
Parallels

Parallels Virtuozzo Containers for Linux

Installation Guide

Version 4.0



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CHAPTER 1

Preface

In This Chapter

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About Parallels Virtuozzo Containers

Parallels Virtuozzo Containers is a patented OS virtualization solution. Virtuozzo Containers 4.0 creates isolated partitions or Containers on a single physical server and OS instance to utilize hardware, software, data center and management effort with maximum efficiency. The basic Virtuozzo capabilities are:

- **Intelligent Partitioning** - Division of a server into as many as hundreds of Containers with full server functionality.
- **Complete Isolation** - Containers are secure and have full functional, fault and performance isolation.
- **Dynamic Resource Allocation** - CPU, memory, network, disk and I/O can be changed without rebooting.
- **Mass Management** - Suite of tools and templates for automated, multi-Container and multi-server administration.

The diagram below represents a typical model of the Virtuozzo-based system structure:

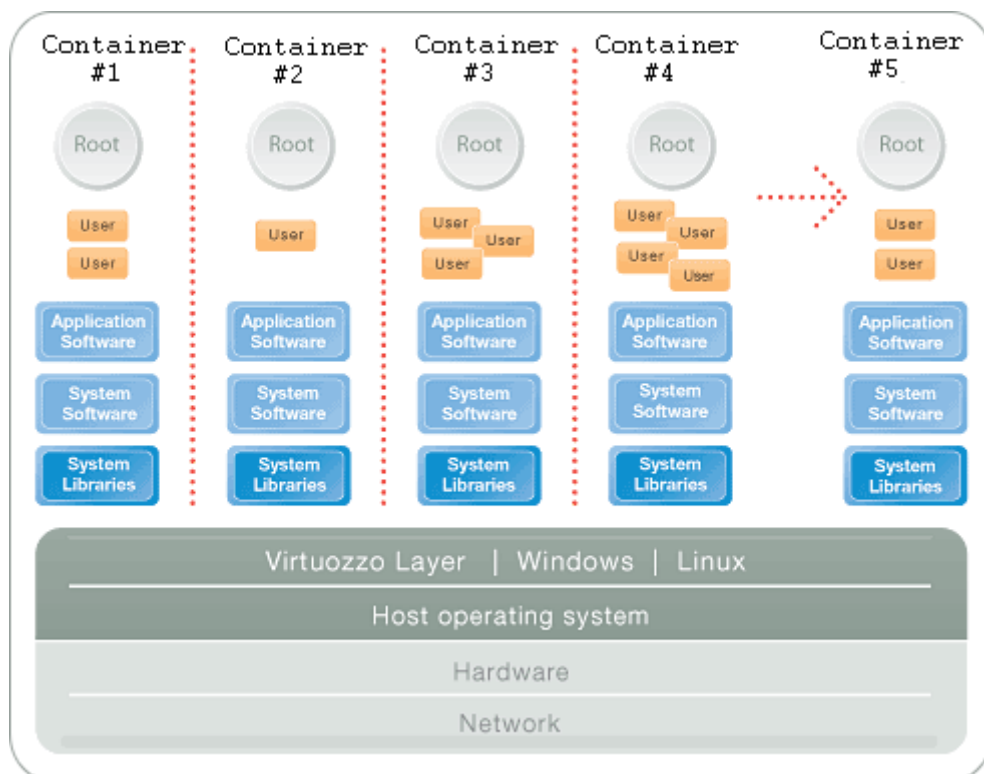


Figure 1: Virtuozzo Containers OS Virtualization

The Parallels Virtuozzo OS virtualization model is streamlined for the best performance, management, and efficiency. At the base resides a standard Host operating system which can be either Windows or Linux. Next is the virtualization layer with a proprietary file system and a kernel service abstraction layer that ensure the isolation and security of resources between different Containers. The virtualization layer makes each Container appear as a standalone server. Finally, the Container itself houses the application or workload.

The Parallels Virtuozzo OS virtualization solution has the highest efficiency and manageability making it the best solution for organizations concerned with containing the IT infrastructure and maximizing the resource utilization. The Parallels Virtuozzo complete set of management tools and unique architecture makes it the perfect solution for easily maintaining, monitoring, and managing virtualized server resources for consolidation and business continuity configurations.

About This Guide

This guide provides exhaustive information on the process of installing, configuring, and deploying Parallels Virtuozzo Containers 4.0 for Linux on your system including the prerequisites and the stages you shall pass.

The primary audience for this book is anyone interested in installing and putting Virtuozzo Containers 4.0 in operation on their servers. To fully understand the guide, you should have strong Linux system administration habits. Still, no more than superficial knowledge of Linux OS is required in order to learn to perform the basic installation operations.

Organization of This Guide

Chapter 2, Preliminary Operations, explains the fundamentals of planning your Virtuozzo system, describes hardware and software requirements your system should meet, and sketches out the steps required to successfully install Virtuozzo Containers 4.0.

Chapter 3, Installing Virtuozzo Containers 4.0 on Hardware Node, familiarizes you with the way to install Parallels Virtuozzo Containers on the Hardware Node including the installation and configuration of both the root operating system and Virtuozzo Containers software itself.

Chapter 4, Setting Virtuozzo Tools to Work, provides information on how to set up Parallels Management Console and Parallels Infrastructure Manager - tools for managing your Hardware Nodes and Containers residing on them.

Documentation Conventions

Before you start using this guide, it is important to understand the documentation conventions used in it. For information on specialized terms used in the documentation, see the Glossary at the end of this document.

The table below presents the existing formatting conventions.

Formatting convention	Type of Information	Example
Triangular Bullet(▶)	Step-by-step procedures. You can follow the instructions below to complete a specific task.	<i>To create a Container:</i>
Special Bold	Items you must select, such as menu options, command buttons, or items in a list.	Go to the Resources tab.
	Titles of chapters, sections, and subsections.	Read the Basic Administration chapter.
<i>Italics</i>	Used to emphasize the importance of a point, to introduce a term or to designate a command line placeholder, which is to be replaced with a real name or value.	These are the so-called <i>EZ templates</i> . To destroy a Container, type <code>vzctl destroy ctid</code> .
Monospace	The names of commands, files, and directories.	Use <code>vzctl start</code> to start a Container.
Preformatted	On-screen computer output in your command-line sessions; source code in XML, C++, or other programming languages.	<pre>Saved parameters for Container 101</pre>
Monospace Bold	What you type, as contrasted with on-screen computer output.	<pre># rpm -V virtuozzo-release</pre>
CAPITALS	Names of keys on the keyboard.	SHIFT, CTRL, ALT
KEY+KEY	Key combinations for which the user must press and hold down one key and then press another.	CTRL+P, ALT+F4

Besides the formatting conventions, you should also know about the document organization convention applied to Parallels documents: chapters in all guides are divided into sections, which, in turn, are subdivided into subsections. For example, **About This Guide** is a section, and **Documentation Conventions** is a subsection.

Getting Help

In addition to this guide, there are a number of other resources shipped with Virtuozzo Containers 4.0 which can help you use the product more effectively. These resources include:

- **Manuals:**
 - **Parallels Virtuozzo Containers Evaluation Guide.** This guide is destined to introduce you to the main features of Virtuozzo Containers 4.0 and to its underlying technology, to help you set up an environment for evaluating the Virtuozzo major features, and to suggest the relevant procedures for this evaluation.
 - **Getting Started With Parallels Virtuozzo Containers for Linux.** This guide provides basic information on how to install Parallels Virtuozzo Containers 4.0 on your server, create new Containers, and perform main operations on them. As distinct from the given guide, it does not contain detailed description of all the operations needed to install and set Parallels Virtuozzo to work (e.g. planning the structure of your Virtuozzo network or performing the Virtuozzo Containers unattended installation).
 - **Parallels Virtuozzo Containers for Linux User's Guide.** This guide provides comprehensive information on Virtuozzo Containers 4.0 covering the necessary theoretical conceptions as well as all practical aspects of working with Parallels Virtuozzo Containers. However, it does not deal with the process of installing and configuring your Virtuozzo system.
 - **Parallels Virtuozzo Containers for Linux Templates Management Guide.** This guide is meant to provide complete information on Virtuozzo templates - an exclusive Parallels Virtuozzo technology allowing you to efficiently deploy standard Linux applications inside your Containers and to greatly save the Hardware Node resources (physical memory, disk space, etc.).
 - **Parallels Virtuozzo Containers for Linux Reference Guide.** This guide is a complete reference on all Virtuozzo configuration files and Hardware Node command-line utilities.
- **Help systems:**
 - **Parallels Management Console Help.** This help system provides detailed information on Parallels Management Console - a graphical user interface tool for managing Virtuozzo Hardware Nodes and their Containers.
 - **Parallels Infrastructure Manager Online Help.** This help system shows you how to work with Parallels Infrastructure Manager - a tool providing you with the ability to manage Virtuozzo Hardware Nodes and their Containers with the help of a standard Web browser on any platform.
 - **Parallels Power Panel Online Help.** This help system deals with Parallels Power Panel - a means for administering individual Containers through a common Web browser on any platform.

Feedback

If you spot a typo in this guide, or if you have thought of a way to make this guide better, we would love to hear from you!

The ideal place for your comments and suggestions is the Parallels documentation feedback page (<http://www.parallels.com/en/support/usersdoc/>).

CHAPTER 2

Preliminary Operations

This chapter familiarizes you with the basics of planning your Virtuozzo system, describes hardware and software requirements your system should meet, and sketches out the stages you should pass to successfully install Virtuozzo Containers 4.0 on your server.

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Planning Your Virtuozzo System

Before installing the product, you should carefully plan the structure of your Virtuozzo network and the role(s) the individual computers are to perform in it. This will help you avoid many problems related to the Virtuozzo support maintenance and successfully solve the problems, if they appear.

The principal roles of computers in a Virtuozzo network are the following:

- 1 **Hardware Node.** It is a server with the Virtuozzo Containers software installed that houses a certain number of Containers.
- 2 **Parallels Management Console workstation.** It is a computer running a Windows OS with Parallels Management Console installed. It may be located virtually everywhere on the Internet and serves for the remote administration of your Hardware Nodes.
- 3 **Parallels Infrastructure Manager client.** It is a computer providing you with the ability to manage Hardware Nodes and all their Containers residing on it with the help of a standard Web browser on any platform. The only requirement this computer should meet is to be able to connect to the Hardware Node and run a Web browser supported by Virtuozzo Containers 4.0.
- 4 **Backup Node.** It is a server used to store Containers backups on its hard disks.

