

# Parallels<sup>®</sup> Workstation 4.0 Extreme

User's Guide

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**CHAPTER 1**

# Introduction

Parallels Workstation Extreme enables you to use the hardware resources of your Intel-based Windows® or Linux® computer more efficiently by sharing them between multiple virtual machines running on it.

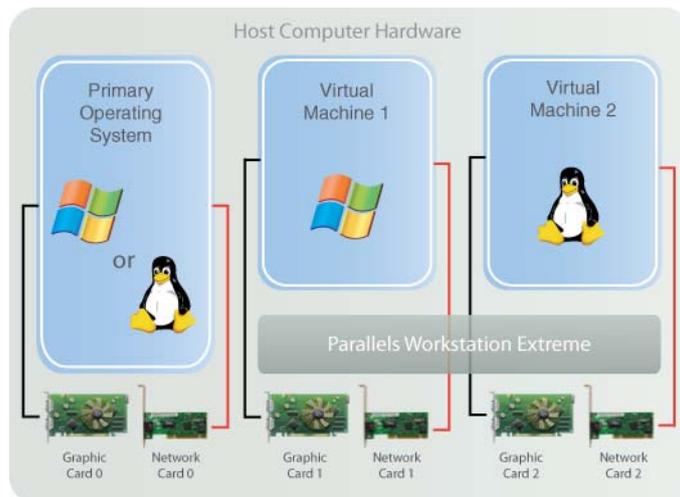
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# About Parallels Workstation Extreme

Parallels Workstation Extreme is a virtualization solution that enables you to create virtual machines on computers with Intel® processors (1.66 GHz and faster) and a Windows or Linux operating system installed. You can install a Windows, Linux, or another supported guest operating system in each of your virtual machines and work with them and their applications side by side with the applications of the primary operating system installed on the physical computer.

When installed on computers with Intel VT-d support, Parallels Workstation Extreme can even better utilize the physical hardware by allowing virtual machines to use their own physical PCI Express (PCIe) devices without sharing them with the host computer. The VT-d hardware assistance built into Intel's chipsets enables you to assign physical devices directly to the virtual machine, making them invisible to the host computer they are physically plugged into. Owing to this technology, Parallels virtual machines can achieve a very high level of performance.



Built on Parallels' hypervisor-based virtualization technology, Parallels Workstation Extreme enables you to:

- create powerful and easy-to-use virtual machines
- use Windows and Linux applications side by side with the primary operating system applications
- directly connect PCIe graphical and network cards to your virtual machines (if your host computer's processor supports the Intel VT-d technology)

To enhance your experience of running more than one operating system on your physical computer, Parallels Workstation Extreme includes several add-on utilities:

- Parallels Transporter® for migrating physical computers and third-party virtual machines to Parallels virtual machines
- Parallels Image Tool for maintaining the capacity and other properties of your virtual hard disks
- Parallels Compressor® for compressing the data stored on Windows virtual hard disks

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## About This Guide

This Guide is aimed at a wide range of users who want to use Parallels Workstation Extreme to create, configure, and run Parallels virtual machines.

### Abbreviations used in the text

In the present guide, the following abbreviations are used:

- *OS* is used instead of *operating system* in long sentences where using it will not change the meaning of the sentence.
- *VM* is used instead of *virtual machine* in long sentences where using it will not change the meaning of the sentence.

### Definitions

*Primary operating system* (primary OS): In this Guide this term is used to refer to the operating system that controls the I/O devices of the computer and that is loaded when the physical computer is turned on.

*Guest operating system* (guest OS): The term is used to refer to an operating system that runs under the virtual machine control.

## Organization of This Guide

This guide is organized into the following chapters:

- **Introduction** (p. 7) (you are reading it now). Provides basic information about the product and this guide.
- **Virtual Machine Technology Basics** (p. 13). Provides information on the specification and technologies of virtual machines.
- **Installing Parallels Workstation Extreme** (p. 16). Provides instructions on product installation.
- **Principles of Working With Parallels Workstation Extreme** (p. 30). Provides basic information on how to work with Parallels Workstation Extreme.
- **Setting Up a Virtual Machine** (p. 57). Provides instructions on creating a new virtual machine, adding an existing one, and installing Parallels Tools in guest OSs.
- **Working in a Virtual Machine** (p. 84). Provides basic information on how to work with virtual machines.
- **Configuring a Virtual Machine** (p. 109). Provides information on how to change the virtual machine configuration.
- **Managing Virtual Machines** (p. 178). Provides basic information on how to manage your virtual machines.
- **Using Parallels Add-ons** (p. 196). Provides information on how and when you can use Parallels Transporter, Parallels Compressor, and Parallels Image Tool.
- **Troubleshooting and Limitations** (p. 208). Provides the solutions for some of the known issues.

## Documentation Conventions

Before you start using this guide, it is important to understand the documentation conventions used in it.

The table below presents the existing formatting conventions.

Formatting convention	Type of Information	Example
Special Bold	Items you must select, such as menu options, command buttons, or items in a list.	Go to the <b>Resources</b> tab.
	Titles of chapters, sections, and subsections.	Read the <b>Basic Administration</b> chapter.
<i>Italics</i>	Used to emphasize the importance of a point, to introduce a term or to designate a command-line placeholder, which is to be replaced with a real name or value.	These are the so-called <i>EZ templates</i> . To destroy a Container, type <code>vzctl destroy <i>ctid</i></code> .
Monospace	The names of commands, files, and directories.	Use <code>vzctl start</code> to start a Container.
Preformatted	On-screen computer output in your command-line sessions; source code in XML, C++, or other programming languages.	<code>Saved parameters for Container 101</code>
Monospace Bold	What you type, as contrasted with on-screen computer output.	<code># rpm -V virtuoizzo-release</code>
Key+Key	Key combinations for which the user must press and hold down one key and then press another.	Ctrl+P, Alt+F4

Besides the formatting conventions, you should also know about the document organization convention applied to Parallels documents: chapters in all guides are divided into sections, which, in their turn, are subdivided into subsections. For example, **About This Guide** is a section, and **Documentation Conventions** is a subsection.

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## Getting Help

Parallels Workstation Extreme offers several options for accessing the necessary information:

- **Parallels Workstation Extreme User's Guide.** This document contains extensive information about the product, its usage and, troubleshooting. You can access the guide by choosing **Parallels Workstation Extreme Help** from the **Parallels Workstation Extreme Help** menu.
- **Online documentation.** The PDF documentation for Parallels Workstation Extreme and other Parallels products, such as Parallels Transporter, Parallels Image Tool, and Parallels Compressor. To open the online documentation page, choose **Online Documentation** from the **Help** menu.
- **Parallels Command Line Reference Guide.** This document contains information on using the `prlctl` command line utility designed to manage Parallels Workstation Extreme and its virtual machines from command line. To access the document, go to the **Online documentation** ([http://www.parallels.com/products/desktop/stm40\\_docs-en\\_US](http://www.parallels.com/products/desktop/stm40_docs-en_US)) page on our website.
- **Parallels API references and the SDK programmer's guide.** These guides are aimed at IT-professionals mainly and can be found on the **Online documentation** ([http://www.parallels.com/products/desktop/stm40\\_docs-en\\_US](http://www.parallels.com/products/desktop/stm40_docs-en_US)) page on our website.
- **Context-sensitive help.** You can open a help page for the active window by pressing F1.
- **Parallels website** (<http://www.parallels.com>). Explore the **Support** web page that includes product help files and the **FAQ** section.
- **Parallels Knowledge Base** (<http://kb.parallels.com/>). This online resource comprises valuable articles about using Parallels Workstation Extreme and other Parallels products.

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## Feedback

If you spot a typo in this guide, or if you have thought of a way to make this guide better, you can share your comments and suggestions with us by completing the feedback form at the Parallels documentation feedback page (<http://www.parallels.com/en/support/usersdoc/>).

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## Acknowledgements

This software may utilize the following copyrighted material, the use of which is hereby acknowledged.

### **tinyBIOS**

tinyBIOS is used as the system BIOS. The source code was published by PC Engines and is subject to the Common Public License available at <http://www.ibm.com/developerworks/library/os-cpl.html>.

### **Plex86/Bochs VGABios**

Plex86/Bochs VGABios is used as the video BIOS and is licensed under the terms of the GNU Lesser General Public License available at <http://www.gnu.org/licenses/lgpl-2.1.html>.

### **libmspack**

libmspack is used to extract the contents of Microsoft cabinet files and is licensed under the terms of the GNU Lesser General Public License available at <http://www.gnu.org/licenses/lgpl-2.1.html>.

## CHAPTER 2

# Virtual Machine Technology Basics

This chapter provides a brief description of Parallels virtual machines, their specifications, and the underlying technologies.

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## Virtual Machine Technology Overview

The Parallels Workstation Extreme software is based on the virtual machine technology that allows you to share the hardware resources of the physical computer between the primary operating system (the operating system installed on this physical computer) and multiple virtual machines running on this computer.

The virtual machine technology can be successfully used on computers that support the Intel virtualization technology (Intel VT-x). This technology allows Parallels Workstation Extreme to emulate virtual processors inside virtual machines.

Intel VT-x implemented in the architecture of the new Intel processors is specially developed for platforms running multiple operating systems. VT-x processors allow more precise emulation of virtual processors. To learn more about Intel virtualization technology, visit the Intel website.

## Parallels Virtual Machine

Taking the best from the virtual machine and Intel virtualization technologies, Parallels Workstation Extreme enables you to create virtual machines with a variety of virtual hardware devices.

A Parallels virtual machine works like a stand-alone computer with the following hardware:

CPU	Up to 12-core Intel CPU
Motherboard	Intel i965 chipset based motherboard
RAM	Up to 64 GB of RAM
Video Adapter	VGA and SVGA with VESA 3.0 compatible Video Adapter
Video RAM	Up to 256 MB of Video RAM
Floppy Disk Drive	1.44 MB Floppy Disk Drive mapped to an image file or to a physical floppy drive.
IDE Devices	Up to 4 IDE devices
<ul style="list-style-type: none"> <li>▪ Hard Disk</li> <li>▪ CD/DVD-ROM Drive</li> </ul>	<p>Hard Disk Drive mapped to an image file (up to 2 TB each)</p> <p>CD/DVD-ROM drive mapped to a physical drive or to an image file</p>
SCSI Devices	Up to 15 SCSI devices
<ul style="list-style-type: none"> <li>▪ Hard Disk</li> <li>▪ Generic SCSI Device</li> </ul>	<p>Hard Disk Drive mapped to an image file (up to 2 TB each)</p> <p>Generic SCSI device</p>
Network Interfaces	Up to 16 Network interfaces: including Ethernet virtual network card compatible with RTL8029
Serial (COM) Ports	Up to 4 Serial (COM) ports, mapped to a socket or to an output file
Parallel (LPT) Ports	Up to 3 Parallel (LPT) ports, mapped to output file, to a real port, or to a printer
Sound Card	AC'97-compatible Sound Card, sound recording support
Keyboard	Generic PC keyboard
Mouse	PS/2 wheel mouse

USB	Up to 8 USB 2.0 and up to 8 USB 1.1 devices
PCIe via VT-d	Up to 8 PCIe devices: video or network adapters

Each virtual machine is stored in the primary OS as a bundle of files (.pvm) that contains the virtual machine configuration file (.pvs), the virtual hard disk file (.hdd), and other files of the virtual machine.

A virtual machine may have the following files:

.pvm	A bundle that contains the virtual machine files.
.pvs	A virtual machine configuration file. It defines hardware and resources configuration of a virtual machine. The configuration file is generated when the virtual machine is created.
.sav	A file created when the virtual machine is suspended. It contains the state of the virtual machine and its applications for the moment the suspend was invoked.
.mem	A file containing memory dump for the suspended virtual machine. For a running virtual machine, it is a temporary virtual memory file.
.hdd	A bundle of files that represents a virtual hard disk of a Parallels virtual machine. When you create a virtual machine, you can create it with a new virtual hard disk or use an existing one.
.iso	An image file of a CD or DVD disc. Virtual machines treat ISO images as real CD/DVD discs.

.fdd	<p>A floppy disk image file. Virtual machines treat FDD images as real diskettes.</p> <p>If you install a Windows guest OS in the Express Windows installation mode, Parallels Workstation Extreme creates the <code>unattended.fdd</code> floppy disk image file and places it to the virtual machine folder. The file is required for Windows Server 2003, Windows XP, and Windows Vista installation.</p>
.txt	Output files for serial and parallel ports. The output .txt files are generated when a serial or parallel port connected to an output file is added to the virtual machine configuration.

## CHAPTER 3

# Installing Parallels Workstation Extreme

This chapter lists the system requirements and provides all the information required to install Parallels Workstation Extreme in Linux or Windows operating systems.

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# System Requirements

Before installing Parallels Workstation Extreme, please make sure that your computer complies with the hardware and software requirements listed here.

## Hardware Requirements

- Minimum 1.66 GHz x64 (64-bit) CPU with the Intel VT-x hardware virtualization technology support.

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**Note:** To be able to assign PCI Express (PCIe) devices directly to your virtual machines, you will need a processor that supports the Intel VT-d technology.

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The support for Intel VT-x and VT-d may be disabled by default in some computers that actually support Intel VT-x and VT-d. To enable these features, you should usually enter BIOS, go to System Settings > Virtualization Support, and select the Enable Intel Virtualization and Enable Intel VT for Direct I/O checkboxes.

For detailed information on enabling the Intel VT-x and VT-d features in BIOS, please refer to the OEM supplier's documentation.

- 2 GB RAM minimum. 4 GB RAM or more is recommended.

The recommended amount of memory assigned to a virtual machine is 1-2 GB (you can assign up to 64 GB of RAM).

- 200 MB of hard disk space for the Parallels Workstation Extreme installation.
- About 30 GB of hard disk space for each virtual machine.

To store a virtual machine's temporary files, you need to have twice as much free disk space as the overall amount of this virtual machine's memory (memory + video memory) +150 MB.

- CD-ROM or DVD-ROM drive (optional).
- Ethernet network adapter.

If you want to use a directly connected PCIe video card in your virtual machine, you will also need:

- Two PCIe video cards. One video card for your host computer and the other – for the virtual machine.

Parallels Workstation Extreme officially supports the NVIDIA Quadro® FX 3800, 4800, and 5800 video cards for virtual machines. For these video cards, use the latest drivers (starting from 182.65 for Windows and 180.51 for Linux) available on the manufacturer's website.

Direct assignment of PCIe video cards requires an NVIDIA Video BIOS version of 62.00.62.00.01 or later. If you have a supported video card which does not have this BIOS level, please contact your OEM supplier.

## Software Requirements

Parallels Workstation Extreme officially supports host computers with the following operating systems installed.

### 64-bit operating systems

- Windows 7
- Windows Vista SP2
- Windows XP SP2
- RHEL 5.3

In Linux operating systems, make sure the following software packages are installed:

- kernel development packages

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**Note:** In RedHat-based systems, such packages are called `kernel-<kernel_version>-devel`, in Debian-based systems - `linux-headers-<kernel_version>`.

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- gcc of the version with which the host kernel was compiled
- 32-bit version of glibc 2.3.6 or later
- make or gmake

For 64-bit systems, it is also desired to have 32-bit `alsa-lib` installed in RedHat-based systems or `lib32asound` in Debian-based systems.

If you do not have any of the aforementioned packages installed on your Linux-based physical computer, the Parallels Workstation Extreme installer will try to install it automatically.

---

## Installing Parallels Workstation Extreme

This section contains complete information about installing Parallels Workstation Extreme in any of the supported Windows and Linux operating systems.

## Installing Parallels Workstation Extreme in Windows

Before installing Parallels Workstation Extreme on a Windows computer, make sure that it complies with the system requirements (p. 17).

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**Note:** You must have administrator's rights to install Parallels Workstation Extreme in a Windows operating system.

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To install Parallels Workstation Extreme in Windows, you will need the Parallels Workstation Extreme setup file. The setup file is available:

- in the Parallels Workstation Extreme installation package that can be downloaded from the Parallels website
- on the Parallels Workstation Extreme installation disc included in the boxed version of Parallels Workstation Extreme

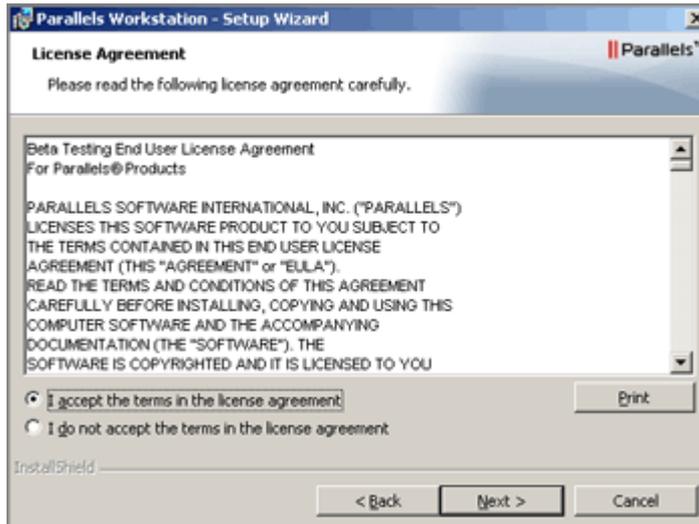
To install Parallels Workstation Extreme in Windows:

- 1 Locate the `ParallelsWorkstationExtreme-4.0.xxxx.xxxxxx.exe` file and open it.
- 2 Parallels Workstation Extreme will connect to the Parallels update server and check for available updates. If there is a newer version of Parallels Workstation Extreme available, you will be offered to install the most recent version of Parallels Workstation Extreme. If you do not want to install the most recent version, you may choose to install the version from the installation media.
  - If you click **Install existing version**, Parallels Workstation Extreme will be installed from the installation media.
  - If you click **Download and install new version**, the latest version of Parallels Workstation Extreme will be downloaded and installed on your computer.

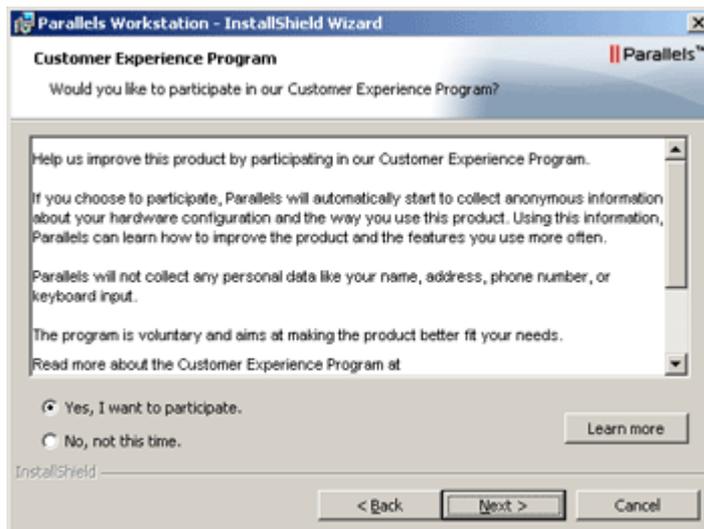
If there are no updates available or your host computer is not connected to the Internet, Parallels Workstation Extreme will be installed from the current installation source.

- 3 In the installation wizard **Welcome** window, click **Next**.
- 4 In the **License Agreement** window, read carefully the entire agreement. Select **I accept the terms in the license agreement**, and click **Next**.

You may print the license agreement for your records using the **Print** button.



- 5 In the Customer Experience Program window, you can choose to participate in the program that will help us improve Parallels Workstation Extreme according to your experience. Read carefully the information about the program and decide whether you want to participate in it or not. Click Next when finished.

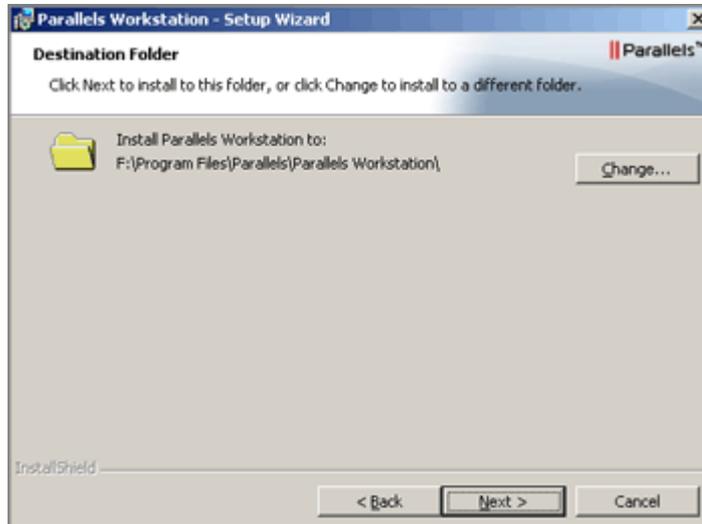


- 6 In the **Destination Folder** window, specify the folder where Parallels Workstation Extreme will be installed and click **Next**. If you do not want to install to the default folder, click the **Change** button to specify another one.

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**Note:** Parallels Workstation Extreme must be installed on the boot volume.

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- 7 In the **Ready to Install the Program** window, click **Install** to start the Parallels Workstation Extreme installation or click **Back** to return to the previous steps.
- 8 You can see the installation progress shown in the **Installing Parallels Workstation Extreme** window.
- 9 When Parallels Workstation Extreme is installed, the **Setup Wizard Completed** window appears. Click **Finish** to exit the installer.

## Installing Parallels Workstation Extreme in Linux

Before installing Parallels Workstation Extreme on a Linux computer, make sure that the packages and libraries listed in the system requirements (p. 17) for Linux primary OSs are installed in your system.

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**Note:** You must have the `root` privileges to be able to install Parallels Workstation Extreme in a Linux operating system.

---

To install Parallels Workstation Extreme in Linux, you will need a RUN installation package. The RUN package is available:

- in the Parallels Workstation Extreme installation package that can be downloaded from the Parallels website
- on the Parallels Workstation Extreme installation disc included in the boxed version of Parallels Workstation Extreme

To install Parallels Workstation Extreme in Linux:

- 1 Double-click the Parallels Workstation Extreme RUN package. This will open a terminal and start the installation.
- 2 Parallels Workstation Extreme will connect to the Parallels update server and check for available updates. If there is a newer version of Parallels Workstation Extreme available, you will be offered to install the most recent version of Parallels Workstation Extreme. If you do not want to install the most recent version, you may choose to install the version from the installation media.

---

**Note:** If the host computer is accessing the Internet only via a proxy server, configure the proxy server settings to allow Parallels Workstation Extreme to check for available updates during the installation process. For more information on how to configure the proxy server settings, refer to the **Troubleshooting** subsection below.

---

- If you click **Next**, the most recent version of Parallels Workstation Extreme will be downloaded and installed.
- If you click **Cancel**, Parallels Workstation Extreme will be installed from the current installation media.

If there are no updates available or your host computer is not connected to the Internet, Parallels Workstation Extreme will be installed from the current installation source.

- 3 The Parallels Workstation Extreme Installation wizard starts. In the **Welcome** screen, click **Next**.
- 4 In the **License Agreement** screen, read the license agreement scrolling it by pressing **Spacebar** on your keyboard. To accept the agreement, click the **Accept** button.
- 5 In the **CEP Agreement** screen, you can choose to participate in a program that will help us improve Parallels Workstation Extreme according to your experience. Read carefully the information about the program and click the **Yes** button if you want to participate in it. Otherwise click **No**.
- 6 When the installation is completed, the **Parallels Workstation Extreme Installation completed** screen appears. Click the **Exit** button to close the wizard.
- 7 To exit the terminal, enter:

```
exit
```

## Troubleshooting

If the host computer is accessing the Internet only via a proxy server, you should configure the proxy server settings to allow Parallels Workstation Extreme to check for available updates during the installation process. To this effect, begin the Parallels Workstation Extreme installation as follows:

- 1 Launch a terminal, locate the Parallels Workstation Extreme installation package, and execute the following command to start the installation:

```
sudo ./parallels-workstation-extreme-4.0.xxxx.xxxxxx.run -- -p  
proxy_server_host_name:port
```

or

```
sudo ./parallels-workstation-extreme-4.0.xxxx.xxxxxx.run -- -p ip_address:port
```

where *proxy\_server\_host\_name* stands for the proxy server host name, *ip\_address* stands for the proxy server IP address, and *port* stands for the proxy server port.

- 2 Continue the installation as it was described above.

If the proxy-server requires authentication, you will be prompted to enter your name and password in one of the steps.

---

# Activating Parallels Workstation Extreme

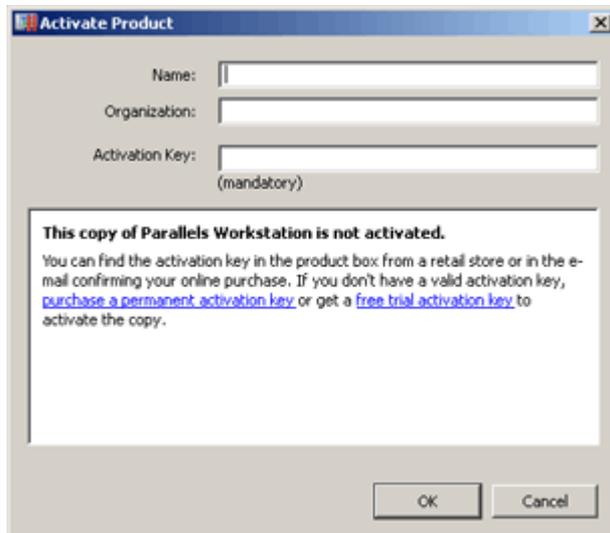
To fully run Parallels Workstation Extreme, you should activate it with an activation key. If you purchased a boxed version of the program, you can find the activation key printed on the installation CD sleeve. If you purchased the program online, the activation key was sent to your e-mail. If you downloaded a copy of Parallels Workstation Extreme to evaluate it before buying, you can get a trial activation key valid for a certain period of time.

After you activate your copy of Parallels Workstation Extreme, you can run virtual machines, install operating systems and various applications in them.

## Activating Your Copy of Parallels Workstation Extreme

To activate Parallels Workstation Extreme:

- 1 Choose **Activate Product** from the **Help** menu.
- 2 In the **Activate Product** dialog, specify your name and your company name in the **Name** and **Organization** fields (optional) and type the activation key into the **Product Key** field:
  - To get a trial activation key, click the [free trial activation key link](#).
  - To buy a permanent activation key, click [purchase a permanent activation key](#).



Click **OK** when finished.

Now that your copy of Parallels Workstation Extreme is activated, you can create virtual machines, install operating systems in them, and work with the virtual machines' applications side by side with the applications of your primary OS.

---

## Updating Parallels Workstation Extreme

Parallels Workstation Extreme includes an updating feature that helps you keep your Parallels Workstation Extreme installation up-to-date. You can use the update feature only if your computer is connected to the Internet.

Update checks can be performed either *automatically* or *manually*.

- We recommend that you turn on *automatic* updating to be notified when an update is available. Parallels Workstation Extreme will regularly check for updates available and inform you about them.
- In addition to automatic updating, you can start the updating *manually* at any time.

---

**Note:** To be able to update Parallels Workstation Extreme in a Linux primary operating system, you must have `root` privileges or be a `sudo` user. To update Parallels Workstation Extreme in a Windows primary operating system, you must have administrator or power user rights or just know the administrator or power user name and password and provide them when prompted.

---

## Automatic Updating

To use the automatic updating feature, your host computer should have a stable Internet connection.

Parallels Workstation Extreme enables you to set up an automatic check for updates and determine the frequency for this checking.

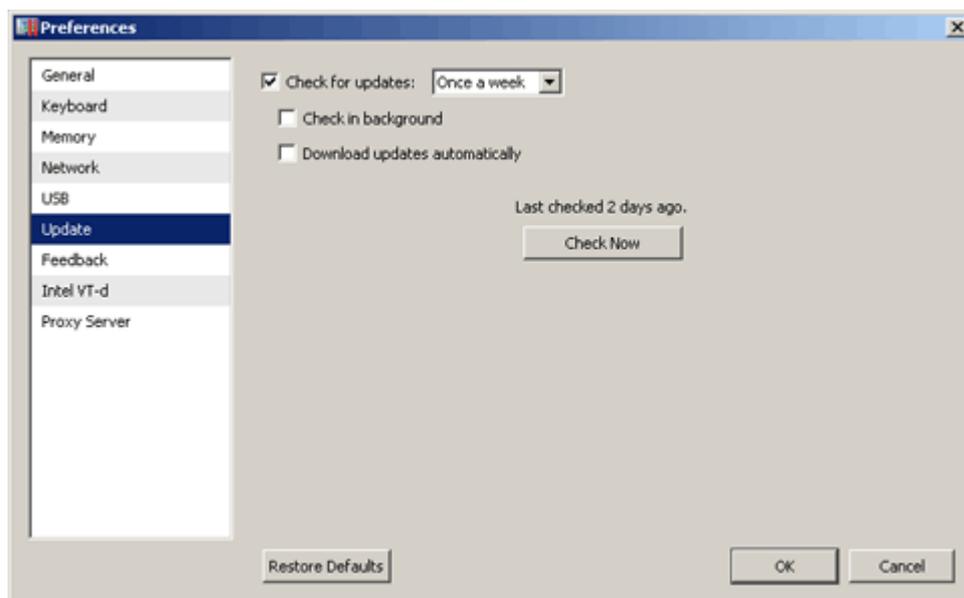
To set up automatic update checking:

- 1 Launch Parallels Workstation Extreme.
- 2 In the File menu select Preferences and go to the Update pane.
- 3 In the Update pane, you can define the necessary settings. To set up automatic checking for new versions, just select the **Check for updates** option and define the checking frequency. The system can search for new updates once a day, once a week, or once a month. With these options set, Parallels Workstation Extreme will access the Parallels update server and notify you when an update is available. If you do not need automatic checking, you can easily turn it off by clearing the **Check for updates** check box.

Checking for new updates may take some time and, if you do not want to have the process window on top of your desktop, you can hide it to the background. To do that, enable the **Check in background** option.

Select the **Download updates automatically** option if you want all new available updates to be downloaded at once without showing you the **Download** dialog.

From the **Update** pane, you can also perform a manual instant search for updates. To do that, just click the **Check Now** button. The updates available for your version of Parallels Workstation Extreme will be displayed in the **Download** dialog. Choose the update(s) you want to install and click the **Download** button. If your version of Parallels Workstation Extreme is up to date, you will see the corresponding message.



- 4 When you finish, click OK to save the changes and close the dialog.

