Virtuozzo Containers for Windows 6.0

Getting Started Guide

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CHAPTER 1

Introduction

This chapter provides general information about Virtuozzo Containers for Windows and this guide.

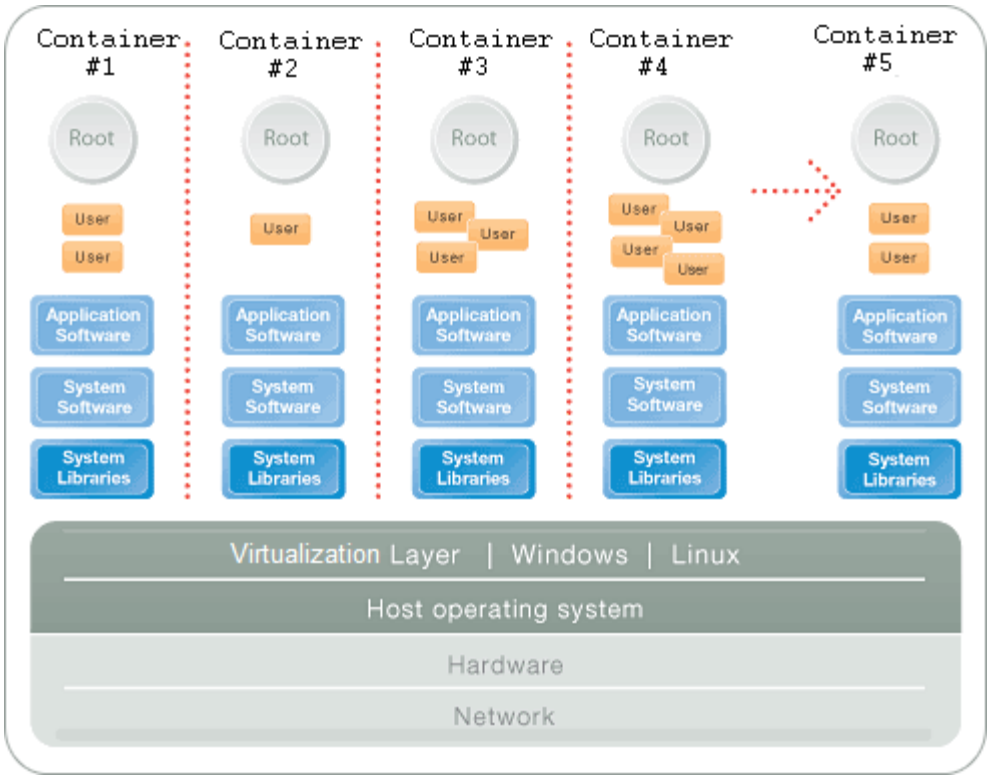
In This Chapter

About Virtuozzo Containers for Windows 6.0

Virtuozzo Containers for Windows 6.0 is a patented OS virtualization solution. It 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 Containers for Windows capabilities are:

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

The diagram below represents a typical Virtuozzo Containers for Windows system structure:



The Virtuozzo Containers for Windows OS virtualization model is streamlined for the best performance, management, and efficiency. At the base resides a standard Windows host operating system. 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 applications and workload.

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

About This Guide

The *Getting Started With Virtuozzo Containers for Windows 6.0* guide will help you install and run Virtuozzo Containers for Windows 6.0 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 as follows:

- **Chapter 1, Introduction**, provides an overview of available information sources shipped with Virtuozzo Containers for Windows 6.0, introduces the main Virtuozzo Containers for Windows notions, and enumerates the requirements to be fulfilled to successfully install Virtuozzo Containers for Windows on your server.
- **Chapter 2, Installing Virtuozzo Containers for Windows 6.0**, furnishes you with detailed information on how to install Virtuozzo Containers for Windows 6.0 on your server including the installation and configuration of both the Host operating system and Virtuozzo Containers for Windows software itself.
- **Chapter 3, Virtuozzo Containers for Windows Management Tools**, contains brief instructions on how to start working in Virtuozzo Automator to efficiently manage Hardware Nodes and their Containers.
- **Chapter 4, Container Management with Virtuozzo Automator**, describes the process of managing Containers with Virtuozzo Automator. You will learn how to create new Containers, start and stop them, manage files and folders in Containers, and so on.

Getting Help

In addition to this guide, there are a number of other guides that can help you use the product more effectively:

- *Virtuozzo Containers for Windows 6.0 Installation Guide*. This guide provides exhaustive information on the process of installing, configuring, and deploying your Virtuozzo Containers for Windows system.Unlike this guide, it contains a more detailed description of all the operations needed to install and set Virtuozzo Containers for Windows 6.0 to work including planning the structure of your Virtuozzo Containers for Windows network, performing the Virtuozzo Containers for Windows unattended installation, etc. Besides, it does not include the description of any Container-related operations.
- *Virtuozzo Containers for Windows 6.0 User's Guide*. This guide provides comprehensive information on Virtuozzo Containers for Windows 6.0 covering the necessary theoretical conceptions as well as all practical aspects of working with Virtuozzo Containers for Windows. However, it does not deal with the process of installing and configuring your Virtuozzo Containers for Windows system.
- *Virtuozzo Containers for Windows 6.0 Templates Management Guide*. This guide is meant to provide complete information on Virtuozzo Containers for Windows templates, an exclusive 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.).