Graphically, a typical Virtuozzo system may be represented as follows:

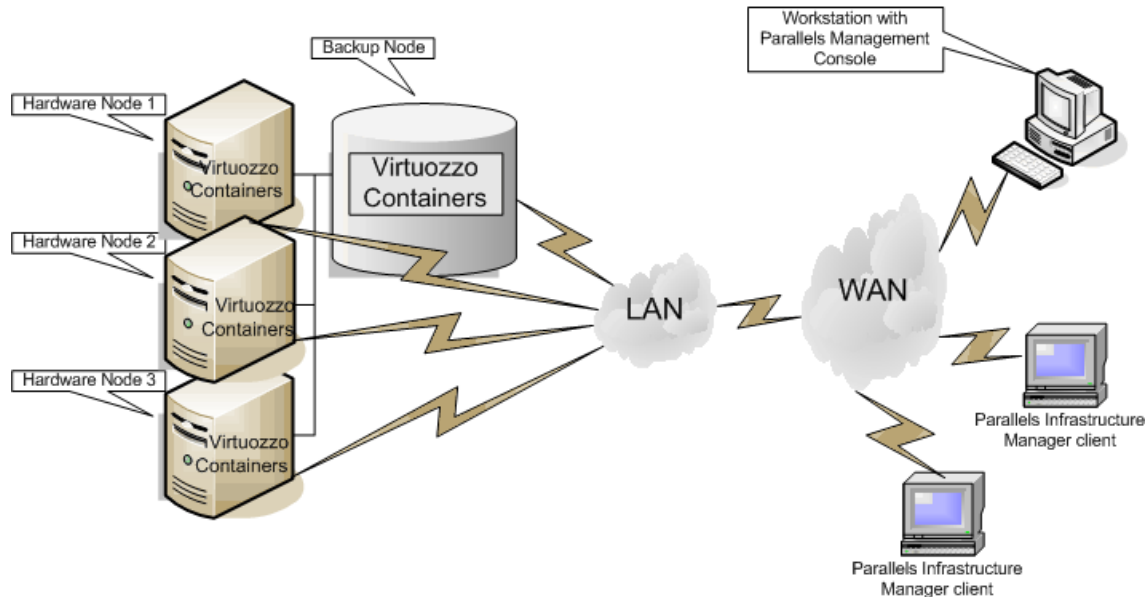


Figure 2: Virtuozzo System Configuration Scheme

This picture shows the configuration with a network consisting of a number of Hardware Nodes and a server performing the functions of the Backup Node, respectively. As a rule, you are supposed to have several Virtuozzo-based physical servers; however, you may have only one dedicated server to effectively use Virtuozzo Containers 4.0. All the Hardware Nodes have separate Virtuozzo licenses installed and host a number of Containers. All Containers residing on the Hardware Nodes can be migrated from one Node to another with near-zero downtime; so, you can easily move all Containers from a Node in case of its upgrading or for any other purpose.

The Backup Node is a server intended for storing the backups of all your Containers. Generally, any Hardware Node can be assigned an additional role of the Backup Node. However, we recommend that you set up a dedicated server to serve as the Backup Node (which is shown in the picture above). The Backup Node should have high-capacity hard drives to be able to store the Containers backups on them.

Apart from the aforementioned servers, you can make use of the following computers to remotely manage the Hardware Node(s) and Containers:

- A workstation with Parallels Management Console installed. A Parallels Management Console workstation allows you to control multiple Hardware Nodes, to manage all their Containers, and to monitor the system.
- A workstation where Parallels Infrastructure Manager is launched in a standard Web browser, which enables you to perform all the main operations on your Hardware Nodes and inside their Containers.

The picture above shows only one of the possible configurations you may choose while planning your Virtuozzo network. You can hold to this scheme or work out your own one and build your own Virtuozzo system. You may, as a matter of fact, assign all the roles to one and the same Hardware Node, although you are not recommended to. The only requirement that you should fulfill while planning any Virtuozzo network is to make sure that all the Nodes running Virtuozzo Containers 4.0 are accessible from the other participating workstations.

Installation Requirements

After deciding on the structure of your Virtuozzo system, you should make sure that all the Hardware Nodes where you are going to deploy Virtuozzo Containers 4.0 for Linux meet the following system (hardware and software) and network requirements.

System Requirements for 32-bit Version of Virtuozzo Containers

This subsection focuses on the hardware and software requirements for the 32-bit version of Virtuozzo Containers for Linux software product.

Hardware Compatibility

The Hardware Node requirements for the standard 32-bit edition of Virtuozzo Containers are the following:

- IBM PC-compatible server;
- Intel Celeron, Pentium III, Pentium 4, Xeon, or AMD Athlon CPU;
- At least 128 MB of RAM;
- Hard drive with at least 15 GB of free disk space;
- Network card. A complete list of network cards supported in Virtuozzo Containers 4.0 can be found at <http://www.swsoft.com/en/products/virtuozzo/hcl/network/>. This list is constantly updated, so you may check back periodically.
- SCSI controllers, for example. A complete list of SCSI controllers supported in Virtuozzo Containers 4.0 can be found at <http://www.swsoft.com/en/products/virtuozzo/hcl/other/>. This list is constantly updated, so you may check back periodically.

Note: If you are considering using one of the Virtuozzo Containers 64-bit editions, you should consult your Parallels representative about the supported hardware. You can also find a list of 64-bit processors currently supported by Virtuozzo Containers 4.0 in the **List of Supported 64-bit Processors** subsection (p. 16).

The exact server configuration depends on how many Containers you are going to run on the server and what load these Containers are going to produce. Thus, in order to choose the right configuration, please follow the recommendations below:

- CPUs. The more Containers you plan to run simultaneously, the more CPUs you need.
- Memory. The more memory you have, the more Containers you can run. The exact figure depends on the number and nature of applications you are planning to run in your Containers.
- Disk space. Each Container occupies 40–150 MB of hard disk space for system files in addition to the user data inside the Container (for example, web site content). You should consider it when planning disk partitioning and the number of Containers to run.

Software Compatibility

Virtuozzo Containers 4.0 can be installed on the Hardware Node running one of the following Linux distributions with the 2.6 kernel:

- Red Hat Enterprise Linux 4
- Red Hat Enterprise Linux 5
- CentOS 4
- CentOS 5
- Fedora 7
- Fedora 8
- SUSE Linux Enterprise Server 10 (with or without Service Pack 1)
- SUSE Linux Enterprise Desktop 10 (with or without Service Pack 1).

Note: If you are going to install Parallels Virtuozzo 4.0 on a server running a SUSE-based operating system (e.g. SUSE Linux Enterprise Server 10 with Service Pack 1), please make sure that the IPv6 module is enabled on this server; otherwise, you will not be able to load the Virtuozzo kernel.

This requirement does not restrict the ability of Virtuozzo Containers 4.0 to provide other Linux versions as an operating system for Containers. The Linux distribution installed in a Container may differ from that of the host OS.

If your Hardware Node is already running Virtuozzo Containers 3.0, the following upgrades to Virtuozzo Containers 4.0 are possible (with upgrading to the 2.6 kernel):

- Red Hat Enterprise Linux 3
- Red Hat Enterprise Linux 4
- CentOS 3
- CentOS 4
- Fedora Core 2
- Fedora Core 4
- SUSE Linux Enterprise Server 9.

Note: If you are going to run the 64-bit version of Virtuozzo Containers, please consult the **Software Requirements** subsection (p. 16) to learn what Linux operating systems can be used for installing the Virtuozzo Containers 64-bit version or upgrading to it.

System Requirements for 64-bit Versions of Virtuozzo Containers

The given subsection provides information on the hardware and software requirements that should be met while installing or upgrading the 64-bit versions of Virtuozzo Containers 4.0.

List of Supported 64-bit Processors

Parallels Virtuozzo Containers 4.0 is released in three variants – for common 32-bit processors and for two groups of 64-bit processors:

1 x86-64 including the following processors:

AMD K8:

- AMD Athlon 64;
- AMD Athlon 64 X2;
- AMD Athlon 64 FX;
- AMD Opteron;
- AMD Turion 64;
- 64-bit models of AMD Sempron.

Intel NetBurst (EM64T):

- 64-bit models of Intel Xeon;
- 64-bit models of Intel Celeron D;
- 64-bit models of Intel Pentium 4;
- Intel Pentium D;
- Intel Pentium Extreme Edition.

2 IA-64 containing the Intel® Itanium® 2 processor only.

Depending on the kind of processor to be used, this or that variant of the Virtuozzo Containers distribution set should be chosen.

Software Requirements

The Virtuozzo Containers 64-bit versions can be installed on the Hardware Node running the 64-bit edition of one of the following Linux distributions with the 2.6 kernel:

- x86-64:
 - Red Hat Enterprise Linux 4;
 - Red Hat Enterprise Linux 5;
 - CentOS 4;
 - CentOS 5;
 - Fedora 7;
 - Fedora 8;
 - SUSE Linux Enterprise Server 10 (with or without Service Pack 1);
 - SUSE Linux Enterprise Desktop 10 (with or without Service Pack 1).
- IA-64:
 - Red Hat Enterprise Linux 4;
 - Red Hat Enterprise Linux 5;

- CentOS 4;
- CentOS 5;
- SUSE Linux Enterprise Server 10 (with or without Service Pack 1).

Note: If you are going to install Parallels Virtuozzo 4.0 on a server running a SUSE-based operating system (e.g. SUSE Linux Enterprise Server 10 with Service Pack 1), please make sure that the IPv6 module is enabled on this server; otherwise, you will not be able to load the Virtuozzo kernel.

If you are already running one of the 64-bit versions of Virtuozzo Containers 3.0 on your Hardware Node, the following upgrades to Parallels Virtuozzo Containers 4.0 are possible (with upgrading to the 2.6 kernel):

- x86-64:
 - Red Hat Enterprise Linux 3;
 - Red Hat Enterprise Linux 4;
 - Fedora Core 4;
 - CentOS 3;
 - CentOS 4;
 - Suse Linux Enterprise Server 9.
- IA-64:
 - Red Hat Enterprise Linux 4;
 - CentOS 4;
 - Suse Linux Enterprise Server 9 Service Pack 3.

