing a virtual environment residing on the physical server with the Linux operating system installed and wish to stop your virtual environment, bear in mind that there is a two-minute timeout for the virtual environment shutdown scripts to be executed. If the virtual environment is not stopped in two minutes, the system forcibly kills all the processes in the virtual environment. The virtual environment will be stopped in any case, even if it is seriously damaged. To avoid waiting for two minutes if you are operating a virtual environment that is known to be corrupt, you may use the **Power Off** link.
-  suspending the selected Container(s): a suspended Container stays put, and so its processes and services do, to be later resumed from the checkpoint. Suspending Containers is a good method to disengage the Hardware Node recourses for a certain period of time or saving the state of current operations which can be quickly launched again afterwards. Remember, that repairing, restarting and reinstalling a suspended Container can change the saved state of the Container, so these actions are not recommended for suspended Containers.





Note: The availability of the start/stop/restart/suspend operations depends on the Container current status. Both VA Control Panel and Power Panel display the same operations (start/stop/restart/suspend) being available at a moment.

Configure


- Changing the Container name, description, OS template version, start-up and offline management options (the **General Settings** link (p. 105)).
- Changing the root/Administrator password of the Container (the **Password** link).

- Changing the Container hostname, IP address, DNS server IP address and search domains and configuring the mode of the Virtual Network adapters (the **Network Settings** link (p. 226)).
- Configuring the network bandwidth of the outgoing traffic for this Container (the **Network Shaping** link). To define the default Container network shaping settings on the given physical server, see the **Configure Shaping** screen.
- Changing the resources share allocated to the Container (the **Resources** link).
-  Activating the firewall and configuring its mode (the **Firewall** link).
-  Configuring the virtual disk volumes of the Container (the **Volumes** link). The C: volume is always present in the Container as the mount point for the `root.efd` image file.
- Changing the Container resources configuration by changing the template the Container is based on (the **Apply Template** link).

Manage

-  Connecting to the Container via SSH (the **Terminal Login** link).
-  Connecting to the Container via VNC (the **Open Console** link).
-  Logging in to the Container via Remote Desktop Connection (the **Remote Desktop** link).
- Launching Virtuozzo Power Panel to manage the Container in a separate window (the **Open Power Panel** link).
- Installing new applications to or uninstalling existing ones from the Container (the **Software** link).
-  Managing the services running on the Container except for the `xinetd`-dependent services (the **Services** link).
- Managing the Container files and folders (the **Files** link).
- Backing up the Container, renewing or removing the existing backup, restoring the Container (the **Backups** link).
- Manage the policies on the Container level. The policies set on the level will be applied to the given Container only (the **Power Panel Policies** link).
- Creating a Container clone (the **Clone** link).
- Cloning a Container to template (the **Clone to Template** link).
- Removing the Container if you don't need it any more (the **Delete** link).

Maintenance

- Getting detailed information on Container resources consumption (the **Resources Monitor** link).
- Configuring all the parameters of the backup operation and performing that operation on the current Container (the **Back Up** link).
-  Saving important data from the damaged Container and repairing the Container by creating a new temporary Container (the **Repair** link).




- Recovering the original state of the Container in case you have unintentionally modified, replaced, or deleted any file that is part of an application or OS template, and the action has brought about the Container malfunction (the **Reinstall** link).
- Moving the Container to another physical server or converting it into a virtual machine (the **Migrate** link).



Resources section

The section summarizes the information on the current consumption of the CPU, memory and disk share allocated to the Container: the **Resources** column lists these resources, the **Used**, **Free**, and **Total** columns display the corresponding values in percentage terms and in diagrams. The percent value is calculated not in proportion to the total disk space of the Hardware Node, but in proportion to the quota on using the Node disk space by the Container.

Note: CPU and memory statistics for Windows-based Containers will be displayed as "n/a" if performance counters are disabled on the hardware node.

Apart from the operations available in the **Tasks** section, the Virtuoizzo Automator toolbar provides you with access to the following operations:

- starting or stopping the Container (the **Start/Stop** link);
- restarting the Container (the **Restart** link);
- backing up the Container (the **Backups** link on the **Manage** menu);
- launching Virtuoizzo Power Panel to manage the Container (the **Open Power Panel** link on the **Login** menu). You can use this feature if:
 1. The offline management for the Container is enabled.
 2. A valid IP address is assigned to the Container.
 3. The IP address you have used to log in to Virtuoizzo Automator does not coincide with that of the corresponding Container.
-  connecting to the Container via SSH (the **Terminal Login** link on the **Login** menu);
-  logging in to the Container via Remote Desktop Connection (the **Remote Desktop** link on the **Login** menu);
-  suspending the selected Container(s): a suspended Container stays put, and so its processes and services do, to be later resumed from the checkpoint. Suspending Containers is a good method to disengage the Hardware Node recourses for a certain period of time or saving the state of current operations which can be quickly launched again afterwards. Remember, that repairing, restarting and reinstalling a suspended Container can change the saved state of the Container, so these actions are not recommended for suspended Containers;
- changing the Container name, description, resources management configuration and start-up and offline management options (p. 105) (the **General Settings** link on the **Configure** menu);

- changing the root/Administrator password of the Container (p. 105) (the **Password** link on the **Configure** menu);
- changing the network settings (p. 226) (the **Network** link on the **Configure** menu);
- configuring the network bandwidth (the **Shaping** link on the **Configure** menu);
- changing the Container resource settings (the **Resources** link on the **Configure** menu);
-  configuring the virtual disk volumes of the Container (the **Volumes** link on the **Configure** menu);
-  changing the firewall settings (the **Firewall** link on the **Configure** menu);
- changing the Container resources configuration by changing the template the Container is based on (the **Apply Template** link on the **Configure** menu).
- installing new Container applications (the **Software** link on the **Manage** menu);

Creating Containers

Having chosen to create a Container as described in **Starting to Create Virtual Environments** (p. 52), you can proceed to define general and network settings, customize and validate resource settings, install applications, and review the resulting configuration. This section describes these operations in detail.

Defining General Settings

The second page of the **New Container** wizard enables you to define the Container general settings that are divided into several groups for your convenience. You can choose between creating a single Container and multiple Containers by entering the necessary number on the first step of the Container creation wizard, and it is only in the latter case that the **Multiple Container Configuration** group is displayed.

The **General Configuration** group enables you to perform the following operations:

- Provide a name and a description for the Container; available when configuring settings for a single Container only. If you need a specific name and description for one of Containers created simultaneously, you can assign them after the Containers are created (p. 105).
- Choose an OS template and its version you wish the Container to be based on.
- Start the Container after its creation;

The **Multiple Container Configuration** group appears if you are creating more than one Container at a time. Following is an explanation of the five drop-down menus that you find in this group:

- **Container IDs**

Option	Description
Assign Container IDs automatically	Virtuozzo Automator will assign Container IDs randomly.

Assign Container IDs starting from a specified one	On the following screen, you will be able to specify the Container ID for the first Container created. Other Container IDs will be assigned based on the sequential incrementation of this first Container ID.
Set Container IDs manually	On the following screen, you will be able to specify the Container IDs manually for each Container.

- **Names**

Assign names based on a specified template	On the following screen you will be able to specify a template for assigning Container names, with the Container ID as the changing part.
Set names manually for every Container	On the following screen you will be able to specify the Container names manually for each Container.

- **Hostnames**

Assign hostnames based on a specified template	On the following screen you will be able to specify a template for assigning Container hostnames, with the Container ID as the changing part.
Set hostnames manually for every Container	On the following screen you will be able to specify the Container hostnames manually for each Container.

- **Routed Interface IP Addresses**

Assign according to the Container template	The host-routed interface settings are taken from the Container template used to create the Containers. These settings just define if the host-routed interface is created inside the Containers (one interface in each Container). If it is created, its IP address is taken from the global IP addresses pool.
Get from the global IP addresses pool	The IP addresses for the host-routed interfaces will be taken from the global pool of IP addresses (that can be configured on the IP Address Pool tab of the Setup --> Network screen).
Assign from a specified IP addresses range	On the following screen you will be able to specify the IP address for the first Container created. All the remaining Container IP addresses will be assigned based on the sequential incrementation of this first IP address.
Specify manually for every Container	On the following screen you will be able to specify the IP addresses manually for each Container.

- **Bridged Interface IP addresses**

Assign according to the Container template	The bridged interface settings are taken from the Container template used to create the Containers. These settings define the number of bridged interfaces to be created inside each Container, and if this number is 1 or more, whether their IP addresses are received from the DHCP server or is taken from the global IP addresses pool.
Get from the DHCP server	The IP addresses for the bridged interfaces will be received from the DHCP server.
Get from the global IP addresses pool	The IP addresses for the bridged interfaces will be taken from the global pool of IP addresses (that can be configured on the IP Address Pool tab of the Setup --> Network screen).

Assign from a specified IP addresses range	On the following screen you will be able to specify the IP address for the first Container created. All the remaining Container IP addresses will be assigned based on the sequential incrementation of this first IP address.
Specify manually for every Container	On the following screen you will be able to specify the IP addresses manually for each Container.

In the **Administrative Password** group, you should define and confirm the root/Administrator password. You will need this password to access the Container in the future, for example, through Virtuozzo Power Panel.


Note: Remember that each virtual environment user with the privileges of an administrator exercises full control over his/her virtual environment, has his/her own user credentials (name and password) to access the virtual environment and enjoys an unlimited access to other user accounts inside this virtual environment, i.e. s/he has any right granted to a privately owned physical server as opposed to the physical server administrator's authority or the rights of the other virtual environments users in regard to the given virtual environment. Any virtual environment user can be a member of an Active Directory domain (e.g. access any of the network shares to which the virtual environment user has rights).

The **Advanced Configuration** group allows you to do the following:

- Specify the Container ID, a 32-bit (ranging from 0 to 4294967295) integer number over 100. This option is available only if you are creating a single Container. For detailed information on Container ID allocation, see the *Virtuozzo Containers for Windows User's Guide*.

WARNING! When deciding on a Container ID, do not use the ID of any Container that was ever present in the system unless you are sure that no data belonging to the old Container remains on the physical server. The fact is that the administrator of the newly-created Container might have access to these data in this case, i.e. to the backups of the old Container, its logs, statistics, etc.

- Specify the paths to the Container Private Area and Root Directory;
- Have the Container started on every boot of the physical server.

 The **Capabilities** subgroup of options in the **Advanced Configuration** group appears if you are creating more than one Container at a time. It enhances the operation of the Windows-based Containers you are creating by providing you with the ability to:

- Switch on the network browsing feature for the Container being created. The Windows 2003 browser service allows the Container on a Windows 2003 network to view the whole network environment available. The browser service maintains a list (called the browse list) of all available domains and computers. The browse list can be viewed using Windows 2003 Explorer and is provided by a browser in the Container. The default for the feature is the off status. You can learn more on the option from the **Network Places overview** article of the Windows 2003 **Help** system invoked by selecting **Help and Support** on the Windows **Start** menu.
- Allow the packet QoS scheduler for the Container. This is one of the Quality of Service components in MS Windows 2003 Server that enable differentiation and preferential treatment for subsets of data transmitted over the network. The packet scheduler is the traffic control module that regulates how much traffic various applications are allowed, essentially enforcing the QoS parameters that are set for each particular application. For instance, you can use the feature to restrict a web site throughput to a certain maximum bandwidth value or differentiate


between the data transmitted by critical applications (e.g. Plesk) and excessive data (e.g. multimedia applications), and allow preferential treatment for the important web sites or critical applications. The option is disabled by default. For additional information on the packet scheduler, address the **MSDN Library > Win32 and COM Development > Network Protocols > Quality of Service (QOS)**

(http://msdn.microsoft.com/library/default.asp?url=/library/en-us/qos/qos/qos_start_page.asp).

Note: The concept of Quality of Service in MS Windows 2003 Server differs from that of Virtuozzo Quality of Service used to provide a fair share of the main system resources (disk space, CPU time, etc.) among Containers.

- Have the Container ID displayed on the Container desktop when connected to it by the RDP protocol.
- Enable/disable the Microsoft Cluster Server (MSCS) software to run inside the Container. The MSCS software integrated into the Windows Server 2003 operating system is designed to allow servers to work together as one server, thus, providing greater reliability for your applications and services. Running one and the same application on two or more servers in the cluster helps ensure high application availability if one of the servers fails. The clustering software controls the failover process so that the application continues running on the second server without any loss of data and without interruption in service. The Virtuozzo Containers software allows you to include Containers in a server cluster so that they can act as full participants (nodes) in the cluster. To learn more about the MSCS software, address **MSDN Library > Servers and Enterprise Development > Windows Server > Windows Server 2003 > Technical Articles > Introducing Microsoft Cluster Service (MSCS) in the Windows Server 2003 Family** (<http://msdn2.microsoft.com/en-us/library/ms952401.aspx>).

To enable/disable any of the features listed under the **Advanced Configuration** group, select/clear the corresponding check box.

 The **Terminal Services** group allows you to define in which one of the two standard Windows TS modes (Remote Desktop for Administration and Terminal Server) the created Containers will operate. By default, any Container is automatically set to work in the Remote Desktop for Administration mode during its creation. So, you do not need to perform any additional operations to start connecting to Containers using this mode. Like in any other system with Windows Server 2003 installed, the Remote Desktop for Administration mode allows you to simultaneously open no more than two remote sessions and a console session to any Container on the physical server.

If you are planning to have more than 2 remote sessions to a Container at the same time, you should enable the Terminal Server mode for this Container. You may also need to switch on this mode in case some of the Container applications require Terminal Server for their functioning. While set in the Terminal Server mode, the Container starts using the same Terminal Server License (TSL) server as the physical server does. So, you can log in to the Container in this mode provided the TSL server for the physical server is accessible by the Container and has a number of free client access licenses (CALs) installed. You can also redefine the TSL server to be used by the Container or set additional TSL servers for it in the **License Server Address** field.

The **Offline Management** group allows you to set the offline service options by selecting the appropriate option. Offline Service of the corresponding Container ensures the Container manageability by means of one or more offline services from any browser at its own IP address.

After offline service is enabled for the Container, one port of its IP address becomes permanently active whatever the Container state. The currently supported services are Virtuozzo Power Panel and Plesk Control panel (for managing Containers with the Plesk control panel installed in them). You can:

- Disable the offline service of the Container.
- Enable the offline service of the Container via the offline service settings operating on the physical server. Whenever you need to manage the Container offline, its offline service settings will be brought into synchronization with those in effect on the physical server. Should any service be removed from the default services list, the Container will be unable to be managed via the service off the list. This option subscribes the Container to the default offline services.
- Manually compose the Container offline services list. You can select the service(s) you would like the Container to be subscribed to in the corresponding checkbox(es).



The **Feature Management** group allows you to toggle various features supported in Linux-based Containers.



The **Device Access Management** group allows you to set access rights for devices attached to the Container.

The **Permissions** group lets you create one or more permissions for the Containers to be created. As any permission is by definition a combination of a user or a group of users and a role in respect of a certain Virtuozzo Automator object, you can indicate the corresponding user/group and role in the provided fields, thus creating a permission with respect to the Containers being created. To add more permissions, click the green plus sign to the right of the fields.

Click **Next** to submit the settings and move on to the next **New Container** wizard stage.

Specifying Multiple Container IDs, IP Addresses, and Hostnames

The **New Containers: Multiple Configuration** screen comes after determining the general Container settings.

You need to set the following:

- **Container IDs.** Depending on what you have specified on the General Settings screen, you will let Virtuozzo Automator assign Container IDs automatically or will need to manually specify the starting Container ID, or every Container ID.
- Container **Names** and **Hostnames**.

When assigning Container names and hostnames, remember that both fields should contain the `@ctid@` tags. Those tags will be automatically replaced with suitable IDs for all Containers you are creating. For example, if you are creating 4 Containers and have entered `MYCT@ctid@` in the hostname field, and 105 is the highest Container ID on the hardware node, then Containers with the following hostnames will be created: MYCT106, MYCT107, MYCT108, and MYCT109.

- **Network** parameters.

The IP addresses can be assigned, if at all, either manually or on the "start from the one specified" basis, which means entering an IP address only once for the 1st Container of the Containers you are creating, with all the rest of the Containers IP addresses being calculated from this one. If you are creating 4 Containers and have entered 10.10.0.1 to the **IP Address / Subnet Mask** field, then the Containers will be created with these IP addresses: 10.10.0.1, 10.10.0.2, 10.10.0.3, and 10.10.0.4.

Click **Next** to proceed to customizing Container resources.


Configuring Container Network Parameters

The **Network Configuration** page lets you define all the major network parameters of the Container you are creating. For more information, see **Configuring Container Network Parameters** (p. 226).




Customizing Resource Settings

The **Resources Customization** screen allows you to adjust the resources the Container being created. For more information, see the descriptions of Linux-related **CPU** (p. 72), **disk** (p. 74), and **memory** (p. 75) resources; or Windows-related **CPU** (p. 73), **disk** (p. 75), and **memory** (p. 78) resources.

Validating Resource Configuration


 The system resource control parameters have complex interdependencies, or constraints. Violation of these interdependencies can be catastrophic for the Container. In order to ensure that the Container under creation does not break them, it is important to validate the Container configuration file before creating Containers on its basis.

The utility checks constraints on the resource management parameters and displays all the constraint violations found. There can be three levels of violation severity, represented by the following icons on the Container dashboard:

 Recommendation	This is a suggestion, which is not critical for the Container or physical server operations. The configuration is valid in general; however, if the system has enough memory, it is better to increase the settings as advised.
 Warning	A constraint is not satisfied, and the configuration is invalid. The Container applications may not have optimal performance or may fail in an ungraceful way.
 Error	An important constraint is not satisfied, and the configuration is invalid. The Container applications have increased chances to fail unexpectedly, to be terminated, or to hang.

After setting the reasonable values for the parameters, the Container can be safely run.

Installing Applications into Containers

 The **New Containers: Application Selection** page of the **New Container** wizard allows you to choose applications to install them to the Container directly after its creation. All available applications that can be added to the Container are listed in the **Available Applications** table in the left part of the displayed page. The type and number of applications vary depending on the OS template the Container will be based on, i.e. only those applications are displayed that are compatible with the Container OS template.

To add the applications you need to the Container, tick the check boxes opposite the applications you wish to add and click the **>>** button. After that, the applications appear in the **Scheduled for Installation** table in the right part of the page. To remove any application from the Container being created, tick its check box in the **Scheduled for Installation** table and click the **<<** button. If you are not sure what applications you need to add to the Container, you can add them after the Container has been created, as is described in **Managing Container Applications**.

After you have selected the applications to be installed and checked their dependencies, click the **Next>** button.

Reviewing Container Configuration

The last page of the **New Container** wizard lets you review the major settings of the Container configuration you provided on the previous steps. If you are satisfied with the information entered, click **Create** to start creating the Container. Otherwise, you can return to the previous steps by clicking the **Back** button and change the corresponding parameters.

Logging In to Containers

Accessing Containers via Virtuozzo Power Panel

Virtuozzo Power Panel is the tool designed for the administrators of a particular Container. A Virtuozzo Automator user can also use it to take a closer look at a particular Container (provided the corresponding rights are granted to them).

Virtuozzo Power Panel can be opened in one of the following ways:

- On a list of Containers, right-click the needed Container, then select **Log In -> Open Virtuozzo Power Panel**;
- On the Container dashboard, select **Log In -> Open Virtuozzo Power Panel** on the top toolbar;
- On the Container dashboard, click **Open Virtuozzo Power Panel** in the **Tasks** group of links.


Sometimes it is not possible to open Virtuozzo Power Panel due to the following reasons:

- An IP address might not be assigned to the corresponding Container;
- Offline service might be disabled globally on the physical server;

- Offline service might be disabled for the corresponding Container (though enabled globally).

So, to make sure Virtuozzo Power Panel can be opened for any Container, you should enable Offline Service both globally and for the particular Container, as well as assign this Container an IP address.


Accessing Containers via SSH

 You can use the Secure Shell (ssh) application to remotely connect to running Containers and work in their directory trees using standard Linux command line tools. To connect to a running Container via `ssh`, make sure you have the Java Virtual Machine installed on your computer (you can also launch Virtuozzo Automator in the Internet Explorer). For more information, see **Accessing Physical Servers via SSH** (p. 45).

Notes:

1. If your Container is running a Windows Server operating system, see **Accessing Containers via RDP** (p. 67) to learn to manage Containers by means of Remote Desktop Connection.
2. To learn the port numbers that should be open to ensure a successful SSH connection, refer to <http://kb.virtuozzo.com/en/9516>.


Accessing Containers via VNC

 In Virtuozzo Automator, The **VNC Console** screen displays the VNC console opened to the Container. You can use the **Refresh** button to update the displayed information, if necessary.

If the VNC connection to the Container could not be established, check the following:

- The Sun Java(TM) plug-in and JRE are installed and enabled in your browser.
- The server where the Container resides is running Server Bare Metal.
- The Container is running.


Accessing Containers via RDP




 You can use Remote Desktop Connection, a standard Windows tool, to connect to a running Container via the Remote Desktop Protocol (RDP). The feature is only available for the Internet Explorer. For more information, see **Accessing Physical Servers via RDP** (p. 45).


Notes:

1. For Linux-based Containers, see **Accessing Containers via SSH** (p. 45) to learn to manage the Container by means of Secure Shell.
2. To learn the port numbers that should be open to ensure a successful RDP connection, refer to <http://kb.virtuozzo.com/en/9516>.

Managing Virtual Environment Files and Folders

For a running virtual environment, you can navigate inside the virtual environment directory structure, list the virtual environment files and directories and perform all essential file operations on the **File Manager** page. ( Container. Right after opening this screen, you are presented with a list of drives inside the Container. Click a drive (e.g. C:) to see its contents.) The main information on the directory/drive contents is presented in the form of a table.

Column Name	Description
Type	The type of the object: a folder or a file.
Name	The name of the directory or file.
Size	The size of the file.
Modified	The date and time of the last modification of the directory or file.
 Permissions	The first symbol in this column indicates if this is a directory (the letter d) or not (the minus sign). The following three symbols designate the permissions that the owner of the directory/file has on it, then go another three symbols for the permissions of the users belonging to the group assigned to the directory/file, and the final set of three symbols denotes the permissions of all the rest. The symbols in each of the set express consecutively the following permissions: read, write, and execute. The presence of a letter (correspondingly, r, w, or x) indicates that the permission is given, and the minus sign - that it is absent.
 User	The owner of the file/directory.
 Group	The users' group that has certain permissions on the file/folder. These permissions are presented by the 5th thru 7th symbols in the Permissions column.
Actions	Hyperlinks for performing certain operations with the directory or file (see below).

 **Note:** If the Container is being repaired (p. 102), the file manager root directory (/) corresponds to the `/repair` directory of the temporary Container, in other words, it represents the root directory of the problem Container, not that of the newly-created one.

Apart from viewing a list of files and directories with their essential properties, you are able to perform the following operations:

- Create a new folder in the current directory (p. 69);
- Create a new text file in the current directory (p. 69);
- Edit existing text files (p. 69);
- Upload a file from your local computer to the current virtual environment directory (p. 69);

- Download a file from the current virtual environment directory to your local computer (by clicking the diskette icon in the **Actions** column);
- Copy any number of files or folders to another directory inside the virtual environment (p. 70);
- Move any number of files or folders to another directory inside the virtual environment (p. 70);
- Edit the properties of any folder or file (p. 70);
- Remove any number of files or folders by selecting them and following the **Remove** link.

To perform a certain operation (e.g. copying) on a number of directories or files, tick the corresponding check boxes. The uppermost check box allows you to select all the directories and files at once.

Creating Folder

On the Create Folder screen, you can add a new folder and specify its name in the Folder Name field. Upon finishing the operation, click **Create** to save the changes. The new folder will be created in the current directory (designated above the field).

You can access the **Create Folder** screen from the **File Manager** section by clicking the **Create Folder** button.

Creating Text File

The **Create File** page allows you to create simple text files directly inside the virtual environment, without uploading them from your local computer.

In the **Specify File** section, you should enter the name of the file to be created in the current directory (this directory is indicated under the page heading) to the **Name** field and, optionally, type the text of the file in the **Content** field. Click **Create** when you are finished to create the new file.

Editing Text File

Virtuozzo Automator allows you to edit any text file inside your virtual environment directly through the Virtuozzo Automator interface. The **Edit File** page can be accessed by clicking on the right icon in the **Actions** column for the corresponding text file on the **File Manager** page.

This page presents the contents of the file in an editable field. Make your modifications and click **Submit** to write a new version of the file.

Uploading File to Virtual Environment

The current version of Virtuozzo Automator allows you to upload external files to the virtual environment, up to ten files at a time. The **Upload File** page is displayed after clicking the **Upload File** link on the **File Manager** page.

Click the **Browse** button, navigate to the local file you wish to upload and double-click it. The path to the file will be displayed in the corresponding **Specify File** field. Another way of indicating the file is to enter this path manually.

When you click **Upload**, the files that you have specified will be uploaded to the current directory inside the virtual environment. For your reference, this directory is indicated above the **Specify File** group.

Copying Files and Folders Inside Virtual Environment

The **Copy File(s)** page, where you can perform the copy operation, gets displayed after you have selected one or more files and/or folders by ticking the corresponding check boxes on the **File Manager** page and clicking **Copy**.

On the **Copy File(s)** page, click **Select** and, in the pop-up window, navigate to the folder where you want to copy the files and/or folders, check the radio button to the left of it, and press **Select**. The path to the target folder will be displayed in the **Destination Path** field. Click **Copy** to begin the copy process.

Moving Files and Folders Inside Virtual Environment

The **Move File(s)** page, where you can perform the move operation, gets displayed after you have selected one or more files and/or folders by ticking the corresponding check boxes on the **File Manager** page and clicked **Move**.

On the **Move File(s)** page, click **Select** and, in the pop-up window, navigate to the folder where you want to move the files and/or folders, check the radio button to the left of it, and press **Select**. The path to the target folder will be displayed in the **Destination Path** field. Click **Move** to begin the move process.

Editing File or Folder Properties

The page where you can view and edit some properties of a certain file or folder is accessible by clicking the leftmost icon in the **Actions** column for the corresponding file or folder on the **File Manager** page.

The information is given on the following file or folder general properties, whether editable or not:

Field	Description	Editable?
Name	The name of the file or folder.	Yes.
Path	The path to the file or folder inside the virtual environment.	No. See Moving Files and Folders Inside virtual environment for information on how to change the path.
Size	The size of the file. To save the time needed to open the page, a link is given for a folder to calculate its overall size.	No.

Modified	The date and time of the last modification of the file or folder.	No.
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 Container. You can also change such file/folder properties as permissions and ownership.

When you click **Submit** on the **Change Properties** page, your changes will be applied to the given file or folder.

Managing and Monitoring Container Resources

To open the **Container Monitor** subtab, go to **Infrastructure** > physical server > Container > **Resources** tab > **Container Resources** subtab.

The **Container Monitor** screen shows the graphical statistics on CPU, memory and disk resource consumption in percentage, i.e. how much of the physical server resources this Container consumes.

Also, the **Container Monitor** screen allows viewing the disk and traffic incoming/outgoing statistics for the specified period.

Each resource has its own colour on the chart. If you need to monitor the changes only for one resource, whatever it is, you can disable the others. Use the **Select Graph** subsection.

The chart shows the changes for the defined period. In the **Graph Period** subsection, select whether to show the data for a particular date, month, year or for any other period of time. To implement the changes, click **Apply**. The chart will change its appearance.


Partially, the information on resource consumption is available on the Container **Summary** page (p. 56).

The **Export Data** link allows you to export the graphical data in the CSV format.

Note: The Container network and system resources can also be monitored via SNMP. For more information, see **Monitoring Virtuozzo Objects via SNMP** (p. 282).

Resources Overview

The **Overview** subtab summarizes the current CPU, system and disk usage by the Container in the following table:

CPU Usage	<p>This figure shows current CPU utilization in percent.</p> <p> Load Average for the CPU usage is the average number of active processes for the past 1, 5, and 15 minutes, respectively. Value 0.0 means that the CPU is idle, 1.0 that the CPU is fully used. Value 2.0 denotes that the CPU load exceeds the nominal value by two times.</p>
Memory Usage	<p>This is a cumulative figure presenting the average consumption of a number of critical memory-related parameters by your Container.</p>

Disk Usage	<p>Disk Space is a total amount of disk space allocated to the Container. When the space used by the Container hits the soft limit (or reaches 100% on the percent bar), the Container can be allowed additional disk space up to the hard limit during the grace period.</p> <p>Disk I/O is a cumulative figure presenting how much of the allowed disk i/o bandwidth is used by the Container and how much is still available up to the limit.</p>
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The information on the disk and memory usage is organized as follows:

Column Name	Description
Resource	The name of the resource: memory, disk space, disk i/o bandwidth or disk inodes.
Used	Consumed amount of memory, disk size, disk /o resource or the number of inodes.
Free	Available amount of memory, disk size, disk /o resource or inodes number.
Total	The total amount of memory, disk size, disk /o resource or inodes.

CPU Resources

Linux-related CPU Resources

The CPU-related resource management is based on the following parameters:

Parameter	Description
<code>cpuunits</code>	This is a positive integer number that determines the minimal guaranteed share of the CPU time your virtual environment will receive.
<code>cpulimit</code> <code>cpulimit_mhz</code>	This is a positive number indicating the CPU time, in percent or megahertz, the corresponding virtual environment is not allowed to exceed.
<code>burst_cpulimit</code>	The CPU power limit, in percent, the virtual environment cannot exceed. The limitations set in this parameter are applied to the virtual environment when it exceeds the limit specified in the <code>burst_cpu_avg_usage</code> parameter.
<code>burst_cpu_avg_usage</code>	The CPU usage limit, in percent, set for the virtual environment. This limit is calculated as the ratio of the current virtual environment CPU usage to the CPU limit (i.e to the value of the <code>CPULIMIT</code> parameter) set for the virtual environment. If the limit is not specified, the full CPU power of the physical server is considered as the CPU limit. Upon exceeding the <code>burst_cpu_avg_usage</code> limit, the <code>burst_cpulimit</code> limit is applied to the virtual environment.
<code>cpus</code>	The number of CPUs set to handle all the processes inside the given virtual environment. By default, any virtual environment is allowed to consume the CPU time of all processors on the physical server.

The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.

Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current VirtuoZZo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Soft Limit	The limit on the consumption of the given resource by the Container that can be exceeded only if the system is not fully loaded. The units in which the limit is measured are specified in the Units column.
Hard Limit	The limit on the consumption of the given resource by the current Container that cannot be exceeded under any circumstances. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Windows-related CPU Resources

The CPU-related resource management is based on the following parameters:

Parameter	Description
<code>cpuunits</code>	This is a positive integer number that determines the minimal guaranteed share of the CPU time your virtual environment will receive.
<code>cpulimit</code>	This is a positive number indicating the CPU time, in percent, the corresponding virtual environment is not allowed to exceed.
<code>cpuguarantee</code>	This is a positive integer number indicating the CPU time, in percent, the corresponding virtual environment is guaranteed to receive. If both the <code>cpuguarantee</code> and <code>cpuunits</code> parameters are set, the <code>cpuguarantee</code> parameter is first taken into account when distributing processor time among the virtual environments existing on the physical server; the remaining CPU time, if any, is given to the virtual environment in accordance with the value of the <code>cpuunits</code> parameter.
<code>cpus</code>	The number of CPUs set to handle all the processes inside the given virtual environment. By default, any virtual environment is allowed to consume the CPU time of all processors on the physical server.






The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.
Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current VirtuoZZo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Limit	The limit on the consumption of the given resource by the Container. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Disk Resources

Linux-related Disk Resources

The disk-related resource management is based on the following parameters:

Parameter	Description
diskspace	Total size of disk space consumed by the virtual environment.  When the space used by the virtual environment hits the soft limit, the virtual environment can allocate additional disk space up to the hard limit during the grace period indicated by the <code>quotatime</code> parameter value.
 <code>diskinodes</code>	Total number of disk inodes (files, directories, and symbolic links) allocated by the virtual environment. When the number of inodes used by the virtual environment hits the soft limit, the virtual environment can create additional inodes up to the hard limit during the grace period indicated by the <code>quotatime</code> parameter value.
 <code>quotauidlimit</code>	Number of user/group IDs allowed for the virtual environment internal disk quota. If set to 0, UID/GID quota will not be enabled.
 <code>quotatime</code>	The grace period for the disk quota overusage defined in seconds. The virtual environment is allowed to temporarily exceed its quota soft limits for no more than the <code>QUOTATIME</code> period.
 <code>ioprio</code>	The virtual environment priority for disk I/O operations. The allowed range of values is 0-7. The greater the priority, the more time the virtual environment has for writing to and reading from the disk. The default virtual environment priority is 4.
<code>iolimit</code>	The bandwidth the virtual environment is allowed to use for its disk input and output operations.
<code>iopslimit</code>	The maximum number of disk input and output operations per second a Container is allowed to perform.

The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.
Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current VirtuoZZo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Soft Limit	The limit on the consumption of the given resource by the Container that can be exceeded only if the system is not fully loaded. The units in which the limit is measured are specified in the Units column.
Hard Limit	The limit on the consumption of the given resource by the current Container that cannot be exceeded under any circumstances. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Windows-related Disk Resources

The disk-related resource management is based on the following parameters:

Parameter	Description
diskspace	Total size of disk space consumed by the virtual environment.

The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.
Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current Virtuozzo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Limit	The limit on the consumption of the given resource by the Container. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Memory Resources

Linux-related Memory Resources

This screen displays information on the memory-based or system-based virtual environment resources, or both, depending on your memory configuration:

- If the memory management mode is enabled for the virtual environment, it can be allocated memory in much the same way as a certain amount of physical memory is installed on a physical computer. This is the recommended mode for managing virtual environments for most administrators.
- If the system management mode is enabled, the virtual environment's performance depends on the values of quite a number of fine-grained parameters. The primary parameters are the starting point for defining the relative power of a virtual environment. The secondary parameters are dependent on the primary ones and are calculated from them according to a set of constraints. The auxiliary parameters help improve fault isolation among applications in a virtual environment and the way applications handle errors and consume resources.
- If both resource management modes are used, the more restrictive value is taken into account each time the system makes the decision whether to allocate this or that resource to the virtual environment.

Memory parameters

Parameter	Description
<code>slmmemorylimit</code>	An approximation of the size of the physical memory allocated to the virtual environment. In other words, the virtual environment performance is similar to the performance of a physical computer with as much physical memory installed as is indicated in this parameter.

Primary system parameters

Parameter	Description
<code>numproc</code>	The maximal number of processes the virtual environment may create.
<code>numtcpsock</code>	The number of TCP sockets (PF_INET family, SOCK_STREAM type). This parameter limits the number of TCP connections and, thus, the number of clients the server application can handle in parallel.
<code>numothersock</code>	The number of sockets other than TCP ones. Local (UNIX-domain) sockets are used for communications inside the system. UDP sockets are used, for example, for Domain Name Service (DNS) queries. UDP and other sockets may also be used in some very specialized applications (SNMP agents and others).
<code>vmguarpages</code>	The memory allocation guarantee, in pages. <code>r</code> applications are guaranteed to be able to allocate additional memory so long as the amount of memory accounted as <code>privmpages</code> (see the auxiliary parameters) does not exceed the configured barrier of the <code>vmguarpages</code> parameter. Above the barrier, additional memory allocation is not guaranteed and may fail in case of overall memory shortage.
<code>avnumproc</code>	The average number of processes and threads.

Secondary system parameters

Parameter	Description
<code>kmemsize</code>	<p>The size of unswappable kernel memory allocated for the internal kernel structures for the processes of a particular virtual environment.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: For the Containers 64-bit version for IA-64 processors, it takes 4 (four) times more the size of the kernel memory than that for the Virtuozzo Containers 32-bit version to handle one and the same process.</p> </div>
<code>tcpsndbuf</code>	The total size of send buffers for TCP sockets, i.e. the amount of kernel memory allocated for the data sent from an application to a TCP socket, but not acknowledged by the remote side yet.
<code>tcprcvbuf</code>	The total size of receive buffers for TCP sockets, i.e. the amount of kernel memory allocated for the data received from the remote side, but not read by the local application yet.
<code>othersockbuf</code>	The total size of UNIX-domain socket buffers, UDP, and other datagram protocol send buffers.
<code>dgramrcvbuf</code>	The total size of receive buffers of UDP and other datagram protocols.
<code>oomguarpages</code>	The out-of-memory guarantee, in pages. Any virtual environment process will not be killed even in case of heavy memory shortage if the current memory consumption (including both physical memory and swap) does not reach the <code>oomguarpages</code> barrier.

privvmpages	The size of private (or potentially private) memory allocated by an application. The memory that is always shared among different applications is not included in this resource parameter.
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Auxiliary system parameters

Parameter	Description
lockedpages	The memory not allowed to be swapped out (locked with the <code>mlock()</code> system call), in pages.
shmpages	The total size of shared memory (including IPC, shared anonymous mappings and tmpfs objects) allocated by the processes of a particular virtual environment, in pages.
numfile	The number of files opened by all virtual environment processes.
numflock	The number of file locks created by all virtual environment processes.
numpty	The number of pseudo-terminals, such as an ssh session, screen or xterm applications, etc.
numsiginfo	The number of siginfo structures (essentially, this parameter limits the size of the signal delivery queue).
dcachesize	The total size of dentry and inode structures locked in the memory.
numiptent	The number of IP packet filtering entries.

Notes: The parameters containing "pages" in their names are measured in 4096-byte pages in the Virtuozzo Containers 32-bit version and in 16384-byte pages in the Virtuozzo Containers 64-bit version for IA-64 processors. In the Virtuozzo Containers 64-bit versions, all the system parameter values are 64-bit and, therefore, can exceed the values in the Virtuozzo Containers 32-bit version (where the parameters values are 32-bit). For example, the limit of the `oomguarpages` parameter in the Virtuozzo Containers 64-bit version for IA-64 processors can be maximally set to 9223372036854775807 instead of 2147483647 in the Virtuozzo Containers 32-bit version. To learn more about the difference between the Virtuozzo Containers 64-bit and 32-bit versions turn to the **Virtuozzo Containers for 64-bit Processors** section of the *Virtuozzo Containers User's Guide*.

The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.
Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current Virtuozzo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Soft Limit	The limit on the consumption of the given resource by the Container that can be exceeded only if the system is not fully loaded. The units in which the limit is measured are specified in the Units column.
Hard Limit	The limit on the consumption of the given resource by the current Container that cannot be exceeded under any circumstances. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Windows-related Memory Resources

The memory-related resource management parameters are divided into 4 groups: memory parameters, primary system parameters, secondary system parameters, and auxiliary system parameters.

Windows-based virtual environments use only the primary system parameters.

Primary system parameters

Parameter	Description
numproc	The maximal number of processes the virtual environment may create.
numsessions	The number of simultaneous terminal sessions that can be opened to the virtual environment.
vprvmem	The size of private (or potentially private) memory allocated by the virtual environment. The memory that is always shared among different applications is not included in this resource parameter.

Notes: The parameters containing "pages" in their names are measured in 4096-byte pages in the Virtuozzo Containers 32-bit version and in 16384-byte pages in the Virtuozzo Containers 64-bit version for IA-64 processors. In the Virtuozzo Containers 64-bit versions, all the system parameter values are 64-bit and, therefore, can exceed the values in the Virtuozzo Containers 32-bit version (where the parameters values are 32-bit). For example, the limit of the `oomguarpages` parameter in the Virtuozzo Containers 64-bit version for IA-64 processors can be maximally set to 9223372036854775807 instead of 2147483647 in the Virtuozzo Containers 32-bit version. To learn more about the difference between the Virtuozzo Containers 64-bit and 32-bit versions turn to the **Virtuozzo Containers for 64-bit Processors** section of the *Virtuozzo Containers User's Guide*.

The information on the available parameters is presented in the table with the following columns:

Column Name	Description
Parameter	The name of the resource parameter.
Current Usage	Indicates the consumption of the corresponding resource by the Container at the moment of calling the current Virtuozzo Automator page. The units in which the consumption is measured are specified in the Units column. If the current usage is not available (n/a), it means that either the Container is not running, or the nature of the resource does not suggest its changing over time.
Limit	The limit on the consumption of the given resource by the Container. The units in which the limit is measured are specified in the Units column.
Units	The units in which the resource values are measured.
Description	The description of the resource parameter.

Changing Container Resource Parameters

This screen allows you to adjust the resources of the selected virtual environment. For more information, see the descriptions of Linux-related **CPU** (p. 72), **disk** (p. 74), and **memory** (p. 75) resources; or Windows-related **CPU** (p. 73), **disk** (p. 75), and **memory** (p. 78) resources.

You can also edit Container resource values via `ssh` by using the `vzctl` utility. You will need to use the `--save` option to have the edited UBC parameters reported by VirtuoZZo Automator or VirtuoZZo Power Panel. For more information, see the *VirtuoZZo Containers Reference Guide*.

Changing Disk Quota for Multiple Containers

You can specify a new disk quota for a bunch of your Containers at once on the **Configure: Set Container Disk Limits** page.

The **Containers Disk Usage Current Statistics** table lets you take in the current disk quota and usage for all the selected Containers at a single glance.

In the **Change Containers Disk Quota** group there are three major options to set a defined disk quota for the Containers:

- Use the **Set Disk Quota to** option to specify an exact size of the disk space each Container is allowed to consume.
- Use the **Increase Disk Quota by** option to have the quota increased by a specified amount for each Container. So, if two or more Containers had different disk quotas before, the latter will remain different because the increase is the same.
- Use the **Decrease Disk Quota by** option to have the quota decreased by a specified amount for each Container. So, if two or more Containers had different disk quotas before, the latter will remain different because the decrease is the same.

To further tune the disk usage, set the inodes limit you think is reasonable for the total number of files you have or are going to have on each Container disk. In the **Change Containers Disk Inodes Limit** group you can:

- Set an inodes density value and use the **Calculate the disk inodes limit using the inodes per KB ratio option**;
- Set an inodes limit value to depend on the current Container inodes density;
- Manually enter an inodes limit value;


Just enter the desired number into the corresponding field, choose the proper units of measurements and click **Submit**.

Note: When performing the operation, bear in mind that the disk quota for a Container cannot be less than the size of the disk space already occupied by this Container (you can learn it from the **Resources** table on the **Summary** tab).

The two remaining options in both groups speak for themselves - select **Set unlimited Disk Quota/Inodes** to remove any disk space/inodes restrictions for the selected Containers, or select **Do not change Disk Quota/Inodes Limit** to leave the current disk space restrictions intact.

Applying New Container Templates

Any Container is configured by means of its own Container template (a configuration file used as an archetype to reproduce all its settings for a Container based on it). The **Apply template to Container** page enables you to change the Container template the Container is based on and, thus, to change all the resources the Container may consume and/or allocate at once.

In the **Original Container template** table at the top of the page, you can view the name and description of the current Container template the Container is based on ( the information is not available currently for the Containers running the Windows operating system).

The **Select Library Container template** table allows you to choose another configuration template to base the Container on by selecting the radio button against the corresponding Container template. All available Container templates listed are supplied with the following information: the name and brief description of the Container template.

To facilitate working with Container templates, you may have the **Select Library Container template** table display only those Container templates that have the corresponding name or a certain word in their description. On top of the table, press the **Show Search** link to display the fields where you can specify the parameters the given Container template should meet; then click on the **Search** link. To view all available Container templates, click on the **Reset Results** link to the right of the **Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.



The **Advanced Options** group allows you to have the Container restarted if the parameters setup for the selected template requires restarting.

Note: Before applying a new Container template to a Container, make sure you are aware of the resource values defined in this Container template and to be set for the Container. Detailed information on Container templates is provided in the **Managing Container templates** section.

Applying New Container Template to Multiple Containers

You can specify a new Container template for a bunch of your Containers at once on the **Configure: Apply Container template** page.

You should select the relevant Container template on the **Container templates** list, then click **Next** to choose from the template Quality of Service parameters to be applied to the Containers, if needed.

Viewing Container Logs

Viewing Container Task Logs

The **Tasks** subtab lists recent operations on the selected Container. For more details on information shown, see **Viewing Infrastructure Task Logs** (p. 32).

Viewing Container Alert Logs

The **Alerts** subtab lists resource consumption alerts for the selected Container. For more details on information shown, see **Viewing Infrastructure Alert Logs** (p. 32).

Viewing Container Event Logs

The **Events** subtab lists status changes of the selected Container. For more details on information shown, see **Viewing Infrastructure Event Logs** (p. 34).

Adjusting Container Template Resource Parameters for Multiple Containers

The **Configure: Review Resources** page allows you to specify what resource parameters from the selected template should be applied to the Containers. You can decide whether a parameter needs to be applied by selecting the corresponding check box.

For the description of Linux-related resources, refer to these subsections:

- **Linux-Related CPU Resources** (p. 72),
- **Linux-Related Disk Resources** (p. 74),
- **Linux-Related Memory Resources** (p. 75).





For the description of Windows-related resources, refer to these subsections:

- **Windows-Related CPU Resources** (p. 73),
- **Windows-Related Disk Resources** (p. 75),
- **Windows-Related Memory Resources** (p. 78).

Managing Container Services and Processes

Virtuozzo Automator allows you to manage services and processes inside Containers in a number of ways. You can:

- Open a list of principal services inside your Container through the **System Services** link with the opportunity to start, stop, restart any of them and control their autostart option.

- Open a list of processes running inside the Container by clicking the **System Processes** link with the opportunity to send various signals to any of the processes.
-  Log in to the Plesk control panel via the **Plesk Control Panel** link in case the corresponding template is installed in the Container. If the Plesk template is not installed, the **Plesk Control Panel** link is not displayed. Instead you can make use of the **Install** link provided in lieu of the **Plesk Control Panel** link to install the Plesk control panel in the Container.
-  Log in to the Confixx control panel by choosing the **Confixx control panel** link in case the corresponding template is installed in the Container. If the template is not installed, the **Confixx control panel** link is not displayed. The feature is available for a Linux-based Container.
-  Create or change your firewall settings by clicking on the **Firewall** link.
- Providing you have installed a Site Builder application template to this Container, you can use it by clicking the **Site Builder** link.
-  If the name-based hosting is enabled on the physical server, you can edit the **Name-Based Hosting** settings for this Container.

Managing Container Services

The process of managing services inside Container running the Windows operating system and the Linux operating system varies slightly:

- To learn how to manage services in virtual environment running the Linux operating system, please see the **Managing Services in Linux** subsection.
- To learn how to manage services in virtual environment running the Windows operating system, please see the **Managing Services in Windows** subsection.

Managing Services in Linux

The **System Services SysV** subtab is used to view all the services you are running on the Container except for the `xinetd`-dependent services. To see the `xinetd`-dependent services list, click the **System Services Xinetd** subtab. By default, 20 services are shown on the screen, but you may have more services displayed by pressing the appropriate link on top of the table. You may also have the **System Services** table display only those services that have a particular name or status. On top of the table, press the **Show Search** link to display the fields where you can specify the name or the status of the service you wish to view; then click on the **Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

The **System Services SysV** screen presents a table reflecting the services inside the Container and providing the following information:

Column Name	Description
Name	The system ID of the service executable file.
Status	Indicates whether the service is running or not. A green arrow means that the service is running; a red cross - that it is stopped.

Autostart	If there is a green tick in this column, this service is started automatically on the Container startup; if a red cross - it is not.
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Note: This table displays only those services that are listed in the configuration file `etc/opt/pva/cc/standart-services.xml`. placed in the Container directory `/vz/root/1`.

With the help of the Virtuozzo Automator toolbar you can perform the following actions on any service in the table:

- Start the service by selecting its check box and clicking **Start Service**.
- Restart the service by selecting its check box and clicking **Restart Service**.
- Stop the service by selecting its check box and clicking **Stop Service**.
- Enable/disable the autostart feature by selecting the service(s) and clicking **Enable/Disable Autostart**.

All the above and a service description are available on the screen which opens by clicking the name of the service in the **Name** column.

Note: If you have just started the Container and opened the **Services** page, not all the services may have had enough time to start. Wait a little and refresh the page to update the state of the services.

Managing xinetd-Dependent Services

The **System Services Xinetd** subtab is used to view all the services you are running on this Container that are dependent on the `xinetd` service. To see the other services, click the **System Services SysV** subtab. By default, 20 services are shown for each tab, but you may have more services displayed by pressing the appropriate link on top of the table. You may also have the **System Services** table display only those services that have a particular name or status. On top of the table, press the **Show Search** link to display the fields where you can specify the name or the status of the service you wish to view; then click on the **Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

The **System Services Xinetd** page presents a table reflecting the `xinetd`-dependent services inside the Container and providing the following information:

Column Name	Description
Name	The system ID of the service executable file.
Status	Indicates whether the service is enabled or not. A green arrow means that the service is enabled; a red cross - that it is disabled.
Autostart	If there is a tick in this column, the <code>xinetd</code> service is started automatically on the Container startup, so is the given service; if a cross - it is not.

Note: This table displays only those services that are listed in the configuration file `etc/vzcp/standart-services.xml`. placed in the Container directory `/vz/root/1`.

You can perform the following actions on any service in the table:

- Enable the service by selecting its check box and clicking on the **Enable** button on the VirtuoZZo Automator toolbar. Only disabled services are subject to this action.
- Disable the service by selecting its check box and clicking on the **Disable** button on the VirtuoZZo Automator toolbar. Only enabled services are subject to this action.

Viewing Service Details

The **Service Details** screen provides the principal information on the given service and lets you manage it.

The following information is provided:

- The description of the service;
- Whether the service is running or stopped;
- Whether the service is started automatically on the Container startup or not.

You may perform the following actions on any such service:

- Stop the service by clicking the **Stop Service** button. Only running services are subject to this action.
- Restart the service by clicking the **Restart Service** button. Only running services are subject to this action.
- Start the service by clicking the **Start Service** button. Only stopped services are subject to this action.
- Enable/disable the autostart feature by clicking the **Enable Autostart/Disable Autostart** button, correspondingly.


Viewing xinetd-Dependent Service Details



The **Service Details** screen provides the principal information on the given service and lets you manage it.

As the service is dependent on the xinetd service, i.e. xinetd is charged with launching the service when necessary, you can only either enable or disable such a service — depending on its current state — by clicking the **Enable/Disable Service** button, correspondingly. Moreover, the xinetd service must be running to perform any such action; otherwise, the operation will result in an error. You cannot manage the autostart feature of xinetd-dependent services, as its value is inherited from the xinetd service.

Managing Services in Windows

 The **System Services** page is displayed when clicking the **System Services** link on the Services tab of the Container dashboard. It presents the table reflecting those services inside your Container that you can manage. The table provides the following information:

Column Name	Description
Name	The name of the service running inside your Container.
Status	Indicates whether the service is running or not.
Startup Type	Indicates whether: <ul style="list-style-type: none"> The service is started automatically on the Container startup; The startup type of the service is set to <code>SERVICE_DISABLED</code>; The service can be launched only manually.
Ligon as	Indicates the user account (the <code>LocalService</code> account, the <code>NetworkService</code> account, etc.) that was used to start the service.

You can perform the following operations on any service in the table:

- Stop the service by selecting its check box and clicking on the **Stop** button.
- Restart the service by selecting its check box and clicking **Restart**.
- Start the service by selecting its check box and clicking on the **Start** button.
- Open the **Services Details** page to enable/disable the autostart feature by clicking on the name of the service in the Name column.

To facilitate working with Container services, you may have the **System Services** table display only those services that have a particular name, startup type (automatic, manual, disabled), are in a certain state (running or stopped), or were started by a certain user. On top of the table, press the **Show Search** link to display the fields where you can specify the parameters your services should meet; then click on the **Search** link. To view all the services currently running inside your Container, click on the **Reset Results** link to the right of the **Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

Note: If you have just started the Container and opened the **Services** page, not all the services may have had enough time to start. Wait a little and refresh the page to update the state of the services.

Viewing Service Details

 The **Service Management** page opened on clicking the name of the service you have selected on the **System Services** page allows you to change the startup type of your Container services:

- Make a service automatically start on the Container startup by selecting **Automatic** in the drop-down list of the **Startup Type** field and clicking on the **Submit** button.




- Set a service as "manual" meaning that you should start the service manually before it can be loaded by the operating system and made available for use. To this effect, select **Manual** and click on the **Submit** button.
- Disable a service by selecting **Disabled** in the drop-down list and clicking on the **Submit** button.

Note: Changing the default service settings might prevent key services from running correctly. It is especially important to use caution when changing the startup type of services that are configured to start automatically.

In the **Dependencies** section you can find out what system components depend on the selected service. You can also view the system components your service depends on, if there are any. You should always take into account the service dependencies before changing its settings. This information is very important since if a service is stopped or is not functioning properly, the dependent services may also be affected.


Managing Container Processes


The **System Processes** page is displayed when clicking the **Service > System Processes** link. It presents a table reflecting all the running processes inside the Container. The table provides the following information:

Column Name	Description
PID	The process ID.
%CPU	The percent of the CPU time the process is currently using.
 %MEM	The percent of the RAM size the process is currently using.
Command	The command that is used to launch the process.
 Nice	The relative priority of the process assigned to it by the user. The negative values mean that the user has manually increased the priority, the positive values - that they have decreased it.
Pri	The absolute priority of the process assigned to it by the process scheduler. On a Linux physical server, the range is from 0 (the highest priority) to 39 (the lowest priority). The usual process priority is 30. On a Windows physical server, the range can be from 0 (the highest priority) to 31 (the lowest priority). The usual process priority is 8.
RSS	(Resident Segment Size) The size of physical memory the process really uses (in Kilobytes).
 Stat	The state of the process. The possible states are: R - runnable, on the run queue; S - sleeping; T - traced or stopped; D - uninterruptable sleep; Z - defunct, "zombie". If two letters are shown, the second letter means the following: W - has no resident pages; < - high-priority process; N - low-priority task; L - has pages locked in memory; s - the process is a session leader; "+" means the process is in the foreground process group of its control terminal.
Time	The total amount of the CPU time the process has used so far.
User	The user the process belongs to.

To have the information in the table refreshed automatically with the current values, click the **Enable Autorefresh** button. It is worthy to note that only the table on the current page is refreshed, which takes much less resources in comparison with refreshing the whole Virtuozzo Automator page.

Note: The table is available only for a running Container. If the table cannot be accessed, Power Panel suggests possible actions.

 On a Windows physical server, you may select any number of processes by ticking the check boxes against the corresponding processes (tick the uppermost check box to select all the processes at once) and end them by clicking the **End Process** button.

 On a Linux physical server, you may select any number of processes by ticking the check boxes against the corresponding processes (tick the uppermost check box to select all the processes at once) and send them a standard signal. Choose the needed signal on the drop-down menu and click the **Send Signal** button. The following signals can be sent:

- **SIGHUP** - is a hang-up signal. It is often used to ask a daemon process to re-read its configuration.
- **SIGTERM** - sends the termination signal to the process. This is the best way to give the process a chance for an orderly shutdown and proper data saving. As the process might be able to catch this signal and stay alive, you may have to make use of the `sigkill` or `sigint` signals.
- **SIGCONT** - continues the process causing it to resume.
- **SIGSTOP** - stops (suspends) the process. The process will still be on the task list.
- **SIGINT** - causes the process to immediately interrupt. The signal is very close to `sigkill`, the difference being that, unlike `sigkill`, it can be caught by the process and ignored if the process gets out of hand. In this case you should send `sigkill` to shut down the process.
- **SIGKILL** - unconditionally kills the process. Mind that sending `sigkill` to any process removes any chance for it to do a tidy cleanup and shutdown, which might have unfortunate consequences.

Managing Container Applications


Applications can either be added to the Container by means of the corresponding Virtuozzo templates or installed in the Container as individual software packages.

The **Applications** subtab of the Container **Software** tab allows you to do the following:

- view the applications added to the Container as application templates (both EZ and standard) as well as their up-to-date status.
- if some of the applications are not up to date (i.e. the updated versions of the corresponding templates or template packages are available on the physical server), update them by clicking the **Update Container Software** button on the toolbar.
- add more applications available on the physical server or delete unnecessary ones by clicking **Manage Applications** and performing these actions on the screen that opens.