- *Virtuozzo Containers for Windows 6.0 Reference Guide*. This guide is a complete reference on all Virtuozzo Containers for Windows configuration files and Hardware Node command-line utilities.
- *Deploying Microsoft Clusters in Virtuozzo-Based Systems*. This document provides information on creating Microsoft failover and Network Load Balancing clusters in Virtuozzo Containers for Windows-based systems.
- *Virtuozzo Automator Administrator's Guide*. This help system shows you how to work with Virtuozzo Automator, a tool providing you with the ability to manage Hardware Nodes and their Containers with the help of a standard Web browser on any platform.
- *Virtuozzo Power Panel User's Guide*. This help system deals with Virtuozzo Power Panel, a means for administering individual Containers through a common Web browser on any platform.

CHAPTER 2

Installing Virtuozzo Containers for Windows 6.0

The process of installing Virtuozzo Containers for Windows includes the following major steps:

1. Installing and activating a licensed Windows Server operating system on the server. For the list of supported operating systems, see **Software Compatibility**.
2. Installing the Virtuozzo Containers for Windows on the server.

To facilitate managing your servers running Virtuozzo Containers for Windows (also known as Hardware Nodes or Nodes) and Containers and to keep track of the resource consumption on your Nodes, you may want to additionally configure Virtuozzo Automator and Virtuozzo Power Panel. These tools are intended for managing Hardware Nodes and Containers residing on it with the help of a standard Web browser. For more information, see **Setting Up Virtuozzo Automator** (p. 22).

In This Chapter

Installation Requirements

Before starting installation, make sure that all the Hardware Nodes where you plan to deploy Virtuozzo Containers for Windows meet the requirements listed in this section.

Hardware Requirements

Virtuozzo Containers for Windows does not have any special hardware requirements for servers. If Windows Server 2008 R2 SP1 or Windows Server 2012 can run on a given server, Virtuozzo Containers for Windows can be installed on it as well. The number and performance of Containers you can create and simultaneously run on a server depends on its hard disk space and memory capacity.

Software Requirements

This version of Virtuozzo Containers for Windows 6.0 can be installed on servers running:

- Windows Server 2012 Datacenter Edition, US English, German, Spanish, French, Italian, Japanese, Korean, Polish, Russian, Simplified Chinese, Brazilian
- Windows Server 2008 R2 Service Pack 1, Enterprise or Datacenter Edition, US English, German, Japanese, Russian
- Windows Server 2008 R2 Service Pack 1, Standard Edition, US English, German, Russian

Before installing Virtuozzo Containers for Windows, make sure that

- the Windows Server OS installation is activated,
- the Windows Server distribution is not patched, i.e. all the binaries in the distribution are in their original state as provided by Microsoft.

Notes:

1. During the Virtuozzo Containers for Windows installation, you may see a warning that certain Windows Server updates installed on your server are not compatible with Virtuozzo Containers for Windows 6.0. In this case, you need to uninstall these updates from the server (e.g., using the **Add/Remove Programs** tool in **Control Panel**) and restart the Virtuozzo Containers for Windows installation. You will be able to install all the necessary Windows Server updates on your Hardware Node after the Virtuozzo Containers for Windows installation.

2. After installing Virtuozzo Containers for Windows 6.0 on servers with Windows Server 2012, do not remove any of the standard Windows components from the Hardware Node (e.g., Internet Information Services). Doing so may cause malfunctions in the same application inside your Containers.

3. If you install Windows Server 2012 Datacenter Edition, the number of Containers you will be able to run on the Hardware Node will only be limited by the Virtuozzo Containers for Windows license.

Network Requirements

The network pre-requisites enlisted in this subsection will help you avoid delays and problems with getting 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.

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 for Windows to the virtual adapters of the corresponding Containers; so, you only have to specify what IP address is to be applied to what Container.

Memory Dump Requirements

In problem situations, you may need a complete or kernel memory dump file for debugging purposes (for instructions on how to generate one, see the *Virtuozzo Containers for Windows User's Guide*). The hardware requirements for ensuring integrity and validity of memory dump files are the following:

- The paging file size must be 1.5 times larger than the amount of RAM used by the Node.
- The paging file must be located on the system drive (C: by default).
- After the paging file is set, the remaining free space on a Node's system drive must be at least 1.5 times the RAM.
- If a remote server controller is used (e.g. Dell DRAC or HP iLO), its Node reboot timeout must be long enough for a complete or kernel memory dump file to be created fully. Otherwise, a dump file may become truncated and unreadable.

Note: If a Node's system drive does not meet the above requirements, limit the amount of RAM available to the Node to 16GB or less. To do that, add the `/MAXMEM=16384` option to the `boot.ini` file (for instructions, see http://support.microsoft.com/kb/108393). Then reboot the Node and recheck the configuration against the requirements.

