



Virtuozzo Containers for Windows 6.0

Installation Guide

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CHAPTER 1

Introduction

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

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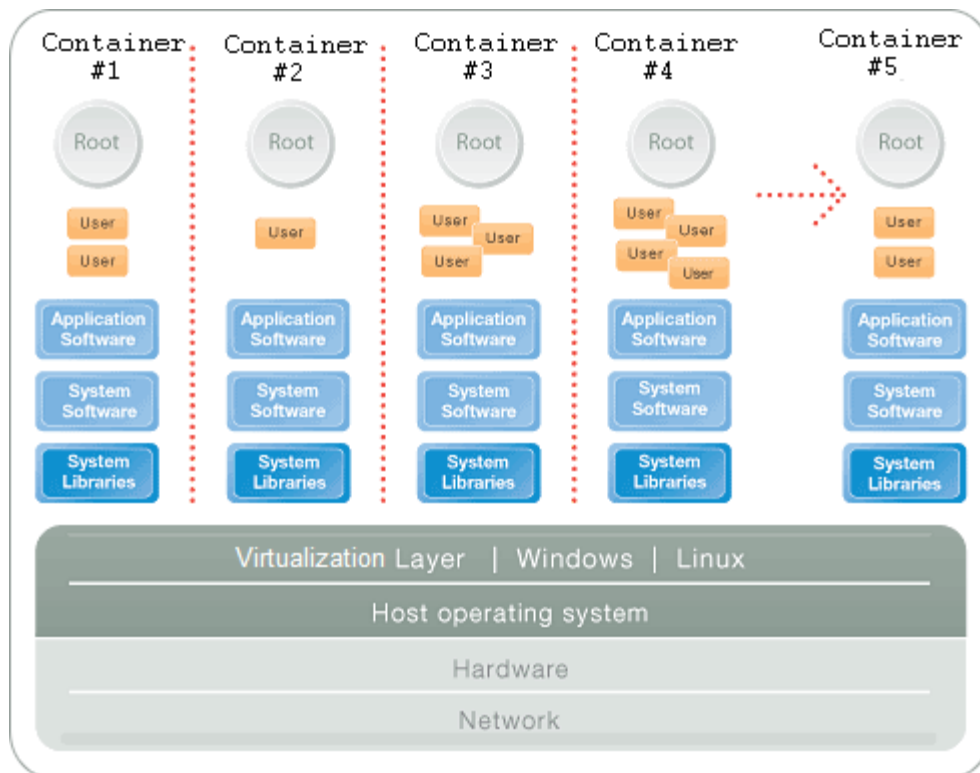
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About Virtuozzo Containers for Windows 6.0

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

This guide provides exhaustive information on the process of installing, configuring, and deploying Virtuozzo Containers for Windows 6.0 on your system, including the pre-requisites and the stages you shall pass.

The primary audience for this book is anyone interested in installing and putting Virtuozzo Containers for Windows in operation on their servers. To fully understand the guide, you should

have strong Windows system administration habits. Still, no more than superficial knowledge of Windows Server OS is required in order to learn to perform the basic installation operations.

Organization of This Guide

The guide is organized as follows:

- **Chapter 1, Introduction**, gives an overview of Virtuozzo Containers for Windows installation and this guide.
- **Chapter 2, Preparing for Virtuozzo Containers for Windows 6.0 Installation**, explains the fundamentals of planning your Virtuozzo Containers for Windows system, describes hardware and software requirements your system should meet, and sketches out the steps required to successfully install Virtuozzo Containers for Windows 6.0.
- **Chapter 3, Installing Virtuozzo Containers for Windows 6.0**, shows you how to install and configure Virtuozzo Containers for Windows 6.0 on your server. It also informs you of the ways to remove the current Virtuozzo Containers for Windows installation from your server.
- **Chapter 4, Setting Virtuozzo Containers for Windows Tools to Work**, provides information on how to set up Virtuozzo Automator tools for managing your servers (Hardware Nodes) and Containers residing on them.

