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Parallels

# Getting Started With Parallels Virtuozzo Containers for Windows

Version 4.0



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## CHAPTER 1

# Introduction

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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:

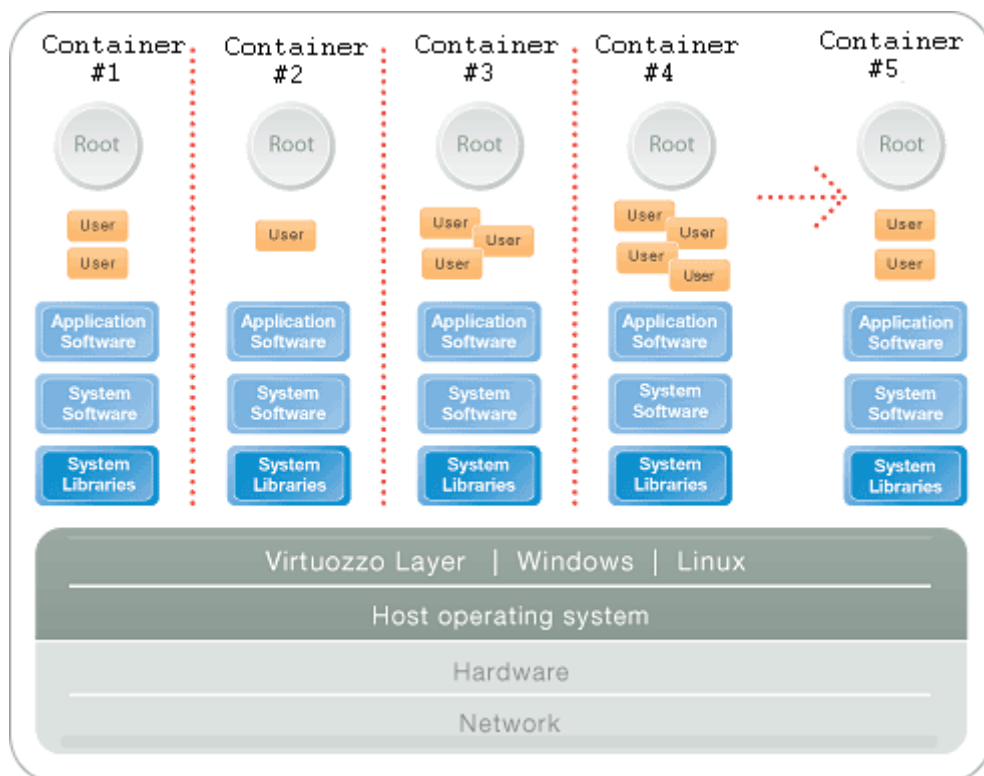


Figure 1: Virtuozzo Containers OS Virtualization

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.

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## About This Guide

The *Getting Started With Parallels Virtuozzo Containers 4.0 for Windows* guide will help you install and run Parallels Virtuozzo Containers 4.0 on your server. You will also learn the basics of working with Containers - how to create a Container, start/stop it, install additional software in it, and the like.

## Organization of This Guide

The guide is organized in the following way:

- **Chapter 1, Introduction**, provides an overview of available information sources shipped with Virtuozzo Containers 4.0, introduces the main Virtuozzo notions, and enumerates the requirements to be fulfilled to successfully install Virtuozzo Containers 4.0 on your server.
- **Chapter 2, Installation in a Nutshell**, is a quick reference list sketching out the steps required to successfully install Virtuozzo Containers 4.0 for Windows.
- **Chapter 3, Virtuozzo Containers Installation**, furnishes you with detailed information on how to install Virtuozzo Containers 4.0 on your server including the installation and configuration of both the Host operating system and Virtuozzo Containers software itself.
- **Chapter 4, Using Virtuozzo Tools**, contains brief instructions on how to install Parallels Management Console and to log in to Parallels Infrastructure Manager - tools to efficiently manage your Hardware Nodes and Containers residing on them.
- **Chapter 5, Container Management**, familiarizes you with the way to perform the main operations on your Containers: create new Containers, start/stop them, manage applications inside your Containers, etc.

## 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 <b>Basic Administration</b> 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 <i>ctid</i></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.

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## 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.
  - **Parallels Virtuozzo Containers for Windows Installation Guide.** This guide provides exhaustive information on the process of installing, configuring, and deploying your Virtuozzo system. As distinct from the given guide, it contains a more detailed description of all the operations needed to install and set Virtuozzo Containers 4.0 to work including planning the structure of your Virtuozzo network, performing the Virtuozzo Containers unattended installation, etc. Besides, it does not include the description of any Container-related operations.
  - **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 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.

