



SWSOFT™

VIRTUOZZO™

SWsoft, Inc.

Getting Started With Virtuozzo™ for Windows

Version 3.5.1 Service Pack 1



SWSOFT™

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CHAPTER 1

Introduction

The *Getting Started With Virtuozzo 3.5.1 SP1 for Windows* guide will help you install and run Virtuozzo on your computer. You will also learn how to work with Virtual Environments (VEs) - create a VE, access it, install additional software in it, and the like.

This guide is a counterpart of the *Virtuozzo 3.5.1 for Windows User's Guide* - it contains the description of only major tasks you are going to perform as a Virtuozzo administrator, and does not go into details with explaining the inner workings of Virtuozzo and performing advanced tasks. Nor does it provide any reference for the Virtuozzo command-line utilities.

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Glossary

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

Hardware Node (or *Node*) is a computer where *Virtuozzo* is installed for hosting *Virtual Environments*. Sometimes, it is marked as *VE 0*.

HN is an abbreviation of *Hardware Node*.

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 *Virtual Environments*. See also *Template*.

Package set is a synonym for *Template*.

Private area is a part of the file system where *VE* files that are not shared with other *Virtual Environments* are stored.

Service Virtual Environment is a special secure *VE* running *VZAgent* which is responsible for managing all the *Virtual Environments* of the given *Hardware Node*. You should use the IP address of the Service *VE* to connect to a *Hardware Node* by means of *VZMC* or *VZCC*. The Service *VE* is always marked as *Virtual Environment 1*.

Service VE is an abbreviation of *Service Virtual Environment*.

SSH stands for *Secure Shell*. It is a protocol for logging on to a remote machine and executing commands on that machine. It provides secure encrypted communications between two untrusted hosts over an insecure network.

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

Template (or *package set*) is a set of original files and registry settings installed on the *Host OS* in such a way as to be usable by any *VE* by mounting over *Virtuozzo File System*. There are two types of templates. *OS Templates* are used to create new *Virtual Environments*. *Application templates* are used to install an application or a set of applications in *Virtual Environments*.

Virtual Environment is a virtual private server, which is functionally identical to an isolated standalone server, with its own IP addresses, processes, files, its own users database, its own configuration files, its own applications, system libraries, and so on. *Virtual Environments* share one *Hardware Node* and one OS kernel. However, they are isolated from each other. A *Virtual Environment* is a kind of ‘sandbox’ for processes and users. *Virtual Environment 0* is used to designate the *Hardware Node* itself.

Virtual Private Server or *VPS* is an obsolete designation of a *Virtual Environment*. See *Virtual Environment*.

Virtuozzo is a complete server automation and virtualization solution allowing you to create multiple isolated *Virtual Environments* on a single physical server to share hardware, licenses, and management effort with maximum efficiency.

Virtuozzo Control Center is a tool designed for managing a particular *Hardware Node* and all *Virtual Environments* residing on it with the help of a standard Web browser on any platform.

Virtuozzo File System is a virtual file system for mounting to VE private areas. VZFS links are seen as real files inside *Virtual Environments*.

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

Virtuozzo Management Console is a *Virtuozzo* management and monitoring tool with graphical user interface. It uses *VZagent Protocol* to control *Hardware Nodes* and their *Virtual Environments*.

Virtuozzo Power Panels is a means for administering personal *Virtual Environments* with the help of a standard Web browser (Internet Explorer, Mozilla, etc.) on any platform.

VE is an abbreviation of *Virtual Environment*.

VE 0 is used to designate a *Hardware Node* where *Virtuozzo* is installed.

VZagent is a special software used to tune, monitor, and manage the given *Hardware Node* and all the *Virtual Environments* residing on this Node.

VZagent Protocol is an XML-based protocol used to monitor and manage a *Hardware Node*. The `vzagent` software implements this protocol and is a backend for the *Virtuozzo Management Console* and other *Virtuozzo* utilities.

`vzagent0` is the user who has a full administrative access to the *Service VE*. You will need to provide this user name and password when connecting to a *Hardware Node* by means of *VZMC* and *VZCC*.

VZCC is an abbreviation of *Virtuozzo Control Center*.

VZCC license is a license loaded to the *Hardware Node* and needed to activate *VZCC*. You should enter it the first time you log in to *VZCC*.

VZFS is an abbreviation of *Virtuozzo File System*.

VZMC is an abbreviation of *Virtuozzo Management Console*.

VZMC license is a license installed on each computer where *Virtuozzo Management Console* is to be run and needed to activate *VZMC*. You should enter it the first time you launch *VZMC*.

VZPP is an abbreviation of *Virtuozzo Power Panels*.

What is Virtuozzo

Virtuozzo is a complete server automation and virtualization solution based on a patent-pending technology developed by SWsoft. Virtuozzo creates multiple isolated Virtual Environments (VEs) on a single physical server to share hardware, licenses, and management effort with maximum efficiency. Each VE performs and executes exactly like a stand-alone server for its users and applications as it can be rebooted independently and has its own Administrator access, Active Directory domain users, IP addresses, memory, processes, files, applications, system libraries, and configuration files. Light overhead and efficient design of Virtuozzo makes it the right virtualization choice for production servers with live applications and real-life data.

The basic Virtuozzo capabilities are:

- **Dynamic Real-time Partitioning** – Partition a physical server into tens of VEs, each with full dedicated server functionality.
- **Resource Management** – Assign and control VE resource parameters and re-allocate resources in real-time.
- **Virtualization** - Move VEs and its application(s) between physical servers transparently with near-zero or zero downtime.
- **Mass Management** - Manage a multitude of physical servers and Virtual Environments in a unified way.

What is VE

VE is a virtual private server, which is functionally identical to an isolated standalone server:

- Each VE has its own processes, Active Directory domain users, files and provides full administrative access.
- Each VE has its own IP addresses, port numbers, filtering and routing rules.
- Each VE can have its own configuration for the system and application software, as well as its own versions of Dynamic Link Libraries (DLLs), system libraries, and registry. It is possible to install or customize software packages inside a VE independently from other VEs or the host system. Multiple distributions of a package can be run on one and the same Windows box.
- Each VE has its own unique Administrator user with full control over the given VE and full access to other user accounts inside this VE.
- Each VE can be a member of a Windows domain (e.g. access any of the network shares to which the VE user has rights). Moreover, any Virtual Environment can act as a domain controller granting other VEs and stand-alone servers users access to a set of network resources (applications, printers, etc.).

Virtuozzo Applications

Virtuozzo can be efficiently applied in a wide range of areas: enterprise server consolidation, web and applications hosting, software development and testing, user training, and so on.

If you administer a number of Windows dedicated servers within an enterprise, you can benefit from the Virtuozzo solution in the following ways:

- Reduce the number of required physical servers and corresponding support by grouping a multitude of your enterprise servers onto a single computer without losing a bit of valuable information and without compromising performance.
- Increase server utilization and maximize server potential.
- Provision servers in minutes by using the technology of Virtuozzo templates.
- Migrate Virtual Environments in the time of network data transfer, nearly eliminating the planned downtime and enabling fast reaction to unplanned downtime situations.
- Monitor OS and application versions and update/upgrade the current software easily across all of your physical servers running Virtuozzo and their Virtual Environments.
- Guarantee Quality-of-Service (QoS) in accordance with a corporate service level agreement (SLA).
- Automate routine tasks such as upgrades and updates.
- Minimize software license and support requirements, etc.

Due to its unique efficiency and completeness, Virtuozzo has also a wide variety of profitable uses for Hosting Service Providers allowing them to:

- Sell new powerful and popular services such as:
 - *Advanced Shared* for shared hosting with customized application sets and QoS;
 - *True VE* for a cheaper, secure, and easier alternative to dedicated servers;
 - *Split Dedicated* allowing your customers to split the servers for their better utilization, etc.
- Provide complete self-administration panels (Virtuozzo Power Panels) including system backup/restore and monitoring tools.
- Have a multitude of customers with their individual full-featured Virtual Environments sharing a single physical server.
- Transparently move customers and their environments between servers, without any manual reconfiguration.
- Increase profitability through the better management and leverage of hardware and software investments.
- Automate service provisioning by using the technology of Virtuozzo templates, etc.

Besides, Virtuozzo proves invaluable for IT educational institutions that can now provide every student with a personal Windows server, which can be monitored and managed remotely. Software development companies may use Virtual Environments for testing purposes and the like.

Main Principles of Virtuozzo

In this section we will try to let you form a more or less precise idea of the way the Virtuozzo software operates on your computer.

Let us assume that you have a number of physical servers united into a network. In fact, you may have only one dedicated server to effectively use Virtuozzo for the needs of your network. If you have more than one Virtuozzo-based physical server, each one of the servers will have a similar architecture. In Virtuozzo terminology, such servers are called Hardware Nodes (or HN, or just Nodes), because they represent hardware units within a network.

Virtuozzo for Windows is installed on the computer running Microsoft Windows Server 2003 (Windows Server 2003). The latter is called the root operating system or the host operating system, as distinct from the operating systems running inside Virtual Environments. After Virtuozzo is installed, the virtualization capabilities are added to your system so that you are able to create VEs on it.

The ability to create a multitude of VEs on a single physical server is achieved by sharing the disk space and memory of the Hardware Node among multiple VEs. This technology is ensured by using templates. Templates are those operating system and application software packages that are installed on the Hardware Node and shared by a number of VEs running on this Node. In this version of Virtuozzo, several templates to be used are shipped together with Virtuozzo installation files.

At present, Virtual Environments can run only the Windows Server 2003 operating system (English, German, French, Spanish, Traditional Chinese, Simplified Chinese, or Japanese Standard or Enterprise Edition). In this case we say that a VE is based on the Windows Server 2003 OS template. Before you are able to create a Virtual Environment, you should install the corresponding OS template in Virtuozzo. The instructions are provided in the next chapter.

After you have installed at least one OS template, you can create any number of VEs, configure their network and/or other settings, and work with these VEs as with fully functional Windows servers.

CHAPTER 2

Installation and Setup Operations

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

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Planning Your Virtuozzo System

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

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

- 1** Hardware Node. It is a computer with the Virtuozzo software installed that houses a certain number of Virtual Environments.
- 2** VZMC workstation. It is a computer running a Windows OS with Virtuozzo Management Console (VZMC) installed. It may be located virtually everywhere on the Internet and serves for the remote administration of your Hardware Nodes.
- 3** VZCC client. It is a computer providing you with the ability to manage a particular Hardware Node and all Virtual Environments residing on it with the help of a standard Web browser on any platform. The only requirement this computer should meet is to be able to connect to the Hardware Node and run a Web browser supported by Virtuozzo.
- 4** Backup Node. It is a computer running the Virtuozzo software and used to store the Virtual Environments backups on its hard disk(s).
- 5** Monitor Node. It is a computer running a Windows OS that allows you to keep track of the resources consumption on your Hardware Nodes and the state of the Nodes themselves.

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

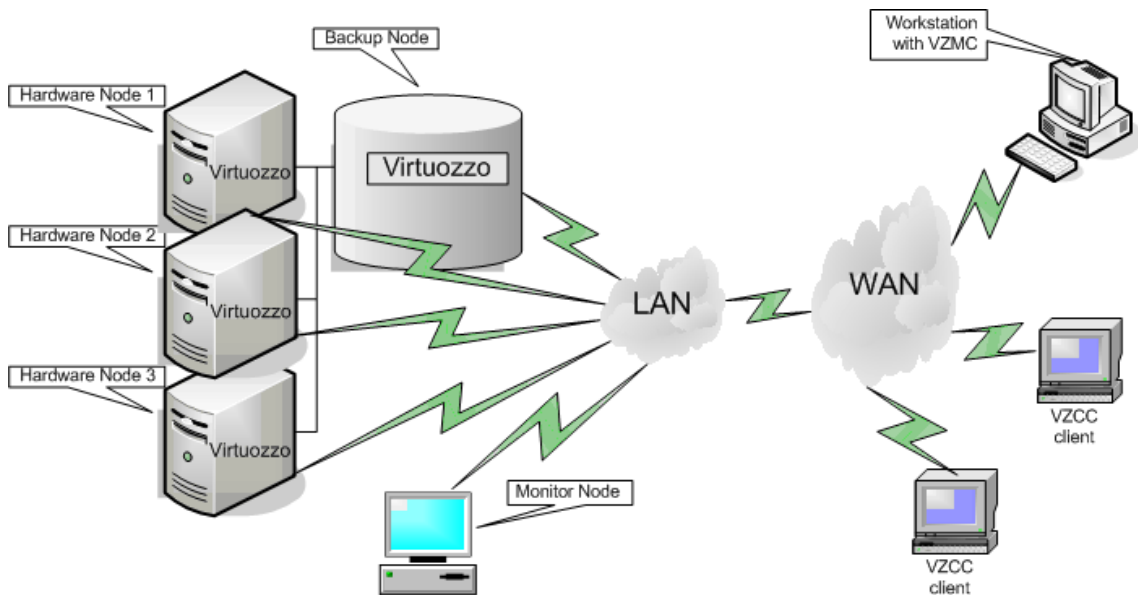


Figure 1: Virtuozzo System Configuration Scheme

This picture shows the configuration with a network consisting of a number of Hardware Nodes and two computers performing the functions of the Backup Node and the Monitor Node, respectively. As a rule, you are supposed to have several Virtuozzo-based physical servers; however, you may have only one dedicated server to effectively use Virtuozzo. All the Hardware Nodes have separate Virtuozzo licenses loaded to them and host a number of Virtual Private Servers. All the VEs residing on the Hardware Nodes can be migrated from one Node to another with near-zero downtime; so, you can easily move all VEs 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 VEs from one Node to another without having to modify the VEs IP addresses or the HN routing tables.

The Backup Node is a Node intended for storing the backups of all your Virtual Environments. Generally, any Hardware Node can be assigned an additional role of the Backup Node. However, we recommend that you set up a dedicated Backup Node (which is shown in the picture above). The Backup Node shall run Virtuozzo and have high-capacity hard drives to be able to store the VEs backups on them. If you plan to use a dedicated Node for storing the VE backups only, you do not have to install a Virtuozzo license on this Node.

The Monitor Node has a standard network interface, periodically checks up the state of the Hardware Nodes registered for being monitored, and sends alerts to you if a Node is down, up again, or a critical parameter is violated. No special requirements are set for the Monitor Node – it just has to be able to run a standard Windows system.

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

- A computer with VZMC installed. A VZMC workstation allows you to control multiple Hardware Nodes, to manage all their Virtual Environments, and to monitor the system.
- A computer where Virtuozzo Control Center is launched in a standard Web browser, which enables you to perform all the main operations on a particular Hardware Node and inside its Virtual Environments.

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

Installation Requirements

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

System Requirements

This subsection focuses on the hardware and software requirements for the Virtuozzo 3.5.1 SP1 software product.

Network Requirements

The network pre-requisites enlisted in this subsection will help you avoid delays and problems with making Virtuozzo 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 Virtual Environment you will be creating on the Node. The total number of addresses should be no less than the planned number of VEs.

Note: The addresses to be assigned to Virtual Environments (including the Service VE) 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 VE. The VE IP addresses are automatically assigned by Virtuozzo to the virtual adapters of the corresponding VEs; so, you only have to specify what IP address is to be applied to what VE.