Getting Help

In addition to this guide, the following documents can help you use the product more effectively:

- *Getting Started With Virtuozzo Containers for Windows 6.0*. This guide provides basic information on how to install Virtuozzo Containers for Windows 6.0 on your server, create new Containers, and perform main operations on them. Unlike this guide, it does not contain detailed description of all the operations needed to install and set Virtuozzo Containers for Windows to work (e.g. planning the structure of your Virtuozzo Containers for Windows network or performing the Virtuozzo Containers for Windows unattended installation).
- *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.

Preparing for Virtuozzo Containers for Windows 6.0 Installation

This chapter familiarizes you with the basics of planning your Virtuozzo Containers for Windows system, describes hardware and software requirements your system must meet, and sketches out the stages you need to pass to successfully install Virtuozzo Containers for Windows 6.0 on your server.

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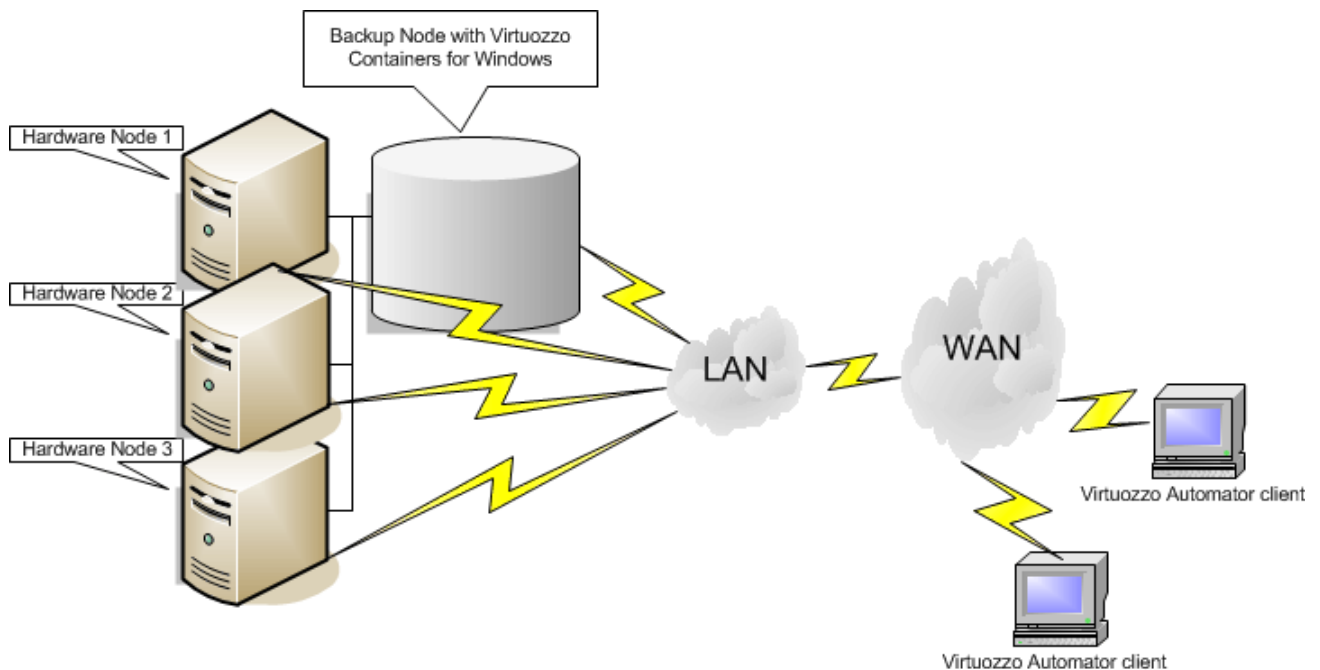
Planning Your Virtuozzo Containers for Windows System

First of all, you should carefully plan the structure of your network as well as the roles your servers will perform in it.