Obtaining Virtuozzo Containers for Windows

You can use one of the following ways to obtain Virtuozzo Containers for Windows 6.0:

- Get a CD or DVD from Virtuozzo.
- Download the appropriate archive containing the Virtuozzo Containers for Windows installation files from the Virtuozzo website to your server.
- Use the `vzautoinstall60.exe` utility to download the Virtuozzo Containers for Windows distribution to your server and install it there, if necessary. In this case you should download the `vzautoinstall60.exe` file from the Virtuozzo website to your server and run it there. When executed, the utility launches the **Virtuozzo Containers for Windows Autoinstall** wizard which will ask you about the Virtuozzo Containers for Windows components you wish to download and, after gathering the necessary information, start the downloading process. You can also make the `vzautoinstall60.exe` utility initiate the **Virtuozzo Containers for Windows Installation** wizard right after the Virtuozzo Containers for Windows components downloading and help you install Virtuozzo Containers for Windows 6.0 on your server.

Obtaining Virtuozzo Containers for Windows License

Before installing Virtuozzo Containers for Windows 6.0 on your server, you should obtain a special license needed to start using the product on your Hardware Node. You can use one of the following ways to obtain a Virtuozzo Containers for Windows license:

- Fill out a special registration form on the Virtuozzo website and get a free evaluation license.
- Contact a Virtuozzo sales representative.

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

Note: If you do not wish to install the license during the Virtuozzo Containers for Windows installation, you can do it later by means of Virtuozzo Automator or special command line utilities. Detailed information on how to install Virtuozzo Containers for Windows licenses by using these tools is provided in the *Virtuozzo Containers for Windows 6.0 User's Guide*.

Installing Virtuozzo Containers for Windows Using the Wizard

To start installing Virtuozzo Containers for Windows 6.0, launch the installation program (e.g., `containers6.0_x64_w2k12.exe`) to invoke the **Virtuozzo Containers for Windows Installation Wizard**. In the **Choose Setup Language** dialog, choose the user interface language (English by default) and click **OK**. The installation program will greet you with the **Welcome** screen.

Note: The **Welcome** screen is skipped if you use the `vzautoinstall60.exe` utility in the "Download and install" mode to automatically download and install Virtuozzo Containers for Windows on your server.

Clicking the **Next** button will display the Virtuozzo end user license agreement that you must accept to be able to install Virtuozzo Containers for Windows. 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 appears where you are asked to specify your personal information.

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

On the next screen, specify the location for Virtuozzo Containers for Windows program files and the folders for keeping all Container data and backups.

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

- The first folder with the default path of `C:\Program Files\Parallels\Containers` contains all Virtuozzo Containers for Windows program files including drivers, scripts, services, etc. specific for Virtuozzo Containers for Windows. 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 for Windows is uninstalled from your server, this folder will be also 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, keep in mind 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.

  Unlike the previous folder, this folder remains intact if Virtuozzo Containers for Windows is uninstalled from your server.
- The third folder is destined for keeping all Container backups created on the Node
  - by using the `vzabackup` utility (consult the *Virtuozzo Containers for Windows 6.0 Reference Guide* for detailed information on this utility) or
  - by means Virtuozzo Automator/Virtuozzo 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 Virtuozzo Automator. Detailed information on the way to manage Container backups in Virtuozzo Automator/Virtuozzo Power Panel is provided in the **Operations on Containers** chapter of the *Virtuozzo Containers for Windows 6.0 User's Guide* and Virtuozzo Automator/Virtuozzo 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 specified the necessary folders, click **Next**. The **Virtuozzo Automator Installation** window appears.

This window allows you to install Virtuozzo Automator and its components on the Hardware Node. Using Virtuozzo Automator, you can connect to the Virtuozzo server and manage Containers with your favorite browser. In this window, you can do the following:

- **Install VA Agent on the server**. Leave this option selected to install a special agent on the Hardware Node. This agent ensures the interaction between the Node, the Master Server (see below), and Virtuozzo Automator. Without the agent installed, you will not be able to connect to your Node using Virtuozzo Automator.

- **Create a Container and install VA Management Node in it**. Choose this option to automatically create a special Container on the Node and install the VA Management Node component in it. Once the VA Management Node component is installed, the Container starts acting as the Master Server, ensuring the communication between the Hardware Node and the Containers hosted on it. You can register more than one Node with the Master Server. If you select this check box, you will go through a number of additional steps to specify the parameters for the Master Server. For more details on these steps, see **Installing Virtuozzo Automator Automatically**.

  If you already have a Master Server in your network, clear the **Create a Container and install VA Management Node in it** check box. You will be able to register your Node with this Master Server.

Notes:

1. To download and install Virtuozzo Automator and its components, your server must be connected to the Internet.

2. You can skip this step and install Virtuozzo Automator and its components later. For information on how you can do it, see **Installing Virtuozzo Automator Manually**.