Network Requirements

The network pre-requisites enlisted in this subsection will help you avoid delays and problems with making Virtuozzo Containers for Linux up and running. You should take care in advance of the following:

- Local Area Network (LAN) for the Hardware Node.
- Internet connection for the Hardware Node.
- Valid IP address for the Hardware Node as well as other IP parameters (default gateway, network mask, DNS configuration).
- At least one valid IP address for each Container. The total number of addresses should be no less than the planned number of Containers. The addresses may be allocated in different IP networks.
- If a firewall is deployed, check that IP addresses allocated to Containers are open for access from the outside.
- Ensure that the IP address of the Hardware Node is not altered while Parallels Virtuozzo Containers is running. If you are using a DHCP server, please ensure that one and the same IP address is always leased to a particular MAC address.

Installation Process Overview

Depending on the scope of your business needs, you might use the Virtuozzo Containers 4.0 software on any number of PCs (provided you have the corresponding number of licenses). In any case, we assume that Virtuozzo Containers 4.0 is installed on dedicated servers only. This is but natural bearing in mind the all-importance of Virtuozzo-based systems for your network.

The basic installation and preliminary operations for any Virtuozzo system include the following steps:

- 1 Installing and configuring the root Linux operating system on the Hardware Node.
- 2 Installing the Virtuozzo Containers 4.0 software on the Hardware Node:
 - a Installing the Virtuozzo packages;
 - b Installing the OS and application templates.

Steps 2b may be performed at Step 2a at your desire. In case it is not, the instructions on how to perform this step manually are provided in the *Installing OS Templates* subsection (p. 39).

It is very probable that you will want to have a central management workstation for the remote control of all the Hardware Nodes of your network by means of Parallels Management Console. This workstation may run under either Windows 2000/XP/2003 or Linux (Fedora 7 and 8; Red Hat Enterprise Linux 4 and 5; CentOS 4 and 5; SUSE Linux Server Desktop 10; Ubuntu 6). In the latter case, it may theoretically coincide with a certain Hardware Node, but this should be avoided. So, there is another step to be performed before you can start the administration proper of your Virtuozzo systems:

- 3 Installing Parallels Management Console and registering the needed Hardware Node(s).

You may also wish to put Parallels Infrastructure Manager and Parallels Power Panel into operation. These tools are intended for managing a particular Hardware Node and/or individual Containers residing on it with the help of a standard Web browser. Thus, your next step is:
- 4 Setting Parallels Infrastructure Manager/Parallels Power Panel to work.

The following chapters concentrate on all these steps.

Installation Checklist

We provide this checklist for your convenience. It contains the steps required to install Virtuozzo Containers 4.0 successfully. Mark check boxes as you finish the corresponding steps.

Installing/ Configuring Root OS

- Start root Linux OS installation
- Partition disk
- Reboot your system and log in as `root`

Installing Virtuozzo Containers 4.0

- Install the Virtuozzo Containers software
- Reboot the Hardware Node
- Install OS and application templates
- Verify your installation

Installing Parallels Management Console and Registering Hardware Node

- Install Parallels Management Console for Windows or Linux
- Register all the Hardware Nodes with Virtuozzo Containers 4.0 installed

Configuring Parallels Infrastructure Manager

- Log in to Parallels Infrastructure Manager

CHAPTER 3

Installing Virtuozzo Containers 4.0 on Hardware Node

The given chapter provides information on how to install Virtuozzo Containers 4.0 on your Hardware Node. Along with the information on installing the Virtuozzo Containers software itself, it explains the way to install the root operating system on the Node and to configure it for Virtuozzo Containers 4.0.

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Installing and Configuring Host Operating System on Hardware Node

This section provides information on the specifics that should be taken into account while installing the Host operating system on your Hardware Node and configuring it for Virtuozzo Containers 4.0.

Note: The Red Hat Enterprise Linux 5 OS will be used as an example of the Host OS throughout the section.

Disk Partitioning

Please follow the instructions from your Red Hat Enterprise Linux 5.0 Installation Guide when installing the OS on your Hardware Node. After the first several screens, you will be presented with the following window:



Figure 3: Red Hat Enterprise Linux Installation - Creating Custom Layout

In this window you are supposed to select **Create custom layout** on the drop-down menu. Do not choose automatic partitioning since this type of partitioning will create a default disk layout intended for systems running multiple services. In case of Virtuozzo Containers 4.0, all your services shall run inside Containers.

Create the following partitions on the Hardware Node:

Partition	Description	Typical size
/	The root partition containing all Hardware Node operating system and Virtuozzo Containers software files.	10 -12 Gb
swap	The paging partition for the Linux operating system.	2 times RAM
/vz	The partition to host Virtuozzo templates and all Container data. You are recommended to allocate as much disk space as possible to this partition.	all the remaining space on the hard disk

We highly recommend that you use the ext3 file system for the /vz partition. We also recommend using the ext3 filesystem for other partitions on your server, if you are going to have any. Otherwise, these partitions may become invisible/inaccessible when the Virtuozzo kernel is loaded.

Note: Along with ext3, the Virtuozzo 4.0 kernel also includes support for other conventional filesystems: reiserfs, jfs, xfs, etc. However, ext3 is the only filesystem that has been thoroughly tested with Virtuozzo Containers 4.0 and is officially supported by Parallels.

The figure below presents a system with a 20 Gb SCSI hard drive:



Figure 4: Red Hat Enterprise Linux Installation - Disk Druid

We recommend that you keep Container private areas containing all data of the Containers under a separate /vz disk partition.

Finishing OS Installation

After the proper partitioning of your hard drive(s), proceed in accordance with your Red Hat Enterprise Linux 4.0 Installation Guide. Please follow the following recommendations:

- While deciding on the network settings, ensure the correctness of the Hardware Node's IP address, host name, DNS, and default gateway information. If you are using DHCP, make sure that it is properly configured. If necessary, consult your network administrator.
- On the Package Group Selection screen, clear the Software Development, Virtualization, and Web server check boxes and select the Customize now radio button.
- In the Package Group Details window, clear the check boxes of all package groups offered for installing on your server, except for the Base package group available on clicking the Base System item in the left part of the displayed window. For its functioning, Virtuozzo Containers 4.0 does not need any additional packages to be installed on the Hardware Node.



Figure 5: Red Hat Enterprise Linux Installation - Selecting Packages

Note: If you are installing a Linux distribution for x86-64-bit platforms (e.g. the CentOS-4 x86-64 distribution), you should additionally ascertain that the 32-bit runtime environment providing support for 32-bit applications is also installed on your server. Otherwise, the Virtuozzo Containers installation may fail.

When configuring your RHEL 5 installation (i.e. after you have installed the RHEL program files and rebooted your server):

- You are recommended to disable the RHEL standard firewall. The reason for this is that the Virtuozzo Containers software uses a number of specific services for its operation. To prevent unsafe network packets from accessing your system, consider using an external firewall.
- Disable SELinux. The reason for this is that the current version of Virtuozzo Containers 4.0 does not support SELinux functionality; so, enabling this option will not have any effect.

Obtaining Virtuozzo Containers 4.0 Distribution Set

You can obtain the Virtuozzo Containers 4.0 distribution set in one of the following ways:

- Get a CD or DVD containing Virtuozzo Containers 4.0 from Parallels.
- Use the `vzinstall-linux.bin` utility (or the `vzinstall-linux-ia64.bin` utility if you wish to install the IA64-bit version of Virtuozzo Containers) to download the Virtuozzo Containers 4.0 distribution to your server and install it there, if necessary. This way of getting the Virtuozzo Containers software is described below in detail.

Starting with version 4.0, Parallels Virtuozzo Containers comes with a new utility - `vzinstall-linux.bin` - allowing you to quickly get the Virtuozzo Containers distribution from the Internet. All you have to do is to download the `vzinstall-linux.bin` file from the Parallels web site to your server and run it there. When executed, the utility launches the Virtuozzo Containers Autoinstall wizard which will ask you about the Virtuozzo components you wish to download and, after gathering the necessary information, start the downloading process. You can also make the wizard automatically run the Virtuozzo Containers Installation Wizard right after the Virtuozzo components downloading.

On the first step of the wizard, you will be asked to choose the `vzinstall-linux.bin` operation mode:

```

Welcome to Virtuozzo Containers Autoinstall
Virtuozzo Autoinstall will help you download and install the Parallels
Virtuozzo Containers 4.0 software on your computer. In order to run it,
you need a Virtuozzo license. If you do not have it, you can get
an evaluation one at http://www.swssoft.com/virtuozzo/linux\_eval/.

Autoinstall supports both the mouse and keyboard navigation. If you need
to copy some text, hold the Shift key down while selecting it with the
mouse.

The full log file can be found at
/root/virtuozzo/logs/vzautoinstall.log.

Select the action to perform:

(*) Download and install
( ) Download only (e.g. for the installation on another computer)

[ Quit ]           [ Next ]           [ Configure settings ]

```

Figure 6: Virtuozzo Autoinstaller - Welcome Screen

You can choose between the following modes:

- *Download only*: if you wish to download the Virtuozzo Containers software to your server, however, do not plan to install it there (e.g. you intend to install Virtuozzo Containers 4.0 on another server), select the **Download only** radio button and click **Next**.
- *Download and install*: if you wish to download and install the Virtuozzo Containers 4.0 software on the server where you are running the `vzinstall-linux.bin` utility, select the **Download and install** radio button and click **Next**.

Depending on the installation type chosen, your further Virtuozzo Containers installation steps will slightly differ from each other. These steps are described in the following subsections in detail.