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## 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.

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## Virtuozzo Notions

In order to avoid any misunderstandings while following the instructions in the guide, please become acquainted with the main Virtuozzo definitions:

- *Parallels 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.
- *Container* is a virtual private server, which is functionally identical to an isolated standalone computer, 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. Container is a kind of ‘sandbox’ for processes and users.
- *Hardware Node (Node, Container 0)* is a server where the Virtuozzo Containers software is installed for hosting Containers.
- *Host Operating System (or Host OS)* is an operating system installed on the Hardware Node.
- *Virtuozzo license* is a special license that you should install on the Hardware Node to be able to start using Parallels Virtuozzo Containers and Virtuozzo Tools (*Parallels Management Console, Parallels Infrastructure Manager, and Parallels Power Panel*). Every Hardware Node shall have its own Virtuozzo license.
- *Virtuozzo template* is a set of program files that make up a complete OS or application and that are installed on the Host operating system in such a way as to be usable by any Container on the Hardware Node and to allow Containers to efficiently share OS and application resources.
- *Parallels Management Console* is a Virtuozzo management and monitoring tool with graphical user interface. Parallels Management Console is cross-platform and runs on both Microsoft Windows and Linux workstations.
- *Parallels 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.

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# Installation 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 operating systems:

- 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.

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**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 Virtuozzo Containers 4.0 does not differ from deploying the Virtuozzo Containers software on Nodes with Windows Server 2003.

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Before installing Virtuozzo Containers 4.0, you should also make sure that:

- 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.

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**Note:** During the Virtuozzo Containers 4.0 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.

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## Network Requirements

The network pre-requisites enlisted in this subsection will help you avoid delays and problems with making Parallels Virtuozzo Containers for Windows 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 and WINS configuration).
- 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.

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**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.

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## CHAPTER 2

# Installation in a Nutshell

To install Virtuozzo Containers 4.0, follow these steps. To know more of a particular step, please see the next chapter.

- 1** Download the `vzinstall.exe` file from the Parallels web site to the server where you wish to install Virtuozzo Containers 4.0 and run it there.
- 2** The Welcome to Parallels Virtuozzo Containers Autoinstall window:  
Click Next.
- 3** The Installation Type window:  
Click Next.
- 4** The Download Information window:  
Click Download.
- 5** The Parallels Virtuozzo Containers Autoinstall dialog window:  
Click Yes.
- 6** The Ready to Install window:  
Insert the CD with or specify the path to the same Windows Server 2003 distribution kit as the one installed on your server and click Next..
- 7** The Terms of License Agreement window:  
Read the Parallels end user license agreement, select the I accept the terms in the license agreement radio button, and click Next.
- 8** The User Information window:  
Enter the necessary information in the User Name and Organization fields and click Next.
- 9** The Locations of Virtuozzo Data and Program Files window:  
Click Install.
- 10** The Container Services Configuration window:  
Click Next.
- 11** The License Installation window:  
Enter the Virtuozzo product key number and click Next.
- 12** The InstallShield Wizard Completed window:  
Click Finish.

## CHAPTER 3

# Parallels Virtuozzo Containers Installation

The current chapter provides exhaustive information on the process of planning, installing, configuring, and deploying your Virtuozzo system including the pre-requisites and the stages you shall pass.

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## Obtaining Virtuozzo License

Before installing Virtuozzo Containers 4.0 on your server, you should obtain a special license needed to start using the Virtuozzo Containers software on your Hardware Node. You can use one of the following ways to obtain a Virtuozzo license:

- Fill up a special registration form on the Parallels web site (available at [http://www.swsoft.com/en/products/virtuozzo/windows\\_eval](http://www.swsoft.com/en/products/virtuozzo/windows_eval)) and get a free evaluation license.
- Contact a Parallels sales representative.

You will have to enter the obtained Virtuozzo license number during the Virtuozzo Containers installation on your server.

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**Note:** If you do not wish to install the license during the Virtuozzo Containers installation, you can do it later by means of Parallels Management Console, Parallels Infrastructure Manager, or special command line utilities. Detailed information on how to install Virtuozzo licenses by using these tools is provided in the *Managing Hardware Node* chapter of the *Parallels Virtuozzo Containers User's Guide*.

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# Virtuozzo 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 9).
- 2** Installing the Virtuozzo Containers 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 Nodes and Containers and to keep track of the resource consumption on your Nodes, you may want to additionally perform the following operations:

- Install Parallels Management Console - a graphical tool for administering Virtuozzo Containers 4.0 and performing main administrative tasks on Hardware Nodes and in the Container context - and register the needed Hardware Node(s).
- Set Parallels Infrastructure Manager and Parallels Power Panel to work. 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.