After selecting the Virtuozzo Automator options and clicking **Next**, you are asked to provide a Windows distribution directory (Windows Server 2012 only). Based on this directory Virtuozzo Containers for Windows will create a special template that will be used as a repair source for the on-demand installation of features in Containers.

During installation, Virtuozzo Containers for Windows creates a special template containing sources of SxS components found in your Windows distribution. This template will later be used as a repair source to automatically install or restore missing Windows features in Containers. One example is the .NET Framework required by numerous applications. If not installed by default, it now can be supplied to Containers on demand from the aforementioned Virtuozzo Containers for Windows template, even if the original Windows distribution is no longer available.

Note: To successfully migrate Containers between Hardware Nodes, each Hardware Node must have such a special template with SxS component sources.

After having provided a Windows distribution directory, click **Next** to proceed to the **Ready to Install the Program** screen.

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 for Windows installation and configuration, the following operations are performed:

Note: If you use the `vzautoinstall60.exe` utility in the 'Download and install' mode, the **Ready to Install the Program** screen is skipped and the Virtuozzo Containers for Windows installation is initiated after clicking the **Install** button in the **Locations of Virtuozzo Containers for Windows Data and Program Files** window.

1. The necessary Virtuozzo Containers for Windows program files are installed on your server.
2. The Virtuozzo website is checked for available Virtuozzo Containers for Windows 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 their names and click **Next**.

   If your server fails to connect to the Virtuozzo website, you will be presented with the **Select Update Folder** window.

   In this window, you can do the following:

   - Specify the path to a folder storing the latest Virtuozzo Containers for Windows updates. You can manually type the path in the provided field using one of the indicated formats or click the **...** button and navigate to the folder. When you are ready, click **OK**.
   - Configure your proxy server settings to connect to the Virtuozzo website by using the **Proxy Settings** button and adjusting the necessary parameters. When you are ready, click **OK**.
   - Click the **Ignore** or **Cancel** button to skip the step of installing updates and continue with the Virtuozzo Containers for Windows installation.
3. The Virtuozzo Containers for Windows tools are installed on the Hardware Node. These tools include Virtuozzo Automator and Virtuozzo Power Panel and are intended to facilitate your working with Virtuozzo Containers for Windows. Virtuozzo Automator and Virtuozzo Power Panel are installed only if you select the corresponding options in the **Virtuozzo Automator Installation** window.
4. Additional Windows Server 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 distribution files (either by inserting a CD with the Windows Server 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 distribution kit as the one installed on your Hardware Node.
5. A number of additional Virtuozzo Containers for Windows components are installed on the Hardware Node. For example, the Windows Server OS template is installed during this step. This OS template is needed to create Containers on its basis.

Once the Virtuozzo Containers for Windows program files are installed, the **Container Services Configuration** windows appears. In this window, you can choose the set of Windows Server system services to be launched inside newly created Containers on their startup.

You can choose between the two system services sets:

- Select the **Standard set of Windows services used by Windows Server** radio button to automatically launch the standard set of Windows Server 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 onto it.

- Leave the **Minimal set of Windows services** radio button selected to have the minimal set of Windows Server 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 installed inside a Container, 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 tools (e.g., the Services snap-in or the `sc.exe` command line tool).

Next, you are asked to install a Virtuozzo Containers for Windows license on the Hardware Node.

Every Hardware Node must have its own Virtuozzo Containers for Windows license installed. Licenses are issued by Virtuozzo and needed to start using Virtuozzo Containers for Windows on your server. Although you can complete some tasks on the Hardware Node without having a license, you are not allowed to perform the majority of operations (e.g. start Containers) until you upload a valid Virtuozzo Containers for Windows license to the Node. In this window you can do one of the following:

- Enter the license key obtained from Virtuozzo in the provided field and click **Next**.
- Flag the **Skip license installation** checkbox to skip Virtuozzo Containers for Windows license installation and click **Next**. You will be able to install the license later on using the **Virtuozzo Containers for Windows Configuration** wizard (to launch the wizard, select **Programs** > **Virtuozzo** > **Virtuozzo Containers for Windows** > **Virtuozzo Containers for Windows Configuration Wizard** on the Windows **Start** menu), Virtuozzo Automator or the `vzlicload` utility.

The last step of the wizard is an offer to participate in the Customer Experience Program.

If you choose to participate (select **Yes, I want to participate** and click **Next**), Virtuozzo will periodically collect the information about your physical server and Containers configuration and use it to make the product better fit your needs. No private information like your name, e-mail address, phone number, and keyboard input will be collected. For more details about the Customer Experience Program, click the **Learn more** button, or read **Configuring your Participation in the Customer Experience Program** in the *Virtuozzo Containers for Windows 6.0 User's Guide*.

After Virtuozzo Containers for Windows has been successfully installed and configured, the **InstallShield Wizard Completed** window is displayed. Click the **Finish** button to exit the wizard.

Note: You must reboot the Hardware Node after installing Virtuozzo Containers for Windows to be able to install Microsoft updates.