Configuring Virtuozzo Repository Parameters

Before proceeding with the Virtuozzo Containers Autoinstall wizard, you may wish to check and configure, if necessary, the parameters to be used by the Virtuozzo Containers Autoinstaller wizard during its execution. To view the current settings, click the **Configure settings** button on the **Welcome to Virtuozzo Containers Autoinstall** screen. You will be presented with the **Configure Settings** window:

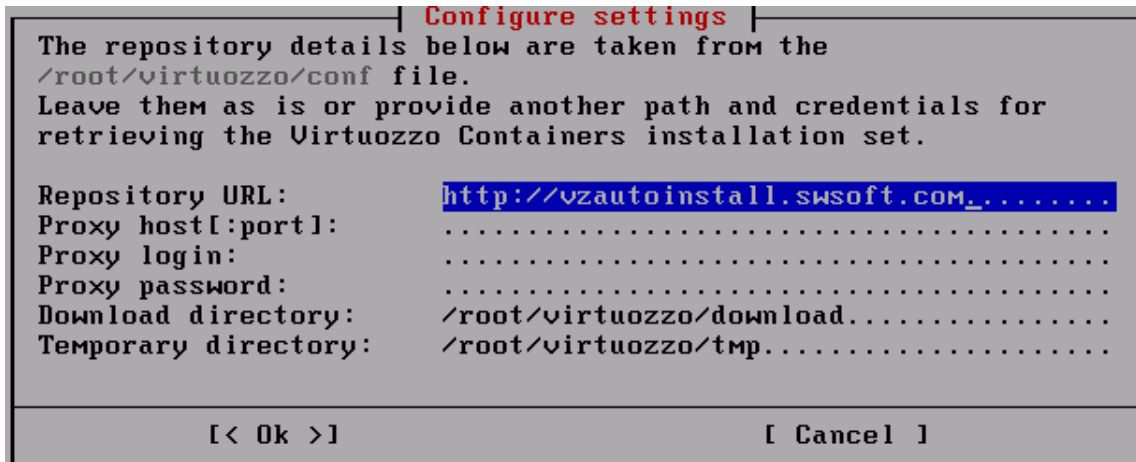


Figure 7: Virtuozzo Autoinstaller - Configuring Connection Settings

In this window you can configure the following parameters:

- **Repository URL:** the URL (Uniform Resource Locator) of the server storing the repository with Virtuozzo Containers 4.0 distribution sets. By default, the utility connects to the repository located at `http://vzautoinstall.swsoft.com`.
- **Proxy host[:port]:** the hostname or IP address of the proxy server to be used to connect to the repository, if you use this server.
- **Proxy login:** the user name used by the proxy server for your authentication.
- **Proxy password:** the password of the user specified in the **Proxy login** field and used for your authentication by the proxy server.
- **Download directory:** the directory on your server where the Virtuozzo Containers distribution will be downloaded. By default, the `/root/virtuozzo/download` directory is used.
- **Temporary directory:** the directory where the Virtuozzo Containers distribution will be stored during the downloading process. By default, the `/root/virtuozzo/tmp` directory is used.

Running vzinstall-linux.bin in 'Download only' Mode

If you have selected the Download only radio button and clicked Next in the Welcome to Virtuozzo Containers Autoinstaller window, you will be presented with the Select Virtuozzo Containers Version screen.

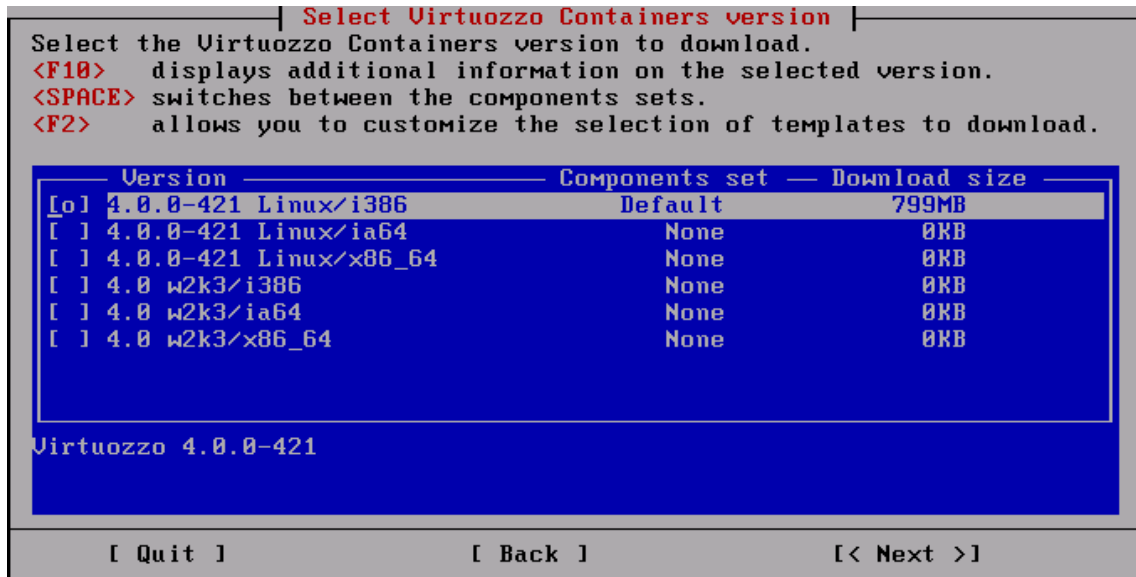


Figure 8: Virtuozzo Autoinstaller - Selecting Virtuozzo Containers Distribution Set

In this window you are supposed to choose the Virtuozzo Containers distribution set and the suit of OS templates to be downloaded to your server. By default, you are offered to download the Virtuozzo Containers distribution set corresponding to your server architecture and one OS template - Fedora Core 7 (you will need this OS template to create Containers on its basis). However, you can choose any other Virtuozzo Containers distribution sets listed in the Select Virtuozzo Containers Version window and configure the set of OS templates by doing the following:

- To download the full set of Virtuozzo Containers 4.0 containing the Virtuozzo program files and all available OS templates, select the name of the corresponding Virtuozzo Containers distribution and click the space bar once (the o sign will change to x and the Components set column will have the 'Full' inscription displayed).
- To customize the set of OS templates to be downloaded to your server, select the name of the corresponding Virtuozzo Containers distribution and press F2. You will be presented with the Select Templates window where you can choose OS templates for downloading.
- To schedule a Virtuozzo Containers distribution for downloading, select the name of the corresponding Virtuozzo Containers distribution and click the space bar either once (to download the default set of Virtuozzo Containers 4.0) or twice (to download the full set of Virtuozzo Containers 4.0).
- To prevent the selected Virtuozzo Containers distribution from being downloaded, click the space bar two times (the o sign will disappear and the Components set column will have the 'None' inscription displayed).

Note: The Select Virtuozzo Containers Version screen lists all available Virtuozzo Containers distribution sets for servers running both the supported Linux distributions and the Windows Server 2003 operating system. So, you can choose any of the listed sets and download them to your server for further installation.

After you have chosen all the necessary Virtuozzo Containers distributions, click Next:

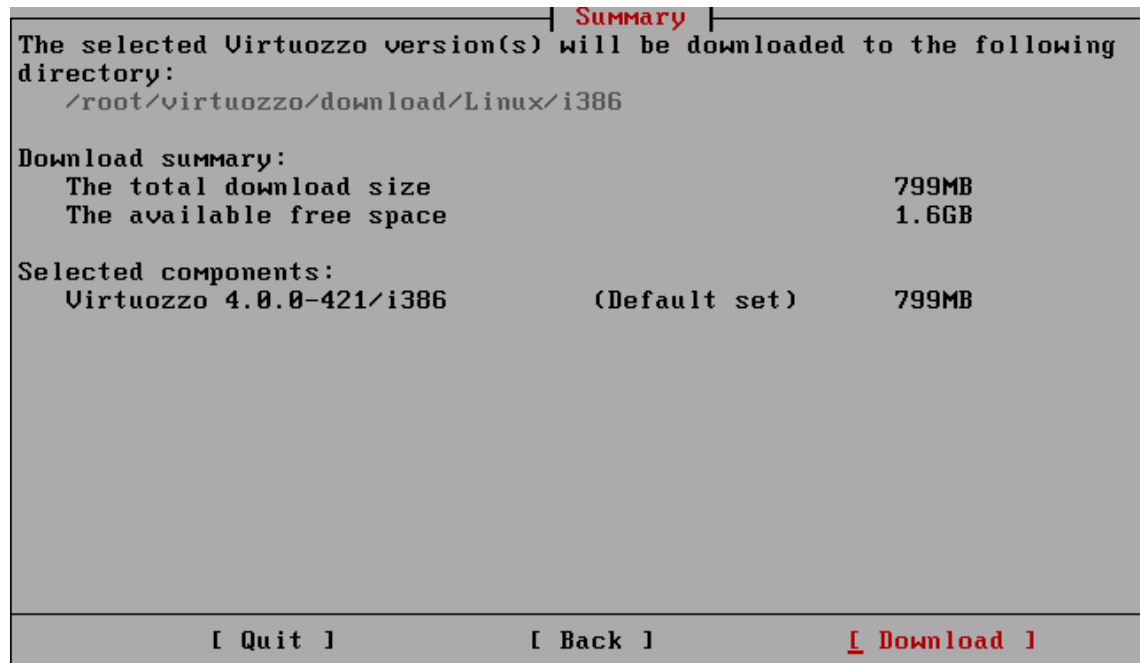


Figure 9: Virtuozzo Autoinstaller - Reviewing Download Information

The Summary window allows you to review the parameters provided by you on the previous steps of the wizard. Click **Download** to start downloading the selected Virtuozzo Containers distribution sets to the download folder; otherwise, click **Back** and configure the necessary parameters.

After the Virtuozzo Containers distribution has been successfully downloaded to your server, you will be presented with the corresponding window where you should click **OK** to exit the wizard.

At any time, you can start the Virtuozzo Containers installation by doing the following:

- Follow the http://www.swsoft.com/virtuozzo/linux_eval/ link and get a free Virtuozzo evaluation license needed to start using Virtuozzo Containers 4.0 on the server.
- Copy all the contents of this directory together with all its files and subdirectories to the system where you are planning to install Virtuozzo Containers 4.0, if needed, and execute one of the following commands:
 - To install the 32-bit version of Virtuozzo Containers 4.0:


```
# ./virtuozzo-4.0.0-<build_version>.swsoft-i386.sfx
```
 - To install the 64-bit version of Virtuozzo Containers 4.0 on x64-86 processors:


```
# ./virtuozzo-4.0.0-<build_version>.swsoft-x86_64.sfx
```
 - To install the 64-bit version of Virtuozzo Containers 4.0 on IA-64 processors:

```
# ./virtuozzo-4.0.0-<build_version>.swsoft-ia64.sfx
```

This will launch the Virtuozzo Containers 4.0 Installation Wizard. Detailed information on this wizard is provided in the [Running Virtuozzo Installation Program](#) subsection (p. 33).

Running vzinstall-linux.bin in 'Download and Install' Mode

If you have selected the **Download and install** radio button and clicked **Next** in the **Welcome to Virtuozzo Containers Autoinstaller** window, the **Autoinstall Wizard** starts gathering the information on your system architecture and, on the basis of the collected data, determines the version of the Virtuozzo Containers distribution set that is suitable for installing on your system. The process of gathering the information is shown on the **Checking System Requirements** screen. After your system has been successfully checked, click **Next** to proceed with the **Virtuozzo Containers Autoinstall wizard**.

