Parallels

Parallels Virtuozzo Containers for Windows

Installation Guide

Version 4.0

ISBN: N/A
Parallels Holdings Ltd.
13755 Sunrise Valley Drive
Suite 600
Herndon, VA 20171
USA
Tel: +1 (703) 815 5670
Fax: +1 (703) 815 5675

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Preface

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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:

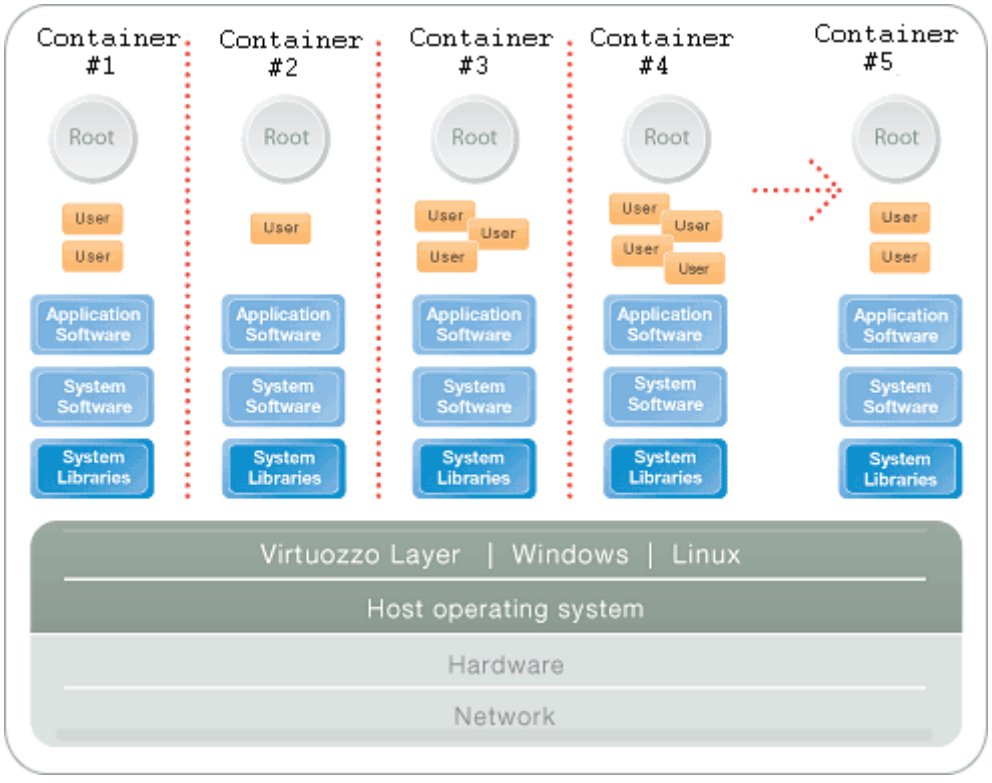


Figure 1: Virtuozzo Containers OS Virtualization

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 Windows on your system including the pre-requisites 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, Preparing for Virtuozzo Containers Installation, 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 for Windows.

Chapter 3, Installing and Configuring Parallels Virtuozzo Containers on Hardware Node, familiarizes you with the way to install and configure Virtuozzo Containers 4.0 on the Hardware Node. It also informs you of the ways to remove the current Virtuozzo Containers installation from your server.

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.	*To create a Container:*
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.
Italics	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 *EZ templates*. To destroy a Container, type `vzctl destroy` *`ctid`*.
`Monospace`	The names of commands, files, and directories.	Use `vzctl start` to start a Container.
`Preformatted`	On-screen computer output in your command-line sessions; source code in XML, C++, or other programming languages.	`Saved parameters for Container 101`
`Monospace Bold`	What you type, as contrasted with on-screen computer output.	**`# rpm –V virtuozzo-release`**
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 Windows. 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 Windows 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 Container for Windows 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 Windows applications inside your Containers and to greatly save the Hardware Node resources (physical memory, disk space, etc.).
  - Parallels Virtuozzo Containers for Windows 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 thru 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 Parallels documentation forum is the ideal place for your comments and suggestions. It is regularly monitored by the members of the Parallels technical documentation department, so it is likely that you will receive a reply to your post before long.

Note that new users will be asked to fill in a short registration form before being able to post. Registering will allow you to participate not only in the documentation forum discussions, but in all the other Parallels forums as well.

CHAPTER 2

Preparing for Virtuozzo Containers Installation

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 and configure Virtuozzo Containers 4.0 for Windows on your server.

In This Chapter

Planning Your Virtuozzo System

Before installing the product, you should carefully plan the structure of your Virtuozzo network and the roles 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 disk(s).

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

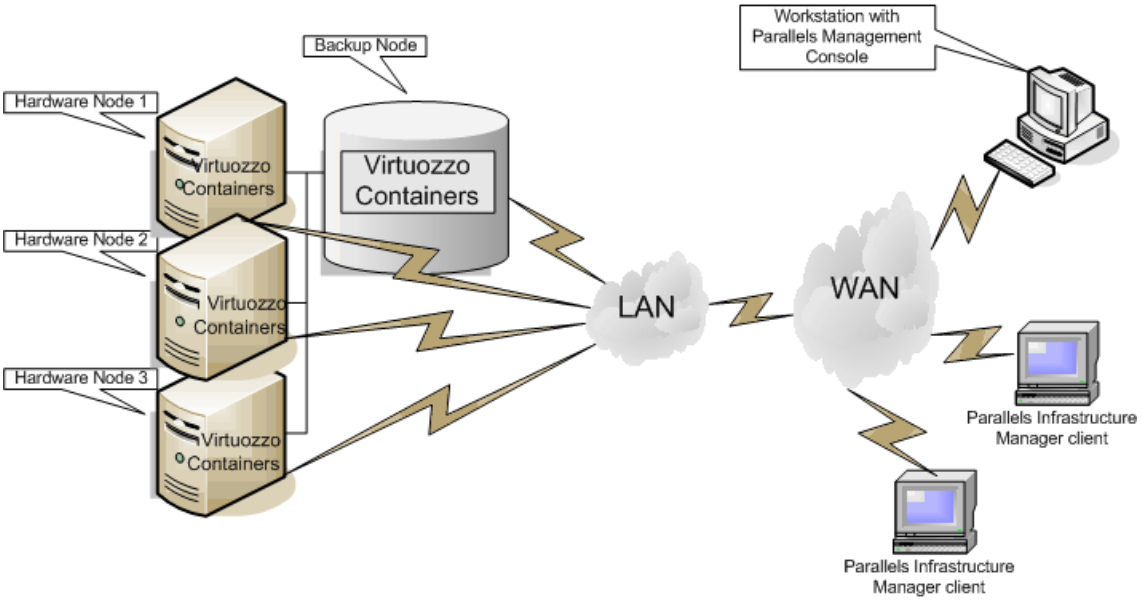


Figure 2: Virtuozzo System Configuration Scheme

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 Parallels Virtuozzo Containers. 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. It is recommended to keep all the Hardware Nodes in one subnet. In this case you will be able to transparently migrate Containers from one Node to another without having to modify the Containers IP addresses or the Hardware Node routing tables.

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 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 Parallels Virtuozzo Containers are accessible from the other participating computers.

Installation Requirements

After deciding on the structure of your Virtuozzo system, please make sure that all the Hardware Nodes where you are planning to deploy Virtuozzo Containers 4.0 meet the following system and network requirements.

System Requirements

This subsection focuses on the hardware and software requirements for the Virtuozzo Containers 4.0 software product.

Hardware Compatibility

There are no special requirements for the Hardware Node; if Windows Server 2003 can run on the given server, Parallels Virtuozzo Containers can be installed on it. The amount of hard disk space and memory present on the Hardware Node will determine the number and performance of Containers you will be able to create and simultaneously run on the given Node.

Software Compatibility

Virtuozzo Containers 4.0 can be installed on a dedicated server running a fresh installation of the following versions of Microsoft Windows Server 2003:

- 32-bit versions of Windows Server 2003:
  - Standard or Enterprise Edition of Windows Server 2003 Service Pack 1 with or without R2: US English, German, French, Korean, Spanish, Traditional Chinese, Simplified Chinese, or Japanese;
  - Standard or Enterprise Edition of Windows Server 2003 Service Pack 2 with or without R2: US English, German, French, Italian, Korean, Spanish, Traditional Chinese, Simplified Chinese, or Japanese;
  - Datacenter Edition of Windows Server 2003 Service Pack 1 with or without R2 (US English);
  - Datacenter Edition of Windows Server 2003 Service Pack 2 with or without R2 (US English);
- x86-64-bit versions of Windows Server 2003:
  - Standard or Enterprise Edition of Windows Server 2003 x64 Service Pack 1 with or without R2 (US English or Japanese);
  - Standard or Enterprise Edition of Windows Server 2003 x64 Service Pack 2 with or without R2 (US English or Japanese);
  - Datacenter Edition of Windows Server 2003 x64 Datacenter Edition Service Pack 1 with or without R2 (US English);
  - Datacenter Edition of Windows Server 2003 x64 Datacenter Edition Service Pack 2 with or without R2 (US English);
  - Datacenter Edition of Windows Server 2003 x64 with Service Pack 2 (Japanese);
- IA64-bit versions of Windows Server 2003:
  - Standard or Enterprise Edition of Windows Server 2003 IA64 with Service Pack 2 (US English, German, French, or Japanese);
- 32-bit English version of Windows Small Business Server 2003 Service Pack 1.

Note: To install the Windows SBS SP1 operating system on your server, you should use only CD 1 from your distribution kit. In all other aspects, the process of installing and configuring the Virtuozzo Containers software does not differ from deploying the Virtuozzo Containers software on Nodes with Windows Server 2003.

Before installing Virtuozzo Containers 4.0, you should also make sure of the following:

- The Windows Server 2003 OS installation is activated.
- The Windows Server 2003 distribution kit is not patched, i.e. all the binaries inside the distribution kit are in their original state as they are supplied by Microsoft Corporation.

Notes: 1. During the Virtuozzo Containers installation, you may be presented with a warning message informing you that some Windows Server 2003 updates installed on your server are not compatible with Virtuozzo Containers 4.0. In this case you need to uninstall these updates from the server (e.g. using the Add/Remove Programs tool in Control Panel) and start the Virtuozzo Containers installation anew. You will be able to install all the necessary Windows Server 2003 updates on your Hardware Node after the Virtuozzo Containers installation.

2. After installing Virtuozzo Containers 4.0, do not remove any of the standard Windows components from the Hardware Node (e.g. Internet Information Services). Deleting an installed component might cause the corresponding application inside your Containers to malfunction. You can disable the unnecessary Windows components on the Node instead.