Managing Container Application Templates

The **Manage Applications** button on the **Applications** subtab of the Container **Software** tab opens the screen that allows you to manage applications available to the Container. On this page, you can:

- View the applications already installed in the Container. These applications are listed in the **Installed/Scheduled Applications** table in the right part of the page.
- Install new applications to the Container. To add any of the applications from the **Available Applications** table to the Container, tick the corresponding check boxes and click on the **>>** button. After that, the applications appear in the **Installed/Scheduled Applications** table in the right part of the page. Clicking the **Submit** button starts the installation process.
- Delete those applications from the Container that are not needed any more. To remove any application, tick the corresponding check box in the **Installed/Scheduled Applications** table and click on the **<<** button. After that, the application appears in the **Available Applications** table in the left part of the page. Click the **Submit** button to start the deletion process.
-  Check unresolved dependencies among the selected applications with the help of the **Resolve** button. To eliminate unresolved dependencies, you can remove one of the problem applications from the **Installed/Scheduled Applications** table as explained above.

Note: Only standard template based Container application dependencies require resolving. If you are managing a Container based on an EZ template, the **Resolve** button is not present on the screen.

Adding Application Templates to Multiple Containers

It is possible to add one or more application templates simultaneously to a multitude of Containers on the **Configure: Add Software to Containers** page (accessible by selecting the Containers on the list, clicking **Configure** and selecting the **Add Software to Containers** option). The available templates are listed in the **Select Applications to Install** group. There are two conditions for being able to add the templates listed under that group to the Containers in question:

- 1 They should be installed on all the physical servers where the respective Containers are situated.
- 2 They should be compatible with all the Containers for which this operation is performed.

Select the check boxes beside those applications that you want to add to the Containers. You also have the option to start those Containers that are stopped to be able to add the templates to them. Otherwise, the templates will not be added to the Containers that are not running.

Click **Next** to review your operation details and start the software installation.

Removing Application Templates From Multiple Containers


It is possible to remove one or more application templates simultaneously from a multitude of Containers on the **Configure: Remove Software From Containers** page (accessible by selecting the Containers on the list, clicking **Configure** and selecting the **Remove Software From**

Containers option). The templates that are added to all the Containers in question and thus can be removed from all of them are listed in the **Select Applications to Remove** group.

Select the check boxes beside those applications that you want to remove from the Containers. You also have the option to start those Containers that are stopped to be able to remove the templates from them. Otherwise, the templates will not be removed from the Containers that are not running.

Click **Submit** to start the software uninstallation.

Managing Container Software Packages

 Virtuozzo Automator enables you to install, update, and uninstall rpm and deb packages in Containers based on EZ OS templates.

Note: The Container you want to manage software packages in has to be running.

You can obtain the information on the packages currently installed in the Container in the **Installed Packages** table, presented as follows:

Column Name	Description
Name	The name of the package.
Epoch	Indicates the version of a deb package or the version of an rpm package in case the version of the rpm package is not available.
Version	The version of an rpm package.
Arch	The processor architecture; if the column shows the "noarch" value, the packet is likely to be either non-executable or contain documentation.
Summary	A short description of the package.
Status	Shows if there is a fresher version of the package: Up-to-date or Update Found .

The **Installed Packages** table displays from 10 up to 80 packages; the default number is 20 and can be changed by clicking **10**, **40**, or **80** on top of the table. To see the next portion of packages, click either the number of the page next to the one you are having at the moment, or **next** (or **last**, to view the last page).


If the status of a package in the **Installed Packages** table suggests that an update is available, you can select this package and click the **Update** link on the Virtuozzo Automator toolbar. To update all those packages that you can see on the page, select the uppermost check box and click **Update**. If you need to run update for all the packages installed in the Container, do not select anything - simply click the **Update All** icon on the Virtuozzo Automator toolbar.

To uninstall a package, select it (or select the uppermost check box to uninstall all the packages listed on the page), and click **Uninstall**.

The Virtuozzo Containers software can query the repository where the packages for your distribution are stored for new packages available for downloading and install them in your Container. To connect to the repository, fetch a list of the packages, see the packages description,

and download and install in your Container the packages you need, click **Install Packages** on the Virtuozzo Automator toolbar.

Installing Software Packages in Container

 The Virtuozzo Containers software can connect to your Linux distribution download packages repository to form a list of packages ready to be downloaded to your physical server and installed in your Container. All these operations are available on the **Install New Packages** screen.

Note: A repository can be a place where multiple files are located for distribution over a network, or a repository can be a location that is directly accessible to the user without having to travel across a network. Therefore connecting to your repository might involve either going to the web site repository (e.g. Fedora Core or Red Hat), or to the repository, created on your physical server. For information on creating a local repository, refer to the **Setting Up Repository for EZ Templates** section in the **Virtuozzo Containers Templates Management Guide**.



On the **Install New Packages** screen you can obtain the following information on the packages:

Column Name	Description
Name	The name of the package.
Epoch	Indicates the version of a deb package or the version of an rpm package in case the version of the rpm package is not available.
Version	The version of an rpm package.
Arch	The processor architecture; if the column shows the "noarch" value, the packet is likely to be either non-executable or contain documentation.

The **Available Packages** table can display 10, 20, 40 or 80 packages, the default number is 20 and can be changed by clicking **10**, **40**, or **80** on top of the table. To see the next portion of packages, click either the number of the page next to the one you are having at the moment, or **next** (or **last**, to view the last page).

To install a package, select its check box (or the uppermost check box, to install all the packages shown in the table) and click **Install**.

Managing Container Control Panels

There are a number of control panels that can be installed on the physical server in the form of templates and added to any Container hosted on that physical server. Among such control panels are Plesk,  Sitebuilder, and  Confixx.

The **Control Panels** subtab of the **Software** tab of the Container dashboard provides a single place for managing all these control panels in this particular Container. It goes without saying that the control panel template must be installed on the Node for the panel to be manageable on this screen.

The two major management operations that can be performed here are:

- adding the control panel template to the Container (the **Install** link), which ensures that this Container can be managed by the given control panel.
- logging in to the control panel to begin managing the Container with its help (the **Login** link). This is possible only if the control panel template has already been added to the Container.

Note: In the case of the Plesk control panel, the **Login** link is called **Manage** and leads to the screen where you can not only log in to Plesk but also change the Plesk admin password.

Updating Container Software

The **Update Software** page allows you to update the OS and application packages in the given Container by adding available templates updates (in the case of standard Container templates) or updating Container packages directly (in the case of Virtuozzo EZ templates). The **Update Software** page is available on clicking the **Update Container Software** link on the Virtuozzo Automator toolbar, which becomes visible if you are currently located on the **Application Templates** subtab of the Container **Software** tab.

The page will display the relevant information in one of three ways:

- 1 If no updated templates for the given Container have been installed on the physical server or no updated packages are found in the repository, the page just informs you of this fact.
- 2 If the Container uses standard Virtuozzo templates and one or more updated versions of the corresponding template(s) are installed on the physical server, you are able to select an updated version for adding to the Container.
- 3 If the Container uses Virtuozzo EZ templates and updated packages for the given Container can be found in the repository, you are able to select the packages that you wish to update inside the Container.

Two options for customizing the update process are available on clicking the **Configure Updating** group:

- The **Force software update** option tells the system to perform the update even if unresolved dependencies are met during the process;
- The **Jump over several upgrades instead of adding them sequentially** option can be used if two or more sequential updates are found for this or that template.

Click **Update** to update the templates/packages you have selected for the given Container.

Updating Software in Multiple Containers

The OS and application packages can be updated simultaneously in a multitude of Containers by adding available templates updates (in the case of standard Container templates) or updating Container packages directly (in the case of Virtuozzo EZ templates). All the currently available OS and application packages updates will be installed to the selected Containers. This is done on the **Configure: Upgrade Containers Software** page. For instructions on updating Container templates, refer to **Updating OS and Application**.

Two actions for customizing the update process are available on clicking the **Configure Updating** group:

- The **Force software update** action tells the system to perform the update even if unresolved dependencies are met during the process;
- There is no way to update a stopped Container. If some of the Containers you selected for updating are not running, select the **Start the stopped Containers** check box. The Containers that are not running will then be started only to be updated and stopped again.

Click **Update** to update the selected Containers. To return to the previous page, or cancel upgrading click **Back** and **Cancel**, accordingly.

Cloning Containers



You can create a complete copy of a particular Container (in respect of all the Container data and resource parameters), or a Container *clone*. This is a good means to save your time since you do not bother about setting the Container configuration parameters and the like. Moreover, you can create a number of Container clones at a sitting by opening the Containers page, selecting the ones to be cloned and clicking the **Clone** link.

The option is available on the **Clone Container** page which enables you to define the name, hostname, password, offline service, and set the advanced settings for the Container being created.

The **General Settings** section enables you to:

- Provide a name for the Container clone.

The **Network Settings** section lets you:

- Set a hostname of the Container. Mind that the range of symbols for the Container hostname is limited.  For a Windows Node, the hostname may start singularly with a-z, A-Z or an underscore (_), contain further any of the following symbols: a-z, A-Z, 0-9, _ , - and have a-z, A-Z, 0-9 or _ at the end. The maximum number of symbols is 15.  For a Linux-based Container, the hostname should consist of a-z, 0-9, _ , and may have a point in the middle. The number of symbols should not exceed 256.

In the **New Password** section, you can set a new password for the Container clone. In this case you provide the password in the **Administrative password** field and confirm it in the field below. You can leave the field blank though to use the password from the cloned Container. The password is needed to access the Container in the future, for example, through Virtuozzo Power Panel.

The **Advanced Settings** section lets you:

- Specify the Container ID, a 32-bit (ranging from 0 to 4294967295) integer number over 100 (For more information on Container ID allocation, see the *Virtuozzo Containers for Windows User's Guide*);

- Start the Container after cloning.

The **Offline Management** group allows you to set the offline service options by selecting the appropriate option. Offline Service of the corresponding Container ensures the Container manageability by means of one or more offline services from any browser at its own IP address. After offline service is enabled for the Container, one port of its IP address becomes permanently active whatever the Container state. The currently supported services are Virtuozzo Power Panel and Plesk Control panel (for managing Containers with the Plesk control panel installed in them). You can:

- Disable the offline service of the Container.
- Enable the offline service of the Container via the offline service settings operating on the physical server. Whenever you need to manage the Container offline, its offline service settings will be brought into synchronization with those in effect on the physical server. Should any service be removed from the default services list, the Container will be unable to be managed via the service off the list. This option subscribes the Container to the default offline services.
- Manually compose the Container offline services list. You can select the service(s) you would like the Container to be subscribed to in the corresponding checkbox(es).

By default, the **Offline Service** radio button is set to the option used by the Container being cloned. You can change it to use another offline service mode for the new Container.

Note: The rest of the Container general settings (p. 60) are copied from the cloned Container by default.

Click **Clone** to initiate the creation of the Container clone or **Customize** to set up the remaining network settings of the new Container.


Configuring Clone Network Parameters


The **Clone Container - Configure Network** screen allows you to define what Virtual Network adapters the new Container will use and to configure the settings of these adapters. For more information, see **Configuring Container Network Parameters** (p. 226).

After deciding on the necessary parameters, click **Clone** to start the cloning procedure.

Cloning Multiple Containers

One of the easiest methods of creating new Containers of a certain type or particular configuration is cloning the old ones. Cloned Containers are exact replicas of the prototypes and can be created on the **Clone Containers** screen where you can:

- Specify a name and a hostname for each new Container clone. The number of sections to set these parameters is equal to the number of Containers you want to clone. Mind that the range of symbols for the Container hostname is limited.  For a Windows Node, the hostname may start singularly with a-z, A-Z or an underscore (_), contain further any of the following symbols: a-z, A-Z, 0-9, _ , - and have a-z, A-Z, 0-9 or _ at the end. The maximum number

of symbols is 15.  For a Linux-based Container, the hostname should consist of a–z, 0–9, _, and may have a point in the middle. The number of symbols should not exceed 256.

- If you need to start the clones immediately after they are created, select the **Start the Containers after cloning** check box in the **Post Procedures** section.

After entering the necessary data, click **Clone** to begin the cloning procedure, otherwise click **Cancel**.

Migrating and Converting Containers

The cases when you need to move your Containers from one physical server to another can be quite numerous. A migration can be performed to distribute the workload between physical servers, etc. On the **Migrate Containers** screen, you need to select the physical server you are going to move the Container to and select some additional options.

A Container can be migrated to:

- Same-platform physical server with the same operating system as the Container has.
- Server Bare Metal physical server. If you migrate a Linux-based Container, you can choose whether to convert the Container to a virtual machine or not. If you migrate a Windows-based Container, the Container will be automatically converted into the virtual machine with the Windows operating system. This is done, because virtual machines, in contrast to Containers, can have an operating system different from the hosting physical server OS.

Note: The physical server must be registered in the infrastructure. If you need to migrate the Containers to a physical server that has not been registered yet, this has to be done first.

Irrespective of the migration case, in the **Migration Options** section, consider the following:

- **Perform live migration to avoid service interruption.** By default, the Container, if running before the migration, is stopped. But you can leave it running even during the migration by selecting this option.
- **Remove the private areas from the source Hardware Node after the migration.** You can remove the Containers private areas (the directories to store the Containers files and other data) from the source physical server when the migration is finished, which lets you free some disk space. On the other hand, you might want to leave the private areas on the source physical server intact until you ascertain the migrated Container operates normally;
- **Do not start the Container after the migration.** If the Container was in a running state before the migration, it will automatically start after the migration is complete. But you can leave it stopped to perform some additional operations on it by choosing this option.
- **Force the migration. Ignore possible conflicts in IP addresses applications.** The Container migration happens even if its IP address might cause conflicts on the destination physical server or if the templates the Container uses are not installed there. Keep in mind that though it is possible to force the migration of such a Container, it might not be able to start on the destination physical server until the problems with IP addresses and/or templates are resolved.

Click the **Migrate** button if you are ready to initiate the Containers migration, otherwise click **Cancel**.

Migrating Container to Virtuozzo Physical Servers

To migrate a Container to a Virtuozzo physical server, do the following:

In the **Migration From** section, choose the physical server that will host the Container.

- 1 Choose the Virtuozzo physical server that will host the Container from the **To Hardware Node** drop-down list. Depending on the Container's operating system, the list will display only Windows or only Linux Virtuozzo physical servers.

Note: If you choose a Server Bare Metal physical server, you will also be able to convert the Container to a virtual machine. See the information below.

- 2 Specify the settings in the **Migration Options** section, if needed.
- 3 Click **Migrate** to continue.

Migrating Containers to Bare Metal Physical Servers

The **Migrate Containers** page allows you to migrate a Windows- or a Linux-based Container to a Server Bare Metal physical server and to convert it to a virtual machine.

To migrate a Container to such a physical server, do the following:

- 1 Choose the Server Bare Metal physical server that will host the Container from the **To Hardware Node** drop-down list.

The **Convert Containers to Virtuozzo Virtual Machines** option appears.

If you convert a Windows-based Container to a SBM physical server, the conversion to a virtual machine is obligatory, and the check box is automatically ticked off.

If you convert a Linux-based Container to a SBM physical server, the conversion is not obligatory, and you can choose whether to convert the Container into a virtual machine or not.

- 2 Specify other **Migration Options** if needed and click **Migrate** to continue.

The created virtual machine is an exact copy of the Container, i.e. it will have the same operating system and networking settings, memory size and CPU count, the whole scope of software programs and data stored in the Container, the same security and port redirection settings, etc. Moreover, the virtual machine will have the information on traffic, disk, CPU and memory usage recorded during the Containers activity.

Migrating Physical Servers to Containers

Virtuozzo Automator provides you with an effective tool - Virtuozzo Transporter - for a fast and reliable migration from a physical server to a Container. Migration of a stand-alone physical server to a virtual environment may be useful for a server using its available resources only partially, as the usage of the resources on the physical server hosting virtual environments is distributed efficiently

among the virtual environments. Therefore the physical server is never idle at the same time allotting the virtual environments enough resources to operate. You can benefit from the physical server to virtual environment migration by:

- Cutting down administrative and operations costs. Decreasing the number of physical servers under management reduces administrative overhead, as well as rack space, power, and hardware replacement costs.
- Reducing downtime costs. virtual environment allows you to back up your production environment, which can be rapidly deployed in the event of a system failure.
- Optimizing resource utilization. Each server under management is fully used; its resources are not wasted.

Improving standardization. Deployment of standard hardware allows for improved security and reliability across your organization's network as well as the streamlined management that virtual infrastructure brings. The migration procedure is rendered easy and smooth with the help of Virtuozzo Transporter which can be invoked by following the **Containers** link on the Virtuozzo Automator main menu or on the **Virtuozzo Automator** dashboard and then clicking on the **Migrate Server to Container** icon.

Note: Although the Virtuozzo Containers software allows you to migrate virtually any physical server running the Windows Server 2003/Windows Server 2008 or Linux operating system to a Container on your physical server, there are a number of limitations which should be taken into account before deciding on the migration process. To get detailed information on these limitations, please consult the *Virtuozzo Containers for Windows User's Guide*.

Setting Up Connection to Physical Servers

The starting point of the migrating procedure with Virtuozzo Transporter is establishing a connection to the physical server you wish to migrate.

To do this you need to specify the server IP address or hostname in the **IP Address or Hostname** field. The IP address and hostname should be the ones the server is recognized by on a network. After you have filled in the server coordinates, you have to provide the administrator's credentials (in the **Administrator Name** and **Administrator Password** fields) you use to log in to the migrating server. The default user name for the Linux-based server is `root`, the default user name for the Windows-based server is `Administrator` unless you have created a different user account. In this case you are expected to enter the user name you have adopted for a new user account. Mind that the new user must have the scope of rights the Linux root user or the Windows administrator is endowed with. Finally, specify the physical server that will host the target Container. If there is only one physical server that can host the Container, it will be filled in by default, and the field is grayed out.

Note: To secure a successful connection, the source physical server should have either of the following ports open: 4434 or 4435 for a physical server irrespective of its operating system, 445 port for Windows-based physical servers only, and port 22 for Linux-based physical server only.

After you have entered all the required information, click **Connect** to set up a connection to the server.

Reviewing Physical Server Configuration

In the second step Virtuozzo Transporter allows you to check the configuration of the server you are going to migrate into a Container. This is necessary for you to verify that you are connected to exactly the same server you wish to migrate.

The information on the server is divided into three groups.

The **Hardware Information** table includes:

Name	Description
Architecture	The architecture of the server CPU(s).
CPU	The number, name and power of the processor(s) installed on the physical server.
Operating Memory (Physical Memory on a Windows-based server)	The physical memory: the total physical memory available, the amount of the server physical memory used and the amount of free memory still remaining.
Swap Memory	The swap partition data: the total swap partition size, the swap memory used and the amount of the free swap memory.

The **Network Information** tells you the server hostname and the network interface details, such as the server IP address(es) and the network adapter type(s).



The Linux **Disk Partitions** section yields the following information:



Name	Description
Name	The name of the partition on the server disk.
Mounted	The mount point of the partition described.
Type	The file system type.
Block Size	The block size of the partition file system.
Total Blocks	The number of the blocks in the file system.
Used Blocks	The number of the blocks used.
Free Blocks	The number of the blocks still available for data storage.
Total Inodes	The overall number of the inodes in the partition.
Used Inodes	The number of the inodes used.
Free Inodes	The number of inodes free to use.




The Windows **Disk Partitions** section reads:

Name	Description
Drive	The name of the partition on the server disk.
Type	The file system type.

Total Space	The volume of the drive.
Used Space	The space of the drive in use.
Free Space	The space of the drive free to be used.



After you have reviewed the physical server system information, click **Next** to proceed to the  customization of the server migration procedure or  configuring the target Container.

Customizing Migration Procedure

 In the third step you have an opportunity to edit the details of the migration process. On this page you can tune your physical server migration by:

- indicating your Linux distribution in the **Distribution Selection** section before migrating a physical server (the option is required). Virtuozzo Transporter tries to identify the migrated server distribution automatically, but the potential danger here may be its failure to do so. This is likely to make it impossible to carry out certain post-migration operations on the Container into which the physical server has been migrated. Therefore, to cut out the risk, you must prompt the wizard your server distribution by selecting the corresponding name in the **Select the Distribution** drop-down menu.
- choosing a user/group quota partition to migrate. As a server administrator, you might have already divided your hard disk into partitions to be used by different users/groups and set a corresponding quota for the usage thereof. Since all the file systems are copied to a single partition in the Container, your user/group quota parameters configuration may be lost. Therefore you are allowed to choose a partition you wish to save the quota values for and specify it in the **Quota migration** section. To do this, you have to select the partition name on the drop-down menu. Note that if you have more than one partition you have allocated for non-`root` users, the quota parameters setup will be lost for the partitions other than the one you have indicated in this section. In this case you will need extra post-migration user/group, or *second-level* quota parameters setting up. You can learn more on the second-level quota configuration option in the **Managing Disk Quotas** section of the **Virtuozzo Containers User's Guide**.


Note: Although the partition migration with quotas proceeds smoothly in most cases, we recommend that you check all the partition quotas after the physical server migration and adjust them, if needed.


- excluding paths from copying them to the Container in the **Exclude Paths** section. This option allows you to avoid migrating the data you do not need. You can single out such paths yourself or in some cases you will be prompted to do so by the relevant warning, advising you to exclude a certain path. The droppable path should be provided in the blank field in this section. You can add more paths to skip by clicking the  icon to the right of the field. Clicking the  icon near the field will remove the field with the path entered.
- stopping the services before the migration by means of the **Stop Services** section. This is highly recommended to prevent the running services from modifying any files which might hamper the migration. To stop the services, click their checkboxes.


After you have done all the necessary customization, click **Next** to move on to the fourth page where you can configure the Container to migrate your physical server to.

Configuring Destination Containers

The **Virtuozzo Transporter: Configure Container** page allows you to configure a Container into which you can migrate your physical server.





 When configuring the Container for the migration of a Windows-based server, the only information to provide is the Container ID in the **Container Configuration** group. You can either opt for selecting the Container ID automatically (the **Select Container ID automatically** radio button), or assign the Container the ID to fit in your Containers nomenclature. The Container ID is a 32-bit (ranging from 0 to 4294967295) integer number over 100. (Detailed information on the Container IDs allocation can be viewed in the **Choosing Container ID** subsection of the **Virtuozzo Containers User's Guide**.) To enable the feature, select its checkbox.

 By default, most Container parameters, such as Container hostname, IP address(es), DNS server(s) and hostname lookup parameters are inherited from the physical server and are displayed on this page in the appropriate fields. By editing these parameters you can apply your own values. Mind though that you do so at your own risk, and if you are not quite expert in the matter, the recommendation is to leave the default settings. On this page you can verify or edit Container general settings that are divided into three groups for your convenience: configuration parameters, network parameters, and advanced parameters.


 The **Configuration** group enables you to perform the following operations:

- Select a Container sample (p. 161) you want the Container to be based on;
- Choose an OS template and its version you wish the Container to be based on. By default, Virtuozzo Automator automatically searches for the most compatible OS template. However you can change the OS template if needed.
- Select the **Customize resource settings** checkbox, which allows you to adjust resource parameters on the next page of the wizard. This operation is optional.

 The **Network** group lets you do the following to define the network parameters:

- Verify the Container hostname. Mind that it is inherited from the physical server. Changing the hostname may result in future conflicts and malfunction.
- Assign an IP address to it. You can set several IP addresses for the Container by clicking the  icon to the right of the **IP Address** field. At the same time, clicking the  icon near the **IP Address** field will remove the corresponding IP address assigned to the Container.
- Enter one or more DNS servers that this Container is supposed to use in the **DNS server IP address** field or leave it blank. By clicking the  or  icons you can add/remove, accordingly, the DNS servers IP addresses for the Container being configured. Note that the static values in these fields might be overridden if the Container gets the DNS servers from the DHCP server when operating in the bridged network mode.
- Define a list for hostname lookup in the **Search domain** field or leave it blank. The search list is normally determined by the domain name(s); by default, it contains the local domain name(s) only. You can also add external domain names for a particular Container. A search query is

performed by attempting to use each item in the list in turn until a match is found. Note that this process may be slow and may generate a lot of network traffic if the servers for the listed domains are not local, and that the query might time out if no server is available for one of the domains. Note also that the static values in these fields might be overridden if the Container gets the search domains from the DHCP server when operating in the bridged network mode.


 The **Advanced** group helps to specify the Container ID, a 32-bit (ranging from 0 to 4294967295) integer number over 100. For more information on Container ID allocation, see the *Virtuozzo Containers User's Guide*. To enable the feature, select its check box.

Click **Next** to submit the settings and go on to the next **Migration** wizard stage.

Configuring Container Network Parameters

This step lets you define all the major network parameters of the Container you are migrating the physical server to. For more information, see **Configuring Container Network Parameters** (p. 226).

Customizing Container Resource Settings

 The **Virtuozzo Transporter: Container Resources Customization** page, where you can check or edit the future Container resource parameters, can only be displayed on the conditions that you:

- first, are migrating a *Linux-based* physical server;
- and, second, have selected the **Customize resources settings** check box on the previous step.

Note: The default resource parameters are calculated with a 150% allowance made for the physical server maximum load. However if you are sure you need to increase the available resources, you can do so by entering new values in the appropriate fields.

Reviewing Configuration and Setting Post-migration Start/Stop Option

In the final step you can review the physical and virtual environments configuration details. To revise or change any of these, please, go **Back**.

You are also offered to automatically stop the physical server and start the Container after migration. Stopping the physical server and starting the Container after migration is necessary to avoid a possible conflict between the physical and virtual environments due to the identical network and other settings. However you can skip the option and do the work manually right after the migration before managing the virtual environment if you want to check the migration results, e.g. compare the files in the source migrated machine and target virtual environment.

When you are ready, click **Migrate** to start the physical server to virtual environment migration.



Note: If you press **Cancel** on certain steps, and the migration wizard exits, there may remain a temporary directory on the physical server that you should remove manually. The name of the directory is `/var/vzagent.tmp`.

Reinstalling Containers

Container reinstallation means recovering the original state of a Container in case you have unintentionally modified, replaced, or deleted any file that is part of an application or OS template, and the action has brought about the Container malfunction. The Container reinstallation process restores these files as they were at the time when the Container was created or when other applications were added to the Container afterwards, if so.

Reinstallation is likely to bring about some irrevocable changes to your Container, therefore, to be on the safe side, it is recommended to back up your Container before reinstallation.





Click **Next** on the **Reinstall Container** introductory page to review the available options and to decide whether you really need to reinstall your Container and in what way.

Note: In order to be reinstalled, each Container has to be stopped first. The description of all possible Container statuses is provided in the **Container Statuses** section. If a Container is not stopped, the corresponding screen will inform you of the fact. In this case follow the **Stop Container** link in the **Possible Solutions** section. Afterwards it is recommended to refresh the page by clicking the **Refresh this page** link in the **Other possible actions** section.

Selecting Reinstallation Type

The page where you should choose the mode of reinstallation is displayed after you click **Next>** on the **Reinstall Container** page. You shall select one of the two reinstallation options and specify whether to preserve or drop your Container password database.

When selecting a reinstallation option, bear in mind that there is one thing both options have in common: the original files of the OS and applications templates are restored in the Container. Pay attention to the fact that any customization changes you have made to these files will be lost during the Container reinstallation. In case you have not seriously modified any system configuration files, reinstalling the original files is likely to solve many problems.

However, you have probably already filled the Container with your personal files. If you are sure these files cannot cause problems or you need them in your Container, select the first option - **Keep the existing Container contents**. In this case, your Container is created anew with all existing files moved to the  `/old` directory or  `c:\reinstall` directory inside the Container. You shall be sure there is enough disk space to perform this operation, otherwise, it will fail. Be prepared to move the necessary files from the  `/old` directory or  `c:\reinstall` directory to the new existing installation manually. If such files are numerous, this may prove a tedious task.

If you think you have nothing to lose at all, select the second option: **Drop the existing Container contents**. Your Container will be erased and recreated from the original template(s). Naturally, all

your personal files will be lost. That is why you should select this option only if you have no valuable data in your Container or if you have a backup of your personal files elsewhere.

Pay attention to the **Password Options** group. The **Keep the password database** option retains the information on the Container users and groups. Selecting the **Drop the password database** radio button will purge this information altogether and create only the root account with the password specified in the **Set the administrative account password** and **Retype the password** fields under the radio button. This option may prove useful if your Container has got a corrupted password database.

When you are done, click **Next>** to proceed to the **Reinstall Container: Final confirmation** page.

Confirming Reinstallation

Finally you shall confirm the reinstallation or give it up. The reinstallation option you have chosen at the previous step is displayed for you to have a last chance to revise what you are about to do. Click the **Reinstall** button to begin the reinstallation process.

Do not forget to start the Container when the operation is complete. To see the current status of the operation, click the **Details** link.

Repairing Containers



Repairing a Container is another way to solve problems with the Container functioning. In Virtuozzo Containers terminology, the Container is mounted in the repair mode. This means that a new Container is temporarily created from scratch with the same network and other parameters as the broken Container, and the root directory of the broken Container is mounted as `/repair` into the newly-created Container. Thereafter, the administrator is supposed to connect to the new Container via `ssh` or Virtuozzo Automator file manager (p. 68) using the network and login parameters of the broken Container, go to the `/repair` directory, and perform one of the following actions:


- 1 Find the personal data that needs to be saved and copy it to a safe location elsewhere. Do not copy your personal data directly into your new Container, as it will be destroyed once you exit the repair mode. After quitting the repair mode, the broken Container can be reinstalled and the personal data can further be loaded into it from the place where you have saved them.
- 2 Identify the source of the problem and manually correct it. This method can be recommended to advanced Container administrators, as it presupposes some technical expertise. And it is still recommended to save first your personal data in a safe location, just in case something goes wrong.

Note: When working inside the Container being repaired by means of the Virtuozzo Automator file manager, the file manager root directory (`/`) corresponds to the `/repair` directory of the temporary Container, in other words, it represents the root directory of the problem Container, not that of the newly-created one.

Clicking the **Start Repair** button on the **Repair Container** screen mounts the Container in the repair mode. It is not necessary to stop the Container beforehand; if the Container is running at the moment of pressing the **Start Repair** button, it will be first automatically stopped. The description of all possible Container statuses is provided in **Container Statuses**.

When the page is refreshed after pressing the **Start Repair** button, click the **Details** link at the end of the **The Container has been scheduled to start in the repair mode** message to see if the repair mode has been successfully entered. Once the Container enters the repair mode, connect to the new Container via `ssh` or Virtuozzo Automator file manager and do what you deem reasonable inside the Container. After closing your `ssh` session, click the **Repair** link on the Container dashboard once again and press the **Finish Repair** button to exit the repair mode. After the repair mode is exited, the broken Container starts running, and you may check the repairing effect.

Mounting External Volumes Inside Containers

 External volumes are those drives inside a Container that can be added to the default `c :` drive. The **Volumes** page opened on following the **Volumes** link in the **Configure** section on the Tasks tab of the Container dashboard enables you to perform the following operations:

- Add additional disk drives to your Container (by following the **New Volume** link);
- Increase/decrease the current size of the disk drive and modify its measurement units (by clicking on a drive in the **Volumes** table);
- Mount a physical server image file to a Container virtual drive (by following the **Mount Disk Image** link);
- Unmount an existing disk drive from your Container (by selecting the corresponding check box in the **Volumes** table and clicking **Unmount**);
- Unmount an existing disk drive from your Container and remove the corresponding image file from the physical server (by selecting the corresponding check box in the **Volumes** table and clicking **Delete**);
- Mount a physical server physical device to a Container virtual drive (by following the **Mount Device** link).

The **Volumes** table lists all the available drives inside the Container, including the default `C :` drive:

Column Name	Description
Mount Point	The name of the drive as it is seen inside the Container.
Device	This can be either a file or a physical device on the physical server that is mounted to the mount point.
Size	The size of the drive (not applicable for certain devices, for example, if a physical server CD-ROM device is mounted inside the Container).

Creating Virtual Drives Inside Containers


 Any Container is created with only one disk storage inside it - the C: disk drive. However, VirtuoZZO Automator allows you to add new virtual disk drives to any Container residing on your physical server. You can then use the newly created virtual disk drive in the same way as you would use it on a stand-alone computer: format it, create new files and folders within the drive, etc.

To create a new virtual drive inside a Container, make use of the **Create Volume** page which opens on clicking the **New Volume** link on the **Volumes** page. You will be asked to fill in two fields:

- In the **Mount Point** field, choose the name of the drive from the drop-down list.
- In the **Volume Size** field, enter the desired size of the new drive and choose the relevant units of measurement.


Click **Create** to create the new virtual drive inside the given Container.

Resizing Virtual Drives

 Resizing any virtual drive inside a Container, including the default C: drive, can be performed on the **Resize Volume** page, which is opened after you click on the corresponding drive on the **Volumes** page.

Designate the desired size in the **New Size** field, choose the relevant units of measurement and click **Resize**. Mind that the operation of decreasing the size might not be successful if the total size of used space on the drive exceeds the new size that you wish to assign to the drive.

Mounting Existing Virtual Disks

 VirtuoZZO Automator allows you to mount virtual disk files located on the physical server to new drive letters inside any Container. Currently, only the `efi` virtual disk format is supported. Image files can be located anywhere on the physical server (on your hard disk, CD-ROM drive, floppy drive, etc.) and should have the `.efi` extension.


The path to the virtual disk image is provided on the **Mount Disk Image** page, which you access by following the corresponding link on the **Volumes** page. On the **Mount Disk Image** page, you may either fill in the **Image Path** field manually (the path to the image should be absolute in relation to the physical server) or click **Select** next to the field and navigate to the needed virtual disk file in the window that opens.

In the **Mount Point** field, choose the name of the drive from the drop-down list.

Click **Mount** after you have provided the path to the virtual disk file and the mount point, and the file will be mounted to the desired drive inside your Container.

Note: The permissions of the image file mounted to a Container correspond to those of this image file on the physical server, i.e. you are able to perform the same operations on the file inside the Container as you are allowed on the physical server.

Mounting Physical Server Devices

 In some circumstances, you may need to give your Container direct access to a drive on your physical server. Virtuozzo Automator allows you to mount a drive on the physical server to a drive inside your Container, thus, granting you access to this drive from inside the Container. After mounting the drive, you can work with the mounted drive inside the Container in the same way as you would do it on the physical server.

Virtually any drive available on the physical server can be mounted to a Container, e.g.:

- a physical hard drive;
- a DVD-ROM drive;
- a CD-ROM drive;
- a floppy disk, etc.

A physical server device can be mounted to a Container on the **Mount Device** page accessible by following the corresponding link on the **Volumes** page. On the **Mount Device** page, you should first indicate the name of the physical server drive in the **HN Device** field. This should be a letter of the alphabet followed by a colon. For example, D: is a common appellation of CD-ROM drives.

In the **Mount Point** field, choose the name of the drive from the drop-down list.

Click **Mount** after you have provided the name of the device on the physical server and the mount point inside the Container, and the device will be mounted to the desired drive inside your Container.


Note: The permissions of the device mounted to a Container correspond to those of this device on the physical server, i.e. you are able to perform the same operations on the drive inside the Container as you are allowed on the physical server.


Adjusting Container Configuration and Advanced Settings

The **Configure** page allows you to adjust the main settings for your Containers. If the Container was created singularly, you might have provided it with a name and a description. If the Container was one of Containers created as a group, providing names and descriptions were not available. If you created a Container by migrating a physical server into a Container, the name and description fields were also left empty.

In the **General Configuration** group, you can specify the name or description of a Container.

Use the **Advanced** group to:


- Change Container ID.
-  Have the Container start disabled by selecting the **Disable this Container** check box.

- Make the Container automatically boot at physical server startup. For this purpose, select the **Start on the Hardware Node boot** check box.
-  In the **Capabilities** group you can:
 - switch on/off the network browsing for the Container. The Windows 2003 browser service allows the Container on a Windows 2003 network to view the whole network environment available. The browser service maintains a list (called the browse list) of all available domains and computers. The browse list can be viewed using Windows 2003 Explorer and is provided by a browser in the Container. The default for the feature is the off status. You can learn more on the option from the **Network Places overview** article of the Windows 2003 **Help** system invoked by selecting **Help and Support** on the Windows **Start** menu.
 - enable/disable the packet QoS scheduler for the Container. This is one of the Quality of Service components in MS Windows 2003 Server that enable differentiation and preferential treatment for subsets of data transmitted over the network. The packet scheduler is the traffic control module that regulates how much traffic various applications are allowed, essentially enforcing the QoS parameters that are set for each particular application. For instance, you can use the feature to restrict a web site throughput to a certain maximum bandwidth value or differentiate between the data transmitted by critical applications (e.g. Plesk) and excessive data (e.g. multimedia applications), and allow preferential treatment for the important web sites or critical applications. The option is disabled by default. For additional information on the packet scheduler, address the **MSDN Library > Win32 and COM Development > Network Protocols > Quality of Service (QOS)** (http://msdn.microsoft.com/library/default.asp?url=/library/en-us/qos/qos/qos_start_page.asp).

Note: The concept of Quality of Service in MS Windows 2003 Server differs from that of Virtuozzo Quality of Service used to provide a fair share of the main system resources (disk space, CPU time, etc.) among Containers.

- let you know at a glance the ID of the Container to which you have connected by means of RDP. This ID is displayed in the upper right corner of the remote desktop.
- enable/disable the Microsoft Cluster Server (MSCS) software to run inside the Container. The MSCS software integrated into the Windows Server 2003 operating system is designed to allow servers to work together as one server, thus, providing greater reliability for your applications and services. Running one and the same application on two or more servers in the cluster helps ensure high application availability if one of the servers fails. The clustering software controls the failover process so that the application continues running on the second server without any loss of data and without interruption in service. The Virtuozzo Containers software allows you to include Containers in a server cluster so that they can act as full participants (nodes) in the cluster. To learn more about the MSCS software, address **MSDN Library > Servers and Enterprise Development > Windows Server > Windows Server 2003 > Technical Articles > Introducing Microsoft Cluster Service (MSCS) in the Windows Server 2003 Family** (<http://msdn2.microsoft.com/en-us/library/ms952401.aspx>).


The options in the **Capabilities** group are enabled/disabled by selecting/clearing the corresponding check boxes.


 The **Terminal Services** group allows you to define in which one of the two standard Windows TS modes (Remote Desktop for Administration and Terminal Server) the created Containers will operate. By default, any Container is automatically set to work in the Remote Desktop for Administration mode during its creation. So, you do not need to perform any additional operations to start connecting to Containers using this mode. Like in any other system with Windows Server 2003 installed, the Remote Desktop for Administration mode allows you to simultaneously open no more than two remote sessions and a console session to any Container on the physical server.

If you are planning to have more than 2 remote sessions to a Container at the same time, you should enable the Terminal Server mode for this Container. You may also need to switch on this mode in case some of the Container applications require Terminal Server for their functioning. While set in the Terminal Server mode, the Container starts using the same Terminal Server License (TSL) server as the physical server does. So, you can log in to the Container in this mode provided the TSL server for the physical server is accessible by the Container and has a number of free client access licenses (CALs) installed. You can also redefine the TSL server to be used by the Container or set additional TSL servers for it in the **License Server Address** field.

The **Offline Management** group allows you to set the offline service options by selecting the appropriate option. Offline Service of the corresponding Container ensures the Container manageability by means of one or more offline services from any browser at its own IP address. After offline service is enabled for the Container, one port of its IP address becomes permanently active whatever the Container state. The currently supported services are Virtuozzo Power Panel and Plesk Control panel (for managing Containers with the Plesk control panel installed in them). You can:

- Disable the offline service of the Container.
- Enable the offline service of the Container via the offline service settings operating on the physical server. Whenever you need to manage the Container offline, its offline service settings will be brought into synchronization with those in effect on the physical server. Should any service be removed from the default services list, the Container will be unable to be managed via the service off the list. This option subscribes the Container to the default offline services.
- Manually compose the Container offline services list. You can select the service(s) you would like the Container to be subscribed to in the corresponding checkbox(es).

 The **Feature Management** group allows you to toggle various features supported in Linux-based Containers.

 The **Device Access Management** group allows you to set access rights for devices attached to the Container.

Press the **Submit** button to save the changes.

Adjusting General Configuration of Multiple Containers

There exist two configuration options that you may apply simultaneously to a multitude of Containers. These options are whether the Containers should be automatically started after the physical server is booted, and whether offline service is enabled for the Containers. This is done on

the **Configure: Change Containers General Settings** page. Select the desired options under the **Change "Start on Hardware Node boot" to, Change "Offline Management service Enabled" to and Change "Container Enabled" to groups** and click **Submit** for the changes to be applied to your Containers.

Installing Plesk



The **Install Plesk** page allows you to install the Plesk control panel on the Container.

To access this page, from the Container's dashboard, click **Software** tab > **Control Panels** subtab > **Install** link. The link is displayed is the Plesk template is not installed on the Container. To install Plesk on a Container, you should click the **Install** button on the **Install Plesk** page. Just follow the instructions on the screen to complete the installation. After you have successfully installed the Plesk control panel in the Container, the **Plesk Panel** link becomes visible on the Container dashboard. Follow this link to start working in Plesk.

Note: For the Plesk installation to be possible, the Plesk application template on the physical server must be compatible with the OS template the current Container is running. Besides, the Container must have the resources available no less than is entered in the `pvacc.conf` configuration file for Plesk installation, i. e. enough to run Plesk on the given Container.

Working with Plesk Control Panel

When the Plesk control panel is installed inside the Container, you can use the **Login to Plesk** link on the **Control Panels** page to start a Plesk control panel session. A new browser window with the Plesk control panel is launched and you are able to get straight down to work there.

To change the Plesk `admin` password, click the **Change Password** link on the **Plesk Control Panel** page. Setting a new password from time to time is recommended to assure the maximum security of a Container.

Logging In to Plesk Control Panel




Using the **Login to Plesk** link on the **Plesk control panel** page you can open a pop-up window to start managing the Container via Plesk.

In this window, you should open the **Login to Plesk** link to start a Plesk control panel session. A new browser window with the Plesk control panel is launched and you are able to get straight down to work there.

The logging in to Plesk is performed automatically, you do not need to enter the name and password of the `admin` user since you have already been identified by your Virtuozzo Automator user credentials.

Note: If your Plesk version is lower than 7.0.2, the option of changing the `admin` password is not provided for Virtuozzo Automator.

Changing Plesk Administrator Password


 Although logging in to Plesk from Virtuozzo Automator is performed automatically and does not require specifying the credentials of the `admin` user, the Plesk `admin` user name and password may be of use for a Virtuozzo Power Panel user willing to directly log in to the Container via Plesk. To maintain the maximum security of the Container, it is recommended to change occasionally the current password of the `admin` user. The **Change Plesk Admin Password** page opened through the **Change Password** link on the **Plesk Control Panel** page allows you to edit the administrator password.

To set a new password, you need to type it into the **New admin password** field and then retype it in the **Retype new admin password** field below to ensure you have provided a correct password. The password should be no less than 5 characters and difficult enough to guess to guarantee the privacy of the Container.

After you have entered a new admin password, press **Change** to submit the changes made.

Note: If your Plesk version is lower than 7.0.2, the option of changing the `admin` password is not provided for Virtuozzo Automator.

Logging In to Confixx Control Panel

 In case the Confixx control panel is installed inside a Container, the **Confixx control panel** icon becomes visible on the Container dashboard. You can click this icon to go to the **Confixx control panel** login window.

In this window, you should enter your credentials (login and password) into the corresponding fields and press the **Login to Confixx** button. You may learn the credentials from your provider. In case the credentials entered are correct, a new browser window with Confixx control panel is launched and you can get straight down to work there.

If you select the **Save Login data** check box, you won't have to type your login and password again when you later visit this page - the credentials will be filled in automatically. In this case, the credentials information is stored not on the server, but on the client side (i.e. on the computer where your browser window is launched).


Note: The Confixx control panel with version below 3.0 is not supported.

Managing Container Templates


The Virtuozzo Containers software allows you to create new Containers on the basis of the configuration template files, called also Container templates.

 On physical servers running Windows 2003 Server, you can create new Containers by using the following configuration template files:

- `basic` - to be used for creating standard Containers;
- `MSDE` - to be used for creating Containers that are to run Microsoft SQL Server Desktop Engines;
- `Oracle` - to be used for creating Containers that are to run Oracle database servers;
- `Plesk` - to be used for creating Containers that are to run the Plesk application;
- `SharePoint` - to be used for creating Containers that are to run SharePoint Portal Server 2003;

 On physical servers running Windows 2008 Server, you can create new Containers by using the following configuration template files:

- `ADDS-role` - to be used for creating Containers that are to work as domain controller;
- `Basic` - to be used for creating standard Containers;
- `Exchange-2007` - to be used for creating Containers that are to run Microsoft Exchange 2007 application;

 For physical servers with the Linux operating system installed, the following configuration template files are provided:

- `basic` - to be used for standard Containers;
- `slm.256MB` - to be used for creating Containers with 256 Mb of virtual RAM;
- `slm.512MB` - to be used for creating Containers with 512 Mb of virtual RAM;
- `slm.1024MB` - to be used for creating Containers with 1024 Mb of virtual RAM;
- `slm.2048MB` - to be used for creating Containers with 2048 Mb of virtual RAM;
- `slm.plesk` - to be used for creating Containers with the Plesk control panel;
- `confiXX` - to be used for creating Containers that are to use the ConfiXX control panels;

You can perform a number of operations on Container templates by using Virtuozzo Automator:

- Create new Container templates;
- List the Container templates currently existing on the physical server;
- Copy Container templates within the physical server;
- Delete those Container templates that are not needed any more;
- Upload new templates onto the physical server.

Creating Container Templates

Creating a Container template starts with defining the initial template configuration on the **New Template: Begin** screen (p. 163) which is available by clicking **Templates** under the **Resource Library** option in the left menu tree. Having decided on the template configuration, you can move on to setting the general template settings (p. 111).

Defining Container Template General Settings

The second page of the **New Container Template** wizard enables you to define the Container general settings. In the **General** group, you should:

- Enter a name for the Container template being created.
- Give a brief description of the Container template.
- Select on the pop-up menu the OS template and its version the Container template will be based on. If you do not want the Container template to depend on any specific OS template, leave this field intact.

The information provided in the **General** group will be displayed in the **Container templates** table and **Container Summary** table.

The **Advanced** group allows you to make the Container that will be based on this Container template automatically start on the physical server boot.

The **Offline Management** group allows you to set the offline service options by selecting the appropriate option. Offline Service of the corresponding Container ensures the Container manageability by means of one or more offline services from any browser at its own IP address. After offline service is enabled for the Container, one port of its IP address becomes permanently active whatever the Container state. The currently supported services are Virtuozzo Power Panel and Plesk Control panel (for managing Containers with the Plesk control panel installed in them). You can:

- Disable the offline service of the Container.
- Enable the offline service of the Container via the offline service settings operating on the physical server. Whenever you need to manage the Container offline, its offline service settings will be brought into synchronization with those in effect on the physical server. Should any service be removed from the default services list, the Container will be unable to be managed via the service off the list. This option subscribes the Container to the default offline services.
- Manually compose the Container offline services list. You can select the service(s) you would like the Container to be subscribed to in the corresponding checkbox(es).



The **Feature Management** group allows you to toggle various features supported in Linux-based Containers.



The **Device Access Management** group allows you to set access rights for devices attached to the Container.

After you have provided the necessary information, click on the **Next** button.

Setting Network Parameters

The **New Template: Network** page lets you define all the major network parameters of the Container you are creating. For more information, see **Configuring Container Network Parameters** (p. 226).

After you have provided the necessary information, click **Next**.

Customizing Resource Settings

Next, you will be presented with the **New Template: Resources** screen allowing you to adjust resource parameters for the Containers based on the template being created. For more information, see the descriptions of Linux-related **CPU** (p. 72), **disk** (p. 74), and **memory** (p. 75) resources; or Windows-related **CPU** (p. 73), **disk** (p. 75), and **memory** (p. 78) resources.

Choosing Applications

On the fifth page you can choose one or more applications that will be automatically added to the Container created from the current template configuration. All applications available on your physical server are listed in the **Available Applications** table in the left part of the displayed page. The number of applications vary depending on the OS template the Container will be based on, i.e. only those applications are displayed that are compatible with the given OS template.

To add any applications to the Container template, tick the check boxes opposite the applications in the **Available Applications** table and click the **>>** button. After that, the applications appear in the **Included Applications** table in the right part of the page. Ticking one or several check boxes opposite the corresponding applications in the **Included Applications** table and clicking the **<<** button removes the applications from the Container template.

After you have selected the applications to be added to and/or removed from the Container template, click the **Next** button.

Note: This window is displayed only if you have chosen the OS template (on the first page of the wizard) the Container template will be based on.

Reviewing Template Configuration

The last screen of the **New Container template** wizard lets you review all the data you provided on the previous steps. If you are satisfied with the entered information, click **Create** to start creating the Container template. Otherwise, you can return to the previous steps by clicking the **Back** button and change the corresponding parameters.


Creating New Templates by Splitting Physical Server



It is possible to create a Container configuration file that roughly represents a given fraction of the physical server. Splitting the physical server allows you to share your physical server resources

equally between a certain number of Containers based on this configuration file. You may use the option to create identical Containers on your physical server and distribute the resources available on a fair basis between them. Or you can simply benefit from it to easily create a new Container template with a certain share of the physical server resources to use it later for one or more Containers. A special two-step **Split Hardware Node** wizard will guide you through the process.


Specifying General Parameters

 On this page of the **Split Hardware Node** wizard, you are asked to set the general parameters for the Container template being created. Please enter the relevant information into the following fields:

Section	Field Name	Information to Provide
HN Selection	Hardware Node	Select the VirtuoZZO Automator physical server you want to split.
Virtual Environment template Configuration	Name (required)	The name of the virtual environment template you are going to create by splitting your physical server.
	Description (optional)	Any relevant additional information about the template that may be helpful to identify the template at once.
Number of Virtual Environment	Number (required)	The number of virtual environments among which you want to divide the physical server resources.

The 'offline service', 'starting Container on the physical server boot' and 'choosing OS template' parameters are disabled by default. However, you can switch on these options later on for the Container created and edit its name and description (p. 115).

Checking Container Template Resource Parameters

 The **Split Hardware Node: Final** page allows you to review the resource parameters that are going to be allotted to the Container template being created. The resources are grouped by their relations to five computer subsystems: **CPU Parameters**, **Disk Quota**, **Primary System Parameters**, **Secondary System Parameters** and **Auxiliary System Parameters**. Information on the Container parameters is presented in the table with the following columns:

Column Name	Description
Soft Limit	The limit on the consumption of the given resource by the Container that once reached or exceeded can lead to grave problems inside the Container. Depending on the considered parameter, either some process might be killed at any time in the Container, or the next resource allocation request might be refused to it. However, the Container is allowed to temporarily exceed its quota soft limit for the Disk Space and Disk Inodes resources without any damage to the Container processes for the grace period, set in the <code>quotatime</code> parameter in the Disk Quota table.
Hard Limit	The limit on the consumption of the given resource by the current Container that cannot be exceeded in any circumstances.
Units	The units in which the value of the Soft Limit and/or Hard Limit column is measured.

For more details on resources, see **Customizing Resources Settings** (p. 112).

To edit the resource parameters values that do not meet your demand, go **Back** to change the number of Containers you have split your physical server into. If you are satisfied with the resources allocation, click **Submit** to initiate the creation of the Container template with the parameters you have set and reviewed.

Note: Later on, you can configure any of the resource parameters of the newly created Container template.

Cloning Containers to Templates

The **Clone to Template** page allows you to create a template of the chosen Container.

With this option, you can have a functioning Container and its clone with the template characteristics at the same time.

Before you create a template, you should decide where to store it:

- **Clone Container to Library Template.** In this case, the template will be placed to the Resource library folder accessible to all users who have enough rights. In future, these users will be able to create a Container using this template and to place it on any physical server.

Note: The physical server must have the same virtualization technology as the template has.

- **Clone Container to Local Template.** In this case, the template will be created locally on the same physical server the Container belongs to. Such a template is visible from the hosting physical server only. To find the list of such templates, go to the **Summary** page of the physical server and click **Container Templates** (p. 114). In future, the Container created from this template will be placed on this physical server.

When you click **Clone**, the process of cloning starts. If you have chosen to create a library template, you will find it in the **Resource Library > Templates** folder. If you have chosen to create a local template of the Container, you will find it in the local library on the physical server the Container initially belonged to.

Operations on Local Physical Server Templates

The **Container Templates** page enables you to monitor and manage the state of all the templates stored locally on this physical server. This is a storage for local templates only.

The templates are listed in the table that has two columns: a **Name** and **Description** column. To add or remove any of the columns, use the **Select Columns** button above the table.

The **Search** section also comprises two fields: **Name** and **Description**. This allows you to search the templates according to any of the parameters. If you use only some of these fields, you can add or remove them according to your needs with the help of the **Customize** button. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

On the **Container Templates** page, you can perform any of the following actions:

- Create a clone of the template and store it in the Library (the **Clone to Library** button);
- Create a clone of the template and store it on the same physical server (the **Clone** button);
- Delete a template (the **Delete** button);

To perform an action, you should select one or more templates by enabling the check box in the left column.

If you click a template name, the template Summary page will open.


Editing Container Templates

The **Container template** dashboard allows you to edit the given Container template in the following ways:

- change the name, the description, and the operating system of the current Container template;
- change the operating system, or its version run by the current Container template;
- define Container template network settings;
- adjust resource parameters for the Container template;
- specify if the Container based on the given Container template should start on the physical server boot;
- enable/disable the offline service for any Container based on the given Container template;
- add applications and remove them from the Container template.

Configuring General Settings

The **General Settings** page enables you to change the basic properties of the Container template:

Column Name	Description
Name	The name of the Container template.
Description	The description of the Container template.
Platform	The platform (Linux or Windows) on which the physical server storing the template is based and the type of Containers that can be created on base of this template.
OS Template	The operating system the Container template is based on.
 Memory Management Mode	The memory management mode that will be used inside the Container based on this template. For more details on memory management configuration, see Customizing Resources Settings (p. 116).
Applications Included	All applications included in the Container template.

In the **General** group, you can:

- Change the name of the Container template it will be referred to by typing a new name in the **Name** field. This name will be displayed in the **Container template** and **Container Summary** tables.
- Edit the description of the Container template in the **Description** field. The information entered in the field will be provided in the **Container templates** and **Container Summary** tables.
- Change the operating system or its version the Container template is based on. This change will be reflected in the **Container template** and **Container Summary** tables.

The **Advanced** group allows you to make the Container that will be based on this template automatically start on the physical server boot.

The **Offline Service** group allows you to set the offline service options by selecting the appropriate radio button. Offline service settings ensure the manageability of the Container based on this template by means of one or more offline services from any browser at its own IP address. After offline service is enabled for the Container, one port of its IP address becomes permanently active whatever the Container state. The currently supported services are `vzpp` and `plesk` (for managing Containers with the Plesk control panel installed in them). You can:

- Disable the offline service of the Container.
- Enable the offline service of the Container via the offline service settings operating on the physical server. Whenever you need to manage the Container offline, its offline service settings will be brought into synchronization with those in effect on the physical server. Should any service be removed from the default services list, the Container will be unable to be managed via the service off the list. This option subscribes the Container to the default offline services.
- Manually compose the Container offline services list. You can select the services you would like the Container to be subscribed to in the corresponding check boxes.

After you have made the necessary changes, click **Submit**.

Configuring Network Settings

On the screen opened after clicking the **Network** tab, you can change the default network settings which will be active for all the Containers you will create on the base of the template you are configuring. For more information, see **Configuring Container Network Parameters** (p. 226).

After you have provided the necessary information, click the **Submit** button.

Customizing Resources Settings

On the **Configure Resources** page you can manage the resource parameters for the currently selected Container template. For more information, see the descriptions of Linux-related **CPU** (p. 72), **disk** (p. 74), and **memory** (p. 75) resources; or Windows-related **CPU** (p. 73), **disk** (p. 75), and **memory** (p. 78) resources.

Adding Applications to Templates

On the **Applications Templates** page, you can choose those applications that will be included in the corresponding Container template. These applications will be automatically installed in all the Containers created on the basis of this Container template.

All available applications that can be added to the Container template are listed in the **Available Applications** table in the left part of the displayed page. To add any of them to the Container template, tick the check boxes opposite the applications you wish to add and click the **>>** button. After that, these applications appear in the **Included Applications** table in the right part of the page.

At the same time, you may want to exclude one or several applications from the Container template which, you are sure, will be of no use to you. To remove any application from the Container template, tick its check box in the **Included Applications** table in the right part of the **Applications** page and click on the **<<** button.