Besides, if you are going to use Virtuozzo tools (VZMC and VZCC/VZPP) for managing your Hardware Nodes and Virtual Environments residing on them and/or to keep track of the resources consumption on your Node(s) by means of the Monitor Node or thru a Web browser, you may have to open the following ports in your firewall:

- 22: this port should be opened on the Hardware Node and inside the Service VE and is needed to be able to establish an SSH connection to the Service VE from the computer where VZMC is installed.
- 3141: this port should be opened on the Hardware Node and is needed to be able to view the information on the current HN resources consumption on the Monitor Node or thru a standard Web browser.
- 3389: this port should be opened on the Hardware Node and is needed to connect to your Virtual Environments by means of the standard Windows Remote Desktop Connection (RDP) application.
- 8049: this port should be opened on the Hardware Node and is needed to check the information on the current state of the Hardware Node thru a standard Web browser.
- 4643: this port should be opened inside the Service VE and is needed to be able to connect to the Service VE and other VEs on the Node thru VZCC/VZPP.
- 8443: this port should be opened inside the Service VE and is needed to be able to connect to Virtual Environments on the Hardware Node by means of the Plesk application.
- 4646: this port should be opened inside the Service VE and is needed to be able to use VZAgent SOAP on your Hardware Node.

Virtuozzo Installation Overview

The Virtuozzo installation shall consist of the following major steps:

- 1 Installing and activating a licensed Windows Server 2003 operating system on your computer.

- 2 Upgrading your Windows Server 2003 installation to Windows Server 2003 Service Pack 1. This step is optional, though recommended.
- 3 Installing the Virtuozzo 3.5.1 SP1 for Windows basic pack on the Hardware Node.
- 4 Performing a number of necessary preliminary steps with the help of the **Virtuozzo for Windows Configuration** wizard. These steps include installing a number of application templates on the Hardware Node, installing the Windows 2003 Server OS template on and copying additional Windows components to the Node, and creating the Service VE, which is responsible for accepting connections to the given Virtuozzo system from the outside. You are also supposed to install a Virtuozzo license on the Hardware Node on this step to start using Virtuozzo on your computer.

Besides, to facilitate managing your Hardware Nodes and Virtual Environments and to keep track of the resource consumption on your Nodes, you may want to additionally perform the following operations:

- Install Virtuozzo Management Console (VZMC) - a graphical tool for administering Virtuozzo and performing main administrative tasks on Hardware Nodes and in the VE context - and register the needed Hardware Node(s).
- Set Virtuozzo Control Center (VZCC) and Virtuozzo Power Panels (VZPP) to work. These tools are intended for managing a particular Hardware Node and/or individual Virtual Environments residing on it with the help of a standard Web browser.
- Set up the Monitor Node allowing you to get information on the current HN resources consumption and determine the state of the Node itself.

All these steps are described below in the guide.

Note: If you have not uploaded a Virtuozzo license while configuring Virtuozzo (i.e. while running the **Virtuozzo for Windows Configuration** wizard), you can install it later either by using a graphical interface (VZMC or VZCC) or by means of the `vzlicload` utility. Detailed information on how to upload Virtuozzo licenses to your Node is provided in the **Managing Virtuozzo Licenses** section of the **Managing Hardware Node** chapter in the **Virtuozzo 3.5.1 for Windows User's Guide**.

Installation Checklist

We provide this checklist for your convenience. It contains the steps required to install Virtuozzo 3.5.1 SP1 for Windows successfully. Mark checkboxes as you finish the corresponding steps.

Installing Windows OS

- Install a fresh version of Windows Server 2003 on your computer.
- Activate your Windows Server 2003 installation.
- Optional, though recommended. Upgrade your Windows Server 2003 installation to Windows Server 2003 Service Pack 1.

Important! Please do not download any Windows Server 2003 updates (except for Service Pack 1) from the Windows Update Web site and install them on your computer before installing the Virtuozzo software. All the necessary Windows updates will be AUTOMATICALLY downloaded and deployed to your Node after the Virtuozzo installation.

Installing Virtuozzo	Express Installation	Standard Installation
<input type="checkbox"/> Install the Virtuozzo 3.5.1 SP1 for Windows basic pack on your computer by executing the Virtuozzo installation file.	auto	auto
<input type="checkbox"/> Update the current Virtuozzo for Windows installation by running the Virtuozzo for Windows Update wizard.	auto	auto
<input type="checkbox"/> Configure the Virtuozzo for Windows installation by running the Virtuozzo for Windows Configuration wizard.	auto	manual
<p>Note: During the Virtuozzo configuration, you will be asked to provide a path to the Windows Server 2003 distribution files. So, you should keep handy the same Windows Server 2003 distribution kit (on a CD or elsewhere) as is installed on your Hardware Node.</p>		
<input type="checkbox"/> Install an additional TS CAL license on the Hardware Node for each VE to be created on the Node, if needed.	auto	auto

Note: The 'auto' and 'manual' designations in the Express Installation and Standard Installation columns are used to indicate whether the corresponding operation will be automatically performed by Virtuozzo or you should manually initiate its execution depending on the Virtuozzo installation type you choose.

If you are going to use VZMC and/or VZCC/VZPP to manage your Hardware Nodes and Virtual Environments and to keep track of the resource consumption on your Nodes, you should additionally perform the following operations:

Installing Virtuozzo Management Console

- Install Virtuozzo Management Console.
- Launch VZMC and install a valid VZMC license.
- Register all the Hardware Nodes with Virtuozzo for Windows installed.

Configuring Virtuozzo Control Center

- Log in to Virtuozzo Control Center.
- Install a VZCC license.
- Set up the HN mail relay server.

Setting Up Monitor Node

- Prepare the Hardware Node to collect information on its resources usage and to send this information to the Monitor Node.
- Prepare the Monitor Node for receiving messages from the Hardware Node.
- Prepare the Monitor Node for sending alerts.

Installing Virtuozzo Software

To install Virtuozzo 3.5.1 SP1 for Windows on any given Hardware Node, launch the **Virtuozzo Installation Wizard** by double-clicking the `Virtuozzo351sp1_<system_architecture>_<language_name>.exe` installation file where `<system_architecture>` and `<language_name>` denote the system architecture and the language of the Windows Server 2003 OS under which the Virtuozzo software is to be run (e.g. `Virtuozzo351sp1_x86_en.exe` to install Virtuozzo on 32-bit systems running the English version of Windows Server 2003). The installation program will greet you with the following screen:

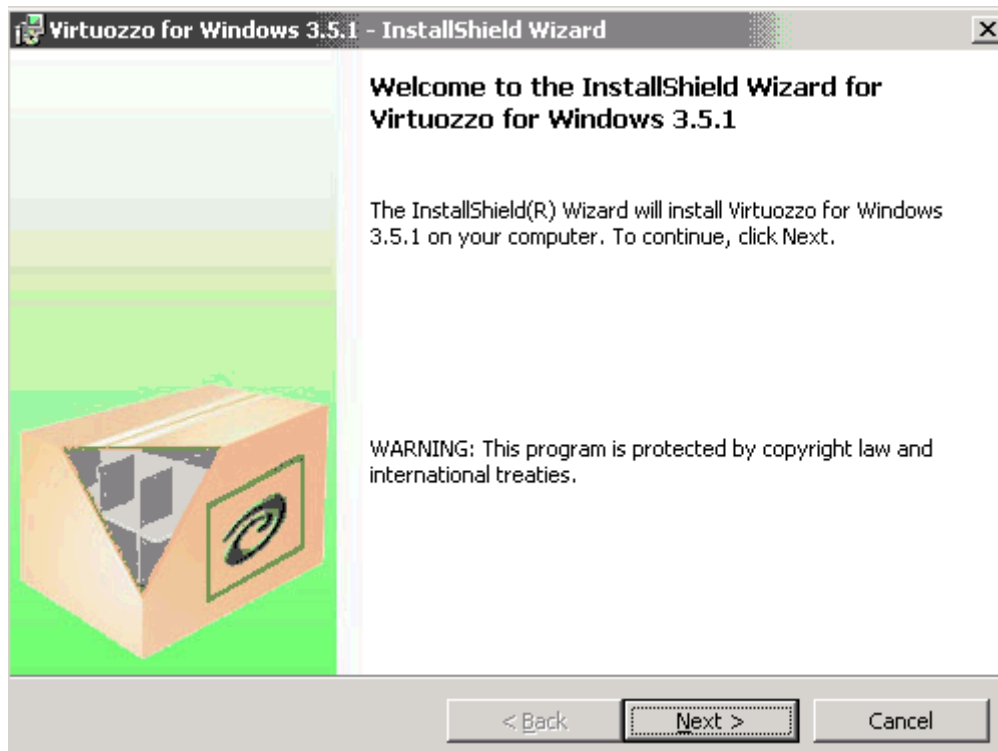
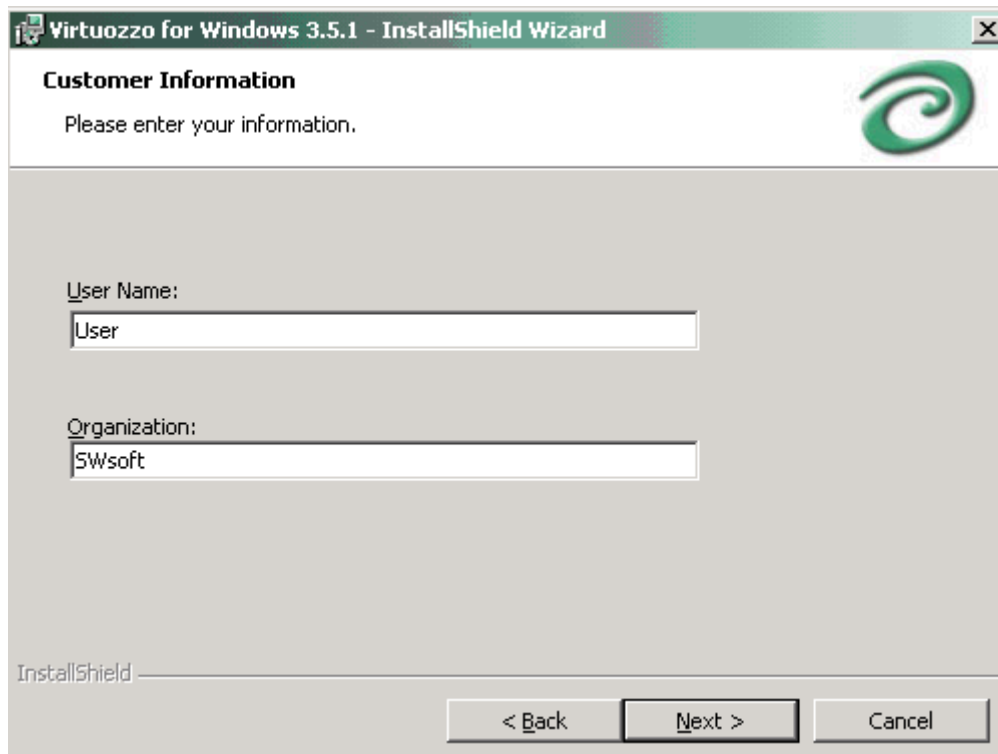


Figure 2: Installing Virtuozzo - Welcome to InstallShield Wizard

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

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



Virtuozzo for Windows 3.5.1 - InstallShield Wizard

Customer Information

Please enter your information.

User Name:
User

Organization:
SWsoft

InstallShield

< Back Next > Cancel

Figure 3: Installing Virtuozzo - Entering User's Information

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

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

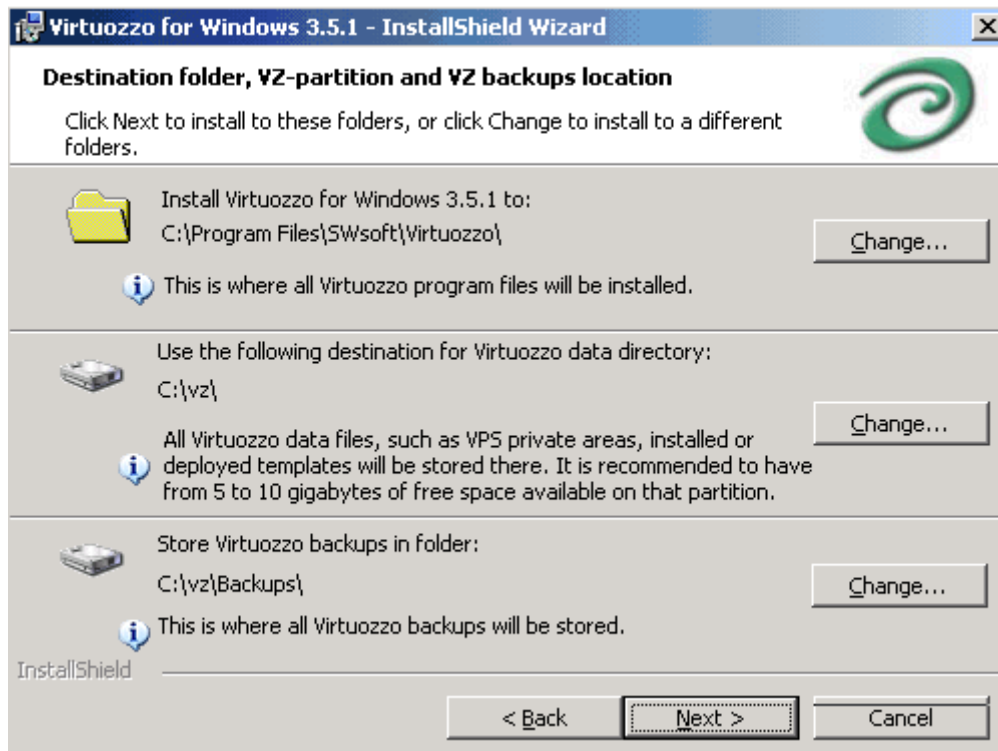


Figure 4: Installing Virtuozzo - Specifying Destination Folders

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

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

As distinct from the previous directory, this directory remains intact if Virtuozzo is uninstalled from your computer.

- The third directory is destined for keeping all VE backups created on the Node
 - by using the `vzexport` Virtuozzo backup utility (see Reference in the *Virtuozzo 3.5.1 for Windows User's Guide* for the description of this utility);
 - by using the `vzbackup` Virtuozzo utility (consult Reference in the *Virtuozzo 3.5.1 for Windows User's Guide* for detailed information on this utility),or
 - by means of VZMC and VZCC/VZPP if there is no default Backup Node or this Hardware Node is to serve as one. In the latter case, this directory will be used to store the VE backups from all Hardware Nodes registered in VZMC. Detailed information on the way to manage VE backups in VZMC and VZCC/VZPP is provided in the *Operations on Virtual Environments* chapter of the *Virtuozzo 3.5.1 for Windows User's Guide* and VZCC/VZPP online help, respectively.