Network Requirements

The network pre-requisites enlisted in this subsection will help you avoid delays and problems with making Virtuozzo Containers 4.0 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.
- A valid IP address for the Hardware Node as well as other IP parameters (default gateway, network mask, DNS configuration, etc.).
- At least one valid IP address for each ordinary Container you will be creating on the Node. The total number of addresses should be no less than the planned number of Containers.

Note: The addresses to be assigned to Containers should differ from those of the Hardware Node, i.e. any existing IP address of the Hardware Node network interface cards must not be assigned to any Container. The Container IP addresses are automatically assigned by Virtuozzo Containers 4.0 to the virtual adapters of the corresponding Containers; so, you only have to specify what IP address is to be applied to what Container.

Virtuozzo Containers 4.0 Containers Installation Overview

The Virtuozzo Containers installation shall consist of the following major steps:

1. Installing and activating a licensed Windows Server 2003 operating system on your server. A list of supported versions of Microsoft Windows Server 2003 is given in the Software Compatibility subsection (on page 14).
2. Installing the Virtuozzo Containers 4.0 for Windows basic pack on the Hardware Node.
3. Performing a number of steps to configure your Virtuozzo Containers installation. These steps include:
   - adding certain Windows components to your Host OS;
   - installing a number of additional Virtuozzo components on the Hardware Node;
   - installing a Virtuozzo license on the Node.

Besides, to facilitate managing your Hardware Node and its Containers and to keep track of the resource consumption on the Node, you may want to additionally perform the following operations:

- Launch Parallels Management Console - a graphical tool for administering Parallels Virtuozzo Containers and performing main administrative tasks on Hardware Nodes and in the Container context - and register the Hardware Node with it.
- Set Parallels Infrastructure Manager and Parallels Power Panel to work. These tools are intended for managing Hardware Nodes and/or individual Containers residing on it with the help of a standard Web browser.

All these steps are described below in the guide.

Installation Checklist

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

Installing Windows OS

- ❑ Install a fresh version of Windows Server 2003 on your server.
- ❑ Activate your Windows Server 2003 installation.

Note: During the Virtuozzo Containers installation, you may be presented with a warning message informing you that some Windows Server 2003 updates installed on your server are not compatible with Virtuozzo Containers 4.0. In this case you should uninstall these updates from the server (e.g. using the Add/Remove Programs tool in Control Panel) and start the Virtuozzo Containers installation anew. You will be able to turn on the Windows Automatic Update service and deploy the necessary Windows Service 2003 updates to your Node after the Virtuozzo Containers installation. Detailed information on how you can do it is provided in the Updating Hardware Node Software section of the Parallels Virtuozzo Containers User's Guide.

Installing Parallels Virtuozzo Containers

- ❑ Insert a CD with the same Windows Server 2003 distribution kit as the one installed on your server.

  Note: If you skip this step, you will be asked to insert such a CD or to provide the path to the Windows Server 2003 distribution files during the Virtuozzo Containers installation.

- ❑ Execute the Virtuozzo Containers installation file to install and configure Virtuozzo Containers 4.0 for Windows on your server.

If you are going to use Parallels Management Console and/or Parallels Infrastructure Manager/Parallels Power Panel to manage your Hardware Node and its Containers and to keep track of the resource consumption on the Node, you should additionally perform the following operations:

Configuring Parallels Management Console

- ❑ Launch Parallels Management Console.
- ❑ Register the Hardware Node in Parallels Management Console.

Configuring Parallels Infrastructure Manager

- ❑ Log in to Parallels Infrastructure Manager.
- ❑ Install a server certificate on the Hardware Node.

CHAPTER 3

Installing and Configuring Virtuozzo Containers 4.0 on Hardware Node

The given chapter provides information on how to install and configure Virtuozzo Containers 4.0 on your server. It also informs you of the way to upgrade your current Virtuozzo Containers installation and to remove the Virtuozzo Containers installation from your server.

Note: This chapter does not deal with installing the Virtuozzo Containers software on Hardware Nodes included in MSCS clusters. For detailed information on how you can do this, please turn to the Deploying Microsoft Clusters in Virtuozzo-Based Systems document shipped with Virtuozzo Containers 4.0.

In This Chapter

Obtaining Virtuozzo Containers Distribution Set

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

- Get a CD or DVD containing Virtuozzo Containers 4.0 from Parallels.
- Download the appropriate `zip` archive containing the Virtuozzo Containers 4.0 installation files from the Parallels web site to your server.
- Use the `vzinstall.exe` utility 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.exe` - allowing you to quickly get the Virtuozzo Containers distribution from the Internet. All you have to do is to download the `vzinstall.exe` file from the Parallels web site to your server and run it there. After double-clicking this file, you will be presented with the Choose language dialog where you can choose the user interface language of the Parallels Virtuozzo Containers Autoinstall wizard (which is set to English by default), according to your preferences, by selecting any of the supported languages on the drop-down menu. This wizard 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 Parallels 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.exe` operation mode:

Figure 3: Virtuozzo Containers Autoinstaller - Welcome Screen

You can choose between the following modes:

- *Download only*: if you wish to download the Virtuozzo Containers 4.0 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.exe` utility, select the Download and install radio button and click Next.

Depending on the mode chosen, your further steps will be slightly different. In the following, we will insert a special remark when this or that step is skipped in the corresponding mode.

After you have clicked the Next button in the Welcome to Parallels Virtuozzo Containers Autoinstall window, the wizard will try to establish a connection to the Parallels server, get a list of Virtuozzo components available for downloading, and check your system against its compatibility with the Virtuozzo Containers software (the latter action is performed only if you are running `vzinstall.exe` in the 'Download and install' mode). After completing these tasks, the wizard will ask you to choose the Virtuozzo Containers installation type:

Notes: 1. If the wizard has detected some problems when connecting to the Parallels server, fetching a list of Virtuozzo components, or checking your system compatibility, you will be presented with the Report Problem screen helping you draw up a problem report and automatically send it to the Parallels support team (provided you have an active Internet connection). The support team will diagnose the received report and do its best to quickly solve your problem.

2. The Installation Type window is skipped if you are running the `vzinstall.exe` utility in the 'Download only' mode.

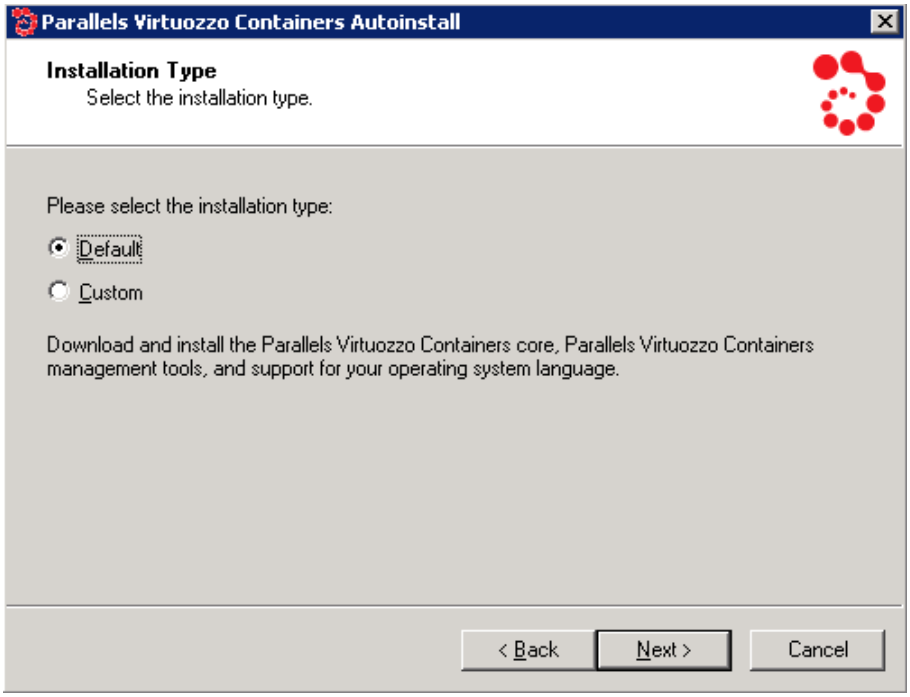


Figure 4: Virtuozzo Containers Autoinstaller - Choosing Virtuozzo Installation Type

In this window you can choose one of the following Virtuozzo Containers installation types:

- *Default*: select this radio button to let the wizard automatically determine the version of the Windows Server 2003 operating system installed on your server and download the appropriate components for this system. The Virtuozzo Containers 4.0 default set includes the following components:
  - the `virtuozzo4.0_x86.exe` or `virtuozzo4.0_x64.exe` or `virtuozzo4.0_IA64.exe` file: the main Virtuozzo Containers 4.0 installation file containing the Virtuozzo Containers program files to be installed on the 32-bit or x86-64-bit or IA64-bit version of Windows Server 2003, respectively;
  - the `VZTools_x86.ex_` or `VZTools_x64.ex_` or `VZTools_IA64.ex_` file: the installation file for Virtuozzo tools - a set of special tools (Parallels Management Console, Parallels Infrastructure Manager, etc.) intended to facilitate your working with Virtuozzo Containers 4.0 - to be installed on the 32-bit or x86-64-bit or IA64-bit version of Windows Server 2003, respectively;
  - one or more OS (operating system) templates to be used for creating Containers on their basis (e.g. `w2k3en_sp1_x86.ex_`, and `w2k3en_sp2_x86.ex_`for making Containers running the 32-bit English version of Windows Server 2003 Service Pack 1 and Windows Server 2003 Service Pack 2, respectively).
- *Custom*: select this radio button to manually specify the Virtuozzo components to be downloaded to and installed on your server.