After you have selected the application(s) to be added to or removed from the Container template, click on the **Submit** button.

Managing Virtual Machines

Virtual Machine Dashboard Overview

The virtual machine **Summary** page allows you to exercise the overall control on the virtual machine activity, state, and configuration.

For your convenience, the parameters on the Summary page are divided into 6 logical sections.

Status

The virtual machine **Status** section displays:

- The current status of the virtual machine.
- The information on the resources consumption by the virtual machine: coming close to, reaching, or going beyond the limits option can appear. To view the detailed information on the resource alerts, see the **Logs** page
- The hostname of the physical server where the virtual machine is hosted
- The CPU consumption.
- The time the computer has been left unattended without crashes and need to reboot it.
- The guest tools being installed or not in the virtual machine.

General Settings

The virtual machine **General Settings** section provides you with the virtual machine identification information: its name, location, IP addresses if available, type of the guest operating system and the original operating system template the virtual machine is based on.

Hardware Settings

The virtual machine **Hardware Settings** section provides you with the virtual machine configuration information. The section shows the number and type of CPUs and the memory amount used by the virtual machine. You can also see the emulated devices the virtual machine possess and their characteristics.

You can change any of these settings on the **Virtual Machine Hardware Settings** page (p. [133](#)).

Tasks

The virtual machine **Tasks** section provides you with a quick access to the main operations:

- In the **Operate** subsection, you can start, stop, suspend, restart, pause and power off a virtual machine. Depending on the virtual machine state (running or stopped), only that operation is accessible that is opposite to the current state.
- In the **Configure** subsection, you obtain a quick access to the general settings (p. [130](#)) and hardware settings (p. [133](#)) of the virtual machine.
- In the **Manage** subsection, you can quickly initiate the following operations:
 - open the VNC Console, Power Panel or Remote Desktop to work with the virtual machine;
 - create a virtual machine clone;
 - create a virtual machine backup;
 - create a virtual machine template by converting to template (p. [145](#)) and cloning to template (p. [145](#));
 - delete the virtual machine from the physical server;
 - unregister the virtual machine from the physical server or completely delete it;
- In the Maintenance section, you can quickly initiate the following operations:
 - viewing detailed information on the virtual machine resources consumption.
 - backing up the virtual machine.
 - reinstall the virtual machine (p. [141](#)).
 - migrate the virtual machine (p. [143](#)) to another physical server.

Resources

The virtual machine **Resources** section provides you with the detailed information on the CPU and memory resources (total and currently in use).

Screenshot

The virtual machine **Screenshot** section enables you to view what's going on in the virtual machine remote display. Using the **Refresh Screenshot** link, you can update the screen.

Creating Virtual Machines

Having chosen to create a virtual machine as described in **Starting to Create Virtual Environments** (p. 52), you can proceed to define general and hardware settings, and review the resulting configuration. This section describes these operations in detail.

Express Windows Installation

If you create a virtual machine with a Windows operating system, the wizard offers you to install an operating system in an Express mode. In the Express installation mode, the wizard not only creates a virtual machine configuration, but also automatically installs the corresponding guest OS in it. It is the easiest way to make a new virtual machine: you only need to insert an installation disc with the guest operating system or specify the path to its image file, and provide the system with the OS credentials. The wizard will do the rest (including the installation of Virtio Tools).

Note: The Express Windows installation demands an accessible installation disc or a valid ISO image.

In the **Windows Use Account** section, provide the user name and the name of company. To avoid a confusion between the VA user accounts and the private virtual machine accounts, do not use such names as Administrator or Guest.

In the **Windows Licensing** section, provide the guest operating licensing number. This allows the wizard to install the guest OS in an independent mode.

When finished, click **Next**.

Defining New Virtual Machine General Settings

The second step of the **New Virtual Environment** wizard allows you to define the virtual machine general settings. These settings can be divided into several groups for your convenience.

In the **General Configuration** group of settings, you can set the following parameters:

- Specify an arbitrary name for the virtual machine in the **Name** field and provide its description in the **Description** field. The latter is not available if you are creating more than one virtual machine. If you wish, you can set descriptions of your virtual machines after they are created (p. 105).


- Specify the destination folder for the virtual machine files in the **Location** field. Use the **Select** link to browse the hosting physical server system.
- Select an operating system to be installed in the virtual machine and choose its version in the **Guest Operating System** box.
- Decide on whether the virtual machine is to be started after its creation (the **Start the Virtual Machine After Creation** check box is selected) or left in the stopped state (the check box is cleared).
- Select the **Install the Guest Operating System After Start** check box if you wish Virtuozzo Automator to ask you to install the specified operating system in the virtual machine on its first start. If you check this option, you will need to indicate the path to the source installation files and the appropriate product key on the next step of the wizard.

Note: This field is available only for the following guest operating systems: Windows 2003, Windows XP, Windows 2008, and Windows Vista.

The **Multiple Virtual Machine Configuration** section is displayed only if you are creating more than one virtual machine at a time. This group of settings allows you to choose the way of assigning names to your virtual machines:

- **Assign names based on a specified template.** If you choose this option, you will need to specify a pattern for assigning names to your virtual machines in the **Virtual Machine Name Template** field. This pattern must contain the @index@ placeholder that will be replaced with the corresponding index number. For example, if you are creating two virtual machines and specify `virtual environment @index@` in this field, your virtual machines will be named `virtual environment 1` and `virtual environment 2`.
- **Set names manually for every virtual machine.** If you choose this option, you will need to manually type the names for each virtual machine you are planning to create in the fields below this option.

For more information on the **Host System Integration**, **Remote Display**, and **Offline Management** settings, see **Defining Virtual Machine General Settings** (p. 130).

The **Permissions** group of settings lets you create one or more permissions for the virtual machine. A permission is a combination of a user or a group of users and a role in respect of a certain Virtuozzo Automator object, you can indicate the corresponding user/group and role in the provided fields, thus creating a permission with respect to the virtual machine being created. To add more permissions, click the  **Add** button.

Click **Next** to move on to the next step of the **New Virtual Environment** wizard.

Or click **Create**, to start the virtual machine creation process. The virtual machine will be created with the default system configuration. After it's created, you can view and change its configuration (p. 130).

Defining New Virtual Machine Hardware Settings

The **New Virtual Machine: Hardware Settings** page allows you to configure the main hardware settings of the virtual machine being created. For more information, see **Defining Virtual Machine Hardware Settings** (p. 133).

Reviewing Virtual Machine Configuration

The final step of the **New Virtual Environment** wizard lets you review the major settings of the virtual machine configuration you provided on the previous steps. If you are satisfied with the information entered, click **Create** to start creating the virtual machine. Otherwise, you can return to the previous steps by clicking the **Back** button and change the corresponding parameters.

Registering Virtual Machines

The **Register Virtual Machine** page allows you to add a virtual machine to the virtual machine list of the physical server.

If you have a virtual machine on the physical server, you cannot use it or otherwise manage it until it is registered. Only after that, the virtual machine becomes available for all sorts of manipulations provided by the Virtuozzo Automator functionality. For example, if you decide to move a virtual machine from one physical server to another, you will need to unregister it on the initial physical server, manually move it and register it on the target physical server. Otherwise, the final physical server will serve as a data storage for the virtual machine files.

To register a virtual machine, you should specify the path to it on the physical server. The **Path to Server** field allows you to type the path or to locate the virtual machine using the **Select** link.

To confirm your choice, click **Register**. When the operation is complete, the virtual machine will appear in the list of registered virtual machine.

Changing Virtual Machine Root/Administrator Password

A virtual machine(s) administrator can benefit from the **Change Password** option on the screen where, to perform this operation, you should enter a new root/Administrator password for the current virtual machine into the fields provided and click **Change**.

Note that Virtuozzo Automator does not check the entered password as to its length and non-conformity to dictionary entries, so choosing a simple password rests entirely at your own risk. It is recommended to use a chaotic set of lowercase (a-z) and uppercase (A-Z) letters, digits (0-9), and punctuation marks as root/administrator password. The following punctuation marks are allowed: ! " \$ % & , () * + - . / ; : < = > ? [\] ^ _ { | }. The space character, #, and @ symbols are not allowed. The password should not be less than 5 or more than 14 characters.

Note: The password of the VA server(s) administrator proper can be changed on the **Personal Settings** tab of the **User Profile** screen which is displayed through the **User Profile** link on the right of the Virtuozzo Automator toolbar.

Unregistering Virtual Machines

The **Unregister Virtual Machine** page allows you to delete the virtual machine from the physical server list of virtual machine without deleting its files from the physical server. You may need to unregister a virtual machine if you want to use it as a data storage on the physical server and do not need it in the list. If you want to move the virtual machine from one physical server to another, you should also unregister it first and register it on the target physical server.

Before you click the **Unregister** button, confirm your wish to unregister the virtual machine and enable the **Yes, I want to unregister the Virtual Machine(s)** check box.

Installing Virtuozzo guest tools in Virtual Machines

Virtuozzo Tools are a suite of special utilities that help you use your virtual machines in the most comfortable and efficient way. With Virtuozzo Tools, you can move the mouse seamlessly outside the guest OS window without pressing any key, change the virtual machine's screen resolution by simply resizing its window, synchronize your virtual machine's time and date settings with the time settings of the host computer, and share the host computer disks and folders with its virtual machines.

Virtuozzo Tools are located on the disc images that are installed along with Server Bare Metal. There is a separate Virtuozzo Tools disc image for each type of the supported guest operating systems.

- `prl-tools-win.iso` - disc image with Virtuozzo Tools for Windows guest operating systems.
- `prl-tools-lin.iso` - disc image with Virtuozzo Tools for Linux guest operating systems.

These disc images can be found in the following locations:

- in Server Bare Metal: `/usr/share/parallels-server/tools/`
- in Server Bare Metal Xserve Edition: `/usr/share/parallels-server/tools/`

Installing Virtuozzo guest tools in Windows

Virtuozzo Tools are available for the Windows guest operating systems:

- Windows 2000
- Windows Server 2003
- Windows XP
- Windows Vista

- Windows Server 2008
- Windows Server 2012

Virtuozzo Tools are installed automatically after the installation of the Windows guest operating system., if the virtual machine machine was created using the **Express Windows** mode (p. 119).

If the virtual machine was created through a standard creation procedure, you will need to install Virtuozzo Tools manually. Note that the virtual machine should already have a guest operating system before you start installing Virtuozzo Tools.

To install Virtuozzo Tools from the Control Panel, perform the following actions:

- 1 From the **Infrastructure** > physical server > virtual machine dashboard screen, start the virtual machine.
- 2 Switch to the **Remote Console** screen. You can view the virtual machine active desktop.
- 3 Log in to the guest operating system.
- 4 When the guest OS boots up, click the **Install Tools** button. Thus, you connect the Virtuozzo Tools ISO image and launch the Virtuozzo Tools installation Wizard inside the virtual machine.

Tip: The **Install Tools** button is grayed out if the current guest operating system is not supported by Virtuozzo Tools.

- 5 In the **Welcome** window, click **Install**. The wizard will start the automatic installation.
- 6 When the installation is complete, click **Reboot** to exit the wizard and restart the virtual machine.

Reinstalling Virtuozzo guest tools

To reinstall Virtuozzo Tools, start your virtual machine, and select **Reinstall Virtuozzo Tools** from the Virtual Machine menu. This option is available only if Virtuozzo Tools are up-to-date. If Virtuozzo Tools are outdated, you will see the **Update Virtuozzo Tools** option instead.

How to check if Virtuozzo Tools are installed

If you are not sure whether Virtuozzo Tools are installed, you can easily check this. Start your virtual machine and look at the status bar of its window: if the tip "Press Ctrl + Alt to release the mouse and keyboard" appears in the status bar of the virtual machine's window, this means that Virtuozzo Tools are not installed. When Virtuozzo Tools are installed, you do not need to press any key to release the mouse and keyboard - they are released automatically.

Installing Virtuozzo Tools in Linux

Virtuozzo Tools are available for any supported Linux guest operating systems that have the following packages installed:

- X.org 6.7 and later;

- glibc2.4 and later;

Before installing Virtuoizzo Tools in a Linux guest OS, perform the following actions:

- Close all applications in the guest operating system.
- Disable the 3D accelerated window manager if you use any.
- Make sure that you have the gcc package and kernel sources installed. If these packages are not installed, the Virtuoizzo Tools installer will warn you. The kernel sources package name depends on the type of Linux operating system you use: it can be `kernel-devel`, or `kernel-headers`, or something else.

Note: To install Virtuoizzo Tools in your virtual machine, you must have the root privileges.

Installing Virtuoizzo Tools in the most recent versions of Linux guest OSs

If you have one of the most recent versions of Linux OSs (Fedora 10) in your virtual machine, the `prl-tools-lin.iso` image file will be mounted automatically after you connect it to the CD/DVD-ROM drive. To install Virtuoizzo Tools, do the following:

- 1 From the **Infrastructure** > physical server > virtual machine dashboard screen, start the virtual machine.
- 2 Switch to the **Remote Console** screen. You can view the virtual machine active desktop.
- 3 Log in to the guest operating system.
- 4 When the guest OS boots up, click the **Install Tools** button. The `prl-tools-lin.iso` image file will be connected to the virtual machine's CD/DVD-ROM drive and mounted.

Tip: The **Install Tools** button is grayed out if the current guest operating system is not supported by Virtuoizzo Tools.

- 5 Start a terminal in your Linux guest OS. Type the following command to gain the root privileges:

```
su
```

- 6 Change the directory to the CD/DVD-ROM directory using

```
cd /media/cdrom/
```

Note: In some of the Linux operating systems, the mount point for the virtual CD/DVDROM drive may appear as `/media/Virtuoizzo Tools/`.

- 7 In the CD/DVD-ROM directory, enter the following command to launch Virtuoizzo Tools installation:

```
./install
```

- 8 Follow the Virtuoizzo Tools Installer instructions to complete the installation.
- 9 When the installation of Virtuoizzo Tools is complete, restart your virtual machine.

Installing VirtuoZZo Tools in other versions of Linux guest OSs

To install VirtuoZZo Tools in the older versions of Linux OSs, you have to mount the prltools-lin.iso image file manually. Do the following:

- 1 From the **Infrastructure** > physical server > virtual machine dashboard screen, start the virtual machine.
- 2 Switch to the **Remote Console** screen. You can view the virtual machine active desktop.
- 3 Log in to the guest operating system.
- 4 When the guest OS boots up, click the **Install Tools** button. The prl-tools-lin.iso image file will be connected to the virtual machine's CD/DVD-ROM drive and mounted.

Tip: The **Install Tools** button is grayed out if the current guest operating system is not supported by VirtuoZZo Tools.

- 5 Start a terminal in your Linux guest OS. Type the following command to gain the root privileges:

```
su
```

- 6 Check if the VirtuoZZo Tools CD image is mounted by entering

```
mount | grep iso9660
```

If this command does not return anything, proceed to the next step.

If this command returns anything like

```
/dev/cdrom on /media/cdrom type iso9660 (ro,exec,nosuid,nodev,uid=0),
```

skip the next step and proceed to the following one.

If this command returns anything like

```
/dev/cdrom on /media/cdrom type iso9660 (ro,noexec,nosuid,nodev,uid=0)
```

with the noexec option present in parentheses, you need to unmount the disc using the following command and then proceed to the next step:

```
umount /dev/cdrom
```

- 7 To mount the VirtuoZZo Tools installation disc image, enter the following:

```
mount -o exec /dev/cdrom /media/cdrom
```

Note: /dev/cdrom is the virtual machine's CD/DVD-ROM drive and /media/cdrom is the mount point for this device. In some of the Linux operating systems the virtual CD/DVD-ROM drive may appear as /dev/hdb and the mount point /mnt/cdrom. Some Linux OSs do not have the CD/DVD-ROM mount point. In this case, you should create the mount point directory manually.

- 8 When the installation disc image is mounted, change the directory to the CD/DVD-ROM directory using

```
cd /media/cdrom/
```

- 9 In the CD/DVD-ROM directory, enter the following to launch VirtuoZZo Tools installation:

```
./install
```

Note: You must have the root privileges to run this command.

- 10 Follow the VirtuoZZo Tools Installer instructions to complete the installation.

When the installation of Virtuoizzo Tools is complete, restart your virtual machine.

Note: If X Server fails to start in your virtual machine, you can install Virtuoizzo Tools manually in the text mode.

Reinstalling Virtuoizzo Tools

To reinstall Virtuoizzo Tools, remove them first, and then install them again using the above procedure.

How to check if Virtuoizzo Tools are installed

If you are not sure whether Virtuoizzo Tools are installed, you can easily check this. Start your virtual machine and look at the status bar of its window: if the tip "Press Ctrl + Alt to release the mouse and keyboard" appears in the status bar of the virtual machine's window, this means that Virtuoizzo Tools are not installed. When Virtuoizzo Tools are installed, you do not need to press any key to release the mouse and keyboard - they are released automatically.

Troubleshooting

Virtuoizzo Tools installer can be blocked by SELinux. To solve this problem:

- 1 Start a terminal and determine your version of kernel by entering

```
uname -r  
2.6.18-8.el5
```

2.6.18-8.el5 is the version of your kernel.

- 2 Open the `/boot/grub/grub.conf` file or `/boot/grub/menu.lst` (depends on the version of your Linux operating system) and find the entry that corresponds to your version of kernel.

```
title Red Hat Enterprise Linux Server (2.6.18-8.el5)  
root (hd0,0)  
kernel /vmlinuz-2.6.18-8.el5 ro root=/dev/VolGroup00/LogVol100 rhgb quiet  
initrd /initrd-2.6.18-8.el5.img
```

- 3 Type the following text at the end of the entry:

```
selinux=0
```

and the whole entry will be:

```
kernel /vmlinuz-2.6.18-8.el5 ro root=/dev/VolGroup00/LogVol100 rhgb quiet  
selinux=0
```

- 4 Save the file and restart the virtual machine.

After the restart, mount the Virtuoizzo Tools disc image and try to install Virtuoizzo Tools.

Removing Virtuoizzo Tools

Virtuoizzo Tools can be removed through a general procedure of removing applications from the operating system installed in your virtual machine.

Removing from a Windows guest OS

- 1 Start the virtual machine and log in to the guest OS.
- 2 From the Windows **Start** menu, choose **Control Panel > Add or Remove Programs**. In Windows Vista, choose **Control Panel > Programs and Features**.
- 3 Select Virtuoizzo Tools in the list and click **Remove**.

When Virtuoizzo Tools are removed, restart the guest operating system.

Removing from a Linux guest OS

Perform the following actions before removing Virtuoizzo Tools:

- Close all applications in the guest operating system.
- Disable the 3D accelerated window manager if you use any.

To remove Virtuoizzo Tools:

- 1 Start the virtual machine.
- 2 To remove Virtuoizzo Tools, you should connect and mount the `prl-tools-lin.iso` image and launch Virtuoizzo Tools Installer. See **Installing Virtuoizzo Tools in a Linux** for detailed information how you can do it.
- 3 Follow the Virtuoizzo Tools Installer instructions. When prompted to choose the action to perform, select **Remove** and press Enter.

When Virtuoizzo Tools are successfully removed, press Enter to close the window.

Connecting to Virtual Machines via VNC

Using the Built-In VNC Client

Virtuoizzo Automator allows you to connect to and manage running virtual machines via the built-in VNC client on port 4649. The mechanism works as follows:

- 1 The routing service receives a request from a user on port 4649, identifies the virtual machine the request is addressed to, and connects to the VNC server for the required virtual machine which runs on the Hardware Node.
- 2 After the connection is established, the routing service directs and encrypts network traffic between the VNC client and server.

In Virtuoizzo Automator, the **Console** tab displays the VNC console opened to the virtual machine. You can use the buttons above the console to perform the following operations on the virtual machine:

Button	Description
Install Tools	Install Virtio tools in the virtual machine. For detailed instructions, see Installing Virtio Tools in Virtual Machines (p. 122).
Change CD/DVD ROM	View and configure the CD/DVD-ROM image file of the virtual machine.
Refresh Display	Update the displayed screen and information.
Detach Console	Open the virtual machine console in a new browser window.

The **Keyboard Event** drop-down menu under the console allows you to send the `Ctrl+Alt+Del` key sequence and "magic" SysRq key combinations to the virtual machine. To send a key combination, select it in the menu and click the **Send** button.

Note: The SysRq key combinations are available only for virtual machines running Linux operating systems. For the full list of supported combinations, see <http://kernel.org/doc/Documentation/sysrq.txt>.

If the VNC connection to the virtual machine could not be established, check the following:

- The Sun Java(TM) plug-in and JRE are installed and enabled in your browser.
- The Hardware Node where the virtual machine resides is running Server Bare Metal.
- The virtual machine is running.
- The port 4649 is open.

Using Third-Party VNC Clients

You can also use third-party VNC clients to remotely connect to virtual machines. In this case, you need to additionally enable and configure the **Remote Display Service** option for the virtual machine. You can do this when creating a virtual machine or by configuring its settings on the **General Settings** screen (p. 130).

Once you enable and configure the **Remote Display Service** settings, start your VNC client and connect to the virtual machine using the IP address of the Hardware Node where it resides and the port shown at the top of the detached **Console** tab.

Monitoring Virtual Machine Resources Consumption

The **VM Monitor** subtab shows the graphical statistics on CPU, Memory and Disk resource consumption, i.e. how much of the physical server resources this virtual machine consumes. The data are shown in percentage.

Each of the three resources has its own colour on the chart. If you need to monitor the changes only for one resource, whatever it is, you can disable the others. Use the **Select Graph** subsection.

The chart shows the changes for the defined period. In the **Graph Period** subsection, you can select whether to show the data for a particular date, month, year or for any other period of time. To implement the changes, click **Apply**. The chart will change its appearance.

Partially, the information on resource consumption is available on the virtual machine **Summary** page (p. 117).

The **Export Data** link allows you save the graphical data in the format of a plain text (.csv file) on your computer.

Monitoring Virtual Machine Traffic Usage

The **Traffics Usage** subtab of the virtual machine **Network** pane shows the traffic statistics for the selected period or class.

To display traffic statistics, you should perform the following operations:

- 1 In the **Show traffic for** field, specify the time span for which you wish to see your traffic by selecting the corresponding duration unit on the drop-down menu. Depending on the selected unit, the field to the right of the drop-down menu changes and offers you a list of appropriate values to choose from. The duration units are listed below:
 - **Day**: Click the calendar and specify the exact date (i.e. day, month, and year) for which you wish to view your network traffic statistics.
 - **Month**: Specify the month and year to display your traffic statistics for.
 - **Year**: Specify the year to display your traffic statistics for.
 - **Period**: Specify the period for which you wish to view your traffic statistics by selecting the start and end dates on the calendar.
- 2 In the **Traffic class** field, specify the traffic accounting classes that will be displayed in the table.
 - **All**. This option includes all specifically created accounting classes and those traffics that were not included into any class.
 - **Other**. This option includes only those traffics that do not belong to any specific accounting class.
 - **Specific accounting classes**. Apart from the **All** and **Other** classes, the list shows the classes created by you for specific needs. You can choose one concrete class to be displayed in the table. You can create new and view the detailed on the already existing ones by going to the hosting physical server and clicking the **Network tab --> Traffic subtab** (p. 240).
- 3 In the **Traffic unit** field, specify the unit of measurement your traffic statistics will be displayed in.
- 4 Click on the **Update** button to display your traffic statistics for the specified period.

The results will be presented in the following table:

Column Name	Description
<Period>	Denotes the specified period. The name of this column depends on the duration unit selected in the Period field.

Incoming	The input traffic statistics (in the selected unit of measurement) during the specified period. This is the traffic that comes to the virtual environment from the Internet (e.g. requests from Internet surfers' web browsers to display a virtual environment website page).
Outgoing	The amount of output traffic (in the selected unit of measurement) during the specified period. This is the traffic that goes out of the virtual environment to the Internet (e.g. the virtual environment website pages sent to be displayed in the Internet surfers' web browsers).

The **Total** row at the bottom of the table summarizes all the incoming and outgoing network traffic for the specified time span.

Changing Virtual Machine Configuration

Defining Virtual Machine General Settings

The **Configure General Settings** page allows you to adjust the main settings for your virtual machines. If the virtual machine was created singularly, you might have provided it with a name and a description. If the virtual machine was one of virtual machines created as a group, providing names and descriptions were not available.

Note: If you change the configuration of a running virtual machine, you can choose when to apply the changes - immediately after saving the changes or later when you stop/restart the virtual machine. Use the **Restart** group settings.

In the **Preferences** group, you can change the name or description of a virtual machine created singularly, or assign a name and a description to a mass-produced virtual machine. You can also view where the virtual machine configuration file is stored. Additionally, the group includes the following settings:

Hostname. Assign and change the virtual machine hostname. A hostname is a unique name under which the virtual machine is visible on the global network, meanwhile the virtual machine name is used within the VA system only. The virtual machine hostname cannot be longer than 32 valid symbols.

Guest Tools Autoupdate. Ticking off the check-box ensures, that Virtuoizzo Tools are kept updated, and a new update is offered to install every time it is available.

The **Host System Integration** section allows you to configure the parameters responsible for integration between the virtual machine being created and the physical server. This group of settings includes the following subgroups:

- **Run VM Under Host User Account.** This subgroup enables you to define the user account under which the created virtual machine will be started. You can choose one of the following options:
 - **Administrative Account.** Select this option if you wish to run the virtual machine with the VA Administrator's rights.

- **Other User.** Select this option if wish to run the virtual machine as a non-administrator VA user. In this case, you will need to specify the corresponding user credentials in the fields below this option.
- **Service Default Account.** Select this option if you wish to run the virtual machine under the same VA user account under which you are launching Virtuozzo Management Console.
- **Host Startup and Shutdown.** This subgroup allows you to define a number of parameters related to the procedures of starting and shutting down the physical server. The parameters that can be specified in this subgroup are described in the table below:

On Host Startup

Do nothing	Select this option if you do not want your virtual machine to start automatically when you turn on the physical server hosting this virtual machine.
Start Virtual Machine	Select this option if you want the virtual machine to start automatically when you turn on the physical server hosting this virtual machine.
Restore Previous State	Select this option if you want the virtual machine to start in the same mode that was applied to it at the time the physical server was turned off.

On Host Shutdown

Stop Virtual Machine	Select this option if you want the virtual machine to be stopped when you turn off the physical server hosting it.
Shut down Virtual Machine	Select this option if you want the virtual machine to shut down when you turn off the physical computer hosting it.
Suspend Virtual Machine	Select this option if you want the virtual machine to be suspended when you turn off the physical server hosting it.

- **Optimization Settings.** This subgroup allows you to define the priority of distributing the bare metal physical server resources

Optimize for. Define whether the virtual machine or the hosting server processes should have priority for host resource consumption.

- **Virtual machine.** Select this option to allocate more resources to the virtual machine and its applications. Selecting this option may significantly increase the virtual machine performance; however, it may slow down the work of the bare metal computer.
- **Host Computer.** Select this option to allocate more resources to the Server Bare Metal physical server and its applications. In this case, the resources usage will be optimized to provide better performance of bare metal physical server.

Disk I/O Priority. Priority level of the virtual machine disk I/O operations in comparison to those of other virtual environments allocated on this physical server. The allowed range is 0-7. The greater the priority, the more time the virtual environment has for writing to and reading from the disk. The default priority is 4.

Disk I/O Limit, Bps. Disk I/O bandwidth limit in bytes per second. The default value is 0 which stands for unlimited bandwidth.

Disk I/O Limit, Nps. Disk IOPS limit in operations per second. The default value is 0 which stands for unlimited IOPS.

The **Remote Display** group allows you to configure the settings to be used to remotely control your virtual machine via the VNC protocol.

- **Enabled with default settings.** Use the network settings of the host physical server to connect to the virtual machine via the VNC protocol. To learn the physical server settings, go to **Network** pane of the physical server itself.
- **Enabled with custom settings.** This option, if selected, allows you to specify your own connection parameters when connecting to the virtual machine via the VNC protocol. In this case you should specify the following parameters:

IP address	The IP address of the server where the virtual machine is hosted.
Beginning of the Ports Range	The port to be used by the virtual machine. The VNC protocol uses ports 5900 through 5906.
Type password Retype password	Indicate and confirm the password to be used for viewing the virtual machine desktop in the VNC client application.

- **Disabled.** Forbid using the VNC protocol for connecting to the virtual machine.

The **Offline Services Management** group of settings lets you enable the virtual machine management through Virtuozzo Power Panel and/or Virtuozzo Plesk Control Panel irrespective of the virtual machine state, running or stopped. Offline services of the corresponding virtual machine ensure the virtual machine manageability by means of one or more offline services from any browser at its own IP address. After offline service is enabled for the virtual machine, one port of its IP addresses becomes permanently active irrespective of the virtual machine state.

Note: The virtual machine should have either the **Bridged** or the **Host-Only** network adapter to support the offline service management.

- **Disabled.** The offline management is turned off. The virtual machine can be accessed through the Virtuozzo Power Panel and Virtuozzo Plesk Control Panel only if it is in the running state.
- **Enabled With Default Settings.** The offline management is turned on with the physical server settings being used as default ones. Both control panels have ports and enabled.
- **Enabled With Custom Settings.** The offline management is turned on. Choose those control panels that you will use to manage the virtual machine.

The **Restart** group is available if you configure a running virtual machine. It allows you to decide when to apply the changes.

- The **Restart the Virtual Machine to apply the changes immediately** check box is selected. The changes will be applied immediately after you click the **Submit** button. The virtual machine will be stopped and then started again.

The **Restart the Virtual Machine to apply the changes immediately** check box is cleared. The changes will be saved when you click the **Submit** button but will not be applied to the virtual machine. The changes will be applied on the first time the virtual machine is stopped or restarted.

Defining Virtual Machine Hardware Settings

The **Configure Hardware Settings** page allows you to view and change the configuration of a virtual machine. Also, you can add new devices and remove no more used ones.

To be able to change the virtual machine configuration, you should have sufficient rights.

Note: If you change the configuration of a running virtual machine, you can choose when to apply the changes - immediately after saving the changes or later when you stop/restart the virtual machine. Use the **Restart** group settings.

You can:

- View and edit the general settings in the **General** subsection;
- View and edit the parameters of the virtual machine devices in the **Devices** subsection;
- Add and remove various hardware devices.

CPU Settings

This group of settings allows you to set the following CPU parameters:

- Define the number of CPUs to be available to the virtual machine in the **Number of CPUs** field. Keep in mind that the number of CPUs cannot exceed the number of physical CPUs installed on the physical server where the virtual machine resides.
- Define the CPU units and in the **CPU Units** field. CPU unit is a positive integer number that determines the minimal guaranteed share of the hosting server CPU time your virtual environment will receive.
- Define the CPU limit in the **CPU Limits** field. CPU limit can be set in percentage or in megahertz (MHz).

Note: This option is available for virtual machines being created on Server Bare Metal physical servers only.

- CPU limit set in percentage is a positive number indicating the hosting server CPU time in percent that cannot be exceeded by the corresponding virtual machine. To calculate the CPU limit for a virtual machine, you should first count the hosting server maximum CPU value in percent. To do this, multiply the number of server CPUs by 100%. For example, the maximum CPU value of a server with 4 CPUs will be 400%. Now, you can decide what portion of the whole CPU power of this server you want to allocate to this virtual machine.

Since, the limitation is set in percent, it will be recounted automatically each time the CPU power of the hosting server changes.

- CPU limit in megahertz is a positive number indicating the hosting server CPU value in MHz that cannot be exceeded by the corresponding virtual machine.

The CPU limitation is strict and does not change in case of the virtual machine migration to a different physical server or if the hosting server CPU power changes.

- View the processor virtualization type supported for this virtual machine in the **Hardware Virtualization** field.

Indicate one or more flags in the **System Flags** field. When specified, these flags define additional properties of the virtual machine and may change its system behavior. This field serves for the technical support needs. You will be instructed what flags to specify if such cases arise.

Operating Memory Settings

This pane allows you to specify the amount of operating memory (RAM) available for this virtual machine. You can specify any value from 4 to 8192 MB, but it is recommended to set the value indicated in the tip message that is displayed when you move the mouse cursor over the value set in the **Operating Memory** field. Note that this value can be different for different kinds of guest operating systems.

Video Memory Settings

This pane allows you to specify the amount of the memory allocated for the emulated video card inside the virtual machine. The more you allocate, the more powerful the video card will be. You can specify any value from 2 to 256 MB.

Boot settings

This group of settings allows you to configure the virtual machine boot sequence and EFI boot capability.

To enable EFI boot, check the **Use EFI** box.

The current boot sequence is displayed in the **In Use** table. To change the boot order, select a bootable device in the table and use the **Up** and **Down** buttons to move it up or down in the list. To remove a boot device from the boot sequence, select it and click the **<<** button to move it to the **Not Used** table. To include the device in the boot sequence, select it in the **Not Used** table and click the **>>** button.

The currently supported devices are as follows:

Hard disk	The virtual machine will use its hard disk to boot.
Floppy Disk	The virtual Machine will boot from the floppy disk.
CD/DVD-ROM	The virtual machine will boot from the media connected to the CD/DVD-ROM.
Network Adapter	The virtual machine will be connected to the PXE Server and will boot from the ISO image stored on it.

Note: Make sure that the devices in the boot sequence are present in the virtual machine configuration.

Hard Disk Settings

Using this group of parameters, you can configure the following emulated hard disk drive settings:

Enabled. Select this option to enable hard disk operations. If you want to temporarily disable this device, but do not want to remove it completely, disable this option.

Image File. In this field, you can view and change the location of the hard disk image file. By default, the hard disk image file is located in the virtual machine home folder

Disk Size and Image Type. In this section, you can change the hard disk size and format.

Note: For minimizing the disk size, enable the **Resize filesystem** option. Enlarging the disk size can be performed without this option enabled.

When changing the image type, you can choose one of these formats for the disk: *Expanding* (such disks are small initially and grow in size as you add data to them) or *Plain* (such disks have a fixed size from the moment of their creation such).

If you want the virtual disk to be split into 2GB pieces, select the **Splitted** option.

Enable the **Recreate** option, if you want to replace the existing hard disk with a new blank one.

Note: Recreating the hard disk removes all data stored on it.

Interface Type and Location. In this section, you can select the interface type to use for connecting devices and set the position for them.

- **IDE.** Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.
- **SCSI.** Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.

Virtual Network Settings

This group of settings allows you to manage the virtual machine's network settings:

- **Enabled.** Select this option if you want to enable the given network adapter in the virtual machine. If you want to temporarily disable the network adapter without deleting it from the virtual machine configuration, clear the **Enabled** check box.
- **Connected.** Select this option if you want the virtual machine to start up with this network adapter connected.
- **Configure network settings from guest OS.** When selected, hides the **Network Settings** section of the screen and enables you to configure the network settings from inside the virtual machine. When deselected, reveals the **Network Settings** section of the screen and allows you to configure the network settings from Virtuozzo Automator.

- **Connect to Virtual Network.** The virtual machine will connect to one of the virtual networks available on the Virtuozzo server. By default, you can choose from these networks: Bridged and Host-Only.
 - **Bridged.** The virtual machine will access the local network and Internet through one of the network adapters installed on the physical computer. In this case, the virtual machine will be treated as a standalone computer on the network and you will need to configure it accordingly.
 - **Host-Only.** The virtual machine will only connect to the physical computer and virtual machines within the same host-only network.

Additionally, you can populate the list with more virtual networks that you have already created in Virtuozzo Automator (on either the **Resource Library > Networks** screen or physical server's **Networks** screen). To be added to this list, the virtual network needs to be configured for use on this server only (**Host-Only** mode) or bound to a physical server network adapter or VLAN (**Bridged** mode). If a virtual network adapter is indicated in brackets, for example, (`eth0`), the network works in the **Bridged** mode. Virtual networks marked with (`n/a`) work in the **Host-Only** mode.

- **Routed.** The virtual machine will appear as a full member on the network, and its traffic will be routed via one of the virtual adapters on the Virtuozzo server.
- **Connect Using Direct Assignment (Intel VT-d).** This option is only available if a PCIe network adapter is installed on the Virtuozzo server and the Intel VT-d technology is enabled on it. If you select this option, the virtual machine will be able to access the local network and Internet through the specified PCIe network adapter.

To check the virtual networks mode and to add more virtual networks to the list, go to **Infrastructure > slave server > Network** tab > **Virtual Networks** subtab.

Note: To manage the virtual machine through Virtuozzo Power Panel and/or Virtuozzo Plesk Control Panel, use virtual networks working in the **Bridged** and **Host-Only** modes.

- **Mac Address.** During virtual machine creation, a MAC address for the virtual network adapter is generated automatically. You can view and edit it on virtual machine's **Hardware Configuration** (p. 133) screen. When you clone a virtual machine, leave the field empty so the system will automatically generate a new MAC address for it.
- **Get IP Address by.** Select the **DHCPv4** or **DHCPv6** checkbox to automatically receive TCP/IP configuration properties from the local server (the DHCP server inside the virtual machine), and the information on the default gateway through the Dynamic Host Configuration Protocol for the IP address of version 4 or version 6, correspondingly. The virtual machine adapter can have up to two IP addresses either set manually or assigned by the DHCP server automatically.

Note: The IP addresses should be of different versions. This way, a network adapter will have one IPv4 and one IPv6 address no matter how they were assigned: manually by you or automatically by DHCP.

- **IP address/Subnet mask and Default Gateway.** Fill out these fields to use a static IP address instead of a dynamic one automatically assigned by the DHCP server. If you leave the value at `<auto>`, Virtuozzo Automator will assign the IP address and subnet mask automatically.
- **DNS Server IP Address.** DNS server IP address for Internet connection.

- **Search Domain.** Search domain name. A search domain is a list for hostname lookup. The search list is normally determined by the local domain name and contains only that by default. You can add other hostnames for a particular Container. A search query is performed by attempting to use each item in the list until a match is found. Note that this process might be slow and generate a lot of network traffic if the servers for the listed domains are not local. Besides, the query might timeout if no server is available for one of the domains.
- **Filter by MAC Address.** Determines if the specified network adapter is configured to filter network packages by MAC address. If set to "yes", the adapter is allowed to send packages only from its own MAC address.
- **Filter by IP Address.** Determines if the specified network adapter is configured to filter network packages by IP address. If set to "yes", the adapter is allowed to send packages only from IPs in the network adapter IP addresses list.

Promiscuous Mode. Determines if the specified network adapter should reject packages not addressed to its virtual machine. If set to "yes", the adapter will drop such packages.

CD/DVD-ROM Settings

This group of settings provides you with the possibility to configure the following virtual machine's CD/DVD-ROM drive settings:

- Leave the **Enabled** option selected if you want the virtual machine to use the given CD/DVD-ROM drive. To temporarily disable operations with this drive without removing it from the virtual machine configuration, clear the **Enabled** check box.
- Select the **Connected** option if you want the virtual machine to start up with this CD/DVD-ROM drive connected.
- In the **Image Type** section, specify whether you wish to use a real CD/DVD-ROM drive on your physical server or a CD/DVD-ROM image file to emulate the virtual machine CD/DVD-ROM drive. First of all, the CD/DVD-ROM is needed to install an operating system inside the virtual machine. If you have a real CD with an operating system, the Physical Drive option is to be selected.
 - If you wish to use a real CD/DVD-ROM drive of the hosting physical server, select the **Physical Drive** radio button. In this case, you will need to use a real CD to install an operating system inside the virtual machine. Choose the device to be connected to the virtual machine's CD/DVD-ROM drive in the **CD/DVD-ROM** list.
 - If you wish to use a CD/DVD-ROM image file, select the **Existing Image File** radio button. In this case, you will need to specify the file location (use the **Image File Location** field), the name or path to the file, and the login/password information in case of the remote storage. An image file is very useful as it should not necessarily be stored on the same physical server where the virtual machine is located. It can be stored locally on the same host (choose the **Local CD/DVD Image** option), can be stored on any physical computer accessible via network (choose the **Network CD/DVD Image** option), or it can be stored on a file storage shared with Virtuozzo Automator (choose the **Library CD/DVD image** option).

Note: If you have a Microsoft Windows 2008 installation disk image, we advise you to store this image locally on the hosting physical server. Otherwise, check that the network connection is fast enough to successfully boot from a remote image.

- Select the interface type for connecting the CD/DVD-ROM drive in the **Interface Type** field:
 - **IDE**. Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.
 - **SCSI**. Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.
- Select the device location in the **Location** list.
- Select the **Passthrough** checkbox to connect the physical server real CD/DVD-ROM drive to the virtual machine in the passthrough mode. In this mode, the CD/DVD-ROM drive is directly assigned to the virtual machine. If you connect a recordable optical drive to a virtual machine in the passthrough mode, you will be able to use it to burn CD or DVD discs in the virtual machine. To use this option, you should have a write access to the physical server CD/DVD-ROM.

Note: If you select the **Passthrough** option, the physical server will have no access to this CD/DVD-ROM drive.

Floppy Disk Settings

This group of settings allows you to configure the virtual machine's floppy disk drive settings:

- Leave the **Enabled** option selected if you want the virtual machine to use the given floppy disk drive. To temporarily disable operations with this drive without removing it from the virtual machine configuration, clear the **Enabled** check box.
- Select the **Connected** option if you want the virtual machine to start up with this floppy disk drive connected.
- In the **Image Type** section, you can choose the device that will be used to emulate the virtual machine's floppy disk drive:
 - **Physical Drive**. Select this option to use a real floppy disk drive installed on your physical server.
 - **Local Disk Image**. Select this option to use an existing image file to emulate the virtual machine's floppy disk drive. Not available when creating a virtual machine template.
 - **Blank Floppy Disk Image**. Select this option to create a new image file that will emulate the virtual machine's disk drive.

Creating a Blank Floppy Disk Image

If you have chosen to create a blank floppy disk image, you should specify its location in the **Image File Location** field. The following options are available:

Auto Assign	In this case, the name and the path to the floppy disk will be specified by the system. By default, it will be located in the virtual machine home directory and named <code>floppy.fdd</code> .
Specify File Name Manually	Choose this option if you want to give a specific name to the floppy disk. If a floppy disk with this name already exists, but you do not need it, you can overwrite the file by choosing the Overwrite image file if exist option. The created floppy will be placed to the default virtual machine home folder.
Specify Full Path Manually	Choose this option to manually set the location for the blank floppy disk. The path should include the name of the file. And if the specified location already has a floppy disk with the same name, you can overwrite it with the Overwrite image file if exist option. Not available when creating a virtual machine template.

Parallel Port Settings

This group of settings allows you to configure the virtual machine's parallel port settings:

Enabled. Select this option to enable the parallel port operations. If you want to temporary disable this device, but do not want to remove it completely, disable this option.

Connected. The parallel port will be automatically connected on the virtual machine startup if you select this option.

In the **Image Type** section, you can choose the device that will be used to emulate the virtual machine's parallel port:

- **Real Device.** Select this option to connect one of the parallel ports of the physical server to the virtual machine's parallel port. In this case you will need to choose the appropriate physical port in the **Parallel Port** list.
- **Printer.** Select this option to connect a printer using the virtual machine's parallel port. In this case, you will need to choose the appropriate printer in the **Printer** list.
- **Output File.** Select this option to emulate the parallel port by using an output file. In this case, a new output file will be created in the virtual machine's folder. The name that will be assigned to the file is displayed in the **Output File** field; you can change it, if necessary. The output file (in `.txt` format) records the information on the parallel port activity.

Serial Port Settings

This group of settings allows you to configure the virtual machine's serial port settings:

Enabled. Select this option to enable the serial port operations. If you want to temporary disable this device, but do not want to remove it completely, disable this option.

Connected. The serial port disk will be automatically connected on the virtual machine startup if you select this option.

In the **Image Type** section, you can choose the device that will be used to emulate the virtual machine's serial port:

- **Real Device.** Select this option to connect the virtual machine's serial port to one of the existing serial ports on the physical computer. In this case, you will need to choose the appropriate port on the physical server in the **Serial Port** list.
- **Socket.** Select this option to connect two virtual machines through the sockets. When connecting the virtual machine to a socket, you can use the default path to the socket or type a new one in the **Socket** field. You can also configure the role the virtual machine will play in the connection by selecting the necessary role in the **Mode** list. Selecting **Server** enables you to use this virtual machine to direct the other one. Selecting **Client** enables you to direct this virtual machine from the other one.
- **Output File.** Select this option to connect the virtual machine's serial port to an output file. You can accept the default file name or type your own one in the **Output File** field. The output file (in .txt format) records the information on the serial port activity.

Sound Settings

This group of settings allows you to configure the virtual machine's sound device settings:

- Leave the **Enabled** option selected if you want the virtual machine to use the given sound device. To temporarily disable operations with this device without removing it from the virtual machine configuration, clear the **Enabled** check box.
- Select the **Connected** option if you want the virtual machine to start up with this sound device connected.
- **Output.** Use this option to choose the necessary output device. You can choose one the following devices:
 - **Default.** Select this option if you want to use the output device set as default in your primary operating system.
 - **Null device.** Select this option if you want to mute the output device.
- **Input.** Use this option to choose the necessary input device. You can choose one of the following devices:
 - **Default.** Select this option if you want to use the input device set as default in your primary operating system.
 - **Null device.** Select this option if you want to mute the input device.
- **Emulated Device.** Use this option to define the device to be emulated. You can emulate the following devices:
 - Creative Labs Sound Blaster 16 or
 - AC'97 Audio for Intel Audio Controller

You can use the **Add** and **Remove** buttons to add new devices to the virtual machine or remove unnecessary ones from it.

The **Restart** group is available if you configure a running virtual machine. It allows you to decide when to apply the changes.

- The **Restart the Virtual Machine to apply the changes immediately** check box is selected. The changes will be applied immediately after you click the **Submit** button. The virtual machine will be stopped and then started again.

The **Restart the Virtual Machine to apply the changes immediately** check box is cleared. The changes will be saved when you click the **Submit** button but will not be applied to the virtual machine. The changes will be applied on the first time the virtual machine is stopped or restarted.

Reinstalling Virtual Machines

Virtual machine reinstallation means recovering the original state of a virtual machine in case you have unintentionally modified, replaced, or deleted any file that is part of an application or OS template, and the action has brought about the Container malfunction. The virtual machine reinstallation process restores these files as they were at the time when the virtual machine was created or when other applications were added to the virtual machine afterwards, if so.

Reinstallation is likely to bring about some irrevocable changes to your virtual machine, therefore, to be on the safe side, it is recommended to back up your virtual machine before reinstallation.

Click **Reinstall** to start reinstallation.

Click **Next** on the **Reinstall Container** introductory page to review the available options and to decide whether you really need to reinstall your Container and in what way.

Note: In order to be reinstalled, each virtual machine has to be stopped first.

Cloning Virtual Machines

This section describes how to define general and hardware settings of cloned virtual machines and how to clone multiple virtual machines.

Defining General Settings of Cloned Virtual Machines

The **Clone Virtual Machine: General Settings** page allows you to preset the main settings for the clone of the virtual machine before you start the process of cloning. The settings on this page are almost the same ones as when you create a new virtual machine

Preferences

In the section, you can change the name or description of a virtual machine created singularly, or assign a name and a description to a mass-produced virtual machine. You can also view where the

virtual machine configuration file is stored. The **Start the Virtual Machine after its creation** option, being enabled, launches the virtual machine upon its creation on the basis of this template.

For more information on the **Host System Integration**, **Remote Display**, and **Offline Management** settings, see **Defining Virtual Machine General Settings** (p. 130).

To configure the hardware settings of the virtual machine clone, click the **Customize** button.

Defining Hardware Settings of Cloned Virtual Machines

The **Clone Virtual Machine: Hardware Settings** page allows you to preset the hardware settings for the clone of the virtual machine before you start the process of cloning. If you want to reconfigure these settings, you can easily do it later on the **Configure Hardware Settings** page. To open this page, choose the clone and go to **Configure > Hardware Settings**.

You can:

- View and edit the general settings in the **General** subsection;
- View and edit the parameters of the virtual machine devices in the **Devices** subsection;
- Add and remove various hardware devices.

For more information, see **Defining Virtual Machine Hardware Settings** (p. 133).

Note: Not all hardware settings may be available for cloned virtual machines.

Cloning Multiple Virtual Machines

The **Clone Virtual Machines** page allows you to create exact copies of several virtual machines at once. The multiple creation of clones is possible only for the virtual machines that are located on the same physical server.

The page comprises as many subsections as many virtual machines you are going to clone. In each subsection, you can specify the future clone name. The default name of the clone is made by adding the "clone_" prefix to the virtual machine initial name.

Note: The running virtual machines will be stopped prior to the process of cloning and restarted again after the process is complete.

If you want to start the virtual machines after cloning, just enable the corresponding check box below the subsections.

The resulting clones of the virtual machines will be located on the same physical server and will be listed together with the initial virtual machines as soon as the process of cloning is complete.

Migrating Virtual Machines

The cases when you need to move your virtual machines from one physical server to another can be quite numerous. Use the migration to distribute the workload between physical servers, or in case of the physical server malfunction. On the **Migrate Virtual Machine(s)** screen, you need to select the physical server you are going to move the virtual machines to and select some additional options.

The screen is available from the virtual machine **Summary** screen by clicking the **Migrate** option from the **Tasks** section.

When selecting the destination physical server for you virtual machines, remember that you will only be able to migrate virtual machines between:

- physical servers with Server Bare Metal virtualization technology, because only this technologies allow hosting virtual machines.
- physical servers registered in VirtuoZZO Automator. If you need to migrate the virtual machines to a physical server that has not been registered yet, this has to be done first.

To initiate the migration process, you should specify what physical server will host the virtual machine. The list includes only Server Bare Metal physical servers.

The **Running VM Migration** section is available only if you are attempting to migrate a running virtual machine. Before you start the migration, you should specify its type. In fact, you specify for what period a virtual machine will be paused/stopped.

Before Migration

- **Pause VM (Warm Migration)**. This is the so-called warm migration, when the virtual machine is automatically paused for the whole process of migration and restarted when the migration is finished. For the successful warm migration, the CPU architecture of the hosting and receiving physical servers should coincide.
- **Stop VM (Cold Migration)**. This is the so-called cold migration, when the virtual machine is stopped before the migration starts. It is not started automatically when the migration is over.

After Migration

If you want the virtual machine to be started automatically after the migration, enable the **Resume VM** option.

Migrating Physical Servers to Virtual Machines

Migration of physical servers to virtual machines is performed with the help of VirtuoZZO Transporter invoked by clicking **Migrate Server to Virtual Machine** in the **Tasks** section of the physical server dashboard. Fill out the required fields as described in **Setting Up Connection to Physical Servers** (p. 96) and click **Submit** to initiate migration and schedule the corresponding task.

Note: If a physical server has multiple partitions, all will be migrated to the virtual machine.

After the physical server is migrated to a virtual machine, you can adjust its configuration (p. 130).

Managing Virtual Machine Templates

Creating Virtual Machine Template

A template of a virtual machine is an exact copy of the virtual machine, with the same hardware and software configuration, but with the only difference that it cannot be started like an ordinary virtual machine though it may have an OS preinstalled and a set of various software programs.

At any time, a template can be easily converted to an ordinary virtual machine.

The created virtual machines will have the same hardware configuration, the operating system and the software that the template has.

You can convert an existing virtual machine into a template or make a clone of the virtual machine that will be used as a template and continue using the initial virtual machine.

Defining Template General Settings

The **New Template: General Settings** page, available on clicking **New Template** on the **Templates** screen from the left menu, allows you to preset the main settings for the virtual machine template. The settings on this page are almost the same ones as when you create a new virtual machine. For more information, see **Defining Virtual Machine General Settings** (p. 130).

To configure the hardware settings of the virtual machine template, click the **Next** button.

To create a template, click **Create**.

Defining Template Hardware Settings

The **New Template: Hardware Settings** page allows you to configure the main hardware settings of the virtual machine template that is being created. For more information, see **Defining Virtual Machine Hardware Settings** (p. 133).

Note: Not all hardware settings may be available for virtual machine templates.

Reviewing Template Parameters

The **New Template: Review** page enables you to make sure that the newly created template will fit all your needs. On this page, you can review all the configuration parameters.

- **General Configuration** (p. 144) contains the information on the template name.

- **Hardware Settings** (p. 144) contains the information on the CPU, operating memory and the devices configuration.

If after the review, you decided to change the type of the network adapter, the size of the hard disk, or any other parameter, just click the **Back** button. You will be able to come back the **Hardware Settings** and **General Settings** pages.

To complete the creation of the template, click the **Create** button and wait while the process finishes.

Cloning a Virtual Machine to Template

The **Clone to Template** page allows you to create a template of the chosen virtual machine.

With this option, you can have a functioning virtual machine and its clone with the template characteristics at the same time.

Before you create a template, you should decide where to store it:

- **Clone VM to Library Template.** In this case, the template will be placed to the Resource library folder accessible to all users who have enough rights. In future, these users will be able to create a virtual machine using this template and to place it on any physical server.

Note: The physical server must have the same virtualization technology as the template has.

- **Clone VM to Local Template.** In this case, the template will be created locally on the same physical server the virtual machine belongs to. Such a template is visible from the hosting physical server only. To find the list of such templates, go to the **Summary** page of the physical server and click **VM Templates** (p. 48). In the future, the virtual machine created from this template will be placed on this physical server.

When you click **Clone**, the process of cloning starts. Wait till the virtual machine is cloned to the template. If you have chosen to create a library template, you will find it in the **Resource Library - > Templates** folder. If you have chosen to create a local template of the virtual machine, you will find it in the local library on the physical server the virtual machine initially belonged to.

Converting a Virtual Machine to Template

The **Convert to Template** page allows you to create a template of the chosen virtual machine.

With this option, your virtual machine no longer exists but is converted to a template.

Before you create a template, you should decide where to store it.

- **Convert VM to Library Template.** In this case, the template will be placed to the **Resource library** folder accessible to all users who have enough rights. In future, these users will be able to create a virtual machine using this template and to place it on any registered physical server.

Note: The physical server must have the same virtualization technology as the template has.

- **Convert VM to Local Template.** In this case, the template will be created locally on the same physical server the virtual machine belongs to. Such a template is visible from the hosting physical server only. To find the list of such templates, go to the **Summary** page of the physical server and click **VM Templates** (p. 48). In the future, the virtual machine created from this template will be placed on this physical server.

When you click **Convert**, the process of converting starts. Wait till the virtual machine is converted to the template. If you have chosen to create a library template, you will find it in the **Resource Library - > Templates** folder. If you have chosen to create a local template of the virtual machine, you will find it in the local library on the physical server the virtual machine initially belonged to.

Editing Virtual Machine Template

Having created a virtual machine template, you may need to change its general or hardware settings before converting it into a new virtual machine. Virtuozzo Automator allows you to do it.

Defining Template General Settings

The **Configure General Settings** page allows you to edit the main settings for the virtual machine template. The settings on this page are almost the same ones as when you create a new virtual machine. For more information, see **Defining Virtual Machine General Settings** (p. 130).

To configure the hardware settings of the virtual machine template, click the **Next** button.

To save the changes, click **Create**, otherwise click **Cancel**.

Defining Template Hardware Settings

The **Configure Hardware Settings** page allows you to configure the main hardware settings of the virtual machine template. For more information, see **Defining Virtual Machine Hardware Settings** (p. 133).

Note: Not all hardware settings may be available for virtual machine templates.

Viewing Virtual Machine Logs

Viewing Virtual Machine Task Logs

The **Tasks** subtab lists recent operations on the selected virtual machine. For more details on information shown, see **Viewing Infrastructure Task Logs** (p. 32).

Viewing Virtual Machine Alert Logs

The **Alerts** subtab lists resource consumption alerts for the selected virtual machine. For more details on information shown, see **Viewing Infrastructure Alert Logs** (p. 32).

Viewing Virtual Machine Event Logs

The **Events** subtab lists status changes of the selected virtual machine. For more details on information shown, see **Viewing Infrastructure Event Logs** (p. 34).

Deleting Virtual Environments

The **Delete** screen allows you to remove those virtual environments from your physical servers that you do not need anymore. This screen is opened:

- after you click the **Delete** link on the corresponding virtual environment dashboard;
- after you select the check boxes of the virtual environments you wish to delete on the **Virtual Environments** tab of the **Infrastructure** window and click the **Delete** icon above the **Virtual Environments** table on this tab.

All the virtual environments scheduled for removing are listed in the **Delete Virtual Environments** section of the **Delete** screen. To delete the listed virtual environments, select the **Yes, I want to delete the Virtual Environments** check box and click the **Delete** button; otherwise, click **Cancel**.