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

After you have made decision on all the folders, click **Next** to display the **Setup Type** window:

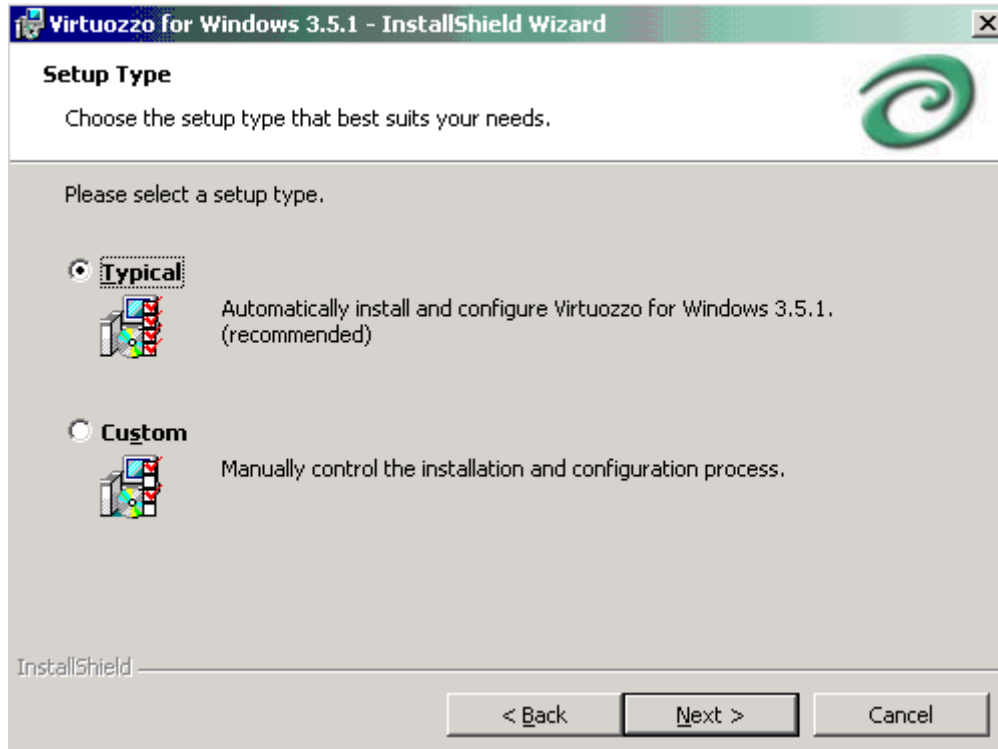


Figure 5: Installing Virtuozzo - Choosing Setup Type

In this window, you are supposed to choose the Virtuozzo installation type:

- **Typical:** select this radio button to automatically install and configure Virtuozzo components. This is the simplest type of installation where most setup and configuration steps are automated and performed by the Virtuozzo installation and configuration wizards themselves. This type is recommended for most administrators who has no experience with Virtuozzo and/or is installing the Virtuozzo software for the first time.
- **Custom:** select this radio button to manually control and/or complete all the steps of the installation and configurations wizards. This is a more complex installation type recommended for advanced administrators only.

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

Express Virtuozzo Installation

If you have selected the **Typical** radio button and clicked **Next** in the **Setup Type** window, you will be presented with the **Ready to Install the Program** screen. Pressing the **Install** button on this screen starts installing and configuring Virtuozzo onto your computer.

Note: You can change your installation settings (e.g. the location for Virtuozzo program files) made on the previous steps of the wizard by clicking the **Back** button in the **Ready to Install the Program** windows and making the necessary changes.

During the Virtuozzo installation and configuration, the following operations are performed:

- 1 The necessary Virtuozzo program files are automatically installed on your computer.
- 2 Your Virtuozzo installation is updated to the latest version. This is done by means of the **Virtuozzo Update Wizard** which is automatically launched during the Virtuozzo installation. In this wizard, you should do one of the following:
 - If your Hardware Node does not use a proxy server, i.e. it is directly connected to the Internet, just click **Next** on the **Welcome to the Virtuozzo Update Wizard** screen to start updating your Virtuozzo software.
 - If you wish to use the proxy settings of your Internet Explorer or of an external proxy server to connect to the Internet, click on the **Proxy Settings** button on the **Welcome to the Virtuozzo Update Wizard** screen to display the **Enter Proxy Settings** window:

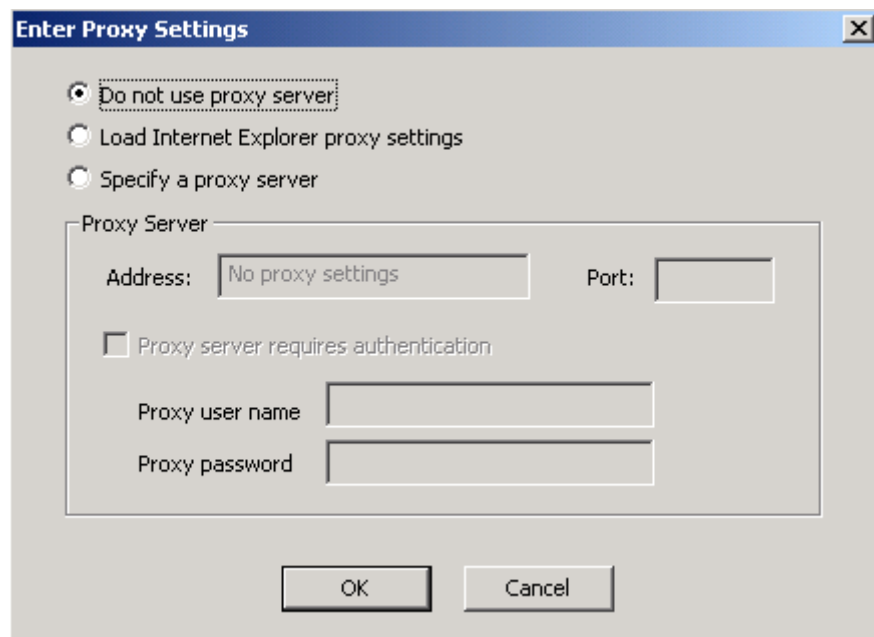


Figure 6: Installing Virtuozzo - Specifying Proxy Parameters

In this window, you can:

- a Select the **Load Internet Explorer proxy settings** radio button to use your Internet Explorer proxy settings to connect to the Virtuozzo updating center.
- b Select the **Specify a proxy server** radio button and specify the IP address and the port of the proxy server to be used to connect to the Virtuozzo updating center in the **Address** and **Port** fields, respectively.

- c If your proxy server is password-protected (i.e. you use a special user name and password to log in to the proxy server), you should also select the **Proxy server requires authentication** checkbox and specify the corresponding credentials in the **Proxy user name** and **Proxy password** fields.

Detailed information on how to update your Virtuozzo software by using the **Virtuozzo Update Wizard** is provided in the **Managing Hardware Node Software** chapter of the **Virtuozzo 3.5.1 for Windows User's Guide**.

- 3 Virtuozzo Management Console is automatically installed on your Hardware Node. VZMC is a graphical user interface client that allows you to remotely manage a multitude of Virtuozzo Hardware Nodes and their Virtual Environments.
- 4 The Virtuozzo Express Configuration Wizard is automatically launched:

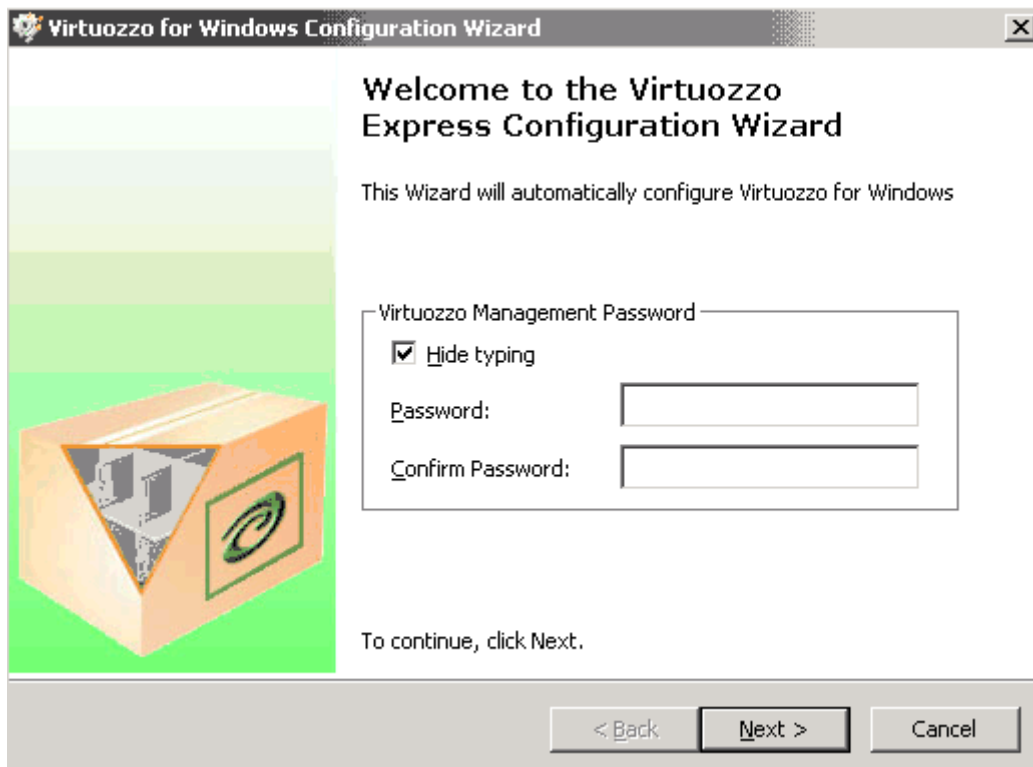


Figure 7: Installing Virtuozzo - Specifying Service VE Credentials

This wizard will help you complete the remaining steps needed to configure your Virtuozzo installation. The only thing the wizard will ask you before continuing with the Virtuozzo configuration is to specify the user password for the `vzagent0` user in the fields provided. You will need to enter this user name and this password every time you connect to the Hardware Node by means of VZMC and VZCC. The **Hide typing** checkbox allows you to choose the variant of entering the password:

- When the checkbox is selected, all symbols entered in the **Password** and **Confirm Password** fields are displayed as asterisks.
 - When the checkbox is cleared, all symbols entered in the **Password** and **Confirm Password** fields are shown as is.
- 5 A number of application templates are automatically installed on the Hardware Node. These applications are needed to perform certain tasks in the Service VE context or inside regular Virtual Environments.

- 6 The Windows Server 2003 template is automatically installed on the Hardware Node. The Windows 2003 OS template is needed to create Virtual Environments on its basis in future.

Note: If you are planning to create Virtual Environments running either localized versions of Windows Server 2003 x64 Editions or any versions of Windows Server 2003 R2, you should perform a number of additional steps described in the **Preparing Virtuozzo 64-bit for Creating Localized VEs** (on page 32) and **Preparing Virtuozzo to Create VEs With Windows Server 2003 R2** (on page 33) subsections, respectively.

- 7 Additional Windows Server 2003 components necessary for running Virtuozzo on your Hardware Node are installed. While adding Windows components, the wizard will ask you to provide a path to the Windows Server 2003 distribution files (either by inserting a CD with the Windows Server 2003 distribution kit or by clicking on the OK button in the displayed window and specifying the path to the distribution files).

Note: While adding the necessary Windows components, you must use the same Windows Server 2003 distribution kit as is installed on your Node.

- 8 The Service VE is automatically created. You should create the Service VE on every Node you are going to manage with the help of VZMC (Virtuozzo Management Console) or VZCC (Virtuozzo Control Center). The created Service VE is assigned a private IP address by Virtuozzo. However, this IP address can access (be accessible by) other computers on the network due to Network Address Translation (NAT) and port mapping settings configured by Virtuozzo in a special way during the Service VE creation.

Note: The Service VE IP address will be configured in such a way as to access (be accessible by) other computers from the outer world provided your Hardware Node has at least one valid public IP address assigned to it.

- 9 A Virtuozzo license is uploaded to the Hardware Node. On this step of the Virtuozzo configuration, you have to specify the path to your Virtuozzo license file by using the **Browse** button in the displayed window.

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

Custom Virtuozzo Installation

Selecting the Custom radio button and clicking Next on the Setup Type screen displays the following window:

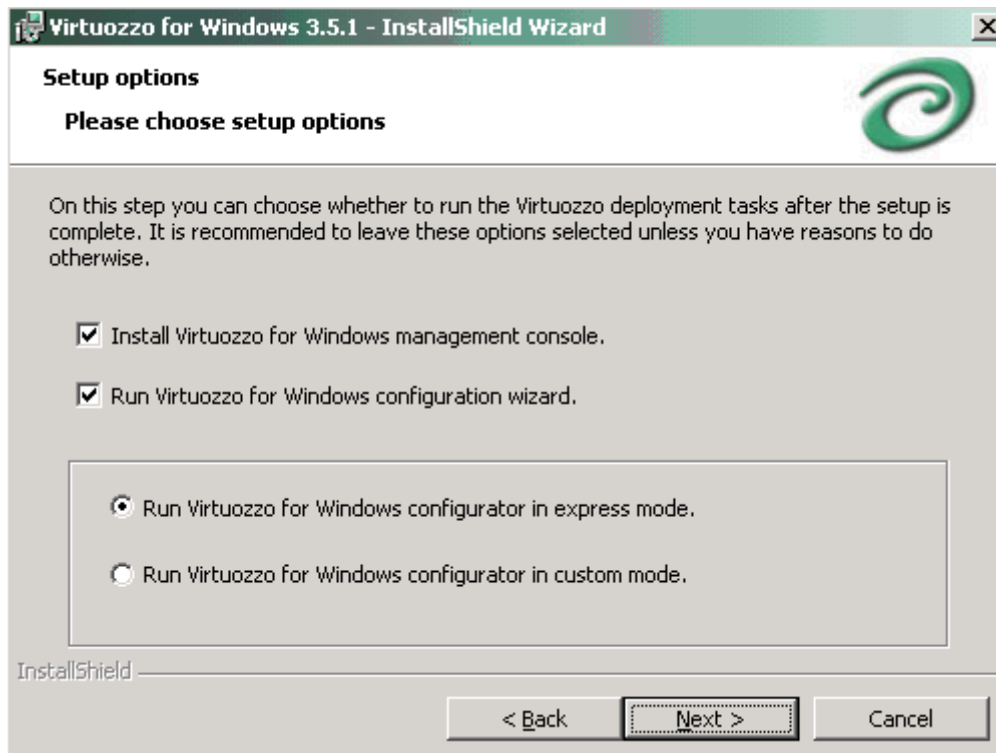


Figure 8: Installing Virtuozzo - Choosing Setup Options

This window allows you to specify the following options:

- Select the **Install Virtuozzo for Windows management console** checkbox to automatically install Virtuozzo Management Console (VZMC) on your Node during the Virtuozzo installation. VZMC is a graphical user interface client that allows you to remotely manage a multitude of Virtuozzo Hardware Nodes and their Virtual Environments.
- Select the **Run Virtuozzo for Windows configuration wizard** checkbox to automatically launch the **Virtuozzo Configuration Wizard** right after the Virtuozzo installation. Otherwise, you will have to manually launch the wizard by clicking **Programs --> SWsoft --> Virtuozzo --> Virtuozzo Configuration Wizard** on the Windows **Start** menu after Virtuozzo is successfully installed on your computer. This wizard allows your to perform a number of configuration steps necessary to make Virtuozzo fully functional. If this checkbox is selected, you are also supposed to choose one of the following options:

- **Run Virtuozzo for Windows configurator in express mode:** in this case the Virtuozzo installation and configuration will be the same as described in the **Express Virtuozzo Installation** subsection (on page 23), i.e. most of the steps will be automatically completed by the installation and configuration wizard. You only have to set the password for the `vzagent0` user to manage your Hardware Node and its VEs by means of VZMC and/or VZCC, to specify the proxy settings to connect to the Virtuozzo updating center, to provide a path to the Windows Server 2003 distribution files, and to define the path to your Virtuozzo license file. Please consult the aforementioned subsection to get detailed information on these steps. After you click **Next** in the **Setup Options** window, you will be presented with the **Ready to Install the Program** screen. This screen allows you to change your Virtuozzo installation settings made on the previous steps of the wizard by clicking the **Back** button and making the necessary changes. Pressing the **Install** button on this screen starts installing and configuring Virtuozzo onto your computer. After Virtuozzo has been successfully installed and configured on your computer, the **InstallShield Wizard Completed** window is displayed where you should click on the **Finish** button to exit the **Virtuozzo Installation Wizard**.
- **Run Virtuozzo for Windows configurator in custom mode:** in this case you are to manually control the processes of installing and configuring Virtuozzo on your computer. Moreover, you will have to manually specify most of the Virtuozzo configuration parameters (e.g. the Service VE IP address).