The Parallels Virtuozzo Containers Components window is displayed if you are running the `vzinstall.exe` utility in the 'Download only' mode or if you chose the Custom radio button on the previous step of the wizard:

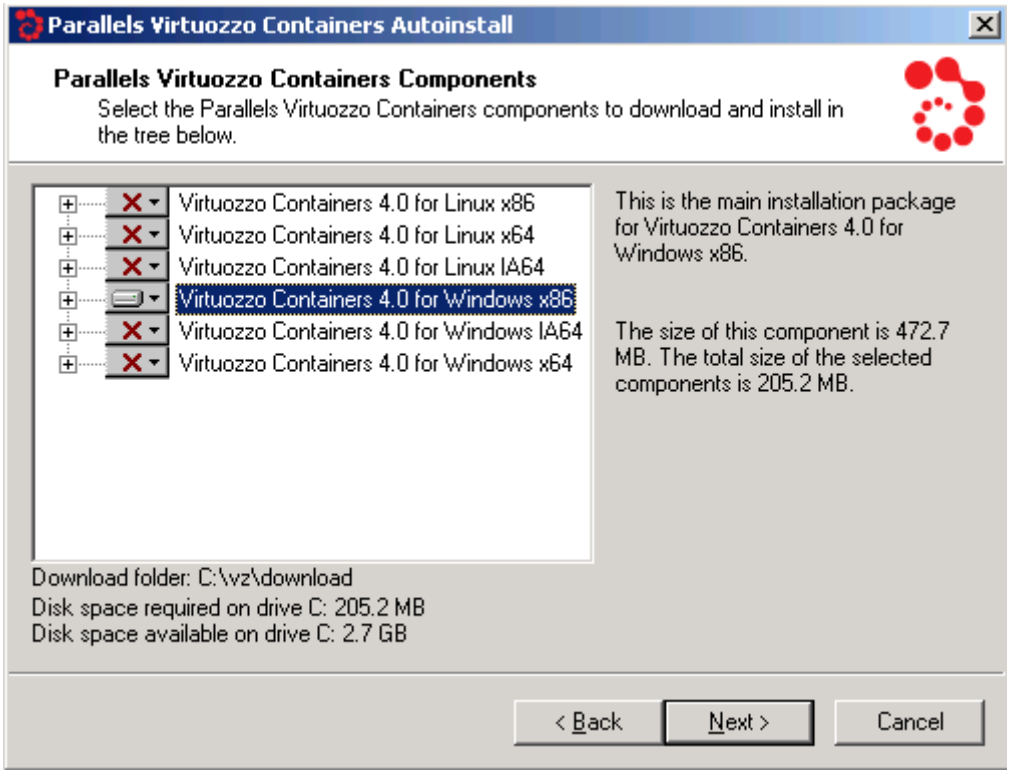


Figure 5: Virtuozzo Containers Autoinstaller - Choosing Components to Install

In this window you are supposed to choose the Virtuozzo components to be downloaded to/installed on your server. To schedule a component for downloading/installing, expand the plus sign near the corresponding Virtuozzo Containers installation package, click the down arrow near the corresponding component, and select Available on the drop-down menu. After you have chosen all the necessary components, click Next.

The Parallels Virtuozzo Containers Components window displays:

- All distribution sets available for Virtuozzo Containers 4.0 (both for Windows and Linux) if you are running the wizard in the 'Download only' mode. So, you can choose any of the listed distribution sets for downloading to your server. By default, the distribution set corresponding to the version of Windows Server 2003 installed on your server is selected for downloading.
- The distribution set corresponding to the version of the Windows Server 2003 operating system installed on your server (e.g. *Virtuozzo Containers 4.0 for Windows x86* if your server is running the 32-bit version of Windows Server 2003) if you are running the wizard in the 'Download and install' mode.

On the next step of the wizard, you can configure the path to the folder where Virtuozzo Containers 4.0 and its components will be downloaded:

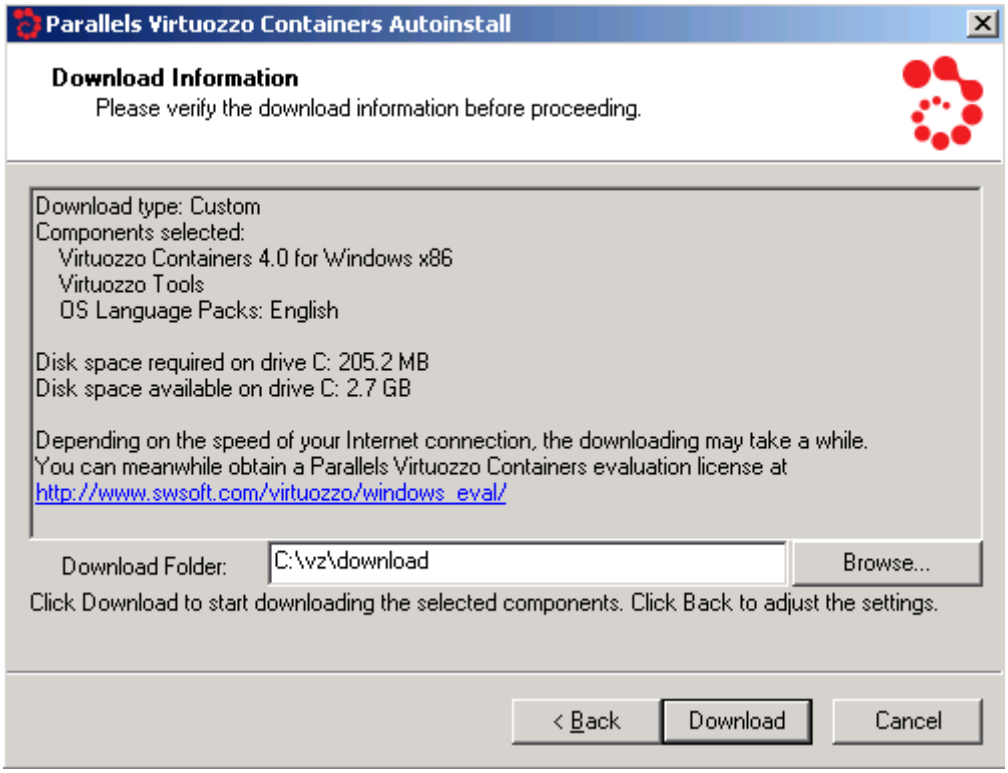


Figure 6: Virtuozzo Containers Autoinstaller - Specifying Download Folder

By default, the Parallels Virtuozzo Containers Autoinstall wizard offers you to store the downloaded files in the `C:\vz\download` folder. You can leave the offered path or specify your own one by typing the needed path in the Download Folder field or clicking the Browse button and indicating the path in the displayed window. Clicking the Download button starts downloading the Virtuozzo components to your server.

If you have not yet obtained a Virtuozzo license needed to start using the Virtuozzo Containers 4.0 software on your Hardware Node, you will also be offered to do so by following the indicated link in the Download Information window (http://www.swsoft.com/virtuozzo/windows_eval).

After the Virtuozzo components have been successfully downloaded to the specified folder on your server, you will be presented:

- with the Ready to Install window if you are running the wizard in the 'Download and install' mode. In this window you are supposed to click Next to launch the Parallels Virtuozzo Containers Installation Wizard helping you install Virtuozzo Containers 4.0 onto your server. The majority of steps in this wizard will be automatically performed by the `vzinstall.exe` utility itself. All you have to do is to insert the CD with or specify the path to the same Windows Server 2003 distribution kit as the one installed on your server on the Installing Windows Components screen and to enter a valid Virtuozzo license in the Virtuozzo License Installation window (however, you can skip the last step and install a Virtuozzo license later on). Detailed information on the Parallels Virtuozzo Containers Installation Wizard is given in the following section.

- with the Congratulations! You have successfully downloaded ... window if you are running the wizard in the 'Download only' mode. In this window you should click Finish to exit the Parallels Virtuozzo Containers Autoinstall wizard. At any time you can start the Virtuozzo Containers installation process by double-clicking either the `virtuozzo4.0_x86.exe` or `virtuozzo4.0_x64.exe` or `virtuozzo4.0_IA64.exe` file (depending on the version of the Windows Server 2003 OS installed on your server) located in the download folder (`C:\vz\download` by default). This will launch the Parallels Virtuozzo Containers Installation Wizard described in the following section in detail.

Installing Virtuozzo Containers Software

To install Virtuozzo Containers 4.0 for Windows on any given Hardware Node, launch the Parallels Virtuozzo Containers Installation Wizard by double-clicking the `virtuozzo4.0_<arch>.exe` installation file where `<arch>` denotes the system architecture of the Windows Server 2003 OS under which Parallels Virtuozzo Containers is to be run (e.g. `virtuozzo4.0_x86.exe` to install Virtuozzo Containers 4.0 on systems running the 32-bit version of Windows Server 2003). In the Choose Setup Language dialog, you can choose the user interface language of the Parallels Virtuozzo Containers Installation Wizard (which is set to English by default), according to your preferences. To this effect, select any of the supported languages on the drop-down list and click OK to proceed with the wizard.

The installation program will greet you with the following screen:

Note: The Welcome to ... screen is skipped if you use the `vzinstall.exe` utility in the 'Download and install' mode to automatically download and install Virtuozzo Containers 4.0 on your server.

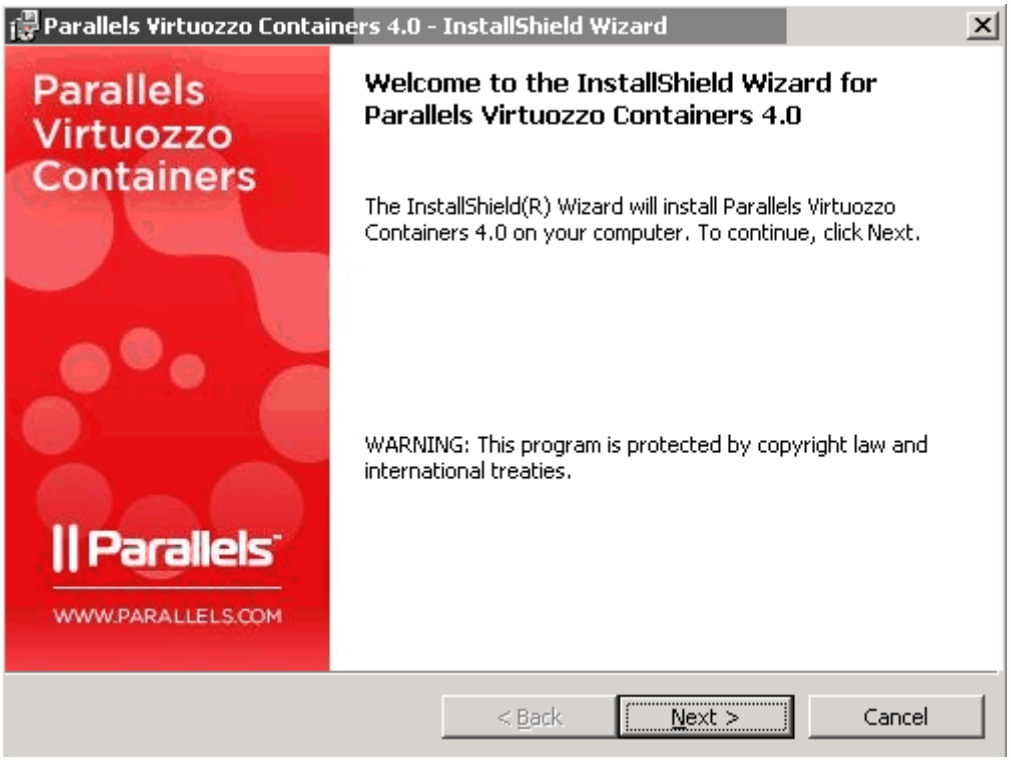


Figure 7: Installing Virtuozzo Containers - Welcome to InstallShield Wizard

Clicking the Next button will display the Parallels end user license agreement that you must accept to be able to install Parallels Virtuozzo Containers. Use either the PgDn key or the down arrow on your keyboard to read all the text of the agreement.