Installing Virtuozzo Automator Automatically

Virtuozzo Automator and its components are automatically installed during the installation of Virtuozzo Containers for Windows if you choose the following options in the **Virtuozzo Automator Installation** window:

- **Install VA Agent on the server**. Choose this option to install a special agent on the Hardware Node. This agent ensures the interaction between your Node, the Master Server, and Virtuozzo Automator. Without the agent installed, you will not be able to connect to your Node using Virtuozzo Automator.
- **Create a Container and install VA Management Node in it**. Choose this option to automatically create a special Container on your Node and install the VA Management Node component in it. Once the VA Management Node component is installed, the Container starts acting as the Master Server, ensuring the communication between the Hardware Node and the Containers hosted on it. You can register more than one Node with the Master Server. If you select this check box, you will go through a number of additional steps to specify the parameters for the Master Server. These steps are described below.

Notes:

1. To download and install Virtuozzo Automator and its components, your server must be connected to the Internet.

2. If you already have a Master Server in your network, clear the **Create a Container and install VA Management Node in it** check box. You will be able to register your Node with this Master Server.

3. The VA Management Node is installed in the Container with ID 50.

If you choose to set up the Master Server, you will need to complete these additional steps:

1 Specify the network parameters to connect to the Master Server.

In the **VA Management Node Configuration** window, type in the following information for the Master Server:

- **Management Node Hostname**. A unique hostname for the Container. Once the installation is complete, you can log in to Virtuozzo Automator by opening `http://hostname` in the browser and using the user name and password you will specify in the next step.
- **Management Node IP Address**. A valid IP address for the Container. The IP address must be unique within your network. Once the installation is complete, you can log in to Virtuozzo Automator by opening `http://IP_address` in the browser and using the user name and password you will specify in the next step.

- **Management Node DNS Server**. One or more DNS servers to be used by the Container. If you do not know what address to type in this field, use the DNS server currently used by your Hardware Node.

2 Set the password to log in to the Master Server.

Once the installation is complete, you can log in to Virtuozzo Automator using the hostname or IP address you assigned to the Container in the previous step, the `Administrator` user name, and the password you set in this step.

Notes: When choosing a password, make sure that it meets the Windows complexity policy. Otherwise, the installation will fail.

Installing Virtuozzo Automator Manually

Sometimes, Virtuozzo Automator and its components are not installed on the Hardware Node during the Virtuozzo Containers for Windows installation. For example, this may be the case if you have had no Internet connection when installing Virtuozzo Containers for Windows or the connection have broken for some reason.

At any time, you can install Virtuozzo Automator or any of its components manually using the **Virtuozzo Containers for Windows Configuration** wizard:

1 Choose **Start** > **Programs** > **Virtuozzo** > **Virtuozzo Containers for Windows** > **Virtuozzo Containers for Windows Configuration Wizard** to launch the wizard.

2 Click **Next** several times until the **Virtuozzo Automator Installation** window appears.

3 Select the options for installing the VA agent and Management Node components.

4 Specify the parameters for the Master Server, and follow the on-screen instructions to finish the wizard. For more information on Master Server parameters, see **Installing Virtuozzo Automator Automatically**.

Installing Virtuozzo Containers for Windows in the Unattended Mode

Unattended installation allows you to automate installing and configuring Virtuozzo Containers for Windows on your computer, thus reducing your interaction with the installation program to zero.

Note: For requirements all the Hardware Nodes where you plan to install Virtuozzo Containers for Windows must meet, see **Installation Requirements** (p. 9).

To run the Virtuozzo Containers for Windows installation in the unattended mode, perform the following operations:

1 Obtain and copy the Virtuozzo Containers for Windows 6.0 installation files to some folder on the server where you want to install Virtuozzo Containers for Windows. For example, you can

use the `vzautoinstall60.exe` utility to download Virtuozzo Containers for Windows to your server.

2 Insert a CD with the same Windows Server distribution kit as the one installed on the Hardware Node into your CD-ROM drive or copy the Windows distribution files to some folder on your server.

3 Launch the Virtuozzo Containers for Windows installation file with the necessary options from the command prompt.

Preparing for Installation

Before starting to install Virtuozzo Containers for Windows in the unattended mode, make sure of the following:

- You have the Virtuozzo Containers for Windows installation files available on the server where you wish to install the software. For example, you can copy these files from your Virtuozzo Containers for Windows installation CD or DVD to some folder on your server or use the `vzautoinstall60.exe` utility to download the necessary installation files. For details, see **Obtaining Virtuozzo Containers for Windows** (p. 11).
- You have the Windows Server 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 for Windows installation to add additional Windows components to your system. 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 distribution kit as the one installed on the server.

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

Installing Virtuozzo Containers for Windows in the Unattended Mode

Unattended installation can be useful if you need to deploy Virtuozzo Containers for Windows on multiple servers in your infrastructure without the need to manually choose configuration options for each server.

To install Virtuozzo Containers for Windows 6.0 in the unattended mode, do the following:

1 Make sure the contents of the Windows Server installation DVD will be accessible to the installer. For example, insert the Windows Server installation DVD into the DVD drive or copy its contents to a folder on the server.