All these steps are described below in the guide.

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## Obtaining Virtuozzo Containers Distribution

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. In this case you should download the `vzinstall.exe` file from the Parallels web site to your server and run it there. When executed, the utility launches the **Parallels 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 `vzinstall.exe` utility initiate the **Parallels Virtuozzo Containers Installation Wizard** right after the Virtuozzo components downloading and help you install Virtuozzo Containers 4.0 on your server.

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## Installing Virtuozzo Containers Software

To install Virtuozzo Containers 4.0 for Windows on any given Hardware Node, you should perform the following operations:

- 1 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 Virtuozzo Containers 4.0 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); click **Next**.
- 2 On the **Welcome** screen, click **Next** to proceed with the installation.

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**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.

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- 3 The next screen will display the Parallels end user license agreement that you must accept to be able to install Virtuozzo Containers 4.0 on the server.
- 4 After accepting the license agreement, you will be presented with the **User Information** screen where you should provide your personal information in the **User Name** and **Organizations** fields.
- 5 On the next step, you should specify the location for Virtuozzo program files and the folders for keeping all Container data and Virtuozzo backups:

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 Virtuozzo Containers 4.0. 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
  - a** by using the `vzabackup` Virtuozzo utility (consult **Parallels Virtuozzo Containers for Windows Reference Guide** for detailed information on this utility), or
  - b** 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 Management Console. 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 for Windows 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.

- 6** On the **Ready to Install the Program** screen, you can 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 installation and configuration, the following operations are performed:

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**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 installation is initiated after clicking the **Install** button in the **Locations of Virtuozzo Data and Program Files** window.

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- The Virtuozzo program files are installed on your server.
- 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**.

- 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 Virtuozzo Containers 4.0.
- Additional Windows Server 2003 components are added to your 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).

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

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- 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.
- 7** Next, you are supposed to choose the set of Windows Server 2003 system services to be launched inside newly created Containers on their startup. You can choose one of the following options:
- 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.
  - 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:
    - a** It has the startup type of the *Print Spooler*; *Remote Registry*; *DNS Client* services set to manual.
    - b** 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 will have to manually start the aforementioned services each time you need them inside this or that Container.

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**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).

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- 8 On the last step, you will be asked to install a valid Virtuozzo license on the Hardware Node to start using Virtuozzo Containers on your server. 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. To install a Virtuozzo license, enter the Virtuozzo license key obtained from Parallels in the field provided and clicking Next.
- 9 Click the Finish button in the InstallShield Wizard Completed window to exit the wizard.

**Important!** If you are installing Virtuozzo Containers 4.0 on a Hardware Node running the IA64-bit version of Windows Server 2003, consult the **Performing Postinstall Operations on IA64-bit Hardware Node** subsection of **Parallels Virtuozzo Containers Installation Guide** to complete the Virtuozzo Containers 4.0 installation.

## CHAPTER 4

# Using Virtuozzo Tools

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

- Parallels Management Console - a remote management tool for Parallels Virtuozzo Containers 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 multiple 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 a particular 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.

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## Installing Parallels Management Console

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 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 Parallels Management Console, execute it there, and follow the instructions of the **Parallels Management Console InstallShield Wizard**. After the installation is complete, you can start Parallels 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.

Before you can start managing a Hardware Node in Parallels Management Console, you should register it there. To start the Node registration process, select the **Register Hardware Node** item on the **Action** menu. You will be presented with the **Register New Hardware Node** window where 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. Please use the `Administrator` 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:
  - `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.

After providing the necessary information, click the **Connect** button to establish a secure connection to the 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.

To log in to Parallels Infrastructure Manager, launch the Web browser that is 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.

---

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. 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 is described in the Microsoft Internet Information Services (IIS) documentation in detail. When working with certificates, please keep in mind the following:

- 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.

- To set up a certificate for your Node, you should log in to the Service Container (also known as Container 1) and install and configure the certificate inside this Container.

## CHAPTER 5

# Container Management

This chapter outlines the major day-to-day operations that you are likely to perform with Containers on your Virtuozzo system. Almost all these operations are performed by means of Parallels Management Console that you must have by now installed either on a separate workstation or on the Hardware Node itself.

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## Creating New Container

Parallels Management Console uses one wizard to create and initially configure a Container. You can launch the Create New Containers wizard by selecting the **Virtuozzo Containers** item under the corresponding Hardware Node name in the Management Console left pane and choosing the **Create Container** option on the **Action** menu:

**Create New Virtuozzo Container**

**Specify Container Parameters**

In this window you should specify basic parameters for your Container(s).