After you have selected the I accept the terms in the license agreement radio button and clicked Next on the License Agreement screen, the User Information window is displayed:

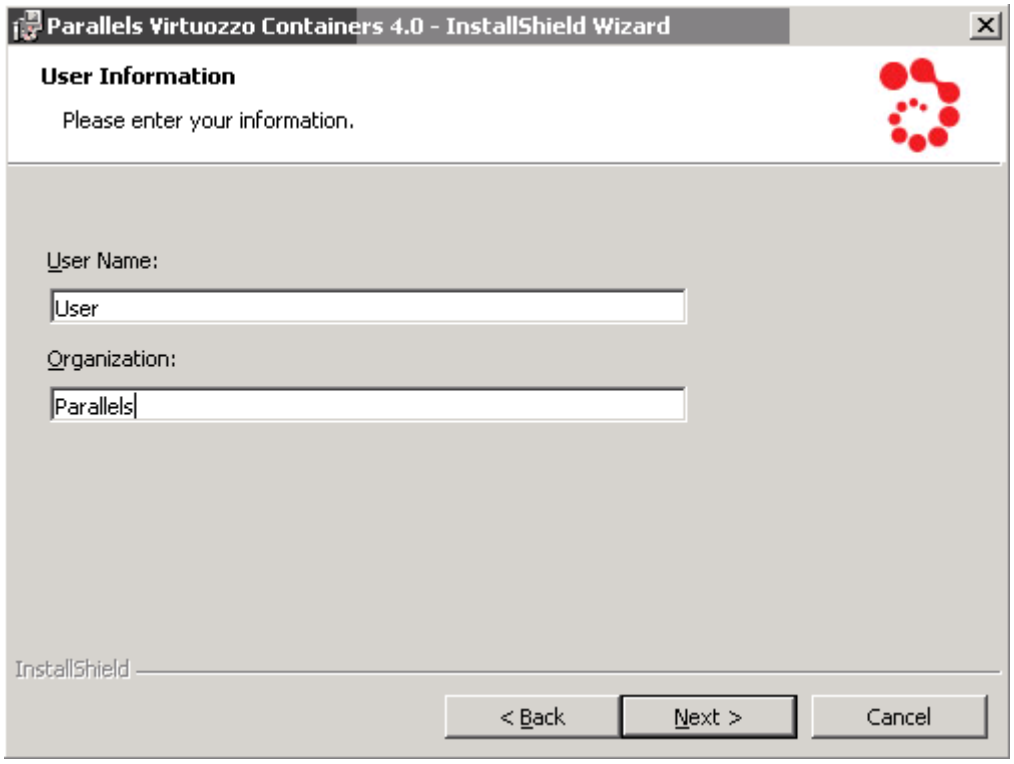


Figure 8: Installing Virtuozzo Containers - Entering User's Information

Enter the necessary information in the fields provided and click Next.

On the next screen, you should specify the location for Virtuozzo program files and the folders for keeping all Container data and Virtuozzo backups:

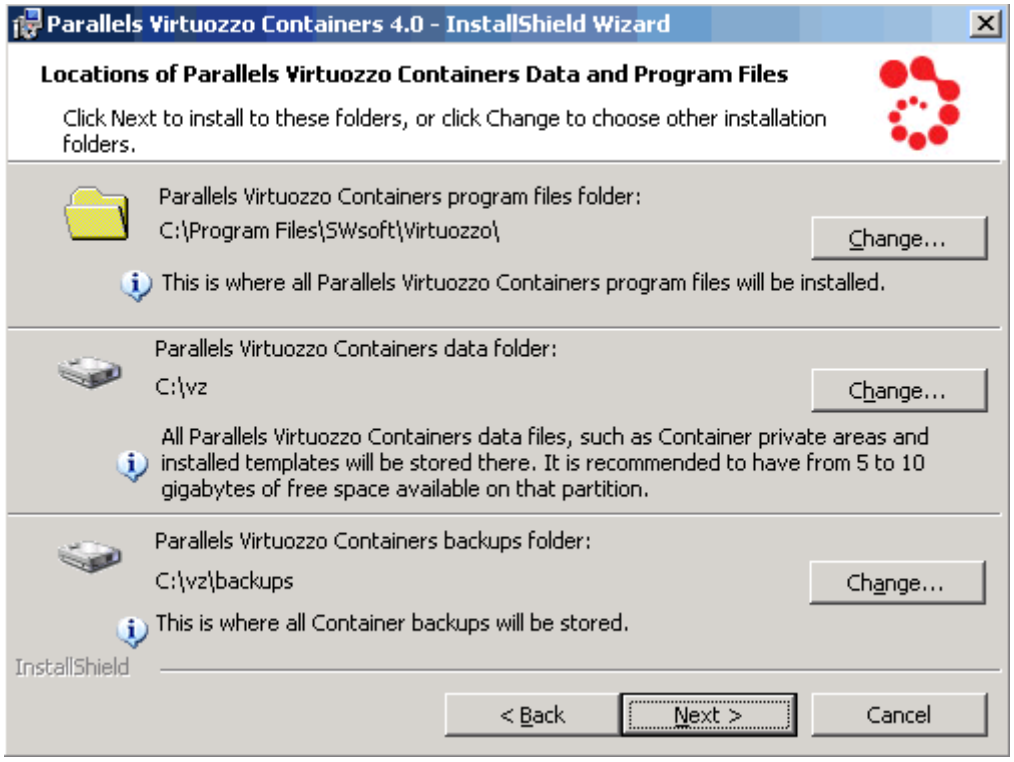


Figure 9: Installing Virtuozzo Containers - Specifying Destination Folders

The three folders specified on the given step of the wizard mean the following:

- The first folder with the default path of `C:\Program Files\SWsoft\Virtuozzo` contains all Virtuozzo program files including drivers, scripts, services, etc. specific for Parallels Virtuozzo Containers. You can specify another path for the folder by clicking the Change button and selecting the desired path. Keep in mind that if Virtuozzo Containers 4.0 is uninstalled from your server, this folder will be removed.
- The second folder is meant for storing all the data used by the Containers that you will be creating on the Node: private areas, installed templates, patches, logs, etc. By default, the `C:\VZ` path is used. You can specify another path for the folder by clicking the Change button and selecting the desired path. While defining a path for this folder, you should take care of the following:
  - This folder cannot be a mount point, i.e. you cannot mount external disk partitions to this folder.
  - This folder cannot be a network share, i.e. it cannot be located on a server network drive.
  - The hard disk partition where this folder will be located should have no less than 10 Gb of free disk space.

  As distinct from the previous folder, this folder remains intact if Virtuozzo Containers 4.0 is uninstalled from your server.

- The third folder is destined for keeping all Container backups created on the Node
  - by using the `vzabackup` Virtuozzo utility (consult Parallels Virtuozzo Containers Reference Guide for detailed information on this utility) or
  - by means of Parallels Management Console and Parallels Infrastructure Manager/Parallels Power Panel if there is no default Backup Node or this Hardware Node is to serve as one. In the latter case, this folder will be used to store the Container backups from all Hardware Nodes registered in Parallels Management Console/Parallels Infrastructure Manager. Detailed information on the way to manage Container backups in Management Console and Parallels Infrastructure Manager/Parallels Power Panel is provided in the Operations on Containers chapter of Parallels Virtuozzo Containers User's Guide and Parallels Infrastructure Manager/Parallels Power Panel online help, respectively.

  The folder has the default path of `C:\VZ\Backups`. You can specify another path for the folder by clicking the Change button and selecting the desired path. While defining the backup folder, make sure that it has sufficient disk space for housing multiple Container backups.

After you have made decision on all the folders, click Next.

The Ready to Install the Program screen allows you to change your installation settings by clicking the Back button and making the necessary changes. Clicking the Install button on this screen starts the installation process. During the Virtuozzo Containers 4.0 installation and configuration, the following operations are performed:

Note: If you use the `vzinstall.exe` utility in the 'Download and install' mode, the Ready to Install the Program screen is skipped and the Virtuozzo Containers 4.0 installation is initiated after clicking the Install button in the Locations of Virtuozzo Data and Program Files window.

---

1. The necessary Virtuozzo program files are automatically installed on your server.
2. The Parallels web site is checked for available Virtuozzo Containers updates. If any updates are found, you will be presented with the Recommended Updates window listing the detected updates. To download and install any of the listed updates, select its name and click Next.
3. The Virtuozzo tools are installed on the Hardware Node. These tools include Parallels Management Console, Parallels Infrastructure Manager, and Parallels Power Panel and are intended to facilitate your working with the Virtuozzo Containers software.
4. Additional Windows Server 2003 components are added to your Host OS:

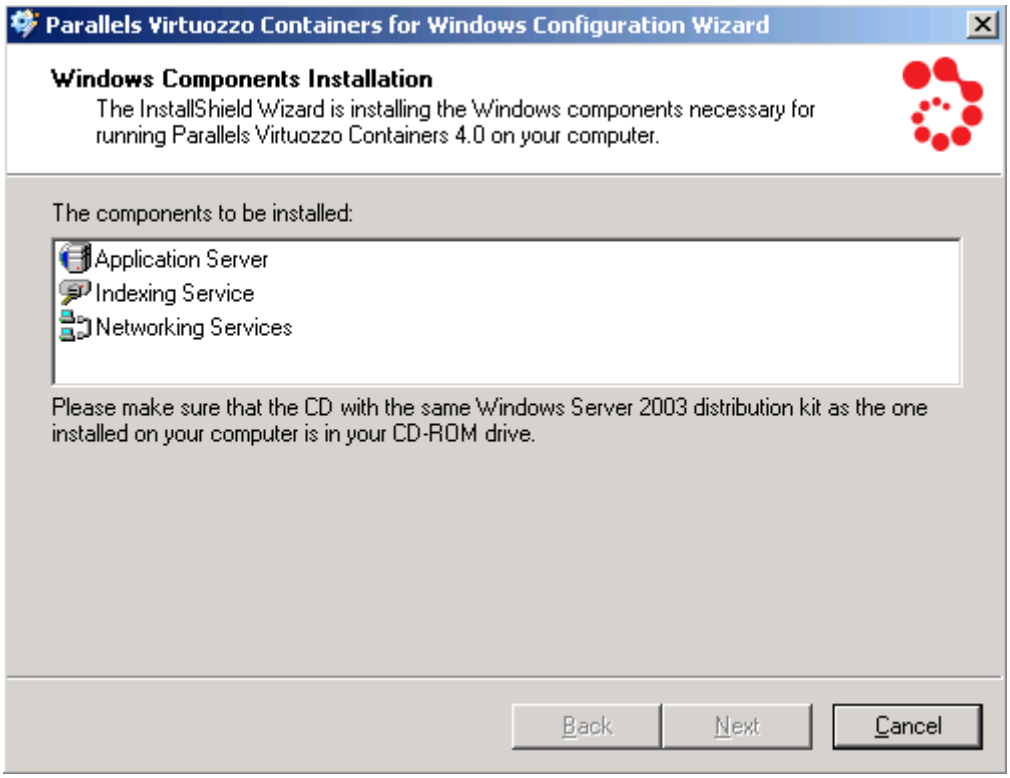


Figure 10: Installing Virtuozzo - Adding Windows Components to Host OS

The components installed on this step of the wizard represent standard Windows applications and are necessary to provide Containers you will create on the Hardware Node with the corresponding functionality. While adding Windows components, the wizard will ask you to provide a path to the Windows Server 2003 distribution files (either by inserting a CD with the Windows Server 2003 distribution kit or by clicking on the OK button in the displayed window and specifying the path to the distribution files).

Note: You must use the same Windows Server 2003 distribution kit as the one installed on your Hardware Node.

5 A number of additional Virtuozzo components are installed on the Hardware Node. These components include the MSDE application template, the Windows 2003 OS template, and the Service Container and are needed to make your Virtuozzo Containers installation fully operational. For example, you need the Windows 2003 OS template to create Containers on its basis, and the Service Container should be created to allow you to manage the created Containers by means of Parallels Management Console, Parallels Infrastructure Manager, and Parallels Power Panel.

Note: If you are installing Virtuozzo Containers on a Hardware Node running the IA64-bit version of Windows Server 2003, this step is skipped. You should manually create the Service Container on your Node by performing the operations described in the Performing Postinstallation Operations on IA64-bit Hardware Nodes subsection (on page 33).

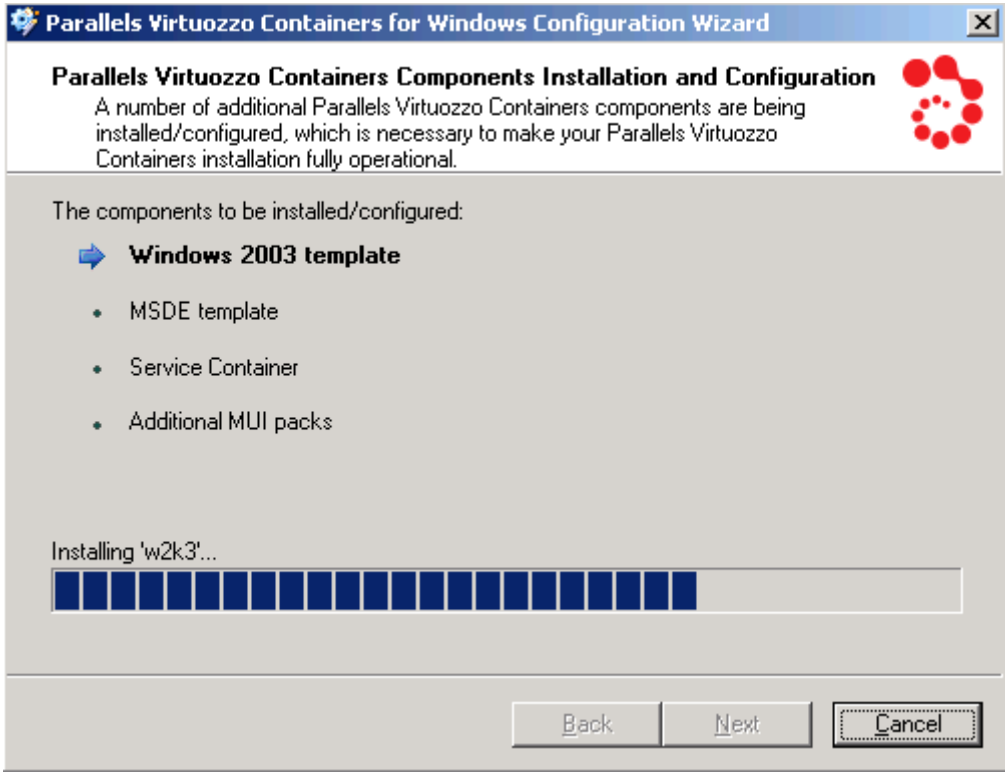


Figure 11: Installing Virtuozzo Containers - Installing Virtuozzo Components

Next, you are supposed to choose the set of Windows Server 2003 system services to be launched inside newly created Containers on their startup:

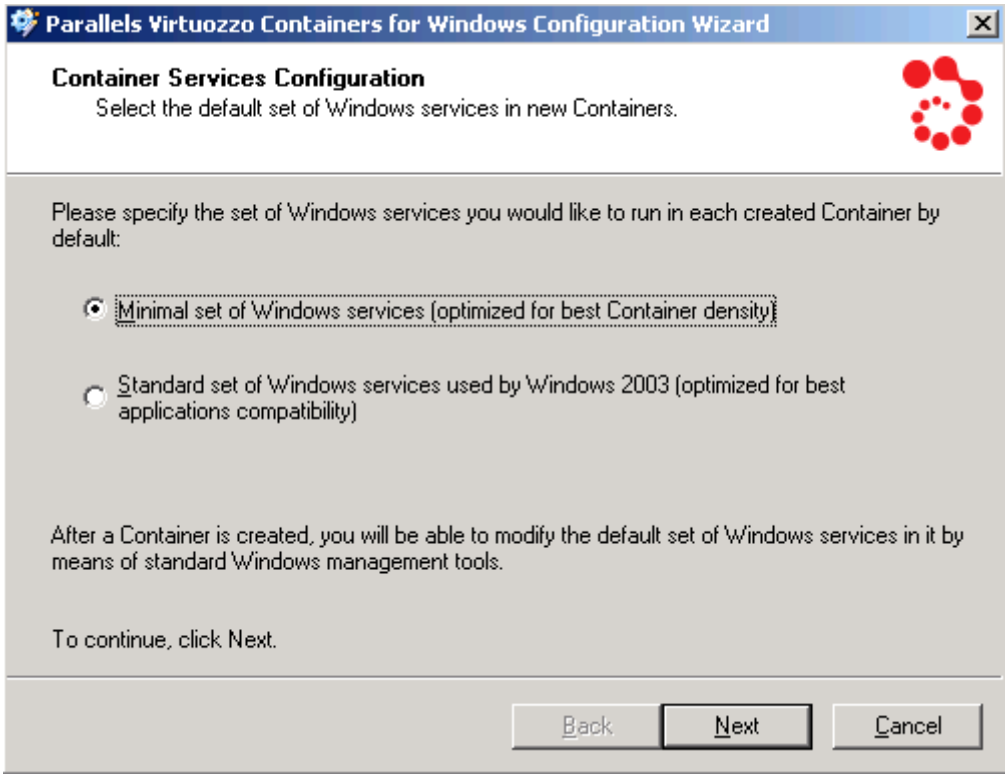


Figure 12: Installing Virtuozzo Containers - Choosing System Services Set

In this window you can choose between the two system services sets:

- Select the Standard set of Windows services used by Windows 2003 radio button to automatically launch the standard set of Windows Server 2003 system services inside each newly created Container on its startup. The standard system services set includes the same services that would be launched inside any other standalone computer after installing Windows Server 2003 onto it.
- Leave the Minimal set of Windows services radio button selected to have the minimal set of Windows Server 2003 services running inside Containers after their startup. The minimal system services set differs from the standard one in the following:
  - It has the startup type of the *Print Spooler*; *Remote Registry*; *DNS Client* services set to manual.
  - The startup type of the *TCP/IP NetBIOS Helper*, *Computer Browser*, *Server* services in the minimal set corresponds to that of the version of Windows Server 2003 installed inside a Container (e.g. Windows Server 2003 Datacenter Edition or Windows Server 2003 Standard Edition), while in the standard set these services are always set to the automatic startup type.

  As a result of these differences, the minimal set allows you to simultaneously run more Containers on the Hardware Node; however, you have to manually start the aforementioned services each time you need them inside this or that Container.

Note: After a Container has been created, you can configure the set of Windows system services to be run inside this Container on its startup using standard Windows Server 2003 tools (e.g. the Services snap-in or the `Sc.exe` command line tool).