## Manual Updating

Parallels Workstation Extreme also enables you to check for updates manually whenever you want.

To check for updates manually:

- 1 Launch Parallels Workstation Extreme.
- 2 From the **Help** menu, choose **Check for Updates**. The program will immediately start the search for updates.

While the updater accesses the Parallels update server and compares the available updates with the installed version, you can hide this window by selecting **Check in background**.

- 3 If there is one or more updates available, they will be listed in the **Parallels Update** window. Select the update to install and click **Install**.

You can also download the update by clicking the **Download** button. To change the download folder, type the path into the **Download folder** field or use the **Choose** button to locate the folder.

---

**Note:** You can install the downloaded update later by locating it in the download folder and launching the installer.

---

- 4 Click **OK** to start the installation.
- 5 Follow the Parallels Workstation Extreme installer's instructions to install the update.

---

**Note:** If the installer displays a list of conflicting applications, quit these applications to be able to proceed with the installation.

---

- 6 When the update is installed, click **Close** to quit the installer.

---

# Removing Parallels Workstation Extreme

Uninstalling Parallels Workstation Extreme does not delete any files that have been created using Parallels Workstation Extreme, such as configuration files, virtual hard disks, floppy .fdd images, and serial or parallel port output files.

## In Windows

---

**Note:** You must have power user or administrator rights to uninstall Parallels Workstation Extreme in a Windows primary operating system.

---

The procedure may be slightly different in different Windows versions. To remove Parallels Workstation Extreme follow these steps:

- 1 Open the Windows **Start** menu, select **Control Panel**, select **Add /Remove Programs**, and then select **Parallels Workstation Extreme**.
- 2 Click the **Remove** button to begin uninstalling.
- 3 Click **Yes** when prompted: "Are you sure you want to remove Parallels Workstation Extreme from your computer?"

If you purchased the program from the Parallels Online store (<http://www.parallels.com/en/buyonline>) or downloaded a trial version, you can also remove Parallels Workstation Extreme with the help of the `ParallelsWorkstationExtreme-4.0.xxxx.xxxxxx.exe` file. Just locate this file and open it. The wizard will lead you through the process of deinstallation.

## In Linux

---

**Note:** To uninstall Parallels Workstation Extreme in a Linux primary operating system you need the `root` privileges.

---

To uninstall Parallels Workstation Extreme in Linux:

- 1 Launch a terminal.
- 2 To gain the `root` privileges, enter the following command:  

```
su
```

Enter the password for the `root` account when prompted.
- 3 Locate the `parallels-workstation-extreme-4.0.xxxx.xxxxxx.run` file that you used during the Parallels Workstation Extreme installation and issue the next command:  

```
sh parallels-workstation-extreme-4.0.xxxx.xxxxxx.run
```
- 4 The Parallels Workstation Extreme Installation wizard starts. In the welcome screen, click **Next**.
- 5 In the **Upgrade Components** screen, click the **Remove** button.

- 6** When the uninstallation is completed, the Parallels Workstation Extreme Uninstalation completed screen appears. Click the Exit button to close the wizard.

## CHAPTER 4

# Principles of Working With Parallels Workstation Extreme

This chapter provides basic information about how to work with Parallels Workstation Extreme.

## In This Chapter

Starting Parallels Workstation Extreme .....	30
Interface Basics .....	31
Setting Parallels Workstation Extreme Preferences .....	38
Using Multiple Displays .....	54

---

## Starting Parallels Workstation Extreme

To start Parallels Workstation Extreme in Windows:

- From the Windows **Start** menu, choose **Programs > Parallels > Parallels Workstation Extreme > Parallels Workstation Extreme**.
- You can also start Parallels Workstation Extreme by double-clicking its icon on the desktop.

To start Parallels Workstation Extreme in Linux:

- From the **Applications** menu, choose **System Tools > Parallels Workstation Extreme**.
- Enter the following command in a terminal:

```
parallels-workstation
```

## Interface Basics

When you launch Parallels Workstation Extreme, the Parallels Workstation Extreme window opens. The Parallels Workstation Extreme window consists of several parts:

**Menus** - contain all the controls available for Parallels Workstation Extreme and its virtual machines. For detailed information, see the **Menus** subsection (p. 32).

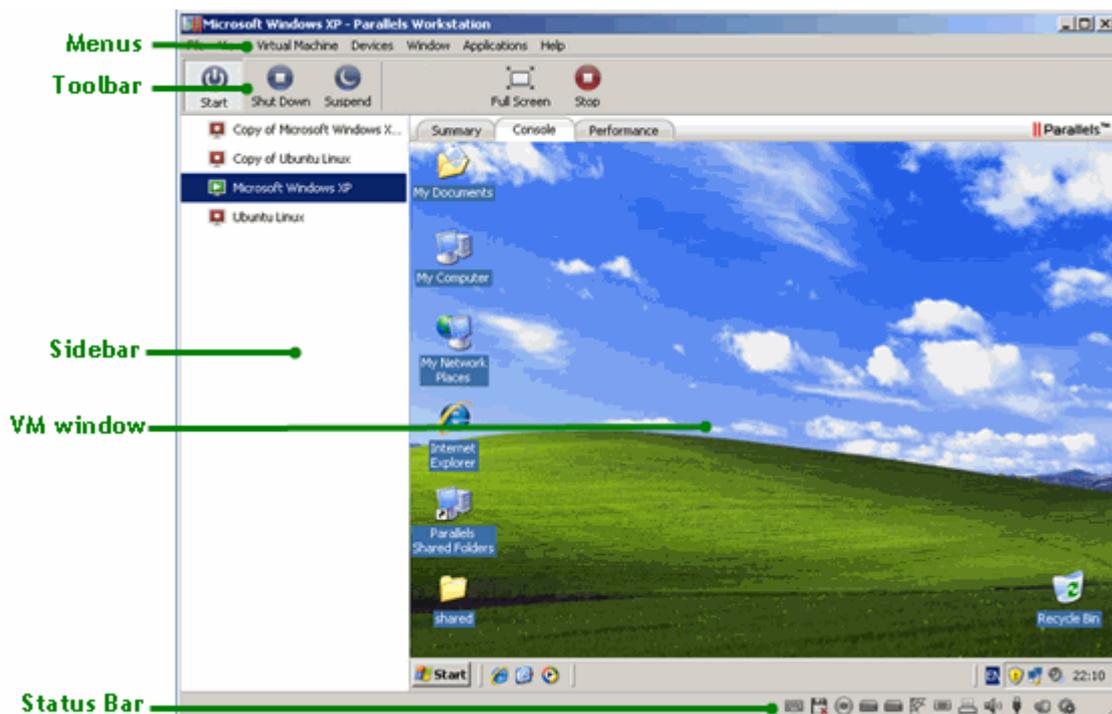
**Toolbar** - comprises buttons that can be used to manage the virtual machine and its appearance. For detailed information, see the **Toolbar** subsection (p. 33).

**Sidebar** - contains the list of all virtual machines registered in Parallels Workstation Extreme. If you right-click a virtual machine name in the list, you can use a set of commands for managing the virtual machine from the virtual machine context menu.

**Virtual Machine window** - acts as the virtual machine display or shows the properties and main operations of the virtual machine you selected in the sidebar. It consists of three tabs:

- The **Summary** tab displays the main information about the virtual machine (its name, location, OS, state and description), the main operations you can perform on it, and the virtual machine configuration. This tab is always available.
- The **Console** tab is available when the virtual machine is running and acts as the virtual machine's display.
- The **Performance** tab shows the CPU and memory usage when the virtual machine is running.

**Status Bar** - displays the devices information when the virtual machine is running. For detailed information, see the **Status Bar** subsection (p. 36).



## Menus

The Parallels Workstation Extreme menus contain all the controls available for Parallels Workstation Extreme and its virtual machines.

There are the following menus:

- The **File** menu allows you to:
  - create a new virtual machine (p. 57)
  - add an existing virtual machine to Parallels Workstation Extreme (p. 70)
  - remove the virtual machine from the Parallels Workstation Extreme sidebar (p. 181)
  - delete the virtual machine (p. 182)
  - download Parallels Virtual Appliances (p. 83)
  - clone the virtual machine (p. 179)
  - clone the virtual machine to a template (p. 186)
  - convert the virtual machine to a template (p. 186)
  - deploy the template to a virtual machine (p. 188)
  - convert the template to a virtual machine (p. 188)
  - quit Parallels Workstation Extreme

The **Run Parallels Transporter** command allows you to migrate the information from other computers or virtual machines with the help of Parallels Transporter. This menu also lets you set **Preferences** (p. 38).

- The **View** menu includes commands for switching between different view modes: the Full Screen and Window mode. You can also customize how you view the Parallels Workstation Extreme window, enable or disable automatic changes of the virtual machine screen resolution, and make screenshots of the guest OS window.
- The **Virtual Machine** menu allows you to:
  - manage the virtual machine (p. 84)
  - edit the virtual machine configuration (p. 109)
  - install Parallels Tools (p. 74)
  - update Parallels Tools (p. 81)
  - launch Parallels Compressor (p. 204)
- The **Devices** menu is available only when the virtual machine is running. It allows you to configure certain devices and shared folders at runtime.
- The **Window** menu allows you to choose the application window you want to appear on top. This menu simplifies the navigation between the virtual machines.
- The **Applications** menu enables you to manage certain elements of the Windows desktop such as the Start menu, the Windows taskbar and recycle bin.

---

**Note:** The **Applications** menu is available only for Windows XP or Windows Vista guest OSs.

---

- The **Help** menu allows you to:
  - open Parallels Workstation Extreme Help

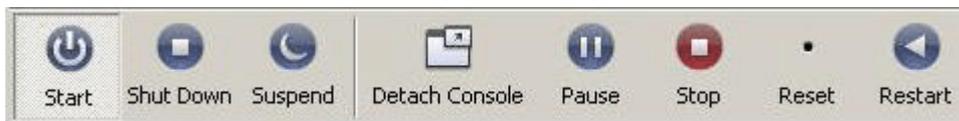
- activate Parallels Workstation Extreme (p. 24)
- check for updates (p. 27)
- report problems (p. 209)

It also displays the **About Parallels Workstation Extreme** dialog.

## Toolbar

The Parallels Workstation Extreme toolbar has buttons for the most frequent commands used to start, stop, and otherwise manage a virtual machine and its window appearance.

Most of the toolbar buttons become enabled only when you start the virtual machine. If you click a toolbar button, it becomes visibly pressed.



The default toolbar buttons:



**Start.** Use this button to start the virtual machine if it is stopped, paused or suspended.



**Shut Down.** Use this button to shut down your guest OS correctly.



**Suspend.** Use this button to put your virtual machine into the sleep mode for a certain period of time. If you need to restart the host computer, you may temporarily suspend your virtual machines and easily resume them after the restart.



**Detach Console.** Use this button to show the Console tab of the Parallels Workstation Extreme window in a separate window.



**Full Screen.** Use this button to switch the virtual machine to the Full Screen mode. To return back to the Window mode, press Alt+Enter. The key combination for switching to the Full Screen mode and back can be changed in the Preferences dialog available from the File menu.

You can easily add other buttons to the toolbar: just right-click the toolbar, choose **Customize Toolbar** (p. 35) from the shortcut menu, and drag the items you need to the toolbar:



**Restart.** Use this button to restart the fully loaded guest operating system.



**Pause.** Use this button to pause the virtual machine. Use this button when you need to instantly release the primary OS resources used by this virtual machine.



**Stop.** Use this button to stop the virtual machine in cases when the machine does not run properly and prevents you from shutting it down.

---

**Note:** If you click this button when the virtual machine is running, you may lose all the unsaved data. To turn off the virtual machine, use the shutdown procedure specified for the guest OS installed in it or use the **Shut Down** button.

---



**Reset.** Use this button for hard reset of your virtual machine in cases when the machine does not run properly and prevents you from resetting it properly.



**Safe Mode.** Use this button to run the virtual machine in Safe Mode (p. 105).



**Configure.** Use this button to open the **Virtual Machine Configuration** dialog (p. 109).

If you often work with snapshots, you can drag any of the three snapshot buttons to the toolbar as well:



**Take Snapshot.** Use this button to create a snapshot for the virtual machine.



**Revert to Snapshot.** Use this button to roll back the changes made to the virtual machine since the moment the last snapshot was made.



**Snapshot Manager.** Use this button to open Snapshot Manager. For more information, refer to the **Working with Snapshots** section (p. 191).

## Customizing Toolbar

To change the appearance of the toolbar items, right-click the toolbar and use the shortcut menu commands:

- **Icon & Text.** Use this command if you want the toolbar to display both the button icons and their names.
- **Icon only.** Use this command if you want the toolbar to display only the button icons.
- **Text only.** Use this command if you want the toolbar to display only the button names.
- **Use Small Size.** Use this command if you want the toolbar buttons to appear in a smaller size.
- **Remove Item.** Point to a toolbar item and use this command if you want to remove this item from the toolbar.
- **Customize Toolbar.** This command opens the toolbar settings pane. See the description below.

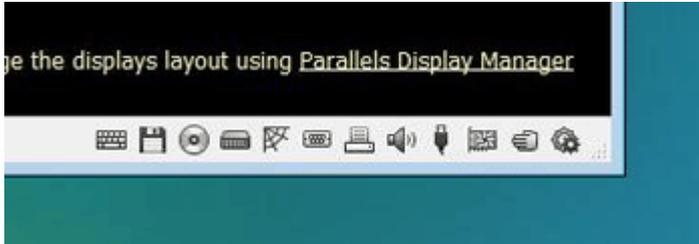
To customize the set of toolbar buttons and their appearance, right-click the toolbar and choose **Customize Toolbar** from the shortcut menu. This will open the toolbar settings pane. You can use this pane to:

- add new buttons to the toolbar by dragging them from the settings pane to the toolbar
- remove buttons from the toolbar by dragging them from the toolbar to the settings pane
- add separators to the toolbar by dragging them from the settings pane to the toolbar
- add spaces to the toolbar by dragging them from the settings pane to the toolbar
- change the current toolbar buttons set to the default one by dragging it to the toolbar
- select the toolbar buttons view mode in the **Show** list

To apply the changes you have made to the toolbar settings pane, click **Done**.

## Status Bar

When the virtual machine is running, the status bar of its window displays the information about devices connected to the virtual machine.

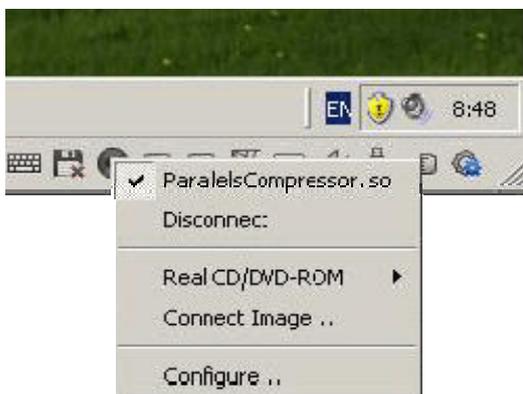


The following devices have the icons on the status bar:

- keyboard 
- floppy disk drive 
- CD/DVD-ROM 
- hard disk 
- network adapter 
- serial port 
- parallel port 
- sound card 
- USB controller 
- assigned PCIe video adapter 
- shared folders 

If you see the  icon in the status bar, it means that Parallels Tools are installed in your virtual machine.

You can connect or disconnect some of the virtual machine devices at runtime by clicking their icons in the status bar and choosing the respective commands from the shortcut menu. The picture below shows the shortcut menu for the CD/DVD-ROM drive.



You can connect ISO images of CD/DVD discs to the virtual machine CD/DVD-ROM drive or connect floppy images to its floppy disk drive in the following way: drag the required image file over the CD/DVD-ROM drive icon or the floppy disk drive icon in the status bar. For more information, please refer to the [Changing Configuration at Runtime](#) section (p. 93).

## Parallels Workstation Extreme Tray Icon

When working with Parallels Workstation Extreme, you can use the Parallels Workstation Extreme tray icon to:

- easily manage your running and paused virtual machines. For detailed information, refer to *Managing Virtual Machines From the Tray* (p. 190).
- bring the Parallels Workstation Extreme window to focus. To this effect, double-click the tray icon or right-click it and choose **Show Main Window**.
- set the Parallels Workstation Extreme window to be minimized to the tray. To this effect, right-click the tray icon and choose **Minimize to tray**. Now, if you click the minimize button on the Parallels Workstation Extreme window, it will be minimized to the tray.

---

**Note:** Minimizing main window to tray does not quit Parallels Workstation Extreme.

---

- quit Parallels Workstation Extreme. To this effect, right-click the tray icon and choose the corresponding item.

To enable the Parallels Workstation Extreme tray icon, select **Show tray icon** option in the **General** pane (p. 39) of Parallels Workstation Extreme Preferences.

---

## Setting Parallels Workstation Extreme Preferences

Common preferences for the Parallels Workstation Extreme application and its virtual machines can be configured using the Preferences dialog. You can open this dialog by choosing Preferences from the File menu.

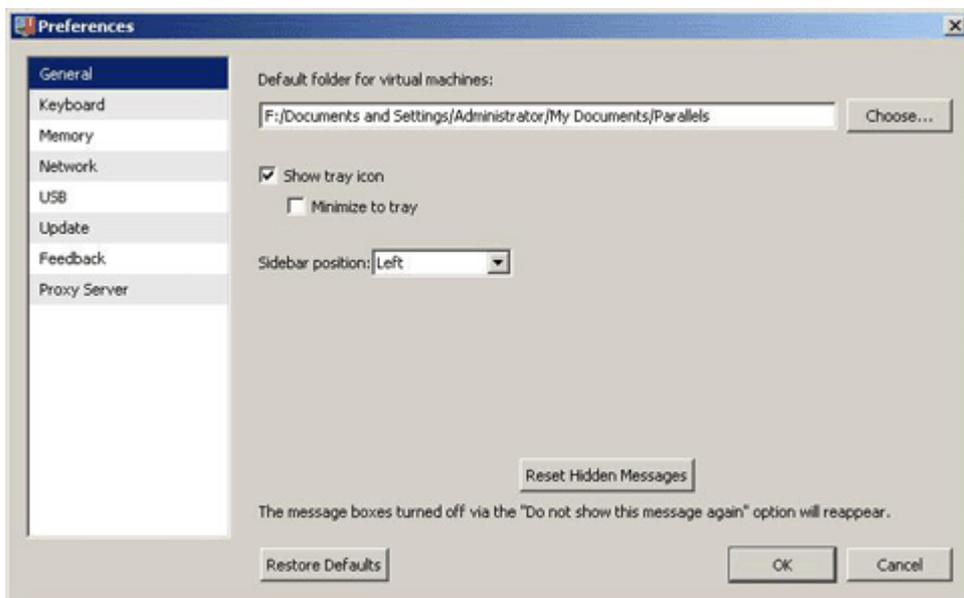
The preferences on the **Memory** and **Network** tabs affect all the users that work on the computer and all the virtual machines. The other preferences may be different for each user.

## General Preferences

In the General pane of Parallels Workstation Extreme Preferences, you can do the following:

- change the default location for storing the folders with the files of virtual machines
- enable the **Minimize main window to system tray on closing** option
- change the sidebar position
- restore hidden messages

**Note:** The settings available in this pane can be configured individually for each user of the physical computer.



## Changing the Default Folder for Virtual Machines

The **Default folder for virtual machines** field displays the default location where Parallels Workstation Extreme stores the files and folders of all virtual machines you create on the host computer. You can change the default location by typing the path to another folder in this field or clicking the **Choose** button and navigating to the necessary folder. After changing the default location, all newly created virtual machines will be saved in the folder specified in the **Default folder for virtual machines** field. However, this does not affect the files of virtual machines that already exist: their files will remain in the original default folder.

## Managing Parallels Workstation Extreme from the tray

If you want to be able to manage Parallels Workstation Extreme and the running or paused virtual machines from the tray, select the **Show tray icon** option. For more details, refer to **Parallels Workstation Extreme Tray Icon** (p. 38) and **Managing Virtual Machines From the Tray** (p. 190).

If you want the Parallels Workstation Extreme window to be hidden when minimized, select the **Minimize to tray** option.

---

**Note:** Minimizing main window to tray does not quit Parallels Workstation Extreme.

---

## Changing the sidebar position

In the **Sidebar position** list, you can choose the sidebar location. It can be located in the right or in the left part of the main window.

## Resetting Hidden Messages

A number of Parallels Workstation Extreme dialogs and wizard windows are provided with the **Do not show this message again** option. If you select this option, the corresponding dialog will not appear next time you perform the same operation. Using the **Reset Hidden Messages** button, you can reset all dialogs and wizard windows with this option selected so that they would be displayed again each time you initiate the corresponding operation.

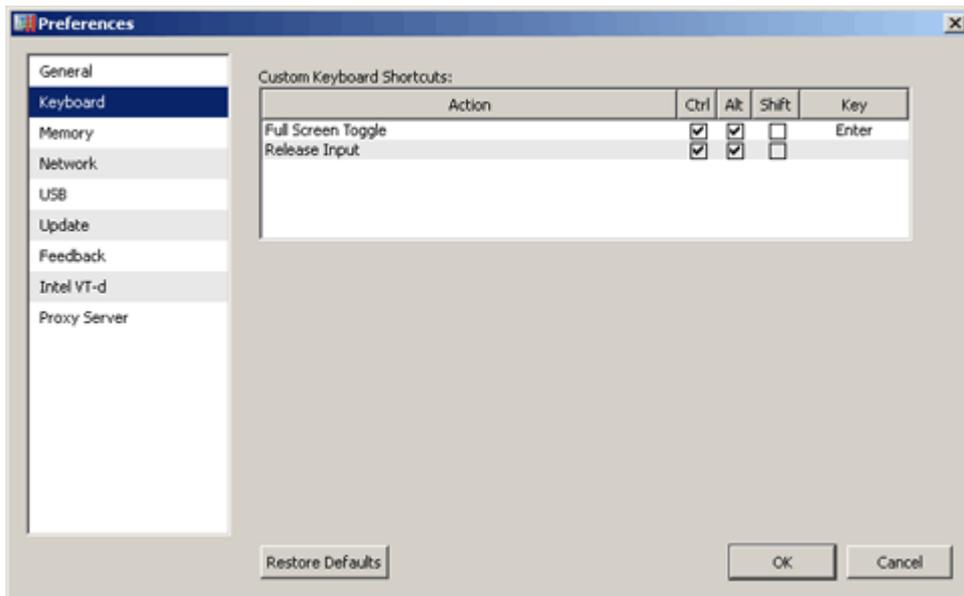
## Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

## Keyboard Preferences

In the **Keyboard** pane of Parallels Workstation Extreme Preferences, you can set keyboard shortcuts for certain commands.

**Note:** The keyboard shortcuts can be configured individually for each user of your physical computer.



You can define two hot key combinations:

- For switching a guest OS window to the Full Screen mode and back. The default hot key combination is Ctrl+Alt+Enter.
- For releasing the keyboard and mouse input to the primary OS. The default hot key combination is Ctrl+Alt.

You can set your own hot key combinations for each case. The key combination must include a key and one or several modifier keys (Ctrl, Alt, or Shift).

To define new key combination, do the following:

- 1 Select one or several modifier keys.
- 2 To add an ordinary key, double-click the **Key** field and press the corresponding key on the keyboard.

**Note:** If you installed Parallels Tools, you can release the mouse and the keyboard input to the primary OS without pressing the hot key combination. See the **Capturing and Releasing the Keyboard and the Mouse** section (p. 88).

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

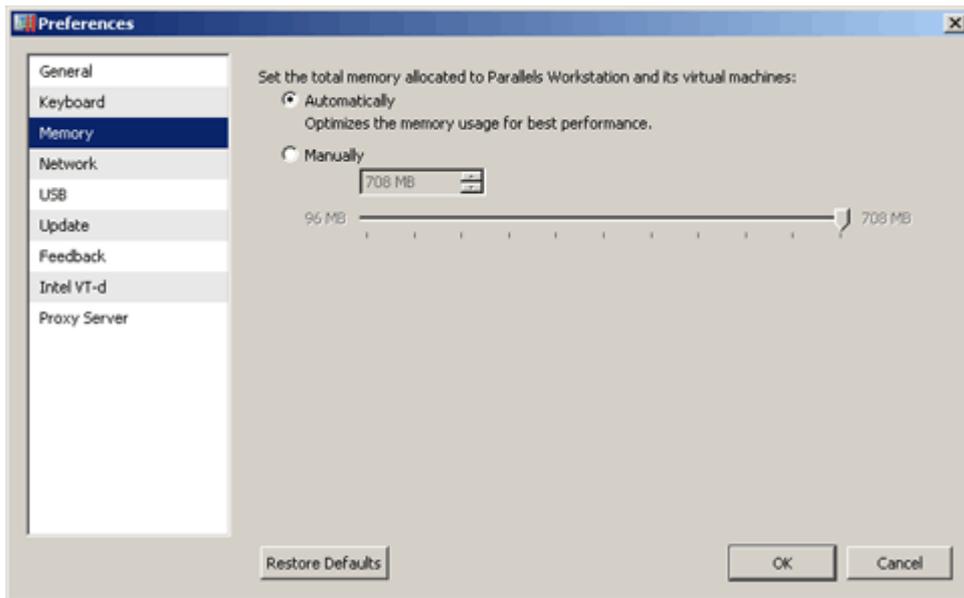
## Memory Preferences

The Memory pane of Parallels Workstation Extreme Preferences allows you to adjust the maximum amount of physical memory (RAM) that the system will reserve for all virtual machines running on your physical computer.

---

**Note:** You must have the `root` privileges to change the memory settings of Parallels Workstation Extreme in a Linux primary OS.

---



By default, the **Automatically** option is selected. In this case, the total amount of RAM to be allocated to all running virtual machines is automatically calculated by the system based on the following main factors:

- the total amount of memory installed on your physical computer and
- the amount of memory required by the primary operating system for its operation.

The allocated amount of memory is shared among all running virtual machines. You can configure the amount of physical memory for a particular virtual machine on the **Memory** tab in Virtual Machine Configuration (p. 109).

You can redefine the default behavior and manually set the amount of memory to be reserved for all active virtual machines. To this effect, select the **Manually** option and specify the needed value by:

- dragging the slider, or
- using the spin box arrows, or
- typing the value directly into the field.

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

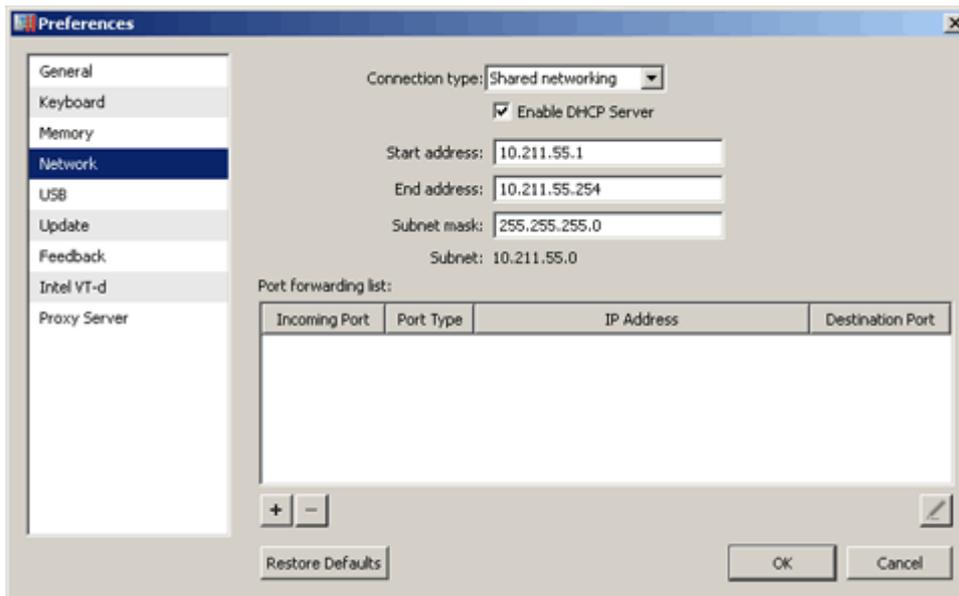
## Network Preferences

The **Network** pane of Parallels Workstation Extreme Preferences allows you to configure a number of network-related settings for Parallels Workstation Extreme and your virtual machines.

---

**Note:** You must have the `root` privileges to change the network settings of Parallels Workstation Extreme in a Linux primary OS.

---



You can configure the range of IP addresses to be assigned to your virtual machines when they are operating in the *shared* (p. 173) and *host-only* (p. 176) networking modes.

To edit the host-only networking settings:

- 1 Select **Host-only networking** in the **Connection type** list.
- 2 Select the **Enable DHCP Server** option to enable the Parallels DHCP server. This server will automatically assign IP addresses to your virtual machines operating in the host-only networking mode from the IP addresses range defined in the appropriate fields below this option.
- 3 If necessary, configure the start and end IP addresses in the **Start address** and **End address** fields and specify the network mask in the **Subnet mask** field.

For more information on configuring the host-only networking parameters, refer to **Host-Only Networking** (p. 176).

To edit the shared networking settings:

- 1 Select **Shared networking** in the **Connection type** list.
- 2 Select the **Enable DHCP Server** option to enable the Parallels DHCP server. This server will automatically assign IP addresses to your virtual machines operating in the shared networking mode from the IP addresses range defined in the appropriate fields below this option.
- 3 If necessary, configure the start and end IP addresses in the **Start address** and **End address** fields and specify the network mask in the **Subnet mask** field.

For more information about configuring shared networking, refer to **Shared Networking** (p. 173).

The **Start address** and **End address** values determine the first and the last IP addresses with the first address usually assigned to the DHCP server itself. The second address is usually given to the host OS. Other addresses are assigned to virtual machines. The scope of IP addresses defined should belong to the same subnet.

## Port Forwarding

Normally, virtual machines set to operate in the shared networking mode cannot be accessed from external computers. The port forwarding functionality allows computers on your local network and on the Internet to transfer data to any of your virtual machines that use the shared networking mode. The data sent to a specific port on the host computer will be redirected to a specific port of your virtual machine according to a port-forwarding rule.