You can select a Container Sample from the list below to be used as the basis for the Container creation:

Name	OS Template	Architecture	Description
basic	w2k3	i386	
MSDE	w2k3	i386	
Oracle	w2k3	i386	
Plesk	w2k3	i386	
SharePoint	w2k3	i386	

Number of Containers to create: 1

Container Name: ct\$VEID  
Description:

Container ID:  
 Assign Container ID automatically  
 Assign Container IDs starting from: 104

Hostname:  
 Assign hostname automatically  
 Hostname:

Password for "Administrator" account:  
 Password:   
 Confirm password:

Help < Back Next > Finish Cancel

*Figure 2: Management Console - Choosing Sample Configuration File*

In this window you are supposed to do the following:

- Select the Container configuration sample to be used as the basis for the Container creation. Configuration samples determine the main Container parameters, including the templates and resource management parameters (detailed information on Container configuration samples is provided in the **Managing Resources** chapter of the **Parallels Virtuozzo Containers User's Guide**). To make your first Container, you can choose the 'basic' configuration sample which is most suitable for creating standard Containers.

- Select the **Assign Container IDs starting from** radio button to manually specify the ID to be assigned to the Container (beginning with 101) or leave the **Assign Container ID automatically** radio button selected to let the wizard automatically assign the first unoccupied ID to the Container.
- Select the **Hostname** radio button to manually set a hostname for the Container or leave the **Assign hostname automatically** radio button selected to let the wizard automatically assign a hostname to the Container.
- Set the **Administrator** password for the Container by typing the desired password in the **Password** and **Confirm password** fields. You will need this password in future to connect to the Container by means of Parallels Power Panel or by using the standard Microsoft Terminal Services Client/Windows Remote Desktop Connection applications.

You can also specify a number of additional parameters on this page (define an arbitrary name for the Container or provide its description). Detailed information on all these parameters is provided in the **Creating New Container** section of the **Parallels Virtuozzo Containers User's Guide**.

After deciding on the aforementioned parameters, click **Next**. On the **Specify Network Settings for Containers(s)** screen, you should specify one or more IP addresses to be assigned to Container. To this effect, select `venet0` (which is the name of the default virtual network adapter created for every Container on the Node) in the **Interfaces** table, click the **Properties** button, and set the needed IP address(es) on the **IP Settings** tab of the displayed window.

You can click on the **Finish** button on this step of the wizard and create the Container with the configuration parameters specified in the configuration sample you chose on the first step of the wizard. If you do not rely on any configuration sample, click the **Next** button instead of **Finish**. In this case you will have to go through a number of steps of the wizard and set all the parameters of the new Container separately. However, you can click **Finish** on every of the following steps of the wizard to start creating the Container.

---

**Note:** Detailed information on all parameters that can be set and configured during the Container creation is provided in the **Creating New Container** section of the **Parallels Virtuozzo Containers User's Guide**.

---

## Listing Containers

Very often you may want to get an overview of the Containers existing on the given Hardware Node and to get additional information about them - their IP addresses, hostnames, status, etc. In Parallels Management Console, you may display a list of all Containers by clicking the Virtuozzo Containers item:

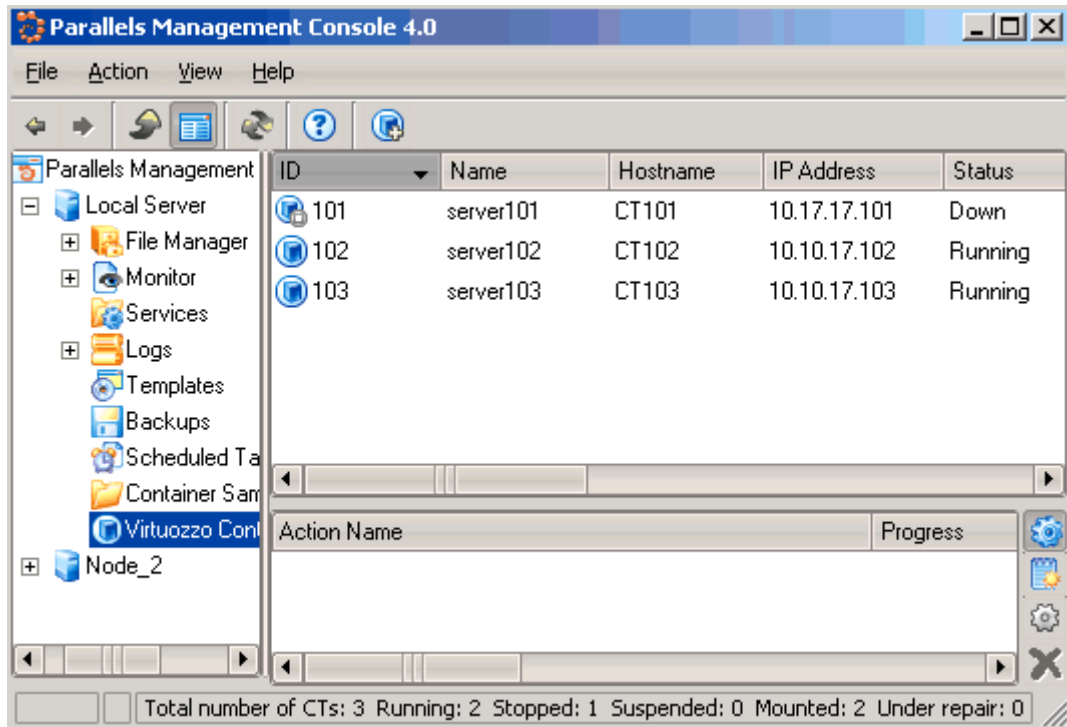


Figure 3: Management Console - Listing Containers

You can see that currently Containers with IDs 101, 102, and 103 exist on the Hardware Node. All the Container vital information (its IP address(es), hostname, statuses, etc.) is presented in the Containers table. To facilitate working with Containers, you can sort them by different parameters: their ID, type, hostname, status, IP address, etc. Just click the column with the appropriate name to put Containers in the desired order.

## Main Operations on Container

When a Container is created, it may be started up and shut down like an ordinary server.

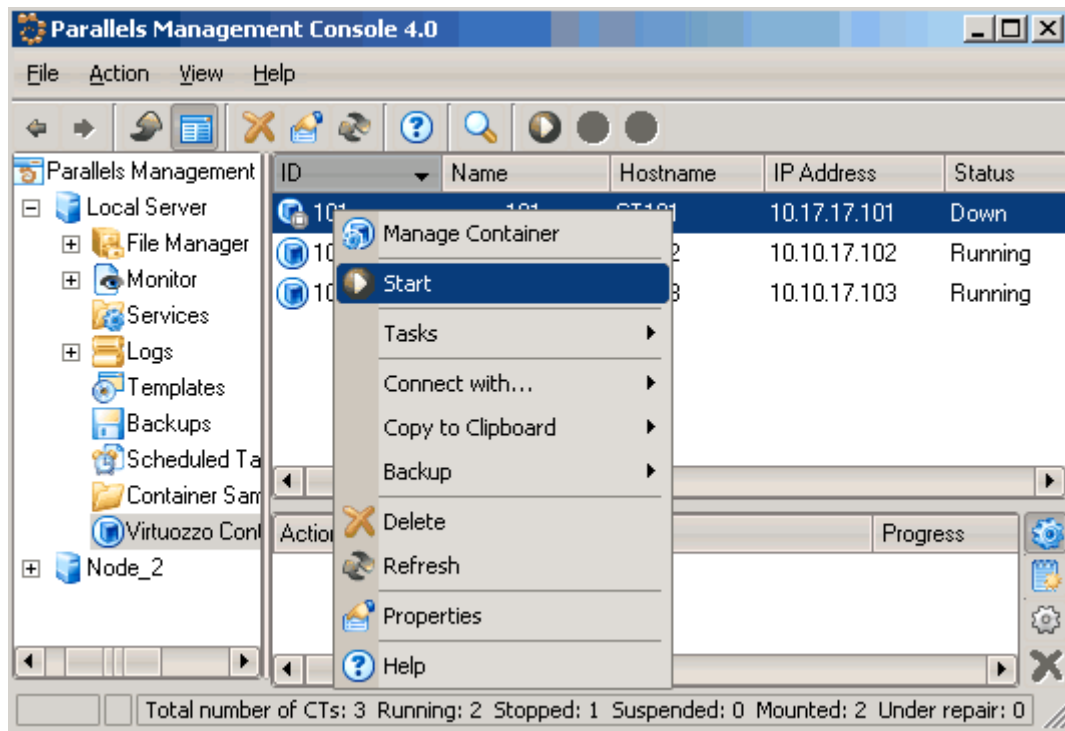


Figure 4: Management Console - Starting Container

To start or stop one or more Containers, select it (them) in the Containers table in the right pane. You can use CTRL+Click to select or deselect a Container, SHIFT+Click to select a range of Containers, CTRL+A to select all Containers. Then click the **Start** or **Stop** button on the toolbar or select **Start** or **Stop** on the **Action** menu.

Keep in mind that starting or stopping a considerable number of Containers may take time. The progress is displayed in the Parallels Management Console Actions pane.