On the next step of the wizard, you can customize the set of OS templates to be downloaded to and installed on your system:

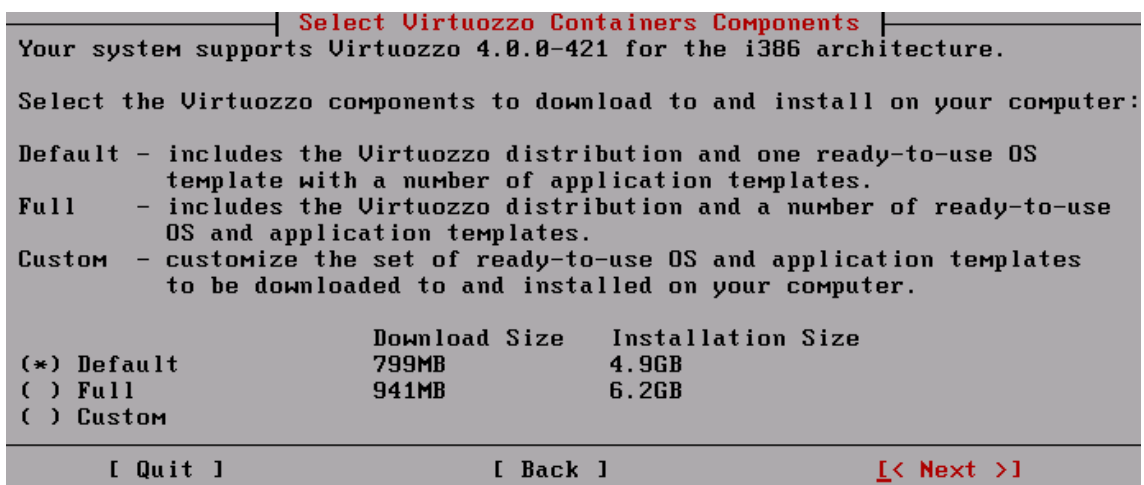


Figure 10: Virtuozzo Autoinstaller - Selecting Installation Type

In this window you can choose one of the following options:

- *Default*: select this radio button to download and install the Virtuozzo program files and one OS template - **Fedora Core 7** (you will need this OS template to create Containers on its basis).
- *Full*: select this radio button to download all available OS templates to your server and install them there.
- *Custom*: select this radio button to customize the set of OS templates to be downloaded to and installed on your server. In this case clicking the **Next** button will display the **Select Templates** window where you can choose OS templates for downloading.

When you are ready, click **Next**:

```
| Summary |
Virtuozzo is ready to be downloaded and installed.
The total download size is 710MB. Installer has detected there is enough
free space to complete the installation.

Components for download:
  Virtuozzo 4.0.0-323/i386          512MB
Precreated template sets:
  Fedora 7 (x86)                   198MB

Download directory: /root/virtuozzo/download
Temporary directory: /root/virtuozzo/tmp

Disk space requirements:
Mount point      Required      Available
/vzt              0KB          4.8GB
/vz               1.2GB        5.2GB
/boot            25MB         462MB
/                 2.5GB        3.2GB

[ Quit ]           [ Back ]           [ Download ]
```

Figure 11: Virtuozzo Autoinstaller - Reviewing Download Information

The **Summary** window allows you to review the parameters provided by you on the previous steps of the wizard. Click **Download** to start downloading the Virtuozzo Containers distribution to your server; otherwise, click **Back** and configure the necessary parameters.

After the Virtuozzo Containers distribution set has been successfully downloaded to your server, you will be presented with the **Installation** screen where you should click the **Install** button to start installing Virtuozzo Containers 4.0 on your system. Detailed information on the Virtuozzo Containers installation process is given in the following section.

Note: If you do not have a valid Virtuozzo license needed to start using the Virtuozzo Containers 4.0 software on your Hardware Node, you will be provided with additional information on how to obtain it.

Installing Virtuozzo Containers Software

The Virtuozzo Containers distribution includes two sets of packages (the prerequisite set and Virtuozzo packages) and a number of OS and application templates. You could receive your Virtuozzo Containers distribution on a CD-ROM or a DVD-ROM; you might also have downloaded it from the Internet via the `vzinstall-linux` utility to a local directory. In either case the directory structure and the contents of the Virtuozzo Containers distribution is the same, except for the `/templates` subdirectory containing a number of standard OS and application templates and present on the DVD-ROM only.

Notes: 1. Detailed information on the `vzinstall-linux.bin` utility is provided in the previous section.

2. If you are interested in the exact Virtuozzo directory structure, please consult the `README` file shipped with Virtuozzo Containers 4.0 where it is described in detail.

In order to install Virtuozzo Containers 4.0, you should be familiar with basic Linux administration commands. For example, you should be able to mount and dismount CD-ROMs. On fresh Red Hat systems, it is enough to issue the following command:

```
# mount /media/cdrom
```

To dismount and eject the CD-ROM, the `eject` command should be used. For additional information and troubleshooting, consult your Linux administration manual.

Running Virtuozzo Containers Installation Program

To install Virtuozzo Containers 4.0 on your server:

- 1 Make sure that the Virtuozzo Containers 4.0 distribution is located on a persistent storage (e.g. on a local file system). This is needed to ensure the accessibility of the distribution after the system reboot, which is performed on the last step of the Virtuozzo Containers installation.
- 2 Log in to the server as root and run the `install` utility located in the `virtuozzo` directory of your Virtuozzo Containers 4.0 CD/DVD or your distribution directory. For example, your session may look like below if you are installing Virtuozzo Containers 4.0 from the CD:

```
# mount /media/cdrom
# /media/cdrom/install
```

The installation program will greet you with the following screen:

Notes: 1. If you are running the `vzinstall-linux.bin` utility in the 'Download and install' mode, the **Welcome to Virtuozzo Containers** screen is automatically displayed after the Virtuozzo Containers distribution set has been successfully downloaded to your server.

2. If you have downloaded the Virtuozzo Containers distribution using the `vzinstall-linux.bin` utility, you should execute the `./virtuozzo-4.0.0-<build_version>.swsoft-<arch>.sfx` command to launch the **Parallels Virtuozzo Containers Installation Wizard**.



Figure 12: Virtuozzo Containers Installation - Welcome Screen

Pressing **Next** will display the Parallels end user license agreement that you must accept to be able to install Virtuozzo Containers 4.0 on the server. Use either the **PgDn** key or the down arrow on your keyboard to read all the text of the agreement, then press the **Accept** button.

Note: If you did not create a separate /vz partition during the Host OS installation (see the **Disk Partitioning** subsection (p. 21) for more detail), on the next step you will be presented with a special message informing you of this fact. For performance and reliability reasons, we recommend that you allocate a separate partition for holding all Container data and Virtuozzo templates. To abort the Virtuozzo Containers installation and repartition your storage, click the **Cancel** button; otherwise, click **OK**.

After accepting the license agreement, the installation program starts installing packages from the Virtuozzo Containers CD, DVD, or your local distribution directory. In case you did not follow completely the operating system installation instructions as was described earlier, the installation program can report unresolved dependencies in system package database. Review these dependencies and, if they are not critical for your system operation, you can continue with the installation.

On the next screen, the installation program will review your Virtuozzo Containers 4.0 distribution for the OS and application templates availability and, in the case of finding any templates, suggest you select the templates that you wish to have installed on your Hardware Node. For example:

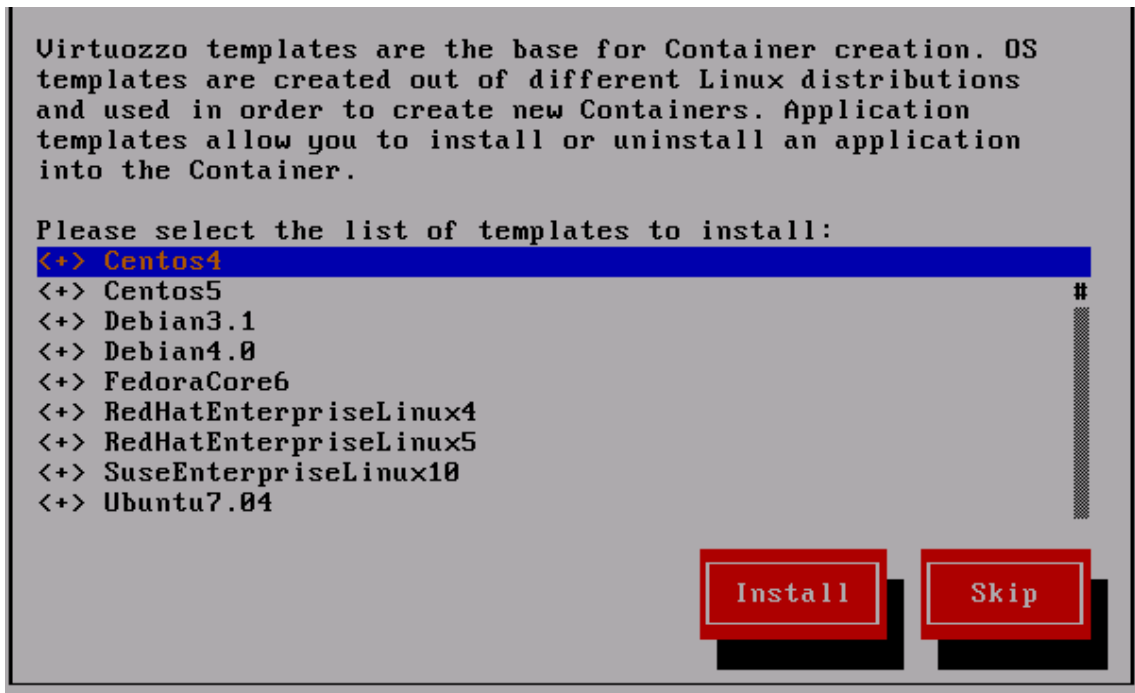


Figure 13: Virtuozzo Containers Installation - Choosing Templates to Install

There are two types of templates in Virtuozzo Containers 4.0. These are OS templates and application templates. An OS template is an operating system and the standard set of applications to be found right after the installation. Virtuozzo Containers 4.0 uses OS templates to create new Containers with a preinstalled operating system. An application template is a set of repackaged software packages optionally accompanied with configuration scripts. Virtuozzo Containers 4.0 uses application templates to add extra software to the existing Containers. Detailed information on Virtuozzo templates is provided in **Parallels Virtuozzo Containers Templates Management Guide** shipped with Virtuozzo Containers 4.0.