After you click **Next**, you will be presented with the **Ready to Install the Program** screen. This screen allows you to change your Virtuozzo installation settings made on the previous steps of the wizard by clicking the **Back** button and making the necessary changes. Pressing the **Install** button on this screen starts installing Virtuozzo onto your computer. During the installation, the **Virtuozzo Update Wizard** will be automatically launched helping you update the Virtuozzo software to the latest version. Please see the **Express Virtuozzo Installation** subsection (on page 23) for more information on how to work with the wizard.

After Virtuozzo has been successfully installed on your computer, the **InstallShield Wizard Completed** window is displayed where you are supposed to select the **Launch Virtuozzo Configuration Wizard** checkbox to launch the **Virtuozzo Configuration Wizard** right after the **Virtuozzo Installation Wizard** exits. Detailed information on how to manually run and complete the **Virtuozzo Configuration Wizard** is provided in the next subsection.

Running Virtuozzo Configuration Wizard

You are supposed to manually control the process of configuring your Virtuozzo installation in the following cases:

- You selected the **Run Virtuozzo for Windows configuration wizard** checkbox and the **Run Virtuozzo for Windows configurator** in custom mode radio button in the **Setup Options** window. In this case the **Virtuozzo for Windows Configuration** wizard is automatically launched after you have successfully installed Virtuozzo on your computer, selected the **Launch Virtuozzo Configuration Wizard** checkbox in the **InstallShield Wizard Completed** window, and clicked on the **Finish** button to exit the **Virtuozzo Installation Wizard**.
- You cleared the **Run Virtuozzo for Windows configuration wizard** checkbox in the **Setup Options** window. In this case after Virtuozzo has been successfully installed on your computer, you can invoke the **Virtuozzo for Windows Configuration** wizard by selecting **Programs --> SWsoft --> Virtuozzo --> Virtuozzo Configuration Wizard** on the Windows Start menu.

The Virtuozzo configuration includes five major steps:

- Installing a number of application templates on the Hardware Node;
- Installing the Windows Server 2003 template on the Hardware Node;
- Installing additional Windows Server 2003 components necessary for running Virtuozzo on the Hardware Node;
- Creating the Service VE, and
- Uploading a Virtuozzo license to the Hardware Node.

The steps of installing application templates, installing the Windows Server 2003 OS template, and copying additional Windows Server 2003 components to your Host OS should precede the creation of the Service VE.

After invoking the wizard, you will be presented with the **Welcome to the Virtuozzo Configuration Wizard** window where you should click **Next** to start configuring Virtuozzo on your computer. In the **Application Templates Installation** window, you are supposed to install the following applications on the Hardware Node:

- `openssh` (Secure Shell to remotely log in to VEs);
- `msde2000` (Microsoft SQL Server Desktop Engine);
- `vzagentve` (Virtuozzo Agent for a regular VE);
- `vzagentsve` (Virtuozzo Agent for the Service VE).

You will need these applications to perform certain tasks in the Service VE context or inside regular VEs. For example, the `vzagentve` application allows Virtual Environments to be managed thru the Service VE by means of VZMC or VZCC, which, however, is possible only on condition that `vzagentsve` is installed inside the Service VE.

On the next step of the **Virtuozzo for Windows Configuration** wizard, you will be asked to install the Windows 2003 OS template on the Hardware Node:

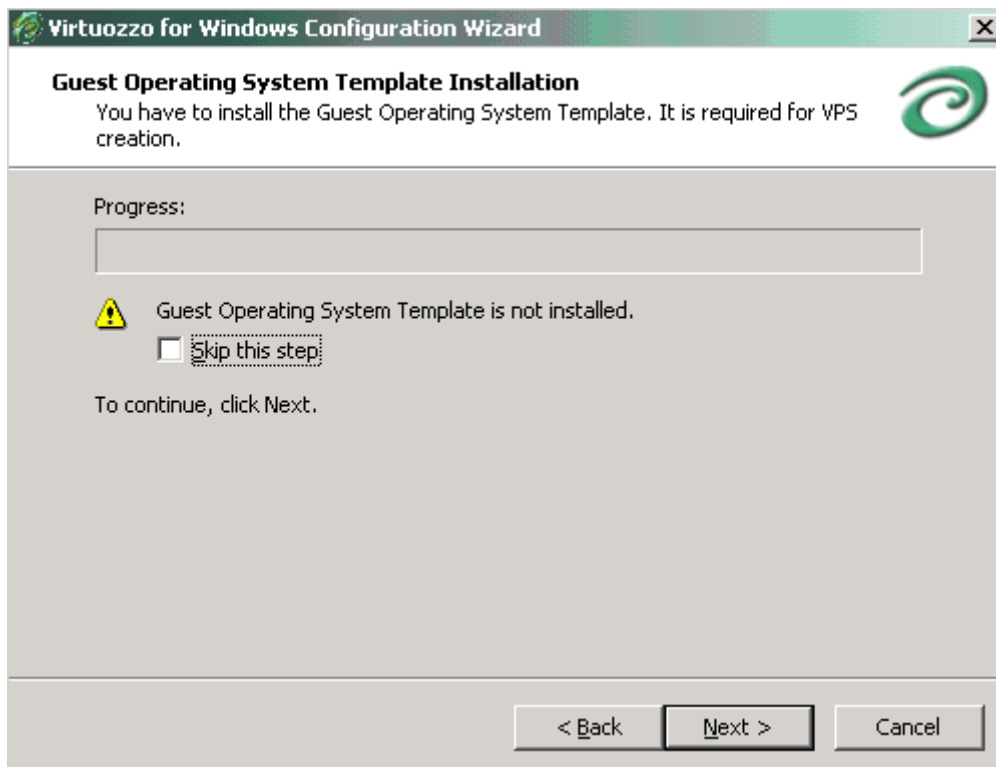


Figure 9: Configuring Virtuozzo - Installing OS Template

The Windows 2003 OS template is needed to create Virtual Environments on its basis in future. The Windows 2003 OS template is shipped with Virtuozzo; just press **Next** to start the installation. The OS template installation may take a rather long run. The progress is displayed in the **Progress** bar.

Note: If you are planning to create Virtual Environments running either German, Spanish, French, Simplified Chinese, and Traditional Chinese versions of Windows Server 2003 x64 Editions or English, German, and Japanese versions of Windows Server 2003 R2, you should perform a number of additional steps described in the **Preparing Virtuozzo 64-bit for Creating Localized VEs** (on page 32) and **Preparing Virtuozzo to Create VEs With Windows Server 2003 R2** (on page 33) subsections, respectively.

In the **Windows Components Installation** window, you will be prompted to add certain Windows components to your Host OS. These components are necessary to make the installed Windows Server 2003 OS template fully operational, i.e. to be able to create Virtual Environments on its basis. Press **Next** to start adding components to the Host OS. During the installation, you will be presented with the window asking you to insert a CD with the Windows Server 2003 distribution kit into your CD-ROM drive. Alternatively, you can click on the **OK** button and provide a path to the Windows Server 2003 distribution files.

Note: While adding the necessary Windows components, you must use the same Windows Server 2003 distribution kit as is installed on your Node.

After that, the wizard asks you to define the parameters for creating the Service VE:

Virtuozzo for Windows Configuration Wizard

Service VPS creation
It is required for Virtual Private Servers remote management through Virtuozzo Management Console or Virtuozzo Power Panels web based tool.

Service VPS IP address settings

Use NAT settings (recommended)

Service VPS IP address: 192 . 168 . 117 . 234

Service VPS password

Password: *****

Confirm Password: *****

Progress:

Service VPS does not exist.
 Skip this step

To continue, click Next.

< Back Next > Cancel

Figure 10: Configuring Virtuozzo - Creating Service VE

You should create the Service VE on every Node you are going to manage with the help of VZMC (Virtuozzo Management Console), VZCC (Virtuozzo Control Center), or VZPP (Virtuozzo Power Panels).

On the displayed screen, specify the Service VE IP address and type the user password for the `vzagent0` user in the fields provided. You will need to provide this IP address, user name, and password when connecting to the Hardware Node by means of VZMC and VZCC. While setting the Service VE IP address, you can do one of the following:

- Select the **Use NAT settings** checkbox to let Virtuozzo automatically assign a private IP address to the Service VE. This private IP address will have access/be accessed to/from the Internet due to Network Address Translation (NAT) and port mapping settings configured by Virtuozzo in a special way during the Service VE creation.

Note: The Service VE IP address will be configured in such a way as to access/be accessible to/from the outer world provided your Hardware Node has at least one valid public IP address assigned to it.

- Clear the **Use NAT settings** checkbox to manually specify the IP address of the Service VE. While specifying the IP address of the Service VE make sure that it is different from that of the Hardware Node and all the other VEs. You should specify an unoccupied IP address from your pool of IP addresses, and Virtuozzo will automatically assign it to the virtual adapter of the Service VE. Please ascertain that the Service VE IP address can be accessed from public networks, for example, from the computer where VZMC is to be installed. To make the Service VE accessible from external networks, you should configure routing to it via the IP address of the Hardware Node where this Service VE resides. Routing should be set on every computer you wish to have access to the Service VE.

Pressing the **Next** button starts the process of the Service VE creation. Virtuozzo will create the Service VE, start it, and add the required applications to it.

Finally, you will be prompted to upload a valid Virtuozzo license to the Hardware Node to start using Virtuozzo on your computer:

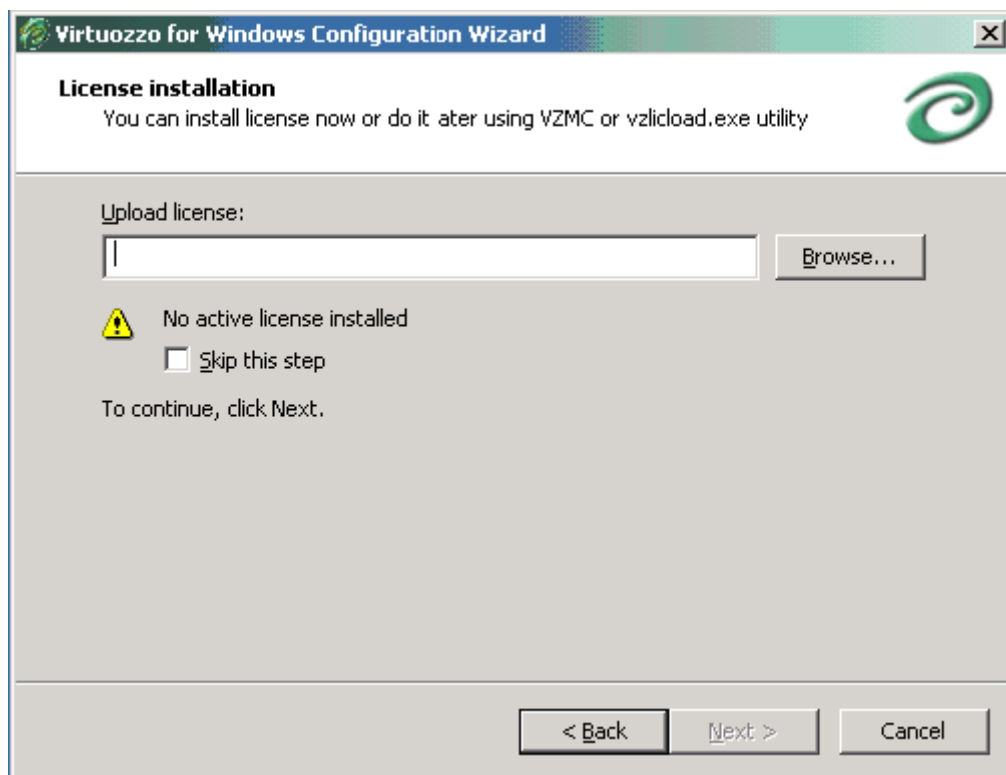


Figure 11: Configuring Virtuozzo - Uploading Virtuozzo License

Every Hardware Node should have its own Virtuozzo license installed. Licenses are issued by SWsoft and needed to start using Virtuozzo on your computer. Although you can complete some tasks on the Hardware Node without having a Virtuozzo license (e.g. store VE backups on this Node), you are not allowed to perform the majority of operations until you upload a valid Virtuozzo license to the Node (e.g. all VE-related operations including the VE creation). To install a Virtuozzo license on your Node, click on the **BROWSE** button and specify the path to your license file.

Note: You can skip the step of uploading a Virtuozzo license to your Node and install it later by means of VZMC, VZCC, or the `vzlicload` utility. Detailed information on how to install Virtuozzo licenses by using these tools is provided in the *Managing Hardware Node* of the *Virtuozzo 3.5.1 for Windows User's Guide* and in the *Virtuozzo 3.5.1 for Window Reference Guide*, respectively.

Now you can connect to the Service VE as the `vzagent0` user by means of the VZMC and/or VZCC client programs and start managing the Hardware Node over the Virtuozzo Agent protocol.

Preparing Virtuozzo 64-bit to Create Localized VEs

If you are going to use the Virtuozzo 64-bit version on your computer and planning to create Virtual Environments which are to run German, Spanish, French, Simplified Chinese, or Traditional Chinese versions of Windows Server 2003 x64 Edition, you should complete a number of additional steps after you have successfully installed the English version of Windows Server 2003 x64 Edition. These steps include:

- Installing the Multilingual User Interface pack (MUI) on the English version of Windows Server 2003 x64 Edition. The MUI pack allows the user interface language of your English 64-bit version of Windows to be changed according to your preferences to one of the following languages: German, Spanish, French, Simplified Chinese, or Traditional Chinese. For detailed information on how you can install the Windows Server 2003 x64 MUI on your computer and configure the system post setup, please visit the Microsoft web site under <http://www.microsoft.com/globaldev/reference/win2k/setup/default.mspx>.

Note: MUI packs are add-ons to the English version of Windows Server 2003 x64 Edition and should not be installed on localized versions of Windows Server 2003 x64 Edition.

- Adding the corresponding Virtuozzo operating system MUI template shipped with Virtuozzo to the Hardware Node. For example, to install the French template, you should execute the `Virtuozzo Operating System MUI Template (French version).exe` file. After the MUI template is added to the Node, it can be viewed by using Virtuozzo Management Console (VZMC), Virtuozzo Console Center (VZCC), or the `vzpkgls` Virtuozzo utility. The corresponding names are:
 - `w2k3_fr` for the French MUI template;
 - `w2k3_de` for the German MUI template;
 - `w2k3_sp` for the Spanish MUI template;
 - `w2k3_sc` for the Simplified Chinese MUI template;
 - `w2k3_tc` for the Traditional Chinese MUI template.

After you have successfully installed the corresponding MUI pack and Virtuozzo OS MUI template on your Hardware Node, you can start creating Virtual Environments based on the corresponding MUI template. Detailed information on how to create new VEs on your Node is provided in the *Operations on Virtual Environments* chapter of the *Virtuozzo 3.5.1 for Windows User's Guide*.