To delete a running Container, you must first stop it. To delete one or more Containers that have been already stopped, select it (them) in the Containers table in the right pane of the Management Console main window. You can use CTRL+Click to select or deselect a Container, SHIFT+Click to select a range of Containers, CTRL+A to select all Containers. Then click the **Delete** button on the toolbar or select **Delete** from the **Action** menu.

You can change the parameters of any Container existing on the Hardware Node by right-clicking the name of the corresponding Container and selecting **Properties** on the context menu. In the displayed window, you can choose the **General**, **Network**, **Resources**, **Terminal Server**, **Options**, or **Advanced** tab to view and configure the necessary Container parameters.

## Operations Inside Container

There are a number of operations that can be performed inside an individual Container only, i.e. by using the Container Manager accessible thru selecting the **Virtuozzo Containers** item in the left pane of the Management Console main window and double-clicking the corresponding Container in the right pane.

### Managing Users and Groups

Parallels Management Console allows you to manage users and groups inside Containers with the help of Container Manager. All users and groups are adjustable. You can also add new users and groups.

To manage groups or users inside a Container, open the main tree for this Container, select the **Users and Groups** item, and click either the **Users** or **Groups** tab to view the users or groups currently existing inside the Container, respectively:

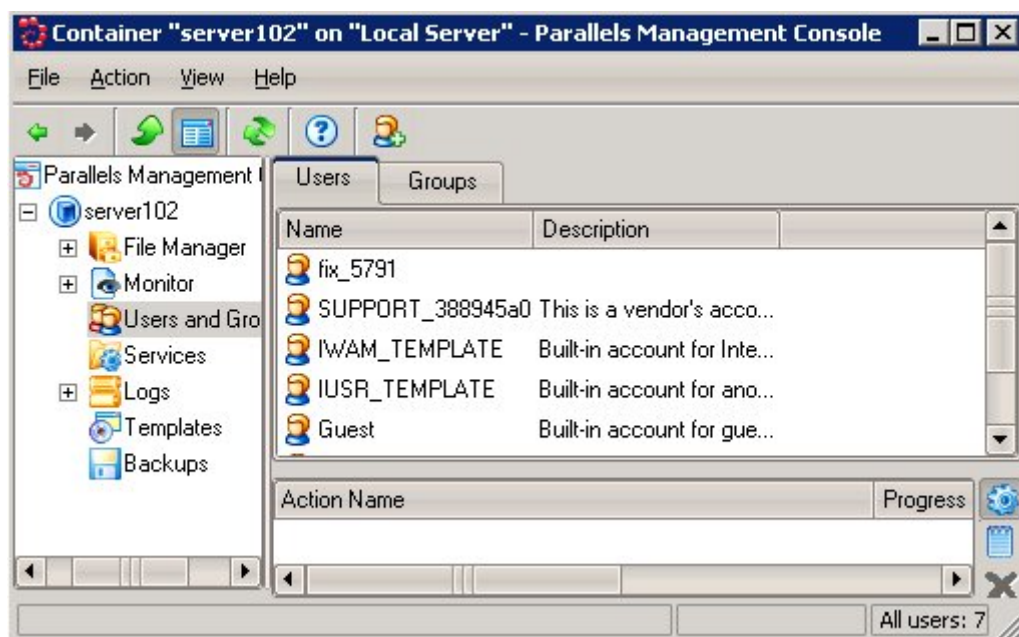


Figure 5: Management Console - Managing Users and Groups

To open the group properties dialog, double-click on the group name in the table of groups or select **Properties** on the context menu. To add a new user to the group, click the **Add** button. To remove a user from the group, select the user name and press the **Remove** button.

To add a new group, click the **New Group** button on the toolbar (note that this button appears only if you are currently working with Container groups). Then enter the group name and click **OK**.

To delete a group, select its name in the table of groups and click the **Delete** button on the toolbar or select the **Delete** item on the context menu.

To add a new user, open the list of users and click the **New user** button at the top toolbar. Enter the user login (user name). This is the only mandatory parameter. You may also set the user description and password and add the user to one or more groups (see the **Member Of** tab). Then click **OK**.

To edit an existing user, double-click on the user name in the table of users or use the **Properties** item on the context menu. The user properties dialog is analogous to the **New User** dialog.

To change the password for a user, right-click the user in the table of users, select **Set Password** on the context menu, then enter the password in the fields provided.

To delete a user, select its name in the table of users and click the **Delete** button at the top toolbar or select the **Delete** option on the context menu.

---

**Note:** In the current version of Virtuozzo Containers, you cannot create Active Directory domain user accounts inside your Container by means of Parallels Management Console. However, you can log in to the Container which acts as a domain controller via RDP and create a domain user like you would do it on any other stand-alone Windows 2003 server.