  The contents of the Windows Server installation DVD will be needed during installation to add Windows components to your system. 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 will need to provide the same Windows Server distribution as the one installed on the server.

2 Make sure the Virtuozzo Containers for Windows distribution is downloaded or copied to the server where you want it installed.

3 Launch the Virtuozzo Containers for Windows installer from the Command Prompt with necessary options. For example, the command

```
C:\vz\download\w2k12\x64\6.0>containers6.0_x64_w2k12.exe /S /V"/qr ALLUSERS=ALL
VIRTUOZZO64=C:\pvc6 VZ=C:\pvc6data WINSOURCE=d:\"
```

will install Virtuozzo Containers for Windows to `C:\pvc6`, obtain Windows sources from `D:\`, and set `C:\pvc6data` for Container data storage.

Predefined Roles

The following roles are installed on the Hardware Node by default and forwarded to each Container you create on it.

- `NET-Framework-Core`
- `SNMP-Service`
- `SNMP-Services`
- `WAS`
- `WAS-Config-APIs`
- `WAS-Process-Model`
- `Web-App-Dev`
- `Web-ASP`
- `Web-Asp-Net`
- `Web-Basic-Auth`
- `Web-Cert-Auth`
- `Web-CGI`
- `Web-Client-Auth`
- `Web-Common-Http`
- `Web-Custom-Logging`
- `Web-DAV-Publishing`
- `Web-Default-Doc`
- `Web-Digest-Auth`
- `Web-Dir-Browsing`
- `Web-Dyn-Compression`
- `Web-Filtering`
- `Web-Ftp-Ext`
- `Web-Ftp-Server`
- `Web-Http-Tracing`
- `Web-Includes`
- `Web-IP-Security`
- `Web-ISAPI-Ext`
- `Web-ISAPI-Filter`
- `Web-Lgcy-Mgmt-Console`
- `Web-Lgcy-Scripting`
- `Web-Log-Libraries`
- `Web-Metabase`
- `Web-Mgmt-Compat`
- `Web-Mgmt-Console`
- `Web-Mgmt-Service`
- `Web-Mgmt-Tools`
- `Web-Performance`
- `Web-Request-Monitor`
- `Web-Security`
- `Web-Server`
- `Web-Scripting-Tools`
- `Web-Stat-Compression`
- `Web-Static-Content`
- `WAS-NET-Environment`
- `Web-Net-Ext AS-NET-Framework`
- `Web-ODBC-Logging`

- `Web-Ftp-Service`
- `Web-Health`
- `Web-Http-Errors`
- `Web-Http-Logging`
- `Web-Http-Redirect`
- `Web-Url-Auth`
- `Web-WebServer`
- `Web-Windows-Auth`
- `Web-WHC`
- `Web-WMI`

If you need only some roles from the above list to be installed, specify them with the `WINDOWS_ROLES_LIST` or `WINDOWS_ROLES_LIST_W2K8` option of the Virtuozzo Containers for Windows installation program. For example:

```
C:\vz\download\w2k12\x64\6.0>containers6.0_x64_w2k12.exe /S /V"WINDOWS_ROLES_LIST=WAS-NET-Environment,Web-Net-Ext,AS-NET-Framework,SNMP-WMI-Provider WINSOURCE=d:\"
```

For more information on the roles listed above, visit http://technet.microsoft.com/en-us/library/cc748918(v=ws.10).aspx.

Performing Post-Installation Tasks

After you have installed Virtuozzo Containers for Windows 6.0, perform the following tasks:

1. Install the latest Virtuozzo Containers for Windows updates.

   Note: Reboot the Hardware Node after installing Virtuozzo Containers for Windows to be able to install Microsoft updates.

2. Install the hotfix for systems running Windows Server 2008 R2 SP1.

Both tasks are described below in detail.

Checking for Updates

To make sure your Virtuozzo Containers for Windows installation is up to date:

1. Launch the Virtuozzo Containers for Windows Update wizard by clicking **Programs** > **Virtuozzo** > **Virtuozzo Containers for Windows** > **Virtuozzo Containers for Windows Update Wizard** on the **Windows Start** menu.
2. Follow the on-screen instructions to check for and install the available updates. For details on using the **Virtuozzo Containers for Windows Update** wizard, see **Keeping your Virtuozzo Containers for Windows System Up To Date** in the *Virtuozzo Containers for Windows 6.0 User's Guide*.

Installing the Hotfix

If your server is running Windows Server 2008 R2 SP1, download and install the hotfix from http://support.microsoft.com/kb/2707576 before using Virtuozzo Containers for Windows.

CHAPTER 3

Virtuozzo Containers for Windows Management Tools

In Virtuozzo Containers for Windows, you can use the following tools for managing servers running Virtuozzo Containers for Windows:

- *Virtuozzo Automator.* The comprehensive management solution that streamlines operations and reduces complexity of managing Hardware Nodes and Containers. Through self-service and automation, it allows administrators to lower costs and efficiently manage their infrastructure from anywhere using their favorite web browsers.
- *Windows PowerShell.* This command-line shell enables you to manage all Virtuozzo Containers for Windows features. It requires no preparations.