When removing virtual environments, please, keep in mind the following:

- Removing a virtual environment means that the private area of the virtual environment is completely deleted from the Host OS and all the virtual environment private files are irrevocably erased from the physical server.
- Deleting a considerable number of virtual environments may take a rather long run.

Managing Virtual Environment Backups

The virtual environment backups are listed and can be created/restored/removed on various levels:

- a global level (p. 149). Here, you can configure default backup settings that will be applied to all physical servers registered in Virtuozzo Automator. Go to the **Configure Backups** page, in the **Setup** section of the left menu.
- an Infrastructure level (p. 150). Here, you will find all backups residing on all physical servers in Virtuozzo Automator. Go to the **Backups** subtab of the **Infrastructure** dashboard.
- a physical server level (p. 151). Here, you will find all backups residing only on particular physical server, i.e. made from those virtual environments that belong to this physical server. Go to the **Backups** subtab of the physical server dashboard.
- a virtual environment level (p. 154). Here, you will find the backups belonging to the particular virtual environment. Go to the **Backups** subtab of the virtual environment dashboard.

There are two ways to back up one or more virtual environments:

- 1 Manually. This can be done by selecting the relevant virtual environments on the virtual environment list on either the Infrastructure level or physical server level and clicking **New Backups**.
- 2 As a scheduled job (p. 208). This can be done by going to the scheduler page in the Management group and creating a new task.

When creating a backup of one or a multitude of Containers, a number of backup settings can be specified during the backup operation. If they are not specified for the given backup operation, the default backup settings of the physical server (p. 151) where each corresponding Container is located are used. The default backup settings of a physical server can in their turn use the default Container backup settings defined for the whole datacenter (p. 149). This means that you can define the backup settings on different levels:

- 1 Globally for your datacenter. Select **Setup > Backups** on the left Virtuozzo Automator menu to define these settings.
- 2 Individually for each physical server. Select the physical server, then click **Configure > Container Backup Settings** on the Virtuozzo Automator toolbar to define these settings.
- 3 During an individual backup operation.

If all the levels are defined for a specific operation, the settings of the lowest level will be of the highest priority.

Note: For the VA backup functionality to work on Containers, forward and reverse DNS lookups must be correctly configured for both the Source and Backup Servers.

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Defining Global Backup Settings

If you have the necessary permissions, you can define the default virtual environment backup settings for the whole Virtuozzo infrastructure on the **Configure Backups** screen (in the **Setup** group on the left Virtuozzo Automator menu):

- On the **Backup Type** drop-down menu, select one of the following types of backup:
 - **Full** backup. This type is recommended when doing a backup job for the first time and contains all the data selected for the backup. A full backup storage space and completion time requirements are the highest. Note, the physical server where you choose to store a full backup may have limitation on the allowed number of full backups. If it is so, the Wizard will delete the oldest backup with all its incremental backups on the physical server in order to create a new one. For more details, see **Defining per-Physical Server Backup Settings** (p. 151).
 - **Incremental** backup affects only those files and data which have changed since the last backup and takes less storage space and creation time.
 - **Differential** backup (Containers only) includes only the data modified since the last full backup (as opposed to incremental backups which save the data changed after *any* last backup, be it full, incremental, or differential).
- (Containers only) On the **Compression Level** drop-down menu, choose one of the possible levels:
 - **None**. This level suggests no compression at all and is recommended if you need to perform a fast backup but do not need to save disk space necessary for backups storage;
 - The **normal** level of compression takes a little more time and allows for some disk space saving;
 - While extending the backup creation time, the **high** level of compression saves you even more disk space;
 - The **maximum** compression level means the longest backup creation time and the best backup compression.

Note: It is recommended to choose the backup compression level according to the type of the data the virtual environment stores. The Virtuozzo virtual environment software will try to compress the backup regardless of the data type, but some data are worth spending time for compression (such as text files and databases) and some, such as already compressed archives are not. Therefore, select the **None**

checkbox when the virtual environment you are backing up stores no data that suggest or need compressing.

- Choose the **Backup Node** for storing virtual environment backups regardless of their Source physical servers.
- Enable backup rotation with the help of the settings in the **Incremental Backup Settings** group. Use the provided checkboxes to specify the number of incremental backups and/or days after which Virtuoizzo Automator should create a new full backup, thus annulling the previous incremental backups.

Note: All these settings can also be set individually (p. 151) for each of the Virtuoizzo Server Group physical servers or virtual environments.

Managing Backups on Infrastructure Level

The **Backups** tab on the infrastructure level lists the virtual environment backups created on all physical servers that are registered in Virtuoizzo Automator. To access this page, go to the **Infrastructure** level and click the **Backups** pane. Any virtual environment is defined by its operating system files, applications installed, configuration files, and personal information. Virtuoizzo Automator allows you to back up all these components. A regular backing up of the existing virtual environments is essential for any virtual environment reliability. If you already have some virtual environment backups, the **Backups** tab displays a table summarizing these backups:

Column Name	Description
Virtual Environment Name	The name of the virtual environment that was backed up.
Last Backup	The date and time when the last backing up was performed.
Total Size	The overall size of the backup.
Backup Node	The physical server where the last backup of the given virtual environment is stored.
Total Backups	The number of backups of the virtual environment.

You can manage your backups on this page in the following ways:

- The **Restore Virtual Environment** button allows restoring one or more virtual environments from their respective backups currently selected in the table. As you may have more than one backup of a virtual environment, any virtual environment backed up with several copies is restored by default from the latest created backup. The opened page provides instructions to lead you through the process. Every virtual environment is restored with all the values overwritten from the backup, including the hostname, IP address, application set, etc. The changes in any virtual environment made after the date of this backup will be lost after the virtual environment has been restored. Mind that you have to confirm restoring the virtual environment(s) on the **Restore Confirmation** page to accomplish the process.
- The **Remove Backups** button removes the virtual environment backup(s) currently selected in the table. Usually this is done to provide extra space for making new virtual environment backups. Use the checkbox at the upper left corner of the table to select/deselect all the backups at once.

- Clicking a virtual environment hostname or ID in the table opens the **Container Backups** or **Virtual Machine Backups** page, which allows you to manage the selected virtual environment backup(s). You can further open the **Backup Details** page where you get more information on the current virtual environment backup(s) and restore or remove or browse the virtual environment backup(s).

You can also back up one or more virtual environments right from this page by clicking the **New Backups** link.

Managing Backups on Physical Server Level

The **Backups** tab of a physical server lists the virtual environment backups created on the selected physical server only. For more information, see **Managing Backups on Infrastructure Level** (p. 150).

Defining per-Physical Server Backup Settings

This screen is available on choosing the physicals server and clicking **Configure --> Virtual Environment Backup Settings** option from the upper toolbar.

On the **Configure Virtual Environment Backup Settings** screen displayed individually for each physical server registered in Virtuozzo Automator, you can configure:

- 1 The backup settings that will be used by default during the backing up of the virtual environments belonging to the current physical server. These settings are defined in the **Default Backup Options**, **Number of Backups Available From Virtuozzo Power Panel**, and **Incremental Backup Settings** groups.
- 2 The location for virtual environment backups that will be used during the backing up of the virtual environments from any physical server (including this one) provided the current physical server is set as the Backup physical server for the corresponding backup operation. This setting is defined in the **Local Backups Location Settings** group.

If you are configuring the Master Server settings, these settings also serve as the global backup settings for the physical servers group and there is no the **Virtual Environment Backup Settings** section on this screen. If it is a Slave physical server, you should first decide whether you want to inherit the global virtual environment backup settings for this physical server, or to define its individual settings. In the latter case select the **Use local settings for backing up Virtual Environment of this Node** radio button in the **Virtual Environment Backup Settings** section.

After that you can:

- Select the backup type and compression level as described in **Defining Global Backup Settings** (p. 149).
- Select the **Backup Node** for storing the backups of the virtual environments of this physical server. If you choose to store the backups on this very physical server, their exact location will be determined by the local backup location settings below. If you select another physical

server, the exact location of the virtual environments will be determined by the local backups location settings of the corresponding physical server.

- Use the **Number of full backups to keep** field to specify the maximum number of the full backups that will be stored on the physical server.

Important: In case, the specified number is exceeded, the oldest backup and all its incremental backups will be deleted from the physical server, thus freeing the space for a new full back.

- Enable backup rotation with the help of the settings in the **Incremental Backup Settings** group. Use the provided checkboxes to specify the number of incremental backups and/or days after which Virtuozzo Automator should create a new full backup, thus annulling the previous incremental backups.

The **Local Backups Location Settings** group defines the backup location of those virtual environments that are backed up to the current physical server, irrespective of their source physical server. The virtual environment backups made from different source physical servers will be always stored in one and the same specified path. That is, the path cannot be diversified into several paths according to the source physical server name. You may select either a local drive with a local path or a network share path with the corresponding network credentials.

Creating Virtual Environment Backups

The **New Virtual Environment Backups** screen is available when clicking **New Backups** on the physical server **Container Backups** page or on the Infrastructure **Backups** page.

Click the **Add Virtual Environments** button to choose the virtual environments that you plan to back up.

Note: If you compose a longish backup list of virtual environments, you may need to revise the backup parameter limitations. To check or enlarge the timeout period, go to the VA configuration file:

- Management server: `/var/opt/pva/mn/etc/vzagent.conf`;
- Slave server: `/vz/pva/agent/etc/vzagent.conf`.

The virtual environments to be backed up on this screen can be selected by clicking **Add Virtual Environment** in the **Virtual Environment** section.

In the **Backup Description** section, enter any commentary you think can be practical for further backup operations.

In the **Backup Options** section, define the level of compression and the type of the backup:

- On the **Backup Type** drop-down menu, select one of the following types of backup:
 - **Full backup.** This type is recommended when doing a backup job for the first time and contains all the data selected for the backup. A full backup storage space and completion time requirements are the highest. Note, the physical server where you choose to store a full backup may have limitation on the allowed number of full backups. If it is so, the Wizard will delete the oldest backup with all its incremental backups on the physical server in order to

create a new one. For more details, see **Defining per-Physical Server Backup Settings** (p. 151).

- **Incremental** backup affects only those files and data which have changed since the last backup and takes less storage space and creation time.
- **Differential** backup (Containers only) includes only the data modified since the last full backup (as opposed to incremental backups which save the data changed after *any* last backup, be it full, incremental, or differential).

You can also leave here the default **Use Hardware Node Settings** value. In this case, every virtual environment will be backed up with the default backup parameters (p. 151) of its physical server. To view or set the physical server default backup parameters, select it and click **Configure -> Virtual Environment Backup Settings** on the top toolbar.

- (Containers only) On the **Compression Level** drop-down menu, choose one of the possible levels:
 - **None**. This level suggests no compression at all and is recommended if you need to perform a fast backup but do not need to save disk space necessary for backups storage;
 - The **normal** level of compression takes a little more time and allows for some disk space saving;
 - While extending the backup creation time, the **high** level of compression saves you even more disk space;
 - The **maximum** compression level means the longest backup creation time and the best backup compression.

Note: It is recommended to choose the backup compression level according to the type of the data the virtual environment stores. The Virtuozzo virtual environment software will try to compress the backup regardless of the data type, but some data are worth spending time for compression (such as text files and databases) and some, such as already compressed archives are not. Therefore, select the **None** checkbox when the virtual environment you are backing up stores no data that suggest or need compressing.


You can also leave here the default **Use Hardware Node Settings** value. In this case, every virtual environment will be backed up with the default backup parameters (p. 151) of its physical server. To view or set the physical server default backup parameters, select it and click **Configure -> Virtual Environment Backup Settings** on the top toolbar.


- On the **Backup Node** drop-down menu, select the physical server that will be used for storing the created backups.

You can also leave here the default **Use Hardware Node Settings** value. In this case, every virtual environment will be backed up with the default backup parameters (p. 151) of its physical server. To view or set the physical server default backup parameters, select it and click **Configure -> Virtual Environment Backup Settings** on the top toolbar.

(For Containers only) The **Exclude** section allows you to keep certain files and directories from backing up:

-  Hidden files;

-  System files;
- Single files or directories. If you do not want to back up a whole directory, type it into the corresponding field; to add more directories to be excluded from the backup, click the plus sign.

Warning!  If you exclude one or more system or hidden files/folders from the virtual environment backup (e.g. either the **Hidden files** or **System files** checkbox is selected), you'll be able to restore only separate files from this backup, but not the virtual environment as a whole.

(For Containers only) The **Include** section allows you to limit the backup process with a number of selected files or directories inside the virtual environment. In the field provided, type the absolute path to the file or directory you wish to back up. To include additional files or directories, click the plus icon to the right of an existing path and enter a new path.

Note: The backup will contain only those files and directories that you have indicated in the **Include** section. To back up the whole virtual environment, leave the **Include** section empty.

You can also delay the backup operation till the time specified in the **Backup Start** group of options.

To start performing the backup, click **Backup**, otherwise, click **Cancel**.

Managing Backups on Virtual Environment Level

A regular backing up of the existing virtual environments is essential for any virtual environment reliability. Any virtual environment is defined by its operating system files, applications installed, configuration files, and personal information. Virtuozzo Automator allows you to back up all these components.

For a virtual environment that has been backed up, a table describing its backups is displayed:

Column Name	Description
Backed Up	The date and time when the backing up was performed.
Backup Node	The physical server where the backup is stored.
Size	The size of the backup.
Description	The description of the backup.
Backup Type	Denotes if it is a full, incremental, or differential backup. An incremental backup stores not all the files and settings of the virtual environment at the given period of time, but only the changes the virtual environment has undergone since the last backup. A differential backup saves the data changed after the last full backup. Note: You cannot create differential backups of virtual machines.

To sort out the backups, click the **Show Search** link, enter the date and time of the backup creation, other parameters of the backups you need to display, and click **Search**.

You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

With the help of the action links above the table you can manage your backups on this page in the following ways:

- The **New Backup** link (or the **New** button on the Virtuozzo Automator toolbar) begins the process of backing up the current state of the virtual environment, be it running or not. The description of all possible virtual environment statuses is provided in **Physical Server, Container and Virtual Machine Statuses**. Virtuozzo Automator places the backup of the virtual environment onto one of the physical servers registered in Virtuozzo Automator that was set as the default backup storage space (p. 151). For a Virtuozzo Power Panel user, the button is available only if you have not reached the maximum number of allowed backups for the virtual environments residing on this physical server. If you have, remove one of the backups to yield more extra space (see below for details) or ask your administrator for help. The physical server administrator can change the number of the backups allowed (p. 151).

Note: Backing up is also available on clicking the **Back up** link above the table on the relative page.

- A Virtuozzo Power Panel user who has reached the limit on the number of virtual environment backups he/she is allowed to create can make use of the **Renew Backup** link to renew a virtual environment backup without having to delete any of the existing virtual environment backups. You renew any virtual environment backup by selecting the check box opposite the corresponding date and clicking on the **Renew Backup** button. Mind that only one backup can be renewed at a time.
- The **Restore virtual environment** link allows restoring virtual environment from the backup currently selected in the table. Only one backup should be selected for this operation. The opened page provides instructions to lead you through the process. The virtual environment will be restored with all the values overwritten from the backup, including the hostname, IP address, application set, etc. Mind that you have to confirm restoring the virtual environment on the **Restore Confirmation** page to accomplish the process.

The changes in the virtual environment made after the date of this backup will be lost after the virtual environment has been restored. If you restore a Container from a backup, you cannot change the ID of the resulting Container, i.e. the information of an existing Container, with this ID, will be overwritten.

Note: If you are using a virtual environment IP address to connect to the virtual environment, you may have to reconnect to it with the IP address retrieved from the backup after the virtual environment is restored.

- The **Remove Backups** button removes the virtual environment backups currently selected in the table. Usually this is done to provide extra space for making new virtual environment backups. Use the check box at the upper left corner to select/deselect all the backups at once.
- Clicking on a backup date in the table opens the **Backup Details** page where you can also restore or remove the corresponding virtual environment backup.

Creating Virtual Environment Backup

On the **New Backup** screen you are supposed to define all the parameters of the backup operation.

The screen can be accessed by clicking the **Back up** link on the **Maintenance** field of the virtual environment **Summary** screen.

With Virtuozzo Automator, you can create backup of Containers as well as of virtual machines. The resulting backup can be stored only on the physical servers with the same virtualization technology as the initial virtual environment was. A Container backup can be stored on a physical server running Virtuozzo Containers for Linux/Windows or Containers for Windows, meanwhile a virtual machine backup can be stored on a physical server running Server Bare Metal.

You can view the created backups listed on the **Backups** subfolder (p. 150) of the target physical server. You can use the Backups list to choose virtual environment backups for being deleted permanently or for being restored.

Backup Details

The **Backup Details** page provides general information on the virtual environment backup in the following table:

Column Name	Description
Creation Date	The date and time when the backing up was performed.
Backup Size	The size of the backup.
Backup Type	Denotes if it is a full, incremental, or differential backup. An incremental backup stores not all the files and settings of the virtual environment at the given period of time, but only the changes the virtual environment has undergone since the last backup. A differential backup saves the data changed after the last full backup. Note: You cannot create differential backups of virtual machines.
Virtual Environment	The name of the backed up virtual environment.
IP Address(es)	The IP address of the backed up virtual environment.
Backup Node	The hostname of hardware node where the virtual environment was backed up.

If this backup has any description, you can view it in the **Backup Description** section.

To manage the backup you can use the following options on the Virtuozzo Automator toolbar:


- The **Restore** button restores the virtual environment from the current backup. The changes in the virtual environment made after the date of this backup will be lost after the virtual environment has been restored. Mind that you have to confirm restoring the virtual environment on the **Restore Confirmation** page to accomplish the process.

- The **Browse** (p. 157) button allows you to browse the directory structure of the archived Container backup as if it had been already restored and to restore only the needed files and folders. Note, that the content of virtual machines backups cannot be browsed.
- The **Remove** button removes the current virtual environment backup. Usually this is done to provide extra space for making new virtual environment backups.

Browsing Backup Contents

Virtuozzo Automator allows you to browse the directory structure of any Container backup as if this backup had already been restored and restore only the needed files and folders. The **Browse Backup** page opens after you follow the **Browse** button on the **Backup Details** page (p. 156).

The content of any directory inside the backup is presented in the table. The first table column indicates if the object is a directory or a file. The table on the whole provides the following information:

Column Name	Description
Name	The name of the directory or file.
Size	The size of the file.
Modified	The date and time of the last modification of the directory or file.
Permissions	 The standard Linux permissions for the directory or file.
Actions	Allows you to download a file to your local computer provided it is not part of an OS or application template.

If you are browsing an incremental Container backup, the information is shown not only on the files and folders from this backup, but on all the contents of the Container, should it be restored from this incremental backup. In other words, the backed up Container is always presented in its integrity and not as a collections of sporadic changes from the incremental backup.

To restore separate files and folders from the backup to the actual Container, just select them by ticking the corresponding check boxes in the rightmost column and click the **Restore** button.

Renewing Container Backup

The number of backups you are allowed to create is limited and if the limit is reached, but the Container has still to be backed up and you do not want to spend time on deleting any of the existing backups, you can renew the selected backup on the **Renew Backup** screen.

For information on backup options, see **Creating Virtual Environment Backups** (p. 152).

CHAPTER 7

Managing Resource Library Tools

This chapter provides information on the resource library tools such as templates, IP tools or virtual networks.

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Viewing the Resource Library Dashboard

The **Resource Library** page enables you to view the summary information on the Resource Library tools.

Templates

The subsection shows the overall number of templates registered in Virtuozzo Automator Resource Library. You can monitor how many templates belong to both, Virtuozzo and Virtuozzo Containers, virtual technologies and how many templates have a particular type of guest operating system.

To receive more detailed information on the virtual environment templates, click the **Templates** link from the Virtuozzo Automator left menu.

If you need to create a new template, click the **New Template** link in the bottom of the table. You can initiate the same operation from the **Templates** page (p. 161).

Software

This subsection displays the information on the registered in Virtuozzo Automator file shares and the content of these shares. These can be CD/DVD images (p. 38), application templates (p. 252) or operating system templates (p. 250). To receive more detailed information on any of these files, just click the corresponding link in the table.

If you want to create a new file share, you can either click the **New File Share** link on this screen or pass on to the **Software** page, **File Shares** tab (p. 159), and click the same link there. To synchronize the shares, click the **Synchronize all Shares** link.

IP Pools

The subsection shows the summary information on the registered IP pools and the statistics of leased and free IP addresses. From this subsection, you can create a new IP pool by clicking the **New IP pool** link. To receive more detailed information on IP pools and addresses, pass on to the **IP Pools** section (p. 235), in the Resource Library folder.

Virtual Networks

This subsection displays the number of virtual networks registered in Virtuozzo Automator. To add a new virtual network, click the **New Virtual Network** link. The deleting option is available only from the **Virtual Networks** page (p. 224).

Managing File Shares

If you have any file shares registered in Virtuozzo Automator, they will be displayed on **Resource Library > Software > File Shares** tab.

The information, such as the name, path, size of all the file shares, presented in the **File Shares** table is displayed according to the settings made on the **Select Columns** drop-down menu. If all the columns are selected, this table presents the following:

Column Name	Description
Name	The name of the file share.
Description	The description of the file share.
Path	The network path to the physical server that will serve as a file share.
Size	The size of the corresponding file share.
Status	The current status of the file share.

To facilitate working with file shares registered in Virtuozzo Automator, you may have the **File Shares** table display only those file shares that conform to particular parameters. Above the table, click the **Show Search** link to display the fields where you can specify the parameters the file shares should meet; you can also customize these fields by clicking **Customize**. Then click on the **Search** link. To view all the file shares registered in Virtuozzo Automator, click on the **Reset Results** link to the right of the parameter fields.

To manage several file shares at once, make use of the Virtuozzo Automator toolbar right above the table. You are able to execute the following operations on file shares groups:

- Synchronizing any number of file shares (the **Synchronize** button). You should synchronize the newly registered file shares to view the disk images stored on these shares on the **CD/DVD Images** tab (p. 38).
- Deleting any number of file shares (the **Delete** button).

To perform anything of the above, select the check boxes opposite the corresponding disk images and press the appropriate link on the Virtuozzo Automator toolbar.

To register a new file share, click the **New File Share** button located on the Virtuozzo Automator toolbar right above the **File Shares** table. This registration procedure is described in detail in the following subsection.

Registering File Share

The **New File Share** screen allowing you to register new file shares in Virtuozzo Automator opens on expanding the **Resource Library** item in the left Virtuozzo Automator pane, following the **Software** link, and then clicking **New File Share** on the Virtuozzo Automator toolbar of the **File Shares** tab. To register a new file share, you should fill in the following field:

- **Name** (mandatory): specify the name for the file share which you are going to register in Virtuozzo Automator.
- **Description**: enter any commentary on this file share.
- **Path** (mandatory): enter the network path to the physical server that will serve as a the file share. The format of the path should look as follows: `\\server\path`. In stead of a `<server>`, you can type in either a hostname or an IPv4 address. If your server has an IPv6 address, use its hostname to provide the valid path.
- **User Name** and **Password**: provide the administrator's credentials to log in to the file share.

After specifying the necessary parameters, click the **Save** button to start registering the file share. The newly registered file share will be displayed in the **File Shares** table on the **File Shares** tab of the **Software** screen.

Viewing File Share Details

The file share window is divided into three sections, each reflecting the following file share details:

- 1 The **General Settings** section of the screen displays the information about the file share:
 - the file share name;
 - the path to the file share;
 - the file share description if written;
 - the file share size;
 - the file share status;
- 2 The **Tasks** section provides quick access to performing the following operations:
 - Configuring the file share (**Configure** (p. 161)).
 - Synchronizing the file share (the **Synchronize** link). You should synchronize the file share to view the disk images stored on this share in the **File Share Content** section and on the **CD/DVD Images** tab (p. 38).

- Deleting the file share (the **Delete** link).

3 The **File Share Content** section displays the disk images stored on the file share. The information on the disk images is organized the same way as on the **CD/DVD Images** tab (p. 38).

Configuring File Share Parameters

The **Configure** page allows you to adjust the settings for the file share. In the **General Settings** group, you can change the file share name and description, the path to the file share. In the **Administrative Login to File Share** group, you can change the administrator's credentials to log in to the file share.

Press the **Save** button to save the changes, otherwise, click **Cancel**.

Managing Templates Storage

You may want to list the virtual environment templates that are currently available on any of the physical servers registered in Virtuozzo Automator. The whole list of the virtual environment templates present on your physical servers is given in the **templates** table on the **templates** page:

Column Name	Description
Name	The name of the virtual environment template. It can be a Container or a virtual machine template.
VT	The physical server virtualization technology.
OS	The operating system icon the template is based on.
VT Arch	Virtualization Architecture. The microprocessor architecture of the physical server where the template is stored.
Description	The explanatory text intended to help users understand the virtual environment template purpose or to provide additional information on it.
Operating System	The detailed description of the operating system type and version the template is based on.
Size	The size of the template.
Status	The availability of the status, i.e. whether it is online or offline.

To add or remove any of the columns, use the **Select Columns** button above the table.

The **Search** section comprises four fields: **VT**, **Name**, **OS**, and **Description**. This allows you to search the templates according to any of these parameters. If you use only some of these fields, you can add or remove them according to your needs with the help of the **Customize** button. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

To edit a template, click its name in the **Name** column.

The Virtuoizzo Automator toolbar buttons on this screen let you quickly perform the following operations:

- To create a new template, click **New** and select template.
- To create a new template by dividing the physical server resources by a specified number of virtual environments, click the **Split Hardware Node** link.
- There can be situations when the existing physical server template does not fully satisfy your requirements. In this case, Virtuoizzo Automator provides you with the opportunity to quickly create a new template that will inherit all the properties of the initial template. After that, you can adjust its properties to meet your demands. To this effect, select the check box opposite the corresponding virtual environment template and click **Clone**.
- To delete those templates that are not needed any more, select the check boxes next to the corresponding templates and click **Delete**.

Setting Up a Virtual Machine Storage

To create a global template of a virtual machine, you should first register a **VM Templates Storage**. Thus the system will know where to place the hard disk image file and other files of the resulting virtual machine templates. If you use Virtuoizzo Automator console to place a VM template to the Templates Storage, it is added to the Templates List on this page. If you add a VM template manually, you will need to synchronize the Storage contents and the Templates list.

The Container template, being a configuration file, does not necessarily need a registered Template Storage.

The **VM Templates Storage** table enables you to perform the following actions:

Operation Name	Description
Configure	Click this link to register an external VM template storage in Virtuoizzo Automator.
Check Status	Click this link to check whether the storage is online or not.
Synchronize	Click this link to refresh the storage content in Virtuoizzo Automator.
Unregister	Click this link to unregister the external storage from Virtuoizzo Automator.

Setting Up an External Templates Storage

The **Setup** page enables you to register a physical server a new template storage where you can store the template-related files.

You should fill in the following information to register a storage:

- **Network Path.** Specify the path to the Samba share storage.
- **Login Name.** Specify the valid login name to the Samba share storage.
- **Login Password.** Specify the correct password to the Samba share storage.

When finished, click **Save** to complete registration.

Creating Template: Initial Configuration

If you are not satisfied with the Container templates shipped with the Virtuozzo Containers software or want to have virtual machine templates storage, you can create your own templates. Virtuozzo Automator provides a special wizard for creating virtual environment templates. The **New Template** wizard will guide you through the process and gather all the necessary information. To launch the wizard, click the **template** link on the Virtuozzo Automator left menu, then click the **New template** link on the **template** screen.

The first page of the **New template** wizard enables you to define the main parameters for the virtual environment template being created.

- **Use an existing Template for initial configuration.** Choose one of the virtual environment templates currently existing in the Templates library to create a new template on its basis. In this case, the new virtual environment template will inherit all the properties of the template selected on the drop-down menu.
- **Create a new Template from scratch.** From the drop-down list, choose what technology your template will belong to: Containers or virtual machines.

Note: New virtual machine template, created from scratch, consists of resource preferences and does not have operating system in it.

- **Use an existing Virtual Environment for initial configuration.** Choose among the existing virtual environments the one to copy its resources configuration settings to the template being created. Click the small folder icon next to the **Virtual Environment** field and select a virtual environment from a new window. The resource parameters configuration page presented next for adjustment will feature the resource parameters values from the chosen virtual environment.

To proceed with the template creation, click **Next**.

If you have chosen to create a Virtuozzo Container template, you will see the **Create New template** (p. 111) wizard for a Container template. If you have chosen to create a virtual machine template, you will pass on to the **New Template: General Settings** (p. 144) wizard for virtual machines.

CHAPTER 8

Managing Product Licenses

The **Licensing** screen contains all the necessary information on the Virtuozzo Containers and Server Bare Metal product keys installed on physical servers registered in Virtuozzo Automator.

The **Licenses** table on shows the information on all your licenses:

Column Name	Description
Serial Number	The string of symbols that serves for both activating the license and as an identifier of the license on the physical server.
Key Number	The key number of the license, which identifies the license on the Virtuozzo Key Authentication (KA) server.
Hardware Node	The physical server on which the license is installed.
Status	The status of the license.
Expiration	The expiration date and time of the license.

Physical servers running Virtuozzo Containers technology demand Virtuozzo Containers licenses to create and work with Containers. Physical servers running Server Bare Metal technology demand Server Bare Metal license to create and work with virtual machines and Containers. You do not need to additionally install Virtuozzo Containers license on Server Bare Metal physical servers to run Containers on them.

Note: Virtuozzo Automator 6.1 does not have its own license.

The full list of all the parameters (such as, the number of CPUs, virtual environments, or users your license allows you to have on the physical server) is available on the screen which opens if you click the key number of the license or the license serial number. If any of these parameters has been or will be changed (say, you upgraded your physical server with more CPUs, or want to extend the limit of the virtual environments that the physical server may host), you will need to update your physical server license as well.

You may also want to update the license if the data in the **Status** or **Expiration** columns suggest that you do. For example, if the **Status** column tells you that the license is invalid, or expired, or the expiration date displayed in the **Expiration** column is close, this is a good reason to update it. Finally, you can update your trial license. To update your license, select its check box on the list and click **Refresh** on the Virtuozzo Automator toolbar.

Whereas any of the licenses can be updated through Virtuozzo Automator, you can install it either as a key string or as a text file with the help of the Install License Key or Install License File links, correspondingly.

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Entering License Key

Depending on the context you operate the Virtuozzo virtual environment software in, a Virtuozzo license key is a string of symbols used as:

- a product key that can be installed on the physical server;
- a password that can be sent to the Virtuozzo licensing server to obtain a license file.

The **Install License: Enter Key** screen is available on clicking the **Install License Key** link on the **Licensing** screen and allows you to enter your Virtuozzo product key in the **Product Key** field. Clicking the **Next** button will bring you to the screen where you will be able to select the physical server for the license and review your license details, and either install the product key on the physical server or send the product key to the Virtuozzo licensing server.

Uploading License File on Physical Server

The **Install License: Upload File** screen is available when clicking the **Install License File** link on the **Licensing** screen.

A Virtuozzo Containers or Server Bare Metal license is installed on the physical server after a product key is sent to the licensing server. However, if the physical server has no Internet connection at the moment of sending the product key, Virtuozzo Automator displays a message informing you of the fact and provides you with an installation ID and URL. You will need to use this URL on any computer connected to the Internet to open a Web page where you will be able to manually enter the installation ID and send it to the Virtuozzo host. The server will generate a key file to be either sent to your email address or saved on the disk of the computer that sent the installation ID. For this key file to be installed on the physical server save it on its hard disk (or make it available from there, whatever way you think to be expedient) and install it on the physical server.

To install a new Virtuozzo license on the physical server, do the following:

- 1 Either
 - provide the full path to the file (use the **Browse** button to help)or

- open the new license file by using any text editor and copy its content to the clipboard;
- place the cursor to the text area of the **Install License: Upload File** screen and paste the copied license text.

2 Click the **Next** button.

Installing License Key

On the **Install License: Review** screen, you may select the physical server on which you want to install the license and review your license details: the license usage environment and the conditions of usage.

To select the physical server, click the icon next to the **physical server** field in the **Install License to** section. The list will display only those physical servers on which the current license key can be installed.

Physical servers running Virtuozzo Containers technology demand Virtuozzo Containers licenses to create and work with Containers. Physical servers running Server Bare Metal technology demand Server Bare Metal license to create and work with virtual machines and Containers. You do not need to additionally install Virtuozzo Containers license on Server Bare Metal physical servers to run Containers on them.

The **License General Information** section displays the following information about the Virtuozzo license:

Column Name	Description
Key Number	The license key number. This is a unique identifier of the license on the Virtuozzo KA server.
Expiration	The expiration date and time of the license.

The **Extended Information** section provides the following information on the license:

Column Name	Description
Architectures	Microprocessor architecture(s) suggested by the license.
Backup management allowed	If your license includes backup management, this enables you to schedule backups of certain virtual environments and assign a Server Group physical server, other than the one which hosts the Container to be backed up, to store the backup.
Grace period	The period during which the Virtuozzo Containers software continues functioning after your license has expired, in seconds.
License version	The version of the license (the same as the version of the virtual environment software).
Number of Containers	The total number of Containers you can simultaneously run on the physical server.
Number of CPUs	The total number of central processor units installed on the physical server. A dual core CPU or a CPU with Hyper Threading technology is a single CPU; only CPU sockets are regarded as CPUs.
Number of Virtuozzo Management Console users	The number of users able to simultaneously connect to the physical server through Virtuozzo Management Console.

Number of running virtual machines	The total number of virtual machines you can simultaneously run on the physical server.
Virtuozzo agent allowed	Indicates if the license allows using the Virtuozzo agent functionality.
Virtuozzo Power Panel allowed	Indicates if the license allows managing virtual environments by means of Virtuozzo Power Panel.
Platform	The operating system installed on the physical server
Product key	The string of symbols that serves for both activating the license and as an identifier of the license on the physical server.
Products	Indicates the type of technology: Virtuozzo Containers or Server Bare Metal technology.
Start date	indicates the date when the license comes into effect.
Workflow management allowed	Indicates if the license allows virtual environment requesting.

The physical server selected and the license information reviewed, you can install it to the physical server by clicking the **Install** button. This will either install the key directly on your physical server, or send it to the Virtuozzo licensing server, which, in turn, will generate a license file, send it back to the physical server the product key has been sent from, and install it on this physical server.

If, for some reasons, the physical server is not connected to the Internet at the moment of sending the product key, Virtuozzo Automator displays a message informing you of the fact and provides you with an installation ID and URL. You will need to use this URL on any computer connected to the Internet to open the Web page where you will be able to manually enter the installation ID and send it to the Virtuozzo host. The server will generate a key file to be either sent to your email address or saved on the disk of the computer that sent the installation ID. For this key file to be installed on the physical server, save it on its hard disk (or make it available from there, whatever way you think to be expedient) and upload it on the physical server.

Reviewing Installed Licenses

On this screen, you may review your license details. The **License General Information** section allows you to view the main information on your license:

Column Name	Description
Key Number	The license key number. This is a unique identifier of the license on the Virtuozzo KA server.
Hardware Node	The physical server on which the license is installed.
Target	The physical servers on which the license can be installed.
Status	The status of the license.
Expiration	The expiration date and time of the license.

The **Extended Information** section provides the following information on the license:

Column Name	Description
Architectures	Microprocessor architecture(s) suggested by the license.

Backup management allowed	If your license includes backup management, this enables you to schedule backups of certain virtual environments and assign a Server Group physical server, other than the one which hosts the Container to be backed up, to store the backup.
Grace period	The period during which the Virtuozzo Containers software continues functioning after your license has expired, in seconds.
License version	The version of the license (the same as the version of the virtual environment software).
Number of Containers	The total number of Containers you can simultaneously run on the physical server.
Number of CPUs	The total number of central processor units installed on the physical server. A dual core CPU or a CPU with Hyper Threading technology is a single CPU; only CPU sockets are regarded as CPUs.
Number of Virtuozzo Management Console users	The number of users able to simultaneously connect to the physical server through Virtuozzo Management Console.
Number of running virtual machines	The total number of virtual machines you can simultaneously run on the physical server.
Virtuozzo agent allowed	Indicates if the license allows using the Virtuozzo agent functionality.
Virtuozzo Power Panel allowed	Indicates if the license allows managing virtual environments by means of Virtuozzo Power Panel.
Platform	The operating system installed on the physical server
Product key	The string of symbols that serves for both activating the license and as an identifier of the license on the physical server.
Products	Indicates the type of technology: Virtuozzo Containers or Server Bare Metal technology.
Start date	indicates the date when the license comes into effect.
Workflow management allowed	Indicates if the license allows virtual environment requesting.

Unique ID The key number of the license. This serves for both activating the license and as an identifier of the license on the physical server side. The Virtuozzo KA server identifies the license by its key number shown in the Key Number column in the License General Information table.

The license you are reviewing can be installed on any of the physical servers registered in Virtuozzo Automator. The Virtuozzo Containers licensing scheme allows changing the physical server where the license is installed, which can be performed, for example, when you transfer the Virtuozzo Containers Server license from a non-functional physical server, or the one you are not going to use in the nearest future, to a physical server running a trial version of Virtuozzo Containers when the trial period is drawing to a close.

To transfer the license to another physical server, click **Transfer** on the Virtuozzo Automator toolbar.

Transferring Licenses

The **Transfer** screen lets you transfer the selected license to another physical server. This screen is displayed on clicking the **Transfer** button on the license details screen (p. [167](#)).

The Virtuozzo Containers licensing scheme allows changing the physical server where the license is installed, which can be performed, for example, when you transfer the Virtuozzo Containers license from a non-functional physical server, or the one you are not going to use in the nearest future, to a physical server running a trial version of Virtuozzo Containers when the trial period is drawing to a close.

Click the icon next to the **Hardware Node** field in the **Destination Hardware Node** section and choose the physical server from the list displayed on the pop-up window.

Clicking **Submit** transfers the license to the selected physical server.

The physical server the license is to be transferred to should be started and connected to the network.

Note: The physical server the license is transferred from stops performing the functions stipulated by the license.

License Statuses

When viewing information on the license, you should pay special attention to the license status that can be one of the following:

ACTIVE	The license file is valid and has been successfully loaded.
VALID	The license file contains a valid license for this physical server; however, no license is loaded.
INVALID	The license file is invalid (for example, because of the physical server ID mismatch) or corrupted.
EXPIRED	The license file matches the physical server ID but has expired and, therefore, could not be loaded.
GRACED	The license file has been successfully loaded; however, it has expired and is currently on the grace period (i.e. it is active till the end of the grace period).

CHAPTER 9



Managing Virtuozzo Automator Security

This chapter contains information on how to organize and control the process of granting the users access to physical servers and their virtual environments through Virtuozzo Automator.

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Understanding Role-Based Access Administration in Virtuozzo Automator

As the Virtuozzo datacenter administrator, you can use the credentials of the ( root / ()Administrator user having a full administrative access to the physical servers to manage these physical servers and all their virtual environments by means of Virtuozzo Automator. However, you may want to grant the rights to other users to perform certain operations on a physical server and/or its virtual environments. For example, you can allow some user to manage certain virtual environments without having access to the remaining virtual environments on the physical server and/or to the physical server itself or to complete only a restricted set of tasks in the virtual environment context (e.g. start, stop, and restart a virtual environment without having the right to back up this virtual environment or configure its resources).

To achieve this goal, a well-balanced user authentication and authorization strategy has been implemented. This strategy is based on the following main components:

- users;
- groups;
- permissions;
- roles;
- authentication databases;

The relationship among these components is described as follows. *Users* are objects characterized by the *roles* delegated to them in a certain scope. *Users* can be members of *groups*. *Users* and *groups* can be retrieved either from local databases or from databases on external computers in your network. The information on these databases is stored on the physical server in the form of *authentication databases*. *Roles* are sets of abstract privileges that can be assigned to a *user* or a *group* to form a *permission*. *Permissions* enable *users* or *groups* to perform certain operations in different scopes, which can be represented by one of the following entities:

- virtual environments;
- physical servers;
- logical units;
- server group.

The latter two scopes are only available if you have the Server Group Operations license installed on your physical server.

Virtuozzo Automator allows you to manage any of the aforementioned components in the following way:

- View the users currently existing on the physical server, create a new user, edit its properties (e.g. add users to groups), and remove an existing user from the physical server.
- View the groups currently existing on the physical server, create a new group, edit its properties, and remove an existing group from the physical server.
- View the roles currently existing on the physical server, create a new role, edit its properties, and remove an existing role from the physical server.
- View the authentication databases currently existing on the physical server, create a new realm, set the default realm, and remove an existing realm from the physical server.
- Grant users permissions, i.e. define what rights the users will have within a physical server of virtual environment(s).

Detailed information on how to perform these operations is given in the subsections below.

Typical Scenario of Virtuozzo Automator Security Usage

A typical course of actions to make use of the Virtuozzo virtual environments security model is described below:

- 1 Think over and create the roles you will then assign to your users. A role is a set of privileges or actions that a user is allowed to perform. However, no role has information about particular objects (physical or virtual environments) on which the user is allowed to perform the actions defined by the role.

- 2 If you plan to join your users to certain groups, you should create these groups or use the groups pre-created in Virtuozzo Automator for your convenience.
- 3 Create new users and join them to the corresponding groups, if necessary.
- 4 If you are going to grant access to the physical server to users from external authentication databases, you should additionally register one or more authentication databases on the physical server.
- 5 Assign a role to a user/group, thus, granting this user/group the right to manage the physical server and/or its virtual environments in accordance with the privileges deduced from the assigned role.

Let us see how it all works with a common 'virtual environment Administrator' role.

- 1 The 'virtual environment Administrator' role should be common for virtually every datacenter, so no wonder it is one of the built-in roles in Virtuozzo Automator. This role defines a set of privileges the user will be able to perform in the virtual environment context. However, there is no information in this role about the particular virtual environments that this or that user will be able to administer. As this role is built-in, you do not have to create it, but you may want to see what privileges are included in this role, by default, and modify them, if necessary:
 - Click **Security** in the **Setup** group on the left Virtuozzo Automator menu.
 - Click the **Roles** tab.
 - Click the **Virtual Environment Administrator** role to view its properties.
 - Overview the privileges included in this role in the **Privileges** group. You are free to modify these privileges at your discretion.
 - Click **Submit** to save the changes.

So we have made sure that the role we need exists in Virtuozzo Automator and the necessary privileges are included in it.

- 2 Next, we should think about user groups. User groups are necessary if we create a permission for a number of users at once. However, the virtual environment Administrator role suggests that a particular virtual environment will be managed by a particular user and another virtual environment will be managed by another user. So it would be logical to create a user group (p. 177) only if we are going to grant two or more users to administer the same virtual environment, otherwise, groups will be of no use.
- 3 The users to whom you will later assign the virtual environment Administrator role should all be defined on the **Users** tab of the **Security** screen. This screen has a number of subtabs corresponding to the available authentication databases. This number may vary depending on the number of authentication databases available, but two databases are always present: *Virtuozzo Internal* and *System*. The users in the Virtuozzo Internal database are those that you create in Virtuozzo Automator specifically for Virtuozzo virtual environment management. On a fresh Virtuozzo Automator installation, this database is empty. The users in the System database are the regular system users of the Master Server of the Server Group.

So, you can either create the necessary number of Virtuozzo virtual environment users (p. 175) or just have the users from external databases (listed on the respective tabs).

Note: To be able to use Virtuozzo Automator for the virtual environment administration, the users should also have the privilege to log in to Virtuozzo Automator. Do not forget to enable this right when creating the role or, you can include the users in the precreated **Virtuozzo Automator Users** group.

- 4 To have more users available without the need to create them, you can connect Virtuozzo Automator to other authentication databases (p. 189), e.g. to a Windows Active Directory database.
- 5 Finally, a particular user (or group of users) should be given the right to administer a particular virtual environment. To this effect, a new permission should be created. Before creating a permission, we should think to what level the permission refers. As we want to give the user rights to administer the virtual environment, the virtual environment should be chosen. Thus, you should:
 - Display a list of virtual environments you have in the datacenter/logical unit/ on a physical server and click the needed virtual environment to display its control panel.
 - Click the **Security** tab on the virtual environment dashboard and follow the **New Permission** link.
 - On the **Add Permission** screen, fill the **Users and Groups** area with the users and groups allowed to manage this virtual environment. Normally, it will be just one user.
 - Move the virtual environment Administrator role to the right pane in the **Assigned Roles** group and click **Save**.

Thus, the user we have chosen has got the right to administer this particular virtual environment.

It can be seen from the scenario above that essentially the first four steps (defining the Virtuozzo Automator roles, users, groups, and authentication databases) serve to prepare you as the Virtuozzo Automator administrator for working with particular permissions in Virtuozzo Automator. These four steps are likely to be performed in a detailed manner only once, namely, when you are setting up the Virtuozzo Automator security model, and then only maintained from time to time. The last step (creating a permission) is done each time you are granting or denying certain rights to particular users/groups.

Managing Virtuozzo Automator Users

A user is an object containing the following information: the user name, password, and group(s) where the user is included, if any. Any user can be assigned a role defining her/his rights in respect of the corresponding physical server and/or virtual environment(s). Virtuozzo Automator allows you to manage users in one of the following ways:

- view the information on the users currently existing in Virtuozzo Automator (p. 174);
- remove an existing user from the particular physical/virtual environment or from VA (p. 174);
- create a new user in VA or on a particular physical/virtual environment (p. 175);
- configure the user's parameters (p. 175).

Viewing Users

The users currently registered in Virtuozzo Automator can be viewed on the **Users** tab of the **Security** screen displayed by following the **Security** link on the Virtuozzo Automator menu. There are two default subtabs on this screen allowing you to list the users from two databases (these databases are automatically created):

- The **Virtuozzo Internal** subtab: this database contains VA-specific users.
- The **System** subtab: this database is fully identical to the system database of the Master Server Host OS. It contains the information on the users registered in the Host OS and defines the rights these users have in respect of the system administration. The content of the database can be changed within the Host OS.

The information on users is presented in the table having the following columns:

Name	Description
Icon	The icon that serves as a signal that this object is a single user or a whole group: one figure stands for a user, two - stand for a group of users.
Login	The name used to log in to Virtuozzo Automator.
Full Name	The full name of the user.
E-Mail	The user's valid e-mail address.
Description	A short description of the user.

Warning! If the users from an external authentication database are not listed on this tab, chances are the *objectClass=user* attribute is not set for the users in this database. Make sure all the database users have this attribute set for these users to be listed on the **Users** tab of Virtuozzo Automator.

To facilitate your working with users, you can:

- Filter them by the parameters listed in the table above (e.g. by their full names or emails). To this effect, click the **Show Search** link over the table, enter the needed data in the fields provided and click **Search**. The users matching the specified criteria will be displayed in the **Users** table on the **Security** screen. To have the full list of users back, click **Reset Results**.
- Change the users order by clicking the corresponding column name in the **Users** table.
- Modify the number of users simultaneously displayed in the **Users** table on the **Security** screen by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

The **Users** tab also allows you to:

- Remove an existing user by selecting the check box near the corresponding user and clicking the **Delete** button. When deleting users, please keep in mind that you cannot remove built-in users (i.e. any of the users displayed on the **System** subtab).
- Create a new user (p. [175](#)) by following the **New User** link at the top of the **Users** table.

Creating New User

The **New User** screen allowing you to create new users in Virtuozzo Automator opens on following the **Security** link on the Virtuozzo Automator menu, clicking the **Users** tab on the **Security** screen, and then clicking **New User** on the Virtuozzo Automator toolbar. To make a new user, you should fill in the following field:

- **Login** (mandatory): specify the name to be used to log in to Virtuozzo Automator.
- **Full name**: indicate the full name of the user.
- **Description**: enter any commentary on the user.
- **Email**: enter the user's valid email.
- **Type Password** (mandatory): provide the password to be used by the user to log in to Virtuozzo Automator.
- **Retype Password** (mandatory): retype the password entered in the **Type Password** field.

On this screen, you can also include the user to any of the groups registered in VA. To this effect, select the group where you wish to add the user being created in the **Available** table under **Member of Groups** and click the **>>** button. To cancel the performed action, select the added group in the **Selected** table and click the **<<** button.

Note:

To be able to use Virtuozzo Automator for the virtual environment administration, the users should also have the privilege to log in to Virtuozzo Automator. Do not forget to enable this right when creating the role for the user or, you can include the users in the precreated **Virtuozzo Automator Users** group, which is done by default during the user's creation by means of Virtuozzo Automator. If you do not want the created user to have this privilege (e.g. you want the user to be able to use Virtuozzo Management Console only), remove the user from this group.

After specifying the necessary parameters, click the **Submit** button to start making the user. The newly created user will be displayed in the **Users** table on the **Security** screen.

Viewing User's Details

The **User** screen allows you to view detailed information on a VA user. To display this page, follow the **Security** link on the Virtuozzo Automator menu, click the **Users** tab, and then click the name of the user whose details you wish to view in the **Users** table.

The information on the group is presented in the following fields:

- The **Login** field shows the name used by the user to log in to Virtuozzo Automator.
- The **Full Name** field displays the full name of the user, if set.
- The **Description** field displays the general arbitrary information about the user.
- The **Email** field shows the user's e-mail address, if set.

- The **Member of** field displayed the groups where the user is currently included, if any.

Configuring User's Parameters

The **Configure** screen allows you to configure the current user's parameters. To access this screen, follow the **Security** link on the Virtuozzo Automator menu, click the **Users** tab, click the name of the user whose parameters you wish to configure, and then click the **Configure** button. On this screen, you can configure the user's parameters as follows:

- in the **Login** field, change the user name to be used to log in to Virtuozzo Automator;
- in the **Full name** field, modify the full name of the user;
- in the **Description** field, provide an arbitrary general information about the user;
- in the **Email** field, change the user's email;
- in the **Type Password** and **Retype Password** fields, set a new password to be used by the user to log in to Virtuozzo Automator;
- under **Member of Groups**, use the >> and << button to include the user in new groups or exclude her/him from existing ones, respectively.

After configuring the user's parameters, click **Submit** for the changes to take effect; otherwise, click **Cancel**.

Managing Virtuozzo Automator Groups

In the Virtuozzo security model, a group is a collection of user accounts and/or other groups with a defined set of access rights to certain scope resources. Using groups can simplify the administration of physical and virtual environments by assigning a common set of permissions and rights to several user accounts at once, rather than assigning permissions and rights to each account individually.

Virtuozzo Automator allows you to manage groups in one of the following ways:

- view the groups currently registered in VA (p. 176);
- create a new group (p. 177);
- view group details (p. 178);
- edit the parameters of an existing group (p. 179).

Viewing Groups

The groups currently registered in Virtuozzo Automator can be viewed on the **Groups** tab of the **Security** screen displayed by following the **Security** link on the Virtuozzo Automator menu. There are two subtabs on this screen allowing you to list the groups from two Virtuozzo databases (these databases are automatically created during the Virtuozzo Containers installation):

- The **Virtuozzo Internal** subtab: this database contains VA-specific groups.
- The **System** subtab: this database is fully identical to the system database of the Master Server Host OS. It contains the information on the groups registered in the Host OS and defines the rights these groups have in respect of the system administration. The content of the database can be changed within the Host OS.

The information on groups is presented in the table having the following columns:

Name	Description
Icon	The icon that serves as a signal that this object is a single user or a whole group: one figure stands for a user, two - stand for a group of users.
Name	The name assigned to the group.
Description	The group description.

To facilitate your working with groups, you can:

- Filter them by their names and description. To this effect, click the **Show Search** link over the table, enter the group name and/or description in the fields provided and click **Search**. The groups matching the specified criteria will be displayed in the **Groups** table on the **Security** screen. To have the full list of groups back, click **Reset Results**.
- Change the groups order by clicking the corresponding column name in the **Groups** table.
- Modify the number of groups simultaneously displayed in the **Groups** table on the **Security** screen by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

The **Group** tab also allows you to:

- Remove an existing group by selecting the check box near the corresponding group and clicking the **Delete** button. When deleting groups, please keep in mind that you cannot remove built-in groups (i.e. any of the groups displayed on the **System** subtab).
- Create a new group (p. 177) by following the **New Group** link at the top of the **Groups** table.

Creating New Group

You can create a new group in Virtuozzo Automator on the **New Group** screen which can be accessed by following the **Security** link on the Virtuozzo Automator menu, clicking the **Groups** tab on the **Security** screen, and then clicking the **New Group** link on the subtab corresponding to the authentication database where you wish to create a group.

To create a new group, you should specify an arbitrary name to be assigned to the group in the **Name** field. You are also recommended to provide the group description in the **Description** field.

The **Add User** and **Add Group** buttons serve to fill the group being created with users and/or groups already existing in the given authentication database.

The **Remove Selected** button serves to delete selected users and groups from the list of included ones.

When you are ready, click the **Submit** button.

After the group has been successfully created, it is displayed in the **Groups** table on the **Security** screen. Please note that all new groups do not have any permissions assigned to them and, therefore, do not have access to the physical servers or any of their virtual environments.

Viewing Group Details

The **Group** screen allows you to view detailed information on a VA Group. To display this page, follow the **Security** link on the Virtuozzo Automator menu, click the **Groups** tab on the **Security** screen, and then click the name of the group whose details you wish to view in the **Groups** table.

The **Group Details** section provides the general information on the group - its name and description.

The information on users and/or groups included in the current group is presented in the **Users and Groups** table having the following columns:

Name	Description
Icon	The icon that serves as a signal that this object is a single user or a whole group: one figure stands for a user, two - stand for a group of users.
Login	The name of the user or group.
Full Name	The full name of the user.
E-Mail	The user's valid email address.
Description	The description of the user or group.
Distinguished name	The distinguished name assigned to the user and uniquely identifying this user among other users in the LDAP-compliant database. This column is relevant only for users from external authentication databases.

To facilitate your working with users and groups, you can:

- Filter them by the parameters listed in the table above (e.g. by their full names or emails). To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The users matching the specified criteria will be displayed in the **Users** table on the **Security** screen. To have the full list of users back, click **Reset Results**.
- Change the users' order by clicking the corresponding column name in the **Users and Groups** table.
- Modify the number of users simultaneously displayed in the **Users and Groups** table on the **Security** screen by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

If you want to change the name and description of the group, click the **Configure** icon on the Virtuozzo Automator toolbar (available only for modifiable databases, like the Virtuozzo internal one).

Configuring Group Parameters

You can edit the properties of an existing group on the **Configure** screen which can be accessed by following the **Security** link on the Virtuozzo Automator menu, clicking the **Groups** tab on the **Security** screen, clicking the name of the group whose parameters you wish to configure in the **Groups** table, and, in the displayed window, clicking the **Configure** button on the Virtuozzo Automator upper toolbar.

The **Configure** screen allows you to edit the following group parameters:

- Change the name of the group by typing the desired name in the **Name** field.
- Modify the group description by providing the desired information in the **Description** field.
- Define what users and/or groups from the given authentication database should be included in the group with the help of the **Add User**, **Add Group**, and **Remove Selected** buttons.

After you have configured the group parameters in the proper way, click **Submit** for the changes to take effect. Otherwise, click **Cancel**.

Managing Roles

Roles are system objects defining the privileges a particular user is endowed with. In other words, roles define all possible actions the user may perform on a physical server, a virtual environment, or Logical Unit. Virtuozzo Automator allows you to manage roles in one of the following ways:

- view the roles currently existing in VA; (p. [179](#))
- create a new role (p. [180](#));
- configuring the parameters of an existing role (p. [186](#));
- remove an existing role. (p. [179](#))

Viewing Roles

Roles are system objects created to embody a certain multitude of *permissions*, i. e. the parameters that ultimately define the scope of the privileges the user is endowed with. In other words, roles are users' attributes and are made up of permissions. Permissions are all possible actions that a user or administrator is allowed to perform in the physical server or virtual environment context. You can create any number of roles at your discretion - as long as your own permissions allow you to do so.

To view a list of roles currently existing on the physical server, follow the **Security** link on the Virtuozzo Automator menu and then click the **Roles** tab on the **Security** screen. The information on each role is presented in the table having the following columns:

Column name	Description
Name	The name of the role.
Description	The role description.
Built-in	Indicates whether the given role has been manually created by you or any other user ('No') or it is a built-in role ('Yes').