To add a new port forwarding rule:

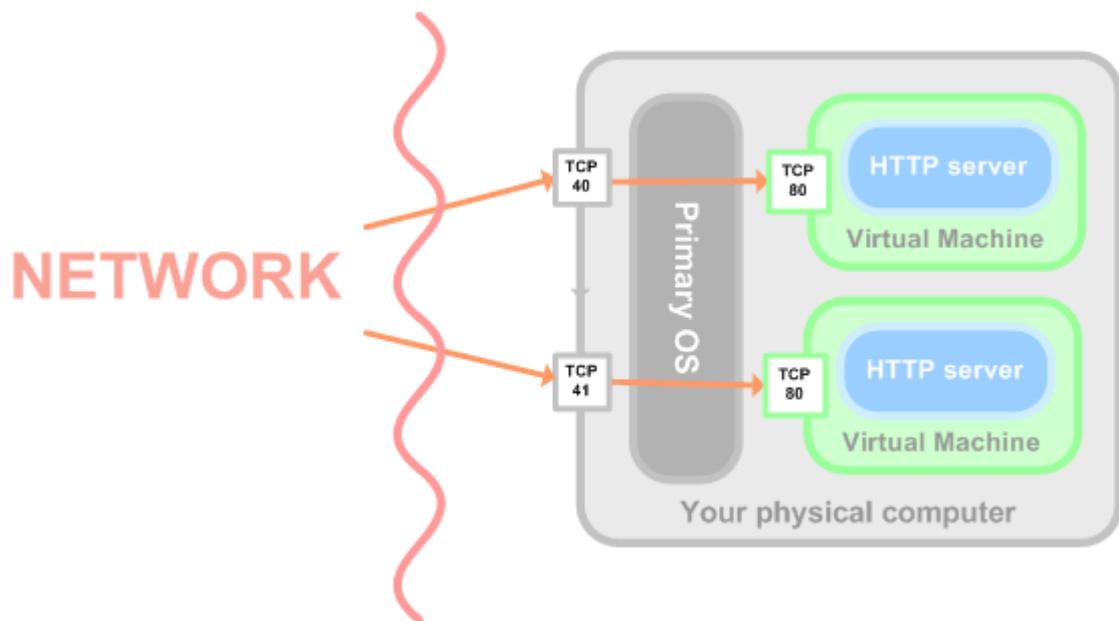
- 1 Click the **Add** button  below **Port forwarding** list.
- 2 In the displayed window, do the following:
  - In the **Port Type** field, specify the port type you want to use for establishing network connections. You can choose between the **TCP** or **UDP** port types.
  - In the **Incoming Port** field, provide the port number on the host computer you want to use for data transfer.
  - In the **IP Address** field, indicate your virtual machine's IP address.

- In the Destination Port field, type the virtual machine's port the data will be transferred to.



- 3 Click OK to add the rule.

When the rule is added, use the following IP address combination for external connections to your virtual machine: <your physical computer IP address>:<Incoming port>.



To edit an existing port forwarding rule, select it in the **Port forwarding** list table, click the **Edit** button , and modify the necessary parameters in the displayed window.

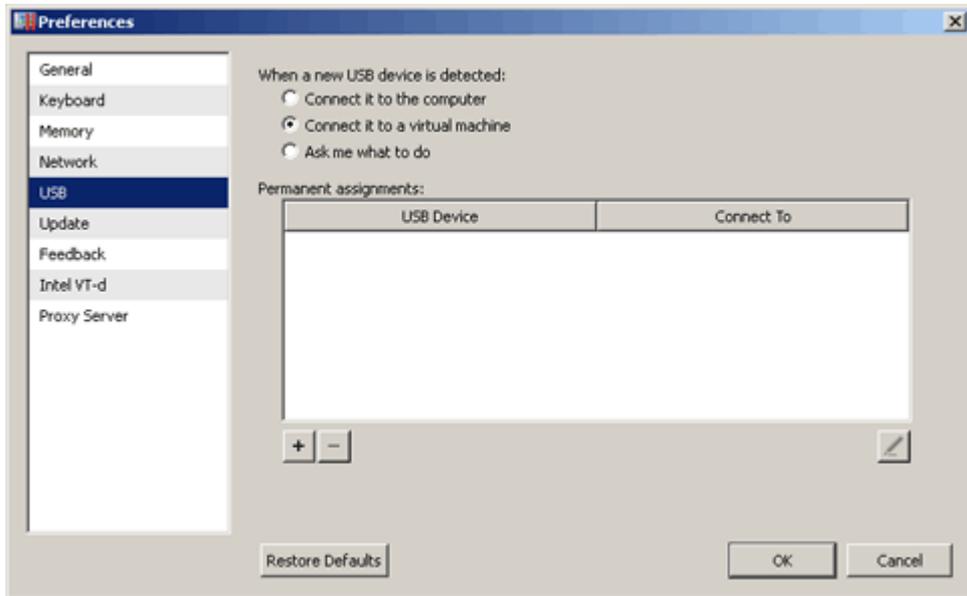
To remove a port forwarding rule, select it in the **Port forwarding** list table and click the **Remove** button .

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

## USB Preferences

In the USB pane of Parallels Workstation Extreme Preferences, you can specify how to connect USB devices that are plugged into your physical computer.



## General Behavior

You can choose a general action to perform when a new USB device is plugged into the host computer by choosing one of these options:

- **Connect it to the host computer.** If you select this option, the USB device plugged into the host computer will be connected to the host computer.
- **Connect it to the active virtual machine.** If you select this option, the USB device plugged into the host computer will be automatically connected to the virtual machine that is currently running on the host computer. When no virtual machine is running, the USB device will be connected to the primary OS.
- **Ask me what to do.** If you select this option, you will be prompted to choose how to connect the USB device each time a new USB device is plugged into the host computer.

## Permanent Assignments

You can also set permanent assignments for certain USB devices. These assignments are displayed in the Permanent assignments list.

To add a new assignment:

- 1 Click the **Add** button  below the Permanent assignments list.
- 2 Click the device field in the **USB Device** column to choose a USB device from the list.
- 3 In the **Connect To** column, double-click the destination field to open the list of available destinations and choose the virtual machine you want to connect this device to. If you want to connect this USB device to the host computer, choose **Computer**.

---

**Note:** To be able to use the USB device in a virtual machine, you may need to install the necessary drivers in its guest OS. By default, such drivers can be obtained from the manufacturers of this device.

---

- 4 Click **OK** to apply the changes.

---

**Note:** You can connect up to eight USB 2.0 devices and up to eight USB 1.1 devices to each virtual machine.

---

You can change an assignment by editing the device and destination in the **USB Device** and **Connect To** fields.

To remove an existing assignment, select it in the Permanent assignments list and click the **Remove** button .

For more information about using USB devices in a virtual machine, refer to **Using USB Devices in a Virtual Machine** (p. 103).

## Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

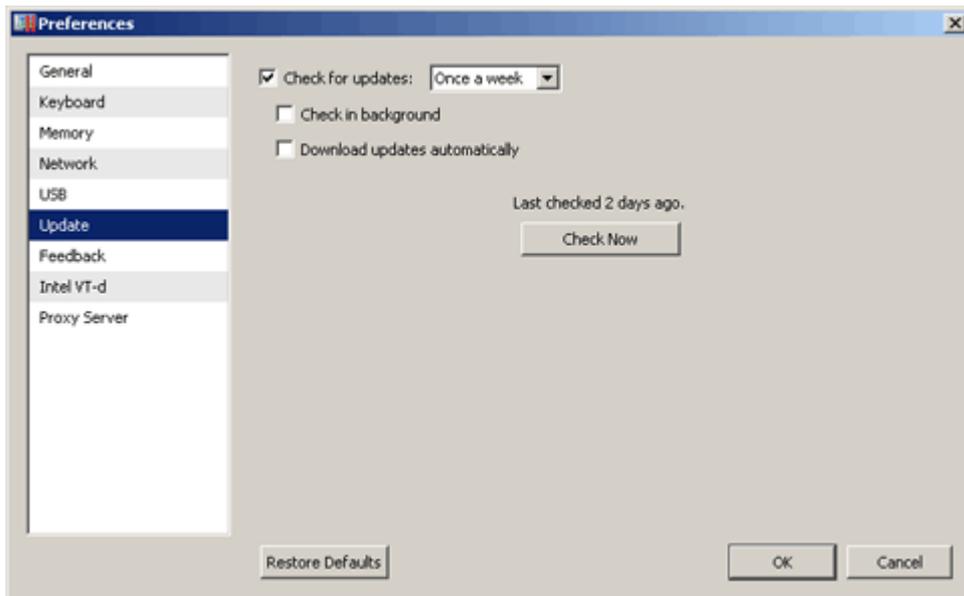
## Update Preferences

In the Update pane of Parallels Workstation Extreme Preferences, you can set preferences for the frequency of update checks.

---

**Note:** The settings available in this pane can be configured individually for each user of the physical computer.

---



The **Check for updates** section defines the policy for updating the Parallels Workstation Extreme software. By default, Parallels Workstation Extreme is set to automatically check for available updates once a week, provided that the Parallels Workstation Extreme application is launched and your physical computer is connected to the Internet. You can specify another interval for updates checking by selecting the necessary value in the **Check for updates** list. The following options are available:

- **Once a day.** Select this option if you want Parallels Workstation Extreme to perform the update check every day.
- **Once a week.** Select this option if you want Parallels Workstation Extreme to perform the update check every week.
- **Once a month.** Select this option if you want Parallels Workstation Extreme to perform the update check every month.

Checking for new updates may take some time and, if you do not want to have the process window on the top of your Desktop, you can hide it to the background. To do that, enable the **Check in background** option.

Select the **Download updates automatically** option if you want all new available updates to be downloaded at once without showing you the **Download** dialog.

You can also check for available updates manually at any time you want by clicking the **Check Now** button:

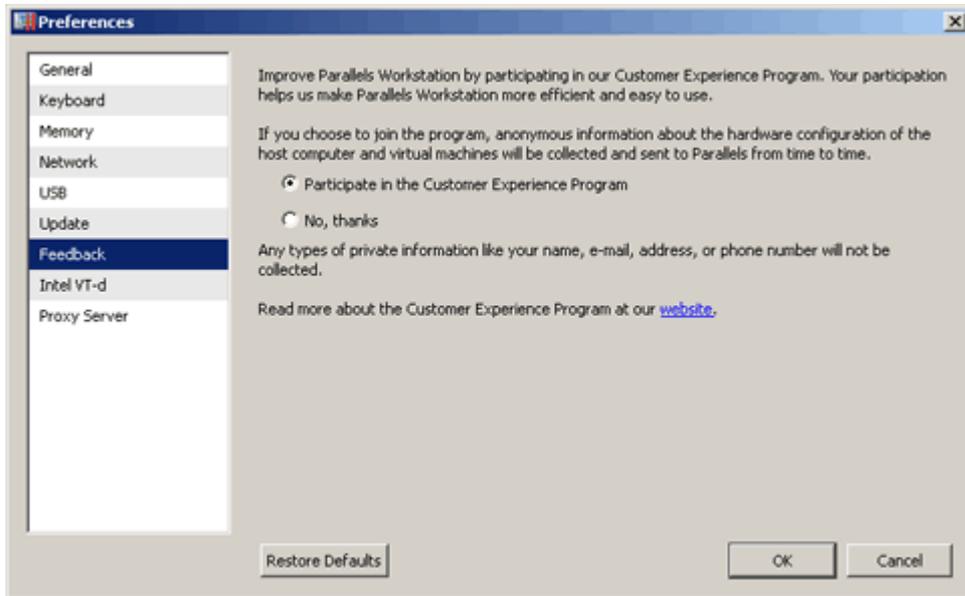
- If any updates are available for your version of Parallels Workstation Extreme, you will see them in the **Download** dialog. Choose the updates you want to install and click the **Download** button.
- If your version of Parallels Workstation Extreme is up to date, you will see the corresponding message.

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

## Feedback Preferences

Using the Feedback pane, you can join the Parallels Customer Experience Program.



If you choose to participate in the program, Parallels will collect information about your host computer and virtual machines configuration. The collected information will help us to make the product better fit your needs.

If you join, only the following types of data will be collected:

- hardware configuration of the host computer;
- software configuration of the host computer and virtual machines (the names and versions of the operating systems and software installed in them);
- configuration files of virtual machines;

Any types of private information like your name, e-mail, address, phone number, and keyboard input will not be collected.

For more details, visit the Customer Experience Program page at the Parallels website (follow the link in the pane).

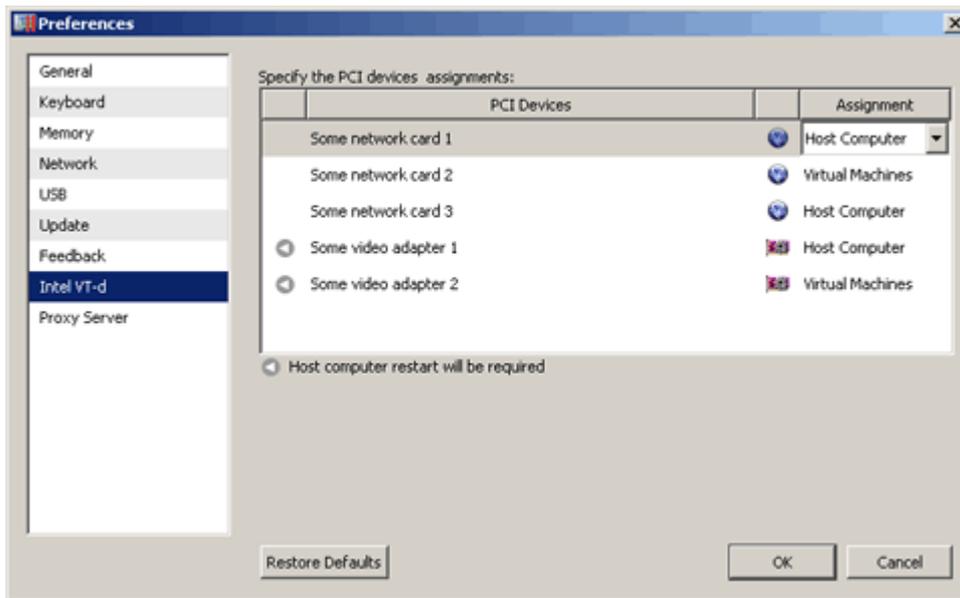
### Restoring default settings

The Restore Defaults button enables you to restore the default settings for all options available in this pane.

## Intel VT-d Preferences

In the Intel VT-d pane of Parallels Workstation Extreme Preferences, you can assign some of the host computer's PCI Express (PCIe) video and network adapters to your virtual machines.

**Note:** This pane appears in Parallels Workstation Extreme Preferences only if your host computer supports the Intel VT-d technology and the Intel VT-d support is enabled in BIOS.



The PCI Device column of the **Specify the PCI devices assignments** table lists all PCIe video and network adapters available on your physical computer. In the **Assignments** column, you can see the assignments of your PCIe devices. There are two types of assignments:

- **Host Computer.** If you select this assignment, the device will be available to your host computer only.
- **Virtual Machines.** If you select this assignment and click **OK**, Parallels Workstation Extreme will automatically install an appropriate pass-through driver in the primary operating system. This driver will make the PCIe device invisible to the primary operating system. It will enable you to assign this device directly to the virtual machine. To use the device in a virtual machine, you should add it to your virtual machine configuration with the help of **Add Hardware Wizard** (p. 150).

To change the assignment of a device, select it in the **PCI Devices** list, double-click the corresponding field in the **Assignment** column and select the desired assignment. Changing the assignment of devices marked by  will require the host computer restart.

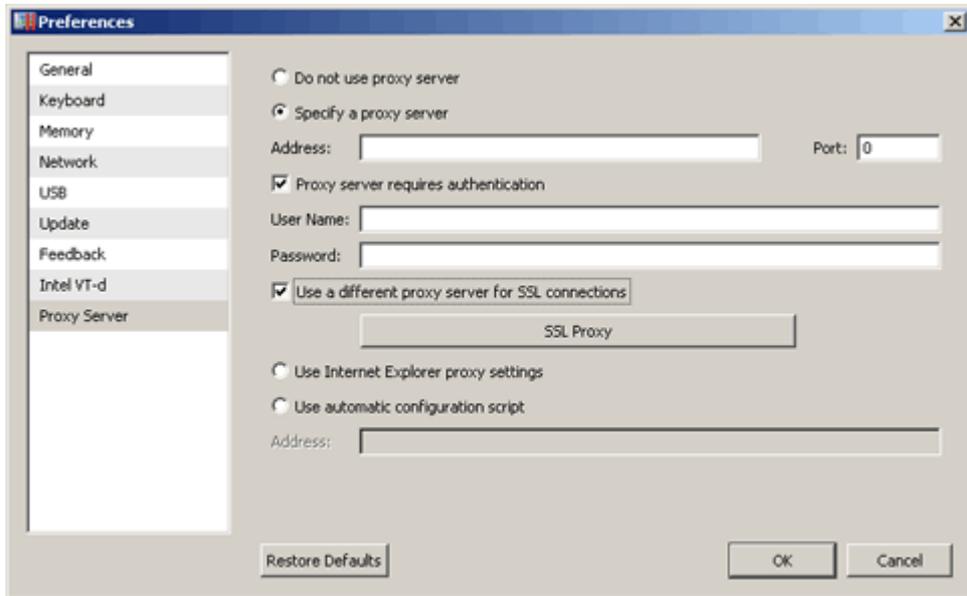
**Note:** If you have only one PCIe video adapter, its name will be grayed out in the **PCI Devices** list and you will not be able to allocate it to your virtual machines.

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

## Proxy Server Preferences

The Proxy Server pane of Parallels Workstation Extreme Preferences allows you to configure a number of proxy server-related settings.



If you do not want Parallels Workstation Extreme to use a proxy server for network connections, select the **Do not use proxy server** option and click **OK**.

If you want Parallels Workstation Extreme to use a proxy server for network connections, you have the following possibilities:

- You can choose the **Specify a proxy server** option and provide the proxy server settings manually.

If you chose the **Specify a proxy server** option, you should specify the address and port of the proxy server. If this proxy server requires authentication, select the **Proxy server requires authentication** option and type the corresponding credentials in the **User Name** and **Password** fields. Choose the **Use a different proxy server for SSL connections** option if you want to use an SSL proxy server for your secure connections. Click the **SSL Proxy** button and provide the SSL proxy server address and port in the **SSL Proxy** window. In this window, you can also provide the credentials for accessing this server if needed. If you clear the **Use a different proxy server for SSL connections** option, the first proxy server specified in this pane will be used for all connections.

- In a Windows primary OS, you can choose the **Use Internet Explorer proxy settings** option to import the proxy server setting from the Connections settings of Internet Explorer.

If you chose the **Use Internet Explorer proxy settings** option, click **OK** to apply the changes.

- In a Windows primary OS, you can also choose the **Use automatic configuration script** option to automatically configure the proxy server settings.

If you chose the **Use automatic configuration script** option, you should provide the path to this script in the **Address** field. Then click **OK** to apply the changes.

### Restoring default settings

The **Restore Defaults** button enables you to restore the default settings for all options available in this pane.

---

## Using Multiple Displays

This version of Parallels Workstation Extreme enables you to use separate displays for your host computer and your virtual machines and freely move the mouse pointer between them. To be able to use this feature, your host computer and virtual machines should comply with the following requirements:

- The host computer should support the Intel VT-d technology and the Intel VT-d support should be enabled in BIOS.
- The host computer configuration should have at least one free PCIe video adapter (p. 17) (in addition to the PCIe video adapter used by the host computer) with a display connected to it.
- At least one PCIe video adapter should be allocated to virtual machines in Parallels Workstation Extreme Preferences (p. 51) and included in the configuration of one of your virtual machines (p. 163).

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**Note:** To ensure this PCIe video adapter proper functioning, you should install the latest driver into the guest OS. The latest drivers are available on the manufacturer's website.

---

- An up-to-date version of Parallels Tools (p. 74) should be installed in the virtual machine that uses this PCIe video adapter.
- If you use two monitors with your Linux host computer, enable either the Xinerama or TwinView mode in the operating system to ensure the proper multi-monitor support. If you use two monitors with your Linux virtual machine, enable either of the two modes in the guest operating system.

You can easily arrange the displays (p. 55) allocated to your host computer and virtual machines using Display Manager. To launch Display Manager:

- 1 Start the virtual machine that has the directly assigned PCIe video adapter with a separate display connected.
- 2 Choose Display Manager from the File menu.

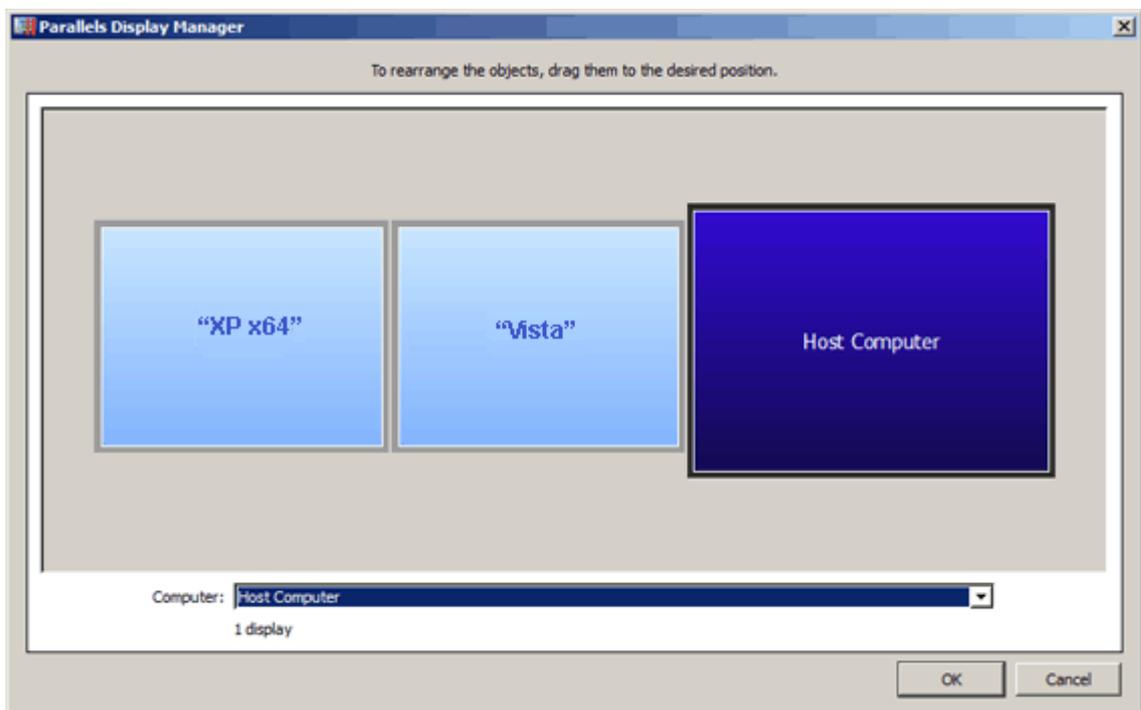
## Display Manager

If you use separate displays for the host computer and virtual machines, Display Manager allows you to specify the order according to which the mouse pointer will flow from one display to another.

To launch Display Manager, start the virtual machine that has the directly assigned PCIe video adapter with a separate display connected and choose **Display Manager** from the **File** menu.

The **Parallels Display Manager** window shows the displays used by the host computer and virtual machines. If you have two displays connected to one PCIe video card, they are joined into one display group.

To make the explanation more vivid, let us assume that you have the "XP x64" and "Vista" virtual machines running on the host computer and three displays: one for the host computer, the second for "XP x64", the third for "Vista". If you launch Display Manager, its window may look like as follows:



The displayed arrangement of monitors means the following order of mouse pointer movements:

- If you are working with the host computer and move the mouse pointer to the right, it will set against the border.
- If you are working with the host computer and move the mouse pointer to the left, it will appear on the display used for the "Vista" virtual machine.
- If you are working with the "Vista" virtual machine and move the mouse pointer to the right, it will appear on the display used for the host computer.
- If you are working with the "Vista" virtual machine and move the mouse pointer to the left, it will appear on the display used for the "XP x64" virtual machine.

This order of mouse pointer movements is inconvenient if, for example, in reality the display used for the host computer is between the displays used for the virtual machines. In this case, in the **Parallels Display Manager** window, you should rearrange the order of displays to place them in accordance with the reality.

To rearrange the displays or display groups:

- 1** Click on the display or display group you want to move or select it in the **Computer** drop-down list.
- 2** Drag this display or display group to the desired position.
- 3** To apply the changes, click **OK**. Otherwise, click **Cancel**.

The positions of displays in a display group cannot be rearranged in Display Manager. You can change the layout and of each display or display group by editing the display settings in the operating system of your host computer or the respective virtual machine.

Before managing your virtual machines via Display Manager, make sure they meet the following requirements:

- They should be running or paused.
- They should have a PCIe video adapter with a separate display connected. For the detailed information on how to assign a PCIe video adapter to a virtual machine, refer to **Adding a Video Adapter** (p. 163).
- They should have the latest version of Parallels Tools installed. See **Updating Parallels Tools** (p. 81).
- They should have the **Automatically capture and release the mouse pointer** option enabled. This option is usually enabled by default. You can make sure if it is enabled or not and enable it if necessary in the **Services** pane (p. 118) of the **Virtual Machine Configuration** dialog (p. 109).

## CHAPTER 5

# Setting Up a Virtual Machine

The process of creating a virtual machine comprises the following steps:

- creating a virtual machine configuration
- installing a guest operating system
- installing Parallels Tools

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## Supported Guest Operating Systems

The current version of Parallels Workstation Extreme officially supports the following guest operating systems.

32-bit guest operating systems:

Windows: Windows XP SP3

64-bit guest operating systems:

Windows: Windows 7; Windows XP SP2

Linux: RHEL 5.3; RHEL 4.7

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**Note:** Parallels Workstation Extreme does not provide users with OS ISO images or OS installation discs. You should purchase an OS installation disc or an OS ISO image if you do not have any.

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## Creating a New Virtual Machine

This section describes how to create a virtual machine using New Virtual Machine Wizard.

## New Virtual Machine Wizard

The wizard offers several installation modes. You can choose the mode that better fits your needs or your experience with Parallels Workstation Extreme. Regardless of what method you select, you will be able to change the configuration of your virtual machine later using the **Virtual Machine Configuration** dialog (p. 109).

### Express Windows Installation

This installation mode is available only for the following guest operating systems: Windows 7, Windows Vista, Windows XP, and Windows Server 2003.

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**Note:** Not all Parallels products support these guest operating systems.

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New Virtual Machine Wizard not only creates a virtual machine configuration, but also automatically installs the corresponding guest OS in it. It is the easiest way to make a new virtual machine: you only need to insert a Windows 7, Windows Vista, Windows XP, or Windows Server 2003 installation disc or specify the path to its image file, and New Virtual Machine Wizard will do the rest (including the installation of Parallels Tools). In this mode, virtual machines are created with typical configurations (see **Typical Configurations** for details) and placed to the default folder (see below).

For more information on this installation mode, see **Express Windows Installation Mode** (p. 60).

### Typical Installation

This installation mode is designed for new users and for fast virtual machine creation. You only have to specify the type and version of the guest operating system that you wish to install and where you wish to store the virtual machine files. New Virtual Machine Wizard creates a typical (for the selected guest OS) virtual machine configuration and starts the installation of the guest OS as interactive installation.

For more information on this installation mode, see **Typical Installation Mode** (p. 63).

### Custom Installation

This installation mode is intended for experienced users only. It allows the user to create configurations other than the typical ones. In this mode, the user is prompted to specify such options for the basic hardware as the amount of RAM, the size and format of a virtual hard disk, and networking parameters. Additional devices can be added later, using the **Virtual Machine Configuration** dialog (p. 109). After New Virtual Machine Wizard creates a virtual machine configuration, it starts installing the guest OS if such an option was selected.

For more information on this installation mode, see **Custom Installation Mode** (p. 65).

### Default Folders for Virtual Machines

By default, Parallels Workstation Extreme is configured to create a new virtual machine folder in the home folder of the user who created it:

 In Windows XP: C:\Documents and Settings\*<User\_Name>*\My Documents\Parallels\

 In Windows Vista: C:\Users\*<User\_Name>*\My Documents\Parallels

▪  In Linux: /*<User\_Name>*/Parallels/

Where *<User\_Name>* stands for the user's home folder.

However, you can select another folder that will be used as the default folder for your virtual machines.

To specify another default destination for saving virtual machines, do the following:

- 1 Choose Preferences from the File menu.
- 2 In the Preferences window, click the General tab, and specify the default destination for new virtual machines in the Default folder for virtual machines field.

---

**Note:** You can also specify a folder for a virtual machine during its creation. An existing virtual machine can also be moved to a different folder after it is created.

---

## Express Windows Installation

- 1 Start Parallels Workstation Extreme and launch New Virtual Machine Wizard by choosing New Virtual Machine from the File menu.
- 2 In the Introduction window, click Next to proceed with the virtual machine creation.
- 3 In the Select Operating System Type and Version window, select the Windows 7, Windows Vista, Windows XP, or Windows Server 2003 guest OS and click Next.

---

**Note:** Not all Parallels products support these guest operating systems.

---

- 4 In the Virtual Machine Type window, select Express Windows and click Next.
- 5 In the Express Windows Installation window, specify your user details and the Windows product key necessary for the Windows guest OS installation.

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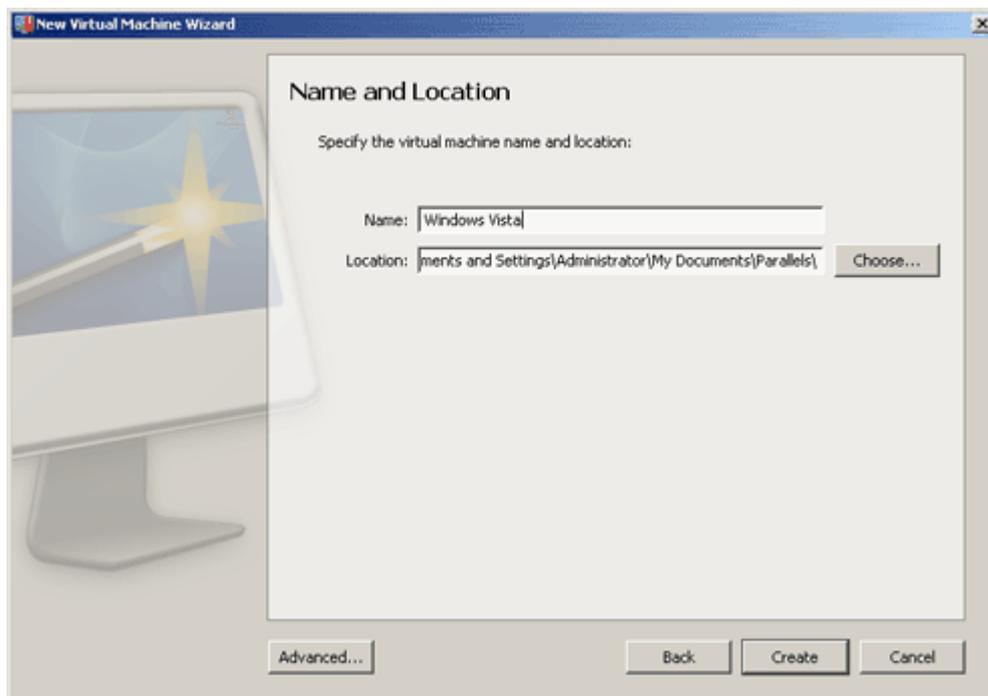
**Note:** If you do not enter the Windows product key in this step, you will have to provide it later when the Windows guest OS installation starts.