Preparing Virtuozzo to Create VEs With Windows Server 2003 R2

Virtuozzo 3.5.1 SP1 supports Windows Server 2003 R2 extending the Windows Server 2003 operating system and providing a number of additional enhancements in comparison with its predecessor: simplified branch server management, improved identity and access management, more efficient storage management, etc. Currently, you can create Virtual Environments running the following versions of Windows Server 2003 R2:

- 32-bit: English, Japanese, and German;
- 64-bit: English and Japanese.

However, before starting to create VEs with Windows Server 2003 R2, you should install the corresponding R2 operating system template shipped with Virtuozzo on the Hardware Node (e.g. the `w2k3_r2` and `w2k3de_r2` templates for the English and German 32-bit versions of Windows Server 2003 R2, respectively). Please keep in mind that R2 OS templates can be installed and used only on Hardware Nodes running one of the aforementioned Windows Server 2003 R2 versions.

Note: You can create Virtual Environments on the Hardware Node running Windows Server 2003 R2 without installing the R2 OS template on this Node. However, in this case your VEs will lack all the benefits and improvements provided in Windows Server 2003 R2.

Thus, to be able to create VEs which are to run the English 32-bit version of Windows Server 2003 R2, you should:

- Make sure that the English 32-bit version of Windows Server 2003 R2 is installed on the Hardware Node;
- Execute the `Virtuozzo Operating System Windows Server 2003 R2 Template (English version).exe` to install the English R2 OS template on the Hardware Node.

After you have successfully installed the English R2 template on the Hardware Node, you can start creating Virtual Environments on its basis. Detailed information on how to create new VEs on your Node is provided in the [Operations on Virtual Environments](#) chapter of the [Virtuozzo 3.5.1 for Windows User's Guide](#).

Installing Virtuozzo Management Console

Virtuozzo Management Console (VZMC) is a graphical user interface client that allows you to remotely manage a multitude of Virtuozzo Hardware Nodes and their Virtual Environments.

VZMC should have been automatically installed on your Node during the Virtuozzo installation in the following cases:

- If have selected the **Typical** radio button in the **Setup Type** window, i.e. all installation and configuration steps were automatically performed by the Virtuozzo installation and configuration wizards.
- If have selected the **Custom** radio button in the **Setup Type** window and on the next screen - the **Install Virtuozzo for Windows management console** checkbox.

If Virtuozzo Management Console has been already installed on your Hardware Node, you can launch it by clicking **Programs --> SWsoft --> VZMC Pro --> Virtuozzo Management Console** on the Windows **Start** menu. In this case you can skip the **Installing Graphical Client** section where the process of the VZMC installation is described and start with the **Installing VZMC License** section. Otherwise, you should read the next section to learn how to manually install Virtuozzo Management Console on the Hardware Node or on any other computer on a TCP/IP network.

Installing Graphical Client

The Virtuozzo Management Console is recommended to be installed on a workstation for the remote administration of the existing Hardware Nodes. However, you may also install VZMC on one of the existing Hardware Nodes running Virtuozzo. To install VZMC, launch the `SETUP_VZMC_ADMIN_PRO.EXE` file. The VZMC InstallShield Wizard will greet you with the following screen:

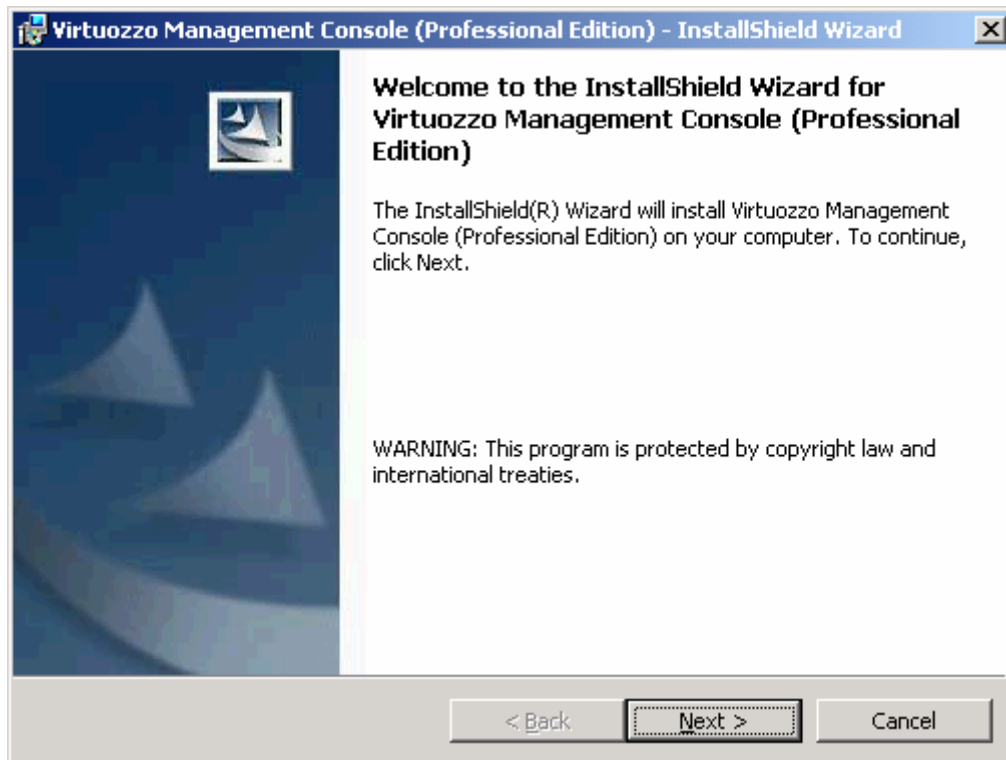


Figure 12: Installing VZMC - Welcome to InstallShieldWizard

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

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

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

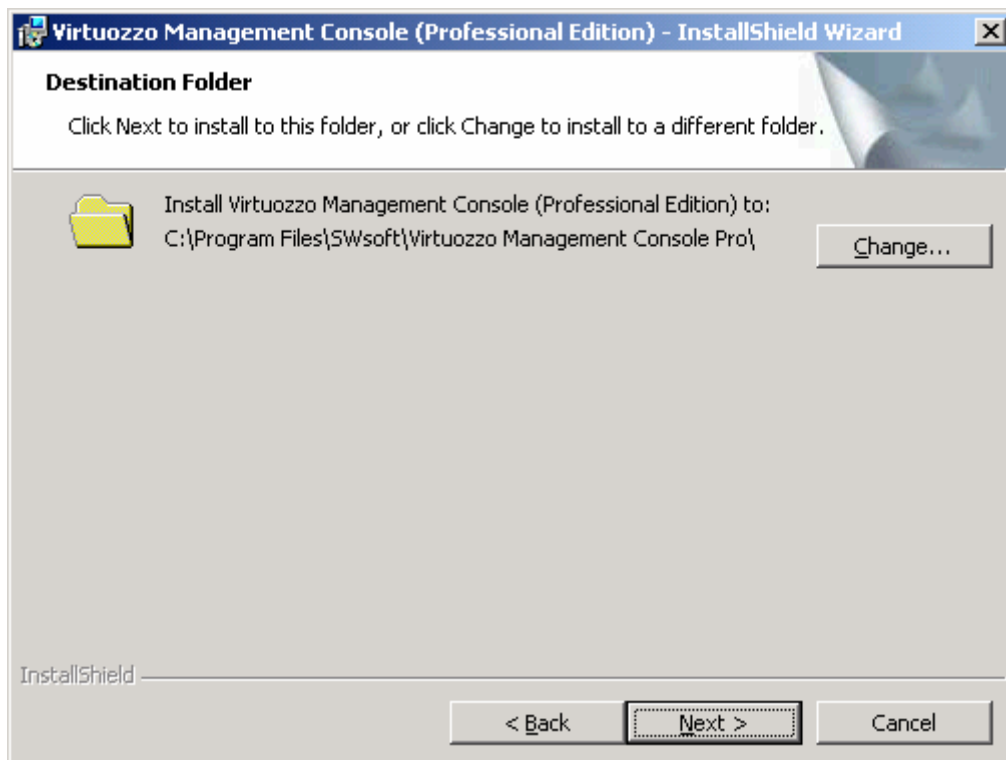


Figure 13: Installing VZMC - Choosing Destination Folder

The **Change** button allows you to choose another folder for the VZMC installation than the default one. Pressing the **Next** button starts installing VZMC onto your computer. After a while, the **InstallShieldWizard Completed** window is displayed indicating that the installation process has successfully completed. Click the **Finish** button to exit the wizard.

After the installation is complete, you can start VZMC by selecting **Programs --> SWsoft --> VZMC Pro --> Virtuooso Management Console** on the Windows **Start** menu.

Installing VZMC License

The first time you start VZMC, you will be asked to enter the VZMC license number. The VZMC licensing model does not allow concurrent connections to the same Hardware Node from two clients with identical licenses. After you have entered a valid license serial number, you can proceed with the normal course of work.

The VZMC license should be installed on each computer where Virtuozzo Management Console is to be run. It differs from the Virtuozzo license that should be loaded to the Hardware Node. A picture representing these two kinds of licenses is given below:

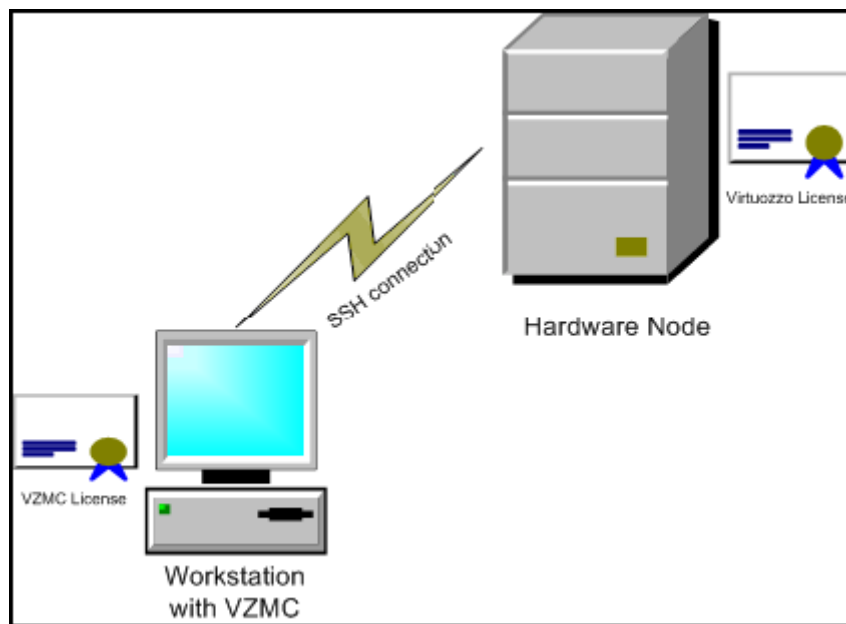


Figure 14: Virtuozzo License vs. VZMC License

VZMC serial numbers can be of two types:

- A serial number allowing the given VZMC client to connect to an unlimited number of Virtuozzo Nodes and to manage Node clusters;
- A serial number allowing the given VZMC client to connect to no more than a pre-defined number of Nodes and not providing the ability of managing Node clusters.

While entering the license serial number, you may be logged in as any user - not necessarily as Administrator. The serial number will be stored in the home directory of the currently logged in user unless you select the **Store in the shared storage available for all users** radio button in the **Virtuozzo Management Console License** window to store it in the common directory.

Note: If you have not uploaded a valid Virtuozzo license to the Hardware Node during the Virtuozzo installation and configuration, you will be offered to obtain a trial license by following the corresponding link in the **Virtuozzo Management Console License** window. Detailed information on Virtuozzo licenses is provided in the **Managing Virtuozzo Licenses** section of the **Managing Hardware Node** chapter in the **Virtuozzo 3.5.1 for Windows User's Guide**.

Registering Hardware Node

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

In case you are running Virtuozzo Management Console on the Hardware Node itself, this Node will be automatically registered in VZMC right after providing a valid VZMC license and clicking OK in the **Virtuozzo Management Console License**. The Node will be registered with the name of `Local Server`. You can then change this name by right-clicking the Hardware Node in the VZMC left pane, selecting **Properties** on the context menu, and typing the desired name in the **Name** field on the **General** tab of the displayed window.

In case you are running Virtuozzo Management Console on a remote computer, you should manually register your Hardware Node in VZMC. A special wizard will guide you through the registration process. To start the Node registration wizard, click on the **Register Virtuozzo Hardware Node** link in the right pane of the VZMC main window or select the **Register Hardware Node** item on the **Action** menu. You will be presented with the **Specify Virtuozzo Hardware Node Address** window:

Figure 15: VZMC - Registering Virtuozzo Hardware Node Wizard

In this window, you should specify:

- A friendly name for the Hardware Node which will be displayed in the VZMC left pane and help you easily find your Node among other Hardware Nodes registered in VZMC. You may specify any name you consider suitable for the Node.

- The IP address of the Hardware Node or of the Service VE. You should have already created the Service VE during the Virtuozzo configuration. Instead of the IP address, you may enter the hostname of your Hardware Node or Service VE, respectively.

Note: In case your Service VE is assigned a private IP address which cannot be accessed from the outer world, you should enter the IP address of the Hardware Node.

You can also choose a version of Secure Shell Protocol (SSH) and change the port number to be used to connect to the Service VE/Hardware Node via SSH. The default port where the SSH service is listening is 22; you may modify it if necessary. You have an option to use SSH version 1 instead of default SSH version 2; however, we recommend using SSH version 2 because it provides a better security level.

After providing the necessary information and clicking **Next**, the program will try to establish a secure connection to the Service VE/Hardware Node with default SSH keys. If you are registering the Node for the first time, VZMC will ask you for the password of the `vzagent0` user having access to the Service VE/Hardware Node. Use the password you entered for `vzagent0` while configuring your Virtuozzo installation. You also need to provide valid SSH keys to enable SSH access to the Node. You can choose between two possibilities:

- Select the **Generate SSH key and store in default location** option to generate the corresponding public and secret keys for the supplied `vzagent0` user credentials.
- If you already have valid SSH keys stored on your computer, you can select the **Use the following SSH keys** option and specify the path to the keys.

The **Specify Registration Information** window displayed after establishing the SSH connection to the Service VE/Hardware Node allows you to review all the parameters entered on the previous steps of the wizard. You can use the **Back** button to return to any step and change the corresponding parameter, if needed. Press the **Finish** button to register the Hardware Node in VZMC.

After your Node has been successfully registered in VZMC, its name is displayed in both parts of the VZMC main window - the tree pane on the left and the view pane on the right.