---

## Managing Files

Parallels Management Console allows you to manage files and folders inside each and every Container by means of the Container Manager window. To open the Container manager window, select the **Virtuozzo Containers** item in the left pane of the Management Console main window and double-click the corresponding Container. After you expand the **File Manager** item in the Container main tree, you will see a list of disk drives available inside your Container:

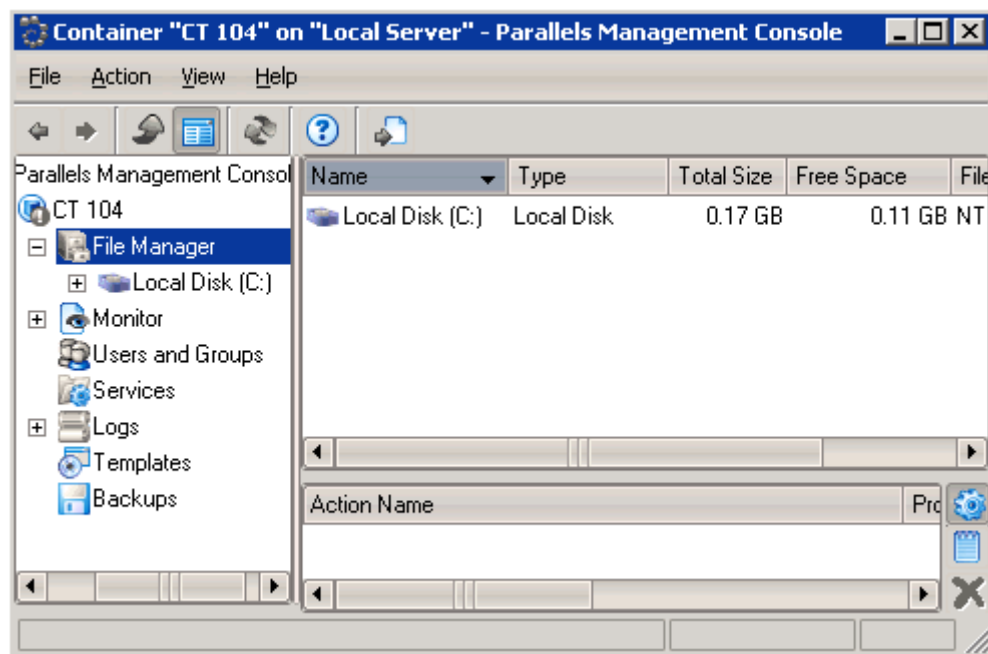


Figure 6: Management Console - File Manager

The principles of working with the Container file manager are standard. You can move thru the hierarchy of Container drives and folders by double-clicking their names or selecting the necessary drives and folders in the left pane. Use the menu items, toolbar buttons, table view, and context menus to perform the following tasks:

- View the contents of simple text files;
- View the principal information about a file/folder available inside the given Container;
- Upload any number of files or whole folders from your local computer (the computer where Parallels Management Console is installed) to any folder of the given Container;
- Download any number of files from the given Container to your local computer;
- Create new folders within the drives of the Container;
- Copy files to another drive/folder of the given Container;
- Move files to another drive/folder of the given Container;
- Delete Container files/folders;
- Rename Container files/folders.

---

## Accessing Container

There are a number of ways for you to access a Container as you would normally access a standalone server:

- Launching the standard Microsoft Terminal Services Client (MS TSC) application.
- Launching the standard Windows Remote Desktop Connection application.
- Accessing the files inside the Container by the Windows file sharing protocol.
- Using the Citrix MetaFrame XP application (<http://www.citrix.com>).

In all these cases, the access is ensured by using the IP address or hostname of the Container and the administrator's or other users' credentials entered when creating and maintaining the given Container.

## Terminal Services Client

Microsoft Terminal Services Client (MS TSC) is a standard Windows application to be used when connecting to any Virtuozzo-based Container:

- 1** Launch MS TSC in the host operating system or on another server on the network by selecting **Programs -->Terminal Services Client --> Terminal Services Client** on the Windows **Start** menu.
- 2** Enter the hostname or the IP address of the Container in the **Server** field.
- 3** Click **Connect**.
- 4** A new window is launched with an invitation to provide the user name and password for logging in to the Container. Type **Administrator** as the user name and the Administrator's password into the corresponding fields and click **OK**.

After the logon, it is possible to change passwords, to create new users, and do all related tasks in the standard way inside the Container.