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

- 1** Hardware Node. A server running Virtuozzo Containers for Windows 6.0 and housing Containers.
- 2** Virtuozzo Automator client. A computer from which you can manage Hardware Nodes and their Containers with the help of a standard Web browser on any platform. The only requirement this computer must meet is to be able to connect to the Hardware Node and run a Web browser supported by Virtuozzo Containers for Windows.
- 3** Backup Node. A server used for storing Containers backups.

Graphically, a typical Virtuozzo Containers for Windows system can be represented as follows:



This picture shows the configuration with a network consisting of a number of Hardware Nodes and a server performing the functions of the Backup Node, respectively. As a rule, you are supposed to have several Virtuozzo Containers for Windows-based physical servers; however, you may have only one dedicated server to effectively use Virtuozzo Containers for Windows. All the Hardware Nodes have separate Virtuozzo Containers for Windows licenses installed and host a number of Containers. All Containers residing on the Hardware Nodes can be migrated from one Node to another with near-zero downtime; so, you can easily move all Containers from a Node in case of its upgrading or for any other purpose. It is recommended to keep all the Hardware Nodes in one subnet. In this case you will be able to transparently migrate Containers from one Node to another without having to modify the Containers IP addresses or the Hardware Node routing tables.

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

Apart from the aforementioned servers, you can make use of a workstation where Virtuozzo Automator is launched in a standard Web browser, which enables you to perform all the main operations on your Hardware Nodes and inside their Containers.

The picture above shows only one of the possible configurations you may choose while planning your Virtuozzo Containers for Windows network. You can hold to this scheme or work out your own and build a custom Virtuozzo Containers for Windows system.

Obtaining Virtuozzo Containers for Windows

You can obtain the Virtuozzo Containers for Windows 6.0 distribution by using the autoinstaller available at the Virtuozzo website. Download the `vzautoinstall60.exe` file from the Virtuozzo website and launch it on the server where you want Virtuozzo Containers for Windows installed.

In the first step of the wizard, you can choose one of the following options:

- **Download and install Virtuozzo Containers on this computer.** Choose this option to have the autoinstaller download the Virtuozzo Containers for Windows distribution and launch the Virtuozzo Containers for Windows setup.
- **Download only.** Choose this option to have the autoinstaller download the Virtuozzo Containers for Windows distribution, so you can copy it where you want Virtuozzo Containers for Windows installed.

After you click **Next** in the **Welcome** window, the wizard will try to connect to the Virtuozzo server, fetch the list of Virtuozzo Containers for Windows components available for downloading, and check your system for compatibility with Virtuozzo Containers for Windows (the latter action is performed only if you have chosen to download and install Virtuozzo Containers for Windows). After completing these tasks, the wizard will ask you to choose the Virtuozzo Containers for Windows installation type.

Notes:

1. If the wizard had problems with connecting to the Virtuozzo server, fetching the list of Virtuozzo Containers for Windows components or checking your system compatibility, you will be presented with the **Report Problem** screen helping you make a problem report and send it to the Virtuozzo support team (provided you have an active Internet connection). The support team will diagnose the received report and do its best to quickly solve your problem.
2. The **Installation Type** window is skipped if you are running the `vzautoinstall60.exe` utility in the 'Download only' mode.

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

- **Default.** Select this radio button to let the wizard automatically determine the version of the Windows Server operating system installed on your server and download the appropriate components for this system.
- **Custom.** Select this radio button to manually specify the Virtuozzo Containers for Windows components to be downloaded to and installed on your server.

The **Virtuozzo Containers for Windows Components** window is displayed if you are running the `vzautoinstall60.exe` utility in the 'Download only' mode or if you chose the **Custom** radio button in the previous step of the wizard.

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

The **Virtuozzo Containers for Windows Components** window displays:

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

In the next step of the wizard, you can configure the path to the folder where Virtuozzo Containers for Windows and its components will be downloaded.