To facilitate working with roles, you can:

- Filter them by their names and description. To this effect, click the **Show Search** link over the table, enter the role name and/or description in the fields provided and click **Search**. The roles matching the specified criteria will be displayed in the **Roles** table on the **Security** screen. To have the full list of roles back, click **Reset Results**.
- Configure the number of columns to be displayed in the **Roles** table. To this effect, click the **Select Columns** link and clear the check boxes near the column name that you wish to hide.
- Change the roles order in the **Roles** table by clicking the corresponding column name.

The **Roles** tab also allows you to complete the following tasks:

- Create a new role (p. 180) by following the **New Role** link at the top of the **Roles** table.
- Clone a role by selecting the check box near the corresponding role and clicking the **Clone** button. Upon the operation completion, the cloned role will be displayed in the **Roles** table with **Copy of** preceding the role name. To clone all the roles at once, select the uppermost check box and click the **Clone** button.
- Remove an existing role by selecting the check box near the corresponding role and clicking the **Delete** button. To delete all the roles at once, select the uppermost check box and click the **Delete** button. When deleting roles, please keep in mind the following:
 - You cannot delete a role which is still assigned to any existing user.
 - You cannot delete any of the built-in roles.


If you have already developed a well-designed taxonomy of roles and are going to further maintain it using the built-in roles remember that you cannot modify or rename the built-in roles to fit them in. If you want to have a modified built-in role to be assigned to a user, clone this role first, and then change the cloned role.

Creating New Roles

You can create any number of roles at your discretion provided your own permissions allow you to do so. You can create a new role on the **New Role** page which can be accessed by following the **Security** link on the Virtuozzo Automator menu, clicking the **Roles** tab on the **Security** screen, and then clicking the **New Role** button over the **Roles** table.

Under the **General Parameters** group of parameters, you must enter the name to be assigned to the role in the **Name** field and can provide the role description in the **Description** field.

The **Privileges** and **Included Roles** groups allow you to define the privileges to be assigned to the role:

- If the privileges of an existing role represent a subset of the privileges to be assigned to the new role, you can save your time by adding the previously created role to the new one. To this effect, expand the **Included Roles** group by clicking the  icon, select the name of the role you wish to include in the new one in the **Available** table and click the **>>** button. The selected role will be moved to the **Selected** table. To cancel your action, select the role in the **Selected** table and click the **<<** button.
- If there are no roles that can be used as the basis for the role being created, you can manually specify what privileges are to be assigned to the role. In this case, you should browse through the hierarchy of available privileges under the **Privileges** group and select the check boxes near those privileges that you wish to have included in the role. Each privilege represents the possibility (if the corresponding check box is selected) or impossibility (if the corresponding check box is cleared) to perform a certain action in the scope context. For example, you can select the check box near the **Virtual Environment Management** privilege to include the right of performing any operations in the virtual environment context (e.g. to create or destroy a virtual environment) in the role. Please keep in mind that selecting a check box which stands for a higher level set of privileges will automatically add the privileges from all lower level sets to the role. So, the **Virtual Environment Management** privilege includes all the lower level privileges (**Configure Virtual Environment**, **Delete Virtual Environment**, etc.).

When setting up VA roles, you should have a clear idea about the scope where these roles will be assigned to users/groups to form permissions. Thus, it is necessary to know in what scope this or that privilege can be applied and what exactly is implied by the privilege. E.g. it bears little sense to include the "Log in to VirtuoZZo Automator" privilege in the role intended for virtual environment administrators and, therefore, used in the virtual environment scope only.

The table below describes all the available privileges and indicates the scopes where they can be used:

Privilege	G	U	PS	VE	Description
Full Control	+	+	+	+	Provide the user with full control over the given scope.
Control Panels	+	+	+	+	Allow the user to log in to various control panels on the given scope.
Log in to VA Control Panel	+	-	-	-	Allow the user to log in to VirtuoZZo Automator.
Log in to VirtuoZZo Power Panel	+	+	+	+	Allow the user to log in to VirtuoZZo Power Panel for any virtual environment included in the given scope.
Log in to virtual environment terminal	+	+	+	+	Allow the user to log in to any virtual environment included in the given scope via SSH or RDP.
Log in to Plesk	+	+	+	+	Allow the user to log in to the Plesk control panel for any virtual environment included in the given scope.
Log in to Sitebuilder	+	+	+	+	Allow the user to log in to the Sitebuilder control panel for any virtual environment included in the given scope.
Log in to Confixx	+	+	+	+	Allow the user to log in to the Confixx control panel for any virtual environment included in the given scope.

Log in via SOAP	+	+	+	+	Allow the user to log in to the physical server using the SOAP API (Application Programming Interface).
Virtual Environment Management	+	+	+	+	Provide the user with all the various virtual environment management permissions enumerated below.
New virtual environment	+	+	+	+	Allow the user to create a new virtual environment using the various methods enumerated below. In a non-global scope, this privilege only allows to clone an existing virtual environment.
Create virtual environment	+	-	-	-	Allow the user to create a new virtual environment.
Clone virtual environment	+	+	+	+	Allow the user to clone any virtual environment included in the given scope.
Migrate physical server to virtual environment	+	-	-	-	Allow the user to create a new virtual environment on the basis of an existing physical server.
View virtual environment properties	+	+	+	+	Allow the user to view the properties of any virtual environment included in the given scope and to have the corresponding virtual environment displayed in the lists of virtual environments. Note: This privilege is necessary for all the other Virtual Environment Management privileges to work.
View extended resources	+	+	+	+	Allow the user to view the resources consumption and configuration on any virtual environment included in the given scope.
Operate virtual environment	+	+	+	+	Allow the user to start, stop, suspend, resume, and migrate any virtual environment included in the given scope.
Start and stop virtual environment	+	+	+	+	Allow the user to start and stop any virtual environment included in the given scope.
Migrate virtual environment	+	+	+	+	Allow the user to migrate any virtual environment included in the given scope to another physical server registered in Virtuozzo Automator, provided the user has the privilege to access the Destination physical server.
Configure virtual environment	+	+	+	+	Allow the user to set up the various virtual environment settings enumerated below.
Configure virtual environment general settings	+	+	+	+	Allow the user to configure the general settings of any virtual environment in the given scope: name and description, offline management, networking, and resources.
Manage applications	+	+	+	+	Allow the user to manage the software packages inside any virtual environment in the given scope.
Manage devices	+	+	+	+	Allow the user to mount and unmount disk volumes in any virtual environment in the given scope.
Maintenance	+	+	+	+	Allow the user to enter the repair mode for any virtual environment included in the given scope.
Repair virtual environment	+	+	+	+	Allow the user to enter the repair mode for any virtual environment included in the given scope.
Backups Management	+	+	+	+	Allow the user to manage the backups of any included in the given scope.
List virtual environment backups	+	+	+	+	Allow the user to view the backups of any virtual environment included in the given scope.

Back up virtual environment	+	+	+	+	Allow the user to back up any virtual environment included in the given scope.
Restore virtual environment	+	+	+	+	Allow the user to restore the backup of any virtual environment included in the given scope.
Remove virtual environment backups	+	+	+	+	Allow the user to delete the backups of any virtual environment included in the given scope.
Manage services	+	+	+	+	Allow the user to manage the services in any virtual environment included in the given scope.
Manage files and services	+	+	+	+	Allow the user to manage the files and services in any virtual environment included in the given scope.
Delete virtual environment	+	+	+	+	Allow the user to delete any virtual environment included in the given scope.
Node Management	+	+	+	-	Provide the user with all the various physical server management permissions enumerated below.
View Node properties	+	+	+	-	Allow the user to view the properties of any Hardware Node included in the given scope and to have the corresponding Node displayed in the lists of Hardware Nodes. Note: This privilege is necessary for all the other Node Management privileges to work.
Configure Node	+	+	+	-	Allow the user to configure the email gateway, network settings, and application templates for any Hardware Node included in the given scope.
Configure Node general settings	+	+	+	-	Allow the user to configure the general settings of any physical server: name and description, offline management, networking, and resources.
Configure email and notifications	+	+	+	-	Allow the user to configure the email gateway for any physical server included in the given scope.
Configure network	+	+	+	-	Allow the user to configure the network settings for any physical server included in the given scope: traffic accounting and shaping, proxy settings, network interfaces. Note: To allow the user to configure the proxy server settings, you should additionally enable the Configure email and notifications privilege.
Manage OS and application Templates	+	+	+	-	Allow the user to perform all the available operations on the application templates for any physical server included in the given scope.
Backups Administration	+	+	+	-	Allow the user to administer any physical server included in the given scope as a Backup physical server.
Configure backups	+	+	+	-	Allow the user to configure the way of storing backups for any physical server included in the given scope.
List backups	+	+	+	-	Allow the user to view the backups stored on any physical server included in the given scope.
Store backups	+	+	+	-	Allow the user to place virtual environment backups on any physical server included in the given scope.
Remove backups	+	+	+	-	Allow the user to delete the virtual environment backups from any physical server included in the given scope.

Update System	+	+	+	-	Allow the user to configure the update repository settings for any physical server included in the given scope.
Reboot	+	+	+	-	Allow the user to reboot any physical server included in the given scope.
Policy Management	+	+	+	+	Allow the user to view, assign and configure the policies.
Configure global policies	+	+	+	+	Allow the user to configure the global policies.
Assign policies to an object	+	+	+	+	Allow the user to assign policies.
Logical Structure	+	+	-	-	Provide the user with all the possible privileges to build up the logical structure of the VA datacenter.
List units	+	+	-	-	<ul style="list-style-type: none"> In the unit scope, allows the user to view the corresponding logical unit on the left Virtuozzo Automator menu and view its contents. In the global scope, allows the user to view all logical units and their contents.
Manage virtual environments and Nodes in unit	+	+	-	-	Allow the user to manage the physical servers and virtual environments in any logical unit included in the given scope. Unlike the Administer unit privilege, this privilege does not allow the user to remove logical units.
Administer unit	+	+	-	-	Allow the user to manage the physical servers and virtual environments in any logical unit included in the given scope and remove the corresponding unit.
Manage sub-units	+	+	-	-	Allow the user to add sub-units to any logical unit included in the given scope and to remove sub-units from it.
Infrastructure	+	-	-	-	Provide the user with all the possible privileges to set up the VA datacenter infrastructure.
Manage disk images					Allow the user to set up and work with disk images.
Manage Server Group	+	-	-	-	<p>Allow the user to exercise the overall management on Master Server and all its slave physical servers: view them, register and unregister Hardware Nodes, etc.</p> <p>Warning! This privilege should be included in the role intended for VA administrators only.</p>
Manage IP addresses pools	+	-	-	-	Allow the user to perform all the available operations on IP addresses pools.
Manage virtual networks	+	-	-	-	<p>Allow the user to create, edit, and delete virtual networks, as well as set up bridged networking on physical servers.</p> <p>Note: This kind of privilege is normally granted to a single person, so included in one role only.</p>
Manage licenses	+	-	-	-	<p>Allow the user to install and remove Virtuozzo licenses.</p> <p>Note: This kind of privilege is normally granted to a single person, so included in one role only.</p>
Manage virtual environment Templates	+	-	-	-	Allow the user to perform all the available operations on virtual environment configuration templates. The user will be able to manage the VM Templates Storage: changing VM Templates Storage configuration, adding or removing VM templates in the Storage.

Set up messaging	+	-	-	-	Allow the user to configure the email messaging system.
Workflow	+	+	+	+	Provide the user with a set of privileges related to virtual environment requesting and troubleshooting enumerated below.
Request new virtual environment	+	-	-	-	Allow the user to submit a request for a new virtual environment for themselves. Note: If virtual environment requesting is enabled in Virtuozzo Automator, it is natural to include this privilege in every role.
Process virtual environment requests	+	-	-	-	Allow the user to fulfill or cancel the requests for new virtual environments. Note: This kind of privilege is normally granted to a single person, so included in one role only.
Troubleshooting	+	+	+	+	<ul style="list-style-type: none"> In the virtual environment scope, allow the user to reinstall the virtual environment. In the physical server and unit scope, additionally allow the user to establish a support channel on any physical server included in the given scope. In the global scope, additionally allow the user to report a problem and see the descriptions of Virtuozzo Automator error codes.
Security	+	+	+	+	Allow the user to manage the Virtuozzo Automator security policy. Warning! This privilege should be included in the role intended for VA administrators only.
Manage users and groups	+	+	+	+	Allow the user to change the administrative password of any virtual environment included in the given scope or set the administrative password during its reinstallation.
Manage roles	+	-	-	-	Allow the user to create, modify, and delete roles and create permissions on their basis in any scope. Warning! This privilege should be included in the role intended for VA administrators only.
Manage authentication databases	+	-	-	-	Allow the user to register, configure, and unregister authentication databases in Virtuozzo Automator.
Log Operations	+	+	+	+	Allow the user to view the logs and cancel the running tasks relevant to the given scope.
View logs	+	+	+	+	Allow the user to view the tasks logs, alerts, and events related to any virtual environment included in the given scope.
Cancel running tasks	+	+	+	+	Allow the user to cancel the tasks initiated for any virtual environment included in the given scope.

The table indicates whether using a particular privilege makes sense in each of the 4 available scopes:

- **G** - the **G**lobal scope;
- **U** - the scope of a single logical or infrastructure **U**nit;
- **PS** - the scope of a single **P**hysical **S**erver;

- **VE** - the scope of a single virtual environment.

When you are ready, click the **Submit** button to start creating the role with the specified parameters.

Note: If you have already developed a well-designed taxonomy of roles and are going to further maintain it using the built-in roles remember that you cannot modify or rename the built-in roles to fit them in. If you want to have a modified built-in role to be assigned to a user, clone this role first, and then change the cloned role.

Configuring Role Parameters

The **Manage Role** page allows you to configure the parameters of any roles existing in Virtuozzo Automator. To display this page, follow the **Security** link on the Virtuozzo Automator menu, click the **Roles** tab on the **Security** screen, and then click the name of the role you wish to edit in the **Roles** table.

Notes: 1. To edit a role, you need to have your own permission to perform this action.

2. You cannot modify or rename the built-in roles. If you want to have a modified built-in role, you should clone this role first and then change its parameters.

In this window you can configure the following parameters of a role:

- The **General Parameters** group of parameters allows you to change the name and description of the role by typing the desired information in the fields provided.
- The **Privileges** and **Included Roles** groups of parameters enable you to modify the role privileges:
 - Browse through the hierarchy of available privileges under the **Privileges** group and select or clear the check boxes of those privileges that you wish to include in the role or to exclude from the role, respectively.
 - Expand the **Included Roles** group and use the **>>** and **<<** buttons to include/exclude any of the existing roles to the role you are editing, respectively.

When setting up VA roles, you should have a clear idea about the scope where these roles will be assigned to users/groups to form permissions. Thus, it is necessary to know in what scope this or that privilege can be applied and what exactly is implied by the privilege. E.g. it bears little sense to include the "Log in to Virtuozzo Automator" privilege in the role intended for virtual environment administrators and, therefore, used in the virtual environment scope only.

The list of settings, you can reconfigure in the **Privileges** section is the same one that you set up when create a new role (p. 180).

After you have configured the role parameters, click the **Submit** button for the changed to take effect.

Managing Authentication Databases

The Virtuozzo Automator security authentication mechanism allows you to grant access to physical servers and their virtual environments to both:

- users on your local computer and
- users stored in external Microsoft Active Directory databases.

Note: Other LDAP-compliant databases, like OpenLDAP for Linux, are supported with some restrictions, see below.

During its installation on the physical server, the Virtuozzo Automator software creates two special databases containing the information on local user accounts:

- The 'System' database: this database is fully identical to the system database created by any operating system and containing the information on the users and groups registered in the Host OS and defining the rights these users and groups have in respect of the system administration;
- The 'Virtuozzo internal' database: this database contains VA-specific users and groups.

Along with the user databases created by the Virtuozzo Automator software by default, you can also register external user databases located virtually on any computer on your network and allow the users from these databases to access physical servers and their virtual environments. So, you do not need to manually create these users and add them to the 'Virtuozzo internal' database. The only requirement that should be met by a database to be registered in Virtuozzo Automator is that it must be based on the Microsoft Active Directory technology. For example, if the user's login information is stored on an external domain controller running an Active Directory (AD) server, you can register this controller in Virtuozzo Automator and allow the users registered in the AD directory to be authenticated through the controller itself rather than go through the authentication process on the physical server. The user authorization, however, will take place on the physical server and the user will get the rights and privileges in accordance with the role(s) assigned to them on this physical server.

If you wish to use an OpenLDAP directory in Linux environments in a similar way, you should make sure that this directory complies with the Microsoft Active Directory schema. In particular, it must have the following attribute types:

`objectSid, groupType, userPrincipalName, userParameters, preferredOU`

and the following object classes:

`container, securityPrincipal, User, Group, foreignSecurityPrincipal, domainDNS.`

For additional details on these attribute types and object classes, please, consult the official Microsoft Active Directory schema, if needed.

Virtuozzo Automator allows you to manage authentication databases as follows:

- view detailed information on the authentication database currently registered on the physical server (p. 190);
- remove a registered authentication database from the physical server (p. 188);
- register a new authentication database on the physical server (p. 189).

Viewing Authentication Databases

The **Authentication Databases** tab (displayed on following the **Security** link on the Virtuozzo Automator main menu) allows you to view a list of user databases currently registered on the physical server and used to authenticate the users trying to log in to the physical server (or Server Group, or virtual environments) through Virtuozzo Automator.

The general information on Virtuozzo Automator authentication databases is given in the **Managing Authentication Databases** subsection.

The information on databases is presented in the table having the following columns:

Column name	Description
Name	The name assigned to the authentication database.
Address	The hostname or IP address of the server where the LDAP-compliant user database is residing.
Port	The port number to be used to connect to the database on the server. The default port for databases hosted by Windows Active Directory and Linux LDAP is 389.

To facilitate your working with authentication databases, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The databases matching the specified criteria will be displayed in the **Authentication Databases** table on the **Security** screen. To have the full list of databases back, click **Reset Results**.
- Change the databases order by clicking the corresponding column name in the **Authentication Databases** table.
- Modify the number of databases simultaneously displayed in the **Authentication Databases** table on the **Security** screen by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

The **Authentication Databases** tab also allows you to:

- Remove an existing database by selecting the check box near the corresponding realm and clicking the **Delete** button.
- Register a new database (p. 189) by following the **Register Database** link at the top of the **Authentication Databases** table.

Registering New Database

Along with the databases registered by VA by default, you can register your own user databases, thus, allowing users' authentication through external servers. The requirements for these databases can be found in the **Managing Authentication Databases** section. You can register a new authentication database on the **Register Authentication Database** screen which can be displayed by following the **Security** link on the Virtuozzo Automator menu, clicking the **Authentication Database** tab, and following the **Register Database** link at the top of the **Authentication Databases** table. On this screen you should provide the following parameters for the database:

- **Database Name** (mandatory): specify an arbitrary name to be assigned to the database; you can choose any descriptive name you like. This name will be displayed in the **Authentication Databases** table and identify the given database among other databases registered in Virtuozzo Automator.
- **Server Address** (mandatory): enter the hostname or IP address of the server storing the user database.
- **Port** (mandatory): indicate the port number to be used to connect to the user database on the server. The default port for databases hosted by Windows Active Directory and Linux LDAP is 389.
- **Login**: type the name of the user with the administrative credentials for the server indicated above.
- **Password**: enter the password of the user specified in the **Login** field.
- **Domain**: enter the name of the domain, if any, where the server hosting the user database resides.

Note: If the Virtuozzo Automator Master Server is running Linux, and you are registering a Windows Active Directory database, you must fill in this field. If you are registering an OpenLDAP database, you must leave this field empty. Doing otherwise will make it impossible to import the users information into Virtuozzo Automator.

- **Base DN** (mandatory): specify a distinguished name uniquely identifying the entry of the user specified in the **Login** field in the authentication database.
- **Default DN**: indicate the default distinguished name used for the user's entry in the authentication database.

After providing the necessary information, click the **Submit** button to start registering the database. After a while, the registered database will be displayed in the table on the **Authentication Databases** tab of the **Security** screen.

Note: To be able to use Virtuozzo Automator, users should have the privilege to log in to Virtuozzo Automator, which can be defined in the global (Server Group) scope only. The easiest way to do this is to include the corresponding users from the external database in the precreated **Virtuozzo Automator Users** group.

Viewing Database Details

On this screen, you may review the detailed information on any authentication database currently registered on the physical server. To display this page, follow the **Security** link on the Virtuozzo Automator menu, click the **Authentication Databases** tab on the **Security** screen, and then click the name of the database whose details you wish to view.

Field	Description
Server Address	The hostname or IP address of the server storing the database.
Port	The port number to be used to connect to the database on the server. The default port for databases hosted by Windows Active Directory and Linux LDAP is 389.
Login	The name of the user with the administrative credentials for the server indicated above.
Domain	The name of the domain, if any, where the server hosting the database resides.
Base DN	The distinguished name uniquely identifying the database entry of the user specified in the Login field (the name of the root directory).
Default DN	The default distinguished name used for the user's entry in the database (the complete navigation path to the users' storage directory).

If you want to change the details of the database, click the **Configure** icon on the Virtuozzo Automator toolbar (not available for the Virtuozzo internal authentication database).

Configuring Database Details

You can edit the properties of an existing database on the **Configure** screen which can be accessed by following the **Security** link on the Virtuozzo Automator menu, clicking the **Authentication Databases** tab on the **Security** screen, clicking the name of the database whose parameters you wish to configure in the **Authentication Databases** table, and, in the displayed window, clicking the **Configure** button on the Virtuozzo Automator upper toolbar.

Note: You cannot modify the details of the Virtuozzo internal and the System databases. These databases are automatically created on the physical server.

The **Configure** screen allows you to edit the following database details:

- In the **General Settings** section, you can change the name of the database by typing the desired name in the **Database Name** field.
- In the **Connection Settings** section, you can change the address of the server storing the database by typing another domain name or IP address in the **Server Address** field. In this section, you can also specify another port number to be used to connect to the database in the server.
- In the **Login Settings** section, you can rename the user with the administrative credentials for the server storing the database, enter a password for it and enter the name of the domain, if any, where the server resides.

- In the **Directory Settings** section, you can change the distinguished name uniquely identifying the database entry of the user with the administrative credentials and the default distinguished name used for the users' entries.

After you have configured the database parameters in the proper way, click **Submit** for the changes to take effect. Otherwise, click **Cancel**.

Managing User/Group Permissions

The main idea of the role-based access control functionality consists in granting a user (or several users within one and the same group) access to the physical server or its virtual environments, thus, allowing them to log in to this physical server/virtual environment(s) by means of Virtuozzo Automator and to perform a number of operations on them in accordance with the rights and permissions assigned to the user (or group). So, in the VA security model any user/group is characterized by the permissions deduced from the roles assigned to the user (group) and allowing her/him to complete certain tasks in the physical server/virtual environment context.

Managing Physical Server Permissions

Viewing Physical Server Permissions

You can view the permissions of a user (group) to perform certain operations in the physical server context on the **Permissions** tab of the **Security** window which can be accessed by following the **Security** link on the physical server dashboard. The **Permissions** table on this tab displays all the permissions currently existing in respect of the physical server. The information on permissions is presented in the following columns:

Column	Description
User or Group	The user/group possessing the given permission.
Assigned Role	The role assigned to the user/group and defining the set of privileges for this user/group.
Authentication Database	The name of the authentication database the user/group belongs to.

To facilitate your working with permissions, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The permissions matching the specified criteria will be displayed in the **Permissions** table on the **Security** screen. To have the full list of permissions back, click **Reset Results**.
- Change the permissions order by clicking the corresponding column name in the **Permissions** table.
- Modify the number of permissions simultaneously displayed in the **Permissions** table on the **Security** screen by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

The **Permissions** tab also allows you to:

- Remove an existing permission by selecting the check box near the corresponding user and clicking the **Delete** button.
- Create a new permission by following the **New Permission** link at the top of the **Users** table.

Creating Physical Server Permissions

The **New Permission** screen allows you to assign roles to users/groups, thus, endowing these users/groups with certain rights in respect of the physical server. This screen can be accessed by following the **Security** link on the physical server dashboard, clicking the **Permissions** tab on the **Security** screen, and clicking **New Permission** on this tab. To make a new permission, you should perform the following operations:

- 1 In the **Assigned Roles** table, select the role you wish to assign to the user/group and click the **>>** button.
- 2 Specify the user(s)/group(s) in the **Users and Groups** table. To this effect:
 - click the **Add User/Add Group** button;
 - in the displayed window, select the check box near the user/group you wish to assign the selected role to;
 - click **Add Selected**.
- 3 Click the **Save** button.

After a while, the newly created permission will be displayed in the table on the **Permission** tab of the **Security** screen.

Managing Container Permissions

Viewing Container Permissions

You can view the permissions of a user (group) to perform certain operations in the Container context on the **Permissions** tab of the **Security** window which can be accessed by following the **Security** link on the Container dashboard. The **Permissions** table on this tab displays all the permissions currently existing in respect of the given Container. For more information, see **Viewing Physical Server Permissions** (p. 191).

Creating Container Permissions

The **New Permission** screen allows you to assign roles to users/groups, thus, endowing these users/groups with certain rights in respect of the given Container. This screen can be accessed by following the **Security** link on the Container dashboard and clicking **New Permission** on this tab. For more information, see **Creating Physical Server Permissions** (p. 192).

Managing Virtual Machine Permissions

Viewing Virtual Machine Permissions

You can view the permissions of a user (group) to perform certain operations in the virtual machine context on the **Security** tab which can be accessed by following the **Security** link on the virtual machine dashboard. The **Permissions** table on this tab displays all the permissions currently existing in respect of the given virtual machine. For more information, see **Viewing Physical Server Permissions** (p. 191).

Creating Virtual Machine Permissions

The **Add Permission** screen allows you to assign roles to users or groups, thus, endowing these users or groups with certain rights in respect of the virtual machine. This screen can be accessed by following the **Security** link on the virtual machine dashboard and clicking **New Permission** on the **Security** tab. For more information, see **Creating Physical Server Permissions** (p. 192).

Managing Server Group Permissions

Viewing Server Group Permissions

You can view the permissions of a user (group), allowing her/him to perform certain operations on all physical servers included in the Server Group, on the **Global Permissions** tab of the **Security** window which can be accessed by following the **Security** link on the Virtuozzo Automator main menu. The **Permissions** table on this tab displays all the permissions currently existing in respect of the Server Group. For more information, see **Viewing Physical Server Permissions** (p. 191).

Note: If you have one physical server registered in Virtuozzo Automator, the **Permissions** table will display the permissions for this physical server only.

Creating Server Group Permissions

The **New Permission** screen allows you to assign roles to users/groups, thus, endowing these users/groups with certain rights to manage all the physical servers included in the Server Group and all their virtual environments. This screen can be accessed by following the **Security** link on the Virtuozzo Automator main menu, clicking the **Global Permissions** tab on the **Security** screen, and clicking **New Permission** on this tab. For more information, see **Creating Physical Server Permissions** (p. 192).

Managing Logical Unit Permissions

Viewing Logical Unit Permissions

You can view the permissions of a user (group), allowing her/him to perform certain operations on all physical servers and virtual environments included in the given logical unit, on the **Permissions** tab of the **Logical View** window which can be accessed by following the **Logical View** link on the Virtuozzo Automator main menu. The **Permissions** table on this tab displays all the permissions currently existing in respect of this logical unit. For more information, see **Viewing Physical Server Permissions** (p. 191).

Creating Logical Unit Permissions

The **New Permission** screen allows you to assign roles to users/groups, thus, endowing these users/groups with certain rights to manage all the physical servers and virtual environments included in the given logical unit. This screen can be accessed by following the **Logical View** link on the Virtuozzo Automator main menu, clicking the **Permissions** tab on the **Logical View** screen, and clicking **New Permission** on this tab. For more information, see **Creating Physical Server Permissions** (p. 192).

Managing Power Panel Policies

Virtuozzo Power Panel is a tool allowing individual users to manage their virtual environments through a common web browser. As virtual environment administrators, they have full control over their virtual environments. For example, they can:

- start, stop, or restart the virtual environment;
- back up and restore the virtual environment;
- start, stop, or restart certain services inside the virtual environment;
- view the processes currently running in the virtual environment and send signals to them;
- view the current resources consumption and resources overusage alerts.

In Virtuozzo Automator 6.1, you can configure the rights users will have in respect of their virtual environments by creating *policies*. A policy is a set of rules that prohibits users from accessing certain functionality in Virtuozzo Power Panel or sets limitations on performing certain operations in the virtual environment context. For example, you can create a policy that will enable the user to create no more than two backups of their virtual environment or completely hide the backup functionality from the user in Power Panel.

Policies can be set on three levels:

- **Global level.** The policies applied on this level have effect on all virtual environments that reside on all physical servers registered in Virtuozzo Automator. You can manage policies on the

global level by following the **Global Policies** link on the **Summary** pane of the **Infrastructure** screen.


- **Physical server level.** The policies applied on this level have effect on all virtual environments residing on a particular physical server. You can manage policies on the physical server level by following the **Power Panel Policies** link on the physical server dashboard or clicking **Manage -> Power Panel Policies** on the upper toolbar from any physical server screen.
- **Virtual Environment level.** The policies applied on this level have effect on particular virtual environments. You can manage policies on the virtual environment level by following the **Power Panel Policies** link on the virtual environment dashboard or clicking **Manage --> Power Panel Policies** on the upper toolbar from any virtual environment screen.

Creating New Policy

This screen allows you to create a new VirtuoZZo Power Panel policy. When applied to a virtual or physical server or a group of virtual environments, this policy will restrict user access to certain Power Panel functionality and/or set limitations on performing certain operations on the corresponding virtual or physical server(s). The **New Policy** screen can be accessed by clicking **New Policy** on the **Power Panel Policies** screen.

To make a new policy, you should perform the following operations:

- 1 In the **General Settings** section, specify a policy name in the **Name** field. You can also provide brief description for the policy in the **Description** field.
- 2 In the **Power Panel Policy Rules** section, choose the restriction rules that will comprise the policy. The following rules can be selected:

Rule Name	Description
Backups Management	Deny access to the backup management functionality in VirtuoZZo Power Panel. In this case, the user will not be able to create and restore virtual environment backups.
Backup Total Count	Having enabled the Backups Management functionality, you can set a limit on the number of backups the user is allowed to create for their virtual environment. <ul style="list-style-type: none"> • With the Unlimited option, there is no limitation for backup creation. • With the Limited option, specify the maximum number of allowed backups. Use the Total field Note: At least one backup should be allowed.
Backup Total Size	Set a limit on the maximal size of all created backups for a particular virtual environment. If you select this rule, you will need to specify the desired size in the Total field.
Packages Management	 Prohibit the user from managing <code>rpm</code> and <code>deb</code> packages in the virtual environment context using VirtuoZZo Power Panel.
Files Management	Prohibit the user from managing the virtual environment files using VirtuoZZo Power Panel.
Applications Management	Prohibit the user from managing applications in the virtual environment context using VirtuoZZo Power Panel.

Control Panel Management	Prohibit the user from managing control panel (Plesk, Confixx or Sitebuilder) from Virtuozzo Power Panel. With this restriction turned on, the Control Panels menu item is removed from the Virtuozzo Power Panel. Note: This rule can be applied to Containers only.
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1 Click the **Save** button.

After a while, the newly created policy will be displayed in the table on the **Power Panel Policies** screen.

To apply any of the policies to a certain virtual or physical server, go to corresponding server and click **Manage --> Power Panel Policies** in the upper toolbar. You can manage policies on the global level by following the **Global Policies** link on the **Summary** pane of the **Infrastructure** screen. On the **Policies** screen (p. 197), you will see if any policies have already been applied to this server and you will be able to apply new policies.

Configuring Policy Parameters

The **Configure Policy** screen allows you to configure the parameters of any policies existing in Virtuozzo Automator. To display this screen, click the name of the policy you wish to edit in the **Policies** table on the **Power Panel Policies** screen.

On this screen, you can configure the policy parameters as follows:

- In the **General Settings** section, you can
 - modify the name currently assigned to the policy in the **Name** field
 - change the policy description in the **Description** field
- In the **Power Panel Policy Rules** section, you can
 - add new restrictions rules to the policy by selecting the check boxes next to the corresponding rules
 - remove any of the restriction rules currently included in the policy by clearing the check box next to the corresponding rules

When you are ready, click the **Save** button to save the changes made.

Performing Main Operation on Policies

The **Power Panel Policies** screen accessible by clicking **Setup > Power Panel Policies** on the Virtuozzo Automator menu allows you to manage your policies in the following way:

- view all Power Panel policies currently existing in Virtuozzo Automator in the **Policies** table
- create a new policy by following the **New Policy** link above the **Policies** table
- configure the policy parameters by clicking the name of the corresponding policy in the **Policies** table

- remove the policies that you do not need any more by selecting the check boxes next to the corresponding policies in the **Policies** table and clicking the **Delete** button.

To facilitate working with policies, you may have the **Policies** table display only those policies that have the corresponding name or a certain word in their description. On top of the table, click the **Show Search** link to display the fields where you can specify the parameters the policy should meet; then click on the **Search** link. To view all available policies, click the **Reset Results** link to the right of the **Search** link.

You can also have Virtuozzo Automator display only those parameters that you need at the moment. To show or hide certain columns in the **Policies** table, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

Managing Policies

The **Policies** screen allows you to manage the policies currently existing in Virtuozzo Automator on three levels: the global level, the physical server level, and the virtual environment level. The following table describes the operations you can perform on each level:

Level	Operation	Description	Access to Screen
Global	Viewing policies	View the policies in the Assigned Policies table that are currently applied to all virtual environments residing on all physical servers registered in Virtuozzo Automator Control Center.	Click the Global Policies link on the Summary pane of the Infrastructure screen.
	Viewing rules	View the restriction rules included in the policies listed in the Assigned Policies table. These rules have effect on all virtual environments in Virtuozzo Automator. All the restriction rules are displayed in the Effective Policy Rules table.	
	Adding and removing policies	Add new policies that will be applied to all virtual environments in Virtuozzo Automator and remove existing ones. To this effect, follow the Manage Assignment link and perform the necessary operation	
Physical server	Viewing policies	View the policies in the Assigned Policies table that are currently applied to all virtual environments residing on the given physical server.	Click the Policies link on the physical server dashboard.
	Viewing rules	View the restriction rules included in the policies listed in the Assigned Policies table. These rules have effect on all virtual environments of the given physical server. All the restriction rules are displayed in the Effective Policy Rules table.	
	Adding and removing policies	Add new policies that will be applied to all virtual environments of the given physical server and remove existing ones. To this effect, follow the Manage Assignment link and perform the necessary operation	

Virtual Environment	Viewing policies	View the policies in the Assigned Policies table that are currently applied to the given virtual environment.	Click the Policies link on the virtual environment dashboard.
	Viewing rules	View the restriction rules included in the policies listed in the Assigned Policies table. These rules have effect on the given virtual environment only. All the restriction rules are displayed in the Effective Policy Rules table.	
	Adding and removing policies	Add new policies that will be applied to the given virtual environment and remove existing ones. To this effect, follow the Manage Assignment link and perform the necessary operation	

Managing Policy Assignments

The **Manage Assignment** screen allows you to assign new policies to your virtual environments and remove those policies that you do not need any more. This screen is displayed on clicking the **Manage Assignment** link on the **Policies** screen.

The **Available Policies** table displays all the policies that currently exist in Virtuozzo Automator and are not yet assigned to your virtual environments. Depending on the level where a policy will be applied, it will have effect on:

- all virtual environments that reside on physical servers registered in Virtuozzo Automator (the global level);
- all virtual environments that reside on a particular physical server (the physical server level);
- a particular virtual environment (the virtual environment level).

To assign a new policy:

- 1 Select the check box next to its name and click the >> button. The policy will appear in the **Assigned Policies** table.
- 2 In the drop-down list box under the policy name, select
 - **Allow to override on sublevels** if you wish to allow policies set on lower levels redefine those assigned on higher levels. If this option is enabled (which is the default behavior):
 - * the policies set on the physical server and virtual environment levels will be able to redefine those assigned on the global level
 - * the policies set on the virtual environment level will be able to redefine those assigned on the physical server level
 - **Force on all sublevels** if you wish to forbid redefining policies set on higher levels by those assigned on lower levels.
- 3 Click the **Save** button.

After a while, the policy name will appear in the **Assigned Policies** table on the **Policies** screen.

The **Assigned Policies** table on the **Manage Assignment** screen lists those policies that are currently assigned to your virtual environments. To remove a policy:

- 1 Select the check box next to its name and click the << button. The policy will be moved to the **Assigned Policies** table.
- 2 Click the **Save** button.

Maintaining Virtuoizzo Automator Management Tools

The **Management** dashboard is divided into the following sections:

Workflow. The links here lead to the **Workflow** screen, where you may check the pending virtual environment requests list (the **Manage Virtual Environment requests** (p. 203) link) and set virtual environment requesting options (the **Configure workflow** (p. 202) link).

Scheduler. The **Manage scheduled operations** (p. 207) link opens the screen where you can set certain virtual environments to be backed up or restarted according to your timetable.

Tasks. The **View tasks log** (p. 205) link opens the screen listing operations that both have already been and are still to be completed.

Support. The **Report a problem** (p. 296) link opens the wizard that helps you send the details of a technical issue to the Virtuoizzo support team. The **Look up Virtuoizzo Automator error descriptions** (p. 296) link opens the one displaying the details of a certain error that occurred during a Virtuoizzo Automator session and a standard way to fix it. To quickly have the path to a screen of which you know only the ID or the name, click **Find the screen by its ID** (p. 299). The **Download files and documentation** (p. 298) link leads to the screen where you may obtain the Virtuoizzo Automator 6.1 and Virtuoizzo Power Panel documentation.

Updates. The **Update Virtuoizzo software** link displays the Virtuoizzo Automator screen where you can select the physical server and update its Virtuoizzo Containers installation.

Alerts and Events. Follow these links to see the virtual environment resources consumption dynamic reflected in alerts signs (**View alerts log** (p. 205)) and changes in virtual environment statuses (**View events log** (p. 205)).

Audit. The links here enable you to view the current live sessions on physical servers and virtual environments on them (the **Live User Sessions** (p. 212) link) and to view the audit logs of these user sessions (the **Audit Logs** (p. 213) link). .

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Provisioning Virtual Environments

Requesting virtual environments is a self-service oriented feature that allows a maximum control over the process of granting internal clients access to virtual environments by the physical server administrator while taking him/her a minimum effort to participate in the process.

Virtual Environment requesting enables enterprise physical server administrators to deliver virtual environments to internal clients and plan the physical server resources expenditures, provides centralized management, administration and security of virtual environments usage across the enterprise network and ensures end-to-end monitoring, analysis and reporting of the whole process of requesting and granting virtual environments within an enterprise.

Virtual Environment requesting is a role-based administration feature which helps the physical server administrator to interactively create and assign thousands of virtual environments to any number of users. Some part of the work to be done is entrusted to users. Here is a stereotyped requesting scenario:

A client requests a virtual environment using the login the physical server administrator previously provided him with.

- 1** A client places a virtual environment request. S/he selects a virtual environment template for the virtual environment s/he requests, enters a password to access the virtual environment s/he requests and leaves comments for the administrator.
- 2** The placement of the request launches generating and sending the physical server administrator an email informing of the fact.
- 3** When informed, the physical server administrator checks the list of placed requests and accepts or declines the request.
- 4** Both accepting and declining sends the client an email informing him/her whether the placed request has been accepted or not.
- 5** The client checks the list of the requests s/he placed. Has the physical server administrator carried out the request, the corresponding virtual environment is ready to be used.

The settings and steps necessary for this scenario are:

- 1** To allow the clients to place virtual environment requests, the physical server administrator enables the virtual environment Requesting and sets (p. [186](#)), or creates the users roles (p. [180](#)) reserved for those clients who are suggested to request virtual environments. These roles must include the privilege to request virtual environments.
- 2** To exchange virtual environment request emails with clients, the physical server administrator enables the email notification (p. [247](#)).
- 3** To check the list of virtual environment requests, the physical server administrator follows the direction given in the virtual environment Requests subsection (p. [203](#)).
- 4** To process a request, the physical server administrator selects the request and follows the direction given in the Viewing and Processing Pending Requests subsection (p. [203](#)).

Setting Up Virtual Environment Requesting

As a physical server Administrator, you have the privilege to carry out the user requests for creating more virtual environment for them to manage. To have this option in effect, use the **Configure Workflow** link on the **Management** screen.

To enable virtual environment requesting for the users, perform the following actions:

- 1 Select the **Allow to Post Virtual Environment Requests** check button, to allows the users to request virtual environments.
- 2 In the **Templates for "Virtuozzo Containers"** and **Templates for "virtual machines"** sections, select one or more configuration templates.
- 3 Thus you select the templates, that will be available for the users requesting a virtual environment creation. To this effect, select the corresponding template name(s) from the **Available** list and move them to the **Selected** list by clicking the **>>** button.
- 4 The **Virtual Environment Owner Default Role** menu further defines the future users' administrative privileges they will have in respect of the virtual environment that will be possibly created for them. On this menu, you will find roles that either have been previously created or are built-in. The built-in roles are:
 - **Administrator;**
 - **Helpdesk;**
 - **Node Administrator;**
 - **VA User;**
 - **Virtual Environment Administrator;**
 - **Workflow User;**

Each of these roles covers a certain number of tasks supposed to be routinely performed on the physical servers registered in Virtuozzo Automator and/or the virtual environment residing on them.

New roles can be created on the **Roles** subtab of the **Setup > Security** menu.

- 5 The **Virtual Environment Name Input** option allows you to define whether entering the future virtual environment hostname, when making a virtual environment request, is:
 - required (select **Visible, Required**);
 - impossible (select **Hidden**);
 - optional (select **Visible, Optional**).
- 6 To save the changes, click **Submit**, otherwise, click **Cancel**.

After you have enabled virtual environment requests and set up their properties, virtual environment can be requested by Virtuozzo Automator users by following the **New Virtual Environment Request** link on the **Virtual Environment Requests** page (p. 203). However, for the user to be

able to request a virtual environment in this way, they should have the Workflow User role defined globally in Virtuozzo Automator (p. 193).

Checking Virtual Environment Requests

If you are logged in to Virtuozzo Automator with the necessary permissions and want to check the virtual environment requests submitted by Virtuozzo Automator users, the **Workflow** screen lists the pending and fulfilled requests arranged as the following table:

Column Name	Description
Posted	The date of placement of the request.
Owner	The username of the user for whom the virtual environment is requested.
Status	Informs you if the request has been processed.
Virtual Environment	If there is a virtual environment ID, the request processing has been started, otherwise it has not.
Virtual Environment template	The template the requested virtual environment is or will be based on.
Container Hostname	Either entered by the user when requesting the virtual environment or assigned by the physical server administrator when creating the requested virtual environment. This column is shown in the table only if the virtual environment hostnames can be entered by the users requesting these virtual environment.

To create a requested virtual environment or further process the request, click the link with the date of placement. The **Review Virtual Environment Request** screen (p. 203) displays.

To delete a request, select the corresponding check box and click the **Reject Requests** button.

Processing Virtual Environment Request

As a physical server Administrator, you have the privilege to carry out the user requests for creating more virtual environment or to reject these requests. The **Review Virtual Environment Request** screen allows you to learn detailed information on the request and either create the virtual environment or reject its creation.

The **Request Details** section shows:

- the date of placing the request;
- the current status of the request, i. e. whether it has already been processed or not.

The information about the user who requested the virtual environment is displayed in the **Owner Details** section:

- the user's name and email;
- the IP address of the computer used to place the request.

The **Virtual Environment Configuration** section contains:

- the virtual environment ID (displayed if entered when the request was placed by the user or assigned by the physical server administrator);
- the virtual environment hostname (displayed if entered by the user when requesting the virtual environment or by the physical server administrator when processing the request);
- the virtual environment password to be assigned to the virtual environment during its creation. The password is entered by the user who logs a request.
- the virtual environment template the requested virtual environment will be or has been based on;

In the **Description** section, you may read the comments the user has left for you, if any.

If you are checking a request you have not yet processed and going to create the requested virtual environment, click the **New Virtual Environment** button; otherwise, click **Reject Request**. The rejected request is deleted from the requests list. If you want to create the requested virtual environment, see steps described in **Creating New Containers** or **Creating Virtual Machines** (p. 119).

The **Reopen Request** option allows you to further manage the accepted requests, which may be needed when:

- You have started creating the requested virtual environment and the process hung;
- You have handed the created virtual environment over to another user (by means of the Security Manager). In this case, you will need this request to stop being misleadingly displayed in the list of virtual environment requests related to the former user. To this effect, reject the request after reopening it, which will eliminate the invalid relation between the user and the virtual environment. The created virtual environment will be left intact.
- Errors during the creation of the virtual environment rendered the virtual environment non-functional. To create the virtual environment anew, the corresponding request has also to be rejected after reopening.

Requesting New Virtual Environment

The **New Virtual Environment Request** screen enables you to send requests to the VA infrastructure Administrator on creating new virtual environments. To place a request, specify the following information:

- 1** In the **Virtual Environment Owner** section, choose a user who will have administrative privileges over the requested virtual environment. Following the **Select** link in the **Virtual Environment Owner** section, select a user from the list of existing Virtuoizzo Automator users (p. 174) appearing in a pop-up window. To be nominated for a virtual environment ownership, the user has to be created with the help of the Security Manager. This functionality is described in the **Managing Virtuoizzo Automator Users Access Rights** chapter.
- 2** In the **Virtual Environment Configuration** group, choose one of the available templates;
- 3** In the **Virtual Environment Administrative Password** group, enter the password to log in to Virtuoizzo Automator;

- 4 If it is provided, you may assign a hostname for the virtual environment.
- 5 In the **Description** field, additional details about the virtual environment can be provided.

To commit the request, click **Request**, to call it off, click **Cancel**.

Note: To be available, the requesting of virtual environment has to be enabled. If it is not, this screen informs you of the fact. In this case, you need to either enable this by yourself, or contact the administrator who has the corresponding permission. To enable the requesting of virtual environment, click **Workflow** on the Virtuozzo Automator left menu, open the **Setup** tab and select the **Enable Container Requests** check box.

Monitoring Operations and Viewing Logs

Viewing Tasks Log

The **Tasks** screen lists all recent operations performed in Virtuozzo Automator. For more details on information shown, see **Viewing Infrastructure Task Logs** (p. 32).

Viewing Alerts Log




The **Alerts** tab lists all resource consumption alerts logged by Virtuozzo Automator. For more details on information shown, see **Viewing Infrastructure Alert Logs** (p. 32).

Viewing Event logs

The **Events** subtab lists all status changes logged by Virtuozzo Automator. For more details on information shown, see **Viewing Infrastructure Event Logs** (p. 34).

Note: Listed objects which are not registered in Virtuozzo Automator anymore are marked with the  icon. No information on such objects remains in Virtuozzo Automator.

Viewing Active Tasks

Almost all Virtuozzo Automator pages, except for those containing an error report, allow you to check for any virtual environment operations currently under way. The **Active Tasks** window can be accessed by clicking the **Active Tasks** icon (,  or ) or clicking the **Active Tasks** link at the right end of the title bar of a Virtuozzo Automator page. Note that the icons vary according to the interface skin selected. If you are planning to perform any operation on a virtual environment, it is a good idea to check the **Active Tasks** window and wait for the tasks to complete, if there are any. The window is refreshed every few seconds.

By default, 20 operations are listed, but you may have more operations displayed by pressing the appropriate link on top of the table. You may also have the **Active Tasks** table display only those operations that are executed by a particular virtual environment, or have a particular status. On top of the table, press the **Show Search** link to display the fields where you can specify the virtual environment ID, or the status of the operation you wish to view the information on; then click on the **Search** link.

The information on the active tasks is presented as a table with the following columns:

Column	Description
Started	The date and time when the operation was started.
virtual environment	The ID of the virtual environment performing the operation.
Operation	The name of the operation.
Status	Indicates the operation status. At present the only one possible is "In Progress", which means that the operation is under way.

The **Details** link beside a task leads to the **Task Details** page, where you can view the details of the operation.

When the operation is successfully completed or fails, the table is closed, and the **No active tasks at the moment** message appears.

Viewing Task Details

The **Task Details** window is available by clicking the **Details** link beside any task, be it **In progress**, **Completed**, or **Failed**.

The **Task Details** window serves for providing brief and most informative reference on the operation. The upper table of the window provides you with the task's type, the name of the virtual environment to which this task is applied, the physical server where the virtual environment resides, the user who initiated the task, and finally, the task's status.

The lower table consists of the following columns:

Column Name	Description
Time	The time when a certain operation stage began.
Operation	The corresponding utility message.
Status	The status of each of the steps the operation the operation consists of- In progress , Completed , or Failed .

Click **Detach** to have the message appear in a separated web-browser window.

Click **Close** to quit the window.

Viewing Error Details

The **Error Details** page provides specific information in case of an operation failure. When you are trying to perform an operation and it fails, the corresponding page is refreshed with a thick red line across the page informing you of the failure and providing the **Details** link to learn more about this failure.

This page presents a complete response as to why the operation failed. This response might help you understand the reason for the failure.

If an operation fails, and a green line is displayed informing that the operation has been scheduled, it means that the failure occurred after the operation had been scheduled. That is why it is desirable to always check the status of the scheduled operation by following the **Details** link at the right end of the green line to make sure that the operation has been successfully completed.

Scheduling Tasks

On this screen, you can automate such a routine maintenance operation as backing up or restarting your virtual environments.

On the **Scheduler** screen, you can create a new task or review the tasks you have already assigned Virtuozzo Automator to perform regularly, if any.

The current system date and time for your convenience is displayed on top of the screen.

The existing tasks are displayed in the **Scheduled Tasks** section as the following table:

Column Name	Description
Title	The name of the task.
Description	The description of the task.
Action	The action Virtuozzo Automator will perform in the framework of this task.
Virtual Environment(s)	The virtual environments to be backed up or restarted. If you see the inscription Deleted , the Virtual Environments that this task is applied to were deleted from the physical server after the task was created.
Next Start	The nearest date and time when the task is to be performed.
Enabled	This column shows the current status of the task.

To filter the tasks by their assigned time spans, statuses, names, and the names of the virtual environments involved, click the **Show Search** link, enter the necessary searching criteria and click **Search**. To have all the tasks back, click **Show All**. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

- To schedule an operation, click the **New Task** link.

- To run a task immediately, select its check box (or the uppermost check box to run all the tasks at once) and click **Run Now**.
- To enable or disable a task, select its check box (or the uppermost check box to enable or disable all the tasks) and click **Enable** or **Disable**.
- To delete a task, select its check box (or the uppermost check box to delete all the tasks) and click **Delete**.

You can change the timetable of a task and the virtual environments list it performs on by clicking its name.

Choosing Tasks

The **New Task: Select Action** page enables you to schedule a task for one or several registered virtual environments.

Back Up Virtual Environment (p. 208). You can create a task for one or several virtual environments to be backed up periodically or once. Having chosen this option, you will be able to specify the virtual environments list, the time and period for the scheduled backups. Virtual Environments can belong to different physical servers.

Restart Virtual Environments (p. 209). You can create a task for one or several virtual environments to be restarted. Having chosen this option, you will be able to specify the virtual environments list, the time and period for the scheduled restarts. The virtual environments can belong to different physical servers.

Choose the task and click the **Next** button to set the details of the operation.

Scheduling Backup Tasks

To back up certain virtual environments at a certain time, you can schedule a backup with the parameters to be entered on the **New Task: Back Up Virtual Environments** screen.

In the **Task Configuration** section, enter task name and the description and enable the task if necessary.

In the **First Run** (or **Next Run**) section, specify:

- first launch time;
- first launch date selected from the **Select date** window.

In the **Recurrence Pattern** section, you can set the task to be performed once, daily or weekly:

- if you select the **Run once** radio button, the task will be performed at the time and on the date set in the **First Run** section;
- if you select the **Daily** radio button, the **Repeat Daily** section will open below, allowing you to set the following periodicity:

- every specified number of days (**Every N day(s)**),
- only on weekdays (**Every weekday**),
- only on weekends (**Every weekend day**);
- if you select the **Weekly** radio button, the **Repeat Weekly** section will open, allowing you to set weekly periodicity (**Recur every N week(s)**) and specific days of week to run the task on.

The **End Date** section is displayed only if the task is to be launched more than once. In this section, you can set the task to be:

- performed repeatedly until manually disabled, removed or edited (the **No end date** radio button);
- launched for the first time on the date set in the **Task Details** section, and for the last time, on the date selected in the **Select date** window next to the **End Date** radio button.

In the **Virtual Environments to back up** section, you can choose:

- individual virtual environments,
- entire Hardware Nodes. In this case, all virtual environments on the Node(s) will be added to the back up task.

Having selected virtual environments to back up, click the **Add Virtual Environments** or **Add** button and select virtual environments from the pop-up window. To remove a virtual environment from the list, select it and click the **Remove Selected** button.

For information on backup options, see **Creating Virtual Environment Backups** (p. 152).

To save the task configuration, click **Save**, otherwise click **Cancel**.

Scheduling Restart Tasks

In the **New Task: Restart Virtual Environment** page, specify all the necessary details for the automatic restart of one or several virtual environments.

In the **Task Configuration** section, enter the name and the description of the task and indicate if the task is enabled. If you are just drafting a possible task, clear the **Enabled** check box.

In the **First Run** section, specify:

- the time when the task will be launched first;
- the date when the task will be launched first selected from the **Select date** window: to set the task to be run the very day you make these settings, click **Today** at the bottom of the **Select date** pop-up window.

In the **Recurrence Pattern** section, you may set the task to be performed once, or on a daily or weekly basis by selecting the corresponding radio button:

- if you select the **Run once** radio button, the task will be performed at the time and date set in the **First Run** section;

- if you select the **Daily** radio button, this opens the **Repeat Daily** section below where you can set the task to be run:
 - either once in a certain number of days to be entered into the corresponding field (the **Every** radio button);
 - or on working days only (the **Every weekday** radio button);
 - or on weekends only (the **Every weekend day** radio button).
- if you select the **Weekly** radio button, this opens the **Repeat Weekly** section to set over what number of weeks (the **Recur every** field) and what weekday the task will be run;

The **End Date** section is displayed only if the task is to be launched more than once. In this section choose if the task will be:

- repeatedly performed until it is manually disabled, removed or edited (the **No end date** radio button);
- or launched for the first time on the date set in the **Task Details** section and for the last time on the date selected from the **Select date** window next to the **End Date** radio button.

The virtual environments the task is addressed to can be selected in the **Restart Virtual Environment** section. Click the **Add Virtual Environments** button and select the virtual environments you want to perform the task on from the pop-up window. To take a virtual environment out of the list, select it and click the **Remove Selected** button.

To save the task configuration, click **Save**, otherwise click **Cancel**.

Managing Maintenance Tasks

The screen can be accessed if you click any of the tasks in the Scheduled Tasks (p. 207) table.

The **Task Details** section displays the following task details:

Field	Description
Title	The name of the task.
Enabled	The current status of the task.
Next start	The nearest date and time when the task is to be performed.
Action	The action Virtuozzo Automator will perform in the framework of this task.
Virtual Environments to process	The Container(s) to back up.

If the task has a description, you can also find the **Description** section after the **Task Details** section.

In the **Logged Operations** section you can analyse the information on the last execution of the task.

Changing Maintenance Tasks

On the **Configure Task** screen you can do the following.

In the **Task Configuration** section, enter task name and the description and enable the task if necessary.

In the **First Run** (or **Next Run**) section, specify:

- first launch time;
- first launch date selected from the **Select date** window.

In the **Recurrence Pattern** section, you can set the task to be performed once, daily or weekly:

- if you select the **Run once** radio button, the task will be performed at the time and on the date set in the **First Run** section;
- if you select the **Daily** radio button, the **Repeat Daily** section will open below, allowing you to set the following periodicity:
 - every specified number of days (**Every N day(s)**),
 - only on weekdays (**Every weekday**),
 - only on weekends (**Every weekend day**);
- if you select the **Weekly** radio button, the **Repeat Weekly** section will open, allowing you to set weekly periodicity (**Recur every N week(s)**) and specific days of week to run the task on.

The **End Date** section is displayed only if the task is to be launched more than once. In this section, you can set the task to be:

- performed repeatedly until manually disabled, removed or edited (the **No end date** radio button);
- launched for the first time on the date set in the **Task Details** section, and for the last time, on the date selected in the **Select date** window next to the **End Date** radio button.