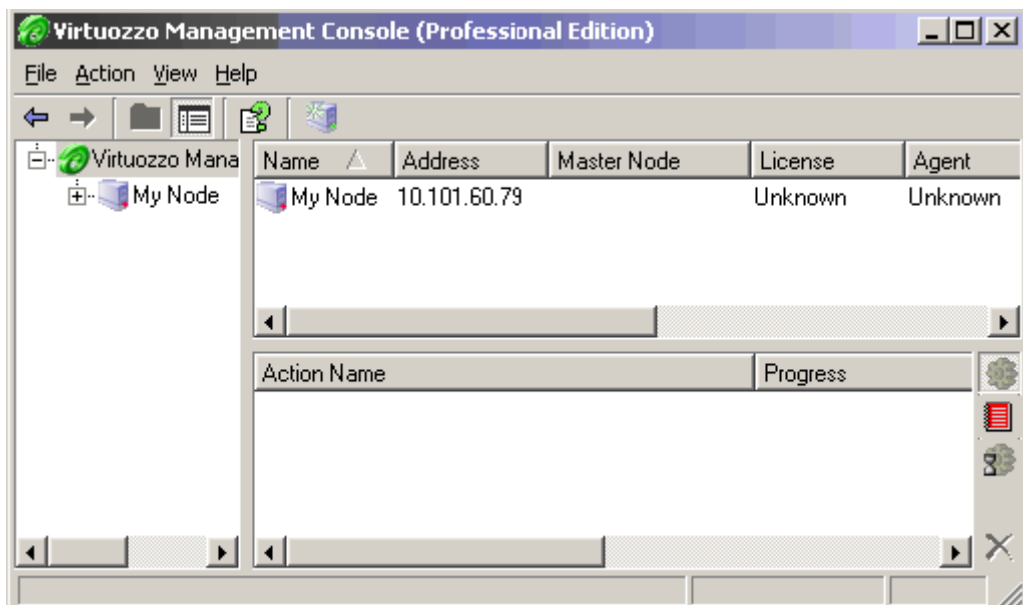


Figure 16: VZMC - Viewing Registered Node

Now you can start creating and managing VEs on the registered Hardware Node. However, if you did not load a valid Virtuozzo license to the Hardware Node while configuring Virtuozzo by means of the **Virtuozzo for Windows Configuration** wizard, you will be warned with a message informing you that no active Virtuozzo license has been found on the Node and suggested to do so. Please see the **Managing Hardware Node** chapter of the **Virtuozzo 3.5.1 for Windows User's Guide** for the information about uploading licenses.

Setting VZCC/VZPP to Work

Along with VZMC, you can make use of the following tools intended for managing your computers running Virtuozzo:

- **Virtuozzo Control Center (VZCC).** This tool is designed for Hardware Node administrators and provides you with the ability to manage a particular Hardware Node and all Virtual Environments residing on it with the help of a standard Web browser on any platform. Detailed information on VZCC is given in the VZCC online help system shipped with Virtuozzo.
- **Virtuozzo Power Panels (VZPP).** This tool provides the most part of the VZCC functionality in respect of managing individual Virtual Environments. However, as distinct from VZCC, it does not allow you to manage Hardware Nodes, adjust VE resources, and has some other restrictions. Therefore, VZPP is primarily regarded as a means for individual VE customers to manage their personal Virtual Environments. Detailed information on all VZPP functionality is provided in the VZPP online help system shipped with Virtuozzo.

Logging In to VZCC

To log in to VZCC, launch a VZCC-compatible Web browser. A list of Web browsers currently supported by Virtuozzo is given in the **VZCC Overview** subsection of the **Virtuozzo Philosophy** chapter in the **Virtuozzo 3.5.1 SP1 for Windows User's Guide**. After you have opened a browser window, you can log in to VZCC in one of the following ways:

- 1 By using the IP address (or hostname) of the Virtuozzo Service VE and the TCP port specified in Virtuozzo offline services (by default, this port is 4643). When connecting to the Service VE, you should enter the user name and password of a Service VE user (for example, `vzagent0`) who is entitled to manage the given Hardware Node and press **Login**. Let us assume that your Service VE has the IP address of `192.168.20.1`. In this case you should enter

```
https://192.168.20.1:4643
```

in the address line of your browser and log in with the credentials of a Service VE user.

- 2 By using the IP address (or hostname) of any VE residing on the given Hardware Node and the TCP port specified in Virtuozzo offline services (by default, this port is 4643). If you are connecting to one of your personal VEs, you should enter the user name and password of a Service VE user who is entitled to manage the given VE and press **Login**. For example, if you have assigned the IP address of `192.168.20.112` to one of your Virtual Environments, you can type

```
https://192.168.20.112:4643
```

and provide the credentials of a Service VE user to log in to VZCC.

Note: Detailed information on Service VE users and Virtuozzo offline services is provided in the **Creating Service VE Users** (on page 43) and **Using Offline Management** (on page 44) subsections, respectively.

Installing VZCC License

The VZCC licensing model envisages the necessity of having a proper VZCC license loaded on the Hardware Node for this Node to be manageable thru VZCC/VZPP. The first time you log in to VZCC, you should provide a valid VZCC license.

Note: In the current version of Virtuozzo, you do not need to install a VZCC license; a trial VZCC license is already included in the Virtuozzo basic pack.

To install a VZCC license, do the following:

- 1 Open the license file obtained from SWsoft and copy its contents to the clipboard.
- 2 Paste the copied contents to the VZCC License field.
- 3 Click Install.

By default, VZCC licenses are stored in the `C:\vz\root\1\C\Program Files\SWsoft\vzcp\licenses\` directory on the Hardware Node and contain information on whether you can use either Virtuozzo Power Panels (VZPP) or Virtuozzo Control Center (VZCC), or both tools to manage your Hardware Node and Virtual Environments residing on it.

After you have successfully installed the VZCC license, you can proceed with the normal course of work.

Managing VZCC/VZPP Access Rights

As the Hardware Node administrator, you can use the credentials of the `vzagent0` user (you specified the password for this user while creating the Service VE) who has a full administrative access to the Service VE to manage your Node and all Virtual Environments residing on it by means of VZCC. However, you may want to grant the rights to other users to manage certain VEs only without having access to the remaining Virtual Environments on the Node and to the Node itself. There are two ways of achieving this:

- Creating a Service VE user who would have access to certain Virtual Environments by means of VZCC.
- Using the offline management feature for a Virtual Environment to be directly managed by its administrator from any browser with the help of VZPP.

These two methods are virtually identical as regards the functionality of managing VEs. Their only difference consists in that the first method allows the VE administrator to connect to the Service VE as its user and manage all their personal VEs without having to log in to each particular VE. If using the second method, the VE administrator will have to log in each time when connecting to a new VE.

Creating Service VE Users

You can create new users of the Service VE and allow them to access certain Virtual Environments by means of VZCC in Virtuozzo Management Console (VZMC).

To open the table of Service VE users, select **Personal Edition Manager** --> **Service VE Users** in the VZMC tree pane below the Hardware Node name. The columns of the users table contain the login name of the user, user ID, group ID, and the description of the user (or comment).

Use the **New User** toolbar button to create a new user:

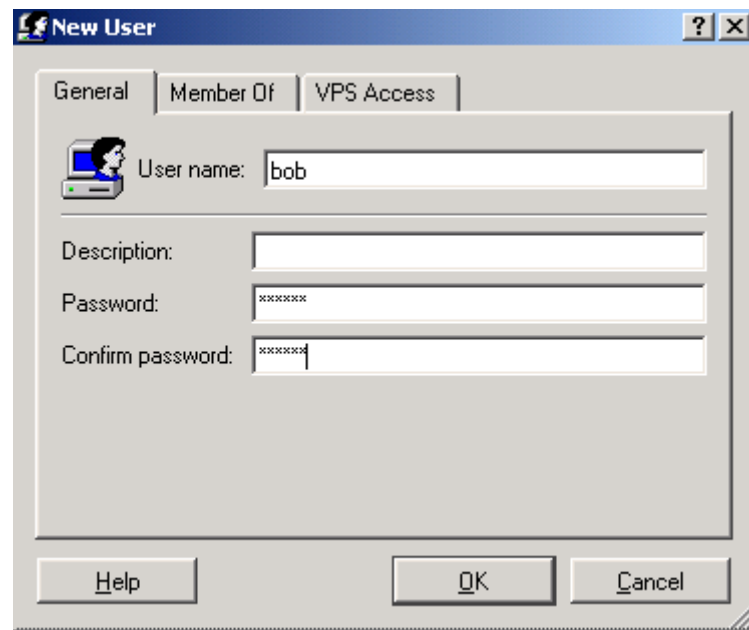


Figure 17: VZMC - User Properties Dialog

In the **New User** window, you can perform the following operations:

- Use the **General** tab to define the general settings like the name and the description of the user and the password to log in to VZCC. User names are often an abbreviation of the user's full name, which makes it easier for the user to remember them.
- Use the **Member Of** tab to add/remove the user to/from any group existing in the Service VE.
- Use the **VE Access** tab to specify those Virtual Environments that the user will be allowed to manage.

After you have created a new user, you can change the settings for this user by double-clicking on their name or selecting **Properties** on the context menu. To change the password for a user, right-click the user in the table of Service VE users, select **Set Password** on the menu, then enter the new password in the fields provided.

Note: The Service VE user differs from the internal VE administrator and is created in the Service VE only.

Using Offline Management

Any VE is created to be managed as a virtual private server by a person who is supposed to be the administrator of this VE. This may be a hosting service subscriber, a student, a server administrator within an enterprise, or any like user. The Hardware Node administrator should ensure that this person may manage the corresponding VE with the help of VZPP without compromising the security of the Hardware Node. This can be achieved by enabling the offline management of the given VE.

When offline management is enabled for a particular Virtual Environment, this VE is said to be subscribed to one or more offline services, which means that one or more ports of its IP address are permanently active whatever the VE state. This is needed to ensure the VE manageability in its down state. The currently supported services are `vzpp` (for managing Virtual Environments by means of Virtuozzo Power Panels) and `plesk` (for managing Virtual Environments by means of the Plesk control panel integrated with Virtuozzo Power Panels).

By default, offline management is enabled for all Virtual Environments residing on the Node. To start using the offline management feature, it is enough to enter

```
https://<VE_IP_address_or_hostname>:<TCP_port>
```

in the address line of any browser and to log in as Administrator with the appropriate password (you should have specified this password during the VE creation) to start to remotely manage the corresponding Virtual Environment. `<TCP_port>` in the line above denotes the port used by the offline service to access the corresponding VE. The port numbers for the `vzpp` and `plesk` offline services are 4643 and 8443, respectively.

This way of logging in to a VE is very handy for VE administrators because they need to know only the IP address/hostname of their VE and its Administrator credentials to be able to manage the VE. No additional information (e.g. the Service VE IP address) is required.

In case the Plesk control panel application is installed in a Virtual Environment and this VE is subscribed to the `plesk` service, the Plesk `admin` account can also be used by the VE administrator for logging in to Virtuozzo Power Panels. The Plesk control panel is integrated with VZPP in such a way that the `Virtuozzo` menu item on the Plesk menu allows the VE administrator to access the standard VZPP functionality, whereas all the other menu items on the Plesk menu ensure the standard Plesk functionality.

At any time, you can disable the offline management for one or all VEs on the Node by means of VZMC:

- To disable the offline management for the given VE:
 - Select the **Virtual Environments** item under the Hardware Node name;
 - Right-click the name of the VE on the VE list and select **Properties** on the context menu;
 - Go to the **General** tab;
 - Clear the **Enable offline management** checkbox;
 - Press **OK**.
- To disable the offline management for all Virtual Environments residing on the Node at once:
 - Right-click the Hardware Node name and select **Tasks --> Manage Offline Services Configuration**;

- In the **Offline Services Configuration** window, clear the **Enable Virtuozzo Power Panels and Control Center services** checkbox ;
- Press **OK**.

Detailed information on how to manage offline services (e.g. to add a new offline service or to change the port number of an existing offline services) is provided in the **Configuring VE Offline Management** section of the **Customizing VZCC/VZPP** chapter in the **Virtuozzo 3.5.1 for Windows User's Guide**.

Configuring Mail for VZCC/VZPP

To be able to send e-mail messages from the Hardware Node to external e-mail addresses, you should configure its mail settings. The situations when some data from the Node are to be dispatched may be the following:

- A user is unable to reach their Virtual Environment(s) thru VZCC/VZPP due to password-related problems and follows the **Forgot your password?** link on the login page in order to receive a URL at their e-mail address informing the user how to change their password.
- The Hardware Node administrator wishes to obtain a new Virtuozzo or VZCC license from SWsoft, generates a license request in VZCC, and sends it to their SWsoft sales contact.

To start sending information from the Node to external addresses, you should perform the following operations:

- 1 Specify an IP address of the mail relay server to send e-mail messages thru. You should do it by means of VZMC:
 - Click on the **Manage Alert Subscription** link on the Hardware Node dashboard to display the **Manage Alert Templates** window;
 - On the **Configuration** tab of the **Manage Alert Templates** window, enter an IP address to be used as the mail relay server in the **E-mail relay IP address** field;
 - Click **OK**.

You can also use VZCC to set your mail relay server:

- On the **Hardware Node** dashboard, click the **Configuration** link and, in the displayed window, the **Email & Notifications** link;
 - In the **Relay Server IP** field, enter the IP address of the mail relay server.
- 2 Specify the sender's e-mail address. This address will be shown in the **From:** field of the message sent from the Node. To this effect, you should do the following:
 - On the Node, open the `vzcpcon.conf` file for editing (e.g. by using Notepad). It is located in the `C:\vz\private\1\root\Program Files\SWSoft\vzcp\etc\` directory by default; however, you might have specified another path for storing all Virtuozzo data during the Virtuozzo installation.
 - Search for the following strings in the file

```
<restore_password>
  <from-email></from-email>
  <signature>Your VE</signature>
</restore_password>
```

and enter an e-mail address as the value of the `<from-email>` element. Make sure that a valid address is specified; otherwise, your message will not be dispatched to the recipient. While setting the sender's e-mail address, you can choose between two variants:

- a** You can type an e-mail address in the form of `name@domain_name`, where `name` identifies the sender's ID (e.g. `peter`) and `domain_name` denotes the actual domain where the mail sender resides. In this case the address will be shown in the **From:** field in exactly the same way as is specified in the `<from-email>` element.
- b** You can type an e-mail address in the form of `name` only. In this case the address will be displayed in the **From:** field as `name@Service_VE_domain_name` where `name` identifies the sender's ID (e.g. `peter`) and `Service_VE_domain_name` denotes the domain name of your Service VE. For example, if the Service VE has a domain name of `sve.your-domain.com` and you specified `peter` as the value of the `<from-email>` element, the **From:** field in your messages will read: `peter@sve.your-domain.com`.

Notes: 1. While specifying the sender's e-mail address, make sure that the messages from this address can be accepted by the set mail relay server.

2. You can choose the **b.** variant only in case the domain name for the Service VE is specified.

- Save the file and restart `vzcp` for the changes to take effect:

```
C:\Documents and Settings\Administrator>vzctl exec 1 sc stop vzcpd
...
Command 'exec' is successfully finished
C:\Documents and Settings\Administrator>vzctl exec 1 sc start vzcpd
...
Command 'exec' is successfully finished
```

CHAPTER 3

VE Management

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

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Creating and Configuring New VE

VZMC uses one wizard to create and initially configure a Virtual Environment. You can launch this wizard by selecting the **Virtual Environments** item under the corresponding **Hardware Node** in the VZMC left pane and choosing the **Create Virtual Environment** option on the **Action** menu:

Create New Virtual Private Servers

Specify Basic Virtual Private Server Parameters

The wizard needs to know basic parameters for Virtual Private Server creation, such as sample configuration to use, number of VPSs to create, their IDs, etc

Please choose one of sample configuration as a basis to create your Virtual Private Servers:

Name	OS Template	Description
basic	w2k3	Standard VPS
MSDE	w2k3	Configuration file for running Microsoft ...
Oracle	w2k3	Configuration file for running Oracle se...
Plesk	w2k3	Configuration file for running Plesk 7.0
SharePoint	w2k3	Configuration file for running SharePoi...