## Remote Desktop Connection

Remote Desktop Connection is a standard Windows application to be used when connecting to any Virtuozzo-based Container by means of the Remote Desktop Protocol (RDP). The easiest way to connect to a Container is right-clicking it in the list of Containers and selecting **Connect via Remote Desktop** on the context menu. Naturally, the Container must be running for this option to become available.

You may connect to the Container from the Remote Desktop Connection (RDC) application itself:

- 1 Launch RDC in the host operating system by selecting **Programs --> Accessories --> Communications --> Remote Desktop Connection** on the Windows Start menu;
- 2 Enter the hostname or the IP address of the Container in the **Computer** field;
- 3 Click **Connect**.
- 4 A new window is launched with an invitation to provide the user name and password for logging in to the Container. Type **Administrator** as the user name and the Administrator's password into the corresponding fields and click **OK**.

After the logon, it is possible to change passwords, to create new users and do all related tasks in the standard way inside the Container.

In case of connecting to a Container as a non-Administrator user, you should make sure that:

- 1 The user whose credentials you wish to use to log in to the Container is created inside this Container;
- 2 The **Remote Desktop Users** group allowing the Container users to remotely log in to Containers via RDC exists inside the Container;
- 3 The user belongs to the **Remote Desktop Users** group.

## Windows File Sharing

To access Container share folders via standard Windows clients, you should type their IP address or hostname preceded by two back slashes in the Windows command line or in the address line of Windows Explorer on the host operating system or on another server on the network. You may optionally specify the name of the Container itself to see what shares are available. For example:

```
\\ct103\c$  
\\192.168.20.103
```

If an authentication window is displayed, enter the appropriate user name and password for the given Container. There must be an administrative account built in the Container that you should know or you might have already created a number of other users inside the Container.

## Citrix MetaFrame XP

Citrix MetaFrame XP is a remote access/application publishing product built on the Citrix Systems' thin client protocol and used to connect to any Virtuozzo-based Container. To start using Citrix to access your Containers on the given Hardware Node, you should:

- 1 Install and enable the Terminal Services component on the Node;
- 2 Install and configure the Citrix MetaFrame XP application on the Node.

After you have successfully completed the aforementioned operations on your Hardware Node, you can use a Citrix ICA Client on the Host OS or on any other server on the network to connect to any of your Containers on this Node by means of the Citrix MetaFrame XP application.

For example, if you have the Program Neighbourhood Client installed on your server, you can select **Programs --> ICA Client --> Citrix Program Neighbourhood** on the Windows Start menu to launch the Citrix ICA Client software. In the opened window, you should then double-click the **Add ICA Connection** icon to invoke the wizard that will help you create a new ICA connection to be used to access your Container.

---

**Note:** Detailed information on how to install, license, configure, and operate your Citrix MetaFrame XP application is provided in the documentation available on the Citrix web site at <http://www.citrix.com/support>.

---

---

## Installing Additional Software Inside Containers

While installing new applications inside your Container(s), you can choose between two possibilities:

- Adding application templates to the Container by means of Parallels Management Console, or
- Copying the application distribution files to the Container via RDP, MS TSC, or by using a standard Windows file sharing and then installing the application in a standard way from inside the given Container.

## Adding Templates to Containers

Parallels Management Console allows you to add any number of templates to any number of Containers thru a single wizard. The templates must have been installed on the Hardware Node beforehand. These are the steps to follow:

- 1 Click **Templates** under the name of the Hardware Node where the needed templates are installed and then click the **Application Templates** tab.
- 2 Select all the needed templates holding down the CTRL or SHIFT keys where necessary.
- 3 Right-click the selection and choose **Install Into Containers** on the context menu.
- 4 Follow the instructions of the wizard.

If you are adding a template to only one Container, you can as well do the following:

- 1 Open a list of Containers in the Management Console main window by selecting the **Virtuozzo Containers** item in the Hardware Node tree.
- 2 Double-click the name of the Container where you want to add a template or a template update to open the Container Manager.
- 3 Right-click on the **Templates** item in the main tree and select the **Add Virtuozzo Application Template** option on the context menu.
- 4 Follow the instructions of the wizard.

## Installing Applications Inside Container

You can install additional software inside your Containers in the same way as you would do it on any other standalone computer. To this effect, you should perform the following operations:

- 1 Connect to the Container where you wish to install an application via Remote Desktop Connection (RDC), MS Terminal Services Client (MS TSC), or by using a standard Windows file sharing.
- 2 Copy the corresponding application distribution to the Container. It may be, for example, such shareware applications as WinRAR (<http://www.rarlab.com/>) or Far Manager (<http://www.farmanager.com/>) or any other application.
- 3 Install the application the way you would do it in a normal Windows system by using the RDP or MS TSC protocols.

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