The following section provides information on how to prepare Virtuozzo Automator for working in Parallels-based systems.

In This Chapter

Setting Up Virtuozzo Automator

Virtuozzo Automator is a tool providing you with the ability to manage Hardware Nodes and Containers with the help of a standard Web browser on any platform.

Logging In to Virtuozzo Automator

To start managing your Hardware Node with Virtuozzo Automator:

1. On the Master Server or any other computer, open a Web browser and log in to Virtuozzo Automator by typing the Master Server IP address or hostname and TCP port 4648 in the address bar. The resulting line may look like the following: `https://10.50.120.70:4648`.

   When logging in from the Master Server, replace the IP address with `localhost`.
2. When the browser displays the login window, type the user name and password for the Master Server, and click the **Login** button.

Notes: For information on installing Virtuozzo Automator, see **Installing Virtuozzo Automator Manually** (p. 18).

Registering Hardware Nodes

To register a physical server in Virtuozzo Automator, do the following:

1. Enter the server's IP address into the **Server Address** field in the **Connection to Physical Server** section.
2. Specify the Administrator credentials for the server in the **Administrative Login to Hardware Node** section.
3. Click the **Register** button to register the server.

You can register several physical servers with the same Master Server.

CHAPTER 4

Container Management with Virtuozzo Automator

This chapter describes the basic operations you can perform on Containers using Virtuozzo Automator.

For more information on Virtuozzo Automator, see the *Virtuozzo Automator Administrator's Guide*.

In This Chapter

Interface Overview

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

The main components of the Virtuozzo Automator interface are the following:

- The left menu frame listing and providing access to all physical servers and Containers and the main operations you can perform on them. The left menu contains the following submenus: **Infrastructure**, **Logical View**, **Resource Library**, **Management**, and **Setup**. Each submenu is intended for performing a certain set of tasks.
- The toolbar on top of the right frame enabling you to perform the basic actions on physical servers and Containers. The set of the toolbar buttons can vary depending on the type of the object you explore.
- The content part on the right frame displaying a summary for the object you select: a physical server, a Container, or a template. The content part may consist of several tabs, each containing more detailed information on the object and links to advanced actions.
- The **Tasks** pane at the bottom of the right frame allowing you to view detailed information on operations that have already finished or are running at the moment. For example, you can see

the operation start time, its status, the object it is applied to, and other details. This pane is minimized by default. To expand it, click **Tasks** at the bottom of the screen.

Creating Containers

To create a new Container in Virtuozzo Automator, do the following:

1. Click the **New** button, and choose **Virtual Environment** from the drop-down list.
2. On the **New Virtual Environments: Begin** screen, select **Virtuozzo Container**.

   As you make the selection, you are prompted for the destination physical server information in the **Hardware Node Selection** section. You can either let Virtuozzo Automator select the server for you, or specify one manually. When creating a new Container on an automatically selected server, you should also specify the desired operating system for the target physical server.

   In the **Virtual Environment Configuration** section, specify the number of Containers to create.

   When you are ready, click **Next**.
3. On the **New Containers: Setup** screen, specify an arbitrary name for the Container, the OS template to base the Container on, and set the Administrator password to use to log in to the Container.

   You can also configure a number of additional settings in the following sections:

   - **Advanced Configuration** lists several customization options and advanced functions you can enable.
   - **Terminal Services** enables you to define in which Windows TS mode (Remote Desktop for Administration and Terminal Server) the Container will operate and which licenses it will use.
   - **Offline Management** enables you to define the services that will be available even when the physical server hosting the Container is down.

   When finished, click **Next** to define the network settings, or click **Create** to apply the default settings and create the Container.
4. On the **New Containers: Network Configuration** screen, specify the network parameters for the Container, such as the Container hostname and its IP address. Click **Next**.
5. On the **New Containers: Resources Customization** screen, you can adjust the Container advanced settings: CPU, memory, and so on. Since setting up these values is quite a challenging task, you can use the default settings.
6. On the **New Containers: Application Selection** screen, specify the applications you want to automatically install in the Container upon its creation. To choose an application, select it in the **Available Applications** list, and click 

to move it to the **Scheduled for Installation** list.
7. On the **Review** screen, check the Container configuration settings, and either click **Back** to go back to the previous steps and change them, or click **Create** to schedule the new Container creation task.

8 At this point, you will be redirected to the **Virtual Environments** tab of the **Infrastructure** window. The information bar at the top of the window informs you of the scheduled task and provides the **Details** link to the task progress information.

9 After the Container has been successfully created, you can find it in the list of available Containers. If it does not appear, click the **Refresh** button. and check again.

Starting, Stopping, and Restarting Containers

A Container can be started up, restarted, paused, and shut down like an ordinary computer. Depending on the Container state, only those operations are accessible that comply with its current state. For example, a running Container cannot be started for obvious reasons, and so on.