---

If you click the **Advanced** button, you can set the number of CPUs and the amount of RAM to your future virtual machine.

Click **Next**.

- 6 In the Name and Location window, define the name and location for your virtual machine:
  - **Name.** Indicate an arbitrary name to be assigned to the virtual machine. By default, the virtual machine gets the same name as the operating system that will be installed inside this virtual machine. If a virtual machine with such a name already exists, you will be prompted to indicate another name. The name must not exceed 50 characters.
  - **Location.** Use the **Choose** button if you want to change the default location of the virtual machine-related files.



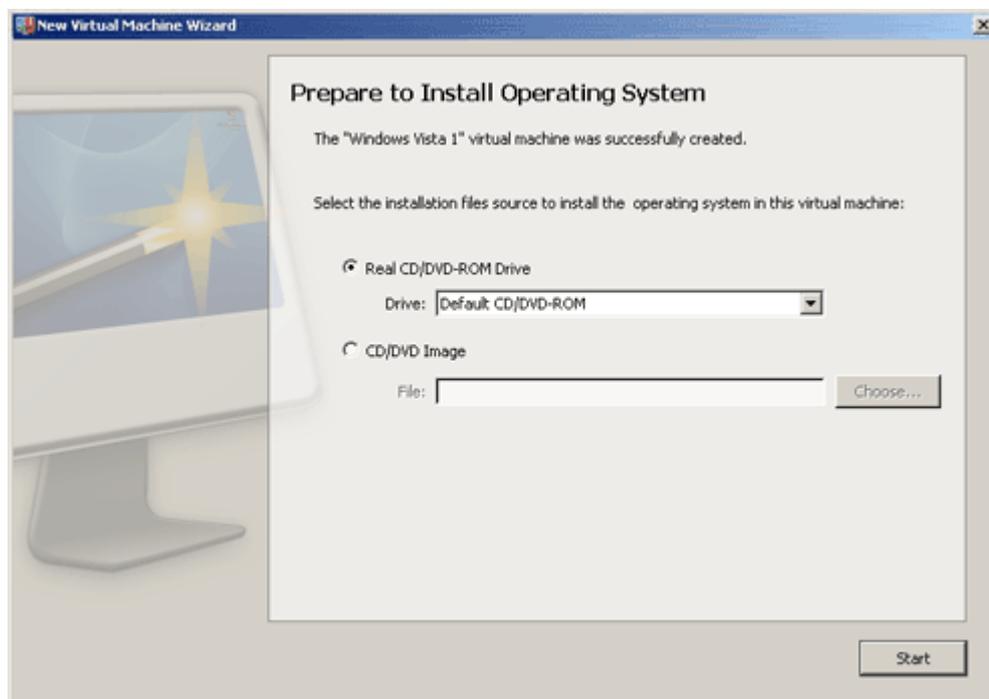
If you click the **Advanced** button, you can set the number of CPUs, the amount of RAM, and the virtual hard disk capacity to your future virtual machine.

Click **Create**.

After the virtual machine is created, in the **Prepare to Install Operating System** window, specify the source of installation files and click **Start**. You can use the following types of installation media:

- **Real CD/DVD-ROM Drive.** Select this option to use a disc inserted into the CD/DVD drive of the computer. Choose the drive to use from the **Drive** list.
- **CD/DVD Image.** Select this option to use a CD/DVD disc image connected to the virtual machine's CD/DVD drive. Type the path to the file in the **File** field or use the **Choose** button to locate the file.

**Note:** Parallels Workstation Extreme does not provide users with OS ISO images or OS installation discs. You should purchase an OS installation disc or an OS ISO image if you do not have any.



- 7 After you click **Start**, New Virtual Machine Wizard will automatically start the new virtual machine and install the guest operating system in it. After the guest OS has been successfully installed, Parallels Workstation Extreme installs Parallels Tools.

During the unattended installation, Parallels Workstation Extreme creates an administrator account with a blank password. When the guest OS installation is complete, we recommend that you change the password in order to protect the safety of your data.

To change the administrator password in Windows Vista:

- 1 Click the **Start** menu, then select **Control Panel -> User Accounts and Family Safety -> Change your Windows password**.

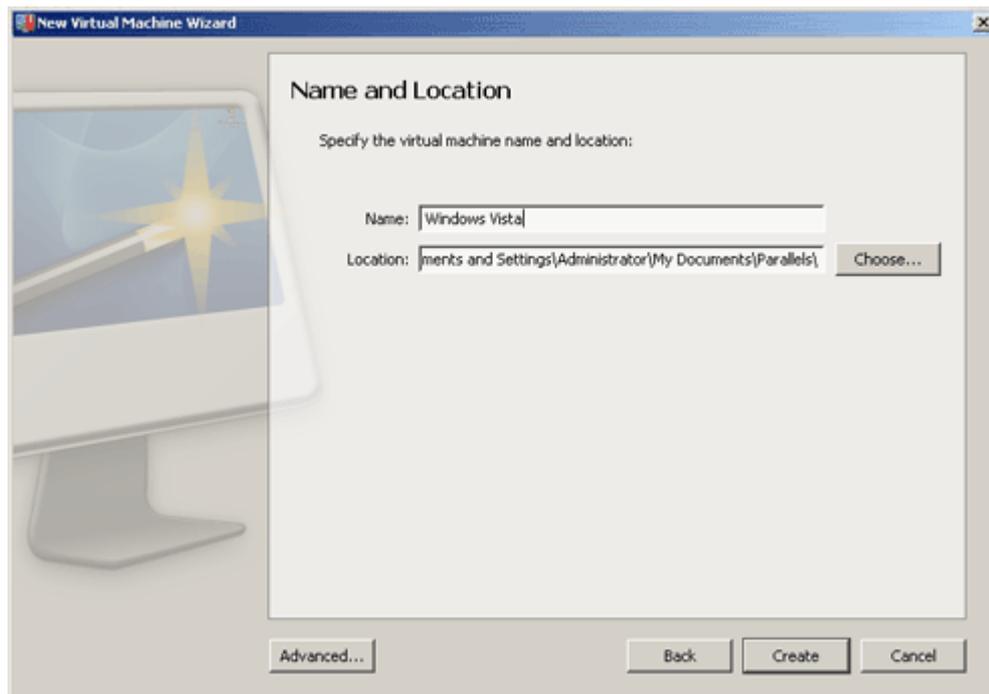
To change the administrator password in Windows XP (Professional Edition):

- 1 Click the **Start** menu, then select **Control Panel -> Administrative Tools -> Computer Management**.
- 2 In the **Computer Management** window, open **System Tools -> Local Users and Groups -> Users**. Right-click the **Administrator** account and choose **Set Password** from the context menu.

## Typical Installation Mode

To create a typical virtual machine:

- 1 Start Parallels Workstation Extreme and launch New Virtual Machine Wizard by choosing **New Virtual Machine** from the **File** menu.
- 2 In the **Introduction** window, click **Next** to proceed with the virtual machine creation.
- 3 In the **Select Operating System Type and Version** window, select the operating system you are planning to install inside your virtual machine and click **Next**.
- 4 In the **Virtual Machine Type** window, select **Typical** and click **Next**.
- 5 In the **Name and Location** window, define the name and location for your virtual machine:
  - **Name.** Indicate an arbitrary name to be assigned to the virtual machine. By default, the virtual machine gets the same name as the operating system that is planned to be installed inside this virtual machine. If a virtual machine with such a name already exists, you will be prompted to indicate another name. The name must not exceed 50 characters.
  - **Location.** Use the **Choose** button if you want to change the default location of the virtual machine-related files.

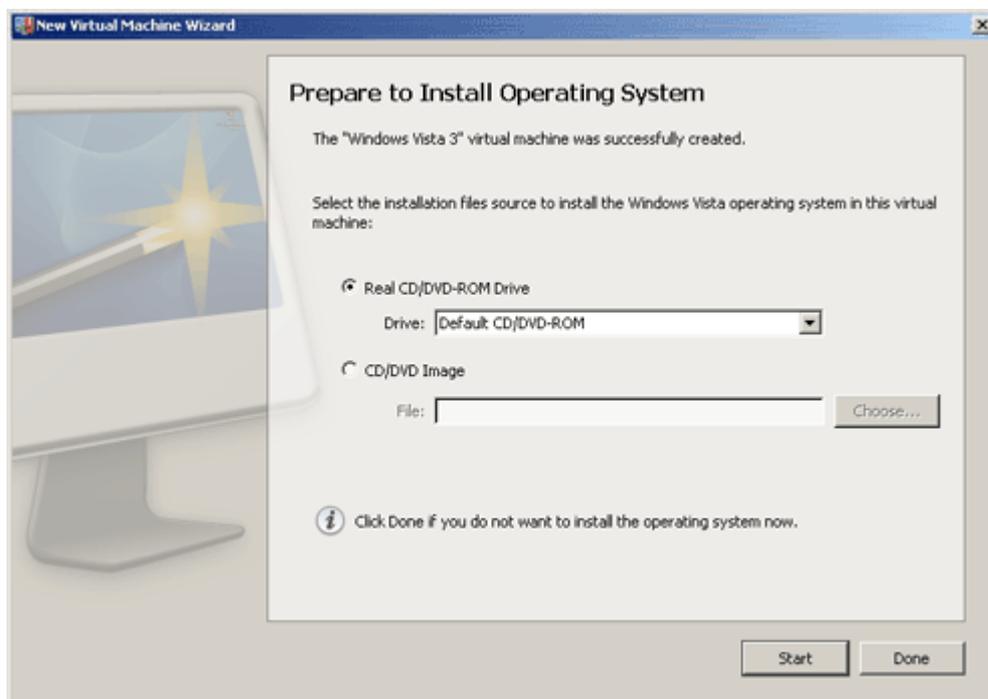


If you click the **Advanced** button, you can set the number of CPUs, the amount of RAM, and the virtual hard disk capacity to your future virtual machine.

Click **Next**.

- 6 After the virtual machine is created, in the **Prepare to Install Operating System** window, specify the source of installation files and click **Start**. You can use the following types of installation media:
  - **Real CD/DVD-ROM Drive**. Select this option to use a disc inserted into the optical drive of the computer. Choose the drive to use from the **Drive** list.
  - **CD/DVD Image**. Select this option to use a CD/DVD disc image connected to the virtual machine's CD/DVD drive. Type the path to the file in the **File** field or use the **Choose** button to locate the file.

**Note:** Parallels Workstation Extreme does not provide you with operating systems installation media. You should purchase an OS installation disc or an image of it if you do not have any.

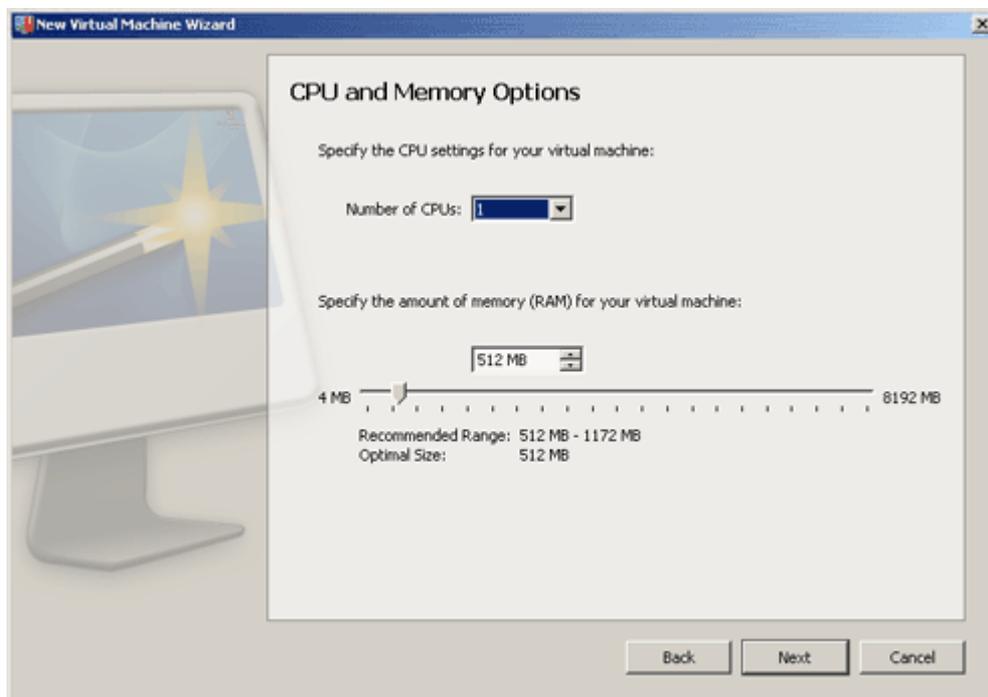


If you do not want to install the guest OS and start the virtual machine, click **Done**. When the installation is complete, install **Parallels Tools** if they are available for the guest OS you have just installed. Refer to the **Installing Parallels Tools** section (p. 74).

## Custom Installation Mode

To create a custom virtual machine:

- 1 Start Parallels Workstation Extreme and launch New Virtual Machine Wizard by choosing New Virtual Machine from the File menu.
- 2 In the Introduction window, click Next to proceed with the virtual machine creation.
- 3 In the Select Operating System Type and Version window, select the guest OS you plan to install inside your virtual machine and click Next.
- 4 In the Virtual Machine Type window, select Custom and click Next.
- 5 In the CPU and Memory Options window, specify the number of CPU(s) and the amount of RAM for the virtual machine and click Next. You may use the slider or arrow buttons to set the value or simply type it into the corresponding field.

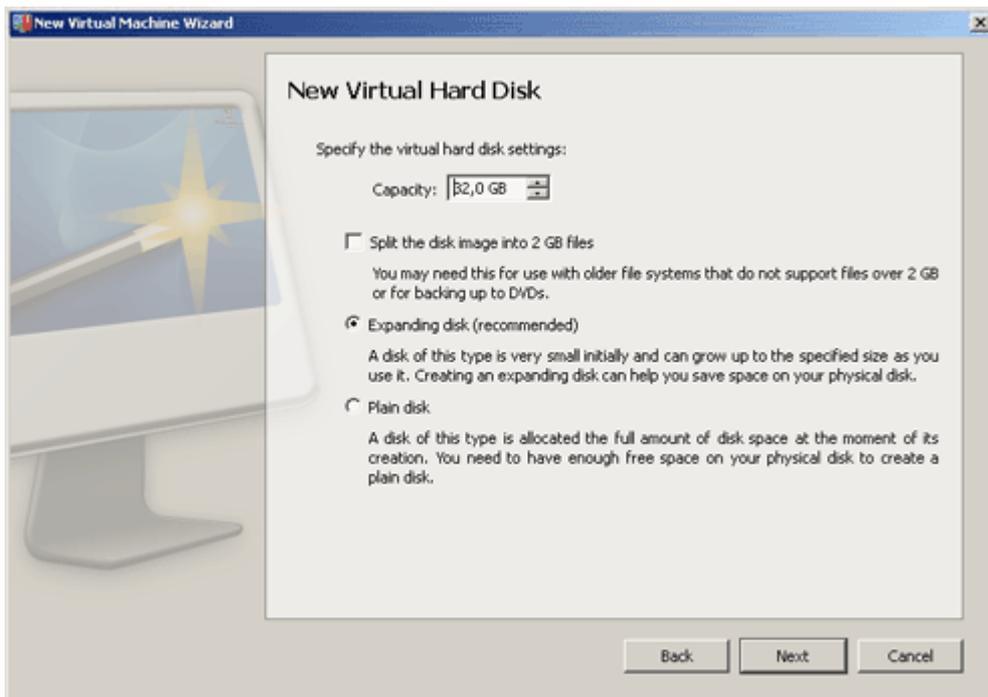


- 6 In the Hard Disk Options window, select the type of virtual hard disk you want to use and click Next. You can create a new hard disk image, use an existing one, or create a virtual machine without any hard disk at all. You may need a virtual machine without a hard disk to work with live CDs/DVDs (CDs or DVDs containing a bootable operating system).



- 7 If you have selected the No hard disk option, go to Step 8.

If you chose to create a new virtual hard disk in the previous step, in the New Virtual Hard Disk window, specify the capacity and type for the disk and click Next. If you have chosen to use an existing image file, in the Existing Virtual Hard Disk window, specify the hard disk image to be connected, its interface type and position. Click Next.



- 8** In the **Networking Type** window, select the type of networking you want to use in the virtual machine and click **Next**.
- **Shared Networking.** If you select this option, the virtual machine will use the host computer's network connections and will be visible only for the host computer and other virtual machines registered on this server.
  - **Bridged Networking.** If you select this option, the virtual machine will be visible on the network as a separate computer.
  - **Host-Only Networking.** If you select this option, the virtual machine will access only the host computer and the virtual machines running on it.
  - **Direct Assignment (using Intel VT-d).** If you select this option, the virtual machine will be able to access the local network and Internet through a PCIe network adapter. This option is available only if you have a PCIe network adapter and the Intel VT-d technology is enabled in your host computer.
  - **No Networking.** If you select this option, the virtual machine will have no network adapter.

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**Note:** You may reconfigure the networking settings after the virtual machine is created, using the **Virtual Machine Configuration** dialog (p. 109).

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- 9** If you have selected the **Shared Networking**, **Host-Only Networking**, or **No Networking** option, go to Step 10.

If you selected **Bridged Networking**, on the next step you will need to select the network adapter to be used by the virtual machine:

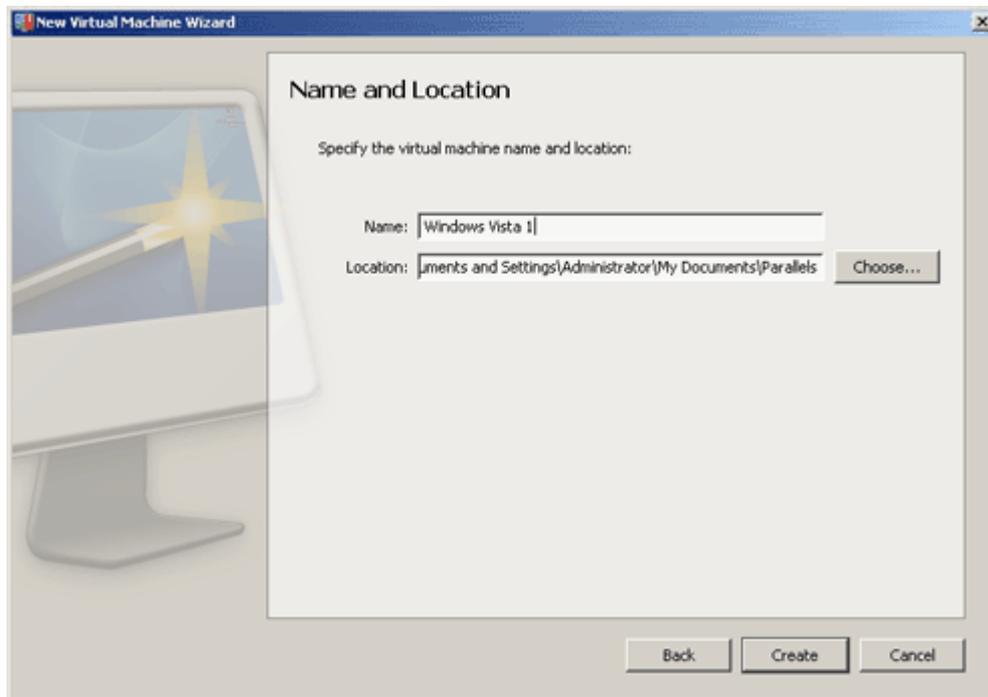
- **Default Adapter.** Select this option to use the adapter specified as default in the primary OS.
- **Parallels Shared Networking Adapter.** Select this option to use Parallels Shared Networking adapter installed together with Parallels Workstation Extreme.
- **Parallels Host-Only Networking Adapter.** Select this option to use Parallels Host-Only Networking adapter installed together with Parallels Workstation Extreme.

The host computer network adapters included in this list are also available for selecting. Select the **Connected** option if you want the virtual machine to start up with this network adapter connected.

If you selected the **Direct Assignment (using Intel VT-d)** option, on the next step select the PCIe network adapter you want to use. Before using the PCIe adapter in your virtual machine, you will need to assign it to your virtual machines in the **Intel VT-d** pane (p. 51) of **Parallels Workstation Extreme Preferences** and install the manufacturer's driver for this PCIe device inside the virtual machine. The driver should support the Intel VT-d technology. For detailed information, see **Networking Using a PCIe Adapter** (p. 177).

- 10** In the **Optimization Options** window, select the optimization mode you prefer and click **Next**. The available options are:
- **Virtual machine (Recommended).** Select this option to allocate more host computer resources to the virtual machine and its applications.
  - **Host Computer.** Select this option to allocate more resources to the host computer and its applications.
- 11** In the **Name and Location** window, define the name and location for your virtual machine:

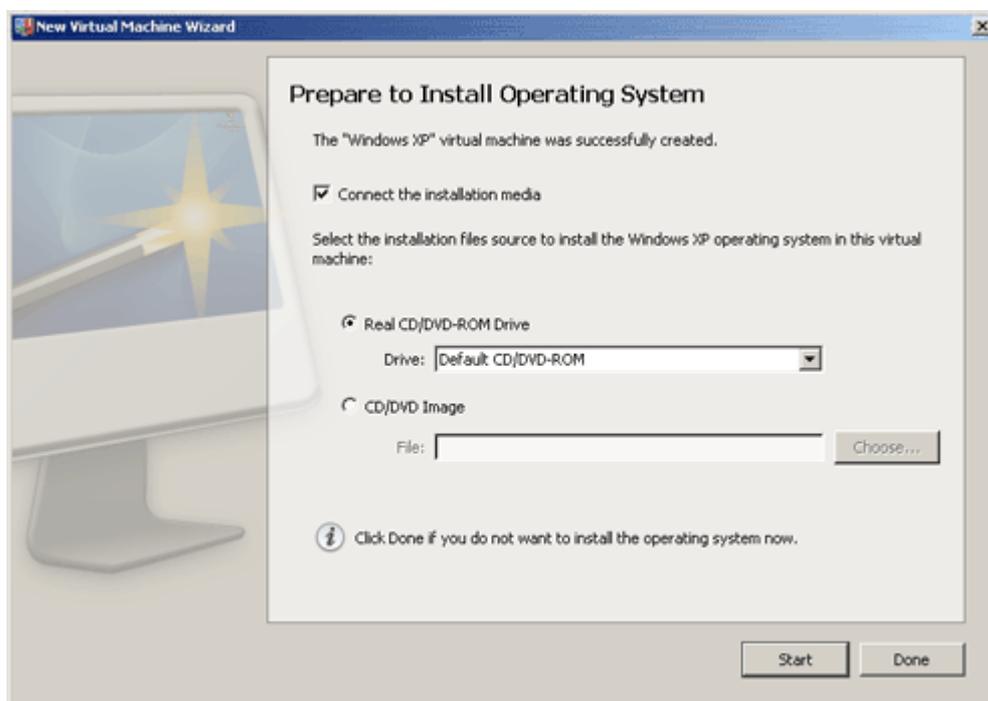
- **Name.** Indicate an arbitrary name to be assigned to the virtual machine. By default, the virtual machine gets the same name as the operating system that will be installed inside this virtual machine. If a virtual machine with such a name already exists, you will be prompted to indicate another name. The name must not exceed 50 characters.
- **Location.** Use the **Choose** button if you want to change the default location of the virtual machine-related files.



**12** After the virtual machine is created, the wizard invites you to install the guest OS in it. For these purposes in the **Prepare to Install Operating System** window, select the **Connect the installation media** check box, specify the source of installation files, and click **Start**. You can use the following types of installation media:

- **Real CD/DVD-ROM Drive.** Select this option to use a disc inserted into the CD/DVD drive of the computer. Choose the drive to use from the **Drive** list.
- **CD/DVD Image.** Select this option to use a CD/DVD disc image connected to the virtual machine's CD/DVD drive. Type the path to the file in the **File** field or use the **Choose** button to locate the file.

**Note:** Parallels Workstation Extreme does not provide users with OS ISO images or OS installation discs. You should purchase an OS installation disc or an OS ISO image if you do not have any.



If you do not want to install the guest OS and start the virtual machine now, click **Done**.

When the installation is complete, install Parallels Tools if they are available for the guest OS you just installed. Refer to the **Installing Parallels Tools** section (p. 74).

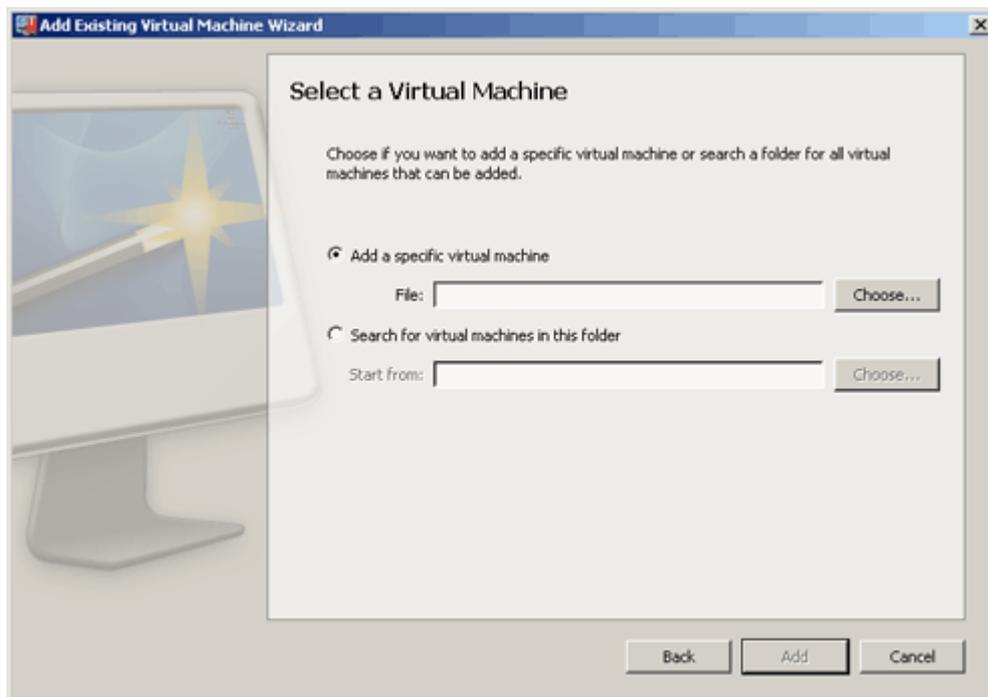
---

## Adding an Existing Virtual Machine

If you already have a virtual machine stored on your physical computer but it is missing from the list of virtual machines registered in Parallels Workstation Extreme, you can easily add it with the help of Add Existing Virtual Machine Wizard.

### To add an existing virtual machine

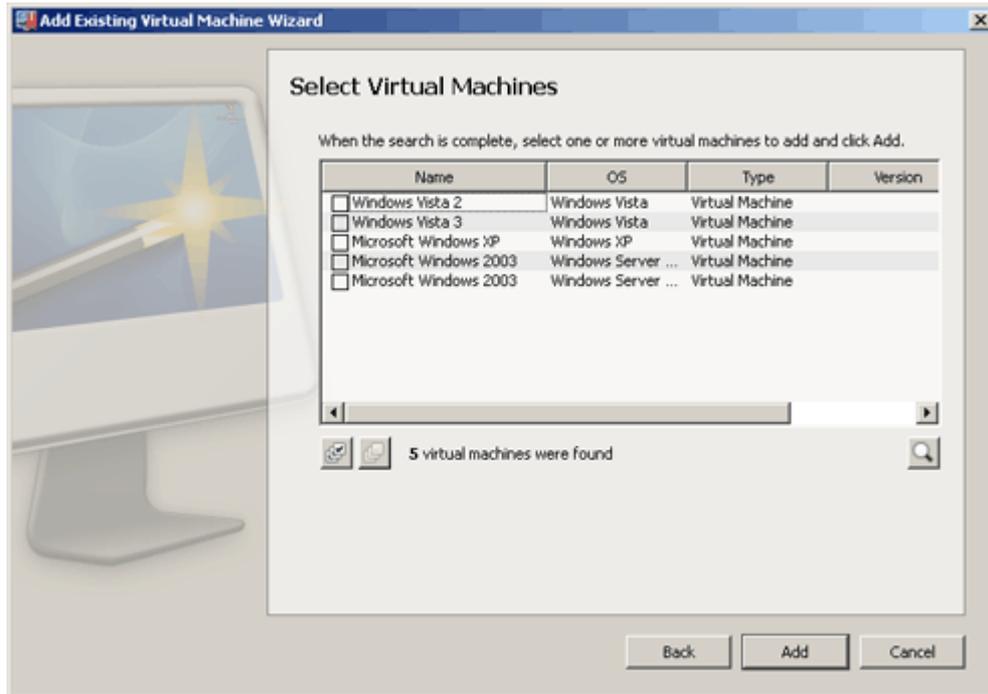
- 1 Choose **Add Existing** from the **File** menu to start Add Existing Virtual Machine Wizard.
- 2 In the **Introduction** window, click **Next**. If you do not want the **Introduction** window to appear in future, select **Always skip introduction**.
- 3 In the **Select a Virtual Machine** window, you should locate the virtual machines you want to add:
  - You can set the path to a specific virtual machine's configuration file (`config.pvs`). Select the **Add a specific virtual machine** option and type the path in the **File** field or click the **Choose** button and navigate to the necessary file. Click **Add** and go to Step 5.
  - You can find all virtual machines in a specific folder. Select the **Search for virtual machines in this folder** option, type the path to the the necessary folder in the **Start from** field or click the **Choose** button, and navigate to it. Click **Search**.