In the Virtuozzo Templates Installation window, you can do one of the following:

- Choose the templates you wish to be installed on the Node and click the **Install** button to initiate the templates installation process. By default, no templates are selected for installation. To schedule a template for installation, expand the <+> sign next to the corresponding template (e.g. by pressing the space bar or Enter) and use the space bar to select this or that template.
- Click the **Skip** button to proceed with the Virtuozzo Containers installation without installing any templates on your Hardware Node. You will be able to install the necessary templates later on using Parallels Infrastructure Manager, Parallels Management Console, or Virtuozzo command line utilities.

Notes: 1. The **Install Templates** screen is skipped if you are installing Virtuozzo Containers 4.0 using the `vzinstall-linux.bin` utility. In this case `vzinstall-linux.bin` will install the OS and application templates specified by you on the **Select Virtuozzo Components** screen of the **Virtuozzo Containers Autoinstall** wizard (p. 30).

2. Before you can start using the installed EZ templates on your Hardware Node (e.g. as the basis for the Container creation), you may need to set up a package repository for them. So, you have to build a special repository for all commercial versions of the Linux distributions (e.g. Red Hat Linux Enterprise 4 and 5). Detailed information on how to manage package repositories is provided in the **Setting Up Repository for EZ Template** section of **Parallels Virtuozzo Containers Templates Management Guide**.

Next, you will be prompted to enter the Virtuozzo product key (license):



Figure 14: Virtuozzo Containers Installation - Installing Virtuozzo License

Every Hardware Node should have its own Virtuozzo license installed. Licenses are issued by Parallels and needed to start using Virtuozzo on your server. Although you can complete some tasks on the Hardware Node without having a Virtuozzo license, you are not allowed to perform the majority of operations until you upload a valid Virtuozzo license to the Node (e.g. all Container-related operations). In the **Virtuozzo Product Key Installation** window, you can do one of the following:

- Install a valid Virtuozzo license by entering the license key number in the field provided and clicking Next. When activating your Virtuozzo Containers installation using a Virtuozzo activation code, make sure that your server is connected to the Internet. This is necessary for the Virtuozzo activation process to complete. If your Hardware Node uses a proxy server to connect to the Internet, you can also use the **Configure** button to specify the necessary information about the proxy server.
- If you do not have a valid Virtuozzo license, you can follow the http://www.swsoft.com/en/products/virtuozzo/linux_eval link and obtain a free Virtuozzo evaluation license. This license does not impose any restrictions on the Virtuozzo Containers functionality; so, you can access and evaluate all Virtuozzo features to the full extent (however, for a limited period of time only). You can also click the **Skip** button to skip the step of installing a Virtuozzo license onto your Hardware Node. You will be able to install the license later on by means of Parallels Management Console, Parallels Infrastructure Manager, or the `vzlicload` utility. Please turn to the **Managing Virtuozzo Licenses** section of *Parallels Virtuozzo Containers User's Guide* to learn how you can do it.

On the last step, you will be offered to check for available Virtuozzo Containers updates:

Note: The Virtuozzo Containers Online Update screen is skipped if you are running the `vzinstall-linux.bin` utility in the 'Download and install' mode.

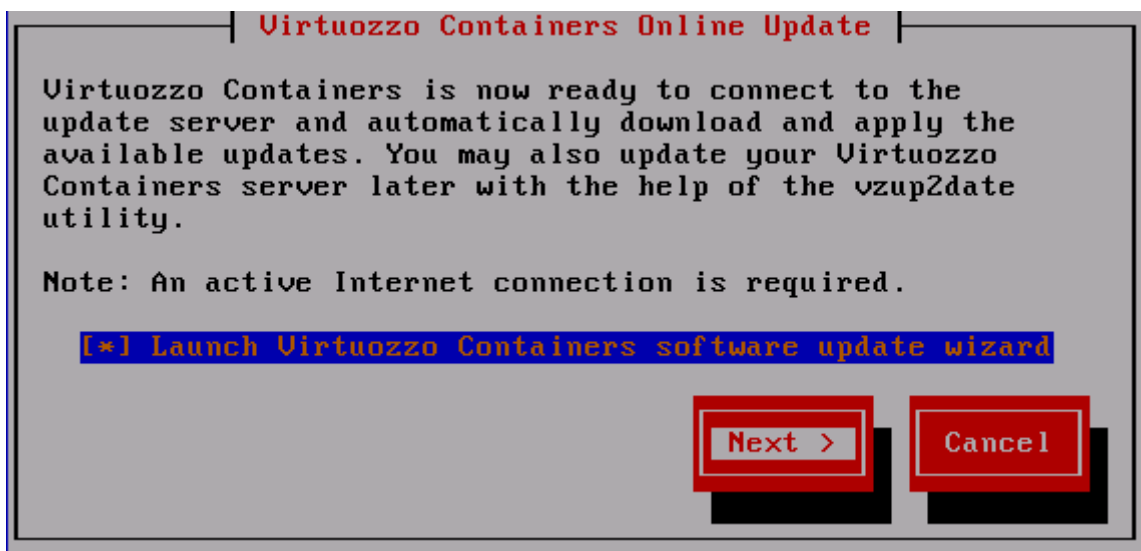


Figure 15: Virtuozzo Containers Installation - Checking for Updates

We recommend that you check for available updates right during the Virtuozzo Containers installation, which will allow you to keep the Virtuozzo Containers software at the most recent version (i.e. to have the latest Virtuozzo core, utilities, and templates installed). To this effect, leave the **Launch Virtuozzo Containers software update wizard** check box selected and click **Next**. Follow the instructions of the wizard to check for available updates, if any, and install them on your Node. If you do not wish to update your Virtuozzo Containers installation for some reason or other, clear the check box; you will be able to update the Virtuozzo Containers software later on by means of the `vzup2date` utility or Parallels Management Console. Detailed information on how you can do it is provided in *Parallels Virtuozzo Containers Reference Guide* and the *Keeping Your Virtuozzo System Up-to-Date* chapter of *Parallels Virtuozzo Containers User's Guide*.

Finally, the installation program will greet you with a success message:

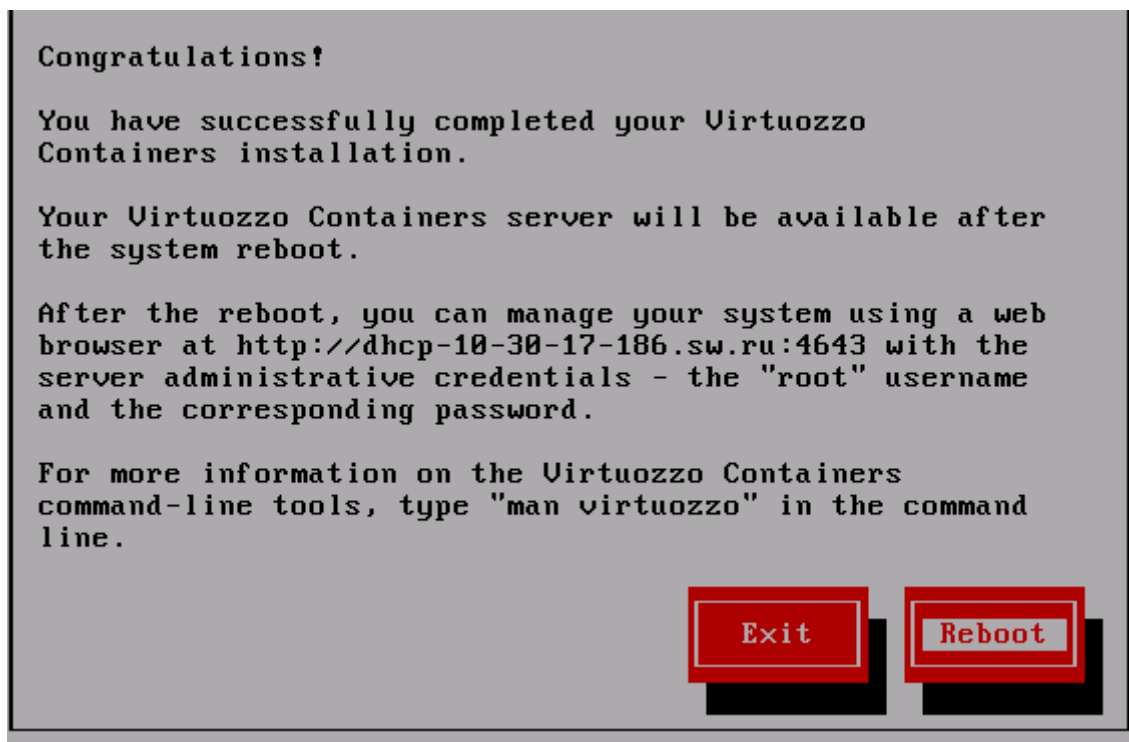


Figure 16: Virtuozzo Containers Installation - Finishing Installation

In the Congratulations! window, you can do the following:

- Click **Exit** to do a manual check of the Hardware Node before booting to the Virtuozzo kernel. Otherwise, click **Reboot** to reboot the Hardware Node.
- Get informed of your further steps to start working with Virtuozzo Containers 4.0 after the Hardware Node reboot:
 - Log in to the Hardware Node through Parallels Infrastructure Manager using the specified URL and the system administrative credentials (i.e. the `root` username and the password you specified for this user when installing the Host OS on your server).
 - Log in to the Hardware Node through SSH (Secure Shell) and run the `man virtuozzo` command to get detailed information on the main Parallels Virtuozzo commands.

Unattended Virtuozzo Containers Installation

Unattended installation is available since the Virtuozzo Containers 2.6 release. While running in the unattended mode, the installation program uses the parameters specified after the `install` utility to install and configure the Virtuozzo Containers software on your server.

The following command line parameters control the installation in the unattended mode:

Parameter	Description
<code>-a, --auto</code>	Install Virtuozzo Containers 4.0 in the automatic (unattended) mode.