In the **Virtual Environments to back up** section, you can choose:

- individual virtual environments,
- entire Hardware Nodes. In this case, all virtual environments on the Node(s) will be added to the back up task.

Having selected virtual environments to back up, click the **Add Virtual Environments** or **Add** button and select virtual environments from the pop-up window. To remove a virtual environment from the list, select it and click the **Remove Selected** button.

For information on backup options, see **Creating Virtual Environment Backups** (p. [152](#)).

To save the task configuration, click **Save**, otherwise click **Cancel**.

Viewing Virtuozzo Automator User Sessions

Viewing Management Server Live User Sessions

On the **Management Node** pane, you can view the detailed information on all the current user sessions on the Virtuozzo Automator Management Servers. The user session is a set of parameters that is created when a user logs in Virtuozzo Automator and is closed when a user logs off.

The **Search** section comprises several fields and enables you to organize the searching process according to a certain parameter or several criteria. If you need only some of the fields, you can easily remove others by clicking the **Customize** link. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

Column Name	Description
Login	The name of the user session. Click the name to switch to the user session properties page.
Authentication Database	<p>The source where the user information is taken from. It may be an external or local database.</p> <p>These databases are used to authenticate the users trying to log in to their physical servers through Virtuozzo Automator.</p> <p>The number of available authentication databases may vary, but two databases are always present: <i>Virtuozzo Internal</i> and <i>System</i>. The users in the Virtuozzo Internal database are those that you create in Virtuozzo Automator specifically for Virtuozzo virtual environment management. On a fresh Virtuozzo virtual environment installation, this database is empty. The users in the System database are the regular system users of the Master Server of the Server Group.</p>
Email	The email the user specified for feedback connection.
IP address	The IP address of the computer the user started the live session
Logon Time	The date and time when the user started the live session.
Expiration time	The date and time when the session will be terminated if the user keeps idle.

Using the **Select Columns** link, you can add or remove any of these columns according to your needs.

If you need to terminate a session or several sessions, choose them and click the **Close Sessions** button above the table.

Viewing Power Panel Live User Sessions

On the **Power Panel** pane, you can view the detailed information on all user sessions currently running in Virtuozzo Power Panel. The user session is a set of parameters that is created when a user logs in and is closed when a user logs off.

The **Search** section comprises several fields and enables you to organize the searching process according to a certain parameter or several criteria. If you need only some of the fields, you can easily remove the others by clicking the **Customize** link. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

Column Name	Description
User	The name of the user session. Click the name to switch to the user session properties page.
User IP Address	The IP address of the computer from which the user started the live session.
Hardware Node	The name of the physical server the virtual environment belongs to.
Virtual Environment	The name of the virtual environment the user is working with.
Logon Time	The date and time when the user started the live session.
Expiration time	The date and time when the session will be terminated if the user does not perform any action on the virtual environment.

Using the **Select Columns** link, you can add or remove any of these columns according to your needs.

If you need to terminate a session or several sessions, choose them and click the **Close Sessions** button above the table.

Viewing Audit Logs

On the **Audit Log** pane, you can view the detailed information on both the Management Server and Power Panel user session.

The **Search** section comprises several fields and enables you to organize the searching process according to a certain parameter or several criteria. If you need only some of the fields, you can easily remove others by clicking the **Customize** link. If you do not need the search section at all, just hide it with the **Hide Search** button above the table. To restore the Search section, click the **Show Search** button that appears on the place of the **Hide Search** one.

Column Name	Description
Time	The number and kind of user sessions at the present time.
User	The name of the user who started this session.
IP address	The IP address of the computer on which the user started the live session, i.e. the computer where the user opened the Virtuozzo Automator client.
Event	The user activity status.

Using the **Select Columns** link, you can add or remove any of these columns according to your needs.

The **Event** column reflects the change of the user session status and can show one of five states:

State Name	Description
Login Successful	The user has logged in successfully.
Failed Login	The login operation failed.
Logoff	The user has logged off successfully.
Session Expired	The user session has been stopped because the user kept idle for a certain period of time.
Session Terminated	The user session has been stopped by the administrator or because of the agent restart.

Viewing User Session Properties

The **User Session** page allows you to see the detailed information on the chosen live user session.

The table provides the following information:

Column Name	Description
Login	The name of the user session. Click the name to switch to the user properties page where you can manage the details of this user.
Authentication Database	The source where the user information is taken from. It may be an external or local database. These databases are used to authenticate the users trying to log in to their physical servers through Virtuozzo Automator.
E-mail	The e-mail the user specified for the feedback connection.
IP address	The IP address of the computer the user started the live session
Logon Time	The date and time when the user started the live session;
Expiration time	The date and time when the session will be terminated if the user keeps idle.
Status	The user status.

The **Tasks** field comprises the **Close Session** link. By clicking this link you will terminate the current session.

The **Session Tasks Log** subsection comprises the list of all tasks prescribed to this user.

Managing Virtuozzo Network

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Managing Network Adapters on Physical Server

Listing Adapters



The **Network Adapters** screen displays a list of network interface cards (NICs) and VLAN adapters currently available on the physical server.

To access the screen, go to **Infrastructure** > physical server > **Network** tab. The information on the network adapters is presented in the table having the following columns:

Column Name	Description
Interface	The name assigned to the network adapter (e.g. physical adapter <code>eth0</code> , VLAN adapter <code>eth0.1</code>).
Type	Indicates whether it is a real physical adapter () or a VLAN adapter created on the basis of a physical adapter ().
VLAN ID	The ID assigned to the VLAN adapter. Relevant for VLAN adapters only.
Virtual Network	The name of the virtual network, if any, that is associated with this network adapter.
IP Addresses	The IP addresses assigned to the network adapter. Note: To assign IP addresses and other network parameters to the adapter, use a command line interface and the <code>ifconfig</code> utility.
MAC Address	The MAC address of the network adapter.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to the Managing Virtual Networks section.

Operations Available

-  Remove an existing VLAN adapter by ticking the check box near the corresponding adapter and clicking the **Delete** button.
-  Create a new VLAN adapter by following the **New VLAN Interface** link at the top of the **Network Adapters** table.

Note: Creating new VLAN interfaces is supported for Server Bare Metal and Virtuozzo Containers physical servers.

- Associate a VLAN interface with any of the existing virtual networks (p. 224) by clicking the name of the corresponding adapter in the **Network Adapters** table.

To facilitate your working with network adapters, you can:

- Configure the number of columns to be displayed in the **Network Adapters** table. To this effect, click the **Select Columns** link and clear the check boxes near the column name(s) that you wish to hide.
- Modify the number of network adapters simultaneously displayed in the **Network Adapters** table by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

Viewing Physical Adapter Properties

The **Physical Interface** screen provides the key information on the physical adapter that you have selected on the **Network** tab of the physical server dashboard:

Column Name	Description
Interface	The name assigned to the network adapter (e.g. eth0).
Type	Indicates that it is a physical adapter ('Physical').
Virtual Network	The name of the virtual network, if any, associated with the network adapter. Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to Managing Virtual Networks (p. 218).
IP Addresses	The IP addresses assigned to the network adapter.
MAC Address	The MAC address of the network adapter.

The **Configure** button allows you to connect this physical network adapter to any of the available virtual networks. To assign IP addresses and other network parameters to the adapter, use a command line interface and the `ifconfig` utility.

Connecting Physical Adapter to Virtual Network


The **Configure** screen allows you to connect the physical network adapter existing on the physical server to any of the available virtual networks. This screen can be accessed by clicking the **Network** tab on the physical server dashboard, then clicking the name of the network adapter you wish to join to a Virtual Network, and clicking **Configure**.

On this screen, you can connect the physical network adapter to a virtual network (and, consequently, to the virtual environments joined to this virtual network) by selecting the name of the corresponding virtual network on the drop-down menu in the **Network** field. If you do not wish the adapter to be joined to any virtual network, select **Not Assigned** on the drop-down menu.

After deciding on the virtual network, click the **Submit** button.

Note: To assign IP addresses and other network parameters to the adapter, use a command line interface and the `ifconfig` utility.

Creating VLAN Adapter on Physical Server

 The **New VLAN Interface** screen allows creating new virtual local area network (VLAN) adapters on the basis of the real physical servers. You can use these adapters later on to connect your virtual environments to the corresponding virtual local area networks.

To access the screen, go to **Infrastructure** > physical server > **Network** tab and click the **New VLAN Interface** link.

Note: Creating new VLAN interfaces is supported for Server Bare Metal and Virtuozzo Containers physical servers.

To create a new VLAN adapter, you should provide the information in the following fields:

- **VLAN Tag** (mandatory). Specify the ID that will be assigned to the new VLAN. The VLAN ID will be displayed in its name. If you choose the IDs "1" and "2" for the VLAN with the base interface, their IDs will be and respectively. As a VLAN ID, you can specify any integer in the range from 2 to 4094.
- **Base Interface**. Specify the physical network adapter on the physical server to which the VLAN is to be bound. Choose one adapter from the drop-down list.
- **Assign Virtual Network** (optional). Specify the virtual network to which you want to connect the VLAN adapter. You can join the VLAN adapter to one of the virtual networks available on the physical server. Virtual network are to be created separately in the **Infrastructure** > physical server > **Network** tab > **Virtual Networks** subtab.

After you have entered the necessary information, click the **Submit** button to create the VLAN adapter with the specified parameters. After a while, the newly created VLAN will be displayed on the **Virtual Adapters** screen.

Viewing VLAN Adapter Properties

The **VLAN Interface** screen provides the key information on the VLAN adapter that you have selected on the **Network** tab of the physical server dashboard:

Column Name	Description
Interface	The name assigned to the VLAN adapter (e.g. <code>eth0.1</code>).
Type	Indicates that it is a VLAN adapter ('VLAN').
VLAN ID	The ID assigned to the VLAN adapter.
Virtual Network	The name of the Virtual Network, if any, associated with the network adapter.
IP Addresses	The IP addresses assigned to the VLAN adapter, if any.
MAC Address	The MAC address of the VLAN adapter.

The **Configure** button allows you to connect this VLAN network adapter to any of the available virtual networks.

Note: To assign IP addresses and other network parameters to the adapter, use a command line interface and the `ifconfig` utility.

Connecting VLAN Adapter to Virtual Network

The **Configure** screen allows you to connect the VLAN network adapter existing on the physical server to any of the available virtual networks. This screen can be accessed by clicking the **Network** tab on the physical server dashboard, then clicking the name of the VLAN network adapter you wish to join to a virtual network, and clicking **Configure**.

On this screen, you can connect the VLAN network adapter to a virtual network (and, consequently, to the virtual environments joined to this virtual network) by choosing the name of the corresponding virtual network on the drop-down menu in the **Network** field. If you do not wish the adapter to be joined to any virtual network, select **Not Assigned** on the drop-down menu.

After deciding on the virtual network, click the **Submit** button.

Note: To assign IP addresses and other network parameters to the VLAN adapter, use a command line interface and the `vznetcfg` utility.

Managing Virtual Networks

A Virtual Network is a grouped number of virtual environments with bridged network interfaces into a single subnet. Using virtual networks you can make groups of virtual environments on a physical server which belong to different subnets invisible to each other. General information on the two network modes in which virtual environments can operate (host-routed and bridged) is provided in *Virtuozzo Containers User's Guide* and Virtuozzo documentation. Only virtual environments operating in the bridged mode can be organized into virtual networks. The chart below illustrates different scenarios of virtual network usage and their respective results.

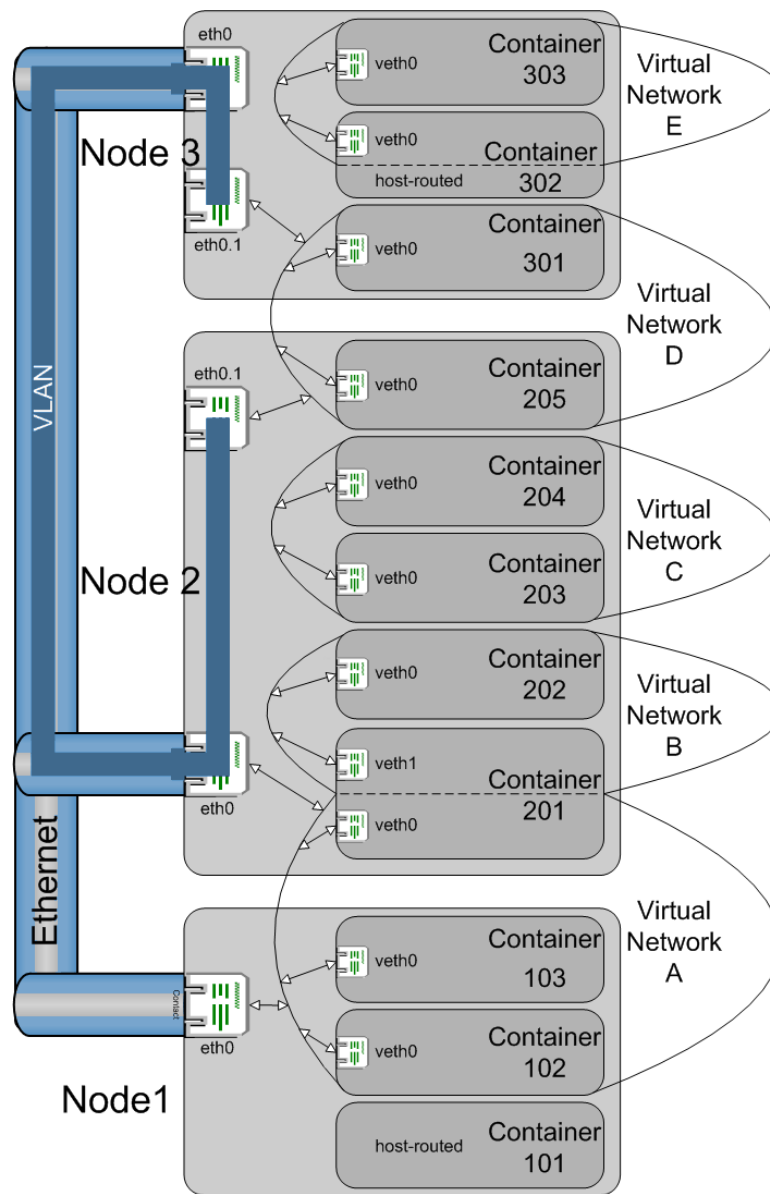


Figure 1: Virtual Networks

The scheme above illustrates three Virtuozzo physical servers each having a single Ethernet adapter (`eth0`). The Ethernet adapters are physically united into a single network. On the Ethernet adapters of Nodes 2 and 3, a VLAN is set up.

Note: 🐧 On a Linux physical server, a VLAN can be set up by standard means of the OS, and Virtuozzo Automator provides an interface for creating VLANs on any network adapter. 🪟 On Windows physical servers, any suitable third-party tools can be used for creating VLANs. Virtuozzo Automator does not provide an interface to these tools, though it naturally displays the VLAN adapters created in this way.

The steps needed to set up each of the five Virtual Networks shown on the scheme (A-E) are the following:

- 1** A Virtual Network is created either on the general Virtuoizzo Automator screen for the whole Server Group of physical servers or on the screen related to a particular physical server. Whatever the screen, the created Virtual Network will be available for all the registered physical servers. If you use a particular physical server for the Virtual Network creation, you can also specify to what network interface card (NIC) of the current physical server the Virtual Network will be assigned, if at all.
- 2** Containers from one or more physical servers are added to the Virtual Network (p. 226), thus creating a separate subnet. Only the bridged interfaces of the Containers are involved in this process; host-routed interfaces cannot be added to Virtual Networks. You should make sure that these Containers can also communicate with each other on the IP level, i.e. their IP addresses/net masks are compatible with each other.
- 3** For each physical server that hosts the Containers included in the Virtual Network, the Virtual Network should either be assigned to one of the physical server's physical/VLAN adapters or defined locally for the physical server (the latter variant is possible if the Containers of only one physical server are included in the Virtual Network).

Using the method above, the configuration shown on the scheme can be created. Each of the five Virtual Networks serves to group two or three Containers of one or two physical servers - this is shown with double-headed arrows connecting the Virtual Network border with the Container bridged interfaces. Each of the Virtual Networks is either local for the physical server or bridged to some adapter - the latter case is illustrated with double-headed arrows connecting the Virtual Network border with the physical servers' Ethernet or VLAN interfaces.

Let us see the effects of each of the combinations shown:

- Container 101 has only a host-routed interface and thus is not included in any Virtual Network. It is visible by any Containers and other hosts that can access the `eth0` adapter of physical server 1.
- Containers 102, 103, and 201 are united into Virtual Network A. They can communicate with each other and other hosts because on each physical server, Virtual Network A is assigned to the `eth0` adapter.
- Container 201 has two bridged adapters, with the second one included in Virtual Network B together with Container 202. Virtual Network B is not assigned to any interface on the physical server, and still Container 202 is able to communicate with the outer world thanks to the fact that Container 201 is bridged to `eth0` on the physical server through Virtual Network A. Of course, for this to be possible, all the bridged adapters of Containers 201 and 202 should belong to one and the same IP subnet.
- Virtual Network C with Containers 203 and 204 is another example of a Virtual Network defined locally on the physical server, but unlike Virtual Network B, its Containers can only see one another and no other hosts, because there is no bridging to any of the adapters of the physical server.
- Containers 205 and 301 are united into Virtual Network D through the respective adapters of their physical servers much like the Containers of Virtual Network A. However, Virtual Network D

is bridged not to the physical interface on both of the physical servers, but to the VLAN interfaces created on the physical ones. This results in the isolation of Containers 205 and 301 within this VLAN so that they are visible to each other but not to any other external hosts.

- Virtual Network E is the most complex example on this scheme. The Virtual Network is not assigned to any of the physical server's interfaces, so it remains local for the physical server. In addition to its inclusion in Virtual Network E, Container 302 enjoys a host-routed interface, so it can effectively communicate with the outer world. But what about Container 303? Unlike Container 202 in Virtual Network B, it cannot be simply included in a single IP subnet with the bridged interface of its fellow Container that would be bridged, in its turn, to the physical server's interface. For Container 303 to be able to go outside the limits of the Virtual Network, network fine-tuning should take place. In particular, the Ethernet frame that is sent by Container 303 to an external host should come to Container 302, lose its framing, thus becoming a pure IP packet, be routed through the host-routed interface of Container 302 to the physical server's adapter eth0, put on a new framing to become again an Ethernet frame (different from the original one because the source MAC address becomes that of the physical server, and not that of Container 303), and go further. Paving the way for a response to get successfully to Container 303 is also a challenge. Thus, if you are not a network guru, chances are Container 303 will remain isolated in the scope of Virtual Network E. Luckily, Virtuozzo Automator provides easier ways of setting up your network, as was illustrated above.

Note: Any interface on the physical server can be assigned to only one Virtual Network. If you need to create more Virtual Networks on one physical server, either use more physical adapters or create VLANs.

Listing Virtual Networks on Physical Server

To access the screen, go to **Infrastructure** > physical server > **Network** tab > **Virtual Networks** subtab.

The **Virtual Networks** screen displays a general list of virtual networks available in Virtuozzo Automator. The information on virtual networks is presented in the table having the following columns:

Column Name	Description
Virtual Network	The name assigned to the virtual network during its creation.
Connection Status	Indicates the virtual network status: <ul style="list-style-type: none"> <i>Not Configured</i>. The virtual network is not connected to any of this physical server network adapters. <i>Local</i>. The virtual network is set for the usage on the physical server only cannot be connected to external networks. <i>Connected</i>. The virtual network is connected to this physical server network adapter. The Assigned Interface column indicates the name of the chosen network adapter.
Network Description	The description of the virtual network, if set.

Assigned Interface	If the virtual network is connected to some network adapter on this physical server, the name of this adapter is displayed.
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Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

Operations Available

- Create a new virtual network. Click the **New Virtual Network** link.
- View and edit the virtual networks details. Click its name in the table.

Note: To delete a virtual network, go to **Resource Library > Virtual Networks** (p. 224).

To facilitate your working with virtual networks, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the fields provided and click **Search**. The Virtual Networks matching the specified criteria will be displayed in the **Connections** table. To have the full list of virtual networks back, click **Reset Results**.
- Configure the number of columns to be displayed in the **Connections** table. To this effect, click the **Select Columns** link and clear the check boxes near the column names that you wish to hide.
- Change the virtual networks order by clicking the corresponding column name in the **Connections** table.
- Modify the number of network adapters simultaneously displayed in the **Connections** table by clicking the **10, 20, 40, or 80** link at the top of the table.

Creating Virtual Network on Physical Server

The aim of the virtual network is to group virtual environments within one physical server or between several physical servers and to provide all virtual environments with common network configuration.

To access the **New Virtual Network** screen, go to **Infrastructure > physical server > Network tab > Virtual Networks** subtab and click the **New Virtual Network** link.

On the **New Virtual Network** screen, you can create a new virtual network. To this effect, you should provide the information in the following fields:

- **Virtual Network Name** (mandatory): specify an arbitrary name to be assigned to the virtual network.
- **Description** (optional): provide the virtual network description, if necessary.

The **Assign Interface** section enables you to configure the following Virtual Network parameters:

- Select the **Not Configured** option if you do not wish to connect the virtual network to any network adapter on this physical server. After the creation, the virtual network's status will be *Not Configured*.
- Select the **Connect via** option and specify the network adapter you wish to connect the virtual network. The drop-down menu lists all physical and VLAN adapters available on the physical server. After the creation, the virtual network's status will be *Connected*.
- Select the **Use on the Node only** option if you do not plan to connect the virtual network to external networks, however, wish to unite some of your virtual environments inside this virtual network to allow these virtual environments to communicate with each other.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

After you have entered the necessary information, click the **Submit** button to create the virtual network. After a while, the newly created virtual network will be displayed on the **Virtual Networks** screen.

Viewing Virtual Network Details

To access the **Virtual Network** screen, go to **Infrastructure** > physical server > **Network** tab > **Virtual Networks** subtab and click the virtual network name in the table.

The **Virtual Network** screen allows viewing the following information:

- The **General Settings** group displays the name and description of the virtual network and indicates whether the virtual network is connected to some network adapter on this physical server (*connected* status), set for usage on this physical server only (*local*), or not configured. To change network interface settings, click the **Configure** button.
- Under **Connected Containers**, you can view the Containers that were added to this virtual network. The list provides extended info on the Containers just like it is presented in the physical server's **Virtual Environment** list.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

Configuring Virtual Network Parameters on Physical Server

The **Configure** screen for the selected virtual network is displayed on clicking the **Configure** button on the details screen for this virtual network.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

The **Assign Interface** section enables you to configure the following Virtual Network parameters:

- Select the **Not Configured** option if you do not wish to connect the virtual network to any network adapter on this physical server. After the creation, the virtual network's status will be *Not Configured*.
- Select the **Connect via** option and specify the network adapter you wish to connect the virtual network. The drop-down menu lists all physical and VLAN adapters available on the physical server. After the creation, the virtual network's status will be *Connected*.
- Select the **Use on the Node only** option if you do not plan to connect the virtual network to external networks, however, wish to unite some of your virtual environments inside this virtual network to allow these virtual environments to communicate with each other.

Listing Virtual Networks in Server Group

To access the **Virtual Networks** screen, go to **Resource Library > Virtual Networks**.

The **Virtual Networks** screen displays all the virtual networks that were created in the VA infrastructure. The virtual networks may have been created either locally on a particular Slave physical server, or from the Resource Library. However, the **Virtual Networks** screen does not provide information on the virtual networks connection statuses. The information on this screen is for the management purposes only.

when you create a new virtual network in the Resource Library, it also appears on the **Virtual Networks** list (p. 221) of every VA physical server. To view this list, go to **Infrastructure > physical server > Network tab > Virtual Networks** subtab. For the physical servers, the newly created virtual network exists in the *Not Configured* status and cannot be used for grouping virtual environments until you configure its properties and bind it to the physical server network adapter (p. 223).

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

The information on **Virtual Networks** is presented in the table having the following columns:

Column Name	Description
Name	The name assigned to the virtual network.
Description	The description of the virtual network, if set.

Operations Available

- **New Virtual Network** link. Create a new virtual network.
- **Delete** link. Delete any of the existing virtual networks. If the virtual network was bound to a physical server network adapter, the adapter will be released and available for connecting to other virtual networks.
- Change the virtual network description by clicking its name in the table.

To facilitate your working with virtual networks, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The Virtual Networks matching the specified criteria will be displayed in the **Virtual Networks** table. To have the full list of Virtual Networks back, click **Reset Results**.
- Configure the number of columns to be displayed in the **Virtual Networks** table. To this effect, click the **Select Columns** link and clear the check boxes near the column name(s) that you wish to hide.
- Change the Virtual Networks order by clicking the corresponding column name in the **Virtual Networks** table.
- Modify the number of network adapters simultaneously displayed in the **Virtual Networks** table by clicking the **10**, **20**, **40**, or **80** link at the top of the table.

Creating New Virtual Network

The aim of the virtual network is to group virtual environments within one physical server or between several physical servers and to provide all virtual environments with common network configuration.

To access the **New Virtual Network** screen, go to **Resource library > Virtual Networks** and click the **New Virtual Network** link.

On the **New Virtual Network** screen, you can create a new virtual network. Provide the information in the following fields:

- **Virtual Network Name** (mandatory). Specify an arbitrary name to be assigned to the virtual network. This can be any name to your like.
- **Description** (optional). Provide the virtual network description, if necessary.

After you have entered the necessary information, click the **Submit** button to create the virtual network. After a while, the newly created virtual network will be displayed on the **Virtual Networks** screen.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

Configuring Virtual Network Parameters

The **Manage Virtual Network** screen allows you to change the description of a virtual network.

To access the screen, go to **Resource Library > Virtual Networks** and click the name of the Virtual Network whose name you wish to modify. To provide a new description for the virtual network, type the needed text in the **Description** field and click the **Submit** button.

Managing Container Network Parameters

This section describes how to view (p. 226) and configure (p. 226) Container network parameters.

Viewing Container Network Parameters



The **Summary** subtab (displayed on clicking the **Network** tab on the Container dashboard) shows the current Container network parameters. The **Global Network Configuration** parameters are relevant for both host-routed and bridged Container adapters, while the **Routed Network** and **Bridged Network** sections refer to respective adapters only.

Field	Description
Global Network Configuration	
Hostname	The hostname assigned to the Container.
DNS Servers	One or more DNS servers the Container is supposed to use (might be overridden if the Container gets the DNS servers from the DHCP server when operating in the bridged network mode).
Search Domains	A list of domains for hostname lookup (might be overridden if the Container gets the search domains from the DHCP server when operating in the bridged network mode).
Netfilter Mode	(Virtuozzo nodes only.) The netfilter mode set for the Container.
Routed Network	
IP Addresses/Subnet Masks	The IP addresses and subnet masks assigned to Container's host-routed adapter.
Bridged Network	
Virtual Network	The virtual network where the virtual network adapter is connected. Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to Managing Virtual Networks (p. 218).
MAC Address	The Mac address assigned to the virtual network adapter.
IP Addresses	The IPv4 or IPv6 address(es) assigned to the virtual interface. One virtual interface can have up to two IP addresses, however the IP addresses should be of different versions: one IPv4 and one IPv6 address.
Default Gateway	The default gateway set for the virtual interface.





To configure these parameters, click **Configure**.

Configuring Container Network Parameters

The **Configure Network** screen displayed after clicking the **Network** tab on the Container dashboard and then clicking **Configure** on the Virtuozzo Automator action menu allows you to configure the following Container network settings as follows:

- Under the **Global Network** group, you can:
 - Modify the Container hostname in the **Hostname** field. You can type any name you consider suitable, however, pay attention to the existing limitations on the use of symbols in the Container hostname.  For a Windows physical server, the hostname may start singularly with a-z, A-Z or an underscore (_), contain further any of the following symbols: a-z, A-Z, 0-9, _ , - and have a-z, A-Z, 0-9 or _ at the end. The maximum number of symbols is 15.  For a Linux-based Container, the hostname should consist of a-z, 0-9, _ , and may have a point in the middle. The number of symbols should not exceed 256.
 - Enter one or more DNS server IP addresses that this Container is supposed to use in the **DNS Server IP Address** field or leave it blank. Use the add and remove icons. Note that the static values in these fields might be overridden if the Container gets the DNS servers from the DHCP server when operating in the bridged network mode.
 - Define a list for hostname lookups in the **Search domain** field. The search list is normally determined by the domain name(s); by default, it contains the local domain name(s) only. You can also add external domain names for a particular Container. A search query is performed by attempting to use each item in the list in turn until a match is found. Note that this process may be slow and may generate a lot of network traffic if the servers for the listed domains are not local, and that the query might time out if no server is available for one of the domains. Note also that the static values in these fields might be overridden if the Container gets the search domains from the DHCP server when operating in the bridged network mode.
 - (Virtuozzo nodes only.) Select the netfilter mode in the **Netfilter Mode** drop-down list.

The parameters defined under **Global Network** will apply to the virtual environment regardless of whether it is on a bridged network or depends on the physical server network interface.

- Select the **Routed Network** check box to make the default Container network adapter (venet.0) operate in the host-routed. In this mode the Container uses the physical server physical adapter as the default gateway to send and receive data to/from other networks. If the **Routed Network** check box is selected, you can specify an IP address ( and a subnet mask) to be assigned to the Container in the **IP Address / Subnet Mask** fields. The field for the subnet mask is slash-separated from the IP address field. You can assign several IP addresses and, consequently, subnet masks (for a Windows-based Container) to the Container by clicking the add icon to the right of the field containing the information on Container IP addresses ( and subnet masks). Clicking the remove icon near the field with the information on Container IP addresses ( and subnet masks) will remove the corresponding IP address and subnet mask (for a Container running Windows) assigned to the Container.  You can leave the **Subnet Mask** field blank after you provide an IP address for the Container. Virtuozzo Automator will use the default 255.255.255.255 subnet mask for the corresponding IP address.

Note: If you have previously consolidated the IP addresses available on your physical server into a range, it is recommended to check those of them that were assigned to virtual environment - when creating or configuring - on the **Allocated IPs** screen so that to be aware of the IP addresses already on use.

- Select the **Bridged Network** check box to make the Container virtual network adapters (except for the default one) operate in the bridged mode. When functioning in this mode, the Container

can be connected to any of the virtual networks existing on the physical server and joined through them to external networks. If the **Bridged Network** check box is selected, you can:

- Add a new virtual adapter by clicking the **Add New Interface** link and providing the necessary information in the displayed fields.
- Connect the virtual network adapter to any of the existing virtual networks on the physical server by choosing the corresponding virtual network name on the drop-down menu in the **Connect to** field.

Note: To learn more about the notion of virtual networks and their relation to physical adapters, VLAN adapters, and virtual environments, please refer to **Managing Virtual Networks** (p. 218).

- Allow the network adapter automatically receive a MAC address or assign it manually by selecting the appropriate option in the **MAC Address** field.
- Select the **DHCPv4** or **DHCPv6** check boxes to automatically assign IP addresses to the Container adapter using the DHCP protocol. You can choose to automatically assign IP addresses of both versions to one network interface. Or you can manually specify IPv4 or IPv6 addresses with the subnet mask and default gateway.

Important: If a network interface has two IP addresses, they must be of different versions: one IPv4 and one IPv6 address.

After configuring the necessary Container network parameters, click the **Submit** button for the changes to take effect.

Managing Container Firewall



A firewall is part of your OS and its security. Its main function is to block or permit traffic between two systems or two parts of a network. The Virtuozzo Containers software has a built-in firewall that can be managed through both Virtuozzo Power Panel and Virtuozzo Automator. Along with - and apart from - the Virtuozzo Power Panel and Virtuozzo Automator web interface, the command line is an effective tool to manage a firewall. Here are the basic principles that make a firewall work.

A firewall applies a control *policy* over the firewalled system. There are three policies:

- *accept* the packet: if the packet is accepted, it gains access to the system;
- *drop* the packet: if the policy is to drop the packet, the packet is denied access to the system;
- *reject* the packet: the system does not let the packet in, notifying the sender of the fact;

You can set one of the three policies when creating (p. 234) or editing (p. 234) an access rule in the advanced mode.

The policies, along with ports and protocols, are chains' attributes. A *chain* is a list (or a chain) of rules grouped by the criterion of what type of packets they process. There are three packets types:

- *input*;
- *output*;

- *forward*.

Therefore we can create three chains - the Input chain, the Output chain and the Forward chain. The Input chain examines the incoming packets. If there is a rule to process a packet, the latter is either let in (accept policy) or not (drop/reject policy). Otherwise, the packet is examined by the next rule. If, finally, there is not any rule to match, the default system policy is applied. The first rule applied to a packet is the first one on the list that forms a chain.


If a packet is created inside the system, it is sent to the Output chain.

Packets that pass through the system, traverse the Forward chain.

When configuring a firewall, you can change a rule's position on the list, delete a rule from the list, create, edit and add rules to the list.

To configure the firewall, click on the **Firewall** link on the Container dashboard.

Configuring Firewall in Normal Mode

 In the normal mode, the rules you delete or add are called *access rules*. The Container access rules are pre-set groups of standard firewall rules. Each access rule refers to a most widely used service and corresponds to a number of standard firewall rules that ensure the availability of this service. In the normal mode, each access rule is dealt with as a single entity. This implies that enabling or disabling an access rule results in enabling or disabling all the standard firewall rules it corresponds to. By default, 8 preset access rules are active:

- 1 Access to outer world;
- 2 DNS server;
- 3 Internal Services;
- 4 Mail server;
- 5 Plesk service;
- 6 POP3 server;
- 7 SSH server;
- 8 WEB server.


The remaining access rules that are not enabled by default can be added on the page, which you can access by clicking **Add Access Rule**.

To delete a rule, select one of the check boxes on the right of the screen, click **Delete** over the check boxes, and then **OK** to confirm. To delete all the rules, select the uppermost check box, click **Delete** over the check boxes, and then **OK** to confirm. Note that no access rules can be permanently deleted from the system. A *deleted* rule is, in fact, temporarily disabled and can be enabled back as described on the **Adding Access Rule in Normal Mode** subsection (p. [230](#)).

To change the mode, click **Firewall Setup**.

Note: If this page informs you that you cannot manage firewall on this Container, refer to the **Dealing With Misconfigured Firewall** subsection (p. 230).


Dealing With Misconfigured Firewall

 If your firewall has not been configured yet, you will most probably have the page informing you of the fact. The page can also appear if you did misconfigure your firewall. The common way to misconfigure a firewall is to add or edit your own specific rules in the advanced mode and then switch to the normal mode without deleting these rules first.


At this point you will have to decide upon one of two basic strategies: to select the normal mode or to select the advanced mode:

- select the normal mode to deny all services except those critical to connecting to the Internet. To select the normal mode, click **Switch the firewall back to the normal mode**.
- select the advanced mode to create a rule to permit, deny, or monitor the access to or from the system for each service you need. If you are going to separately edit each rule, click **Select the advanced firewall mode**.

Adding Access Rule in Normal Mode

 To open this page, follow the **Add Access Rule** link on the **Firewall** page. Here you have the rules that have not been included into the list of active rules you can see on the **Firewall** page. To *add* a rule here means actually to *enable* it. To add a rule, select a check box on the opposite and click **Submit** - or **Cancel** if you want to restore the firewall settings prior to the last action.

Selecting Mode

 If you have only just started using the firewall by clicking the **Firewall** link on the Container dashboard, the **Firewall Setup** page is the first one you have displayed.

On the **Firewall Setup** page, you can choose one of the following modes your firewall operates in:


- The normal mode. If the security strategy you are planning out does not require a complicated system of specific rules and all you are going to do is as simple as providing your system with access to the Internet and the maximum safety, then the best option is the normal mode. Hence, select the normal mode to configure your firewall using the 8 built-in access rules (p. 229) or to fix the firewall rules settings corrupted either in the advanced mode or in the normal mode.
- The advanced firewall mode with default policy Accept, or the advanced firewall mode with default policy Drop. The advanced mode takes more time and experience to configure, but then there is more flexibility and potential in it to make use of.

Besides, the **Firewall Setup** page can be reached with the **Firewall Setup** link from both advanced and normal mode pages. If so, the choice is quite the same. The only difference is that in

this case the normal mode can also be used as an option if you want to roll back the changes in the firewall rule(s) settings you have made.

After selecting a mode, click **Submit**. Click **Cancel** to return to the previous screen.

Building Input Chain

 To build and edit the *Input Chain*, select the **Input** tab. When you click either **Advanced firewall mode with default policy Accept** or **Advanced firewall mode with default policy Drop**, on the page described in the **Selecting mode** subsection (p. 230), the first chain of rules is the *Input Chain*. The *Input Chain* is a set of rules for the incoming traffic. If you once applied **Normal firewall mode** before selecting **Advanced firewall mode with default policy Accept/Drop**, the input chain consists of 13 default rules. If you selected **Advanced firewall mode with default policy Accept/Drop** while configuring the Container firewall at the first time, the input chain has the default system policy access rule only.

Here you can edit, add, delete, enable, disable, filter or change its position in the list of any of the default rules. In case you need to come back to the original advanced mode settings, the default rules are:

- 1 Web server input;
- 2 SSH server input;
- 3 Mail server input;
- 4 POP3 server input;
- 5 DNS server tcp input;
- 6 DNS server udp input;
- 7 All tcp input for hi port allowed;
- 8 All udp input for hi port allowed;
- 9 Plesk Panel proxy input;
- 10 Plesk Panel direct input;
- 11 Loopback tcp input;
- 12 Loopback udp input;
- 13 Default system policy.



Note: If, for some reason, you need to have this rule set back, click **Firewall setup** and select the **Normal firewall mode** radio button.

The table below describes the attributes of the rules in the chain:

Name	Description
Name	The name of a specific web service this rule applies to.
Policy	One of three policies: Accept, Drop or Reject (p. 228).


Protocol	One of two protocols used for package transmission - Transmission Control Protocol (TCP), defined by IETF RFC793 or User Datagram Protocol (UDP), defined by IETF RFC768.
Source Address	The internal address of the packets (e.g.: IPv4 or IPv6 address, the name of a network interface, etc.).
Source Port	The internal port of the packets.
Destination Address	The address where the packets are sent to.
Destination Port	The port where the packets are sent to.
Enabled	The current status of the rule (Enabled/Disabled). The green circle with a tick stands for "enabled", the red circle with a cross stands for "disabled".
Move	Moving the rule a level up or a level down from its current position.

The default system policy access rule cannot be changed as this rule decides the packet's destiny - to accept or to drop - when the packet has not any other rule to be processed by.

To edit a rule, click its name in the **Name** column. To add - or replace - a specific rule, click **New Rule**. To disable, enable or delete a rule, select its check box and then click **Disable**, **Enable** or **Delete**. To move a rule a level up, click . To move a rule a level down, click . To filter rules by the policy, the protocol, or the current status, click the **Show Search** link. You can have Virtuoizzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

You can also switch to the normal mode by clicking **Firewall setup** and selecting normal mode there.

Building Output Chain

 To build and edit the Output Chain, select the **Output** tab. The output chain regulates the outbound access. If you once applied **Normal firewall mode** before selecting **Advanced firewall mode with default policy Accept/Drop**, the output chain consists of 13 default rules. If you selected **Advanced firewall mode with default policy Accept/Drop** while configuring the Container firewall at the first time, the output chain has the default system policy access rule only.

The default rules list is the same as in the **Input Chain** (p. 231), the only difference being the *output*, instead of the *input* characteristic of the rules. The list of rules on this page is this:



- 1 Web server output;
- 2 SSH server output;
- 3 Mail server output;
- 4 POP3 server output;
- 5 DNS server tcp output;
- 6 DNS server udp output;
- 7 All tcp output allowed;

- 8 All udp output allowed;
- 9 Plesk Panel proxy output;
- 10 Plesk Panel direct output;
- 11 Loopback tcp output;
- 12 Loopback udp output;
- 13 Default system policy.

The default system policy access rule cannot be changed as this rule decides the packet's destiny - to accept or to drop - when the packet has not any other rule to be processed by.

If, for some reason, you need to have this rule set back, click **Firewall setup** and select the **Normal firewall mode** radio button.

The attributes of the rules in the chain are described on the **Building Input Chain** subsection (p. 231).



Here you can edit, add, delete, enable, disable, filter or move in the list any or all of the 13 default rules the output chain consists of. To edit a rule, click its name in the name column. To add a specific rule, click **New Rule** in the **Actions** group. To disable, enable or delete a rule select its check box and then click **Disable**, **Enable** or **Delete**. To move a rule a level up, click . To move a rule a level down, click . To filter rules by the policy, the protocol, or the current status, click the **Show Search** link. You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

You can also switch to the normal mode by clicking **Firewall Setup** and selecting normal mode there.

Building Forward Chain



To build and edit the Forward chain, select the **Forward** tab. Unlike the Input and Output chains, the only default rule the forward chain has is **Default system policy**. Conceivably, this one is not to be edited or deleted. Instead, you are free to decide upon any number and kinds of specific rules to create and add to the Forward chain by clicking on the **New Rule** link in the **Actions** group.


After the number of rules in your Forward chain becomes bigger, you may need to sort them out. To do that, click the **Show Search** link and pick the three possible values from the three drop-down menus: the policy, the port, and the current status of the rule(s). You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not. Click  to take a rule a level up its current position in the chain, or  to relocate it a level down. If two or more rules can be applied to the given packet, the uppermost rule takes priority.

The attributes of the rules in the chain are described on the **Building Input Chain** subsection (p. 231).

To switch to the normal mode of managing the firewall, click **Firewall Setup** link in the **Actions** group.


The default forward chain policy is the policy selected on the **Firewall Setup** (p. 230) menu.

Adding Rule in Advanced Mode

 To get to this page, click the **Add Rule** icon on the **Input Chain** (p. 231), **Output Chain** (p. 232), or **Forward Chain** (p. 233) pages. On this page, you can elaborate your own specific rule. Below are the basics of the advanced mode rules adding:

- the **Name** field is marked because this field is an obligatory one;
- select one of three policies: Accept, Drop or Reject;
- select one of two protocols for package transmission - Transmission Control Protocol (TCP), defined by IETF RFC793 or User Datagram Protocol (UDP), defined by IETF RFC768.
- **Source Address and Netmask, Source Port or Port Range, Destination Address and Netmask** and **Destination Port or Port Range** fields are left to your own discretion, but in case of an error there is a pink stripe over the field that has to be corrected;
- the standard format for **Source/Destination Address and Netmask** field is 1.2.3.4/255.255.23.4;
- the standard **Port range** format is 80-123;
- to enable a rule, select the **Enable** check box;
- if you are creating this rule for future purposes, clear this box;
- to include the rule into one of three chains, select Input, Output, or Forward on the drop-down menu;
- on the **The rule's position in the chain** drop-down menu you are to decide what priority this rule will have in its chain. There are two options for you to choose between: the bottom and the top of the chain;
- for the changes you have made to become operational, click **Submit**, to undo the changes and return to the previous page, click **Cancel**.

Editing Rule in Advanced Mode

 The main difference here from the operations described in the **Adding Rule in Advanced Mode** subsection (p. 234) is that the rules you edit are not those you create as you deem it expedient. If you edit a rule (with the exception of renaming it), the rule changes and works differently from the way it did. Before submitting the new settings make sure they meet your security strategy. Otherwise, click **Cancel**.

The other detail to be aware of is the possible consequences of changing the initial (default) firewall settings. If you feel your expertise in the security area permits some future development, do not change them at all. Applying the changes you are not completely certain of may decrease your system's security.

Managing IP Pools

The **IP Pools** tab of the **IP Pools** screen (accessible through clicking the **IP Pools** link on the Virtuozzo Automator left menu and going to the **IP Pools** tab) allows you to manage the IP pools for virtual environments, thus, helping you to ensure a unified space of virtual environment IP addresses within one or several physical servers running Virtuozzo Containers or Virtuozzo virtual machines technology.

The **IP Pools** table on this screen presents detailed information on the IP pools currently created in Virtuozzo Automator:

Column Name	Description
Name	The name of the IP pool.
Description	The description of the IP pool.
IP Address Ranges	The range of IP addresses belonging to the IP pool.
Assigned Hardware Nodes	The physical servers assigned to the IP pool.
Enabled	This column shows whether the IP pool is enabled or not.

To facilitate working with IP pools, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The ranges matching the specified criteria will be displayed in the **IP Pools** table on the **IP Pools** screen. To have the full list of IP address ranges back, click **Reset Results**.
- Configure the number of columns to be displayed in the **IP Pools** table. To this effect, click the **Select Columns** link, clear the check boxes near the column name(s) that you wish to hide, and click **Save**.

To create a new IP pool, click the **New IP Pool** icon.

To disable an IP pool, click the IP pool name displayed in the **Name** column. When the IP pool configuration screen appears, click the **Configure** icon in the **Tasks** section, clear the **Enabled** check box, and click **Save**.

Reviewing IP Pools

The **Summary** tab of the **IP Pools** screen (accessible through clicking the **IP Pools** link on the Virtuozzo Automator left menu) provides you with general statistics about the IP pools created for virtual environments:

- the total number of IP pools created for virtual environments
- the number of enabled and disabled IP pools
- the total number of IP addresses belonging to the IP pools
- the number of leased and free IP addresses

To create a new IP pool, click the **New IP Pool** icon.

Creating New IP Pool

The **New IP Pool** page enables you to create a new IP address pool.

General Settings

Determine the name of the new IP pool and provide a description if needed.

IP Address Ranges

Determine the range of the IP addresses for the IP pool. You can create several ranges. To do that, click the icon with the green plus, that is located on the right from the **Range Mask** field. If you changed your mind and decided to delete one of the pools, just click the icon with the red cross opposite the pool you no longer need. In the **Range Mask** field, specify the mask that would define the IP address.

In the **First IP Address** field, type the address from which the IP range will start.

In the **Last IP Address** field, type the final address that will end up the range of all available IP addresses.

Network Interface Settings

To set up the connection between the virtual environment and the network, specify the network interface settings. Specify the network, gateway parameters and DNS Server IP addresses of the appropriate network interface which IP addresses will be used.

Assigning Hardware Nodes

In this subsection, you can specify the physical servers that will use the IP addresses from this pool. You can add or remove the physical servers by using the corresponding buttons below the table. Currently, only physical servers running the Virtuoizzo Containers technology can be chosen.

Having specified all the parameters, click **Save**.

Viewing Leased IP Addresses

IP Addresses from All IP Pools

The **Leased IP Addresses** screen list the IP addresses from all IP pools that have been already assigned to the virtual environments (either during the virtual environment creation or while configuring these virtual environments afterwards). You can access the screen by clicking the **IP Pools** menu from the Left menu tree and then switching to the **Leased IP Addresses** tab.

The information on the leased IP addresses is presented in the table having the following columns:

Column Name	Description
Hardware Node	The physical server hosting the virtual environment with the specific IP address.
Virtual Environment	The virtual environment to which the IP address is assigned.
IP Address	The leased IP address.
IP Pool	The IP pool to which the IP address belongs.

To facilitate working with leased IP addresses, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The IP addresses matching the specified criteria will be displayed in the **Allocated Ranges** table on the **Network Configuration** screen. To have the full list of allocated IP address ranges back, click **Reset Results**.
- Configure the number of columns to be displayed in the **IP Address** table. To this effect, click the **Select Columns** link and clear the check boxes near the column names that you wish to hide.

IP Addresses from Specific Pool

The **Leased IP Addresses** screen list the IP addresses from a specific IP pool that have been already assigned to the virtual environments (either during the virtual environment creation or while configuring these virtual environments afterwards). To access the screen, choose the **IP Pools** menu from the left menu tree, switch to the **IP Pools** tab and choose the IP pool which IP addresses you need to view. Switch to the **Leased IP Addresses** tab.

The information on the leased IP addresses is presented in the table having the following columns:

Column Name	Description
Hardware Node	The physical server hosting the virtual environment with the specific IP address.
Virtual Environment	The virtual environment to which the IP address is assigned.
IP Address	The leased IP address.

To facilitate working with leased IP addresses, you can:

- Filter them by the parameters listed in the table above. To this effect, click the **Show Search** link over the table, enter the needed data in the field(s) provided and click **Search**. The IP addresses matching the specified criteria will be displayed in the **Allocated Ranges** table on the **Network Configuration** screen. To have the full list of allocated IP address ranges back, click **Reset Results**.
- Configure the number of columns to be displayed in the **IP Address** table. To this effect, click the **Select Columns** link and clear the check boxes near the column names that you wish to hide.

Viewing IP Pool Summary Information

The **Summary** tab of the **IP Pool Configuration** screen provides you with the summary information on the selected IP pool and allows you to perform some main operations. To access this screen, choose **IP Pools** from the left menu tree, switch to the **IP Pools** tab and click the IP pool name in the list.

General Settings

The subsection shows the IP pool name, description (if any) and the status (enabled or not). The *enabled* status of the IP pool indicates that the pool can be used for the IP addresses allocation.

The IP pool status can be changed on its configuration screen. To this effect, click **Configure** (p. 239) in the **Tasks** subsection.

IP Addresses Ranges

The subsection shows the IP address ranges assigned to this IP pool. The number of ranges and the number of IP addresses they include can be changed on the IP pool configuration screen. To this effect, click **Configure** (p. 239) in the **Tasks** subsection.

Network interface Settings

The subsections shows the IP pool network settings. The settings can be changed on its configuration screen. To this effect, click **Configure** (p. 239) in the **Tasks** subsection.

Assigned To

The subsection shows the hardware nodes the IP pool is assigned to (if assigned).

Tasks

The subsections lists the actions available for this IP pool:

- **Configure**. Click this link to open the IP pool configuration screen and to change any of the IP pool settings.
- **Delete**. Click this link to delete the IP pool from the infrastructure.

IP Addresses Summary

The subsection shows the statistics of the leased and free IP addresses of this IP pool. By clicking the leased link, you open the list of the IP addresses within this IP pool and assigned to virtual environments.

Changing IP Pool Configuration

The **Configure** screen allows you to change the current settings of the chosen IP pool. To access this screen, choose **IP Pools** from the left menu tree, switch to the **IP Pools** tab, click the IP pool name in the list and click the **Configure** link in the **Tasks** subsection.

General Settings

In this subsection, change the IP pool name or description using the **Name** and **Description** fields, respectively. Note, that the IP pool name should be unique and descriptive.

Tick the **Enabled** check box to make the IP pool's addresses available for the distribution to the virtual environments.

IP Address Ranges

In this subsection, change the number of IP ranges by adding new or deleting obsolete ones. To add a new range, click the green plus icon. To delete a range, click the red cross icon beside the range you want to delete. Having added a new range, you should specify the first and the last IP addresses within this range. You can also change the first and the last IP addresses of an existing range.

- Type the IP address with which the new range will start in the **First IP Address** field.
- Type the IP address that will close the range of addresses in the **Last IP Address** field.

Network Interface Settings

In this subsection, change the network interface settings. These settings are responsible for the connection between the virtual environments. Specify the network, gateway parameters and DNS Server IP addresses of the appropriate network interface which IP addresses will be used.

Assigning Hardware Settings

In this subsection, you can specify the physical servers that will use the IP addresses from this pool. You can add or remove the physical servers by using the **Add** and **Remove Selected** buttons, respectively. Currently, only physical servers running the Virtuozzo Containers technology can be chosen.

Having specified the parameters, click **Save**.

Managing Network Accounting and Shaping

Virtuozzo Automator allows you to track the inbound and outbound network traffic as well as to shape (limit) the outgoing traffic for virtual environments. In order to provide the ability to distinguish between domestic and international traffic, a concept of network classes is introduced. It is important to fully understand this notion, because network classes IDs are used in essentially all network traffic parameters. A network class is a range of IP addresses for which the virtual environments software (Virtuozzo Containers and Virtuozzo virtual machines) counts and shapes the traffic.

Virtuozzo can have up to 15 different network classes specified. Each class can contain one or more IP address ranges. It is possible to have different bandwidth shaping settings for each class.

Each network class has an ID represented by an integer number and a range of IP addresses presented in the form of *ip_address/prefix_length* (which conforms to the Classless Inter-Domain Routing scheme).

Class 1 has a special meaning. It is defined by the Virtuozzo Containers software to match any IP address and is always present in the system. Other classes should be defined after Class 1. They represent exceptions from the "matching-everything" rule of Class 1.

Let us consider one of the possible situations. One of the classes (let it be the default Class 1) corresponds to the domestic traffic, and Class 2 is supposed to account for the foreign traffic. The foreign traffic goes through the addresses in two ranges: from 10.0.0.0 to 10.255.255.255 and from 11.0.0.0 to 11.255.255.255 with the exception of addresses in the sub-range of 10.10.16.0 to 10.10.16.255, which are treated as domestic traffic, as well as all other IP addresses. Then the classes configuration shall look like the following:

Class Definition	Explanation
1 0.0.0.0/0	Any IP address (all traffic)
2 10.0.0.0/8	Addresses for the "foreign" traffic
2 11.0.0.0/8	More addresses for the "foreign" traffic
1 10.10.16.0/24	Inside the "foreign" network there is a hole belonging to the "local" traffic

As far as the Class 2 addresses in this example are used for foreign routing, the Class 1 addresses are used for local (domestic) routing, by the exclusion method.

Managing Network Accounting and Shaping for Physical Servers

Virtuozzo Automator displays the current status and statistics for the network traffic consumed by virtual environments on registered physical server.

Traffic accounting service is available for Containers residing on the physical servers with Virtuozzo Containers or Server Bare Metal virtualization software. Traffic shaping for virtual machines is supported for Server Bare Metal 5 physical servers only.

The screen is displayed on the **Traffic** subtab of the **Network** tab of a physical server.


With traffic accounting service, you can always view the statistics on the network traffic going from and to the physical server for each of the network classes (p. 240) specified in the system. The statistics is garnered from the moment of the latest physical server boot-up and is displayed in the **Traffic Accounting** table.

The conception of traffic shaping presupposes the limitation of network bandwidth for the traffic going from the physical server to the outer world. The **Interfaces Configuration** table enumerates the network interfaces (Ethernet cards) installed on the physical server and their bandwidth limit. The most common Fast Ethernet cards have their traffic throughput limited at 100 Mbit/s, which would be indicated in the **Bandwidth** column as 102,400 Kbit/s.

Virtuozzo Automator can limit the network bandwidth not for the interface, but for each network class (p. 240) defined in the system and using the given interface. For this reason, the available network classes will be enumerated under each of the existing interfaces in the **Rates Configuration** table. The **Total Rate** column specifies the size of the so-called bandwidth pool for each network class being shaped for the given network adapter. The bandwidth from the pool can be borrowed by virtual environments when they need more bandwidth for communicating with hosts from the corresponding network class. It is used to limit the total available outgoing traffic virtual environments can consume. The default value for Network Class 1 on the first Ethernet adapter is 4Mbit/s.

As to the **Rate Guarantee** column, its value amounts to the number of kilobits per second any virtual environment is guaranteed to receive for outgoing traffic with the corresponding network class on the given Ethernet device. The default value is 8 Kbps, which means that any virtual environment is guaranteed to receive the bandwidth of at least 8 Kbits/s for sending data to Class 1 hosts on the first Ethernet device. This bandwidth is not the limit for a virtual environment (though it is possible to make it the limit) - the virtual environment is able to take the needed bandwidth from the bandwidth pool if it is not used by other virtual environments.

Apart from viewing the current state of affairs with the physical server traffic, the **Traffic** subtab allows you to do the following:

- Define the network classes for the physical server traffic by clicking the **Configure Accounting** button (p. 242);
-  Specify the bandwidth limit for the existing network interface cards by clicking the **Configure Interfaces** button (p. 242);
- Set up the traffic shaping rules for each network interface card on the physical server by clicking the **Configure Rates** button (p. 242);
- Enable traffic shaping for the physical server by clicking the **Enable Shaping** button;



Note: You can enable shaping only if you have already completed the first three actions on this list, namely: defined at least one network class, specified the bandwidth limit for the existing NICs, and configured the outgoing traffic rates for each 'interface-class' pair.

- Disable traffic shaping for the physical server by clicking the **Disable Shaping** button.

Setting Up Network Classes

To set up a network class, go to **Infrastructure** > physical server > **Network** tab > **Traffic** subtab and click the **Configure Accounting** button. The screen allows configuring traffic accounting by creating traffic accounting classes on the physical server and specifying the network for each class.

Virtuozzo Automator allows combining IPv4 and IPv6 addresses within a traffic shaping class. Since a traffic class can include several networks, you just need to add the appropriate networks being constituted of IPv4 and IPv6 addresses.