Number of Virtual Private Servers to create: 1

Virtual Private Server ID

Assign Virtual Private Server ID automatically from the pool at the Master node.

Virtual Private Server ID start from: 101

Hostname

Assign hostname automatically

Hostname:

Administrative account password

Password:

Confirm password:

Help < Back Next > Finish Cancel

Figure 18: VZMC - Choosing Sample Configuration File

The main VE parameters, including the templates and resource management parameters can be retrieved on the basis of the VE configuration sample indicated in the very first option. It may save you many keystrokes if you choose the correct configuration sample on this screen.

The **Hostname** group of options on the first page of the wizard shown above might help you make use of your DNS server. If your DNS server has records for the IP addresses that will be assigned to the newly-created VEs, select the **Assign hostname automatically** radio button. The hostnames will be assigned on the basis of DNS records found. Selecting the **Hostname** radio button allows you to manually set a hostname for the Virtual Environment. In the case of creating several VEs at once, you should use the `$VEID` placeholder which is automatically replaced with the ID of the VE being created. For example, if you are creating Virtual Environments in the range from 101 to 110 and enter `MyVE$VEID` into the **Hostname** field, your VEs will have the following hostnames: `MyVE101`, `MyVE102`, ..., `MyVE110`.

You should set the Administrator password for the VE being created on the first page of the wizard by typing the desired password in the Password and Confirm password fields. You will need this password in future to connect to the VE by means of Virtuozzo Power Panels (VZPP) or by using the standard Microsoft Terminal Services Client/Windows Remote Desktop Connection applications. If you are creating several Virtual Environments, all VEs will be given the same Administrator password. However, you can change the password for each Virtual Environment at a later time.

Pressing the Next button displays the window where you should specify VE network settings:

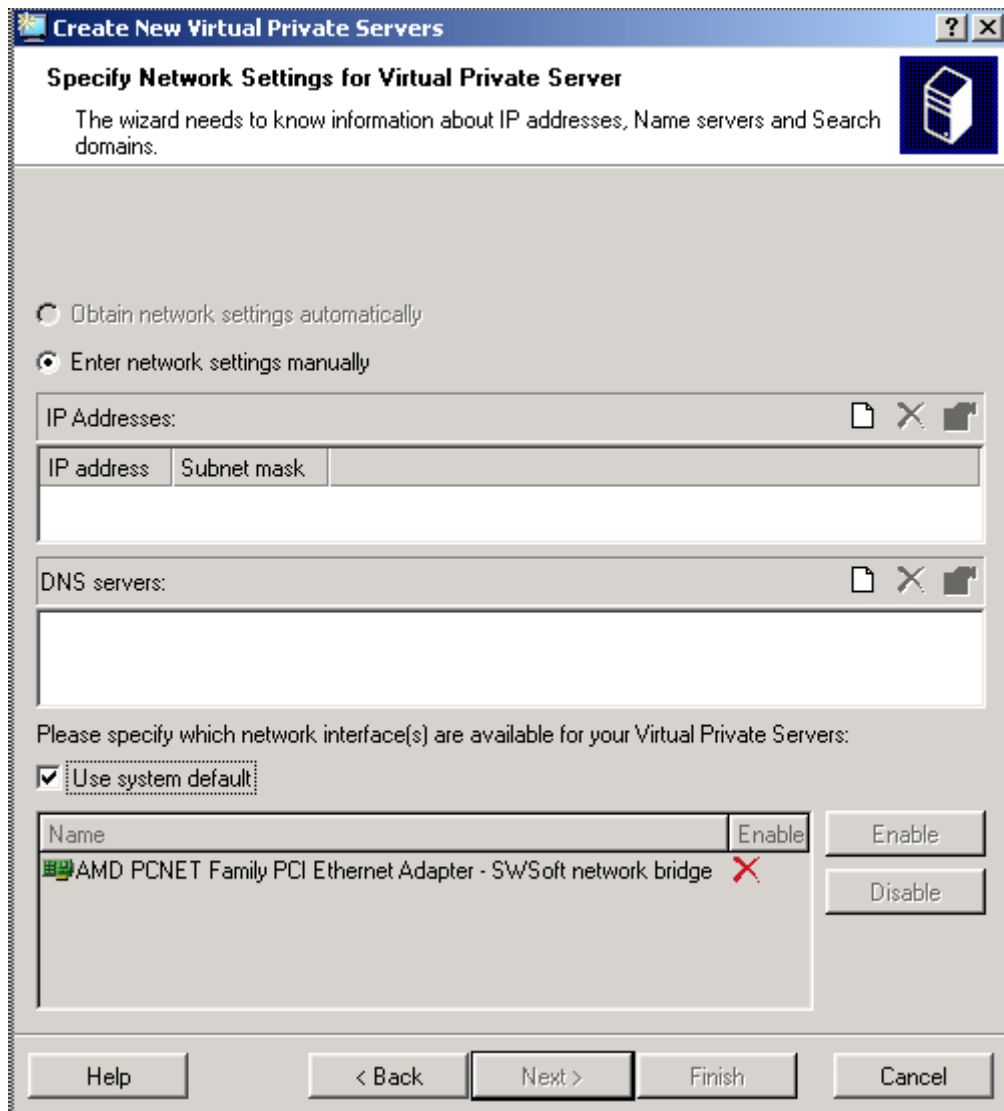


Figure 19: VZMC - Specifying Network Settings

On this screen, you should use the provided Add, Delete, and Edit icons for the corresponding operations on VE IP addresses, their subnet masks, and DNS servers:

- Each VE is bound to have at least one IP address assigned to it, so you cannot leave the **IP Addresses** field blank. In the **Subnet mask** field, you should additionally specify a subnet mask to define to what subnetwork the VE being created will belong. We strongly recommend that you specify the same subnet for all Virtual Environments on all your Nodes. In this case you will not have to manually change the VE IP address(es) every time you migrate a VE to another Node.

Note: Make sure that the IP address you wish to assign to the Virtual Environment differs from that assigned to your Hardware Node.

- You may indicate one or more DNS servers that this VE is supposed to use in the DNS servers field or leave it blank.

In case there are several network interface cards installed on the Hardware Node, Virtuozzo allows you to specify the preferred network adapter for the Virtual Environment by clearing the **Use system default** checkbox, selecting the corresponding network adapter, and clicking on the **Enable** button. This network adapter will be used to connect the VE to the network, i.e. to handle the whole network traffic for this VE. By default, all network adapters on the Node are used to control the network flows of the Virtual Environment. Detailed information on how to manage network interface cards on the Node is provided in the **Advanced Tasks** chapter of the **Virtuozzo User's Guide**.

The **Obtain network settings automatically** radio button becomes available only in case your Hardware Node belongs to a cluster of Nodes. This option allows you to automatically select and assign an IP address to your VE from the range of IP addresses specified in the cluster. Detailed information on clusters is provided in the **Managing Node Clusters** section of the **Virtuozzo User's Guide**.

You can click on the **Finish** button on this step of the wizard and create the VE with the configuration parameters specified in the configuration sample you chose on the first step of the wizard. If you do not rely on any configuration sample, press the **Next** button instead of **Finish**. In this case you will have to go through a number of steps of the wizard and set all the parameters of the new VE(s) separately. All the pages of the wizard are self-explanatory, so there is no need in dwelling upon them here in detail. You have the possibility to choose the application templates to be added to the VEs, to configure Quality of Service parameters, to specify whether the VE is to be started after creation, and to enable the offline management feature for the VE for it to be directly managed by its Administrator from any browser at the VE IP address. Besides, you can save all the parameters set as a configuration sample file to be used in future for creating new Virtual Environments on its basis.

Creating a new Virtual Environment may take some time. You can see the progress in the **Actions** pane.

After you have created, for example, a VE with ID 501, you can see it in the right pane of the VZMC window along with all other Virtual Environments existing on the Node:

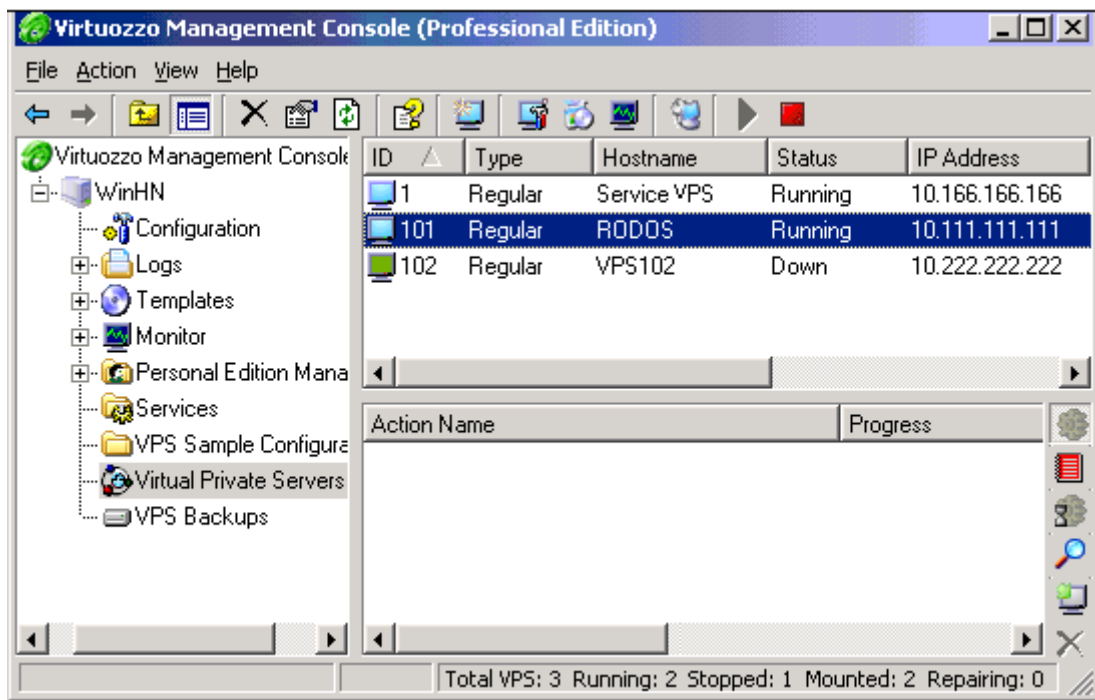
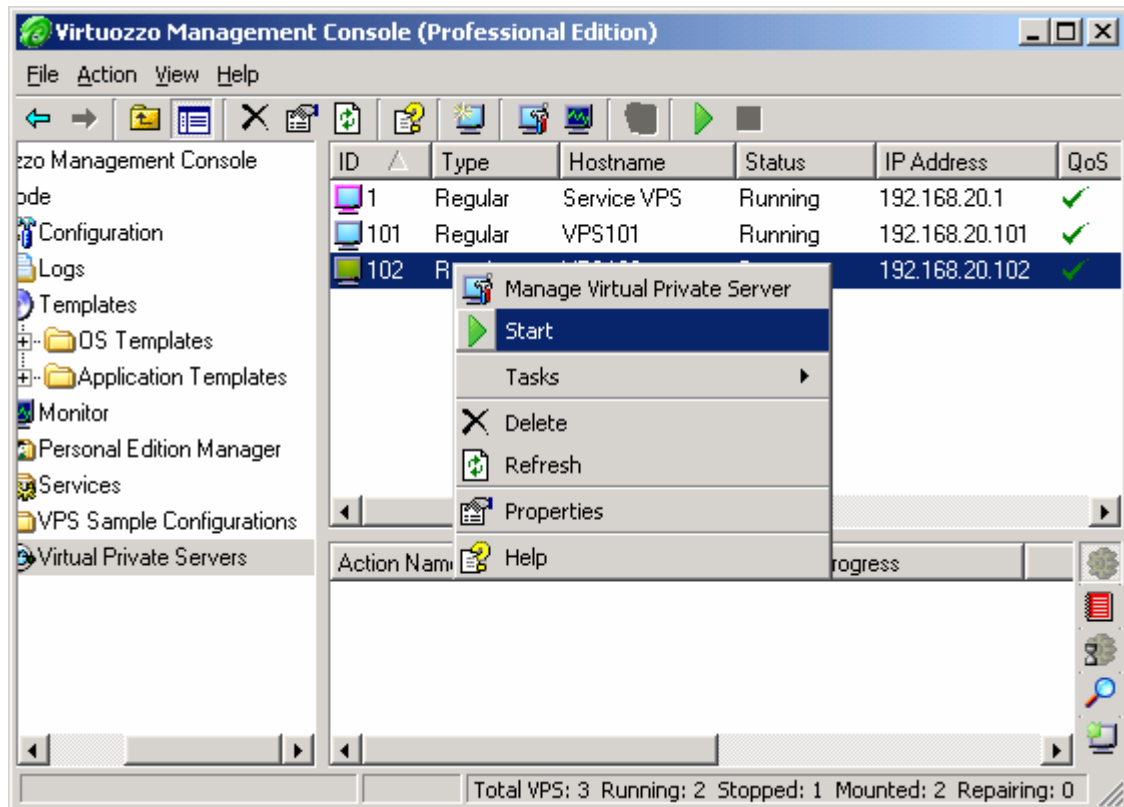


Figure 20: VZMC - Viewing Created VE

Operations on VE

When a Virtual Environment is created, it may be started up and shut down like an ordinary computer.



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

Keep in mind that starting or stopping a considerable number of Virtual Environments may take time. The progress is displayed in the VZMC Actions pane.

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

Operations Inside VE

There are a number of operations that can be performed inside an individual VE only, i.e. by using the Virtual Environment Manager accessible thru selecting the **Virtual Environments** item in the left pane of the VZMC main window and double-clicking the corresponding VE in the right pane.

Managing Users and Groups

Virtuozzo Management Console does not allow you to manage users or groups of the Host OS not to compromise the security of the Hardware Node. However, you can manage users and groups inside regular Virtual Environments with the help of Virtual Environment Manager. All users and groups are adjustable. You can also add new users and groups.

To manage groups or users inside a Virtual Environment, open the main tree for this Virtual Environment and select either the **Groups** or **Users** items in the **Users and Groups** folder, respectively.