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

If you have not yet obtained a Virtuozzo Containers for Windows license needed to start using Virtuozzo Containers for Windows on your Hardware Node, you will also be offered to do so by following the indicated link in the **Download Information** window.

After the Virtuozzo Containers for Windows components have been successfully downloaded to the specified folder on your server, you will see the following windows:

- The **Ready to Install** window if you are running the wizard in the 'Download and install' mode.

In this window, you can click **Next** to launch the **Virtuozzo Containers for Windows Installation Wizard**. The majority of steps in this wizard will be automatically performed by the `vzautoinstall60.exe` utility itself. All you have to do is to insert the CD with or specify the path to the same Windows Server distribution kit as the one installed on your server on the **Installing Windows Components** screen and to enter a valid Virtuozzo Containers for Windows license in the **Virtuozzo Containers for Windows License Installation** window (however, you can skip the last step and install a Virtuozzo Containers for Windows license later). For detailed information on the **Virtuozzo Containers for Windows Installation Wizard**, see the following section.

- The **Congratulations!** window if you are running the wizard in the 'Download only' mode.

In this window, click **Finish** to exit the **Virtuozzo Containers for Windows Autoinstall** wizard. At any time, you can start the installation process by double-clicking the Virtuozzo Containers for Windows installation file in the download folder (`C:\vz\download` by default). This will launch the **Virtuozzo Containers for Windows Installation Wizard** described in the following section in detail.

Installation Requirements

After deciding on the structure of your Virtuozzo Containers for Windows system, 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 can help you avoid delays and problems with making 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 configuration, etc.).
- At least one valid IP address for each ordinary Container you will be creating on the Node. The total number of IP addresses must be no less than the planned number of Containers.

Note: The IP addresses to be assigned to Containers must 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. You can do this by using the `bcdedit /set truncatememory 0x400000000` command. For more information, see <http://msdn.microsoft.com/en-us/library/windows/hardware/ff542202%28v=vs.85%29.aspx>.

Installing Virtuozzo Containers for Windows 6.0

This chapter provides information on how to install and configure Virtuozzo Containers for Windows 6.0 on your server. It also informs you of the way to upgrade your current Virtuozzo Containers for Windows installation and to remove the product.

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Installation Overview

The installation of Virtuozzo Containers for Windows 6.0 includes the following major steps:

- 1 Installing and activating a supported Windows Server operating system on the Hardware Node.
- 2 Installing Virtuozzo Containers for Windows 6.0 on the Hardware Node using the wizard or in the unattended mode.

Note: While installing Virtuozzo Containers for Windows, you can also install Virtuozzo Automator components to be able to manage the Hardware Node and Containers on it using a Web browser.

- 3 Performing post-installation steps, which include checking for Virtuozzo Containers for Windows updates and installing the Windows hotfix for systems running Windows Server 2008 R2 SP1.

All these steps are described in the following sections.

Installation Checklist

Provided for your convenience, the checklist contains the steps required to install Virtuozzo Containers for Windows 6.0 on your server. Mark check boxes as you finish the corresponding steps.

Installing Windows Server

- Install a supported version of Windows Server on your server.
- Activate your Windows Server installation.

Note: During the Virtuozzo Containers for Windows installation, you may be presented with a warning message informing you that some Windows Server updates installed on your server are not compatible with Virtuozzo Containers for Windows 6.0. In this case, you should uninstall these updates from the server (e.g., using the **Add/Remove Programs** tool in Control Panel) and start the Virtuozzo Containers for Windows installation anew. You will be able to turn on the Windows Automatic Update service and deploy the necessary Windows Server updates to your Node after the installation. Detailed information on how you can do it is provided in the *Virtuozzo Containers for Windows 6.0 User's Guide*.

Installing Virtuozzo Containers for Windows

- Insert a DVD with the same Windows Server distribution as the one installed on your server.