- 4 If you chose Search for virtual machines in this folder, in the next window the wizard displays all the virtual machines found in the specified folder that are not registered in Parallels Workstation Extreme. Select the virtual machines you want to add.

If you want to select all items at a time, click the **Select All** button  displayed below the list.

If you want to clear all items at a time, click the **Clear All** button  displayed below the list.  
Review the selection and click **Add**.



- 5 Click **Finish** to exit the wizard.

---

## Installing a Guest Operating System

You can install a guest operating system in a virtual machine from a CD or DVD, or from an image file of such CD/DVD. Some operating systems are available on CD/DVD disc images only.

In some cases, the installation cannot be performed from a real CD/DVD disc because of disc reading problems. In such cases, it is recommended that you try to install the operating system from a CD/DVD disc image of this disc. ISO images of CD/DVD discs can be created using a third party imaging utility.

In this version, you can also install the guest operating system using a PXE server via network.

Some operating systems are installed only from floppy disks. If your computer does not have floppy drives, you can install such operating systems using images of installation diskettes or using real floppy disk drives inserted into an external USB floppy disk drive. You can create floppy disk images using third-party applications.

### Installing from a CD/DVD disc or its image

- 1 Select the virtual machine and make sure that it is stopped.
  - 2 To connect the installation medium, open Virtual Machine Configuration by:
    - right-clicking the machine and choosing **Configure** from the shortcut menu, or
    - choosing **Configure** from the **Virtual Machine** menu.
  - 3 Open the **CD/DVD-ROM** settings and configure the virtual **CD/DVD-ROM** drive settings.
    - If you are installing from a real **CD/DVD**:  
Select the **Real Device** option and specify the real drive to connect in the **CD/DVD-ROM** list.  
Insert the **CD/DVD** disc with the operating system files into the appropriate drive of the computer.
    - If you are installing from an image file:  
Select the **Image file** option and specify the path to the image file in the **File** field.
- 
- Note:** You can use **ISO** and **DMG** images for installing the guest operating system. **CUE** and **CCD** images may be also supported.
- 
- 4 Click **OK** in **Virtual Machine Configuration** to save the changes.
  - 5 Start your virtual machine by clicking **Start** .

The installation will launch soon after the virtual machine is started.

---

**Note:** If you need to press any keys inside the virtual machine during the guest OS installation, first click inside the virtual machine window to capture the keyboard and mouse input and then press the corresponding keys. To release the keyboard and mouse input back to the host OS, press **Ctrl+Alt**. For more information, refer to **Capturing and Releasing the Keyboard and the Mouse** (p. 88).

---

### Installing from the network

- 1 Choose **Configure** from the **Virtual Machine** menu to open Virtual Machine Configuration.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch Add Hardware Assistant.

---

**Note:** The **Add** button is disabled when the virtual machine is running. You need to shut down the virtual machine before you can use this button.

---

- 3 Add a network adapter (p. 161) to your virtual machine configuration.
- 4 Open the **Boot Order** pane in Virtual Machine Configuration and change the boot sequence to make the virtual network adapter the first device in the sequence. To this effect, select **Network Adapter** in the list and use the arrow buttons to move it to the top of the list.
- 5 Click **OK** to apply the changes.
- 6 Start the virtual machine by clicking **Start** .

Soon after your virtual machine is started, a list of available PXE servers appears.

During the installation, when the guest OS reboots for the first time, or after the installation, return the boot sequence to booting from the hard disk.

### Installing from a floppy disk image

- 1 Select the virtual machine and make sure that it is stopped.
- 2 To connect the installation medium, open Virtual Machine Configuration by:
  - right-clicking the machine and choosing **Configure** from the shortcut menu, or
  - choosing **Configure** from the **Virtual Machine** menu.
- 3 Open the **Floppy Disk** pane and specify the path to the floppy image disk file in the **Image File** field.
- 4 Click **OK** to apply the changes
- 5 Start the virtual machine by clicking **Start** .

The installation will launch soon after the virtual machine is started.

### Reinstalling the guest OS

The procedure of reinstalling the guest OS is the same as the procedure of installing the guest OS: provide the installation media or its image, connect it to the virtual machine, and start the virtual machine. The reinstallation will launch soon after the virtual machine is started.

---

**Note:** You can reinstall the guest OS of the same type only. However, you are free to choose the guest OS version.

---

Keep in mind that in some cases, it is easier just to create a new virtual machine, install the guest OS, and delete the old machine after moving all the necessary data to the new one.

---

## Installing Parallels Tools

Parallels Workstation Extreme includes a set of specially developed utilities that help you use your virtual machines in the most comfortable and efficient way.

Parallels Tools are located on the disc images that are installed along with Parallels Workstation Extreme. There is a separate Parallels Tools disc image for each type of the supported guest operating systems.

- `prl-tools-win.iso` - disc image with Parallels Tools for Windows guest operating systems.
- `prl-tools-lin.iso` - disc image with Parallels Tools for Linux guest operating systems.

These disc images can be found in the following folder:

- **In 64-bit Windows:** `C:\Program Files (x86)\Parallels\Parallels Workstation Extreme\Tools\`
- **In Linux:** `/usr/share/parallels-workstation/tools/`

## Parallels Tools Overview

Parallels Tools are a suite of special utilities that help you use your virtual machines in the most comfortable and efficient way. With Parallels Tools, you can move the mouse seamlessly outside the guest OS window without pressing any key, change the virtual machine's screen resolution by simply resizing its window, synchronize your virtual machine's time and date settings with the time settings of the host computer, and share the host computer disks and folders with its virtual machines.

Parallels Tools include the utilities listed below. Many of these utilities are available for the most popular Windows and Linux operating systems.

Mouse Synchronization Tool	Windows, Linux	Mouse Synchronization Tool captures the mouse input in the virtual machine each time the pointer moves over to the guest OS window and automatically releases the input when the pointer moves out of the guest OS window.
Time Synchronization Tool	Windows, Linux	<p>Time Synchronization Tool enables you to customize your virtual machine and the host computer time settings. With this tool, you can:</p> <ul style="list-style-type: none"> <li>▪ Automatically synchronize the time settings of your virtual machine with the host computer time settings.</li> <li>▪ Set up and maintain the time difference between your host computer and the guest OS installed in your virtual machine.</li> </ul>
Clipboard Synchronization Tool	Windows, Linux	<p>Clipboard Synchronization Tool enables you to easily exchange texts between:</p> <ul style="list-style-type: none"> <li>▪ different virtual machines irrespective of the guest operating systems installed in them.</li> <li>▪ a virtual machine and the physical computer hosting this virtual machine.</li> </ul>
Dynamic Resolution Tool	Windows, Linux	<p>Dynamic Resolution Tool enables you to work with dynamic resolution. When you resize the guest OS window by dragging its lower right corner, the guest OS window resolution changes automatically.</p> <hr/> <p><b>Note:</b> If dynamic resolution does not work when switching to the Full Screen mode in virtual machines with Linux guest operating system installed, go to the <b>Video</b> pane (p. 129) of Virtual Machine Configuration and increase the amount of video memory available to the virtual machine's video card up to 16 MB.</p> <hr/>
Shared Folders Tool	Windows, Linux	Shared Folders Tool enables you to share the primary OS folders to access them from the guest OS. With this tool, you can access the host computer shared folders from the virtual machine.
Shared Profile Tool	Windows	Shared Profile Tool enables you to map some of the folders in the physical computer home folder to your user folders in the virtual machine, which allows you to access the physical computer home folders right

from your virtual machine.

Parallels Compressor	Windows	The Parallels Compressor utility enables you to reduce the size of your virtual machine's hard disk.
----------------------	---------	--

After the Parallels Tools installation, the following features are available for settings up in Parallels Workstation Extreme.

SmartMount	Windows, Linux	SmartMount feature enables the automatic detection and mounting of removable devices in your virtual machines.
------------	-------------------	--

Parallels Tools can be installed in all Windows and Linux guest operating systems officially supported by Parallels Workstation Extreme.

## Installing Parallels Tools in a Windows Guest OS

If you created your virtual machine using the *Express Windows* mode, Parallels Tools were installed automatically after the installation of the Windows guest operating system.

If your virtual machine was created in the *Typical* or *Custom* mode, do the following to install Parallels Tools in it:

- 1 Start the virtual machine and log in to the guest operating system.
- 2 When the guest OS boots up, connect the Parallels Tools ISO image by choosing the **Install Parallels Tools** option from the **Virtual Machine** menu.

---

**Note:** If the **Install Parallels Tools** option is grayed out, make sure that Parallels Tools can be installed in your guest operating system. To see the list of guest OSs supported by Parallels Tools, refer to the **Parallels Tools Overview** section (p. 75) in **Parallels Workstation Extreme Help** available through the **Help** menu.

---

- 3 In the **Welcome** window, click **Install**. The wizard will start the automatic installation.
- 4 When the installation is complete, click **Reboot** to exit the wizard and restart the virtual machine.

If the Parallels Tools installation does not start automatically, you can launch it manually:

- 1 Start the virtual machine and log in to the guest operating system.
- 2 When the guest OS boots up, connect the Parallels Tools ISO image by right-clicking the CD/DVD-ROM icon in the virtual machine's window status bar and choosing **Connect Image**.

- 3 Open the following folder:

- In **32-bit Windows**: C:\Program Files\Parallels\Parallels Workstation Extreme\Tools\
- In **64-bit Windows**: C:\Program Files (x86)\Parallels\Parallels Workstation Extreme\Tools\

Select the `prl-tools-win.iso` file, and click **Open** to connect it to the virtual machine.

- 4 In the virtual machine, open **My Computer** and double-click the **Parallels Tools** disc icon to expand its contents.

---

**Note:** If the installation wizard does not launch automatically, right-click the disc, choose **Open** from the shortcut menu, and double-click `Setup.exe` to launch the installer.

---

- 5 Follow the wizard's instructions to complete the installation.

To edit the settings of Parallels Tools installed in your virtual machine, use the **Services** pane (p. 118) of the **Virtual Machine Configuration** dialog.

### How to check if Parallels Tools are installed

If you are not sure whether Parallels Tools are installed, you can easily check this. Start your virtual machine and look at the status bar of its window: if the tip "Press Ctrl + Alt to release the mouse and keyboard" appears in the status bar of the virtual machine's window, this means that Parallels Tools are not installed. When Parallels Tools are installed, you do not need to press any key to release the mouse and keyboard - they are released automatically.

## Installing Parallels Tools in a Linux Guest OS

Before installing Parallels Tools in a Linux guest OS, perform the following actions:

- Close all applications in the guest operating system.
- Disable the 3D accelerated window manager if you use any.
- Make sure that you have the `gcc` package and kernel sources installed. If these packages are not installed, the Parallels Tools installer will inform you about this you. The kernel sources package name depends on the type of Linux operating system you use: it can be `kernel-devel`, or `kernel-headers`, or something else. For more information about the kernel sources, refer to the Installing the GCC package and Kernel Sources in Linux (p. 213) section.

---

**Note:** To install Parallels Tools in your virtual machine, you must have the `root` privileges.

---

### Installing Parallels Tools in the most recent versions of Linux guest OSs

If you have one of the most recent versions of Linux OSs (Ubuntu, Fedora) in your virtual machine, the `prl-tools-lin.iso` image file will be mounted automatically after you connect it to the CD/DVD drive. To install Parallels Tools, do the following:

- 1 Start the virtual machine.
- 2 When the guest OS boots up, click the **Virtual Machine** menu and choose **Install Parallels Tools**.

---

**Note:** If the **Install Parallels Tools** option is grayed out, make sure that Parallels Tools can be installed in your guest operating system. To see the list of guest OSs supported by Parallels Tools, refer to the **Parallels Tools Overview** section (p. 75) in *Parallels Workstation Extreme User's Guide*.

---

- 3 The `prl-tools-lin.iso` image file will be connected to the virtual machine's CD/DVD drive and mounted.

You can connect and mount the Parallels Tools ISO image file manually. Right-click the CD/DVD-ROM icon in the virtual machine's window status bar and choose **Connect Image**. Open the following folder:

- In **32-bit Windows**: `C:\Program Files\Parallels\Parallels Workstation Extreme\Tools\`
- In **64-bit Windows**: `C:\Program Files (x86)\Parallels\Parallels Workstation Extreme\Tools\`
- In **Linux**: `/usr/share/parallels-workstation/tools/`

Select the `prl-tools-lin.iso` file, and click **Open** to connect it to the virtual machine.

- 4 Start a terminal in your Linux guest OS. Type the following command to gain the `root` privileges:

```
su
```

- 5 Change the directory to the CD/DVD drive directory using

```
cd /media/cdrom/
```

---

**Note:** In some of the Linux operating systems, the mount point for the virtual CD/DVD drive may appear as `/media/Parallels\ Tools/`.

---

- 6 In the CD/DVD drive directory, enter the following command to launch Parallels Tools installation:

```
./install
```

- 7 Follow the Parallels Tools Installer instructions to complete the installation.

- 8 When the installation of Parallels Tools is complete, restart your virtual machine.

## Installing Parallels Tools in other versions of Linux guest OSs

To install Parallels Tools in the older versions of Linux OSs, you have to mount the `prl-tools-lin.iso` image file manually. Do the following:

- 1 Start the virtual machine.
- 2 When the guest OS boots up, click the **Virtual Machine** menu and choose **Install Parallels Tools**.

---

**Note:** If the **Install Parallels Tools** option is grayed out, make sure that Parallels Tools can be installed in your guest operating system. To see the list of guest OSs supported by Parallels Tools, refer to the **Parallels Tools Overview** section (p. 75) in *Parallels Workstation Extreme User's Guide*.

---

The `prl-tools-lin.iso` image file will be connected to the virtual machine's CD/DVD drive.

- 3 Start a terminal in your Linux guest OS. Type the following command to gain the `root` privileges:

```
su
```

- 4 Check if the Parallels Tools CD image is mounted by entering

```
mount | grep iso9660
```

If this command does not return anything, proceed to the next step.

If this command returns anything like

```
/dev/cdrom on /media/cdrom type iso9660 (ro,exec,nosuid,nodev,uid=0),
```

skip the next step and proceed to the following one.

If this command returns anything like

```
/dev/cdrom on /media/cdrom type iso9660 (ro,noexec,nosuid,nodev,uid=0)
```

with the `noexec` option present in parentheses, you need to unmount the disc using the following command and then proceed to the next step:

```
umount /dev/cdrom
```

- 5 To mount the Parallels Tools installation disc image, enter the following:

```
mount -o exec /dev/cdrom /media/cdrom
```

---

**Note:** `/dev/cdrom` is the virtual machine's CD/DVD drive and `/media/cdrom` is the mount point for this device. In some of the Linux operating systems the virtual CD/DVD drive may appear as `/dev/hdb` and the mount point `/mnt/cdrom`. Some Linux OSs do not have the CD/DVD drive mount point. In this case, you should create the mount point directory manually.

---

- 6 When the installation disc image is mounted, change the directory to the CD/DVD drive directory using

```
cd /media/cdrom/
```

- 7 In the CD/DVD drive directory, enter the following to launch Parallels Tools installation:

```
./install
```

---

**Note:** You must have the `root` privileges to run this command.

---

- 8 Follow the Parallels Tools Installer instructions to complete the installation.
- 9 When the installation of Parallels Tools is complete, restart your virtual machine.

### How to check if Parallels Tools are installed

If you are not sure whether Parallels Tools are installed, you can easily check this. Start your virtual machine and look at the status bar of its window: if the tip "Press Ctrl + Alt to release the mouse and keyboard" appears in the status bar of the virtual machine's window, this means that Parallels Tools are not installed. When Parallels Tools are installed, you do not need to press any key to release the mouse and keyboard - they are released automatically.

## Updating Parallels Tools

The procedure of updating Parallels Tools depends on the guest operating system they are installed in.

### In a Windows guest OS

Parallels Workstation Extreme automatically checks for new Parallels Tools updates when you start your virtual machine.

If a newer version of Parallels Tools is available, you will see the corresponding message offering you to download and update the tools. Click **Yes** to download Parallels Tools from the Parallels Update server and install them into your virtual machine. Updating will start right after the download finishes and will prompt you to restart the virtual machine when it is complete.

If you do not want to update Parallels Tools or want to do it later, click **No**. You will be able to update them later by using the **Update Parallels Tools** option from the **Virtual Machine** menu.

---

**Note:** If you revert to a snapshot that was made when you had an earlier version of Parallels Tools in your virtual machine, you will also be offered to update them.

---

If Parallels Tools are up-to-date but you want to reinstall them, select the **Reinstall Parallels Tools** option from the **Virtual Machine** menu.

### In a Linux guest OS

In Linux guest operating systems, you should manually check for Parallels Tools updates from time to time.

To update Parallels Tools:

- 1 Start the virtual machine.
- 2 To update Parallels Tools, you should mount the `prl-tools-lin.iso` image and launch Parallels Tools Installer. See **Installing Parallels Tools in a Linux Guest OS** (p. 79) for detailed information how you can do it.
- 3 Follow the Parallels Tools Installer instructions. When prompted to choose the action to perform, select **Update** and press **Enter**.
- 4 When the updating is complete, restart your virtual machine.

## Removing Parallels Tools

Parallels Tools can be removed through a general procedure of removing applications from the operating system installed in your virtual machine.

### Removing from a Windows guest OS

- 1 Start the virtual machine and log in to the guest OS.
- 2 From the Windows Start menu, choose Control Panel > Add or Remove Programs. In Windows Vista, choose Control Panel > Programs and Features.
- 3 Select Parallels Tools in the list and click Remove.
- 4 When Parallels Tools are removed, restart the guest operating system.

### Removing from a Linux guest OS

- 1 Start the virtual machine.
- 2 To remove Parallels Tools, you should connect and mount the `prl-tools-lin.iso` image and launch Parallels Tools Installer. See [Installing Parallels Tools in a Linux Guest OS](#) (p. 79) for detailed information how you can do it.
- 3 Follow the Parallels Tools Installer instructions. When prompted to choose the action to perform, select Remove and press Enter.
- 4 When Parallels Tools are successfully removed, press Enter to close the window.

---

## Downloading Virtual Machines

If you do not have enough time to create a new virtual machine with the required configuration, you can download a ready-to-use virtual machine with a predefined configuration. Besides the basic configuration, pre-built virtual machines also may have a set of applications installed in the guest OS, so that you do not have to spend time on installing and setting up the required software.

Such pre-built virtual machines with target services and applications installed in the guest OS are called Parallels Virtual Appliances. Virtual appliances are built by the Parallels experts and are available for downloading at the Parallels Technology Network page. You can also access the virtual appliances online storage via the Parallels Workstation Extreme menu by choosing **Download** from the **File** menu. Parallels Workstation Extreme redirects you to the Parallels Technology Network page where you will be able to choose the virtual machines that suit you most.

To start using a Linux virtual appliance, do the following:

- 1** On the Parallels Technology Network page, click the virtual appliance's title to view configuration details and the guest OS administrative credentials.
- 2** Download the desired virtual appliance by clicking the **GET APP** link and choosing the download link with the suitable archive file format.
- 3** When the virtual appliance file is downloaded, open it and double-click the PVS file to start the virtual machine.

## CHAPTER 6

# Working in a Virtual Machine

This chapter explains how to start, stop, suspend or pause a virtual machine. It also provides the information on actions you can perform with the virtual machine while the guest operating system is running.

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---

# Performing Main Operations on the Virtual Machine

## Starting Your Virtual Machine and Shutting It Down

### Starting the Virtual Machine

To start the virtual machine, select it in the Parallels Workstation Extreme sidebar and



- click the **Start** button on the Parallels Workstation Extreme toolbar or
- choose **Start** from the **Virtual Machine** menu.

After starting the virtual machine, it will boot into the guest operating system installed in this virtual machine. If no guest operating system is installed in the virtual machine, you will see the following message: "No boot device is available...".

---

**Notes:** 1. The virtual machine can be powered on only if you activated your copy of Parallels Workstation Extreme with permanent or trial activation key. See the *Activating Parallels Workstation Extreme* section (p. 24) in *Parallels Workstation Extreme User's Guide*.

2. It is not recommended that you start your virtual machines from an external storage device, this may result in low performance and unsteady operation.

---

### Shutting Down the Virtual Machine

To turn off the virtual machine, you can:

- use the standard shutdown procedure for the guest operating system installed in your virtual machine,



- click the **Shut Down** button in the Parallels Workstation Extreme toolbar, or
- choose **Shut Down** from the **Virtual Machine** menu.

## Suspending and Pausing Your Virtual Machine

Starting and shutting down virtual machines may take a considerable amount of time. Instead of performing these operations, you can suspend or pause a virtual machine for the required time and quickly resume it later.

---

**Note:** Close the **Virtual Machine Configuration** (p. 109) window before changing the virtual machine state.

---

### Suspending a Virtual Machine

Suspending a virtual machine is similar to putting a real computer into the sleep mode. When you suspend a virtual machine, you save its current state (including the state of all applications and processes running in the virtual machine) to a special file on the host computer. When the suspended virtual machine is resumed, it continues operating at the same point the virtual machine was at the time of its suspending.

Suspending your virtual machine may prove efficient if you need to restart the host computer, but do not want to:

- quit the applications running in the virtual machine
- spend much time on shutting the guest operating system down and then starting it again

To suspend a virtual machine, do one of the following:

- choose **Suspend** from the **Virtual Machine** menu or



- click the **Suspend** button in the Parallels Workstation Extreme toolbar.

---

**Note:** You can view the configuration of the suspended virtual machine in read-only mode. To be able to modify the suspended virtual machine configuration, you should stop the virtual machine.

---



To resume a suspended virtual machine, click the **Resume** button in the Parallels Workstation Extreme toolbar or choose **Resume** from the **Virtual Machine** menu.

### Pausing a Virtual Machine

Pausing a virtual machine releases the resources, such as RAM and CPU, currently used by this virtual machine. The released resources can then be used by the host computer and its applications or by other virtual machines running on the host computer.

---

**Note:** Only the amount of RAM used by the guest OS will be released. The memory used by the Parallels Workstation Extreme application will still be locked.

---

To pause a virtual machine, do one of the following:



- click the **Pause** button in the Parallels Workstation Extreme toolbar or

- choose **Pause** from the **Virtual Machine** menu.

When a virtual machine is paused, its window is grayed out. To continue running the virtual



machine, click the **Resume** button in the Parallels Workstation Extreme toolbar or choose **Resume** from the **Virtual Machine** menu.

Parallels Workstation Extreme is designed to operate like an ordinary computer application. This means that you do not have to change the virtual machine's state from running to paused, suspended, or stopped before putting the host computer to sleep. In sleep mode, the host computer does not allocate any resources to the running applications (including Parallels Workstation Extreme and all virtual machines) so that they are stopped automatically. As you start the host computer, all the applications are automatically up and running again.

## Stopping and Resetting Your Virtual Machine

### Stopping a Virtual Machine

If the guest operating system cannot be shut down for some reason or another, you can forcibly stop the virtual machine by doing one of the following:



- clicking the **Stop** button in the Parallels Workstation Extreme toolbar
- choosing **Stop** from the **Virtual Machine** menu.

**Warning:** If you forcibly stop the virtual machine, you may lose all unsaved data.

### Resetting a Virtual Machine

If some program error has caused your virtual machine to hang, you may wish to reset the virtual machine.

To reset the virtual machine, do one of the following:



- Click the **Reset** button in the Parallels Workstation Extreme toolbar. If this button is absent from the toolbar, refer to the **Customizing Toolbar** subsection (p. 33) of *Parallels Workstation Extreme User's Guide*.
- Choose **Reset** from the **Virtual Machine** menu.

**Warning:** If you reset the virtual machine, you may lose all unsaved data.

---

# Using Keyboard and Mouse

## Capturing and Releasing the Keyboard and Mouse

To start working in a virtual machine, you need first to capture the keyboard and mouse input in the virtual machine. To this effect:

- 1 move the mouse pointer over the virtual machine window
- 2 click in the window

When the keyboard and mouse input is captured in the virtual machine, you cannot move the pointer out of the virtual machine window and all keystrokes and button clicks go to the virtual machine. To release the keyboard and mouse back, press **Ctrl+Alt**. The keyboard and mouse will be released immediately.

---

**Note:** You can change the key combination for releasing the keyboard and mouse input using the **Keyboard** pane of the **Preferences** dialog.

---

If you want to automatically capture and release the keyboard and mouse input, you should install **Parallels Tools** (p. 74) in your virtual machine. After the **Parallels Tools** installation, you can capture and release the mouse and keyboard input more easily:

- click anywhere in the virtual machine window to capture the input
- click anywhere outside the virtual machine window to release the input.

## Keyboard Shortcuts in a Virtual Machine

If when working in a virtual machine, you press a special key combination intended for the guest OS (for example, **Ctrl+Alt+Del** for any of the Windows guest operating systems) the primary operating system may intercept such a command. That is why in this version of **Parallels Workstation Extreme**, you can apply any of the main Windows and Linux shortcuts to your virtual machine with the help of the **Keyboard** icon  in the virtual machine status bar (p. 36). Just click the icon and select the desired key combination from the drop-down list. The corresponding action will take place in your guest OS and your primary OS will ignore this event.

---

## Changing the View Mode

Parallels Workstation Extreme provides a number of view modes to make your work with virtual machines more comfortable and efficient:

- **Window mode.** This is the default view mode in which the virtual machine screen is displayed in the Parallels Workstation Extreme window. The window contains the following panes:
  - **Summary.** This pane provides basic information on the virtual machine and access to the **Virtual Machine Configuration** dialog. The **Summary** pane also contains buttons for the most frequent commands used to start, stop, and otherwise manage the virtual machine.
  - **Console.** In this pane, you can interact with the running virtual machine via its guest OS window.
  - **Performance.** In this pane, you can view the virtual machine CPU, memory, hard disk, and network usage when the virtual machine is running.
  - The **Backup** tab lists all virtual machine backups. It also contains the controls allowing you to create a new backup.
- **Full Screen mode.** In this mode the virtual machine screen is expanded to occupy the whole of your physical computer screen.

### Switching to the Full Screen Mode

You can run a guest operating system in the Full Screen mode when the guest operating system window occupies the whole screen and all controls are hidden.

To switch to the Full Screen mode, do one of the following:

- Click the **Full Screen** button  in the Parallels Workstation Extreme toolbar.
- Choose **Full Screen** from the **View** menu.

---

**Note:** The default hot key combinations can be configured in the **Keyboard** pane (p. 41) of the **Preferences** dialog.

---

To return to the Window mode, press the appropriate hot key combination (Ctrl+Alt+Enter by default).

### Detaching the Console Pane

In this version of Parallels Workstation Extreme, you can detach the **Console** pane of your running virtual machine from the Parallels Workstation Extreme window and work with it in a separate window.

To detach the **Console** pane, do one of the following:

- Choose **Detach Console** from the **View** menu.
- Click the **Detach Console** button  in the Parallels Workstation Extreme toolbar.

---

**Note:** If this button is missing from the toolbar, you can add it by customizing the toolbar (p. 35).

---

If you want the **Console** pane to join the virtual machine window again, do one of the following:

- choose **Attach Console** from the **View** menu
- click the **Attach Console** button in the Parallels Workstation Extreme toolbar
- close the separate **Console** window

### Locking the guest OS screen resolution

The virtual machine screen resolution can be changed in the following situations:

- When you adjust the guest OS display settings.
- When you resize the virtual machine window (this feature works only when Parallels Tools (p. 74) are installed in your virtual machine).
- When you run an application that automatically changes the screen resolution of your guest OS.

This behaviour of the virtual machine window can be irritating. To freeze the virtual machine screen resolution, use the **Lock Window** option available from the **View** menu. When the **Lock Window** option is enabled, the virtual machine screen resolution can be changed by adjusting the guest OS display settings only.

### Switching to the Coherence Mode

The Coherence mode provides the highest level of integration between the host and the guest operating systems. In this mode, you can have any applications running under these operating systems on one desktop. For more information on the Coherence mode, see **Working in the Coherence Mode** (p. 91).

To switch a running virtual machine to operate in the Coherence mode, do one of the following:

- Click the **Coherence** button  in the Parallels Workstation Extreme toolbar.
- Choose **Coherence** from the **View** menu.

To exit Coherence, click the Parallels Workstation Extreme tray icon and choose **Exit Coherence**.

## Working in the Coherence Mode

The Coherence mode is available only for Windows host operating systems and virtual machines with the Windows 2000 and later guest operating systems installed.

Coherence is a visual mode of working with a virtual machine that enables you to use your guest OS applications side by side with the host OS applications.

When you switch a running virtual machine with one or more running applications to the Coherence mode, you will see the guest OS applications windows on your host OS desktop along with the host OS applications windows.

### Switching to the Coherence Mode

Only a running virtual machine with Parallels Tools (p. 74) installed can be switched to the Coherence mode.

To switch to the Coherence mode, do one of the following:

- click the  icon on the toolbar
- choose **Coherence** from the **View** menu

To exit Coherence, click the Parallels Workstation Extreme tray icon and choose **Exit Coherence**.

### Using Windows Guest OS Start Menu

When working in the Coherence mode, you may need to access the guest OS Start menu. To this effect, do the following:

- 1 Point the mouse to the host OS Start menu and the sign of the guest OS Start menu will pop up above.
- 2 Click this sign and the guest OS Start menu will open.

### Distinguishing Guest OS Applications Windows From Host OS Applications Windows

When working with a virtual machine in the Coherence mode, you may confuse guest OS applications windows with host OS applications windows. Parallels Workstation Extreme allows you to distinguish these windows by adding a colored border to the guest OS applications windows.

To add a colored border, do the following:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Go to the **Coherence** pane (p. 126) and make sure that the **Use borders** option is selected.

If you do not like the border color, you can change it in the **General** pane (p. 110) of the **Virtual Machine Configuration** dialog. Choose any from the available palette.

For example, if you choose red and then switch the virtual machine to the Coherence mode, the borders of the guest OS applications windows will be red.

---

**Note:** Select different colors for different virtual machines or you may confuse the guest OSs applications windows if you switch two or more virtual machines to the Coherence mode.

---

---

## Changing Configuration at Runtime

Parallels Workstation Extreme allows you to connect or disconnect certain devices at runtime or switch some of them for using other media.

Generally, the following virtual devices can be connected or disconnected at runtime:

- CD/DVD-ROM drive
- Floppy disk drive
- Network adapter
- Parallel port
- Serial port
- Sound device
- USB device
- Shared folders

---

**Note:** Only devices *enabled* in the virtual machine configuration (p. 109) can be connected or disconnected at runtime.