- `-i, --ip IP_ADDRESS` The public IP address to be assigned to the Service Container. This IP address should be specified when connecting to the Service Container using Parallels Management Console or Parallels Infrastructure Manager. If this option is omitted, Virtuozzo Containers 4.0 automatically assigns a private IP address to the Service Container. In this case you will need to specify the IP address of the Hardware Node when connecting to this Node with Parallels Management Console or Parallels Infrastructure Manager.
- `-n, --nodeps` Ignore dependencies during the unattended installation. You may consider using this option if the installation fails because of broken RPM dependencies.
- `-o, --all-templates` Install all the OS and application templates the installation program finds in your Virtuozzo Containers distribution, not only the default set. The default set includes all the Red Hat and 'minimal' templates (i.e. all the templates having 'redhat' or 'minimal' as part of their name).
- `-t, --templates-file <file>` Read a list of templates from the specified file. This file should contain a list of file names from the directory where the templates are located. The file names in the list should be separated by the new-line character as follows:
- ```
redhat-as3-minimal-p4-tmpl-3.0.0-
2.swsoft.i386.rpm

redhat-el5-x86-ez-3.0.0-4.swsoft.noarch.rpm
```
- `-r, --rpmdir <directory>` The path to the directory containing the Virtuozzo RPM files. By default, the `/virtuozzo/RPMS` directory is used.
- `--skip-reboot` Do not reboot the Hardware Node during the Virtuozzo Containers unattended installation.
- `-p, --proxy <URL>` Set the parameters of the HTTP proxy server, if you use any to connect to the Internet. The Internet connection is needed only if you are planning to activate your Virtuozzo Containers installation using a special Virtuozzo activation code. Use the following form to specify the proxy server parameters: `http://[user:password@]host`.
- `-v, --version` Print the version of the Virtuozzo install utility.
- `-h, --help` Display the utility usage and exit.

Thus, you may run, for example, the following command to install Virtuozzo Containers 4.0 in the unattended mode:

```
./install -a -o --hideip
```

For more detailed information on how to install the Virtuozzo Containers software in the unattended mode, please turn to the unattended file shipped with Virtuozzo Containers 4.0.

## Verifying Your Virtuozzo Containers Installation

Parallels Virtuozzo Containers includes a special package named `virtuozzo-release` that can help you check up that all Virtuozzo packages have been successfully installed. Run the following command:

```
rpm -V virtuozzo-release
```

The command exits silently if all required Virtuozzo packages are available. If some packages are missing, then the output will look like below:

```
rpm -V virtuozzo-release
Unsatisfied dependencies for virtuozzo-release-4.0.0-401.swsoft:
vzctl = 4.0.0-101.swsoft
```

This output shows that the required version of the `vzctl` package is not installed on the system.

## Installing OS Templates

Operating system templates are used to create new Containers with a pre-installed operating system. Therefore, you are bound to install at least one OS template from your Virtuozzo Containers CD, DVD, or Virtuozzo Containers distribution directory before creating Containers. You can use the following command to install an OS template on your Hardware Node:

```
vzpkg install template redhat-el5-x86-ez-3.0.0-4.swsoft.noarch.rpm
Preparing... ##### [100%]
 1:redhat-el5-x86 ##### [100%]
```

You can check that the `redhat-el5-x86` EZ template has been successfully installed on the Node by issuing the following command:

```
vzpkg list
redhat-el5-x86 2007-09-12 12:57:57
```

However, before you can start using the installed OS template for the Container creation, you should cache it with the `vzpkg create cache` command:

```
vzpkg create cache redhat-el5-x86
...
Complete!
Packing cache file redhat-el5-x86.tar.gz ...
Cache file redhat-el5-x86.tar.gz [14M] created.
```

**Notes:** 1. To be able to cache your OS EZ templates, you may need to set up a package repository for them. So, you have to build a special repository for all commercial versions of the Linux distributions (e.g. Red Hat Linux Enterprise 4 or 5). Detailed information on how to manage package repositories is provided in the [Setting Up Repository for EZ Template](#) section of [Parallels Virtuozzo Templates Management Guide](#).

2. Detailed information on how to manage standard OS templates and OS EZ templates is provided in [Parallels Virtuozzo Templates Management Guide](#) shipped with Virtuozzo Containers 4.0.

## CHAPTER 4

# Setting Virtuozzo Tools to Work

Along with the command line utilities, you can make use of the following tools intended for managing your servers running Virtuozzo Containers 4.0:

- Parallels Management Console - a remote management tool for Virtuozzo Containers 4.0 with graphical user interface. Management Console is designed for Hardware Node administrators having access to all the Containers on a particular Node. It allows the administrator to control individual Hardware Nodes, to manage all sorts of Containers, and to monitor the system.
- Parallels Infrastructure Manager designed for Hardware Node administrators and providing you with the ability to manage multiple Hardware Node and all Containers residing on it with the help of a standard Web browser on any platform.

The following sections provide information on how to prepare these Virtuozzo tools for working in Virtuozzo-based systems.

## In This Chapter

|                                                       |    |
|-------------------------------------------------------|----|
| Installing Parallels Management Console .....         | 40 |
| Setting Parallels Infrastructure Manager to Work..... | 44 |

---

## Installing Parallels Management Console

Parallels Management Console is a graphical user interface client that allows you to remotely manage a multitude of Virtuozzo Hardware Nodes and their Containers.

## Installing Graphical Client

The Parallels Management Console shall be installed on a special workstation for the remote administration of the existing Hardware Nodes. The Parallels Management Console installation files are located in the `client` subdirectory on your Virtuozzo 4.0 CD, DVD, or in your local distribution directory. There are two subdirectories there containing the Parallels Management Console builds for Microsoft Windows 2000/XP/2003 and Linux (Fedora 7 and 8; Red Hat Enterprise Linux 4 and 5; CentOS 4 and 5 SUSE Linux Enterprise Desktop 10; Ubuntu 6):

- `win32`: the Management Console build for Windows workstations. To install Management Console for Windows, select **Programs --> Parallels --> Virtuozzo Tools --> Parallels Management Console Setup File** on the Windows Start menu, double-click the `pmc_setup.exe` file in the displayed window, and follow the instructions of the Parallels Management Console setup wizard.
- `linux`: the Management Console build for Linux workstations. It can be installed on Fedora 7 and 8, RHEL 4 and 5, CentOS 4 and 5, SUSE Linux Enterprise Desktop 10, and Ubuntu 6.

To install Parallels Management Console for Linux:

- Use the `rpm -i` command for all Linux distributions except for Ubuntu 6. For example, to install Management Console on the 32-bit version of Fedora 8, you can issue the following command:

```
rpm -i pmc-<build_version>.swsoft.i386.rpm
```

- Use the following commands to install Management Console on Ubuntu 6:

```
sudo aptitude update
[you will be asked to provide the password of the root user]
sudo aptitude install alien
cd /client/linux
sudo alien -i pmc-<build_version>.swsoft.<arch>.rpm
```

After the installation is complete, you can start Management Console by running the `pmc` command on Linux or by selecting **Programs --> Parallels --> Virtuozzo Tools --> Parallels Management Console** on the Start menu in Windows.

## Registering Hardware Node

A special wizard will guide you through the registration process. To start the Node registration wizard, select the Register Hardware Node item on the Action menu. You will be presented with the Register New Hardware Node window:

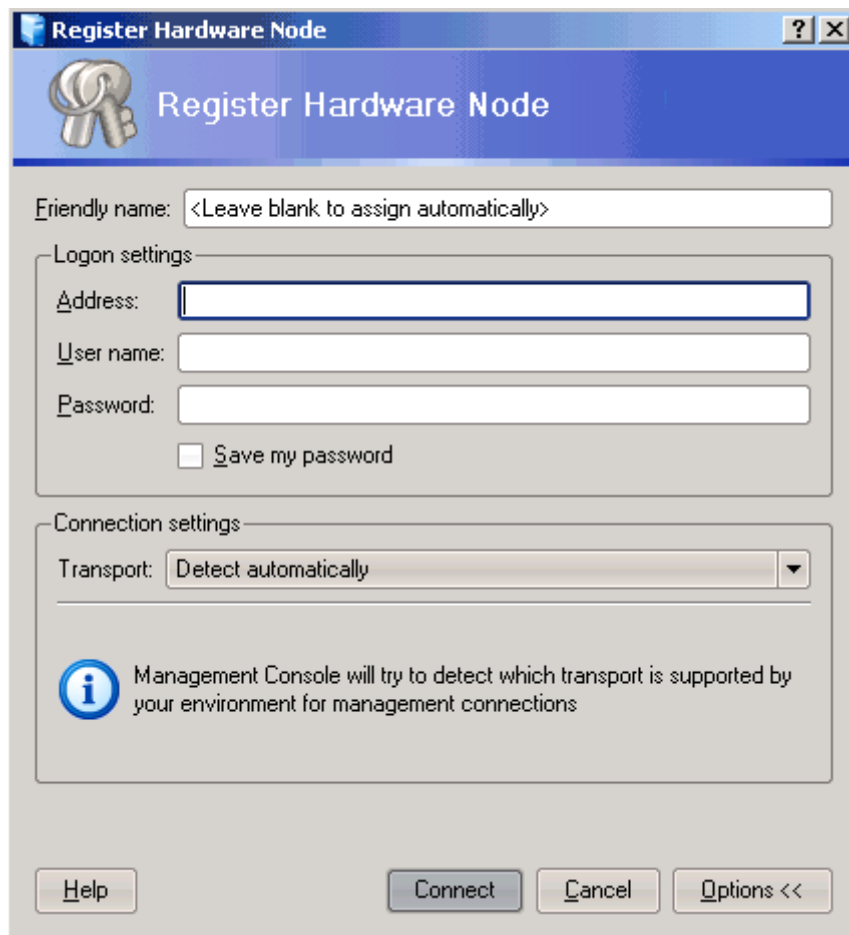


Figure 17: Management Console - Registering Hardware Node

In this window you should enter the following information in the fields provided:

- **Friendly name.** A friendly name for the Hardware Node which will be displayed in the Management Console left pane and help you easily find your Node among other Hardware Nodes registered in Parallels Management Console. You may specify any name you consider suitable for the Node. You can also leave this field blank; in this case the hostname assigned to the Hardware Node will be used as its name (e.g. MyNode.svsoft.com).
- **Address.** The IP address or hostname of the Hardware Node.
- **User name.** The user name to log in to the Hardware Node. By default, you can log in to the Node with the `root` credentials.
- **Password.** The password of the user specified in the **User name** field. If you are logging in as `root`, please use the password you entered while installing the Host OS on your server.

The **Save my password** check box, if selected, permanently saves the provided password on the server where Parallels Management Console is installed; so, you will not have to enter the password each time when trying to access Hardware Node anew.