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

In Virtuozzo Automator, you can use the **Start Virtual Environment**, **Stop Virtual Environment**, and **Restart Virtual Environment** buttons to perform the corresponding actions on Containers.

Deleting Containers

The **Delete** screen allows you to remove those Containers from your physical server that you do not need anymore.

To delete a Container, do the following:

1 Go to the **Virtual Environments** tab of the **Infrastructure** window, choose the Container, and click the **Delete** icon.

All Containers scheduled for removing are listed in the **Delete Virtual Environment** section of the **Delete** screen.

2 To delete the Container, select the **Yes, I want to delete the Virtual Environment(s)** check box, and click the **Delete** button.

When removing Containers, keep in mind the following:

- Removing a Container means that its private area is completely deleted from the Host OS and all its private files are irrevocably erased from the physical server.
- Deleting a considerable number of Container may take some time.

Logging In to Containers

You can use Remote Desktop Connection, a standard Windows application, to connect to a Container by means of the Remote Desktop Protocol (RDP).

Note: The feature is available only for Internet Explorer 6.x and above.

To connect to a Container via RDP, do the following:

1. Make sure that the required Container is running. If it is not, start it.
2. Open the **Remote Desktop** window by selecting the corresponding option either from the Container's context menu (right-click the Container's name and select **Log In** > **Remote Desktop**), or from the Container's toolbar (click the **Log In** button, and choose **Remote Desktop**).
3. In the **Remote Desktop** window, click the **Login** button to open a Remote Desktop session.

   If you are doing this for the first time, your browser may display a security warning asking you to install additional components. Click **Yes**, and wait for the Remote Desktop terminal window to appear.
4. In this window, specify the Administrator username and password you set for the Container during its creation, and click **Enter** to connect to the Container.

Managing Application Templates

The **Applications** subtab of the Container **Software** tab allows you to manage applications as follows:

- View the applications added to the Container as application templates as well as their up-to-date status.
- If some of the applications are not up to date (i.e. the updated versions of the corresponding templates or template packages are available on the physical server), update them by clicking the **Update Container Software** button on the toolbar.
- Use the **Manage Applications** button to add or delete application templates.

Using the Manage Applications button

The **Manage Applications** button, when clicked, opens the screen that allows you to manage applications available to the Container. On this page, you can do the following:

- View the applications already installed in the Container. These applications are listed in the **Installed/Scheduled Applications** table in the right part of the page.
- Install new applications into the Container. To add any of the applications from the **Available Applications** table to the Container, select the corresponding check boxes, and click the **>>** button. After that, the applications appear in the **Installed/Scheduled Applications** table in the right part of the page. Clicking the **Submit** button starts the installation process.
- Delete those applications from the Container that are not needed any more. To remove an application, select the check box next to it in the **Installed/Scheduled Applications** table, and click the **<<** button. After that, the application appears in the **Available Applications** table in the left part of the page. Click the **Submit** button to start the deletion process.

Managing Container Files and Folders

For a running Container, you can browse its folder structure, list files and folders, and perform all essential file operations on the **File Manager** page. Once you open this page, you will see the list of drives existing inside the Container. You can click a drive to view its contents.

The following information on folder/drive contents is available:

- Type
- Name
- Size
- Modified (date and time of file's or folder's last modification).
- Actions (hyperlinks to actions you can perform on the file or folder).

Along with viewing the list of files and folders and their detailed information, you can manage files and folders as follows:

- Create new folders.
- Create new text files.
- Edit existing text files.
- Upload files from your local computer to Containers.
- Download files from Containers to your local computer.
- Copy and move files or folders from within Containers.
- Edit the properties of folders and files.
- Remove files and folders from Containers.

To perform an operation simultaneously on two or more folders or files, select their check boxes. The uppermost check box allows you to select all the files and folders at once.

CHAPTER 5

Glossary

Container is a virtual private server, which is functionally identical to an isolated standalone server, with its own IP addresses, processes, files, user database, configuration files, applications, system libraries, and so on. While sharing the same *Hardware Node* and OS kernel, *Containers* are isolated from each other. A *Container* is a kind of 'sandbox' for processes and users.

Hardware Node (or **Node**) is the server where *Virtuozzo Containers for Windows* is installed. Sometimes, it is called *Container 0*.

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

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

Virtuozzo Containers for Windows is a complete server automation and virtualization solution that allows you to create multiple isolated *Containers* on a single physical server to share hardware, licenses, and management effort with maximum efficiency.

Virtuozzo Containers for Windows license is a special license which you must install on a *Hardware Node* to be able to use *Virtuozzo Containers for Windows*. Every *Hardware Node* must have a license installed.

Parallels Power Panel is a tools for managing personal *Containers* via a standard Web browser.

Virtuozzo Automator is a tool for managing *Hardware Nodes* and *Containers* residing on them via a standard Web browser.

Private area is a location where *Container* files which are not shared with other *Containers* are stored.

Template is a set of original application files (packages) repackaged for using inside *Containers*. 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 applications or sets of applications in *Containers*.

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