---

You can configure any of these devices in one of the following ways:

- Click a device icon on the status bar (p. 36) and choose the necessary command from a device shortcut menu.  
The status bar displays the devices information when the virtual machine is running.
- Use the necessary command from the Parallels Workstation Extreme **Devices** menu. This menu is available only when the virtual machine is running.
- Drag and drop an image file (\*.iso or \*.fdd) or a shared folder on the appropriate device icon on the status bar. This option is available for CD/DVD-ROM drives, floppy drives and shared folders only.

### Connecting a CD/DVD-ROM or a Floppy Drive

If you have several CD/DVD-ROM drives connected to your virtual machine, in the **Devices** menu they are listed in the same order as they were connected. The first CD/DVD-ROM drive will be **CD/DVD-ROM 1**, the second will be **CD/DVD-ROM 2**, and so on.

### Connecting a Network Adapter

You can set up any of the three network modes: Shared Networking, Bridged Networking, or Host-Only Networking. If you have several network adapters used by the virtual machine, on the status bar (p. 36) and in the **Devices** menu they are listed in the same order as they were connected. The first network adapter will be **Network Adapter 1**, the second will be **Network Adapter 2**, and so on.

### Connecting a Parallel Port

If you have several parallel ports used by the virtual machine, on the status bar (p. 36) and in the **Devices** menu they are listed in the same order as they were connected. The first parallel port will be **Parallel Port 1**, the second will be **Parallel Port 2**, and so on. To change the parallel port emulation device at runtime, click the parallel port icon on the status bar (p. 36) and choose **Real Parallel Port**, **Printer** or **Connect Output File** from the device shortcut menu.

### Connecting a Serial Port

If you have several serial ports used by the virtual machine, on the status bar (p. 36) and in the **Devices** menu they are listed in the same order as they were connected. The first serial port will be **Serial Port 1**, the second will be **Serial Port 2**, and so on. To change the serial port emulation device at runtime, click the serial port icon on the status bar (p. 36) and choose **Real Serial Port**, **Connect to Socket** or **Connect Output File** from the device shortcut menu.

### Connecting a Sound Device

To connect or disconnect a sound device, choose the **Activate** or **Mute** options respectively. You can also choose the type of output and input devices.

### Connecting a USB Device

Parallels Workstation Extreme automatically detects all USB devices plugged into the host computer. The devices that are currently connected to the virtual machine appear in the list from the **Device** menu. You cannot use a USB device in the primary operating system while it is being used by the virtual machine. If you want to use the USB device in the primary operating system again, just disconnect it from the virtual machine.

### Connecting a Shared Folder

The **Shared Folders** options available at runtime are much alike the settings in the **Virtual Machine Configuration** dialog.

You can

- share the host computer disks or Home Folder only with the guest operating system
- share the guest operating system disks with the primary OS
- add a new shared folder

You can connect or disconnect all shared folders at a time by clicking the device icon on the status bar (p. 36) and choosing **Connect All** or **Disconnect All** from the device shortcut menu or by choosing the corresponding commands from the **Parallels Workstation Extreme Devices** menu.

---

# Using Devices

## Setting up a Printer in a Virtual Machine

There are four basic ways to set up printing in a virtual machine. You can:

- share a host computer's printer (p. 96)
- use a network printer (p. 98)
- set up printing via LPT port of the physical computer (p. 99)
- set up a USB printer (p. 100)

## Sharing a Host Computer's Printer

You can share any printer connected to the physical computer with your Windows or Linux virtual machine. The printer will be available through the virtual machine's parallel port.

To share the physical computer's printer:

- 1 Launch Parallels Workstation Extreme and open the virtual machine.
- 2 Open the Virtual Machine Configuration dialog by choosing **Configure** from the **Virtual Machine** menu. Make sure that the configuration includes a parallel port. If necessary, add it. See *Adding a Parallel Port* (p. 167).
- 3 In the **Parallel Port** pane, make sure that the **Enabled** option is selected. Select **Connected**, if you want the printer to be automatically connected on the virtual machine startup.
- 4 Select the **Printer** option. You can choose a specific printer from the printers list or use the **Default printer** option if you want to use the default printer set in the primary OS.

Click **OK** to close Virtual Machine Configuration.

- 5 Start the virtual machine.
- 6 In a Windows guest OS, if you have Parallels Tools installed (p. 77), the HP Color LaserJet 8500 PS printer is automatically connected to your virtual machine and you can use it at once. In a Linux guest OS or if you do not have Parallels Tools installed in your Windows guest OS, no matter what type of printer you have, install the HP Color LaserJet 8500 PS printer driver and then follow the procedure of adding a printer in a guest OS described below.

**Warning:** Do not install the driver from the installation CD, supplied with your printer, in the virtual machine.

## Adding a printer in a Windows guest operating system

To add a printer in a Windows guest OS:

- 1 Start the Windows virtual machine and log in as administrator.
- 2 Open the Windows **Start** menu, select **Control Panel**.
- 3 In the **Control Panel** window, select the **Printers and Faxes** (or **Printers**, or **Printers and Other Hardware**) item.
- 4 Open the **Add Printer** wizard:
  - In Windows XP/Vista double-click the **Add a printer** link.
- 5 In the **Add Printer** wizard:
  - In Windows Vista:
    - click **Add a local printer**,
    - select **Use an existing port** and click **Next**.
  - In Windows XP:
    - click **Next** in the wizard's first dialog,
    - in the **Local or Network Printer** dialog, click **Local printer attached to this computer**.

- 6 Continue with the general installation procedure and install the HP Color LaserJet 8500 PS printer driver.

### Adding a printer in a Linux guest operating system

To add a printer in a Linux guest OS:

- 1 Start the Linux virtual machine and log in as administrator.
- 2 Open the `/etc/printcap/` configuration file and click the **Add** option.
- 3 Select the type of printer to add: **Local printer**. Click **Ok**.
- 4 `Printtool` will attempt to detect any printers which are attached to your parallel port and will show you the results. Click **Ok**.
- 5 Specify the details about your printer, such as a name of the printer and its related spool directory, the location of the printer device and other options.
- 6 The **Input Filter** contains information about your specific printer and its formatting requirements. To add your printer's information, click **Select**. The **Configure Filter** dialog will open.
- 7 Choose the printer type: choose the HP Color LaserJet 8500 PS printer driver. You can also set here other printing parameters. Click **Ok**.

## Setting Up a Network Printer

You can install a network printer directly into a guest OS.

Before installing a network printer in a guest OS, make sure that:

- Networking in the primary and guest OSs is configured.
- The virtual machine network adapter is connected to the corresponding virtual machine and enabled. To do this:
  - Select **Configure** from the **Virtual Machine** menu.
  - Click the **Network Adapter** item in the left pane.
  - Make sure that the **Enabled** and **Connected** options are selected. If they are cleared, select these options and click **OK**.
- The user account in the guest OS from which you will setup the printer has permissions to access the network printer.
- You know the printer's IP address.

After that, you can log into your guest OS and install a network printer.

### In a Windows Guest Operating System

Before adding a network printer to Windows, download and install an appropriate printer driver.

The procedure of adding a network printer is almost the same for all Windows guest OSs. To add a network printer in Windows XP or Windows Vista:

- 1** Choose **Control Panel** from the **Start** menu in your guest OS.
- 2** Click **Printers and Faxes** in Windows XP or **Printers** in Windows Vista.
- 3** Click the **Add printer** icon.
- 4** In the **Add Printer** wizard introduction window, click **Next**.
- 5** In Windows XP, select the **Local printer attached to this computer** option and disable **Automatically detect and install my Plug and Play printer**.  
In Windows Vista, choose the **Add a Local Printer** option.
- 6** Select **Create a new port** and specify **Standard TCP/IP port** as the port type.  
Click **Next**.
- 7** In the next window, specify the printer's IP address and click **Next**.
- 8** If prompted to specify additional port information, choose **Standard** and select **Generic Network Card** from the list.
- 9** In the next window, click **Finish**.
- 10** In the **Install Printer Software** window, specify the manufacturer of the driver and select the model of the network printer.  
If the required printer model is not listed, click the **Have Disk** button and specify the path to the `.inf` file in the driver installation folder.  
When finished, click **Next**.
- 11** Follow the wizard's instructions to complete the installation.

## In a Linux Guest Operating System

Make sure that the following components are installed in your guest Linux system:

- Common UNIX Printing System (CUPS). Installation instructions can be found at CUPS site;
- Samba service. Installation instructions can be found at Samba site;
- A Web browser, since we consider controlling CUPS via web interface;

---

**Note:** To set up a network printer, you should have the `root` privileges.

---

Before adding a network printer to Linux, download and install an appropriate printer driver.

To add a network printer in a Linux guest OS:

- 1 Start your Linux virtual machine.
- 2 Start Common UNIX Printing System.

In a terminal, type the command:

```
/etc/init.d/cups start
```

- 3 Start a web browser and type either the IP address of your virtual machine or `http://127.0.0.1:631`.
- 4 Click the **Add Printer** button.
- 5 In the **Add New Printer** window, enter a printer name, location, and description.
- 6 In the **Device for <Printer Name>** window, select the *Windows Printer via Samba*.
- 7 In the **Device URI for <Printer Name>** window, specify the path to the network printer in the following format:  

```
smb://<computer name>/<printer name>
```
- 8 In the **Make/Manufacturer for <Printer Name>** window, select the model of your printer.
- 9 Enter the `root` password when prompted.
- 10 CUPS performs installation. If the installation is successful, the "Printer <name> has been added successfully" message is displayed.

## Setting Up Printing via LPT Port of Physical Computer

To set up printing through a parallel port of your physical computer:

- 1 Make sure that a printer is connected to an LPT port of your real computer.
- 2 Open the virtual machine configuration in Configuration Editor, make sure that the configuration includes a parallel port. If necessary, add it. See [Adding a Parallel Port](#) (p. 167).
- 3 On the **Parallel Port Options** tab, make sure that the **Enabled** and **Connected** options are selected.
- 4 Select the **Real Port** option and choose the necessary parallel port of your physical computer from the corresponding drop-down menu.
- 5 Click **OK** and start the guest operating system.
- 6 Install the native driver for your printer in the guest OS.

## Setting Up a USB Printer

To set up a USB printer:

- 1** Launch Parallels Workstation Extreme and choose the virtual machine.
- 2** Open the Virtual Machine Configuration dialog by choosing **Configure** from the **Virtual Machine** menu. Make sure that the configuration includes a USB controller. If necessary, add it. See **Adding a USB Controller** (p. 168).
- 3** Open the **USB Controller** pane and make sure that the **Enabled** option is selected. Click **OK**.
- 4** Start the virtual machine.
- 5** Plug in the USB printer as a USB device. See **Using USB Devices in a Virtual Machine** (p. 103).
- 6** Install the native driver for the printer in the guest OS.

## Using Intel VT-d PCI Devices in Parallels Virtual Machines

If your computer has an Intel VT-d chipset, you can set the physical PCI Express (PCIe) devices connected to the physical computer to be directly assigned to your virtual machine. The virtual machine will directly access the PCIe devices without using the resources of the primary OS.

You can connect up to eight PCIe devices of any of the supported types to a single virtual machine.

### To connect a PCIe device to a virtual machine

- 1 Assign the device to your virtual machines in the Intel VT-d pane (p. 51) of Parallels Workstation Extreme Preferences.

---

**Note:** You are recommended to have at least two adapters of the same type (video or network adapters): if you reassign one adapter to your virtual machines, the other adapter will be left to the physical computer. Keep in mind that if you assign your video or network adapter to a virtual machine, this adapter will be invisible to your primary OS.

---

- 2 Add the device to the virtual machine configuration. For more information, refer to the Adding a Network Adapter (p. 161), Adding a Video Adapter (p. 163), and Adding Intel VT-d PCI Devices (p. 169) subsections.

### Troubleshooting

In Windows-based virtual machines, if the pass-through driver cannot be installed automatically after a PCIe device has been assigned to virtual machines in Preferences, install it manually by doing the following:

- 1 Go to Start > Control Panel > System > Hardware and open the Device Manager.
- 2 In the Device Manager, locate the appropriate PCIe device, right-click it and choose Update Driver from the context menu.
- 3 In the Hardware Update wizard, choose to install the driver from the specific location.
- 4 Choose to specify the driver yourself.
- 5 In the next window, select the Have Disk option and specify the following path to the driver's location: `C:\Program Files\Parallels\Parallels Workstation\Drivers\prl_vtdvideo.inf` or `C:\Program Files\Parallels\Parallels Workstation\Drivers\prl_vtdnet.inf` and click Open.
- 6 Follow the wizard's instructions to complete the installation of the driver.
- 7 Restart the host computer.

In rare cases you cannot boot the primary Linux operating system after a PCIe device is added to the configuration of a virtual machine. To work around the issue, do the following:

- 1 In the grub loader splash screen, with your primary operating system selected in the list, press `e` on the keyboard to display the boot parameters.
- 2 Select the line starting with "kernel" by pressing the down arrow on the keyboard.
- 3 Press `e` to launch an editor for the selected line.

**4** At the end of the line, add

```
init=/bin/sh
```

**5** Press Enter to return to the boot parameters screen.

**6** Press `b` to boot the kernel.

**7** In the command line window, mount the root partition in read-write mode by entering

```
mount /dev/root / -o remount,rw
```

---

**Note:** If you want your `root` partition to be mounted to a different location, replace `root` with this location in the command above.

---

**8** Type the following command and press Enter:

```
echo -n "" > /etc/parallels/vtd.hook
```

**9** Type the following command and press Enter:

```
mount /dev/root / -o remount,ro
```

**10** Type the following command and press Enter:

```
reboot
```

This procedure will make your primary Linux operating system boot normally.

## Using USB Devices in a Virtual Machine

Parallels Workstation Extreme provides you with the possibility to connect up to eight USB 2.0 and eight USB 1.1 devices to a single virtual machine. This means that you can plug up to eight USB 2.0 devices and eight USB 1.1 devices into the host computer and use them from the virtual machine. To use this feature, you should add a USB controller to the virtual machine configuration (p. 109). If the USB controller is already present in the virtual machine configuration, make sure it is enabled.

By default, when you plug a USB device into the host computer, the **New USB Device** dialog asks if you want to connect this device to the host computer or to the virtual machine you are currently working with.

- Click **Host Computer** if you want to use this USB device in the host operating system.
- Click **Virtual Machine** if you want to use this USB device in the virtual machine you are currently working with.

---

**Note:** If you select to connect the detected USB device to the virtual machine and then reboot this virtual machine, the **New USB Device** dialog will not appear again after the reboot. The USB device will still be connected to this virtual machine.

---

If you want Parallels Workstation Extreme to remember your choice, select **Remember this association**. The next time you plug this USB device into the host computer, it will be automatically connected to the destination you specified in this dialog. To change the destination, use **USB Preferences** in the **Preferences** dialog (p. 38).



If you do not want Parallels Workstation Extreme to display this dialog each time a USB device is plugged into the host computer, configure **USB Preferences** in the **Preferences** dialog (p. 38).

To be able to use the USB device in the virtual machine, you may need to install the necessary drivers in the guest OS. By default, such drivers can be obtained from the manufacturers of this device.

---

**Note:** If you plug a USB 1.1 device into the USB 2.0 port, the port will be identified as USB 1.1.

---

### Connecting a USB device to a virtual machine running on a Windows XP host computer

If Parallels Workstation Extreme is installed on your Windows XP host computer, perform the following operations to connect a USB device to a virtual machine for the first time:

- 1 Connect the USB device to the host computer.
- 2 In the **New USB Device** dialog, click **Virtual Machine**.
- 3 In this step, you will have to install the Parallels USB Device driver into the host OS. The host operating system will open the **Found New Hardware Wizard** dialog. In this dialog:
  - Select **Install from a list of specific location (Advanced)** and click **Next**.
  - Select **Search for the best driver in these locations**, tick **Include this location in the search**, and indicate the **C:\Program Files\Parallels\Parallels Workstation Extreme\Drivers\USB** location. Click **Next**. The Parallels USB Device driver will be installed into the host OS.
- 4 Unplug the USB device and replug it into the host computer.
- 5 In the **New USB Device** dialog, click **Virtual Machine**. The USB device will appear in the guest operating system.

Next time, you will not have to install the Parallels USB Device driver for this USB device.

### Connecting a USB device to a virtual machine running on a Linux host computer

To connect a USB device to a virtual machine running on a Linux host computer:

- 1 Connect the USB device to your physical computer.
- 2 Start the virtual machine and log in to the virtual machine guest OS.
- 3 When the guest OS boots up, connect the USB device by clicking the **USB Controller** icon in the virtual machine's window status bar and choosing your USB device name from the list.

---

## Using Safe Mode

If you do not want a virtual machine to store the changes you make to it during the working session, you can start this virtual machine in Safe Mode. To be able to start the virtual machine

in Safe Mode, you need to add the **Safe Mode** button  to the Parallels Workstation Extreme toolbar first. To this effect:

- 1 Right-click the toolbar in the virtual machine's window, and choose **Customize Toolbar** (p. 35).

- 2 Drag the **Safe Mode** button  to the toolbar and click **Done**.

When you have added the **Safe Mode** button  to the toolbar, you can use this button for starting the virtual machine in Safe Mode. When you shut down a virtual machine operating in Safe Mode, you will be asked whether you want to discard the changes made to the virtual machine's hard disk or to apply them:

- If you choose to discard the changes, the virtual machine's hard disk will be left intact and no changes made to it during your work in Safe Mode will be saved.
- If you choose to apply the changes, the virtual hard disk will keep all the changes made to it during your work in Safe Mode. After applying the changes, the virtual machine will not be able to return to the state it had before you started this virtual machine in Safe Mode.

If you want the virtual machine to permanently work in Safe Mode, you can enable the **Undo Disks** option in the **Startup and Shutdown** (p. 114) pane of Virtual Machine Configuration (p. 109):

- 1 Choose **Configure** from the **Virtual Machine** menu to open the virtual machine configuration.
- 2 Click **Options** in Virtual Machine Configuration.
- 3 Select **Startup and Shutdown**.
- 4 In the **Startup and Shutdown** pane, select the **Enable undo disk** option and click **OK**.

For more information about the **Undo Disks** option, refer to **Startup and Shutdown Settings** (p. 114).

### Usage Tip

Running the virtual machine in Safe Mode can be useful when testing the behavior of some applications to make sure that they cannot damage your computer.

---

## Using Shared Folders

Shared folders are folders in the host computer operating system that are visible to the guest OS too. These folders can be used for exchanging files between the host computer operating system and a virtual machine or between several virtual machines.

In the primary OS shared folders appear as usual folders, while in the guest OS they are objects of the network neighborhood.

Using shared folders is possible for the Windows and Linux guest operating systems. See the list of supported guest operating systems (p. 57).

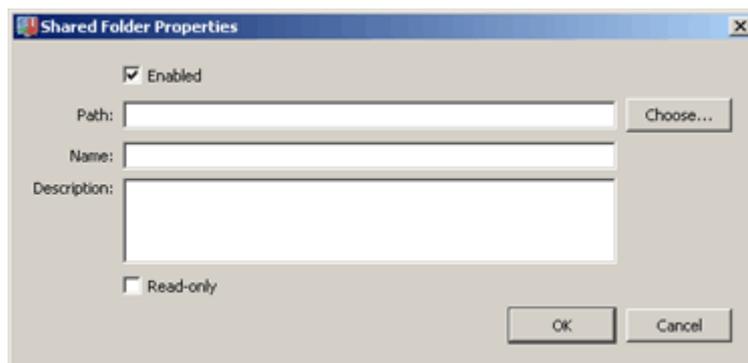
## Setting Up a Shared Folder

Setting up a shared folder requires two steps:

- 1 Installing Parallels Tools in the guest OS. The Shared Folders tool is required for viewing the shared folders in the guest OS. See *Installing Parallels Tools* (p. 74).
- 2 Adding one or more shared folders to the virtual machine configuration.

### Adding a Shared Folder

- 1 Open the virtual machine configuration by choosing **Configure** from the **Virtual Machine** menu.
- 2 In the **Virtual Machine Configuration** dialog, select the **Shared Folders** tab (see *Shared Folders* (p. 120)).
- 3 Select the **Enable shared folders** option.
- 4 Click the **+** button to open the **Shared Folder Properties** window.
- 5 In the **Shared Folder Properties** window:
  - Make sure the **Enabled** option is selected.
  - In the **Path** field, type the path to the folder you want to share with the virtual machine. You can also use the **Choose** button to locate the folder.
  - In the **Name** field, type the shared folder name under which the folder will be accessible from inside the virtual machine.
  - In the **Description** field, you can provide a brief description for the shared folder.
  - Select the **Read-only** option if you want the shared folder to have a read-only status when accessed from inside the virtual machine.
  - Click **OK**.



- 6 Click **OK** in the **Virtual Machine Configuration** dialog.

## Viewing Shared Folders in Guest OS

There are three ways to view the contents of the shared folders in the guest OS.

### Easy Way 1

Click the **Parallels Shared Folders** icon on the desktop of the running guest OS and you will see all your shared folders.

### Easy Way 2

If you select **Map folders to drive letters** in the **Shared Folders** pane (p. 120) of **Virtual Machine Configuration**, shared folders will be displayed as new disks with drive letters assigned every time you open up **My Computer** in the guest operating system.

### General Way

- 1 In the virtual machine, open **Windows Explorer**.
- 2 In Explorer, select **My Networks Places**, then select **Entire Network**, and find **Parallels Shared Folders**.
- 3 Click **Parallels Shared Folders** to view the list of shared folders available in your virtual machine.

---

**Note:** To be able to write to a shared folder inside a virtual machine, make sure that the **Read Only** check box (p. 120) for this folder is cleared in the **Virtual Machine Configuration** dialog.

---

---

## Making Guest OS Screenshots

If you want to make a screenshot of the guest operating system when it is running, choose **Make Screenshot** from the **View** menu. The first screenshot file will be named `Parallels Picture.png` and placed on the primary operating system desktop. The next screenshots will have the same name with an appropriate number added.

## CHAPTER 7

# Configuring a Virtual Machine

This chapter provides the information on configuration options available to a virtual machine.

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## Editing Virtual Machine Configuration

The configuration of an existing virtual machine can be changed in the Virtual Machine Configuration dialog. You can open the Virtual Machine Configuration dialog by doing one of the following:

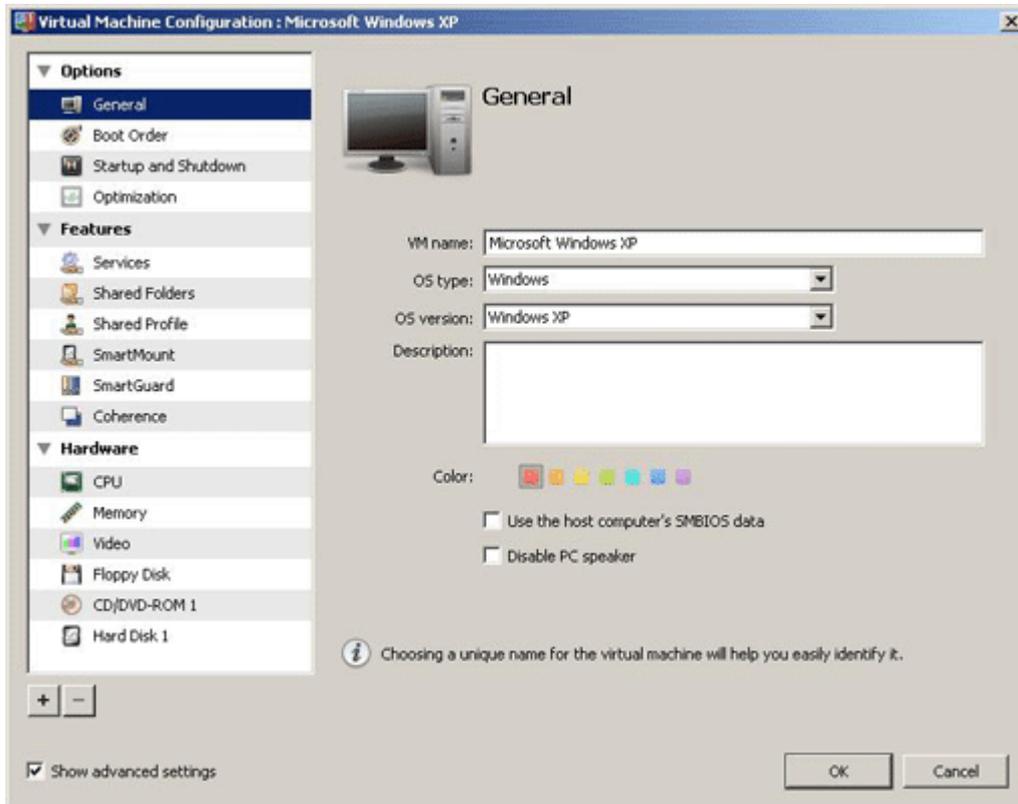
- Choose **Configure** from the **Virtual Machine** menu.
- Click the **Configure** button on the toolbar of the virtual machine main window.
- Right-clicking the virtual machine in the main window sidebar and choosing **Configure** from the context menu.
- Selecting **Configure** in the **Operations** area of the virtual machine **Summary** pane or clicking any of the items in the **Configuration** area.

Virtual Machine Configuration allows you to configure your virtual machine in a variety of ways. For example, you can

- Configure the virtual machine general options in the **General** window (p. 110).
- Define the virtual machine boot options in the **Boot Order** pane of the **Hardware** window (p. 112).
- Configure different parameters of the devices currently available inside the virtual machine: hard disk drives (p. 134), CD/DVD-ROM drives (p. 132), floppy disk drives (p. 131), etc.
- Configure the resource values currently set for the virtual machine: main memory (p. 128), video memory (p. 129), CPU (p. 127), etc.
- Add a new device to the virtual machine or remove an existing one (p. 150).

## General Settings

You can view and configure the virtual machine general settings on the General pane of Virtual Machine Configuration.



The **General** pane includes the following parameters:

- **VM Name.** This field displays the name assigned to the virtual machine. The length of the name is limited to 50 characters. The name of the virtual machine is displayed on its main window and guest OS window.
- **OS Type.** This field displays the type of the operating system installed in the virtual machine or declared to be installed in future.
- **OS Version.** This field displays the version of the operating system installed in the virtual machine or declared to be installed in future.

---

**Note:** The OS type and version fields should reflect the real operating system type and version installed in the virtual machine.

---

- **Description.** This field displays additional information related to the virtual machine.

### Using the host computer's SMBIOS data

Some applications may require the computer hardware characteristics. The host computer BIOS saves this information in the SMBIOS tables. These tables can be easily reached and processed by different applications. You can copy the SMBIOS tables from your primary OS to your guest OS by choosing the **Use the host computer's SMBIOS data** option.

### Disabling the PC speaker

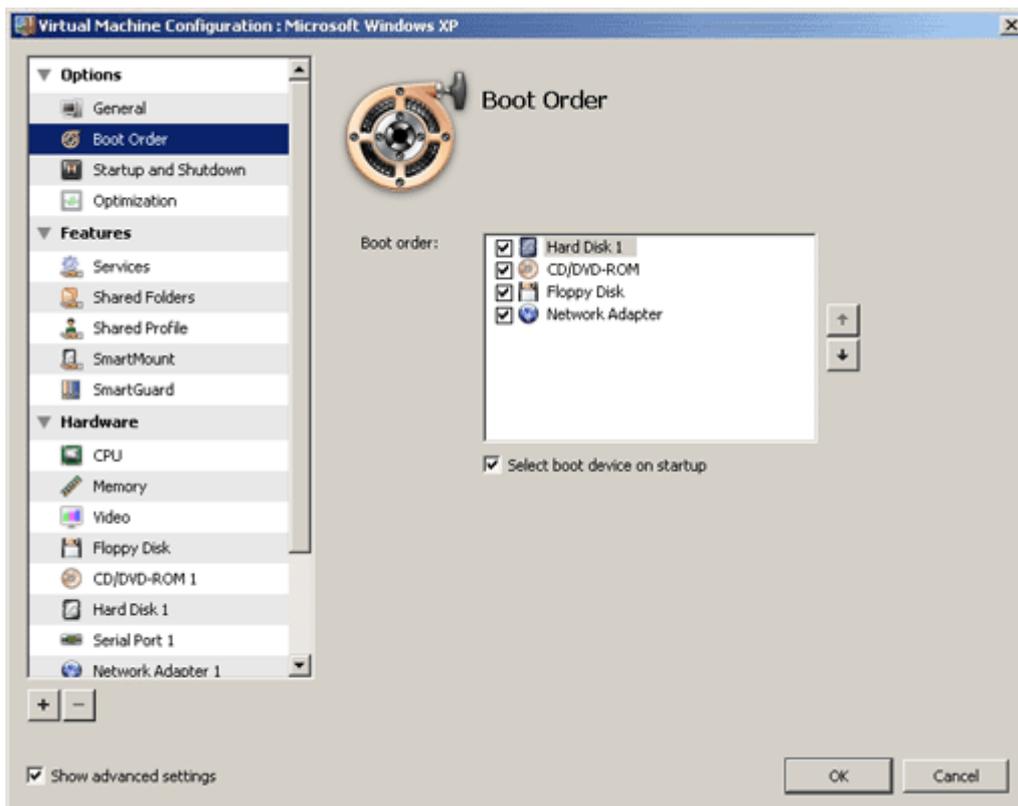
A virtual machine can utter various sounds (beeps and whistles) generated by its guest operating system using the PC speaker. If you want to disable these sounds, select the **Disable PC speaker** option.

To save the changes, click **OK**, otherwise, click **Cancel**.

## Boot Order Settings

Using the Boot Order Settings, you can configure the virtual machine boot sequence, that is, the order in which the virtual machine will try to load the operating system from different boot devices.

**Note:** These settings cannot be changed when the virtual machine is running.



The currently supported boot devices are listed below:

- **Hard Disk.** Select this device if you want the virtual machine to boot up from its virtual hard disk drive.
- **CD/DVD-ROM.** Select this device if you want the virtual machine to boot up from the media connected to its virtual CD/DVD-ROM drive.

---

**Note:** The virtual machine will use the CD/DVD-ROM drive specified as **CD/DVD-ROM 1** in its configuration.

---

- **Floppy Disk.** Select this device if you want the virtual machine to boot up from a floppy disk image connected to its virtual floppy disk drive.
- **Network Adapter.** Select this device if you want your virtual machine to boot from a network adapter using PXE (Pre-Execution Environment).