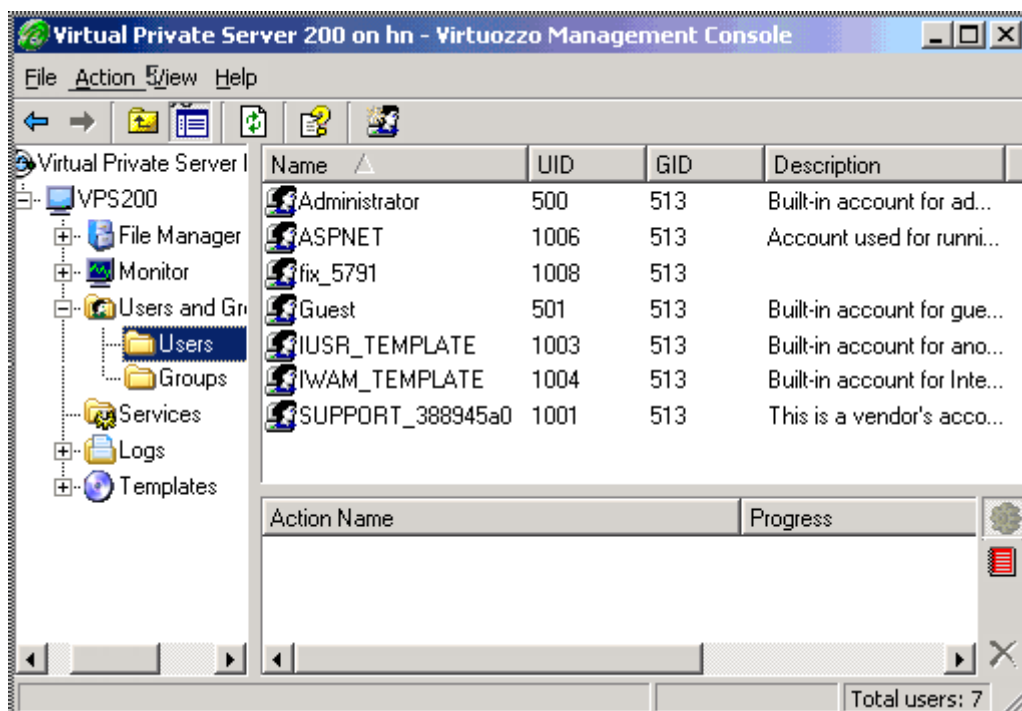


Figure 21: VZMC - Managing Users and Groups

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

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

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

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

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

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

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

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

Managing Files

You cannot manage files/folders directly on the Hardware Node by means of VZMC, but you can do it inside each and every Virtual Environment by means of the Virtual Environment Manager window. To open the VE manager window, select the **Virtual Environments** item in the left pane of the VZMC main window and double-click the corresponding VE. After you expand the **File Manager** item in the VE main tree, you will see a list of disk drives available inside your VE:

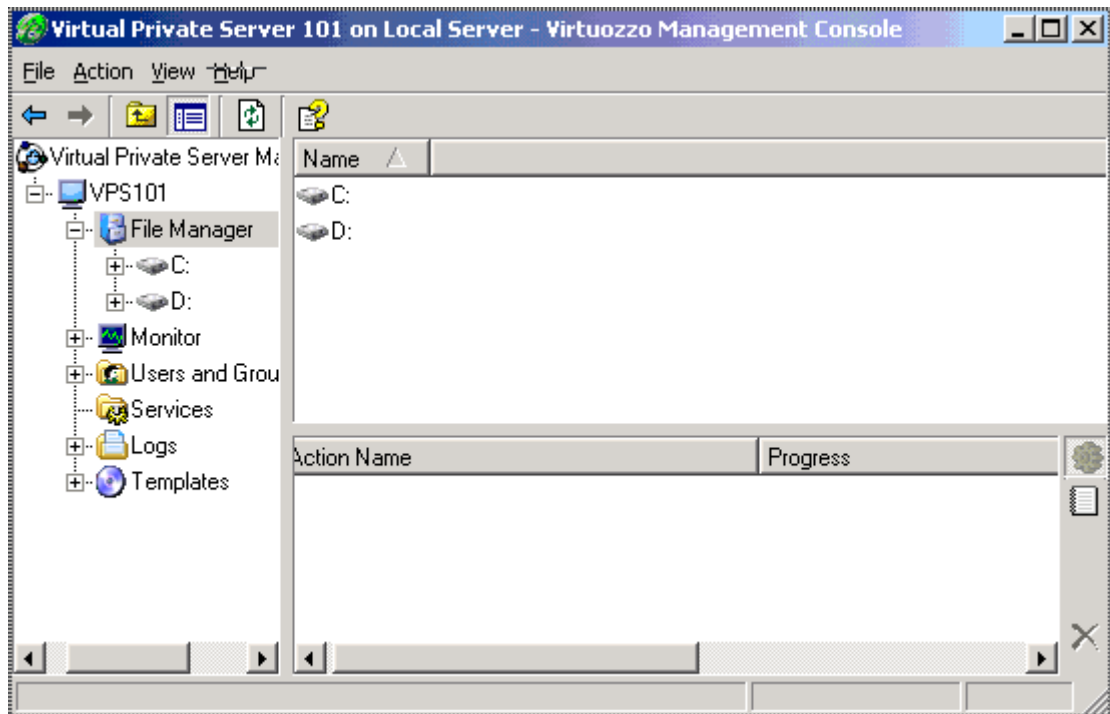


Figure 22: VZMC - File Manager

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

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

VZMC provides a user-intuitive interface for performing all these tasks.

While managing files and folders inside your Virtual Environment, you may accidentally delete one or several system files necessary for the error-free functioning of the VE or even get your VE in a non-operational state. In this case Virtuozzo allows you to restore the VE provided you have a backup of this VE. Detailed information on how to back up and restore your Virtual Environments is provided in the **Backing Up and Restoring VEs** section.

Note: In the current version of Virtuozzo, you cannot compress files and folders as well as encrypt them inside your Virtual Environments.

Accessing VE

There are a number of ways for you to access a VE as you would normally access a standalone computer:

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

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

Note: The default Windows Server 2003 installation permits you to have only 2 (two) RDP sessions and a console session per VE opened at the same time. Detailed information on managing Terminal Services inside VEs is provided in the **Configuring Terminal Services Inside VE** section of the **Virtuozzo 3.5.1 Service Pack 1 for Windows** guide.

It goes without saying that the VE must be started for the connection to be possible.

MS TSC is a standard Windows application to be used when connecting to any Virtuozzo-based VE:

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

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

Remote Desktop Connection is a standard Windows application to be used when connecting to any Virtuozzo-based VE by means of the Remote Desktop Protocol (RDP):

- 1 Launch RDC in the host operating system by selecting **Programs --> Accessories --> Communications --> Remote Desktop Connection** on the Windows Start menu;

- 2 Enter the hostname or the IP address of the VE in the **Computer** field;
- 3 Press **Connect**.
- 4 A new window is launched with an invitation to provide the user name and password for logging in to the Virtual Environment. Type `Administrator` as the user name and the Administrator's password into the corresponding fields and press **OK**.

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

To access a VE via a standard Windows file sharing, you should type its IP address or hostname preceded by two back slashes in the Windows command line or in the address line of Windows Explorer on the host operating system or on another computer on the network. You may optionally specify the name of a shared folder inside the VE. For example:

```
\\192.168.20.103  
\\ve103\c$
```

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

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

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

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

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

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

Installing Additional Software to VEs

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

- Adding application templates to the VE by means of VZMC, or
- Copying the application distribution files to the VE via RDP, MS TSC, or by using a standard Windows file sharing and then installing it as a normal Windows application from inside the given VE.

Adding Templates to VEs

VZMC allows you to add any number of templates to any number of Virtual Environments through a single wizard. The templates must have been installed on the Hardware Node beforehand. These are the steps to follow:

- 1 Click **Templates --> Application Templates** under the name of the Hardware Node where the needed templates are installed:

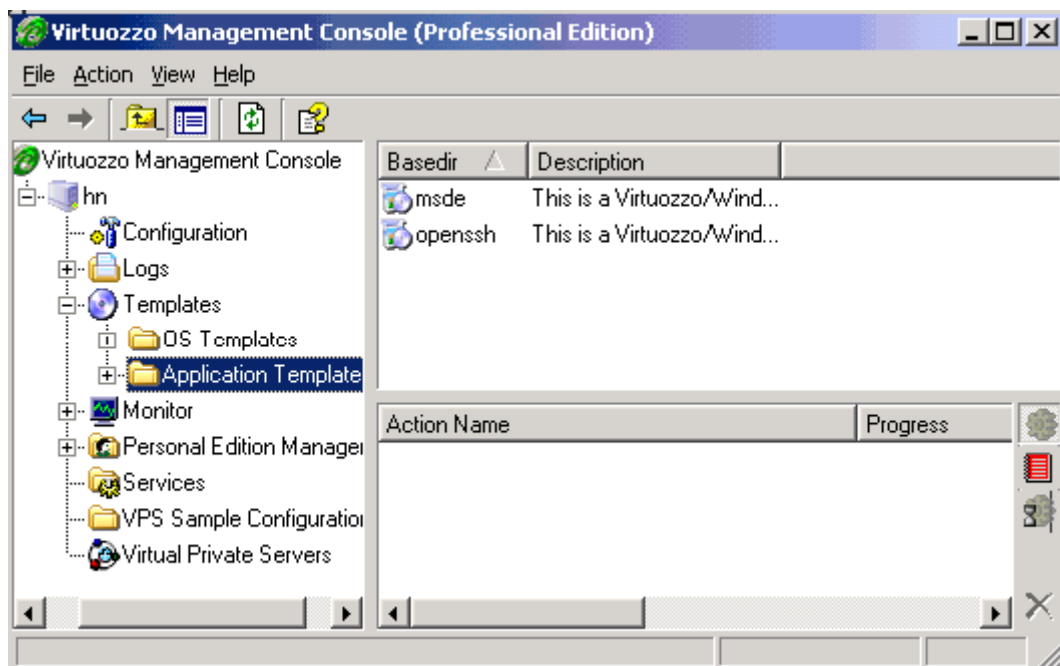


Figure 23: VZMC - Adding Templates to VEs

- 2 Select all the needed templates holding down the CTRL or SHIFT keys where necessary;
- 3 Right-click the selection and choose **Install Into Virtual Environments** on the context menu;
- 4 Follow the instructions of the wizard.

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

- 1 Open the list of Virtual Environments in the VZMC main window by selecting the **Virtual Environments** item in the Hardware Node tree;

- 2 Double-click the name of the VE where you want to add a template or a template update to open the Virtual Environment Manager;
- 3 Right-click on the **Templates** item in the main tree, and select the **Add Virtuozzo Application Template** option on the context menu:

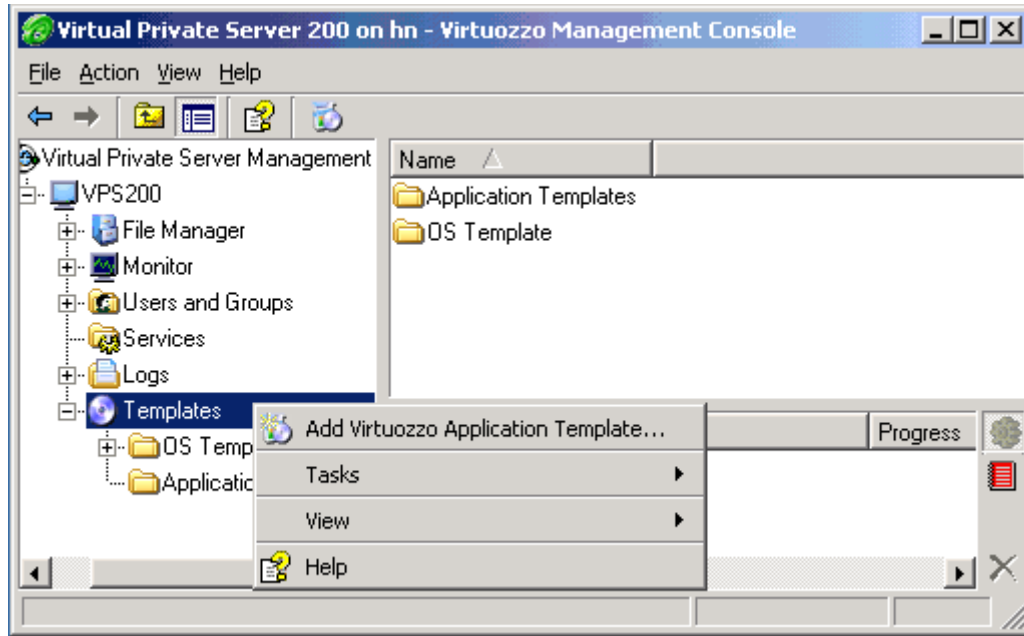


Figure 24: VZMC - Installing Templates in VE Manager

- 4 Follow the instructions of the wizard.

Installing Applications Inside VE

You can install additional software inside your VE(s) as on a dedicated computer. To this effect, you should perform the following operations:

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

Managing VE Resources

The main goal of resource control in Virtuozzo is to provide Service Level Management or Quality of Service (QoS) for Virtual Environments. Correctly configured resource control settings prevent issues resulting from the resource over-usage (accidental or malicious) of any Virtual Environment. Using resource control parameters for Quality of Service management also allows fair use of resources among Virtual Environments and better service quality for preferred VEs, if necessary.

VZMC allows you to manage the following resources:

- Disk space;
- Processor time;
- The number of terminal sessions;
- A set of memory-related parameters.

To view and/or change any of these parameters for a particular Virtual Environment, do the following:

- 1** Click the **Virtual Environments** item in the VZMC left pane, right-click the needed VE in the right pane, and choose **Properties**.

- 2 Click the QoS tab. The QoS counters window is displayed:

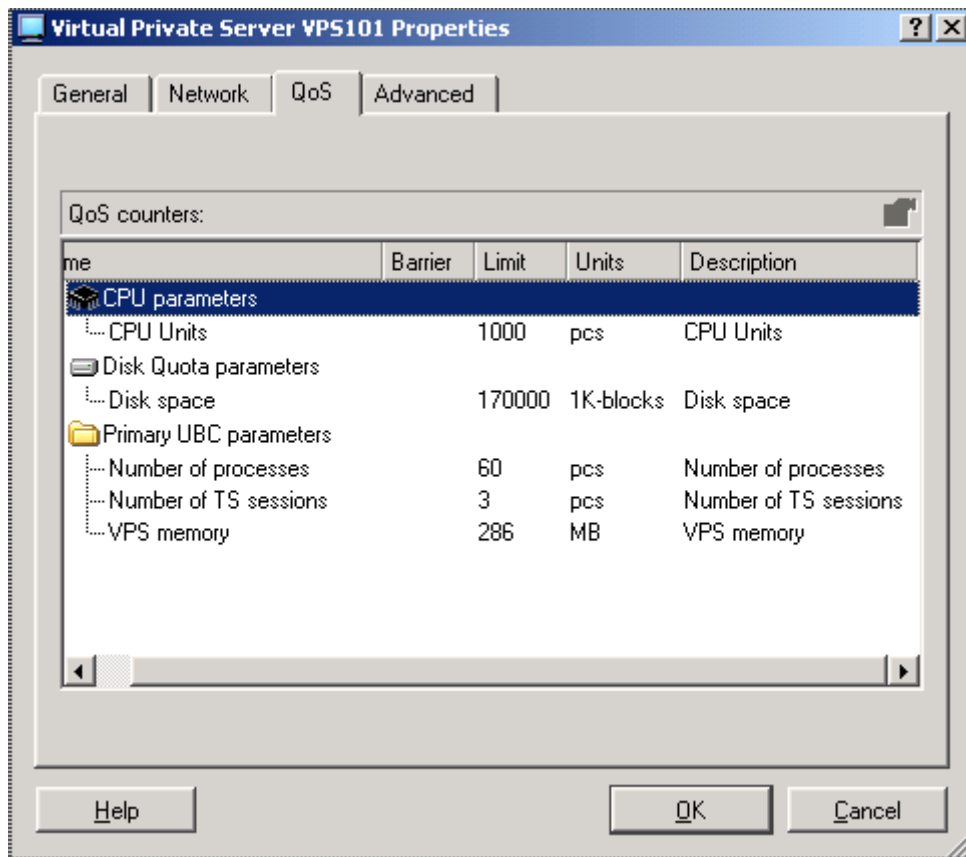


Figure 25: VZMC - Specifying QoS Settings for VE

- 3 Expand the corresponding resource group by clicking on the plus sign.
- 4 Double-click the resource whose value you wish to see/change and, if necessary, enter the right value for the given VE.
- 5 Press OK.

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