On the last step of the wizard, you will be asked to install a valid Virtuozzo license on the Hardware Node to start using Virtuozzo Containers 4.0 on your server:

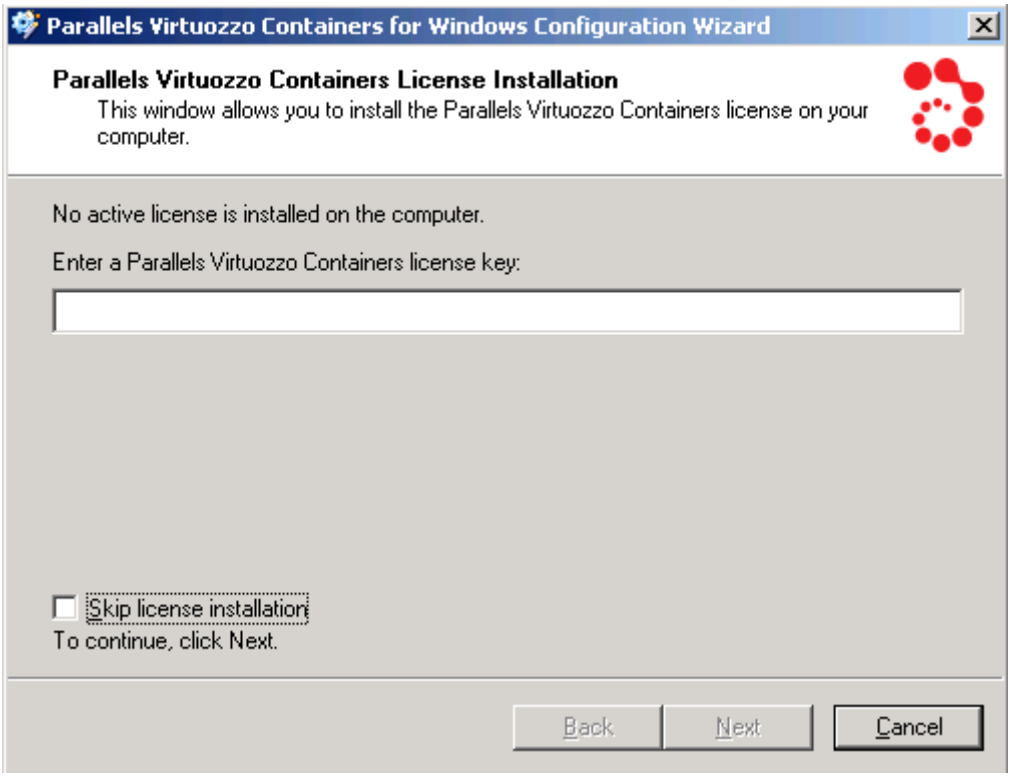


Figure 13: Installing Virtuozzo Containers - Entering License Key

Every Hardware Node should have its own Virtuozzo license installed. Licenses are issued by Parallels and needed to start using Virtuozzo Containers 4.0 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 (e.g. start Containers) until you upload a valid Virtuozzo license to the Node. In this window you can:

- install a Virtuozzo license by enter the Virtuozzo license key obtained from Parallels in the field provided and clicking Next;
- skip the step of the Virtuozzo license installation by selecting the Do not install license at this moment check box and clicking Next. You will be able to install the Virtuozzo license later on using the Parallels Virtuozzo Containers Configuration Wizard (to launch the wizard, select Programs --> Parallels --> Parallels Virtuozzo Containers --> Virtuozzo Configuration Wizard on the Windows Start menu), Parallels Management Console, Parallels Infrastructure Manager, or the `vzlicload` utility.

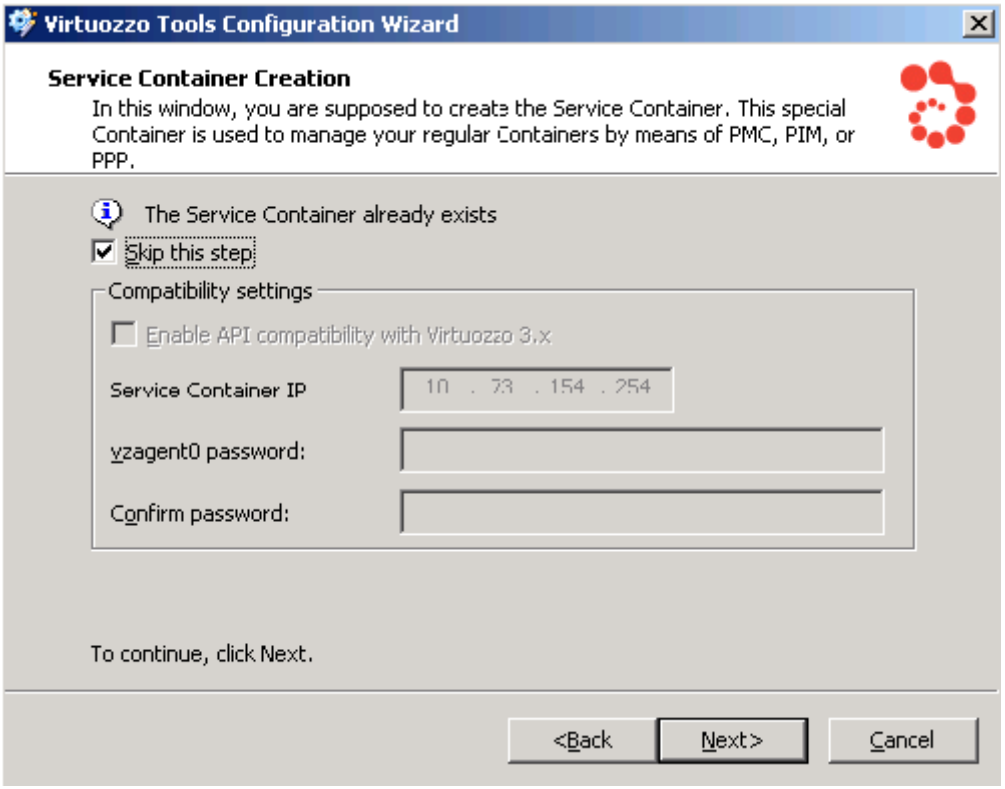
After Virtuozzo Containers 4.0 has been successfully installed and configured on your server, the InstallShield Wizard Completed window is displayed where you should click the Finish button to exit the wizard.

Performing Postinstall Operations On IA-64 Hardware Node

To complete the Virtuozzo Containers installation on a Hardware Node running the IA64-bit version of Windows Server 2003, you should additionally perform the following operations after the Virtuozzo Containers 4.0 software has been installed on the Node:

1 Prepare a Hardware Node running either the 32-bit version or the x86-64-bit version of the Virtuozzo Containers 4.0 software. You can use any of your existing Nodes for this purpose, if you already have any. Make sure that the Service Container has a valid IP address assigned to it and that it can be accessed from the IA64-bit Hardware Node using this IP address; otherwise, recreate the Service Container by completing the following tasks on the Node:

- Invoke the Virtuozzo Tools Configuration Wizard by selecting Programs --> Parallels --> Virtuozzo Tools --> Virtuozzo Tools Configuration Wizard on the Windows Start menu.
- In the Welcome window, click Next.



- In the Service Container Creation window:

  - Clear the Skip this step check box and select the Enable API compatibility with Virtuozzo Containers 3.x check box.

  - Specify a valid IP address to be assigned to the Service Container in the Specify Container IP address field. The only requirement that the specified IP address must meet is to be accessible from the IA64-bit Hardware Node.

  - Enter an arbitrary password in the vzagent0 password field and reenter the password in the Confirm password field.

  - Click Next.

- After the Service Container has been successfully recreated, click Finish to exit the wizard.

The prepared Node will be used as the Source Node for providing the necessary parameters for the IA-64-bit Hardware Node on the next step.

2 Create the Service Container on the IA-64-bit Hardware Node by doing the following:

- On the IA-64-bit Node, launch the Virtuozzo Tools Configuration Wizard by selecting Programs --> Parallels --> Virtuozzo Tools --> Virtuozzo Tools Configuration Wizard on the Windows Start menu.
- In the Welcome to... window, click Next.
- In the Service Container Creation window, click Next to open the Service Container Creation window. In this window:

a specify the IP address assigned to the prepared Node (i.e to the Node hosting the Service Container with the Administrator account enabled and a public IP address assigned) in the Node address field and

b provide the Administrator credentials used to access the prepared Node in the Node administrator and Administrator's password fields.

When you are ready, click Next to start creating the Service Container.

- After the Service Container creation, Finish to exit the Virtuozzo Tools Configuration Wizard.

Unattended Virtuozzo Containers Installation

The given section provides information on how to install and configure Virtuozzo Containers 4.0 for Windows on your computer in the unattended (silent) mode.

Overview

Unattended installation is available since the Virtuozzo Containers 4.0 release. This kind of installation allows you to automate the processes of installing and configuring Virtuozzo Containers 4.0 on your computer, thus, reducing your interaction during these processes to zero.

Note: All Hardware Nodes where you are going to perform the Virtuozzo Containers unattended installation should meet the system and network requirements described in the Installation Requirements section (on page 13).

To run the Virtuozzo Containers installation in the unattended mode, you should perform the following operations:

- Copy the Virtuozzo Containers distribution files to some folder on the server where you wish to install Parallels Virtuozzo Containers. For example, you can use the `vzinstall.exe` utility to download the Virtuozzo Containers software to your server.
- Insert a CD with the same Windows Server 2003 distribution kit as is installed on the Hardware Node into your CD-ROM drive or copy the Windows distribution files to some folder on your server.
- Execute the Virtuozzo Containers installation file in the `cmd.exe` command interpreter and pass the necessary options to it.

Preparing for Installation

Before starting to install Virtuozzo Containers 4.0 in the unattended mode, you should make sure that:

- You have the Virtuozzo Containers 4.0 distribution files available on the server where you wish to install Virtuozzo Containers 4.0. For example, you can copy these files from your Virtuozzo Containers installation CD or DVD to some folder on your server or use the `vzinstall.exe` utility to download the Virtuozzo Containers software to the server. Detailed information on `vzinstall.exe` is provided in the Obtaining Virtuozzo Containers Distribution Set section (on page 19).
- You have the Windows Server 2003 distribution kit at hand (either on a CD/DVD inserted into your CD-ROM drive or downloaded to some folder on the server). It will be needed during the Virtuozzo Containers installation to add additional Windows components on your server. These components represent standard Windows applications and are necessary to provide Containers you will create on the Hardware Node with the corresponding functionality.

  Note: You must use the same Windows Server 2003 distribution kit as the one installed on the server.

After preparing the Virtuozzo Containers 4.0 and Windows distribution files, you can start installing the Virtuozzo Containers software on your server.

Installing Virtuozzo Containers Software

The Virtuozzo Containers 4.0 installation procedure can be initiated by executing the Virtuozzo Containers installation file (`virtuozzo4.0_<arch>.exe` where `<arch>` denotes the system architecture of the Windows Server 2003 OS under which Parallels Virtuozzo Containers is to be run) in the folder where the Virtuozzo Containers distribution files are located and passing the corresponding parameters to it. The following command line parameters control the Virtuozzo Containers installation in the unattended mode:

Parameter	Description
`/S`	Mandatory. Tells `virtuozzo4.0_<arch>.exe` to run the Virtuozzo Containers installation in the unattended mode.
`/V "<parameters>"`	Mandatory. One or more parameters to be passed to the Windows installer during the Virtuozzo Containers silent installation. All the possible parameters that can be used with `virtuozzo4.0_<arch>.exe` are listed further in the table. Quotation marks must precede the first specified parameter and close the last specified parameter.
`/qr`	Mandatory. Starts the Virtuozzo Containers installation in the reduced user interface mode.
`ALLSERS=ALL`	Mandatory. This parameter serves for per-machine installation using folders in the 'All Users' profile and is required for installing a number of specific Virtuozzo components.