---

**Note:** The virtual machine will use the network adapter specified as **Network Adapter 1** in its configuration.

---

Every time you start the virtual machine, it tries to boot from the device specified as the first one in the **Boot order** list. If the virtual machine cannot boot from the first device (for example, no media is connected to it), the virtual machine proceeds to the second device in the list and tries to boot from this device, and so on.

On this pane, you can perform the following operations:

- Change the currently set boot sequence by selecting the name of the corresponding boot device in the **Boot order** list and moving it up or down using the arrows to the right of the list.
- Remove a boot device from the sequence by clearing the check box next to its name.

If you choose the **Select boot device on startup** option, you will see the following message at the virtual machine startup: "Press ESC to select boot device". If you press ESC pending 5 seconds, you will be able to select a boot device. If you do not press ESC, the virtual machine will try to boot from the devices specified in the **Boot order** list.

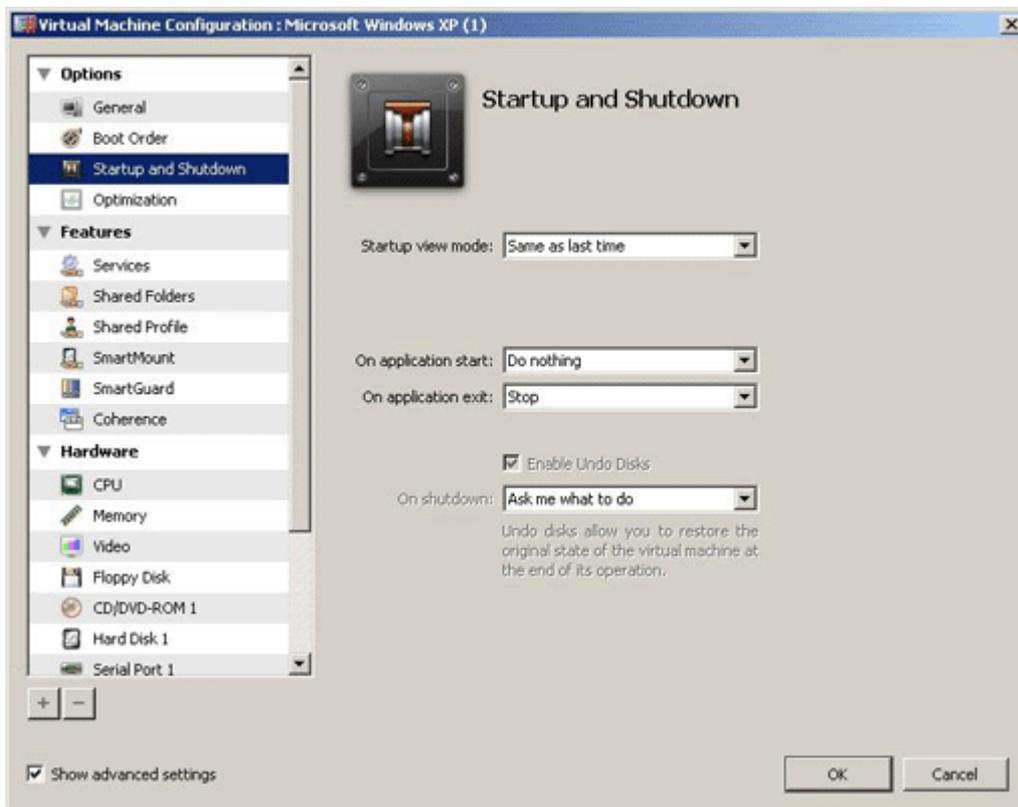
---

**Note:** Make sure that the device you wish to use for your virtual machine booting (hard disk drive, CD-ROM drive, floppy disk drive, or network adapter) is available to the virtual machine and configured properly. If you do not have any boot devices configured in your virtual machine, you will see the following error message after you start the virtual machine: "No boot device is available". In this case, you should stop the virtual machine and configure at least one boot device for it.

---

## Startup and Shutdown Settings

The Startup and Shutdown pane of Virtual Machine Configuration allows you to define a number of parameters related to the procedures of starting and shutting down your virtual machine.



In this pane, you can configure the following parameters:

- The **Startup view mode** option defines the mode in which the virtual machine will work after you select it from the Parallels Workstation Extreme sidebar and start. If the **Window** or **Full Screen** or **Coherence** option is selected, the virtual machine will automatically switch to the specified view mode (p. 89). If the **Same as last time** option is selected, the virtual machine will start in the same mode that was applied to it before it was turned off.
- The **On application start** option defines the operation to be performed on this virtual machine when you start Parallels Workstation Extreme.
  - Select **Start/Resume** if you want your virtual machine to start automatically every time you start Parallels Workstation Extreme.
  - Select **Do Nothing** if you do not want your virtual machine to start automatically when you start Parallels Workstation Extreme.
- The **On application exit** option defines the operation to be performed when you close Parallels Workstation Extreme:
  - Select **Suspend** if you want the virtual machine to be suspended when you close the application.
  - Select **Stop** if you want the virtual machine to be shut down when you close the application.
  - If you select **Ask me what to do**, you will be prompted to choose the operation to perform with the virtual machine each time you close Parallels Workstation Extreme.

## Undo Disks

The **Enable Undo Disks** option allows you to discard or apply the changes you made to the virtual machine's hard disk during your working session. If you choose to discard them, the changes will be discarded when you shut down the virtual machine. When you start this virtual machine again, its virtual hard disk will have the same data it contained before you started the previous working session. If you choose to apply the changes on the virtual machine shutdown, the next time you start this virtual machine, its virtual hard disk will store the changes you made during the previous working session.

---

**Note:** When enabled, the **Undo Disks** feature is applied to all virtual hard disks this virtual machine uses.

---

You can choose whether you want to discard the changes you made to the virtual machine's hard disk or choose the action to perform in the **On shutdown** field.

- **Discard changes.** Select this option if you want to discard the changes when you shut down this virtual machine.
- **Ask me what to do.** If this option is selected, you will be prompted to choose the action to perform with the changes (discard or apply them) each time you shut down the virtual machine.

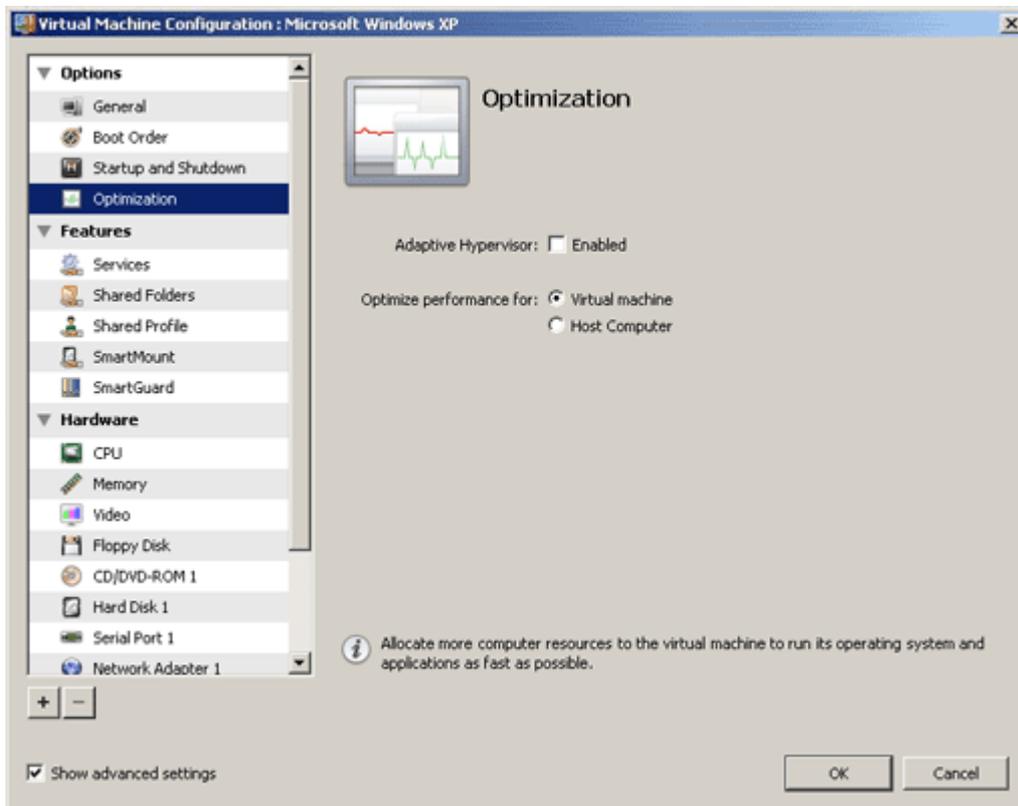
---

**Note:** You cannot create snapshots of virtual machines that have this option enabled.

---

## Optimization Settings

On the Optimization pane of Virtual Machine Configuration, you can configure two groups of settings related to the virtual machine performance.



## Adaptive Hypervisor

Select the **Enabled** option for Adaptive Hypervisor to automatically allocate the host computer CPU resources between the virtual machine and primary OS applications depending on what application you are working with at the moment. If the virtual machine window is in focus, the priority of this virtual machine processes will be set higher than the priority of the primary OS's processes. As a result more CPU resources will be allocated to the virtual machine. If you switch to the primary OS window - the priority of its working applications will be set higher and the CPU resources will be relocated to the primary OS. This Adaptive Hypervisor technology is useful when you use a lot of applications in the primary and guest OSs at a time and as a result lack the CPU resources.

## Optimizing Performance

- **Virtual machine.** Select this option to allocate more physical computer memory resources to the virtual machine and its applications. Selecting this option may significantly increase the virtual machine performance; however, it may slow down the productivity of your host computer applications.
- **Host computer.** Select this option to allocate more memory resources to the host computer and its applications.

## Power Consumption (laptops only)

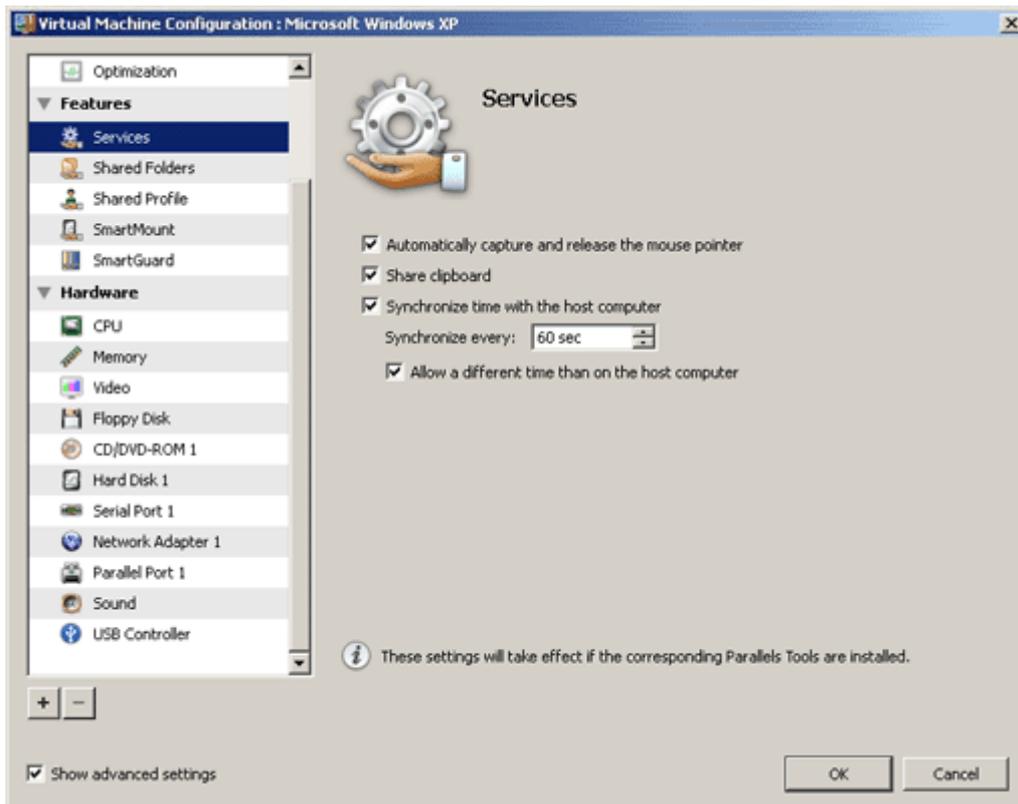
This group of settings allows you to control the virtual machine power consumption if Parallels Workstation Extreme is installed on a laptop computer that is running on batteries:

- **Longer battery life.** If you select this option, the virtual machine power consumption will be automatically reduced to provide a longer life for the battery of your laptop.
- **Better performance.** If you select this option, the virtual machine and its applications will operate at the maximum possible speed. However, enabling this option may significantly reduce the battery life.
- **Enable battery in virtual machine.** If you enable this option, the battery status will be displayed in your virtual machine each time your laptop computer runs on batteries.

## Services Settings

The Services pane of Virtual Machine Configuration allows you to manage a number of Parallels Tools-related parameters.

**Note:** To use the functionality available on the Services pane, you should have Parallels Tools installed in the virtual machine.



## Mouse and Keyboard Synchronization

Select the **Automatically capture and release the mouse pointer** option to facilitate the process of switching the keyboard and mouse input between the virtual machine and physical computer. With this option enabled, Parallels Workstation Extreme automatically grabs input from the keyboard and mouse and directs it to the virtual machine.

## Clipboard Synchronization

Select the **Share Clipboard** option to allow sharing your clipboard between the virtual machines, or the virtual machine and the physical computer. With this option enabled, you can copy and paste text and files from the physical computer to the virtual machine, and vice versa, as well as copy and paste texts and files between the Parallels virtual machines.

---

**Note:** This option is available for Windows guest operating systems only. For more details, see the **Parallels Tools Overview** section (p. 75).

---

## Time Synchronization

Select the **Synchronize time with the host computer** option to synchronize the time settings of your virtual machine with those of the physical computer. You can specify the frequency of time synchronization checks in the **Synchronize every** field.

If the time zone set in your virtual machine differs from that of the physical computer, you can maintain this time difference by selecting the **Allow a different time than the host computer** option.

## Shared Folders Settings

You can manage shared folders and their parameters in the **Shared Folders** pane of Virtual Machine Configuration.

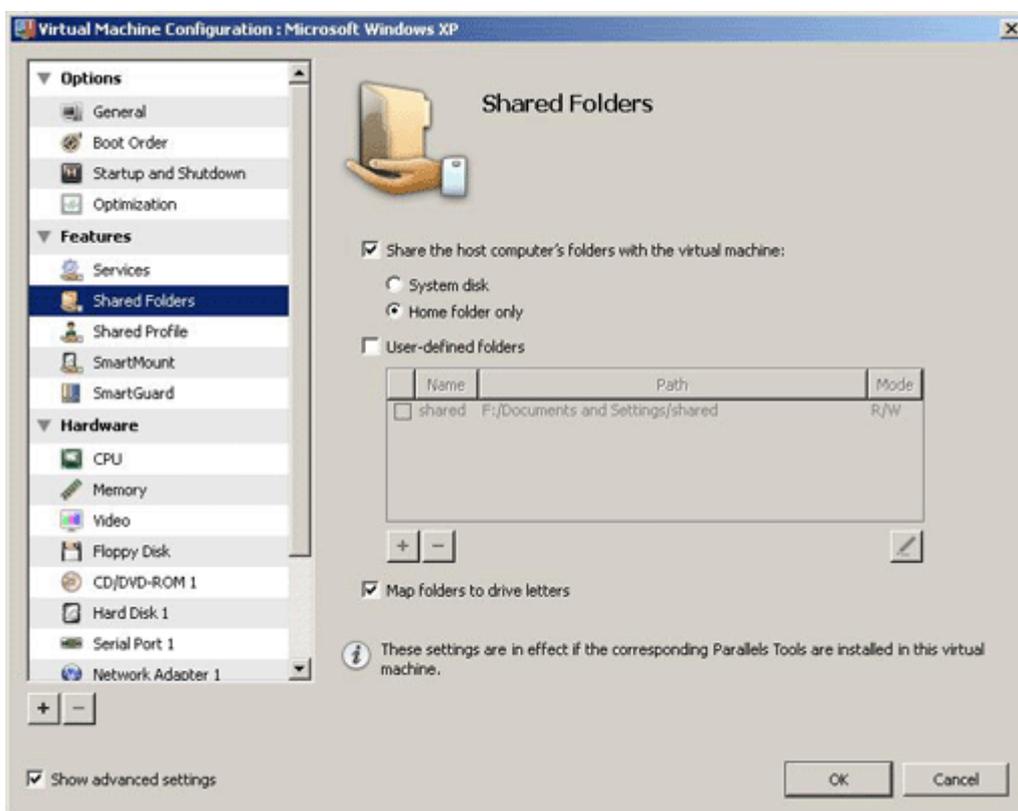
Shared folders and their parameters can be configured for Windows and Linux guest operating systems.

You can also change the shared folders settings at runtime. To learn how to do it, refer to the **Changing the Configuration at Runtime** (p. 93) section.

---

**Note:** To use the functionality available on the **Shared Folders** pane, you should have Parallels Tools (p. 74) installed in the virtual machine.

---



## Sharing the host computer's folders with the virtual machine

Select the **Share the host computer's folders with the virtual machine** option to enable access to the disks and folders on the physical computer from inside the virtual machine. If this option is selected, you can configure access to the physical computer disks and folders as follows:

- Select the **System disk** option (the **All disks** option if Parallels Workstation Extreme is installed in a Linux host OS) to provide the virtual machine with access to:
  - the Windows-based physical computer disk where the operating system is installed
  - the root catalogue of the Linux-based physical computer
- Select the **Home folder only** option to provide the virtual machine with access to the Home folder on the physical computer.

---

**Note:** When you share the host computer's disks or folders with a virtual machine, they still reside and occupy space on the host computer's hard disk.

---

## Defining physical computer folders to be shared

Select the **User-defined folders** option to manually specify one or more folders on the physical computer that are to be shared with the virtual machine.

To add a shared folder:

- 1 Click the **Add**  button.
- 2 In the **Add Shared Folder** dialog, specify the following settings:
  - **Enabled.** Select this option to enable the shared folder.
  - **Path.** In this field, type the path to the folder you want to share with the virtual machine. You can also use the **CHOOSE** button to locate the folder.
  - **Name.** In this field, type the shared folder name under which the folder will be accessible from inside the virtual machine.
  - **Description.** In this field, you can provide a brief description for the shared folder.
  - **Read-only.** Select this option if you want the shared folder to have a read-only status when accessed from inside the virtual machine.
- 3 Click **OK**.

To remove a shared folder, select its name and click the **Remove**  button.

## Mapping folders to drive letters

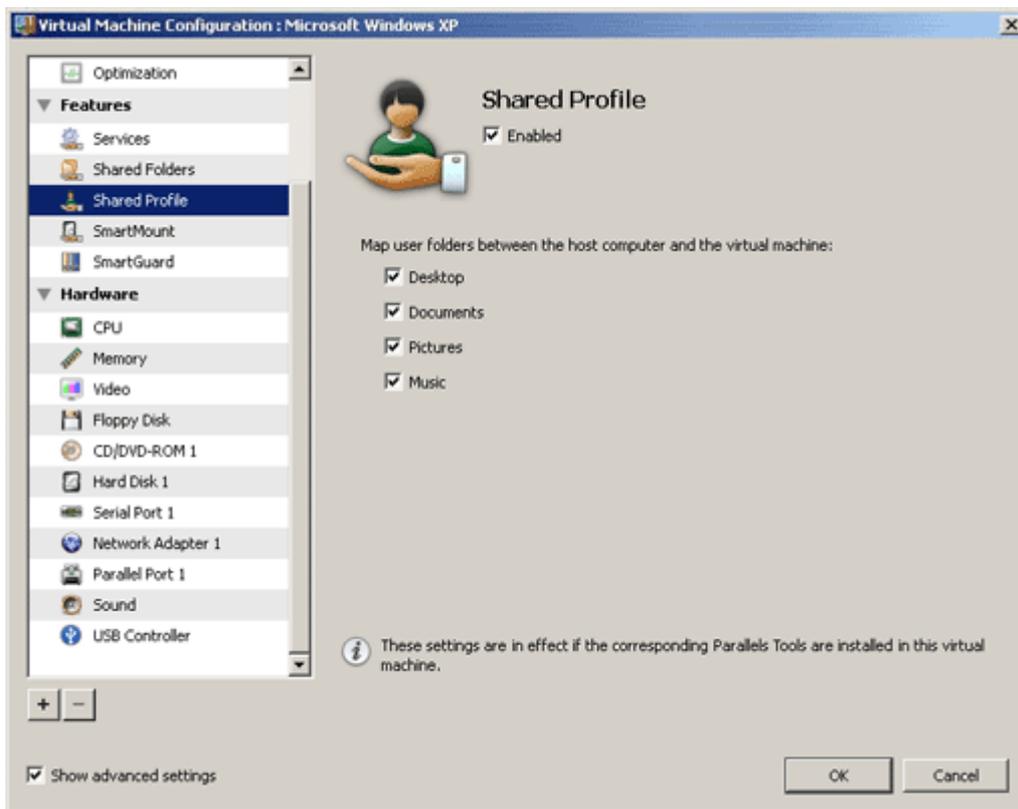
---

**Note:** This functionality is available only to Windows guest operating systems with Parallels Tools (p. 74) installed.

---

In the guest operating system, shared folders can be displayed as new disks with disk letters assigned. You may find it useful if you need to repeatedly access the shared folders. To display the shared folders as disks, select **Map folders to drive letters**. With this option selected, if you open up **My Computer** in the guest operating system, you will see the host computer's shared folders as new disks with drive letters assigned.

## Shared Profile Settings



To enable the Shared Profile functionality, select the **Enabled** option at the top of the **Shared Profile** pane.

If the Shared Profile functionality is activated, you can choose one of the following options:

- Select **Desktop** to use the host computer desktop as the desktop in your Windows guest OS.
- Select **Document** to use the Linux host computer Documents directory or the Windows host computer My Documents folder as the My Documents folder in your Windows guest OS.
- Select **Pictures** to use the Linux host computer Pictures directory or the Windows host computer My Pictures folder as the My Pictures folder in your Windows guest OS.
- Select **Music** to use the Linux host computer Music directory or the Windows host computer My Music folder as the My Music folder in your Windows guest OS.

---

**Notes:** 1. If there is no the Desktop, Documents, Pictures, or Music directory in the Linux primary OS home directory (`/home/<username>`), the corresponding directory will be automatically created before mounting.

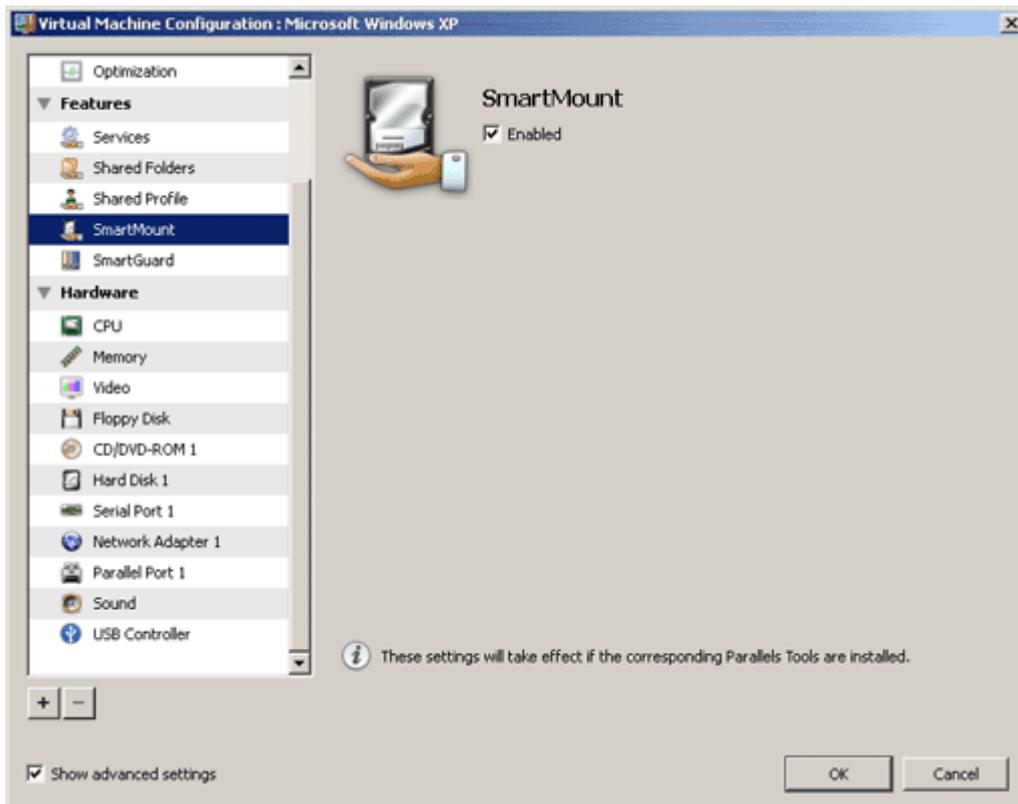
2. The Shared Profile functionality is available for Windows guest operating systems only.

---

## SmartMount Settings

The SmartMount pane of Virtual Machine Configuration allows you to configure the settings related to the automatic detection and mounting of removable devices in your virtual machines.

**Note:** The SmartMount option is available for Windows and Linux virtual machines with Parallels Tools installed.



If the SmartMount option is enabled, any device that you connect to the host computer is also automatically mounted to your guest operating system. For example, a USB flash drive plugged in to your host computer will be accessible from both the host computer and My Computer in the Windows virtual machine. The following devices can be automatically mounted to your virtual machines:

- external storage devices such as USB hard disks and USB flash drives
- CD-ROM and DVD-ROM drives
- network shares
- mounted images (ISO)

The permissions you will have for managing the mounted device from inside the virtual machine will coincide with those you have for this device in the host computer. So, if you can read from and write to a USB flash drive in the host computer, you will have the same permissions for this drive from inside the virtual machine.

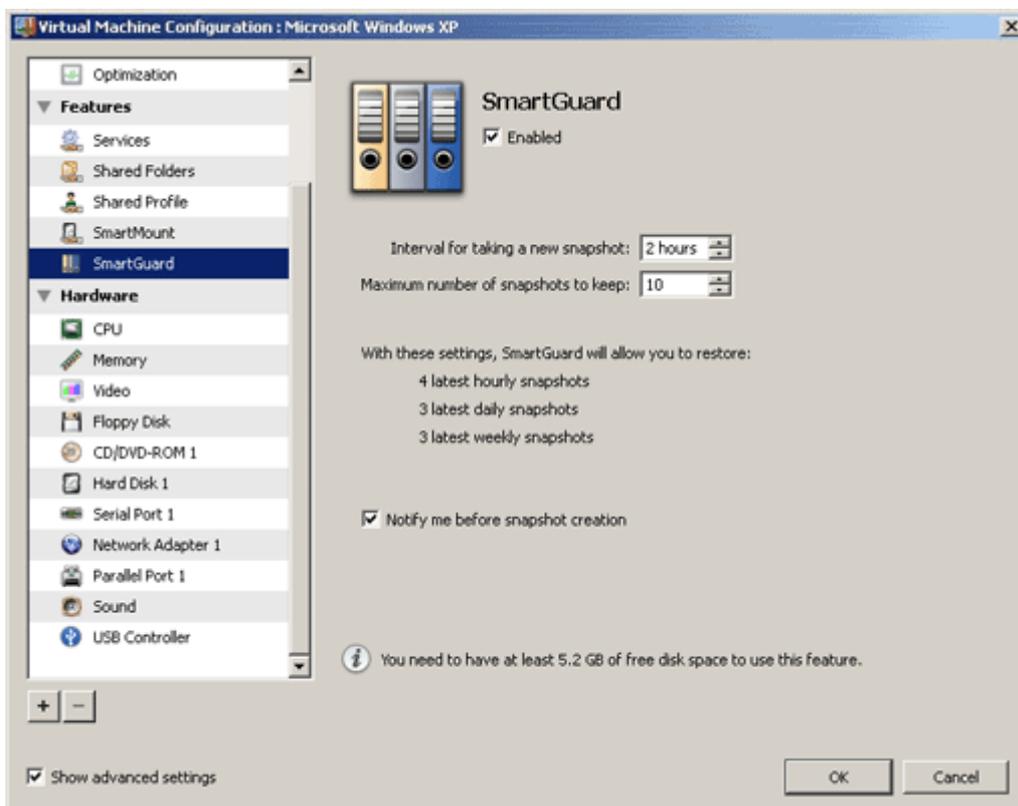
## SmartGuard Settings

Using the SmartGuard Settings, you can automate snapshots creation. You can find detailed information on snapshots and how to work with them in the *Working with snapshots* chapter (p. 191).

To edit these settings, perform the following:

- 1 Open the **Virtual Machine** menu or Alt-click (Option-click) the Parallels icon in the Mac menu bar (in the Crystal view mode).
- 2 Click **Configure**.
- 3 In the **Virtual Machine Configuration** window, click **Options**, and select these settings name in the sidebar.

**Note:** When your virtual machine is paused, snapshot can be created neither manually nor automatically.



To enable the SmartGuard functionality, select the **Enabled** option at the top of the **SmartGuard** pane.

---

**Note:** The SmartGuard feature is available only when the **Undo Disks** feature is disabled and if the virtual machine is not running in **Safe Mode** (p. 105).

---

If you want to know when it is time to make the next snapshot and to be able to reject the snapshot creation, enable the **Notify me before snapshot creation** option.

### Setting the Time Interval

Set how often snapshots should be made in the **Interval for taking a new snapshot** field. You can set from one hour to 48 hours.

If the time interval is less than 24 hours, SmartGuard will allow you to restore the latest hourly, daily and weekly snapshot. If the time interval is more than 24 hours, you will be able to restore the latest daily, weekly and monthly snapshot.