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

- Launch the Virtuozzo Containers for Windows installer to install and configure Virtuozzo Containers for Windows 6.0 on the server.
- Run the **Virtuozzo Containers for Windows Update Wizard** and install the latest updates.
- On systems running Windows Server 2008 R2 SP1, install the hotfix available at <http://support.microsoft.com/kb/2707576>.

If you are going to use Virtuozzo Automator or Virtuozzo Power Panel to manage your Hardware Node and its Containers and to keep track of the resource consumption on the Node, you should additionally perform the following operations:

Configuring Virtuozzo Automator

- Log in to Virtuozzo Automator.
- Register the Hardware Node in Virtuozzo Automator.

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 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.

Virtuozzo Containers for Windows Installer Command-Line Reference

Options

Name	Description
/S	Mandatory. Run the Virtuozzo Containers for Windows installation in the unattended mode.
/V"<parameters>"	Mandatory. One or more parameters to be passed to the Windows installer during the Virtuozzo Containers for Windows unattended installation (see the next table). Parameters must be enclosed in quotation marks.

Parameters

Name	Description
/qr	Mandatory. Starts the Virtuozzo Containers for Windows installation in the reduced user interface mode.
ALLUSERS=ALL	Mandatory. This parameter serves for per-machine installation using folders in the 'All Users' profile and is required for installing a number of specific Virtuozzo Containers for Windows components.
WINDOWS_ROLES_LIST=<list>	Optional. This parameter allows you to select the roles that will be installed on the Hardware Node running Windows Server 2012. For the list of predefined roles, see Predefined Roles (p. 26).
WINDOWS_ROLES_LIST_W2K8=<list>	Optional. This parameter allows you to select the roles that will be installed on the Hardware Node running Windows Server 2008 R2 SP1. For the list of predefined roles, see Predefined Roles (p. 26).
LICENSE=<license>	Optional. The Virtuozzo Containers for Windows license key (e.g., LICENSE="XXXXX-XXXXX-XXXXX-XXXXX-XXXXX") or the path to the Virtuozzo Containers for Windows license file on the Hardware Node (e.g. C:\License). If you omit this parameter, you will need to install a valid Virtuozzo Containers for Windows license (e.g., by means of Virtuozzo Automator) before you can start using Virtuozzo Containers for Windows on your server.
WINSOURCE=<path>	Optional. The path to the Windows Server installation files. Note: Use the same Windows Server distribution as the one installed on your server.
INSTALLDIR=<path>	Optional. This parameter can be used only on Hardware Nodes running the 32-bit versions of Windows Server and defines the path to all Virtuozzo Containers for Windows program files including drivers, scripts, services, etc. If this parameter is omitted, the default path of C:\Program Files\Parallels\Containers is used.
VIRTUOZZO64=<path>	Optional. This parameter can be used only on Hardware Nodes running the 64-bit versions of Windows Server and defines the path to all Virtuozzo Containers for Windows program files including drivers, scripts, services, etc. If this parameter is omitted, the default path of C:\Program Files\Parallels\Containers is used.
SKIP_PAGEFILE_TEST=1	Optional. Set this parameter to 1 to skip the page file test. The page file test checks if there is enough free disk space on the system drive to create a memory dump. The memory dump requires triple the RAM size free space on the system drive.