- The **Class ID** field should be filled with an integer from 0 to 15 representing the ID of the class.
- The **Network** field should indicate the hosts of what network are to be treated as belonging to the given class. The network should be specified in the Classless Inter-Domain Routing format, for example, 212.95.68.0/255.255.255.0 for IPv4 or address or 3ffe:1900:4545:3:200:f8ff:fe21:0000/112 for IPv6.
- The  sign allows you to add another **Class ID/Network** line, where you can either define an additional class or an additional network for an already existing class. In the latter case you will have two or more lines with one and the same class ID, but different networks.
- The  icon allows you to delete the given **Class ID/Network** line.

Configuring Network Adapters


The **Configure Interfaces** page (accessible by clicking the **Configure Interfaces** button on the **Traffic** subtab of the **Network** tab of a physical server) enables you to define which network adapters installed on the physical server will be taken into account by Virtuozzo network accounting and shaping policies.


This page lists all the network interface cards installed on the physical server together with their default (or assigned) bandwidth and IP addresses. You are able to manage these interfaces in two ways:

- 1 Select or clear the check box beside the corresponding adapter to include it in or exclude from being part of network accounting and shaping.
- 2 Adjust the bandwidth value to your liking. Mind though that it is recommended to leave the default hardware value, or at least not to increase it, because it might interfere with the correct working of network accounting and shaping. Another restriction in modifying this value consists in that you cannot make it lower than the **Total Rate** value (p. 240) of any class defined for the given interface.


Configuring Network Shaping

The **Configure Rates** page (accessible by clicking the **Configure Rates** button on the **Traffic** subtab of the **Network** tab of a physical server) allows you to set up all the parameters that define how much bandwidth will be accessible to the virtual machines residing on the physical server. Only the bandwidth for outgoing traffic is considered here.

 The page is split into separate groups for each of the network adapters present on the physical server and selected for being shaped on the **Configuring Interfaces** page (p. 242). If there is only one network adapter, it does not form any group. The following information is given and is customizable for each network adapter.

 The **Bandwidth** field specifies the total bandwidth limit of the adapter (in Kbits per second). The most common Fast Ethernet cards have their traffic throughput limited at 100 Mbit/s, which would be indicated in the **Bandwidth** field as 102,400 Kbit/s. The value in this field corresponds strictly to the value of the **Bandwidth** field on the **Configuring Interfaces** page (p. 242). Thus, it is the second place where you can adjust the total bandwidth throughput of the given network interface.

The Virtuozzo software can limit the network bandwidth not for the interface, but for each network class (p. 240) defined in the system and using the given interface. For this reason, the available network classes are enumerated under each of the existing interfaces. The **Total rate** field specifies the size of the so-called bandwidth pool for each network class being shaped for the given network adapter. The bandwidth from the pool can be borrowed by virtual environments when they need more bandwidth for communicating with hosts from the corresponding network class. It is used to limit the total available outgoing traffic virtual environments can consume. The default value for Network Class 1 on the first Ethernet adapter is 4096, which corresponds to the pool size of 4Mbit/s. Class 1 is always included in the shaping of all adapters, as this class matches all the network addresses not covered by other, user-defined classes. As to all the other classes, they can be excluded from the shaping if you clear the **Enable shaping for this class** check box, and included in the shaping if you select the check box.

 Finally, the value of the **Rate guarantee** field amounts to the number of kilobits per second any virtual environment is guaranteed to receive for outgoing traffic with the corresponding network class on the given Ethernet device. The default value is 8, which means that any virtual environment is guaranteed to receive the bandwidth of at least 8 Kbits/s for sending data to Class 1 hosts on the first Ethernet device. This bandwidth is not the limit for a virtual environment (though it is possible to make it the limit) - the virtual environment is able to take the needed bandwidth from the bandwidth pool if it is not used by other virtual machines.

Managing Network Shaping for Containers

The network shaping (setting limit on the available bandwidth for outgoing traffic) is generally defined for each Container on the given physical server on the **Configure Shaping** page in Virtuozzo Automator. The **Configure Traffic Shaping** page (which you can access by following the **Configure Network Shaping** link on the Container dashboard) allows you to redefine some of the shaping parameters for the given particular Container.

Network bandwidth management works in the following way. The bandwidth pool for a given network class (indicated on the page as **Bandwidth** for each network adapter) is divided among the Containers transmitting data proportionally to their **Rate Guarantee** settings. The global **Rate Guarantee** setting is defined on the **Configure Shaping** page, but can be redefined here in the **Container Rate Guarantee** field for this given Container. If the total value of the rate guarantees of all Containers transmitting data does not exceed the bandwidth pool value, each Container gets the bandwidth equal or greater than its rate guarantee (unless the **Use Container Rate Guarantee**

as **limit** radio button is not selected on this page). If the total value of the rate guarantees of all Containers transmitting data exceeds the bandwidth pool, each Container may get less than its rate guarantee.

It is clear from the above-said that the **Use class bandwidth as limit** radio button lets the Container exceed its rate guarantee, if there is enough spare bandwidth in the pool, whereas the **Use Container Rate Guarantee as limit** does not let it do so.

Worth to mention here that each network class beginning with 2 cannot be taken into account for the network shaping of this particular Container, if the **Enable shaping for this class** check box is cleared. The default state of this option (selected or cleared) depends on what has been chosen on the **Configure Shaping** page (p. 242).

Viewing Network Shaping Settings for Containers

The **Shaping** subtab of the **Network** tab allows you to view the shaping parameters for the given particular Container. These parameters can either be the default ones or customized already.

The presented table informs you of the Container shaping settings for each of the network classes (p. 240) configured on the physical server. If the table is not present, this means that either traffic shaping is disabled on the physical server, or no network classes are configured.

Tip. To configure network classes on a physical server, go to **Infrastructure** > physical server > **Network** tab > **Traffic** subtab.

The **Total Rate** field informs you on the bandwidth limit that is set for the corresponding class on the physical server, which means that the summary outgoing traffic of all the Containers of this physical server to the external addresses belonging to this class cannot exceed this value.

The **Rate Guarantee** value serves as the guaranteed rate for the given Container with this class of addresses (p. 240). Note though that if the total of all the **Rate Guarantee** values of all the Containers exceeds the **Bandwidth** value and all the Containers will demand traffic at the same moment, each Container will have to get less traffic than is guaranteed to it.

Configuring Network Shaping for Container

The network shaping (setting limit on the available bandwidth for outgoing traffic) is generally defined for each Container on the given physical server on the **Configure Shaping** page (p. 242). The **Configure Traffic Shaping** page (which you can access by clicking the **Configure** button on the **Shaping** subtab of the **Network** tab of the Container dashboard) allows you to define more precisely some of the shaping parameters for the given particular Container. To do this on Linux physical servers, you should first select the **Configure the Container rate guarantees manually** radio button in the **Rate Guarantees Setup** group of options.

Shaping is configured separately for each class. The default state of the **Enable shaping for this class** check box (selected or cleared) depends on what has been chosen on the **Configure**

Shaping page (p. 242). However, you can redefine if the shaping of this class should be turned on or off for this particular Container by setting this check box in the appropriate state.

The **Total Rate** field informs you of the bandwidth limit that is set for the corresponding class on the physical server, which means that the summary outgoing traffic of all the Containers of this physical server to the external addresses belonging to this class cannot exceed this value.

The **Rate Guarantee** value that you can set here will serve as the guaranteed rate for the given Container with this class of addresses (p. 240). Note though that if the total of all the **Rate Guarantee** values of all the Containers exceeds the **Bandwidth** value and all the Containers will demand traffic at the same moment, each Container will have to get less traffic than is guaranteed to it.



The **Do not allow to exceed the rate guarantees** check box, if selected, tells Virtuozzo Automator to keep the Container from getting more bandwidth than is defined in its **Rate Guarantee** values, even if there is spare bandwidth on the physical server for this class. Thus, you can efficiently impose bandwidth rate limits on any Container.

Managing Network Shaping for Virtual Machines

The network shaping (setting limit on the available bandwidth for outgoing traffic) is generally defined for each virtual machine on the given physical server on the **Configure Shaping** page in Virtuozzo Automator. The **Configure Traffic Shaping** page (which you can access by following the **Configure Network Shaping** link on the Container dashboard) allows you to redefine some of the shaping parameters for the given particular Container.

Network bandwidth management works in the following way. The bandwidth pool for a given network class (indicated on the page as **Bandwidth** for each network adapter) is divided among the Containers transmitting data proportionally to their **Rate Guarantee** settings. The global **Rate Guarantee** setting is defined on the **Configure Shaping** page, but can be redefined here in the **Container Rate Guarantee** field for this given Container. If the total value of the rate guarantees of all Containers transmitting data does not exceed the bandwidth pool value, each Container gets the bandwidth equal or greater than its rate guarantee (unless the **Use Container Rate Guarantee as limit** radio button is not selected on this page). If the total value of the rate guarantees of all Containers transmitting data exceeds the bandwidth pool, each Container may get less than its rate guarantee.

It is clear from the above-said that the **Use class bandwidth as limit** radio button lets the Container exceed its rate guarantee, if there is enough spare bandwidth in the pool, whereas the **Use Container Rate Guarantee as limit** does not let it do so.

Worth to mention here that each network class beginning with 2 cannot be taken into account for the network shaping of this particular Container, if the **Enable shaping for this class** check box is cleared. The default state of this option (selected or cleared) depends on what has been chosen on the **Configure Shaping** page (p. 242).

Viewing Network Shaping Settings for Virtual Machines

The **Shaping** subtab of the **Network** tab allows you to view the traffic shaping parameters for the given virtual machine. For more information, see **Viewing Network Shaping Settings for Containers** (p. 244).

Configuring Network Shaping for Virtual Machines

Network shaping (limiting of outgoing traffic bandwidth) is generally defined for each virtual machine on the given physical server on the **Configure Shaping** page (p. 242) which allows you to fine-tune shaping for the given virtual machine. For more information, see **Configuring Network Shaping for Containers** (p. 244).


Managing Email Gateway and Proxy Server

There happen situations when a user needs to contact/be contacted via email. The reasons to establish an email connection may be different, a password reminder among them. In order to enable such a connection as the physical server administrator, you have to set up an email gateway by specifying the IP address of the mail relay server to send notifications and other mail through.

The **Proxy** subtab of the **Network** tab of a physical server displays the IP addresses of the email gateway and proxy server of the physical server. To edit any of these, click the **Configure** button on this page or **Configure -> Proxy Settings** on the Virtuozzo Automator toolbar.

Specifying Proxy Server and Email Gateway

The **Configure Proxy Settings** page serves to configure the way a particular physical server communicates with the outer world. This page is called either by clicking the **Configure** button on the **Proxy** subtab of the **Network** tab of the corresponding physical server or selecting **Configure -> Proxy Settings** on the Virtuozzo Automator toolbar.

- In the **SMTP Relay Server IP Address** field, indicate the IP address or hostname of the SMTP mail server the current physical server uses to send emails. The reasons to establish an email connection may be different, a password reminder or an alert notification among them.
-  The **Proxy Server** field allows you to set or edit the proxy server IP address or hostname, if the current physical server uses a proxy server to establish external connections.

Click **Submit** to save your changes or **Cancel** to return to the **Proxy** subtab.

Managing Email Notifications Settings

To have the physical server send email notifications to external e-mail addresses, you can configure the Virtuozzo Automator mail settings.

Notifications are sent about changes to user accounts (passwords, usernames), statuses of pending requests to create virtual environments, and failure of VE/node backup and VE restart tasks.

For email notifications to work, a mail relay needs to be configured. For more information, see **Managing Email Gateway and Proxy Server** (p. 246).

The **Messaging** screen (in the **Setup** group on the left Virtuozzo Automator menu) shows the current configuration of email notification settings in Virtuozzo Automator:

- Whether email notifications are enabled or disabled in Virtuozzo Automator;
- The email address that will be shown in the **From:** field of email messages and used to identify you as the message sender by a person to which the email is sent (the **System Account** field).
- The e-mail address where the system will send administrative notifications (the **Administrative Account** field).

To edit any of these, click the **Configure** button on this page.

Configuring Email Notifications

To configure the email settings in Virtuozzo Automator, follow the **Messaging** link on the Virtuozzo Automator left menu and clicking the **Configure** button on the **Messaging** screen.

On the screen displayed, you should perform the following operations:

- 1 Enable the 'Email Notifications' functionality in Virtuozzo Automator by selecting the **Enable Email Notifications** check box.
- 2 Specify an e-mail address and arbitrary name that will be shown in the **From:** field of the message and used to identify you as the message sender by a person to which the email is sent. To this effect, under the **System Email Account** group on the **Configure** screen:
 - in the **Email User Name** field, specify the name you wish to be displayed in the **From:** field of the sent message;
 - in the **Email Address** field, indicate a valid email address to be displayed in the **From:** field of the sent message.

Note: While specifying the sender's e-mail address, make sure that the messages from this address can be accepted by the mail relay servers (p. 246) your physical servers use.

- 3** Specify your e-mail address and arbitrary name where the system will send administrative notifications. To this effect, under the **Administrator Email Account** group on the **Configure** screen:
- in the **Email User Name** field, specify the name to be displayed in the **To:** field of the system message;
 - in the **Email Address** field, indicate a valid email address where system notifications are to be sent.

To ensure the correct delivery of system e-mail messages, you should also have the correct SMTP relay servers (p. [246](#)) set for all the respective physical servers.

Managing Virtuozzo Containers OS and Application Templates

An OS or an application template is a set of original application files, repackaged for mounting over Virtuozzo File System. Virtuozzo templates allow to share resources among lots of virtual environments, thus enabling huge savings in terms of disk space and memory.


All Virtuozzo Containers templates are divided into OS templates and application templates.

OS templates are used to create new Containers. An OS template cannot be installed on a virtual machine, because any virtual machine is already based on some OS template. Typical examples of OS templates are templates containing Red Hat, SUSE, or Windows 2003 Server.

Application templates are added to Containers after the latter have been created; more than one application template may be installed on one and the same Container. Examples of application templates are the `msde`, `openssh`, `MSSql` templates on physical servers running Windows 2003 Server or `proftpd`, `MySQL` on physical servers running the Linux operating systems (for example, Red Hat 9), or a template with any other application (possibly more than one application in a single template) not included into the OS template.

Note: You cannot use the Virtuozzo OS and Application templates for managing virtual machines.

You may perform the following operations with OS/application templates in Virtuozzo Automator:

- List OS/application templates installed on the physical server;
- Delete those OS/application templates that are not needed any more;
- Install new OS/application templates on the physical server;
- Install/uninstall an application template to/from the virtual environment;
- View the properties of every OS/application template;
- View OS/application template version details.
-  Select an OS template to be used for creating new Containers by default.
- Update OS/application template to their latest versions;
- Download packages for EZ OS templates;
- Cache EZ OS templates.

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Managing OS Templates in Group Context


Virtuozzo Automator allows you to list OS templates installed on the physical servers registered in Virtuozzo Automator. They may be already used or not used by certain virtual environments. All OS templates installed on the physical servers are listed on the **OS Templates** page in the following table:

Column Name	Description
Name	The name of the OS template.
Version	The latest version of the OS template available for installation. Applicable to standard Container templates only, because EZ templates do not have versions.
Type	Denotes if it is a standard or an EZ template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates don't have versions and thus cannot be updates.
Description	The description of the OS template.
OS	The operating system the template is intended for.
Architecture	The microprocessor architecture.

To facilitate working with OS templates, you may have the **OS Templates** table display only those OS templates that have a particular name or word in their description or conform to some other criteria. On top of the table, click the **Show Search** link to display the fields where you can specify the parameters the OS templates should meet; then click on the **Search** link. To view all OS templates residing on your physical servers, click on the **Reset Results** link to the right of the parameter fields.

You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

With the help of the Virtuozzo Automator toolbar you can perform the following operations on OS templates:

- Upload a new template that you have locally and install it on a physical server registered in Virtuozzo Automator (the **New App/OS Template** button);
- Select some templates in the table and install them on one or more Virtuozzo Automator physical servers at once (the **Install to HNs** button);
-  Select some templates in the table and cache them on the physical servers where the templates are already installed (the **Cache on HNs** link);
- Delete those OS templates that are not needed any more. To this effect, select the check boxes opposite the OS templates you wish to delete and click the **Uninstall from HNs** button.

Note: If any virtual environment on your physical servers is based on the OS template you wish to delete, the OS template deletion will fail.


Clicking an OS template name opens the screen where you can cache the template packages and view detailed information (p. 251) on them.


Viewing OS Template Properties

The properties of OS templates are slightly different depending on whether it is a standard Virtuozzo OS template or an EZ template.

The description of the selected OS template is given at the top of the page, after which the **Summary** section provides additional details on the template:

Field Name	Description
Type	Denotes if it is a standard or an EZ Virtuozzo template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates do not have versions.
Architecture	The microprocessor architecture.
Platform	Denotes the operating system the template is intended for.
Supported technologies	Lists the technologies that the physical server must support for the template to work correctly. For more information see the description of the TECHNOLOGIES parameter in the Container Configuration File subsection of the <i>Virtuozzo Containers Reference Guide</i> .

The **Installed on HNs** section enumerates those physical servers where the given template has been installed. You have the possibility to select any number of physical servers in the table and either  cache the given template on these physical servers (the **Cache Template** button) or uninstall it from them (the **Uninstall Template** button).

 If you are going to cache the template, remember that, first, packages "included" in an EZ template are, actually, meta data pointing to what real packages and from what repository can be downloaded to the physical server to make the template work. Second, to be used for creating

virtual environments on its basis, any OS template has to be *cached*. Caching an OS template is preparing it for creating virtual environments on its basis. When you cache an OS template, you:

- download the packages its meta data refer to from the download repository to your physical server (applicable to EZ templates only);
- install them on the physical server;
- and compress them into a gzipped archive for further usage.


If the template has already been cached, clicking the **Cache Template** icon launches updating the cached templates.



If, before doing anything, you want to see what packages the OS template includes, open the **Packages** tab.

Managing Application Templates in Group Context

Virtuozzo Automator allows you to list application templates available in your data center by clicking **Resource Library-> Software -> Virtuozzo Container Software -> Application Templates**. The information on application templates is presented in the table with the following columns:

Column Name	Description
Name	The name of the application template.
Version	The latest version of the application template available for installation. Applicable to standard templates only, because EZ templates do not have versions.
Type	Denotes if it is a standard or an EZ template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates do not have versions.
Description	The description of the application template.
OS	Denotes whether this is a Windows or a Linux template.
Architecture	The microprocessor architecture.
 OS Name	The exact version of the operating system the template is intended for.

To facilitate working with application templates, you may have the Templates table display only those application templates that have a particular name or word in their description or conform to some other criteria. On top of the table, click the Show Search link to display the fields where you can specify the parameters your application template(s) should meet; then click on the Search link. To view all the application templates residing on your physical servers, click the Reset Results link to the right of the parameter fields.

You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

With the help of the Virtuozzo Automator toolbar you can perform the following operations on application templates:

- Upload a new template that you have locally and install it on a physical server registered in Virtuozzo Automator (the **New App/OS Template** button);
- Select some templates in the table and install them on one or more Virtuozzo Automator physical servers at once (the **Install to HNs** button);
- Select some templates in the table and add them to one or more virtual environments (the **Add to Containers** button);

Note: For a template to be added to a Container, it first should be installed on the physical server where the Container is hosted.

- Delete those application templates that are not needed any more. To this effect, select the check boxes opposite the application templates you wish to delete and click the **Uninstall from HNs** button.

Clicking an application template name opens the screen where you can view the detailed information on it.

Viewing Application Template Properties

The properties of application templates are slightly different depending on whether it is a standard Virtuozzo application template or an EZ template.

The template properties page can be accessed by the **Software** option in the **Resource Library** section from the left menu tree, then switch to the **Virtuozzo Container Software** tab and click the application template in the **Application Template** table.


The description of the selected application template is given at the top of the page, after which the **Summary** section provides additional details on the template:

Field Name	Description
Type	Denotes if it is a standard or an EZ template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates don't have versions.
OS Template	The OS template the given template is compatible with.
Platform	Denotes the operating system the template is intended for.

The **Installed on HNs** section enumerates those physical servers where the given template has been installed. You have the possibility to select any number of physical servers in the table and uninstall the given template from them (the **Uninstall Template** button). The table presents the following information:


Field Name	Description
Hostname	The name of the hosting physical server.

Description	The application template description, if any.
Default IP Address	The IP address that will be assigned to the Containers based on this template by default.
Product	The virtualization software product to which the template belongs.
VT	The technologies that the physical server must support for the template to work correctly.
OS	The type of the physical server operating system.
Operating System	The name and version of the physical server operating system.
Arch	The description of the processor model(s) installed on the server.
Status	The current status of the application template.

 If, before doing anything, you want to see what packages the application template includes, open the **Packages** tab.

Managing OS Templates in Physical Server Context


Virtuozzo Automator allows you to list OS templates installed on a particular physical server. They may be already used or not used by certain virtual environments. All OS templates installed on the physical server are listed on the **Container Software -> OS Templates** page of any physical server in the following table:

Column Name	Description
Name	The name of the OS template.
Version	The last version of the OS template available for installation. Applicable to standard Virtuozzo templates only, because EZ templates do not have versions.
Type	Denotes if it is a standard or an EZ Virtuozzo template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates don't have versions.
Description	The description of the OS template.
OS	Denotes the operating system the template is intended for.
Architecture	The microprocessor architecture.
 Cached	The standard OS template, when installed or updated, comes cached by default. So, the "Yes"/"No" value in this column is relevant mainly for OS EZ templates. If the value is "No", this means that to base virtual environments on this template you need to cache it first.


To facilitate working with OS templates, you may have the **Templates** table display only those OS templates that have a particular name or word in their description or conform to some other criteria. On top of the table, click the **Show Search** link to display the fields where you can specify the parameters the OS templates should meet; then click on the **Search** link. To view all OS templates residing on your physical server, click on the **Reset Results** link to the right of the parameter fields.


To show or hide certain columns, click the **Select Columns** link, select the parameters you want to be displayed or clear those you do not and click **Save**.

With the help of the toolbar located above the table you can perform the following operations on OS templates:

- install an OS template present as a file on the local computer to physical servers registered in Virtuozzo Automator by clicking **New App/OS Template**;
- install an OS template present on this physical server to other physical servers registered in Virtuozzo Automator by clicking **Install to HN**s;
-  prepare an OS template (be it EZ or standard) for creating virtual environments on its basis by selecting it and clicking **Cache**;
- delete those OS templates that are not needed any more from the physical server. To do this, select the check boxes opposite the OS templates you wish to delete and click **Uninstall**.

Note: If any virtual environment on the physical server is based on the OS template you wish to delete, the OS template deletion will fail.


-  update an OS template (be it EZ or standard) with new packages from the update repository by selecting it and clicking **Update**.

Clicking an OS template name opens the screen where you can  cache the template packages and view detailed information on them.

Viewing OS Template Properties

The properties of OS templates are slightly different depending on whether it is a standard Virtuozzo OS template or an EZ template.

The description of the selected OS template is given at the top of the page, after which the **Summary** section provides additional details on the template:

Field Name	Description
Type	Denotes if it is a standard or an EZ Virtuozzo template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates don't have versions.
 Cached	If the template is cached on a particular physical server, new virtual environments can be created on its basis on this physical server.
Architecture	The microprocessor architecture.
Platform	Denotes the operating system the template is intended for.
Supported technologies	Lists the technologies that the physical server must support for the template to work correctly. For more information see the description of the TECHNOLOGIES parameter in the Container Configuration File subsection of the <i>Virtuozzo Containers Reference Guide</i> .

The **Containers based on this OS** table at the bottom of the page enumerates those virtual environments that were created on the basis of the current OS template.

If you are going to cache the template, remember that, first, packages "included" in an EZ template are, actually, meta data pointing to what real packages and from what repository can be downloaded to the physical server to make the template work. Second, to be used for creating virtual environments on its basis, any OS template has to be *cached*. Caching an OS template is preparing it for creating virtual environments on its basis. When you cache an OS template, you:

- download the packages its meta data refer to from the download repository to your physical server (applicable to EZ templates only);
- install them on the physical server;
- and compress them into a gzipped archive for further usage.

If the template has already been cached, clicking the **Cache** icon launches updating the cached templates.



If, before doing anything, you want to see what packages the OS template includes, open the **Included Packages** tab.

Managing Application Templates in Physical Server Context

Virtuozzo Automator allows you to list application templates installed on the physical server.

All application templates installed on the physical server are listed on the **Container Software -> Applications Templates** page of any physical server in the following table:


Column Name	Description
Name	The name of the application template.
Version	The latest version of the application template available for installation. Applicable to standard Virtuozzo templates only, because EZ templates do not have versions.
Type	Denotes if it is a standard or an EZ Virtuozzo template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates do not have versions.
Description	The description of the application template.
OS	Denotes whether this is a Windows or a Linux template.
Architecture	The microprocessor architecture.
OS Name	The exact version of the operating system the template is intended for.

To facilitate working with application templates, you may have the **Templates** table display only those application templates that have a particular name or word in their description or conform to some other criteria. On top of the table, click the **Show Search** link to display the fields where you

can specify the parameters the application templates should meet; then click on the **Search** link. To view all the application templates installed on the physical server, click on the **Reset Results** link to the right of the parameter fields.

You can have Virtuozzo Automator display only those parameters you need at the moment. To show or hide certain columns, click the **Select Columns** link and select the parameters you want to be displayed or clear those you do not.

With the help of the Virtuozzo Automator toolbar you can perform the following operations on application templates:


- Upload a new template that you have locally and install it on a physical server registered in Virtuozzo Automator (the **New App/OS Template** button);
- Install an OS template present on this physical server to other physical servers registered in Virtuozzo Automator (the **Install to HNs** button);
- Select some templates in the table and add them to one or more virtual environments of the given physical server (the **Add to Containers** button);
- Delete those application templates that are not needed any more. To this effect, select the check boxes opposite the application templates you wish to delete and click the **Uninstall** button.
-  Update the selected templates with the latest packages from the Virtuozzo update repository (the **Update** button).

Clicking an application template name opens the screen where you can view the detailed information on it.

Viewing Application Template Properties

The properties of application templates are slightly different depending on whether it is a standard Virtuozzo application template or an EZ template.

The description of the selected application template is given at the top of the page, after which the **Summary** section provides additional details on the template:

Field Name	Description
Type	Denotes if it is a standard or an EZ Virtuozzo template. Standard templates carry all the necessary package files inside themselves and have versions. EZ templates have only information about the necessary packages, and the packages themselves are downloaded from a central repository. EZ templates don't have versions.
OS Template	The OS template the given template is compatible with.
Platform	Denotes the operating system the template is intended for.
 Supported technologies	Lists the technologies that the physical server must support for the template to work correctly. For more information see the description of the TECHNOLOGIES parameter in the Container Configuration File subsection of the <i>Virtuozzo Containers Reference Guide</i> .

The **Containers based on this OS** section enumerates those virtual environments where the given template has been added. You have the possibility to select any number of virtual environments in the table and remove the given template from them (the **Uninstall From Containers** button).



If, before doing anything, you want to see what packages the application template includes, open the **Included Packages** tab.

Uploading and Installing Templates on Physical Servers

Virtuozzo Automator enables you to upload and install templates on any of Virtuozzo Server Group physical servers by clicking the **New App/OS Template** button above the table listing available OS and application templates. In case you have one or more new templates that you want to install on your physical servers, you should first have these files accessible from the computer where Virtuozzo Automator is launched (e.g. insert the CD-ROM with the templates into the computer CD-ROM drive or copy the templates to the computer hard disk).

To install a new template to a Virtuozzo Server Group physical server, do the following:

- 1 Click the **Browse** button and provide the right path to the template (this must be the path accessible from the computer where Virtuozzo Automator is running).
- 2 Select the physical server on which the template will be installed by clicking the icon next to the **Hardware Node** field in the **Select Hardware Node** section and opening the screen where you may choose the physical server from the list of physical servers.
- 3 On the **Template Type** field, select the type of the template you are going to install or let Virtuozzo Automator do it for you by selecting the **Detect Automatically** option. Specifying the necessary template type will speed up and streamline the process of installing the template. The overall installation procedure is, for its most part, quite the same for both EZ and standard templates. The basic difference between the two is that a standard template is provided as a solid bundle of all the necessary template files together with the virtual environment software, while an EZ template is built up from separate chunks of code that are uploaded from the web every time you pick an EZ template to install in the Container. This means, that an EZ template is not an independent package but rather a unit containing all the necessary information about repositories from where the necessary packages will be uploaded to the physical server.

Standard templates may be a better choice if you have a slow Internet connection, because you do not need to use Internet at all - the whole template exists on the host physical server. However, EZ templates always include the latest security and functionality updates.

- 4 Select the **Force Installation** check box if you want to install the template even in case any errors appear during the installation process.
- 5 Click **Submit** to upload and install the template.

After the template has been uploaded and installed on one physical server as described above, it can be copied to and installed on any number of physical servers at once. To do this, go to a list of templates in the Server Group context, select the template, and click the **Install to Nodes** button.


Installing Application Templates on Physical Servers

On the **Install to Nodes** screen you can install the template specified in the **Template to Install** section onto any physical server(s) registered in Virtuozzo Automator, or, to use another term, Server Group physical servers. The template will be copied from the physical server it is currently available on and installed to the physical servers which you may choose in the **Select Hardware Nodes** section: click **Add** and select physical servers from the pop-up window. Click **Install** to launch the process of installation.

Installing OS Templates on Physical Servers

On the **Install to Nodes** screen you can install the template specified in the **Template to Install** section onto any physical server(s) registered in Virtuozzo Automator, or, to use another term, Server Group physical servers. The template will be copied from the physical server it is currently available on and installed to the physical servers which you may choose in the **Select Hardware Nodes** section: click **Add** and select physical servers from the pop-up window. Click **Install** to launch the process of installation.

Caching OS Templates on Physical Servers

 The **Cache on HN**s screen allows you to cache the given OS template on one or more physical servers registered in Virtuozzo Automator.

There are two types of caching, which correspond to the two options under the **Select Cache Options** heading:

- Selecting the **Cache OS template for Container creation** option tells Virtuozzo Automator to create a tarball of the packages comprising the template, which helps greatly speed up the process of creating new Containers on the physical servers where this OS template is cached.
- The **Cache application packages** option applies to EZ templates only. Selecting this option makes Virtuozzo Automator download the latest packages comprising the EZ template to the physical server(s) indicated in the **Select Hardware Nodes** section.

Both types of caching are only available on those physical servers where the given template has already been installed. You can define the list of such physical servers in the **Select Hardware Nodes** section with the help of the **Add** and **Remove Selected** buttons.

Note: For standard OS templates, the options described above are not shown, because caching a standard OS template always amounts to creating a virtual environment tarball, which corresponds to the first option for EZ templates.

Click the **Cache** button to initiate the caching procedure.

Uninstalling Templates From Physical Servers

On the **Uninstall From Nodes** screen you can uninstall the template specified in the **Template to Uninstall** section from any physical server(s) registered in Virtuozzo Automator, or, to use another term, Server Group physical servers. The template will be uninstalled from the physical servers which you may choose in the **Select Hardware Nodes** section: click **Add** and select physical servers from the pop-up window. Click **Uninstall**.


Note: If any Container on your physical servers is based on the OS template you wish to delete, the OS template deletion will fail.

Adding Application Templates to Containers

The **Add to Containers** screen enables you to perform the following steps:

- review the templates to be installed to Containers in the **Templates to Install** section;
- choose the Containers these templates are going to be installed to in the **Select Containers** section: click **Add Containers** and select Containers from the pop-up window;
- Install the templates by clicking the **Install** button.

Updating Templates on Physical Server

 The page where you can update certain templates on a particular physical server is displayed if you go to the Virtuozzo physical server and click the **Container Templates** tab, then select the corresponding template(s) on the templates list and click the **Update** link above. This relates both to OS and application templates, both standard and EZ ones.

While the **Update** screen is being loaded, you can see the virtual environments software looking for the available updates.

After the checking procedure is over, its results are displayed in three sections: the first one tells you the exact time of the last update check, the second enumerates the templates for which the update check has just been performed, and the third one informs you if updates are available for these templates.

Note: To obtain the information on the templates updates, the virtual environments software establishes connection with the update repository. If the connection fails, it tells you that **Virtuozzo cannot check for template updates now**, the notice being displayed instead of the **Up-to-date Status** section. In this case, you can check the connection with the update repository: follow the advice to **Please check the repository settings** below to open the page where you can configure these settings.

The information on the available templates in this section is organized as follows. The first item in the list is the OS templates updates followed by the application templates updates down the list. The number of the updates is shown in brackets. The number of "new" updates corresponds to the number of templates not installed on the physical server at the moment of the updates check and the number of "updates" per se is how many template updates you can download from the Virtuozzo update repository to the physical server. The latter number is reversely dependent on the former: if you do not have a certain template installed on the physical server, there are no updates available for this template. If you click the **OS Templates** item, it expands into the list of the OS templates updates and each of them, when expanded, provides you with the information about this template. Similarly, to have the list of application templates updates, click the **Applications for** item and then the application short description to learn what this application is used for and the features it includes.

If you want to install anything from the updates list, click the **Install Updates** button.

Updating Virtuozzo Software

Virtuozzo Automator provides a GUI interface to update your Virtuozzo software. You can query the current state of the following products: Virtuozzo Containers for Linux and Windows, Virtuozzo Containers for Windows, Server Bare Metal, and Virtuozzo Automator itself. And you can install the following, if available:

- kernel updates
- new Virtuozzo product releases
- new or updated Virtuozzo command-line utilities
- OS template updates
- application template updates

The **Updates** screen allows you to update Virtuozzo software on any physical server registered in Virtuozzo Automator.

On the **Updates** screen, you can perform the following operations:

- Filter physical servers by **Hostname** and **OS**: enter search criteria in the corresponding fields, and click **Search**.

Note: You may need to click **Show Search** first, if the search panel is hidden.

- Select columns to display: click **Select Columns**, check the necessary boxes, and click **Save**.
- Check for physical server updates: click a hostname in the **Hostname** column. Found updates, if any, will be listed on the **Software Updates** screen.

To update OS/application templates on a physical server, click its name in the table and switch to the **Template Updates** tab.

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Updating System software

On the **Virtuozzo Software Updates** tab of the **Software Updates** screen, you can browse and install updates for the following Virtuozzo software solutions installed on physical servers:

- Server Bare Metal,
- Virtuozzo Containers for Windows,
- Virtuozzo Containers for Linux,
- Virtuozzo Containers for Windows,
- Virtuozzo Automator.

On opening this tab, Virtuozzo Automator checks for updates if at least one of the following conditions is met:

- A check for updates has never been performed yet.
- It has been 24 hours or more since the last update check.
- You are opening this page following a Virtuozzo software update.
- Connection to the update repository has been insecure.

A check for updates can also be launched by clicking the **Check For Updates** button on the Virtuozzo Automator toolbar.

Virtuozzo updates can be of three types:

- 1** Virtuozzo releases: major updates for Virtuozzo products, these updates are rare. If such an update is available, you should update the Virtuozzo software by following the corresponding link on the Virtuozzo Automator toolbar.
- 2** Virtuozzo core updates: latest patches to Virtuozzo product kernels.
- 3** Virtuozzo tools updates: latest versions of Virtuozzo command-line utilities.

The process of installing updates depends on the product you are updating and is described below.

Installing Updates for Server Bare Metal

To install updates for systems running Server Bare Metal, select the check boxes next to them and click the **Install** button. You can also install all available updates at once by clicking the **Install Everything** button.

Installing Updates for Other Virtuozzo Products

To install updates for systems other than Server Bare Metal (e.g., for Virtuozzo Containers for Linux), you can use the **Install Virtuozzo Software Updates** and **Upgrade Virtuozzo Software**

buttons. The first button installs the latest patches to Virtuozzo product kernels and command-line utilities while the second one upgrades your system to a new major version.

Before installing an update, you can learn more information about it by clicking **View Details**.

Once you click the **Install Virtuozzo Software Updates** or **Upgrade Virtuozzo Software** button, you will be taken to the **Install Updates: Review** page where you can review the updates that will be installed for your system.

Customizing Update Process

On the **Install Updates: Review** screen, you can review the updates you are going to install and configure two update options in the **Install Options** group (click the group name to see the options).

Virtuozzo updates can be of three types:

- Virtuozzo releases: major updates for Virtuozzo products.
- Virtuozzo core updates: latest patches to Virtuozzo product kernels.
- Virtuozzo tools updates: latest versions of Virtuozzo command-line utilities.

The available options allow you to do the following:

- **Disable automatic bootloader configuration.** If selected, this check box forces the system to bypass the bootloader when applying updates.
- **Disable automatic reboot.** If selected, this check box forces the system not to reboot the physical server automatically after installing updates.

Notes:

1. The **Install Updates: Review** screen is not displayed if you are installing updates for systems with Server Bare Metal.

2. The **Disable automatic bootloader configuration** and **Disable automatic reboot** options are not shown if no changes to the bootloader configuration and no system reboot are required to install updates.

Click **Install** to start installing the selected updates.

Installing New OS Templates

On loading the **OS Templates** screen of the **New Software** tab, Virtuozzo Automator checks for new OS templates that can be installed on the physical server. A check is performed if at least one of the following conditions is met:

- A check has never been performed yet.

- It has been 24 hours or more since the last check.
- You are opening this page following a Virtuozzo Containers software update.
- Connection to the repository has been insecure.

The check results are displayed in two sections: the first provides the time of the last check and the second lists found templates, the number of which is provided in brackets after the section name.

Note: To obtain information on templates, Virtuozzo Automator connects to the update repository. If the connection fails, you will be notified with an error message displayed instead of the template list. In this case, check repository settings on the **Repository Settings** page.

To view information on an OS template or install additional compatible application templates, click the OS template name.

To install an OS template from the list without additional application templates, check its box and click the **Install** button on the Virtuozzo Automator toolbar.

Displaying OS Template Information

This screen provides detailed information on the selected OS template and allows you to install it with or without supported application templates:

- To install the OS template without selecting any supported application templates, click **Install OS** in the **Tasks** section.
- To install the OS template along with a list of supported application templates, click **Install OS and applications** in the **Tasks** section.

Choosing Application Templates for Updates

The **New OS Template: Select Applications** screen allows you to choose compatible application templates to install along with the selected OS template.

To choose an application template for installation:

- 1 Select the check box of the application to install in the **Available Applications** table. To choose all available applications at once, select the check box next to the **Available Applications** name at the top of the table.
- 2 Click the **>>** button. This will add the template to the installation list in the **Selected Applications** table.
- 3 Click **Next** to proceed.

To return to the **OS Templates** screen of the **New Software** tab, click **Cancel**.

Reviewing OS and Application Templates

On the **New OS Template: Install Preview** screen, you can review the OS and application templates you selected on the previous screens. The following information on listed templates is presented:

Column	Description
Template Name	Name of the OS/application template to install.
Version	Version of the template to install.
Type	Template type: OS or application.
Description	Template description.

On this screen, you can do the following:

- Install the listed OS and application templates by clicking **Install**. After installation, you will be taken back to the **OS Templates** screen of the **New Software** tab.
- Return to the previous **New OS Template: Select Applications** screen by clicking **Back**.
- Return to the **OS Templates** screen of the **New Software** tab by clicking **Cancel**.

Note: For the installation log, click **Task Log** in the **Management** section on the Virtuozzo Automator menu on the left.

Installing New Application Templates

On loading the **Application Templates** screen of the **New Software** tab, Virtuozzo Automator checks for application templates available for OS templates installed on the physical server. A check is performed if at least one of the following conditions is met:

- A check has never been performed yet.
- It has been 24 hours or more since the last check.
- You are opening this page following a Virtuozzo Containers software update.
- Connection to the update repository has been insecure.

The check results are displayed in two sections: the first provides the time of the last check and the second lists found templates, the number of which is provided in brackets after the section name.

Note: To obtain information on template updates, Virtuozzo Automator connects to the update repository. If the connection fails, you will be notified with an error message displayed instead of the template list. In this case, check repository settings on the **Repository Settings** page.

To install application templates from the list, check their boxes and click **Install** on the Virtuozzo Automator toolbar.

Updating OS Templates

On loading the **OS Templates** screen of the **Template Updates** tab, Virtuozzo Automator checks for OS template updates for supported Linux distributions. A check is performed if at least one of the following conditions is met:

- A check for updates has never been performed yet.
- It has been 24 hours or more since the last update check.
- You are opening this page following a Virtuozzo Containers software update.
- Connection to the update repository has been insecure.

The check results are displayed in two sections: the first provides the exact time of the last check and the second lists found updates, the number of which is provided in brackets after the section name.

Note: To obtain information on template updates, Virtuozzo Automator connects to the update repository. If the connection fails, you will be notified with an error message displayed instead of the template list. In this case, check repository settings on the **Repository Settings** page.

To view information on an OS template update and/or install additional compatible application templates, click the OS template name.

To install an OS template update from the list without additional application templates, check its box and click the **Install** button on the Virtuozzo Automator toolbar.

Updating Application Templates

On loading the **Application Templates** screen of the **Template Updates** tab, Virtuozzo Automator checks for application template updates. A check is performed if at least one of the following conditions is met:

- A check for updates has never been performed yet.
- It has been 24 hours or more since the last update check.
- You are opening this page following a Virtuozzo Containers software update.
- Connection to the update repository has been insecure.

The check results are displayed in two sections: the first provides the exact time of the last check and the second lists found updates, the number of which is provided in brackets after the section name.

Note: To obtain information on template updates, Virtuozzo Automator connects to the update repository. If the connection fails, you will be notified with an error message displayed instead of the template list. In this case, check repository settings on the **Repository Settings** page.

To install application template updates from the list, check their boxes and click the **Install** button on the Virtuozzo Automator toolbar.

Configuring Access to Update Repository

You can configure all network and security parameters for accessing the Virtuozzo update repository on the **Configure** page accessible by clicking the **Configure** button on the **Repository Settings** screen. The configurable parameters depend on the physical server platform.

Note: The settings you configure on this page do not apply to systems running Server Bare Metal.



The following parameters can be set up for a Linux physical server:

- Repository URL
- Repository Login
- Repository Password
- Proxy Server URL
- Proxy Server Login
- Proxy Server Password



The following parameters can be set up for a Windows physical server:

In the **Up-to-Date Service** group:

- The **Enable Updates** check box, if selected, enables the Virtuozzo update service on the corresponding physical server. The service is necessary for delivering updates to the physical server.
- The **Check for updates** menus let you define a schedule of checking for updates.
- The **Automatic reboot** check box, if selected, authorizes the Virtuozzo update service to reboot the physical server if it is required by any updates.

In the **Proxy Server** group:

- Select the **Do not use proxy server** radio button if your physical server connects to the Internet directly, without a proxy server.
- Select the **Load Internet Explorer proxy settings** radio button to connect to the Virtuozzo Update Center using the proxy settings of the Internet Explorer browser installed on the physical server. This option is selected by default.

- Select the **Specify a proxy server** radio button to connect to the Virtuozzo Update Center via a custom proxy server. In this case, you will need to specify proxy server's IP address and port in the **URL** field as well as corresponding credentials in the **Login** and **Password** fields.

In the **Virtuozzo Containers for Windows**, **Virtuozzo for Windows Tools**, **Server Bare Metal** groups:

- Select **Update Mode: Automatic** to have Virtuozzo updates automatically downloaded and installed on the physical server according to the specified schedule.
- Select **Update Mode: Download only** to have the Virtuozzo update service automatically download updates in system background according to the specified schedule without installing them automatically.
- Select **Update Mode: Manual** to have the Virtuozzo update service check the Virtuozzo Update Center for updates according to the specified schedule and inform you if any are found.
- Select **Update Mode: Disabled** to disable automatic updating of Virtuozzo software, so you can manually update it on the **Software Updates** screen (p. 263).
- In the **Repository** section, you can configure the Virtuozzo repository location. By default, the Virtuozzo Update Center, accessible at the Virtuozzo website, is used to check for Virtuozzo updates (if the **Standard location** radio button is selected). However, you can select the **Custom location** check box and specify a custom repository URL. For example, if you have a VUS server set up in your local network, you can specify its URL so the physical server would get updates from there. For details on how to deploy a local VUS server, see **Deploying Local VUS Server** in the *Virtuozzo Containers User's Guide*.
- The **Download Location** button allows you to choose a folder where Virtuozzo updates will be downloaded to before they are installed on the physical server.

Having made the changes, click **Submit** to save them and return to the **Repository Settings** tab.

Checking Update Repository Settings

The **Repository Settings** tab of the **Software Updates** screen allows you to check the current update repository settings. The information displayed on this screen differs depending on what Virtuozzo product is installed on your system.

In the **Up-to-Date Service** group:

- The **Status** field indicates if the Container update service on the corresponding physical server is enabled or disabled. This service is necessary to deliver updates to the physical server.
- The **Check for updates** field shows the update checking schedule.
- The **Automatic reboot** field indicates if the update service is authorized to reboot the physical server if it is required by any updates.

The **Proxy Server** group shows what proxy server is set up for the physical server.

In the **Virtuozzo Containers for Windows**, **Virtuozzo for Windows Tools** groups, the update mode is indicated as follows:

- **Update Mode: Automatic.** This setting means that updates are automatically downloaded and installed on the physical server according to the specified schedule.
- **Update Mode: Download only.** This setting means that updates are automatically downloaded in system background according to the specified schedule but are not automatically installed.
- **Update Mode: Manual.** This setting means that the update service checks the Virtuozzo Update Center for updates according to the specified schedule and informs you if any are found.
- **Update Mode: Disabled.** This setting means that automatic updating of the Virtuozzo software is disabled, so you can manually update it on the **Software Updates** screen (p. [263](#)).
- The **Repository** field shows the Virtuozzo update repository location.
- The **Download Location** field shows the folder where updates will be downloaded to before they are installed on the physical server.

To edit the settings, click the **Configure** button.

Advanced Tasks

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Virtuozzo Automator Command-Line Utilities

This chapter is an additional reference on the Virtuozzo Containers configuration files and Hardware Node command-line utilities. The chapter documents the utilities that are available after the VA Agent is installed on the Hardware Node. For every utility, all available command-line options are described.

The primary audience for this guide is anyone who is looking for an explanation of a particular configuration option, does not understand a Virtuozzo file format, needs help for a particular command, or is seeking for a command to perform a certain task.

vzgroup

The utility is used to logically organize the physical servers and Containers. There are two independent ways to design the structure organization. They are called **Infrastructure** and **Logical View** and presented as top-level elements in the Virtuozzo Automator left menu. You can use either one of them or, better, both at once, as their functions are different. For more information on building up a logical structure and combining Containers into groups, refer to the **Organizing Logical Structure** section.

The utility is also used as a part of an upgrading procedure for importing data between server. For the detailed information, refer to the *Virtuozzo Automator Upgrade Guide*.

The utility can be run either on a Master server or a Slave server with a different number of available commands.

Running on VA Slave Server

The utility has the following syntax:

```
C:\Users\Administrator>vzgroup <command> <options> <node>
```

The restoration options are the following:

Command	Description
<code>addToGroup [USER[:PASSWORD]@]ADDRESS</code>	Adds the Slave server to the VA group.
<code>list</code>	Lists the physical servers within the VA infrastructure. The command shows the statuses (online/offline) and roles (Master/Slave) of the listed servers.
<code>removeFromGroup [USER[:PASSWORD]@]ADDRESS</code>	Removes the Slave server, you are logged into, from the VA group.

Running on VA Master Server

The utility has the following syntax:

```
# vzagroup <command> <options> <node>
```

Commands:

Command	Description
<code>addContainer /<infrastructure organizational>[/subfolder name] [USER[:PASSWORD]@]ADDRESS <ctid></code>	Includes a Container into an Infrastructure (<infrastructure> option) or Logical View (<organizational> option) context. To indicate the Container, specify its ID and the hosting physical server IP address.
<code>addFolder /<infrastructure organizational>[/subfolder name]</code>	Creates a new folder/subfolder in the Infrastructure or Logical View context, <infrastructure> or <organizational> option respectively.
<code>addSlave [USER[:PASSWORD]@]ADDRESS</code>	Registers a new Slave physical server in the VA infrastructure. Specify the physical server's IP address. In case the server is registered in another infrastructure, you can force the server re-registration with the <code>--force</code> option.
<code>delContainer /<infrastructure organizational>[/subfolder name] [USER[:PASSWORD]@]ADDRESS <ctid></code>	Removes Container from the Infrastructure or Logical View context. Specify the folder/subfolder name where the Container belongs, the physical server IP address that host the container and the Container ID.
<code>delFolder /<infrastructure organizational>[/subfolder name]</code>	Removes a folder/sub-folder from the Infrastructure or Logical View context.
<code>list</code>	Lists the physical servers within the VA infrastructure. The command shows the statuses (online/offline) and roles () of the listed servers.
<code>listInfrastructure /<infrastructure organizational>[/subfolder name]</code>	Lists the elements (folders, Containers, etc.) that are grouped under the Infrastructure or Logical View context. To list the elements of a particular folder/sub-folder, specify its name additionally.
<code>reconfigure [/option-path-in-xml-config option-value]</code>	Changes the configuration settings for a group of Containers, such as, managing permissions, scheduling backups, applying system updates, etc. For example, the log level can be changes with the following command: <code>vzagroup reconfigure /data/system/configuration/log_level 5</code>
<code>removeSlave [USER[:PASSWORD]@]ADDRESS</code>	Unregisters a Slave physical server from the VA infrastructure. Use the <code>--force</code> option to unregister the server even if it's offline.

<code>--force</code>	Use the option with the <code>addSlave</code> and <code>removeSlave</code> commands. With the <code>addSlave</code> command, the option forces the Slave registration even if it is registered in another Infrastructure. With the <code>removeSlave</code> command, the option unregisters the Slave server even if it is offline.
----------------------	---

Upgrade commands:

Command	Description
<code>--switchSlave</code> <code>[USER[:PASSWORD]@]ADDRESS</code>	Registers the Slave server from the PIM 4.0 infrastructure in the Virtuozzo Automator 6.1 Infrastructure. The Slave server's version remains 4.0.
<code>--importSettings</code> <code>[USER[:PASSWORD]@]ADDRESS [options]</code>	Transfers data from the PIM 4.0 infrastructure to the Virtuozzo Automator 6.1 infrastructure.

The options which can be used with the `--importSettings` command of `vzgroup`:

Option	Description
<code>--import-security</code>	Imports security settings from 4.0 server (roles, role assignments, users, groups).
<code>--import-infrastructure</code>	Imports infrastructure folders, logical view from 4.0 server.
<code>--import-alerts</code>	Imports alerts and events from 4.0 server.
<code>--import-operations</code>	Imports task log from 4.0 server.
<code>--import-tasks</code>	Imports scheduled tasks from 4.0 server.
<code>--import-messaging</code>	Imports physical server messaging settings from 4.0 server.
<code>--import-backup-settings</code>	Imports default backup settings from 4.0 server.
<code>--import-ipranges</code>	Imports IP ranges from 4.0 server.
<code>--import-samples</code>	Imports Container templates from 4.0 server.
<code>--import-networks</code>	Imports virtual networks from 4.0 server.
<code>--clear</code>	Deletes data from a 6.1 master server before importing information from 4.0 server.
<code>--switch-master</code>	Assigns a 4.0 Master server a Slave server role while registering by 6.1 Master server. Note: You can also register the server from Virtuozzo Automator.

vzabackup

vzabackup for Linux

Any Container is defined by its private area, configuration files, action scripts, and quota information. Backing up these components allows you to restore the whole Container on any Virtuozzo Containers-based system at any time in case the Container gets broken.

The `vzabackup` utility can be run on virtually any Virtuozzo host (including the Source and Backup Nodes) with the `vzabackup` package installed. It has the following syntax:

```
vzabackup [BACKUP_OPTIONS] NODE1 ... [CT_OPTIONS]
vzabackup [STORAGE_OPTIONS]
```

Note: For the `vzabackup` functionality to work, forward and reverse DNS lookups must be correctly configured for both the Source and Backup Nodes.

General backup options:

<code>-F, -I, --Tfull</code>	Forces performing a full backup.
<code>-i, --Tinc</code>	Makes an incremental backup or, if no full backups are available, a full backup. If this and <code>--Tdiffe</code> options are omitted, the full backup is created.
<code>--Tdiffe</code>	Makes a differential backup or, if no full backups are available, a full backup. If this and <code>-i</code> options are omitted, the full backup is created. Note: You cannot create differential backups of virtual machines.
<code>-D DESCRIPTION</code>	The description of the backup archive. The backup description should always be quoted (e.g. "backup for Container 101").
<code>-o, --rm-old</code>	Creates a new backup and then removes the oldest backup of the specified Container.
<code>-d, --rm-tag BACKUP_ID</code>	Creates a backup and then removes the backup with the specified ID. You can learn what ID is assigned to this or that Container backup by running the <code>vzarestore</code> utility with the <code>-l</code> or <code>-f</code> option.
<code>-Cn, -C0</code>	Creates the Container backup without any compression. This will speed up the backing up time; however, it may significantly increase the size of the resulting backup archive.
<code>-Cg, -C1</code>	Compresses the resulting backups with the normal level of compression. This is the default level of compression used to back up all server/Containers. The optimal data compression level depends on the type of files to be stored in the backup archive. For example, it is advisable to use the 'normal' and 'none' compression types if most of the files to be backed up are already compressed (e.g. the files with the <code>.zip</code> and <code>.rar</code> extensions) or can be compressed with a low degree of efficiency (e.g. all executable files with the <code>.exe</code> extension or image files with the <code>.jpg</code> , <code>.jpeg</code> , and <code>.gif</code> extensions).
<code>-C2</code>	Compresses the resulting backups with the high level of compression. The size of the resulting backup file is smaller than that of the backup file compressed with the <code>-C0</code> and <code>C1</code> options; however, it takes longer to create the backup file.

<code>-Cb, -C3</code>	Compresses the resulting backups with the maximum level of compression. In this case the backup file size is the smallest; however, it may take much time to create such backups.
<code>-J</code>	If several servers (Hardware Nodes) are specified, this option tells <code>vzabackup</code> to back up the specified Hardware Nodes (and their Containers) simultaneously. If the option is omitted, the Hardware Nodes are backed up sequentially one after another.
<code>--force</code>	Forces the process of backing up the server (Hardware Nodes)/Containers. You are recommended to use this option when simultaneously backing up more than one Node/Container.
<code>--storage NODE</code>	<p>The IP address or hostname and the credentials of the Backup Node where the created backup will be stored. Should be specified in the following format: <code>[USER[:PASSWD]]@IP_ADDRESS</code> where:</p> <ul style="list-style-type: none"> <code>IP_ADDRESS</code> is the IP address or hostname of the Backup Node and <code>USER</code> and <code>PASSWD</code> denote the credentials of the <code>root</code> user used to log in to the Backup Node. <p>When using this option, keep in mind the following:</p> <ul style="list-style-type: none"> If you do not indicate the user and/or password to log in to the Backup Node, you will be asked to do so during the <code>vzabackup</code> execution. If you are backing up Containers residing on the local Node and this local Node is also used as the Backup Node, you do not need to specify the Node credentials, provided that you are logged in to this Node as <code>root</code>. If the <code>--storage</code> option is omitted, <code>vzabackup</code> puts the created Container backups to the backup directory on the local (Source) Node. By default, this directory is <code>/vz/backups</code>.
<code>NODE1...</code>	<p>The IP address and the root credentials of the Source Node, i.e. of the Node hosting the Containers to be backed up. Should be specified in the following form: <code>[USER[:PASSWD]]@IP_ADDRESS</code> where:</p> <ul style="list-style-type: none"> <code>IP_ADDRESS</code> is the IP address or hostname of the Source Node and <code>USER</code> and <code>PASSWD</code> denote the credentials of the <code>root</code> user used to log in to the Source Node. <p>When using this option, keep in mind the following:</p> <ul style="list-style-type: none"> If you do not indicate the user and/or password to log in to the Source Node, you will be asked to do so during the <code>vzabackup</code> execution. If you are backing up Containers residing on the Source Node, you do not need to specify the Node credentials, provided that you are logged in to this Source Node as <code>root</code>.
<code>-q, --no-progress</code>	Disables logging to the screen during the <code>vzabackup</code> operation.