- Under the **Connection settings** group, you can also choose the type of the transport protocol to be used to connect to the Hardware Node:
  - **Detect automatically.** Selecting this option lets the wizard automatically select the most appropriate protocol type for you. This option is selected by default.
  - **TCP/IP with SSL encryption.** Selecting this option allows you to use the TCP/IP protocol to connect to the Hardware Node while additionally securing your connection using the secure socket layer (SSL) protocol. This protocol type should be chosen if your Hardware Node has Virtuozzo Containers 4.0 installed on it. You can also change the port number to be used to connect to the Hardware Node via TCP/IP. The default port where the TCP/IP service is listening is 4434; you may modify it if necessary.
  - **Secure Socket Shell tunnel.** Selecting this option enables you to connect to the Hardware Node by means of the SSH (Secure Shell Protocol) protocol. This protocol type should be chosen if your Hardware Node is running a Virtuozzo Containers version earlier than 4.0. You can also choose a version of SSH and change the port number to be used to connect to the Hardware Node via SSH. The default port where the SSH service is listening is 22; you may modify it if necessary. You have an option to use SSH version 1 instead of default SSH version 2; however, we recommend using SSH version 2 because it provides a better security level.

---

**Note:** If the **Connection settings** group is hidden, you can display it by clicking the **Options** button at the bottom of the **Register New Hardware Node** screen.

---

After providing the necessary information and clicking the **Connect** button, the program will try to establish a secure connection to the Hardware Node.

Upon the registration completion, the Hardware Node name is displayed in both parts of the Management Console main window - the tree pane on the left and the view pane on the right.

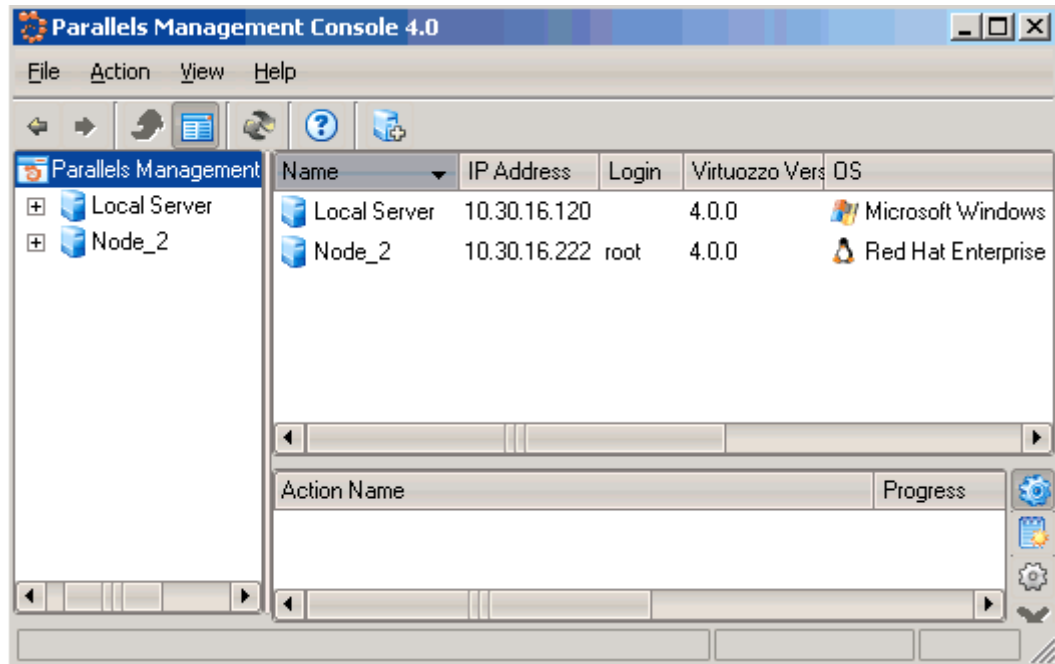


Figure 18: Management Console - Viewing Registered Nodes

---

## Setting Parallels Infrastructure Manager to Work

Along with Parallels Management Console, you can make use of Parallels Infrastructure Manager intended for managing your servers running Virtuozzo Containers 4.0. This tool is designed for Hardware Node administrators and provides you with the ability to manage multiple Hardware Nodes and all Containers residing on them with the help of a standard Web browser on any platform.

### Logging In to Parallels Infrastructure Manager

To log in to Parallels Infrastructure Manager, launch the Web browser that is compatible with Parallels Infrastructure Manager. A list of Web browsers currently supported by Virtuozzo Containers 4.0 is given below:

- Internet Explorer 6.0 and above;
- Mozilla 1.7 and above;
- Firefox 1.0 and above;
- Opera 8.0 and above.

Chances are that you will also be able to use other browsers, but Virtuozzo Containers 4.0 has not been extensively tested with them.

After you have opened a browser window, log in to Parallels Infrastructure Manager by typing the IP address (or hostname) of your Hardware Node and the 4643 TCP port. Assuming that the Node has the IP address of 197.158.201.100, you can enter

```
https://197.158.201.100:4643
```

in the address line of your browser to log in to Parallels Infrastructure Manager. To connect to the Hardware Node, enter the Host OS credentials (i.e. the `root` username and the corresponding password) in the fields provided on the Parallels Infrastructure Manager login screen and click the **Login** button.

---

**Note:** If the Virtuozzo Hardware Node you wish to manage is part of a Virtuozzo Group, you should log in to the Master Node of this Group. Logging in at the IP address/hostname of a Slave Node is not allowed.

---

## Installing Server Certificate

Parallels Infrastructure Manager and Parallels Power Panel use the Secure Sockets Layer (SSL) protocol to establish an encrypted connection to the Hardware Node and Containers, thus ensuring that this connection cannot be intercepted and used by unauthorized parties. For a client browser to successfully set up an SSL connection to a Node or a Container, this Node or Container should have the appropriate server certificate installed. Server certificates contain detailed identification information on your servers and help convince users of the authenticity of the server content and the integrity of the secure HTTP connection.

---

**Note:** You can also work in Parallels Infrastructure Manager and Parallels Power Panel without installing certificates on your Hardware Node and inside its Containers. However, in this case the corresponding warning message will be displayed each time you or your clients will try to connect to the Node and its Containers using their favorite web browsers.

---

The procedure of installing a server certificate on a Hardware Node or inside a Container does not differ from that on a standalone server and usually involves completing the following steps:

- 1 Obtaining a server certificate. For example, you can use the `openssl` utility either to request a trusted Certification Authority (e.g. Thawte or Verisign) for a signed certificate or to issue your own self-signed certificate.
- 2 Logging on to the server where you wish to install the certificate as root.  
**Important!** To set up a certificate for your Node, you should log in to the Service Container (also known as Container 1) and complete the operations stated below in the Service Container context.
- 3 Copying the contents of the obtained certificate to the `ssl.crt` file in the Apache server directory where you plan to keep your certificates (e.g. `/etc/httpd/conf/ssl.crt`).
- 4 Editing the `<VirtualHost>` block of the `httpd.conf` Apache configuration file to enable SSL for your server.
- 5 Restarting the Apache web server for the changes to take effect.

For detailed information on how to set up server certificates, please turn to the Apache web server documentation (e.g. available at <http://httpd.apache.org/docs/2.0/ssl/>).

---

# Glossary

*Application template* is a template used to install a set of applications in *Containers*. See also *Template*.

*Container* (or *regular Container*) is a virtual private server, which is functionally identical to an isolated standalone server, with its own IP addresses, processes, files, its own users database, its own configuration files, its own applications, system libraries, and so on. Containers share one *Hardware Node* and one OS kernel. However, they are isolated from each other. A Container is a kind of 'sandbox' for processes and users. *Container 0* and *Container 1* are used to designate the *Hardware Node* and the *Service Container*, respectively.

*Container 0* is used to designate a *Hardware Node* where the *Virtuozzo Containers* software is installed.

*Container 1* is used to designate the *Service Container*.

*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 in the repository can be updated.

*Hardware Node* (or *Node*) is a server where the *Virtuozzo Containers* software is installed for hosting *Containers*. Sometimes, it is marked as *Container 0*.

*Host Operating System* (or *Host OS*) is an operating system installed on the *Hardware Node*.

*MAC address* stands for Media Access Control address, a hardware address that uniquely identifies each Node in a network. The MAC layer interfaces directly with the network media. Consequently, each different type of network media requires a different MAC layer.

*OS template* (or *Operating System template*) is used to create new *Containers* with a preinstalled operating system. See also *Template*.

*Package set* is a synonym for *Template*.

*Parallels Infrastructure Manager* (or *Infrastructure Manager*) is a tool designed for managing *Hardware Nodes* and all *Containers* residing on them with the help of a standard Web browser on any platform.

*Parallels Management Console* (or *Management Console*) is a *Virtuozzo Containers* management and monitoring tool with graphical user interface. It is used to control individual *Hardware Nodes* and their *Containers*. *Management Console* is cross-platform and runs on both Microsoft Windows and Linux workstations.

*Parallels Power Panel* is a means for administering personal *Containers* with the help of a standard Web browser (Internet Explorer, Mozilla, etc.) on any platform.

*Parallels Virtuozzo Containers* (or *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 *Container* files that are not shared with other *Containers* are stored.

*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.

*Service Container* is a special *Container* automatically created on the Hardware Node during the *Virtuozzo Containers* installation and needed to manage your *regular Containers* by means of *Parallels Infrastructure Manager*, *Parallels Power Panel*, and *Parallels Management Console*. Sometimes, the *Service Container* is marked as Container 1.

*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 *Containers* with a preinstalled operating system. Application templates are used to install an application or a set of applications in *Containers*. 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 *Container* to the external network.

*Virtual Environment* (or *VE*) is an obsolete designation of a *Container*.

*Virtuozzo Control Center* (or *VZCC*) is an obsolete designation of *Parallels Infrastructure Manager*.

*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 Server license* is a special license that you should load to the *Hardware Node* to be able to start using the *Virtuozzo Containers* software. Every *Hardware Node* shall have its own *Virtuozzo Server license*.

*Virtuozzo Power Panels* (or *VZPP*) is an obsolete designation of *Parallels Power Panel*.

*Virtual Private Server* (or *VPS*) is an obsolete designation of a *Container*.

*Parallels Agent* (or *Parallels Agent Protocol*) is an XML-based protocol used to monitor and manage a *Hardware Node*. The *Parallels Agent* software implements this protocol and is a backend for the *Parallels Management Console*.

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