VZ=<path>	<p>Optional. The path to the folder that will store all the data used by the Containers on the Hardware Node: private areas, installed templates, patches, logs, etc. By default, the C:\vz path is used. While defining a path for this folder, you should take care of the following:</p> <ul style="list-style-type: none"> • This folder cannot be a mount point, i.e. you cannot mount external disk partitions to this folder. • This folder cannot be a network share, i.e. it cannot be located on a computer network drive. • The hard disk partition where this folder will be located should have no less than 10 GB of free disk space.
/Lv <path>	<p>Optional. The path to the log file where detailed information about the Virtuozzo Containers for Windows installation will be saved. The <code>v</code> parameter is used to log the verbose output setting.</p>
VZUPDATES=<path>	<p>The full path to the <code>update.xml</code> file in the local folder containing the Virtuozzo Containers for Windows updates (e.g. C:\Updates\update.xml).</p>
JOIN_SEP=<1 0>	<p>Optional. This parameter configures your participation in the Customer Experience Program:</p> <ul style="list-style-type: none"> • 1 — Join the program. • 0 — Do not join the program. <p>By default, this parameter is set to 1 meaning that you agree to participate in the program.</p> <p>For more information on the Customer Experience Program, refer to Configuring Your Participation in Customer Experience Program in the <i>Virtuozzo Containers for Windows 6.0 User's Guide</i>.</p>
PVA_AGENT=<1 0>	<p>Optional. Install VA Agent if set to 1 (default).</p>
PVA_AGENT_DIR=<path>	<p>Optional. Path to the VA Agent installer. If omitted, the component will be downloaded from the Virtuozzo repository.</p>
PVA_MN=1	<p>Optional. Install VA Management Node. The Management Node is set up inside a special Container and used to manage your Hardware Node and Containers through Virtuozzo Automator.</p>
PVA_MN_DIR=<path>	<p>Optional. Path to the VA Management Node installer. If omitted, the component will be downloaded from the Virtuozzo repository.</p>
PVA_MN_HOSTNAME=<hostname>	<p>Mandatory if the <code>PVA_MN</code> option is used. The hostname to assign to the Container that will host the Management Node. Once the installation is complete, you can use this hostname to log in to Virtuozzo Automator and use it for managing your Hardware Node and Containers.</p>
PVA_MN_IP=<IP_addr>	<p>Mandatory if the <code>PVA_MN</code> option is used. The IP address to assign to the Container that will host the Management Node. It must be unique within your network. Once the installation is complete, you can use this IP address to log in to Virtuozzo Automator and use it for managing your Hardware Node and Containers.</p>

<p>PVA_MN_PWD=<passwd></p>	<p>Mandatory if the PVA_MN option is used. The password to be used to log in to the Container that will host the Management Node. You will need to enter this password when logging it to Virtuozzo Automator.</p> <div style="border: 1px solid black; background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note: When choosing a password, make sure that it meets the Windows complexity policy. Otherwise, the Management Node installation will fail.</p> </div>
<p>PVA_MN_DNS=<DNS_IP_addr></p>	<p>Mandatory if the PVA_MN option is used. The IP address of the DNS server to be used by the Container that will host the Management Node.</p>

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-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

- Web-Filtering
- Web-Ftp-Ext
- Web-Ftp-Server
- Web-Ftp-Service
- Web-Health
- Web-Http-Errors
- Web-Http-Logging
- Web-Http-Redirect
- WAS-NET-Environment
- Web-Net-Ext AS-NET-Framework
- Web-ODBC-Logging
- 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](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.

Upgrading to Virtuozzo Containers for Windows 6.0

Virtuozzo Containers for Windows 6.0 allows you to easily upgrade from Virtuozzo Containers for Windows 4.6. All you have to do to start upgrading your Virtuozzo Containers for Windows installation is launch and follow the instructions of the **Virtuozzo Containers for Windows 6.0 Installation Wizard**.

Notes:

1. As with any major changes to the hard disk, it is recommended that you back up your system before beginning the upgrade.
2. This document describes the process of upgrading Virtuozzo Containers for Windows 4.6 to Virtuozzo Containers for Windows 6.0.

During the Virtuozzo Containers for Windows upgrade, you will have to complete the following steps:

- 1 On the **Welcome** screen, click **Next** to proceed with the installation.