`LICENSE`	Optional. The Virtuozzo license key (e.g. `LICENSE="ZENRL-XBL7E-QNKSS-P8ETH-3BVDF"`) or the path to the Virtuozzo license file on the Hardware Node (e.g. `C:\VzLicense`). If you omit this parameter, you will need to install a valid Virtuozzo license (e.g. by means of Parallels Management Console or Parallels Infrastructure Manager) before you can start using the Virtuozzo Containers 4.0 software on your server.
`WINSOURCE`	Optional. The path to the Windows Server 2003 distribution files. **Note:** You must use the same Windows Server 2003 distribution kit as the one installed on your server!
`INSTALLDIR=<Vz_Files_Path>`	Optional. This parameter can be used only on Hardware Nodes running the 32-bit versions of Windows Server 2003 and defines the path to all Virtuozzo program files including drivers, scripts, services, etc. If this parameter is omitted, the default path of `C:\Program Files\SWsoft\Virtuozzo` is used.
`VIRTUOZZO64=<Vz64_Files_Path>`	Optional. This parameter can be used only on Hardware Nodes running the 64-bit versions of Windows Server 2003 and defines the path to all Virtuozzo program files including drivers, scripts, services, etc. If this parameter is omitted, the default path of `C:\Program Files\SWsoft\Virtuozzo` is used.
`VZ=<Vz_Root_Folder_Path>`	Optional. The path to the folder that will store all the data used by the Containers on the Hardware Node: private areas, installed templates, patches, logs, etc. By default, the `C:\vz` path is used. While defining a path for this folder, you should take care of the following: ▪ This folder cannot be a mount point, i.e. you cannot mount external disk partitions to this folder. ▪ This folder cannot be a network share, i.e. it cannot be located on a computer network drive. ▪ The hard disk partition where this folder will be located should have no less than 10 Gb of free disk space.
`/Lv <log_file_path>`	Optional. The path to the log file where detailed information on the Virtuozzo Containers installation will be saved. The `v` parameter is used to log the verbose output setting.

Assuming that the Virtuozzo Containers 4.0 distribution files are located in the `C:\vz\download` folder on the server and the Windows Server 2003 distribution kit is inserted in the `D:\` CD-ROM drive, you can issue the following commands to install the 32-bit version of the Virtuozzo Containers software on your server:

```
C:\...\Administrator>cd C:\vz\download
C:\vz\download>virtuozzo4.0_x86.exe /S /V"/qr ALLUSERS=ALL
      INSTALLDIR=F:\Virtuozzo\Data VZ=F:\vz WINSOURCE=D:\
      LICENSE="ZENRL-XBL7E-QNKSS-P8ETH-3BVDF" /Lv C:\VzInstallLog.txt"
```

This command will:

- launch the Virtuozzo Containers installation in the reduced user mode;
- install the Virtuozzo Containers program files in the `F:\Virtuozzo\Data` folder on the Hardware Node;
- set the `F:\vz` path for storing all Container data;
- install the Virtuozzo license key of `ZENRL-XBL7E-QNKSS-P8ETH-3BVDF` on the Hardware Node;
- use the CD in the `D:\` drive to install additional Windows Server 2003 components on the Hardware Node;
- write detailed information on the Virtuozzo Containers installation process to the `C:\VzInstallLog.txt` file on the Node.

Uninstalling Virtuozzo Containers 4.0

If you are going to uninstall Virtuozzo Containers 4.0 from your server, you should first stop all Containers on the Node. When no Container is running on your Node, you may choose one of the following ways to uninstall the Virtuozzo Containers software:

Using Add or Remove Programs in Control Panel:

1. Choose Settings --> Control Panel on the Windows Start menu.
2. In the displayed window, double-click the Add or Remove Programs item to open the Add or Remove Programs window helping you manage programs and their components on your server.
3. Select the Parallels Virtuozzo Containers 4.0 entry in a list of programs currently installed on your Node and click Change/Remove.
4. In the displayed window, click the Next button to proceed with the Virtuozzo Containers deinstallation.
5. In the Remove the Program window, you can:
   a. Select the Remove Virtuozzo data folder check box and click the Remove button to remove both the Virtuozzo program files, which are stored in the `C:\Program Files\SWsoft\Virtuozzo` folder by default, and the `C:\vz` folder meant for keeping the Containers private data (private areas, installed templates, patches, logs, etc.).

b Click the Remove button without selecting the Remove Virtuozzo data folder check box to remove the Virtuozzo program files only. By default, they are stored in the `C:\Program Files\SWsoft\Virtuozzo` directory. In this case you will be able to start the Containers that have remained on the Node, if you decide to reinstall the Virtuozzo Containers software later on.

Using the Virtuozzo installer:

1 Double-click the Virtuozzo Containers installation file to launch the Virtuozzo Containers installation program and, in the displayed window, click the Next button to proceed with the Virtuozzo Containers deinstallation.

2 In the Remove the Program window, you can:

- Select the Remove Virtuozzo data folder check box and click the Remove button to remove both the Virtuozzo program files, which are stored in the `C:\Program Files\SWsoft\Virtuozzo` folder by default, and the `C:\vz` folder meant for keeping the Containers private data (private areas, installed templates, patches, logs, etc.).
- Click the Remove button without selecting the Remove Virtuozzo data folder check box to remove the Virtuozzo program files only. By default, they are stored in the `C:\Program Files\SWsoft\Virtuozzo` directory. In this case you will be able to start the Containers that have remained on the Node, if you decide to reinstall the Virtuozzo Containers software later on.

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

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

Parallels Management Console is automatically installed on your Node during the Virtuozzo Containers 4.0 installation. You can launch it by clicking Programs --> Parallels --> Virtuozzo Tools --> Parallels Management Console on the Windows Start menu. If you wish to use Management Console on a dedicated computer for the remote administration of your Hardware Nodes, you should manually install the Parallels Management Console software on this computer. To install Parallels Management Console on any workstation, launch the `pmc_setup.exe` file. To find the location of this file, select Programs --> Parallels --> Virtuozzo Tools --> Parallels Management Console Setup File on the Windows Start menu. Copy the file to the computer where you wish to install Management Console and execute it there. The Parallels Management Console InstallShield Wizard will greet you with the following screen:

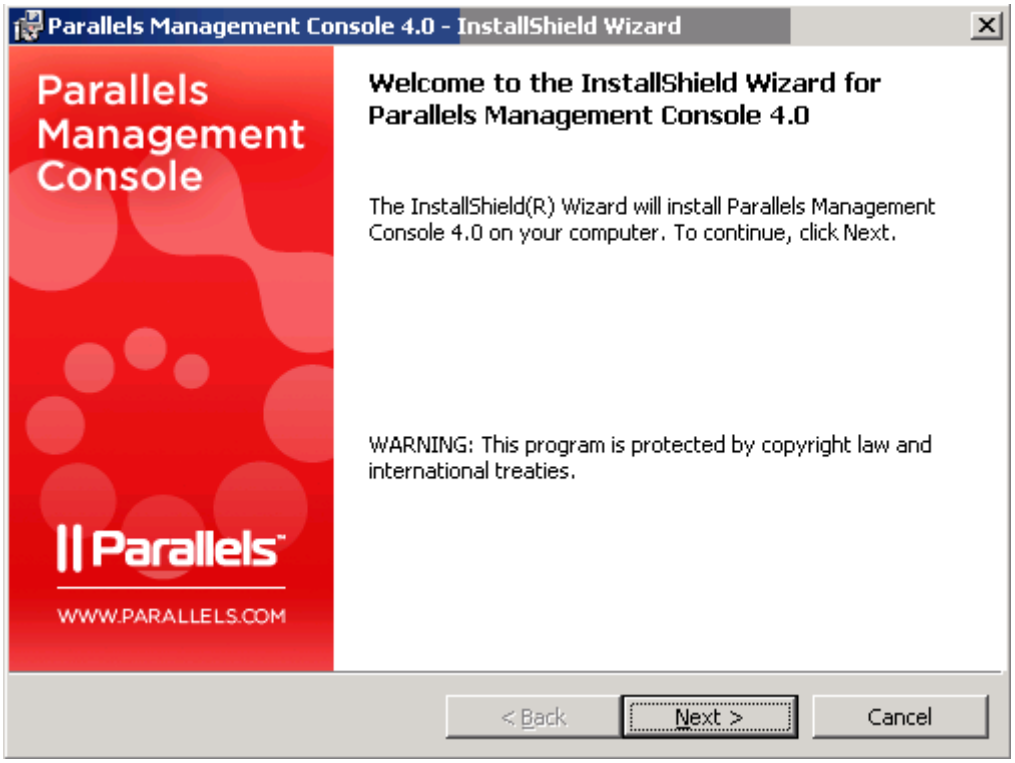


Figure 14: Installing Management Console - Welcome to InstallShieldWizard

Clicking the Next button will display the Parallels end user license agreement that you must accept to be able to install Parallels Management Console on the computer. Use either the PgDn key or the down arrow on your keyboard to read all the text of the agreement.

After you have selected the I accept the terms in the license agreement radio button and clicked Next on the License Agreement screen, the Customer Information window is displayed. Enter your name and organization in the fields provided and click Next.

On the next screen, you should specify the location of the directory where Management Console is to be installed:

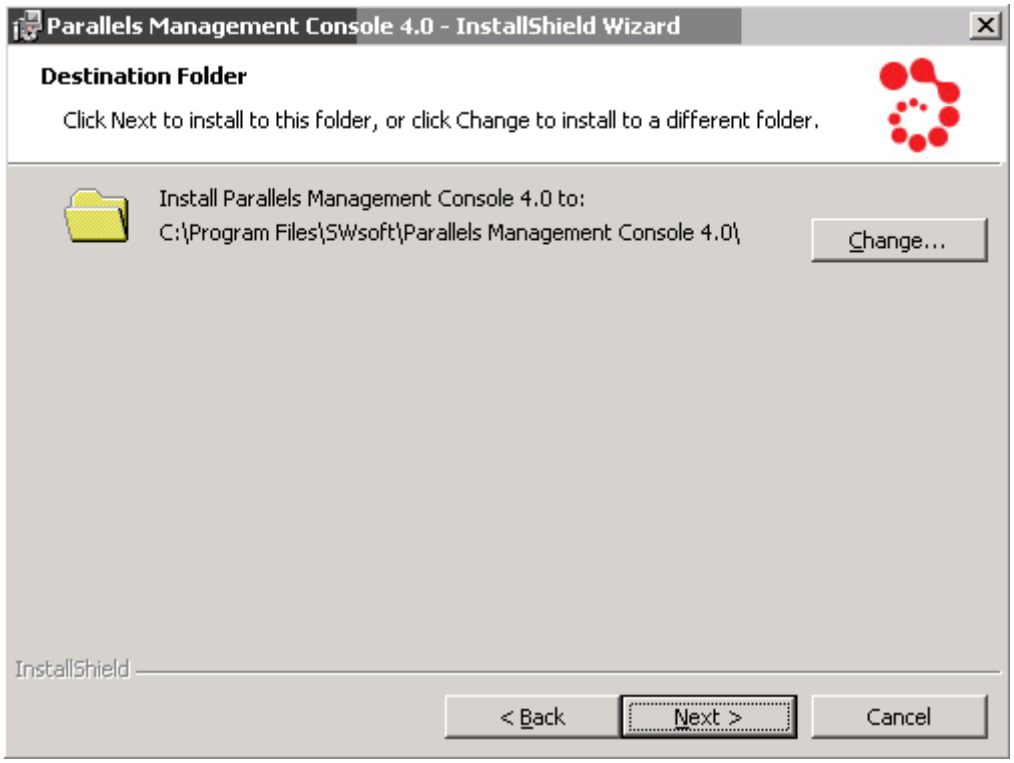


Figure 15: Installing Management Console - Choosing Destination Folder

The Change button allows you to choose another folder for the Management Console installation than the default one.