Per-Container parameters:

<code>--chain-length <i>NUMBER</i></code>	An incremental backup parameter. After this number of incremental backups, a full backup will be performed.
<code>--chain-days <i>NUMBER</i></code>	An incremental backup parameter. After this number of days, a full backup will be performed.

Container backup options:

<code>-e <i>CT1...</i></code>	The Containers to back up on the Source Node. If this and the <code>-x</code> options are omitted, all Containers on the given Node will be backed up. Containers can be specified using both their IDs (e.g., 101 or 102) and their names (e.g. <code>server1</code> or <code>server2</code>).
<code>-x <i>CT1...</i></code>	The Containers that need not to be backed up, i.e. the Containers you wish to exclude from the backup process. If this and the <code>-e</code> options are omitted, all Containers on the given Node will be backed up. Containers can be specified using both their IDs (e.g., 101 or 102) and their names (e.g., <code>server1</code> or <code>server2</code>).
<code>--include-files <i>FILE_LIST</i></code>	The path to the files and directories inside the Container to be included in the backup.
<code>--exclude-files <i>FILE_LIST</i></code>	The path to the files and directories inside the Container to be excluded from the backup.

Backup storage options:

<code>--view-folder</code>	Displays the path to the backup storage directory on the local Node. The default directory is <code>/vz/backups</code> .
<code>--set-folder <i>PATH</i></code>	Sets a new directory on the local Node where the created backups are to be stored (if the local Node is used as the Backup Node). Uses <code>--backup-folder-*</code> parameters.
<code>--set-folder-creds <i>USER[:PASSWD]</i></code>	Sets backup storage login credentials. Required for Samba storage. Uses <code>--backup-folder-*</code> parameters.
<code>--backup-folder-path <i>PATH</i></code>	Path to a custom backup storage location.
<code>--backup-folder-login <i>LOGIN</i></code>	Username for a custom backup storage on a Samba share.
<code>--backup-folder-passwd <i>PASSWD</i></code>	Password for a custom backup storage on a Samba share.

vzabackup for Windows

Any Container is defined by its private area, configuration files, action scripts, and quota information. Backing up these components allows you to restore the whole Container on any Virtuozzo Containers-based system at any time in case the Container gets broken.

The `vzabackup` utility is used to create backups of separate Containers or whole Hardware Nodes. It can be run on one of the following servers:

- Source Node where the Container to be backed up is residing.
- Backup Node, a special Node intended for storing Container backups.
- Any other Virtuozzo Containers-based physical server in your network.

The only requirements that should be met to execute `vzabackup` is to have a server with Virtuozzo Containers and the Virtuozzo Agent software installed on it and to provide the network connectivity for this server to be able to establish connections to the Source and Backup Nodes, if necessary. The created Container backups are then stored on the Backup Node which can also be presented by any Node with running the Virtuozzo Containers and Virtuozzo Agent software.

Note: For the `vzabackup` functionality to work, forward and reverse DNS lookups must be correctly configured for both the Source and Backup Nodes.

The `vzabackup` utility has the following syntax:

```
vzabackup [BACKUP_OPTIONS] --node NODE1 [CT_OPTIONS] ...
```

General backup options:

<code>-F, -I, --Tfull</code>	Makes a full backup. By default, <code>vzabackup</code> creates a full backup of Containers and Hardware Nodes.
<code>-i, --Tinc</code>	Makes an incremental backup or, if no full backups are available, a full backup. If this option is omitted, the full backup is created.
<code>--Tdiff</code>	Makes a differential backup or, if no full backups are available, a full backup. If this option is omitted, the full backup is created. Note: You cannot create differential backups of virtual machines.
<code>-D DESCRIPTION</code>	The description of the backup archive.
<code>-o, --rm-old</code>	Creates a new backup and then removes the oldest backup of the specified Node/Container.
<code>--rm-tag BACKUP_ID</code>	Creates a backup and then removes the backup with the specified ID. You can learn what ID is assigned to what Container backup using the <code>-l</code> and <code>-f</code> options of the <code>vzarestore</code> utility.
<code>-Cn, -Cg, -Cb</code>	Indicates the level of compression for the resulting Container backup archive. In the current version of Virtuozzo Containers, you can set this level to one of the following: <ul style="list-style-type: none"> • <code>n</code>: creates the Container backup without any compression. Using this level of compression may speed up the backing up time; however, it may significantly increase the size of the resulting backup file. • <code>g</code>: compresses the resulting backup with the normal level of compression. This is the default level of compression used to back up all Nodes/Containers. • <code>b</code>: compresses the resulting backup with the maximum level of compression. In this case the backup file size is the smallest; however, it may take much time to create the backups. The optimal data compression level depends on the type of files to be stored in

	the backup archive. For example, it is advisable to use the 'normal' and 'none' compression types if most of the files to be backed up are already compressed (e.g. the files with the .zip and .rar extensions) or can be compressed with a low degree of efficiency (e.g. all executable files with the .exe extension or image files with the .jpg, .jpeg, and .gif extensions).
-J	If several Source Nodes are specified, back up these Nodes and/or their Containers simultaneously. If the option is omitted, the Nodes are backed up sequentially one after another.
--force	Forces the process of backing up the server (Hardware Nodes)/Containers. You are recommended to use this option when simultaneously backing up more than one Node/Container.
--storage <i>NODE</i>	The IP address and the credentials of the Source Node. Should be specified in the following form: <code>USER[:PASSW]@IP_ADDRESS</code> . If you do not indicate the credentials to log in to the Source Node, you will be asked to do so during the <code>vzabackup</code> execution. If this option is omitted, <code>vzabackup</code> puts the created backup(s) to the backup folder on the Source Node (by default, this folder is <code>X:\vz\Backups</code>).
<i>NODE1...</i>	The IP address and the credentials of the Source Node. Should be specified in the following form: <code>USER[:PASSWD]@IP_ADDRESS</code> . If you do not indicate the credentials to log in to the Source Node, you will be asked to do so during the <code>vzabackup</code> execution. You can omit this option when backing up particular Containers on the local Source Node (provided you are logged in to the Node as Administrator); in all other cases specifying the Source Node IP address and credentials is mandatory.
-q, --no-progress	Disables logging to the screen during the <code>vzabackup</code> operation.

Per-Container parameters:

--chain-length <i>NUMBER</i>	An incremental backup parameter. After this number of incremental backups, a full backup is performed.
--chain-days <i>NUMBER</i>	An incremental backup parameter. After this number of days a full backup is performed.

Container backup options:

-e <i>CT1...</i>	The Containers to back up on the Source Node. If this option is omitted, all Containers on the given Node will be backed up. Containers can be specified using both their IDs (e.g., 101 or 102) and their names (e.g., <code>comp1</code> or <code>comp2</code>).
-x <i>CT1...</i>	The Containers that need not be backed up (Containers to exclude). If this option is omitted, all Containers on the given Source Node will be backed up. Containers can be specified using both their IDs (e.g., 101 or 102) and their names (e.g., <code>comp1</code> or <code>comp2</code>).

<code>--include-files <i>FILE_LIST</i></code>	Only the specified files and folders will be included in the Container backup. Note: If you create a Container backup using this option, you will be able to restore only separate files from the resulting Container backup, but not the Container as a whole.
<code>--exclude-files <i>FILE_LIST</i></code>	The path to the files and folders inside the Container to be excluded from the backup.

Backup storage options:

<code>--view-folder</code>	Displays the path to the backup storage directory on the local Node. The default directory is <code>/vz/backups</code> .
<code>--set-folder <i>PATH</i></code>	Sets a new directory on the local Node where the created backups are to be stored (if the local Node is used as the Backup Node). Uses values of <code>--backup-folder-*</code> parameters.
<code>--set-folder-creds <i>USER[:PASSWD]</i></code>	Sets backup storage login credentials. Required for Samba storage. Uses values of <code>--backup-folder-*</code> parameters.
<code>--backup-folder-path <i>PATH</i></code>	Path to a custom backup storage location.
<code>--backup-folder-login <i>LOGIN</i></code>	Username for a custom backup storage on a Samba share.
<code>--backup-folder-passwd <i>PASSWD</i></code>	Password for a custom backup storage on a Samba share.

vzarestore

vzarestore for Linux

The `vzarestore` utility is used to restore Containers or certain Container files/folders from Container backup archives, list backups existing on the Backup Node, remove backups, etc. The `vzarestore` utility can be run on any Hardware Node provided it has the `vzabackup` package installed.

Note: For the `vzarestore` functionality to work, forward and reverse DNS lookups must be correctly configured for both the Source and Backup Nodes.

The utility has the following syntax:

```
vzarestore [CTID[:NEW_CTID] | -e [<CTID[:NEW_CTID]...>] [OPTIONS] [BACKUP_NODE]
vzarestore -r,--remove <BACKUP_ID...>
vzarestore -l,--list [LIST_OPTIONS] [BACKUP_NODE]
vzarestore --browse BACKUP_ID [BROWSE_OPTIONS] [BACKUP_NODE]
vzarestore --print-ct-config BACKUP_ID [BACKUP_NODE]
vzarestore --help
```

Restoration options:

<code>-e <i>CTID[:NEW_CTID]...</i></code>	Comma-separated list of Containers to restore. Containers can be specified using both their IDs (e.g., 101) and their names (e.g., computer1).
---	--

<code>-x CT1...</code>	Comma-separated list of Containers to skip. Containers can be specified using both their IDs (e.g., 101) and their names (e.g., computer1).
<code>-b BACKUP_ID</code>	<p>The ID assigned to the Container backup. This ID can be used to restore this Container or its certain files from the backup with the specified ID. If not specified, the last Container backup is used.</p> <p>This option is incompatible with the <code>-e</code> option.</p> <p>Note: <code>-b</code> is used for restoring files only and can't be used to change the restored Container ID.</p>
<code>--force</code>	Do not stop on errors during the <code>vzarestore</code> execution. You are recommended to use this option when restoring more than one Container at once.
<code>--skip-ct-config</code>	<p>Do not restore the Container configuration file. This option can be used only when restoring a single Container.</p> <p>Note: The Container configuration file is not changed when restoring separate Container files.</p>
<code>--files PATH</code>	The full path to the file/directory inside the Container to be restored. This option is incompatible with the <code>-e</code> option.
<code>--skip-locked</code>	Do not stop on errors even if some of the files to be restored are in the 'locked' state.
<code>-B</code>	Handles the values after the <code>-e</code> option as Container backup IDs.
<code>--storage NODE</code>	The IP address and the credentials of the Backup Node where the Container backups are stored. Can be specified in the following form: <code>USER[:PASSWD]@IP_ADDRESS</code> . If this option is omitted, the local Node is treated as the Backup Node.

Miscellaneous options:

<code>-r, --remove BACKUP_ID</code>	Removes the Container backup with the specified backup ID. You can specify several backup IDs and separate them by spaces.
<code>-l, --list</code>	Do not restore any Containers. Displays the information on the existing backups located either on the Backup Node or on the local Node if the former is not specified.
<code>--browse BACKUP_ID</code>	Displays the contents of the Container backup with the specified backup ID.
<code>--print-ct-config BACKUP_ID</code>	Displays the configuration file contents of the Container with the specified backup ID.

Listing options:

<code>-f, --full</code>	Displays the full information on the specified Container backup. Used only with <code>--list</code> .
<code>--latest</code>	Displays the latest Containers backups. Used only with <code>--list</code> .
<code>-e CT1...</code>	Displays the information on the backups for the specified Containers only.
<code>-B</code>	Handles the values after the <code>-e</code> option as Container backup IDs.

Browsing options:

<code>-d, --dir PATH</code>	Path to a directory inside a Container backup archive contents of which you want to see. Used with <code>--browse</code> .
<code>--backup-folder-path PATH</code>	Path to a custom backup storage location.

vzarestore for Windows

The `vzarestore` utility is used to restore Containers or certain Container files/folders from Container backup archives, list backups existing on the Backup Node, remove backups, etc. The `vzarestore` utility can be run on any Hardware Node provided it has the Virtuozzo Agent software installed.

Note: For the `vzarestore` functionality to work, forward and reverse DNS lookups must be correctly configured for both the Source and Backup Nodes.

The utility has the following syntax:

```
vzarestore [CTID[:NEW_CTID] | -e <CTID[:NEW_CTID]...> | -x <CTID...>] [RESTORE OPTIONS]
[BACKUP_NODE]
vzarestore -r,--remove <BACKUP_ID ...>
vzarestore -l,--list [LIST_OPTIONS] [BACKUP_NODE]
vzarestore --browse BACKUP_ID [BROWSE_OPTIONS] [BACKUP_NODE]
vzarestore --print-ct-config BACKUP_ID [BACKUP_NODE]
vzarestore --help
```

Restoration options:

<code>-e CTID[:NEW_CTID]...</code>	Comma-separated list of Containers to restore. Containers can be specified using both their IDs (e.g., 101) and their names (e.g., computer1).
<code>-x CT1...</code>	Comma-separated list of Containers to skip. Containers can be specified using both their IDs (e.g., 101) and their names (e.g., computer1).
<code>-b BACKUP_ID</code>	<p>The ID assigned to the Container backup. This ID can be used to restore this Container or its certain files from the backup with the specified ID. If not specified, the last Container backup is used.</p> <p>This option is incompatible with the <code>-e</code> option.</p> <p>Note: <code>-b</code> is used for restoring files only and can't be used to change the restored Container ID.</p>
<code>--force</code>	Do not stop on errors during runtime. You are recommended to use this option when restoring more than one Container at once.
<code>--skip-ct-config</code>	<p>Do not restore the Container configuration file. This option can be used only when restoring a single Container.</p> <p>Note: The Container configuration file is not changed when restoring separate Container files.</p>
<code>--files PATH</code>	The full path to the file/directory inside the Container to be restored. This option is incompatible with the <code>-e</code> option.

<code>--skip-locked</code>	Do not stop on errors even if some of the files to be restored are in the 'locked' state.
<code>-B</code>	Handles the values after the <code>-e</code> option as Container backup IDs.
<code>--storage NODE</code>	The IP address and the credentials of the Backup Node where the Container backups are stored. Can be specified in the following form: <code>USER[:PASSWD]@IP_ADDRESS</code> . If this option is omitted, the local Node is treated as the Backup Node.

Miscellaneous options:

<code>-r, --remove BACKUP_ID</code>	Removes the Container backup with the specified backup ID. You can specify several backup IDs and separate them by spaces.
<code>-l, --list</code>	Do not restore any Containers. Displays the information on the existing backups located either on the Backup Node or on the local Node if the former is not specified.
<code>--browse BACKUP_ID</code>	Displays the contents of the Container backup with the specified backup ID.
<code>--print-ct-config BACKUP_ID</code>	Displays the configuration file contents of the Container with the specified backup ID.

Listing options:

<code>-f, --full</code>	Displays the full information on the specified Container backup. Used with <code>--list</code> .
<code>--latest</code>	Displays the latest Containers backups. Used with <code>--list</code> .
<code>-e CT1...</code>	Displays the information on the backups for the specified Containers only.
<code>-B</code>	Handles the values after the <code>-e</code> option as Container backup IDs.

Browsing options:

<code>-d, --dir PATH</code>	Path to a directory inside a Container backup archive contents of which you want to see. Used with <code>--browse</code> .
<code>--backup-folder-path PATH</code>	Path to a custom backup storage location.

Monitoring Virtiozzo Objects via SNMP

You can monitor Linux and Windows-based Virtiozzo Hardware Nodes via the Simple Network Management Protocol (SNMP). The implementation conforms to the same Structure of Management Information (SMI) rules as the data in the standard SNMP context: all Virtiozzo objects are organized in a tree; each object identifier (OID) is a series of integers corresponding to tree nodes and separated by dots.

General information:

- The OID of the root subtree with all the objects you can monitor is `1.3.6.1.4.1.26171.1.1`.

- Two management information base (MIB) files are required to monitor Virtuozzo objects: `SWSOFT-SMI.txt` and `SWSOFT-VIRTUOZZO-MIB.txt`. Both are installed along with VA Agent. On Linux Nodes, their default location is `/usr/share/snmp/mibs`; on Windows Nodes, it is `%PROGRAMFILES(X86)%\Parallels\Parallels Virtual Automation\snmp\mibs`.

The following subsections describe ways to enable and use SNMP to monitor Virtuozzo objects.

Enabling SNMP Access on Hardware Node

To enable SNMP access on a Linux-based Hardware Node, do the following:

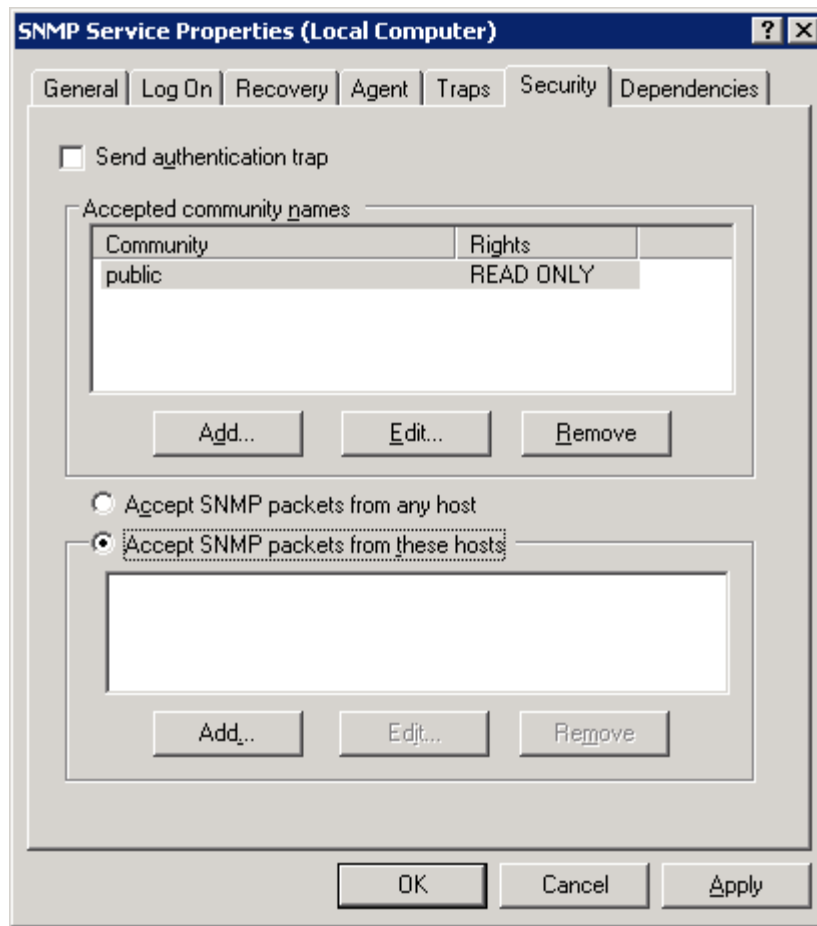
- 1 Install the `net-snmp` package.
- 2 Make sure the `snmpd` service is running.
- 3 Install VA Agent with the SNMP component.

Important: The SNMP option is disabled by default. To enable it in the TUI-based installer, choose custom installation and check the respective box in the component list. To enable it for an unattended installation, add it to the list of components to install. For more information, see *Virtuozzo Automator Installation Guide for Linux*.

To enable SNMP access on a Windows-based Hardware Node, do the following:

- 1 Make sure the `SNMP` service is running.
- 2 Set the `SNMP` service to accept packets from the host you will use to monitor the Hardware Node.

To do that, open the service properties, switch to the **Security** tab and add the necessary host address to the **Accept SNMP packets from these hosts** list.



- 3 Install VA Agent with the SNMP component.

Important: The SNMP option is disabled by default. To enable it in the installer, choose custom installation and check the respective box in the component list. For more information, see *Virtuozzo Automator Installation Guide for Windows*.

Accessing Virtuozzo Objects via SNMP

You can access Virtuozzo Objects with SNMP tools of your choice. Let us examine the procedure on the example of the free Net-SNMP suite.

Note: To translate Virtuozzo numeric OIDs into textual names, make sure the two MIB files, `SWSOFT-SMI.txt` and `SWSOFT-VIRTUOZZO-MIB.txt`, are accessible for your SNMP tools on the machine you monitor Virtuozzo Hardware Nodes from. To do that, you may need to download the MIB files from one of the Hardware Nodes that has VA Agent with the SNMP component installed.

To display the entire Virtuozzo object tree, use the `snmpwalk` command in the Linux console or Windows command prompt. For example:

```
# snmpwalk -m SWSOFT-VIRTUOZZO-MIB -v 1 -c public 10.30.22.58 .1.3.6.1.4.1.26171.1.1
```

Typical output for a Linux Hardware Node may be:

```
SWSOFT-VIRTUOZZO-MIB::vzHWID.0 = STRING: "2ef600c5-17c4-f042-9efe-e13282c53e48"
SWSOFT-VIRTUOZZO-MIB::vzVersion.0 = STRING: 4.0.0
SWSOFT-VIRTUOZZO-MIB::vzLicenseStatus.0 = STRING: ACTIVE
SWSOFT-VIRTUOZZO-MIB::vzEnvID.50 = Gauge32: 50
SWSOFT-VIRTUOZZO-MIB::vzEnvID.111 = Gauge32: 111
SWSOFT-VIRTUOZZO-MIB::vzEnvEid.50 = STRING: "00123d1b-a799-7947-9f11-57e78d8332dd"
SWSOFT-VIRTUOZZO-MIB::vzEnvEid.111 = STRING: "2f211e5b-ca23-5d4f-8111-8ba31831d120"
SWSOFT-VIRTUOZZO-MIB::vzEnvType.50 = STRING: virtuoZZo
SWSOFT-VIRTUOZZO-MIB::vzEnvType.111 = STRING: virtuoZZo
SWSOFT-VIRTUOZZO-MIB::vzEnvName.50 = STRING: pva-mn-77.sw.ru
SWSOFT-VIRTUOZZO-MIB::vzEnvName.111 = STRING: CT111
SWSOFT-VIRTUOZZO-MIB::vzEnvDescription.50 = STRING:
SWSOFT-VIRTUOZZO-MIB::vzEnvDescription.111 = STRING: root
SWSOFT-VIRTUOZZO-MIB::vzEnvOS.50 = STRING: .centos-6-x86_64
SWSOFT-VIRTUOZZO-MIB::vzEnvOS.111 = STRING: .centos-6-x86_64
SWSOFT-VIRTUOZZO-MIB::vzEnvOrigSample.50 = STRING: "00000000-0000-0000-0000-000000000000"
SWSOFT-VIRTUOZZO-MIB::vzEnvOrigSample.111 = STRING: "00000000-0000-0000-0000-000000000000"
SWSOFT-VIRTUOZZO-MIB::vzEnvState.50 = INTEGER: running(6)
SWSOFT-VIRTUOZZO-MIB::vzEnvState.111 = INTEGER: running(6)
SWSOFT-VIRTUOZZO-MIB::vzEnvTransition.50 = INTEGER: none(0)
SWSOFT-VIRTUOZZO-MIB::vzEnvTransition.111 = INTEGER: none(0)
SWSOFT-VIRTUOZZO-MIB::ipAddrEntAddress.50.10.30.128.129 = IPAddress: 10.30.128.129
SWSOFT-VIRTUOZZO-MIB::ipAddrEntAddress.111.255.255.255.255 = IPAddress: 255.255.255.255
SWSOFT-VIRTUOZZO-MIB::ipAddrEntNetMask.50.10.30.128.129 = IPAddress: 255.255.255.255
SWSOFT-VIRTUOZZO-MIB::ipAddrEntNetMask.111.255.255.255.255 = IPAddress: 0.0.0.64
SWSOFT-VIRTUOZZO-MIB::envNetworkClass.50.0 = Gauge32: 0
SWSOFT-VIRTUOZZO-MIB::envNetworkClass.50.1 = Gauge32: 1
SWSOFT-VIRTUOZZO-MIB::envNetworkClass.111.0 = Gauge32: 0
SWSOFT-VIRTUOZZO-MIB::envNetworkClass.111.1 = Gauge32: 1
End of MIB
```

Typical output for a Windows Hardware Node may be:

```
SWSOFT-VIRTUOZZO-MIB::vzHWID.0 = STRING: "f76e17a7-dc39-df34-7be0-11f43663e547"
SWSOFT-VIRTUOZZO-MIB::vzVersion.0 = STRING: 4.0.0
SWSOFT-VIRTUOZZO-MIB::vzLicenseStatus.0 = STRING: ACTIVE
SWSOFT-VIRTUOZZO-MIB::vzEnvID.21415 = Gauge32: 21415
SWSOFT-VIRTUOZZO-MIB::vzEnvEid.21415 = STRING: "76207876-d048-4a50-8d03-52a9a5ad8ae6"
SWSOFT-VIRTUOZZO-MIB::vzEnvType.21415 = STRING: virtuoZZo
SWSOFT-VIRTUOZZO-MIB::vzEnvName.21415 = STRING: CT21415
SWSOFT-VIRTUOZZO-MIB::vzEnvDescription.21415 = STRING:
SWSOFT-VIRTUOZZO-MIB::vzEnvOS.21415 = STRING: windows_2008_std_v_sp1-6.0.6001/20090319
SWSOFT-VIRTUOZZO-MIB::vzEnvOrigSample.21415 = STRING: "00000000-0000-0000-0000-000000000000"
SWSOFT-VIRTUOZZO-MIB::vzEnvState.21415 = INTEGER: down(3)
SWSOFT-VIRTUOZZO-MIB::vzEnvTransition.21415 = INTEGER: none(0)
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpace.21415 = Counter64: 273422
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpaceSoft.21415 = Counter64: 512000
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpaceHard.21415 = Counter64: 279984128
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskInodes.21415 = Counter64: 4632712583963967071
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskInodesSoft.21415 = Counter64: 524288000
End of MIB
```

Description of VirtuoZZo Objects

The table below describes VirtuoZZo objects you can monitor:

Object	Description
SWSOFT-VIRTUOZZO-MIB::vzHWID	The Hardware Node unique identifier used by different management tools to identify the Hardware Node.
SWSOFT-VIRTUOZZO-MIB::vzVersion	<PVC> version currently installed on the Hardware Node.
SWSOFT-VIRTUOZZO-MIB::vzLicenseStatus	<PVC> license status.
SWSOFT-VIRTUOZZO-MIB::vzEnvID	Container ID. (The Service Container is always marked as Container 1.)
SWSOFT-VIRTUOZZO-MIB::vzEnvEid	The unique Container ID used by <PVC> tools to identify the Container.
SWSOFT-VIRTUOZZO-MIB::vzEnvType	Container virtualization technology.
SWSOFT-VIRTUOZZO-MIB::vzEnvName	Container hostname.
SWSOFT-VIRTUOZZO-MIB::vzEnvDescription	Container description, if set.
SWSOFT-VIRTUOZZO-MIB::vzEnvOS	OS template the Container is based on.
SWSOFT-VIRTUOZZO-MIB::vzEnvOrigSample	Container original sample unique ID used by <PVC> tools to identify the Container sample.
SWSOFT-VIRTUOZZO-MIB::vzEnvState	Current Container state.
SWSOFT-VIRTUOZZO-MIB::vzEnvTransition	Transitional Container state.
SWSOFT-VIRTUOZZO-MIB::appEntName	Name of a standard application template installed inside the Container.
SWSOFT-VIRTUOZZO-MIB::appEntVersion	Version of a standard application template installed inside the Container.
SWSOFT-VIRTUOZZO-MIB::ipAddrEntAddress	Container IP address.
SWSOFT-VIRTUOZZO-MIB::ipAddrEntNetMask	Container network mask.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpace	Disk space currently consumed by the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpaceSoft	Soft disk space limit set for the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskSpaceHard	Hard disk space limit set for the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskInodes	Number of disk inodes (files, directories, symbolic links) currently used by the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskInodesSoft	Soft disk inodes limit set for the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaDiskInodesHard	Hard disk inodes limit set for the Container.
SWSOFT-VIRTUOZZO-MIB::envQuotaUgid	Number of user/group IDs allowed for Container's internal disk quota. (Disabled for the Service Container.)
SWSOFT-VIRTUOZZO-MIB::envQuotaUgidHard	
SWSOFT-VIRTUOZZO-MIB::envNetworkClass	Network classes currently existing on the Hardware Node.
SWSOFT-VIRTUOZZO-MIB::envNetstatIncomingBytes	Incoming traffic, in bytes, consumed by the Container.
SWSOFT-VIRTUOZZO-MIB::envNetstatIncomingPackets	Incoming traffic, in packets, consumed by the Container.

SWSOFT-VIRTUOZZO-MIB::envNetstatOutgoingBytes

Outgoing traffic, in bytes, consumed by the Container.

SWSOFT-VIRTUOZZO-MIB::envNetstatOutgoingPackets

Outgoing traffic, in packets, consumed by the Container.

Deploying RHCS Failover Cluster Support

Virtuozzo Containers for Linux and Virtuozzo Automator allow you to use Red Hat Cluster Suite (RHCS) on physical servers running the Red Hat Enterprise Server 5 (RHEL 5) operating system. A failover cluster is used to ensure high availability for your Virtuozzo Containers installations. In this type of cluster, each critical service and Container is treated by the RHCS clustering software as a clustered service and, if necessary, failed over from the active cluster node to a standby one.

Generally, the whole process of setting up the clustering service can be divided into the following stages:

- Setting up physical servers with installed Linux operating system;
- Installing and configuring the Red Hat clustering software, including the shared cluster storage device in the cluster;
- Installing Virtuozzo Containers for Linux 4.7 on every physical server;
- Configuring the Linux clustering services, that can be failed over in the event of a hardware or software failure, according to the instructions in the Virtuozzo Containers documentation;
- Installing Virtuozzo Automator 6.1 components on every physical server;
- Configuring the Linux clustering services that can be failed over in the event of a hardware or software failure;

This section provides the instructions on the final stage of setting up the clustering service only. For the information on installing Virtuozzo Automator, refer to the Virtuozzo Automator installation guides. For the information on other stages, refer to the Virtuozzo Containers for Windows documentation.

Creating VA Cluster Services

The configuration procedure supposes the usage of the `system-config-cluster` utility. This is a Linux default utility, which does not need to be additionally installed.

With this utility, you are to add two more services to the cluster configuration - **VA service** and **Power Panel service**. These services are needed to establish a connection between Virtuozzo Automator and the clustering service itself.

Upon opening the program, you will see the Cluster tree with the settings that you must have set to synchronize Virtuozzo Containers with the RHCS Clustering service. By clicking the **Managed**

Resources --> Resources link, you will see the list of already created resource entries. They should be the following:

- IP address, which is unique for all physical servers within the cluster;
- The file system, which is also unique for all the physical servers within the cluster;

Note: As well as one cluster is created for one physical node, one cluster should be created for every resource.

The instructions on adding Virtuozone Automator scripts to the clustering service comprises the following steps:

- Create Virtuozone Automator cluster service/script;
- Create Power Panel cluster service/script;
- Setting up dependencies between the VA scripts and Virtuozone scripts;

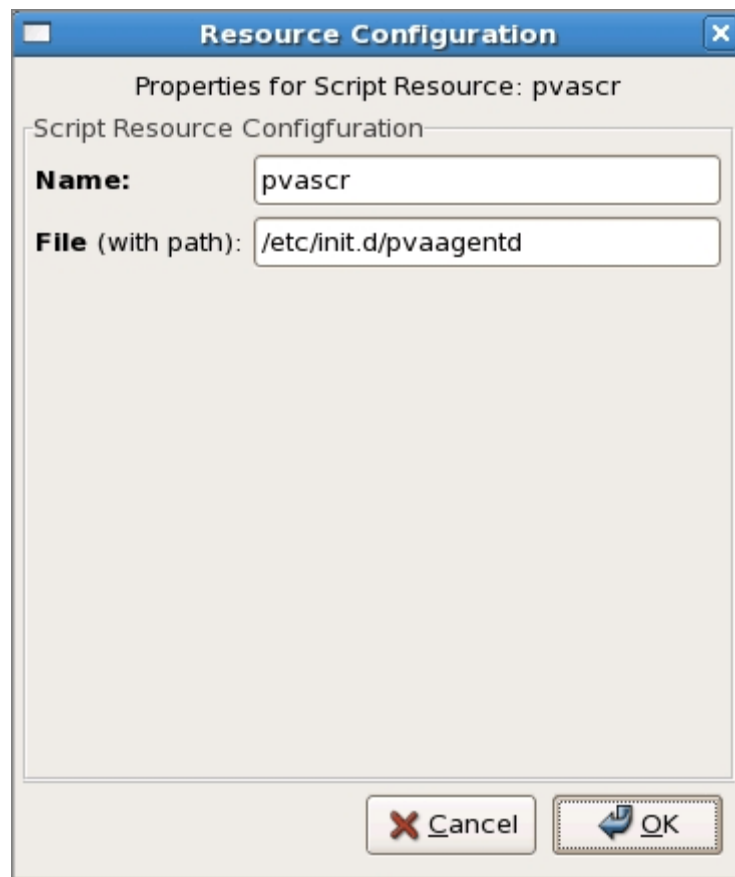
Adding Virtuozone Automator Script

Perform the following actions to register the VA script:

- 1 Log in to any of the physical servers belonging to the cluster and launch the Cluster Configuration Tool as follows:

```
# system-config-cluster
```

- 2 In the utility, choose the **Management Resource --> Resources** section of the tree and click the **Create a Resource** link. This ensures that the newly created resource is put into the correct section among other resources. The Resource Configuration window appears.
- 3 Specify the resource configuration information.
 - Specify the VA script resource name in the **Name** field.
 - Specify the full path where the script file will be located: `/etc/init.d/pvaagentd`. This location is created during the VA Agent installation and should be necessarily specified in this field.



- 4 Click **OK** to save the changes. The VA service script is added to the cluster configuration. Pass on to create the second service script.

Adding Power Panel Script

Perform the same actions to add a Power Panel script to the **Management Resource --> Resources** section as you did with the Virtuozzo Automator script.

Adding Dependency Between Virtuozzo Service and VA Scripts

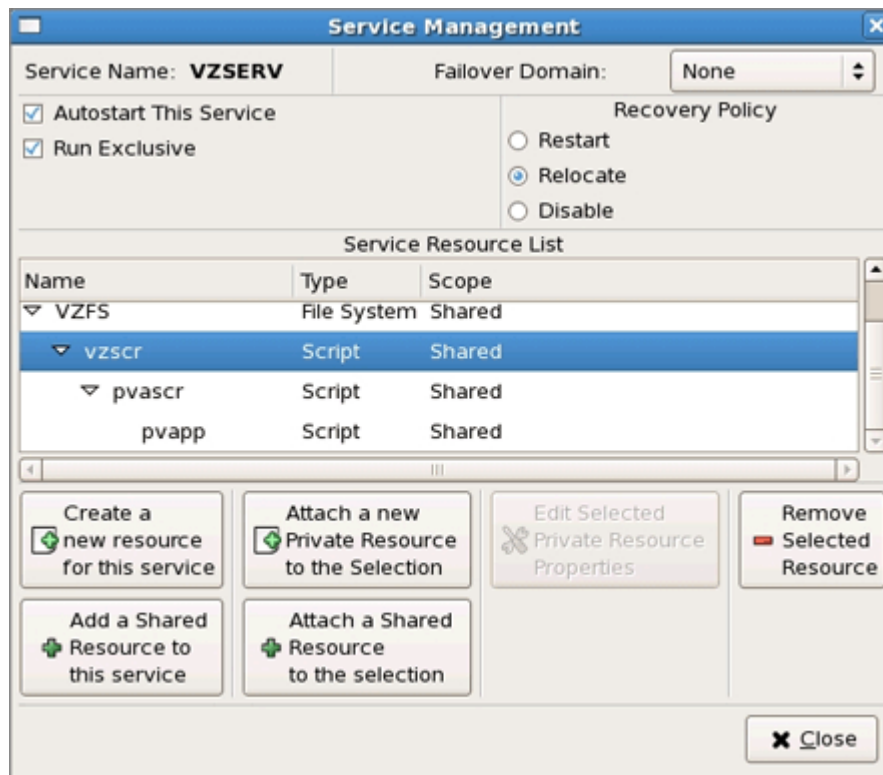
Switch to the **Services** section in the Cluster tree. The final step is to set up the correct dependency relations between the newly created VA cluster scripts and the Virtuozzo services. You are to bind the Virtuozzo Automator script to the Virtuozzo services, and to bind the Power Panel script to the Virtuozzo Automator script. This would mean that Virtuozzo services invoke the VA services every time they are active.

Perform the following actions:

- 1 From the **Services** section, select the Virtuozzo service which should be already created.
- 2 Click the **Edit Service Properties** button. The Service Management window is displayed.

- 3 From the Service Resource List, choose the Virtuozzo script and click the **Attach a Shared Resource to the selection** button. In the picture below, the Virtuozzo service is named `vzscr`.
- 4 From the list of scripts, choose the Virtuozzo Automator script and add it. The dependency between the VA script and the Virtuozzo resource is created. The Service Management screen is displayed again.
- 5 Bind the Power Panel script with the VA script by selecting the VA script in the list of service resources and clicking the **Attach a Shared Resource to the selection** button.
- 6 From the list of scripts, choose the Power Panel script and add it. The dependency between the PP script and the VA script is created.

After you have built up all the necessary connections between the scripts, they should have the following look. The `vzscr` stands for the Virtuozzo services, the `pvascr` - for the Virtuozzo Automator services; the `pvapp` - for the Power Panel services.



- 7 Click **Close** to save the changed cluster configuration.
- 8 Save the current cluster configuration by clicking **File --> Save** on the main menu of the Cluster Configuration Tool.
- 9 Reboot all physical servers in the cluster.

Troubleshooting

Virtuozzo Automator is an indispensable means for solving various kinds of problems related to the virtual environment functioning. It is still more flexible due to its ability to work with not running virtual environments. The common groups of problems lending themselves readily to be handled by Virtuozzo Power Panel boil down to the following:

- Services inaccessibility;
- Elusive problems.

You can also consult the **Network Problems** section to try to find out why the virtual environment is inaccessible by network, and the **File Problems** section.

Note: The problem situations described in this chapter mainly concern virtual environment with the Linux operating system installed. However, it can be also of use for those managing the virtual environments running Windows 2003 Server.

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Services Inaccessibility

Various tasks you are accustomed to perform by means of a virtual environment (accessing your website or sending email and the like) may fail if the corresponding services are inaccessible.

Try consecutively the following three steps to determine the reason for this and do away with the trouble:

- 1 Check if the virtual environment is running. To this effect, log in to Virtuozzo Automator and check the virtual environment status in the **Status** field in the **virtual environment** (p. 51) table or in the **Virtual Environment Summary** table on the Container dashboard. You can also

determine if the virtual environment is running or down with the help of the **Service Unavailable** screen by clicking the corresponding link provided on this screen. If the virtual environment is down, click the **Start/Stop Virtual Environment** link on the menu and press the **Start Virtual Environment** button. Wait a little for the virtual environment and all the services to start.

- 2  Go to the **Services** (p. 82) page and check the status of the service in question. The service must be running for the corresponding functionality to be accessible. For example, `psa` and `mysqld` must be running for the Plesk control panel to handle your requests, `httpd` - for your web site to function properly, `sshd` - for the virtual environment to be accessible by `ssh`, `sendmail` - for you to be able to send email, `popa3d` - to receive email by the POP3 protocol, etc. You may also try to stop the `iptables` service to see if it solves the problem, because some `iptables` rules might prevent certain network connections.
- 3 Go to the **Resources** page to determine if the virtual environment is short of any resources. If some of the resources are marked yellow or red, this is a hazardous situation that should be resolved immediately.


If the Plesk control panel is installed inside the virtual environment you are managing and you are working with this panel, the **Service Unavailable** screen may sometimes be displayed when you are trying to perform this or that Plesk-related operation. This situation is normally handled as described above. However, in case none of the recommended measures works, you may have to reinstall the Plesk control panel into the virtual environment, as the Plesk installation might be corrupted.

Network Problems

Problem

The virtual environment you want to manage is inaccessible by its hostname or IP address.

Solution

- If you are using the hostname, try to use the IP address, and vice versa.
- Ping the inaccessible virtual environment.
- Log in to Virtuozzo Automator and check the problem virtual environment hostname and IP address.
- Log in to Virtuozzo Automator and change the virtual environment root/Administrator password (p. 105).
-  Log in to Virtuozzo Automator and disable the `iptables` service inside the problem virtual environment.

Note: Remember that each virtual environment user with the privileges of an administrator exercises full control over his/her virtual environment, has his/her own user credentials (name and password) to access the virtual environment and enjoys an unlimited access to other user accounts inside this virtual environment, i.e. s/he has any right granted to a privately owned physical server as opposed to the physical server administrator's authority or the rights of the other virtual environments users in regard to

the given virtual environment. Any virtual environment user can be a member of an Active Directory domain (e.g. access any of the network shares to which the virtual environment user has rights).

Backup Problems

Problem

On the backup Node, some of the multiple scheduled backup tasks fail with the "unauthorized request" error.

Solution

This may be caused by the VA Agent's limit for the amount of simultaneous sessions on the backup Node. Set to 20 by default, the limit may be too low for multiple backup tasks. Try raising the VA Agent's limit for the amount of simultaneous sessions on the backup Node. To do it, add the `<user_session_limit>` parameter to the `<sessionm>` section of the `/var/opt/pva/agent/etc/vzagent.conf` file. For example:

```
<sessionm>
<configuration>
<user_session_limit>200</user_session_limit>
...
</configuration>
</sessionm>
```



Propagate this adjustment to every backup Node involved.

Invalid Credentials

Problem

A Virtuozzo internal user who is given the right to manage a particular virtual environment cannot log in to this virtual environment via Virtuozzo Power Panel.

Solution

To log in to Virtuozzo Power Panel, an internal user's credentials should be used ( root/ Administrator). The users defined outside this particular virtual environment cannot log in to it by means of Virtuozzo Power Panel.

File Problems

Virtuozzo Automator is tuned to not allow giant files to be uploaded to virtual environments or the physical server. This setting can be controlled in the `/etc/httpd/conf/httpd.conf` file inside the Service virtual environment:

```
# grep Limit httpd.conf
LimitRequestBody 536870912
```

The `LimitRequestBody` parameter specifies the maximal file size (in bytes) allowed to be uploaded to a virtual environment by means of Virtuozzo Automator. The default value of the example above is 512 Mb. If you need to allow virtual environment administrators to upload larger (or smaller, for that matter) files to their virtual environments, change this value at your discretion. If the parameter is absent, just add it to the file.

Listing Users

Problem

When viewing a list of users on the **Users** tab of the Virtuozzo Automator **Security** module, the list is empty.

Solution

- Check if the authentication database the users of which you are trying to view is empty. If the database is empty, no users will be displayed in Virtuozzo Automator.
- If the database is not empty, check if the users in this authentication database have the `objectClass=user` attribute set. Some LDAP databases employ other attributes, in which case their users will not be displayed in Virtuozzo Automator. If it is possible, set this attribute manually for the users to be displayed in Virtuozzo Automator.
- Try to delete the authentication database from Virtuozzo Automator and register it again changing the value of the **Domain** parameter. If you indicated the domain when registering the database for the first time, leave this field empty this time. And vice versa, if you didn't indicate the domain during the first registration, fill it in this time.

Group Operations

Problem

Some Virtuozzo Automator functions work incorrectly if two or more physical servers are registered. Among these functions are viewing logs, viewing top resource-using virtual environments, managing licenses, and some others.

Solution

Many Virtuozzo Automator group operations rely on the system time being synchronized among all the physical servers constituting the Group. If the physical servers have different system time, various problems might occur. You should keep the system time synchronized among the physical servers with the help of built-in operating system tools or third-party solutions.

Elusive Problems

Sometimes it is hard to determine the exact reason for a problem. The problem might persist despite any actions undertaken. Such problems call for going back to an earlier state of the virtual environment with these problems missing. This change-over is usually effected by means of:

- Restoring the Container from a working backup (p. [154](#));
- Reinstalling the Container (p. [101](#));

Note: It is for you to decide which way suits you most. Generally, these two options are applicable if you can start your Container to copy the valuable information from it. To assure a safe data saving in the situation where you cannot start the Container, repairing your Container is the most advisable problem-solving option.

- Mounting your Container in the repair mode and copying the valuable personal data to a secure place outside the Container. Using the repair mode is covered in **Repairing Containers** (p. [102](#)).

Getting Support

On the **Support** page, you can, without any technical assistance, check the versions of the installed VA modules and the available updates, or report a problem if necessary.

The **Installed Modules** table provides information on the versions and releases for the installed components.

The **Tasks** table provides you with the following options:

- **Check updates.** Click the link to see the up-to-date status of the physical servers and to update them if necessary.
- **Report a problem.** Click the link to file in a problem report (p. [295](#)).

The **Search Virtuozzo Knowledge Base** sections allows you to find a solution article on your own.

Reporting Problems to Technical Support

Virtuozzo Automator enables you to send detailed problem reports to the Virtuozzo support team. Each problem report you are sending to the Virtuozzo support team should correspond to a ticket in the Virtuozzo helpdesk ticketing system.

Note: You should have a valid support contract with Virtuozzo to be able to send problem reports from Virtuozzo Automator.

Specifying Contact Information and Problem Details

On this step of the **Report Problem** wizard you provide your contact information and describe the problem.

Filling out the **Your Contact Information** section, make sure you provide a valid e-mail address. Otherwise, the Virtuozzo support team will not be able to contact you.

Next, fill out the **Problem Details** section. In the **Subject** field, provide a brief description of the problem. To add more details, use the **Problem Description** field. If there is an open support issue in the Virtuozzo ticket reporting system, specify the ticket ID in the **Existing Problem Report** section.

Having filled out all the required fields, click **Report** to send the information to Virtuozzo technical support.

Getting Report Status and Problem ID

After the necessary information has been collected and dispatched to the Virtuozzo technical support team, you will be provided with the ID of your problem. This ID will help you uniquely identify the problem when contacting the Virtuozzo support team later on.

Note: In some cases, when a problem report cannot be automatically sent to the Virtuozzo support team (e.g., due to Internet connection issues), you will receive a warning message with a path to the generated problem report on the physical server. Please submit the generated report to the Virtuozzo support team manually at virtuozzo.com.

Having saved the problem ID, click **Close** to get back to the **Support** dashboard.

Submitting Error Codes

If, at some point of your Virtuozzo Automator session, you encountered an error with a particular number, the **Error Codes** tab of the **Management -> Support** screen lets you get more information on this error by entering its code in the corresponding field in the **Enter Error Code** section and clicking **Submit**. In the **Error Details** section this will display:

- the code of the error;
- the problem it refers to;
- the cause of the error;
- and the standard approach to how to deal with this problem.

For more details on these errors, see **Error Codes Reference**.

Error Codes Reference

If, when performing an operation in Virtuozzo Automator, you are presented with an unknown error code, refer to the following table:

Code	Problem	Reason	Solution
900	Any problem not specified in this table.	Unknown	Click the Actions Logs link in the Other group of options. On the Actions Logs screen click the Details link of the problem virtual environment. In the pop-up window you will find the information on all the operations performed on this virtual environment. Use these logs to single out an operation likely to be the source of the error.
1001	The password reminder is not available.	The mail relay server is not specified.	Log in to Virtuozzo Automator as the administrator, go to the Hardware Node/Configuration/Email and Notifications screen and fill in the Relay Server IP Address field.
1002	The password reminder is not available.	Email notifications are disabled by the administrator.	Log in to Virtuozzo Automator as the administrator, go to the Configuration Manager/Messaging screen, and select the Enable Email Notifications check box.
1003	A virtual environment user cannot log in to Virtuozzo Automator.	The communication with vzadmin/Authm is broken.	Log in to the physical server as root and run the <code>./vzagent_ctl restart</code> command.
1004	A user cannot log in to a virtual environment via the Plesk control panel.	The communication with the Plesk control panel is broken.	Click the Plesk control panel link on the Container dashboard, the Services tab, to start the Plesk control panel in the virtual environment.
1005	The password restoration is not available.	The communication with the Plesk control panel is broken.	Click the Plesk control panel link on the Container dashboard, the Services tab to start the Plesk control panel in the virtual environment.
1100	Placing a request for a virtual environment completed with an error.	VZA/mailc, a Virtuozzo Automator component, returned an error when Virtuozzo Automator tried to send an email notification	Most likely, the relay server IP address is wrong. In this case, you need to log in to Virtuozzo Automator as the physical server administrator, go to the Hardware Node/Configuration/Email and Notifications screen and edit the relay server IP address value. If it does not help, look at <code>vzcp/vzagent.log</code> and find the full

			error description received after the mail/post/message command.
--	--	--	---

Downloading Documents and Software

The **Downloads** page allows you to download a set of documents on the current release of the Virtuozzo virtual environments software, including the **Virtuozzo Automator** and **Virtuozzo Power Panel** guides, as well as additional software for managing your physical server and all virtual environments residing on it. To this effect, click the corresponding button in the displayed window.

Setting Up Support Channel

The Virtuozzo Automator software provides you with an ability to establish a private secure connection to the Virtuozzo support team server via a support channel. After establishing such a channel, the support team will be able to quickly and securely connect to your physical server to diagnose and solve your problem. The secure connection to your computer is achieved through a Virtual Private Network (VPN) created between the Virtuozzo support team server and your physical server. The **Support Channel** page is invoked by clicking the physical server name on the left Virtuozzo Automator menu and following the **Support Channel** link in the **Tasks** table.

Note: The functionality is available for Linux physical servers only.

To establish the channel, you should ask Virtuozzo for a special certificate which will uniquely identify you as a Virtuozzo user. Certificates are issued by Virtuozzo in the form of files and should be installed on your physical server. Requesting and further installing the certificate as well as establishing or abolishing the support channel is available on the **Support Channel** page.

To request a certificate, you need to follow the link in the **Support Certificate** section and fill in the form on the opened page. Enter your name, company name, email address and phone number in the corresponding fields. You may also type in your sales representative name and give comments related to the problem you have come across in the appropriate fields. Click **Submit** to forward the request form when you are done.

On receiving the certificate at the email address specified in the form described above, upload the certificate text file on your local computer.

Before you can install this certificate on the physical server, you should adjust its content (p. [299](#)).

Then you need to go back to the **Support Channel** page and click **Install New Certificate**. On the displayed screen, browse for the certificate file on your computer and click **Submit** to install it on your physical server. You are free to set the support channel now.

The **Support Channel** page allows you to view the status of the support channel (established/canceled). To set a support channel, click the **Establish Channel** button. Likewise, the channel is called off by clicking **Close Channel**.


Adjusting Certificates for Installation

Upon receiving the certificate file from the Virtuozzo support, you should save it on the Master server. If you have saved it on another computer, just transmit it and put it to the following location:

```
SSLCertificateFile /etc/httpd/conf/ssl.crt/server.crt
SSLCertificateKeyFile /etc/httpd/conf/ssl.key/server.key
```

After that you can install the new certificate and establish a support channel.

Installing Certificate on Physical Server

 After you have requested a certificate (p. 298) to establish a support channel and saved the certificate text file on the Master Server computer (p. 299), you need to install it on your physical server for the Virtuozzo technical support to identify you as a Virtuozzo user. Only then you will be able to establish the private secure connection to the technical support. The **Install New Certificate** page enables you to browse for the certificate text file on your computer and further install it on the physical server by clicking the **Submit** button.

When the operation is successfully completed, move up to the **Support Channel** page and establish the secure connection to the technical support team as instructed.

Searching for Screens

The **Screen Finder** tab of the **Support** window allows you to quickly find the necessary screen in Virtuozzo Automator, learn about its purpose and the way to access the screen. You might need this functionality to quickly determine the screen by its ID (for example, when coming across screen IDs in support-related correspondence) or to find out the place where this or that Virtuozzo Automator feature can be accessed.

The available search parameters are the following:


- **ID** - The screen identifier found in the top right corner of every Virtuozzo Automator screen.
- **Title** - The screen title provided in bold font in the top left corner of every Virtuozzo Automator screen or as the tab name (if the main screen has multiple tabs).
- **Description** - The screen description provided directly under the screen title in regular typeface.

You should indicate the parameter by which you wish to search for the screen in the corresponding field and click the **Find Screen** button. After a while, the information on all the screens matching the entered parameter will be displayed. This includes the exact ID, title, and description of the screen as well as the way to access it in Virtuozzo Automator.

Glossary

Application template is a template used to install a set of applications in virtual environments. See also *Template*.

Container is a virtual private server, which is functionally identical to an isolated standalone server, with its own IP addresses, processes, files, its own user database, its own configuration files, its own applications, system libraries, and so on. Containers share one *physical server* (or *Hardware node*) and one OS kernel. However, they are isolated from each other. A Container is a kind of 'sandbox' for processes and users.

EZ template  is a template file that points to a repository with the packages that comprise the template. Unlike *standard templates*, EZ templates cannot be updated because the repository stays the same. However, the packages (these are "standard templates") in the repository can be updated.

Hardware Node is a *physical server* where the Virtuozzo virtual environment software is installed for hosting virtual environments. Sometimes, it is marked as *Container 0*. In the interface, the *Hardware Node* term is used, while in the help *physical server* is being used.

Hardware Virtualization is the simulation of a hardware environment. In Virtuozzo Automator documentation, regards the hardware capabilities, primarily the physical server processors.

Host Operating System (or *Host OS*) is an operating system installed on the *physical server*.

MAC address stands for Media Access Control address, a hardware address that uniquely identifies each *physical server* in a network. The MAC layer interfaces directly with the network media. Consequently, each different type of network media requires a different MAC layer.

Management Node. An obsolete designation of *Management Server*.

Master Server. A physical server where the Virtuozzo Automator Management Server component is installed.

OS template (or *Operating System template*) is used to create new virtual environments with a preinstalled operating system. See also *Template*.

Package set is a synonym for *Template*.

Virtuozzo Automator is a tool designed for managing *physical server* and all virtual environments residing on them with the help of a standard Web browser on any platform.

Virtuozzo Agent (or *Virtuozzo Agent Protocol*) is an XML-based protocol used to monitor and manage a *physical server*..

Virtuozzo Power Panel is a means for administering personal virtual environment with the help of a standard Web browser (Internet Explorer, Mozilla, etc.) on any platform.

Virtuozzo Containers is a complete server automation and virtualization solution allowing you to create multiple isolated *Containers* on a single physical server to share hardware, licenses, and management effort with maximum efficiency.

Private area is a part of the file system where virtual environment files that are not shared with other virtual environments are stored.

Software Virtualization, in Virtuozzo Automator documentation, stands for the Virtuozzo software virtualization products, such as Virtuozzo Containers for Linux and Windows, Server Bare Metal, etc.

SSH stands for Secure Shell. It is a protocol for logging on to a remote machine and executing commands on that machine. It provides secure encrypted communications between two untrusted hosts over an insecure network.

Standard template is a template file that has inside itself all the re-usable files of all the packages comprising the template. If newer versions of any of these packages appear, a standard template can be correspondingly updated. Compare *EZ template*.

TCP (TCP/IP) stands for Transmission Control Protocol/Internet Protocol. This suite of communications protocols is used to connect hosts on the Internet.

Template (or *package set*) is a set of original application files (packages) repackaged for mounting over Virtuozzo File System. There are two types of templates. OS Templates are used to create new virtual environments with a preinstalled operating system. Application templates are used to install an application or a set of applications in virtual environments. See also *Standard template* and *EZ template*.

UBC is an abbreviation of *User Beancounter*.

User Beancounter is the subsystem of the *Virtuozzo Containers* software for managing *Container* memory and some system-related resources.

VENET device is a virtual networking device, a gateway from a virtual environment to the external network.

Virtuozzo Control Center (or *VZCC*) is an obsolete designation of *Virtuozzo Automator*.

Virtuozzo File System (VZFS) is a virtual file system for mounting to *Container* private areas. VZFS symlinks are seen as real files inside *Containers*.

Virtuozzo Containers and Virtuozzo host license is a special license that you should load to the *Hardware Node* to be able to start using the virtual environments software. Every *Hardware Node* shall have its own Server license.

Slave Server. It is a dedicated physical server that has one of the Virtuozzo virtual technologies installed.

Virtual Machine. The computer that is emulated using Virtuozzo virtualization technology, it is functionally identical to an isolated standalone server. A virtual machine has its own virtual hardware and requires an operating system to control its hardware. The installed operating system and its applications are isolated inside the virtual machine and share physical hardware resources of the physical server where the virtual machine resides.

Virtual Private Server (or VPS) is an obsolete designation of a virtual environment.

Virtual Environment. Is a generic name for virtual machines and Containers.

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