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

- 2 On the next screen, accept the Virtuozzo end user license agreement by selecting the **I accept the terms in the license agreement** radio button and clicking **Next**.
- 3 On the **User Information** screen, enter the necessary information in the fields provided, and click **Next**.
- 4 On the **Locations of Virtuozzo Containers for Windows Data and Program Files** screen, review the locations of Virtuozzo Containers for Windows program files, Container-related data (private areas, installed templates, logs, and so on), and Container backups. Notice that you are not allowed to modify these location when performing the upgrade.

During the upgrade, all folders are updated in accordance with the Virtuozzo Containers for Windows 6.0 state. However, no changes are made to any of your Containers and their backups; so, you will find them in the same state as they were before the upgrade.

- 5 On the **Ready to Install the Program** screen, click the **Install** button to start upgrading your Virtuozzo Containers for Windows software. During this procedure:

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 upgrade procedure is initiated after you click the **Install** button in the **Locations of Virtuozzo Containers for Windows Data and Program Files** window.

- All Container on the Hardware Node are stopped for the time needed to upgrade your Virtuozzo Containers for Windows installation. Upon the upgrade completion, these Containers will be started again.
- The old version of Virtuozzo Containers for Windows is removed from the Hardware Node.
- You are asked to restart your system. Just click **OK** in the Virtuozzo Containers for Windows upgrade window. After the system reboot, the installation wizard automatically continues upgrading Virtuozzo Containers for Windows on the Hardware Node. It installs Virtuozzo Containers for Windows 6.0 and upgrades the Windows Server OS templates and the Virtuozzo Containers for Windows tools (Virtuozzo Automator, and Virtuozzo Power Panel) to their latest versions.
- You may also be prompted to add additional Windows Server components to your Host OS. These components represent standard Windows applications and are necessary to provide Containers you will create on the Hardware Node with the corresponding functionality. When adding the components, you need 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 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 the Hardware Node.

- You can choose the set of Windows Server system services to be launched inside newly created Containers on their startup. For details on Windows system services sets, see **Installing Virtuozzo Containers for Windows 6.0**.
- You are asked to upgrade the Virtuozzo Containers for Windows license currently installed on the Hardware Node.

Uninstalling Virtuozzo Containers for Windows

If you are going to remove Virtuozzo Containers for Windows 6.0 from your server, you should first stop all Containers on the Node. When no Container is running on your Node, you can use one of the following ways to uninstall Virtuozzo Containers for Windows:

Using **Add or Remove Programs** in Control Panel:

- 1 Choose **Settings > Control Panel** on the Windows **Start** menu.
- 2 In the displayed window, double-click the **Add or Remove Programs** item.
- 3 In the **Add or Remove Programs** window, select the **Virtuozzo Containers for Windows 6.0** entry in the list of programs currently installed on the Node, and click **Change/Remove**.
- 4 In the displayed window, click the **Next** button.

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

Using the Virtuozzo Containers for Windows 6.0 installer:

- 1 Double-click the Virtuozzo Containers for Windows installation file to launch the Virtuozzo Containers for Windows installation program and, in the displayed window, click the **Next** button.
- 2 In the **Remove the Program** window, do the following:
 - Select the **Remove Virtuozzo Containers for Windows data folder** check box and click the **Remove** button to remove both the Virtuozzo Containers for Windows program files, which are stored in the `C:\Program Files\Parallels\Containers` folder by default, and the `C:\vz` folder meant for keeping the Containers private data (private areas, installed templates, patches, logs, and so on).
 - Click the **Remove** button without selecting the **Remove Virtuozzo Containers for Windows data folder** check box to remove the Virtuozzo Containers for Windows program files only. By default, they are stored in the `C:\Program Files\Parallels\Containers` folder. In this case you will be able to start the Containers that have remained on the Node, if you decide to reinstall Virtuozzo Containers for Windows later on.

Setting Up Virtuozzo Automator for Managing Virtuozzo Containers for Windows Nodes

You can use Virtuozzo Automator for managing servers running Virtuozzo Containers for Windows. Virtuozzo Automator is a 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.

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

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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. 22).

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.

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.

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.

Virtuozzo 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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