After clicking the Next button, you will be presented with the Ready to Install Program screen. This window allows you to return to the previous steps of the wizard by clicking the Back button and modify the corresponding parameters. If you are satisfied with the settings made, click Next to start installing Management Console onto your computer. After a while, the InstallShieldWizard Completed window is displayed indicating that the installation process has successfully completed. In this window you can do one of the following:

- Select the Launch Parallels Management Console 4.0 check box and click the Finish button to exit the wizard and to automatically launch Management Console after the wizard closing.
- Click the Finish button to exit the wizard. At any time you will be able to start Management Console by selecting Programs --> Parallels --> Virtuozzo Tools --> Parallels Management Console on the Windows Start menu or double-clicking the Parallels Management Console shortcut on your desktop.

Registering Hardware Node

Before you can manage a Hardware Node by means of Parallels Management Console, you must register it there. Depending on whether you are using Parallels Management Console on your Hardware Node or on a remote computer, the register process will slightly differ:

Note: If you have not yet installed a valid Virtuozzo license on the Hardware Node, you will be asked to do so by entering the Virtuozzo license number obtained from Parallels in the field provided and clicking the Submit button. For more detailed information on Virtuozzo licenses, please turn to the Parallels Virtuozzo Containers User's Guide.

- If you are running Parallels Management Console on the Hardware Node itself, this Node will be automatically registered in Parallels Management Console. The Node will be registered with the name of `Local Server`. You can then change this name by right-clicking the Hardware Node in the Management Console left pane, selecting Properties on the context menu, and typing the desired name in the Name field on the General tab of the displayed window.
- If you are running Parallels Management Console on a remote computer, you should manually register your Hardware Node in Management Console. 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 16: 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.sw.com`).
- Address. The IP address or hostname of the Hardware Node.
- User name. The user name to log in to the Hardware Node. Currently, you can log in to Parallels Management Console using the `Administrator` credentials only.
- Password. The password of the user specified in the User name field. If you are logging in as `Administrator`, please use the password you entered while installing the Windows Server 2003 OS on your server.

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

a `Detect automatically`. Selecting this option lets the wizard automatically select the most appropriate protocol type for you. This option is selected by default.

b `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.

c `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.

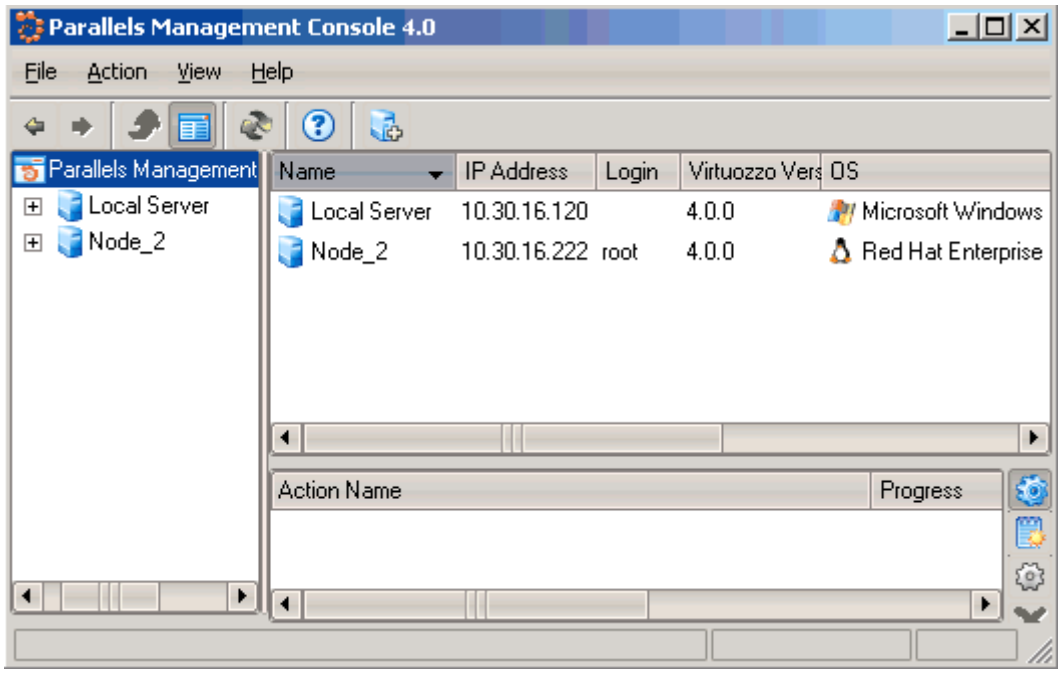


Figure 17: Management Console - Viewing Registered Nodes

Now you can start creating and managing Containers on the registered Hardware Node.

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 compatible with 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 `Administrator` 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 Certificates

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 Security Alert 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.

To set up a server certificate on a Hardware Node or inside a Container, you should perform the following operations:

1. Obtain a server certificate. You can do it either by requesting a certification authority (CA) for a valid certificate or by issuing your own server certificate using Microsoft Certificates Services.
2. Log on to the server where you wish to install the certificate as an administrator.

   Important! To set up a certificate for your Hardware Node, you should log in to the Service Container (also known as Container 1) on this Node and complete the operations stated below in the Service Container context. To log in to the Service Container:

   - enable the Administrator account inside the Service Container by running the following command on the Hardware Node:

```
C:\...\Administrator>vzctl exec 1 net user administrator /active:yes
```

   - find out the IP address assigned to the Service Container:

```
C:\...\Administrator>vzlist
```

   The Service Container can be identified by numeral 1 displayed in the `VEID` column of the command output.

   - Select Programs --> Accessories --> Communications --> Remote Desktop Connection on the Windows Start menu.
   - In the displayed window, type the Service Container IP address in the Computer field and click Connect.
   - Use the `Administrator` user name and `1q` password to log in to the Service Container.
3. Start Internet Information Services (IIS) Manager by selecting Programs --> Administrative Tools --> Internet Information Services (IIS) Manager on the Windows Start menu.
4. Launch the IIS Certificate Wizard:
   - In IIS Manager, expand the local computer node and then expand the Web Sites folder.
   - Right-click the Default Web Site item and select Properties on the context menu.

- On the Directory Security tab of the displayed window, click the Server Certificate button:

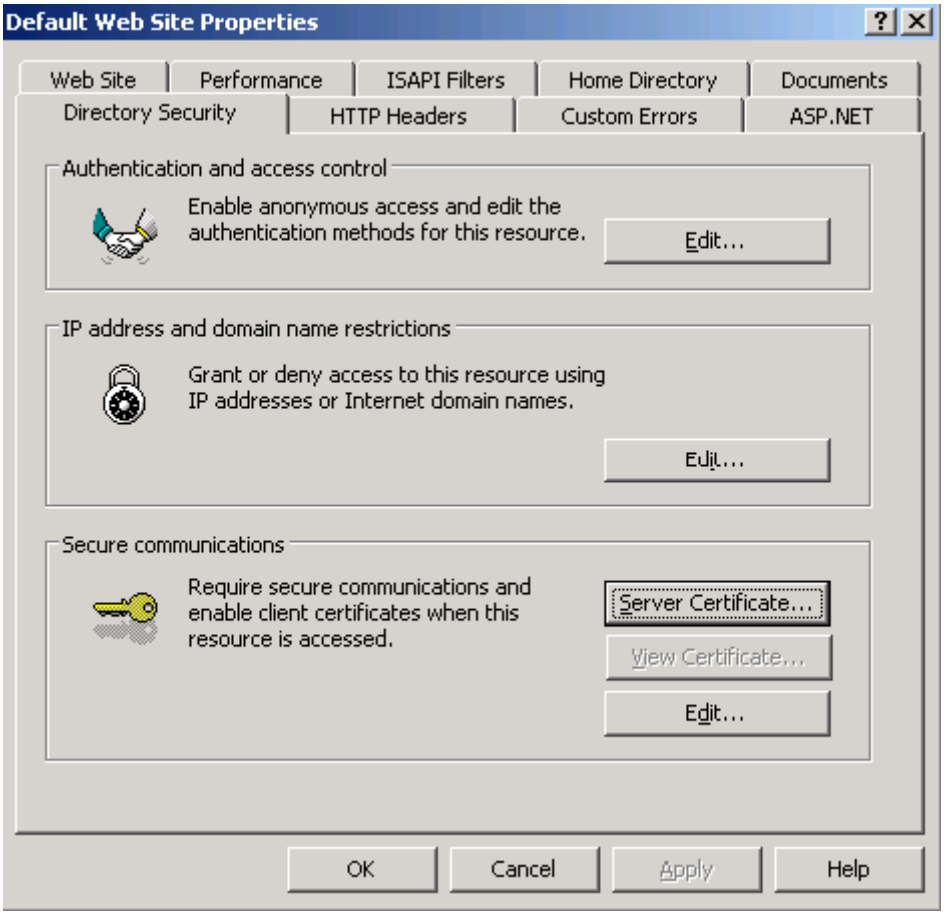


Figure 18: Installing Server Certificates

- On the Welcome screen of the IIS Certificate Wizard, click Next.
- On the Server Certificate screen, select the Assign an existing certificate radio button.
- Follow the IIS Certificate wizard to complete the process of installing the certificate on your server.

5 Click OK.

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*.

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*.

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.

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.

TCP (*TCP/IP*) stands for Transmission Control Protocol/Internet Protocol. This suite of communications protocols is used to connect hosts on the Internet.

Template 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*.

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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