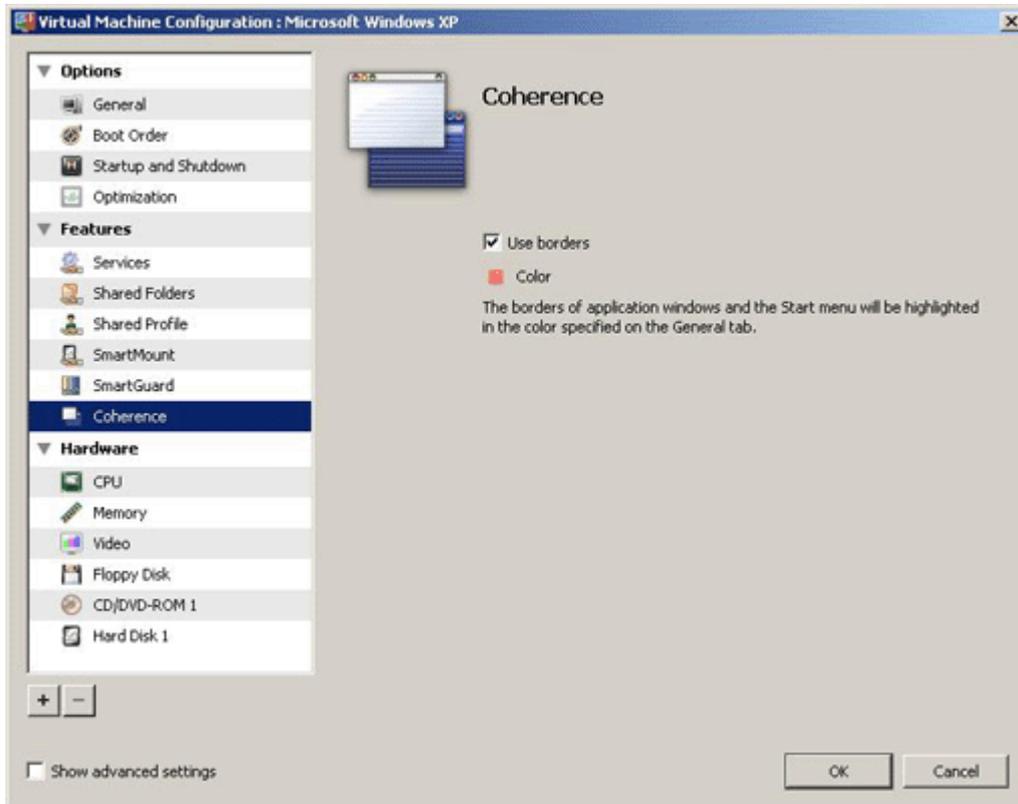
To manage the snapshots and restore any of them, use **Snapshot Manager** (p. 193).

### Restricting the Snapshots Number

Use the **Maximum number of snapshots to keep** field to set the maximum number of snapshots that can be stored on the host computer. The maximum available value is 100 snapshots. As soon as **Snapshots Manager** reaches the limit for snapshots and needs to make a new one over the limit, it deletes the oldest snapshot.

## Coherence Settings

The Coherence pane of the Virtual Machine Configuration dialog allows you to configure the following settings:



- **Use borders.** This option is selected by default. It determines whether the guest OS applications windows will have the colored borders when you work in the Coherence mode (p. 91) or not.
- **Color.** The border color of the guest OS applications windows. If you want to change the color, go to the General pane (p. 110) and choose any from the available palette.

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**Note:** Select different colors for different virtual machines or you may confuse the guest OSs applications windows if you switch two or more virtual machines to the Coherence mode.

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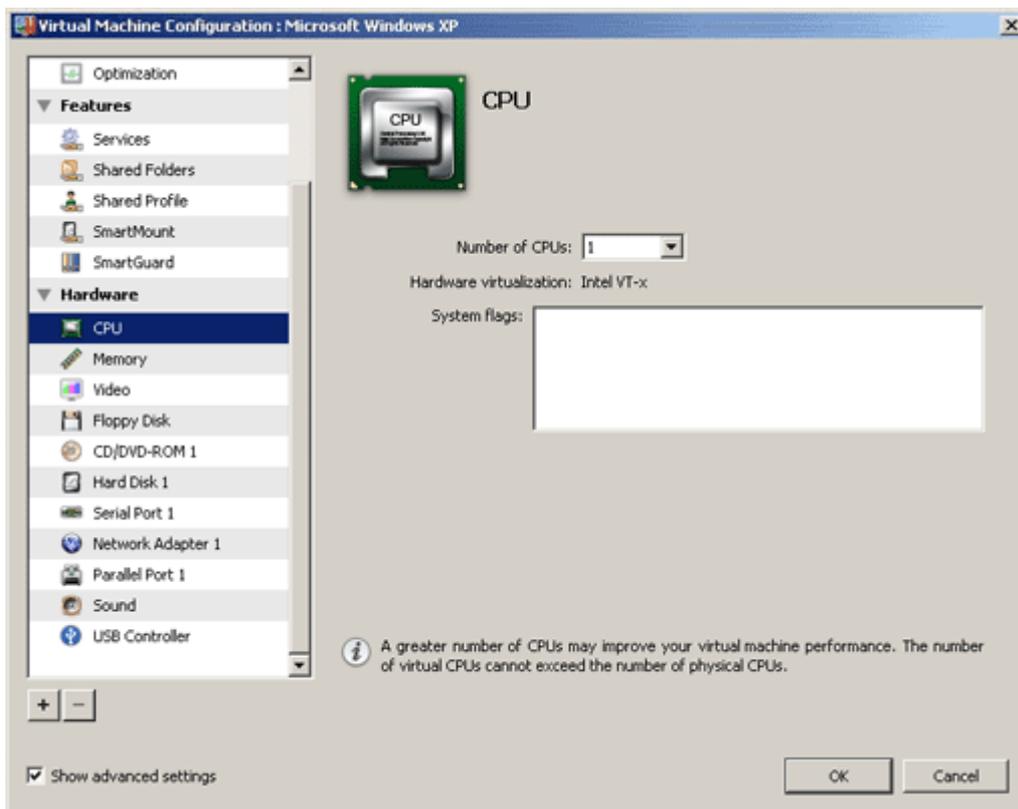
## CPU Settings

You can view and configure the virtual machine's CPU settings on the CPU pane of Virtual Machine Configuration.

---

**Note:** These settings cannot be changed when the virtual machine is running.

---



This pane allows you to configure the number of virtual CPUs that will be used to handle the processes running in the virtual machine. To this effect, choose the necessary number of CPUs from the drop-down menu. The maximum allowable number of virtual CPUs depends on the number of physical CPU cores available to the host computer. For example, if you have the Core 2 Duo physical processor, the maximum allowable number of virtual CPUs will be 2. However, in any case, you will not be able to set more than 12 virtual CPUs to a virtual machine.

In the **Hardware Virtualization** field, you can view the type of hardware virtualization technology used by the virtual machine to emulate the hardware.

To view or edit other CPU settings, select the **Show advanced settings** check box. You can edit the following advanced settings:

- **System Flags.** The flags you type here will change the virtual machine system behavior.

---

**Note:** System flags can be used by the Parallels customer support team in cases when something goes wrong in your virtual machine. It is not recommended to type anything into this field without being instructed to do so by the customer support staff.

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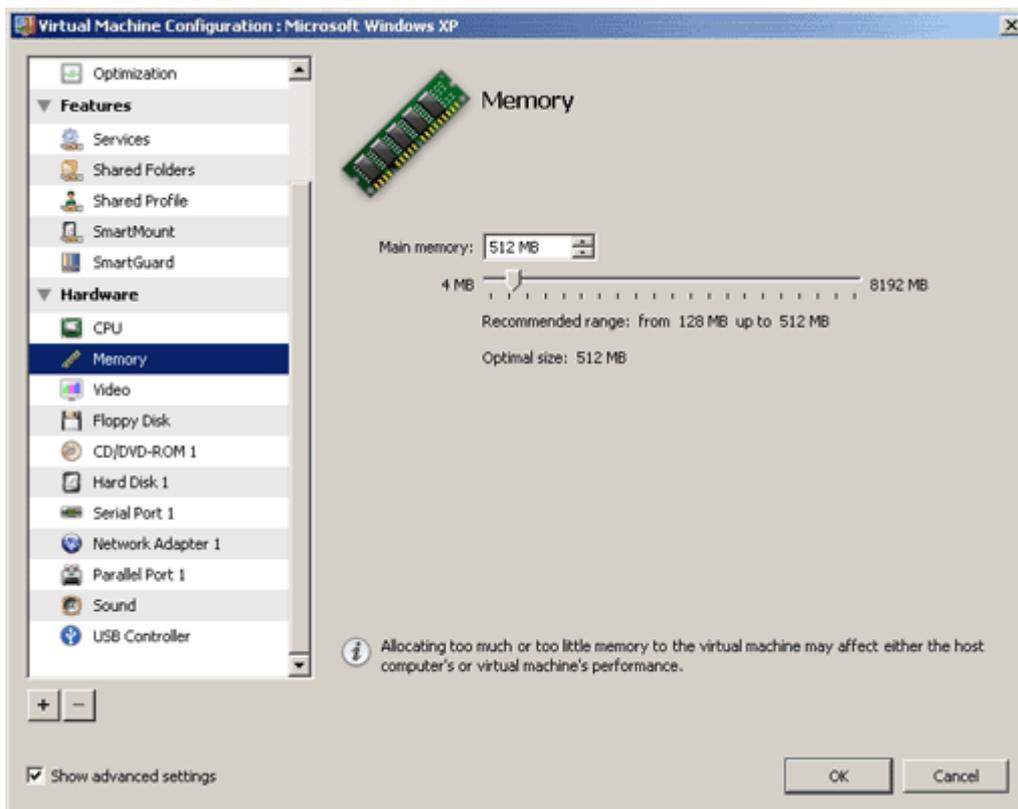
## Memory Settings

To view and configure the amount of RAM available to your virtual machine, use the **Memory** pane of Virtual Machine Configuration.

---

**Note:** These settings cannot be changed when the virtual machine is running.

---



In the **Main Memory** field, you can set the amount of RAM that will be available to the virtual machine. You can specify any value from 4 to 8192 MB, but it is recommended that you set the value provided in the **Optimal Size** field below the slider. This will provide the most optimal performance for your virtual machine and the host computer.

By default, the optimal size is the amount of RAM the guest operating system needs. If some of the applications installed in your virtual machine need more RAM, you can set a greater amount of RAM for this virtual machine, provided the memory resources of the host computer are enough for running both the primary operating system and this virtual machine.

---

**Note:** If the host computer has 1 GB of RAM, it is strongly recommended to assign not more than 512 MB to a single virtual machine.

---

To configure the main memory limit, do one of the following:

- drag the slider
- use the **Main Memory** spin box arrows
- type the value directly into the **Main Memory** field

## Video Settings

To view and configure the amount of video memory available to the virtual machine's video card, use the **Video Settings**.

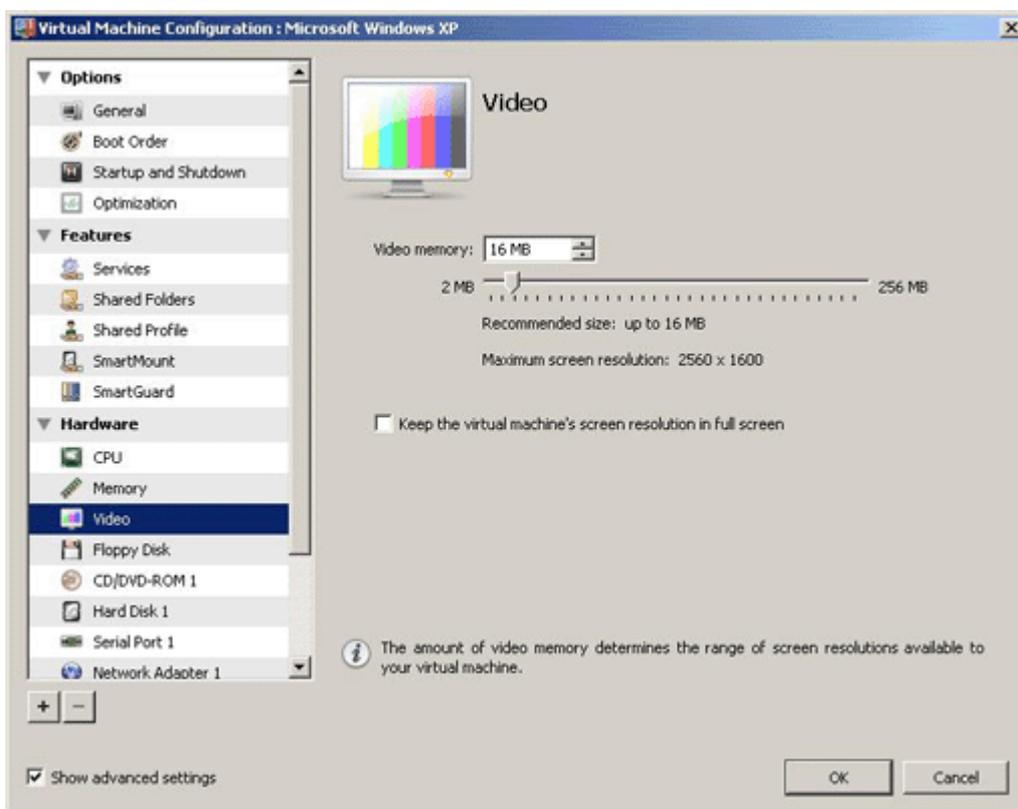
To edit these settings, perform the following:

- 1 Open the **Virtual Machine** menu or Alt-click (Option-click) the Parallels icon in the Mac menu bar (in the Crystal view mode), and click **Configure**.
- 2 In the **Virtual Machine Configuration** window, click **Hardware**, and select **Video** in the sidebar.

---

**Note:** These settings cannot be changed when the virtual machine is running.

---



In the **Video memory** field, you can set the amount of video memory that will be available to the virtual machine. You can specify any value from 2 to 256 MB; however, we recommend that you choose the value from the range given in the **Recommended size** field below the slider. This will provide the most optimal performance for your virtual machine and the physical computer where this virtual machine is hosted.

The **Maximum screen resolution** field shows the maximum screen resolution that will be supported in the virtual machine with the specified amount of video memory.

To configure the video memory limit, do one of the following:

- drag the slider
- use the spin box arrows
- type the value directly into the **Video memory** field

### Keeping Virtual Machine's Screen Resolution in Full Screen Mode

The way the virtual machine is displayed in the Full Screen mode (p. 89) depends on the virtual machine's screen resolution and on whether Parallels Tools (p. 74) are installed or not:

- If the virtual machine's screen resolution is lower than that of the host computer and there are no Parallels Tools (p. 74) installed, in the Full Screen mode (p. 89), the virtual machine's screen will appear on a black background.
- If the virtual machine's screen resolution is higher than that of the host computer and there are no Parallels Tools (p. 74) installed, in the Full Screen mode (p. 89), the virtual machine's screen will have scroll bars.
- If the virtual machine's screen resolution is lower or higher than that of the host computer but Parallels Tools (p. 74) are installed, in the Full Screen mode (p. 89), the virtual machine's screen will be displayed in the host computer's screen resolution. For example, if the virtual machine's screen resolution is 800x600 or 1400x1050 and that of the host computer is 1280x1024, in the Full Screen mode (p. 89), the virtual machine's screen resolution will also become 1280x1024.

---

**Note:** If dynamic resolution does not work when switching to Full Screen mode in virtual machines with Linux guest operating system installed, increase the amount of video memory available to the virtual machine's video card up to 16 MB.

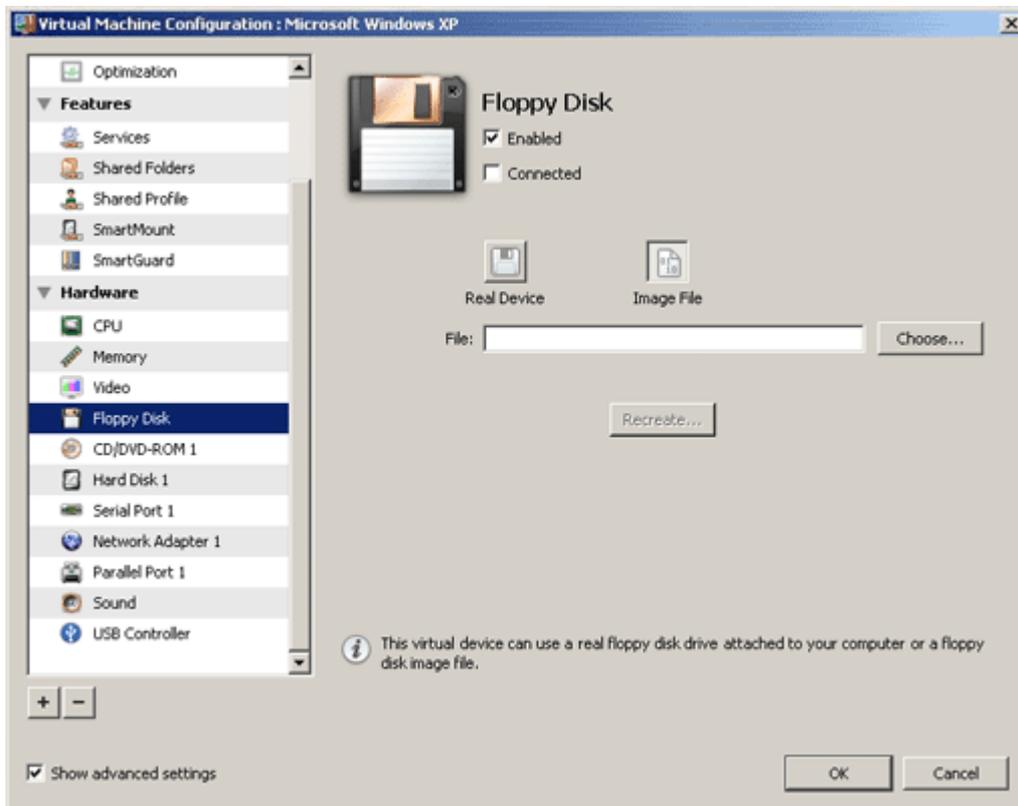
---

To keep the virtual machine's screen resolution in the Full Screen mode (p. 89), select **Keep the virtual machine's screen resolution in full screen**. With this option selected, the virtual machine's screen resolution will remain without any changes in the Full Screen mode (p. 89) even if Parallels Tools (p. 74) are installed. Moreover, if the virtual machine's screen resolution is lower than that of the host computer, the virtual machine will be displayed fullscreen with no black background.

In the second case, if the virtual machine screen resolution is lower than that of the host computer, in the Full Screen mode, the virtual machine's screen will appear on a black background. If the virtual machine's screen resolution is higher than that of the host computer, in the Full Screen mode, the virtual machine's screen will have scroll bars.

## Floppy Settings

To view and configure the virtual machine floppy disk drive settings, use the Floppy Disk pane of Virtual Machine Configuration.



**Enabled.** Select this option to enable floppy disk drive operations in the virtual machine. To temporarily disable floppy drive operations without removing the floppy drive from the virtual machine configuration, clear this option.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

**Connected.** Select this option if you want the floppy disk drive or floppy disk image to be automatically connected to the virtual machine on its startup.

You can choose one of the following devices to emulate the virtual machine floppy disk drive:

- To use a real floppy disk drive, select **Real Device** and specify the device to use.
- To use a floppy disk image, select **Image File** and specify the path to the floppy disk image file in the **File** field. You can also use the **Choose** button to locate the file.

If you want to create a new floppy disk image or to replace the currently used floppy disk image by a blank floppy disk image, click the **Recreate** button.

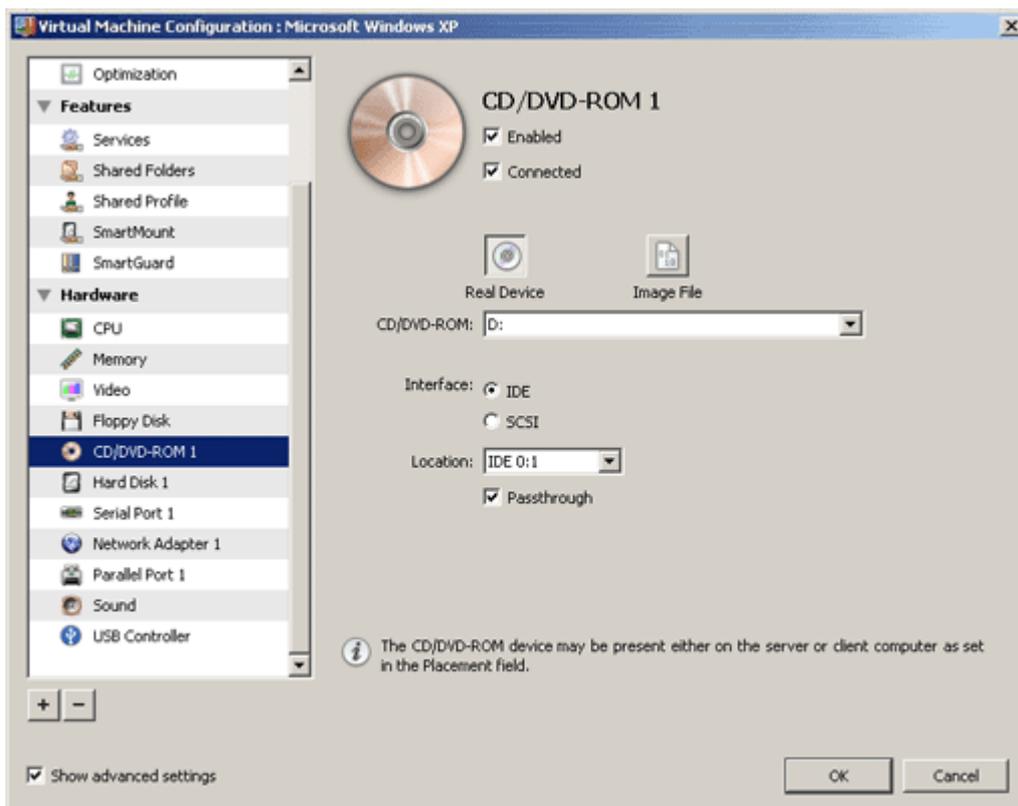
---

**Warning:** Recreating the current floppy disk image deletes all the data stored on this disk image.

## CD-ROM options

To configure the virtual machine's CD/DVD-ROM drive settings, use the CD/DVD-ROM pane of Virtual Machine Configuration. Virtual CD/DVD-ROM drives can be connected either to physical CD/DVD-ROM drives or to CD/DVD images.

**Note:** You can connect up to four IDE devices (hard disks or CD/DVD drives) and 15 SCSI devices to a virtual machine. Each device is listed separately in the Virtual Machine Configuration dialog and has its own number.



Select the **Enabled** option if you want the virtual machine to use this CD/DVD-ROM drive. To temporarily disable operations with the CD/DVD-ROM drive without removing it from the virtual machine configuration, clear the **Enabled** check box.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

---

Select the **Connected** option if you want the CD/DVD-ROM drive to be automatically connected to the virtual machine on its startup.

To emulate the virtual CD/DVD-ROM drive, you can connect one of the real CD/DVD-ROM drives on your physical computer or a CD/DVD-ROM image file to the virtual machine.

---

**Note:** Parallels Workstation Extreme supports ISO image files.

---

### Connecting a real device

To use a real CD/DVD-ROM drive as the virtual machine's CD/DVD-ROM drive:

- 1 Select the **Real Device** option.
- 2 Choose the device to be connected to the virtual CD/DVD-ROM drive in the CD/DVD-ROM list.
- 3 Select the type of interface for connecting the device:
  - **IDE.** Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD-ROM drives).
  - **SCSI.** Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD-ROM drives).

---

**Note:** RHEL 4.7 and RHEL 5.3 guest OSs do not support the SCSI controller.

---

- 4 Select the device position in the **Location** list.

---

**Note:** The SCSI 7:0 location is not available for selecting, since it is occupied by the SCSI controller itself.

---

- 5 Select the **Passthrough** option to connect your real CD/DVD-ROM drive to the virtual machine in the passthrough mode. In this mode, the CD/DVD-ROM drive is directly assigned to the virtual machine. If you connect a recordable optical drive to a virtual machine in the passthrough mode, you will be able to use it to burn CD or DVD discs in the virtual machine.

---

**Note:** If you select the **Passthrough** option, the physical computer will have no access to this CD/DVD-ROM drive.

---

- 6 Click **OK**.

---

**Note:** The **Interface**, **Location**, and **Passthrough** options are available only if the **Show advanced settings** check box is selected at the bottom of Virtual Machine Configuration.

---

### Connecting an image file

To use an image file as the virtual machine's CD/DVD-ROM drive:

- 1 Select the **Image File** option.

- 2 Type the path to the image file in the **File** field or use the **Choose** button to locate the file.
- 3 Select the type of interface to connect the image file to:
  - **IDE**. Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD-ROM drives).
  - **SCSI**. Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD-ROM drives).

---

**Note:** RHEL 4.7 and RHEL 5.3 guest OSs do not support the SCSI controller.

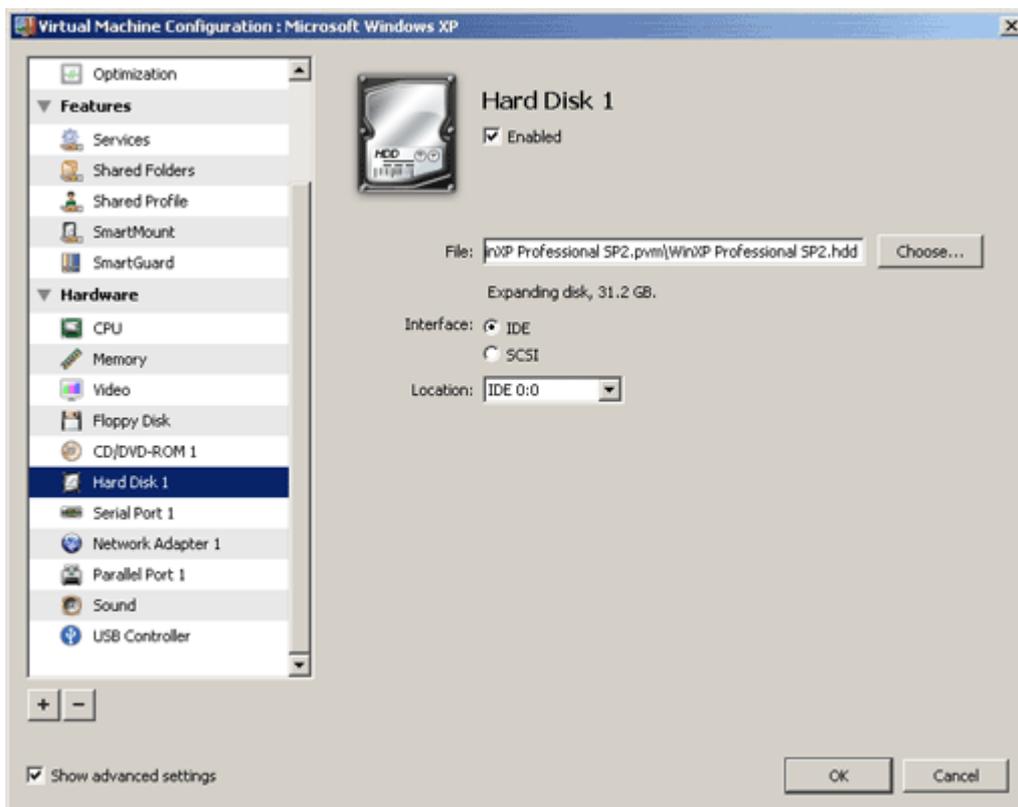
---

- 4 Select the device position in the **Location** list.
- 5 Click **OK**.

## Hard Disk Settings

To view and configure the virtual hard disk settings, use the **Hard Disk** pane of **Virtual Machine Configuration**. The current version of Parallels Workstation Extreme allows virtual machines to use hard disk images in the `.hdd` format.

**Note:** You can connect up to four IDE devices (hard disks or CD/DVD drives) and 15 SCSI devices to a virtual machine. Each device is listed separately in the **Virtual Machine Configuration** dialog and has its own number.



Select the **Enabled** option if you want the virtual machine to use this hard disk drive. To temporarily disable operations with the hard disk without removing it from the virtual machine configuration, clear the **Enabled** check box.

### Using a hard disk image file as a virtual hard disk

- 1 Type the path to the hard disk image file in the **File** field or use the **Choose** button to locate the file.
- 2 Select the **Show advanced settings** option if it is not selected and choose the interface type for connecting the hard disk image. Two types are available:
  - **IDE**. Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.
  - **SCSI**. Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD-ROM drives) to the virtual machine.

**Note:** In some Linux distributions (e.g. RHEL 5.3), the SCSI driver may be not installed. In this case, you should install this driver in your Linux guest OS to be able to use the SCSI controller.

- 1 Select the device location in the **Location** list.

---

**Note:** The SCSI 7:0 location is not available for selecting, since it is occupied by the SCSI controller itself.

---

- 2 Click **OK**.

---

**Note:** The **Interface** and **Location** options are available only if the **Show advanced settings** check box is selected at the bottom of the **Virtual Machine Configuration** dialog.

---

## Support for Virtual and Real Disks

This section lists the types of disks that can be used by Parallels virtual machines and provides the information about basic operations you can perform on these disks.

### Supported Types of Hard Disks

Parallels virtual machines use virtual hard disks as their hard disks.

#### Virtual Hard Disks

The capacity of a virtual hard disk can be set from 100 MB to 2 TB.

Virtual hard disks can be of either *plain* or *expanding* format. When you create a virtual machine in **Express Windows** or **Typical** mode (in the New Virtual Machine wizard (p. 58)), the disk is created in the *expanding* format.

- |                  |   |
|------------------|---|
| <b>plain</b>     | A plain virtual hard disk image file has a fixed size. The size is determined when the disk is created. Plain disks can be created with the help of New Virtual Machine wizard (the Custom mode.) |
| <b>expanding</b> | An expanding virtual hard disk image file is small initially. Its size grows as you add applications and data to the virtual hard disk in the guest OS.   |

#### Split disks

A virtual disk of either format can be a single-piece disk or a split disk. A split disk is cut into 2 GB pieces and is stored as a single `.hdd` file.

### CD/DVD Discs and Their Images

Parallels Workstation Extreme can access real CD/DVD discs and images of CD/DVD discs.

Parallels Workstation Extreme has no limitations on using multisession CD/DVD discs. Virtual machine can play back audio CDs without any limitations on copy-protected discs.

If your host computer has a recordable optical drive, you can use it to burn CD or DVD discs in a virtual machine.

---

**Note:** To burn CD or DVD discs in a virtual machine, the recordable optical drive should be connected to the virtual machine in the passthrough mode (p. 132).

---

Parallels Workstation Extreme supports CD/DVD disc images in the ISO format. Parallels Workstation Extreme may also support CD/DVD disc images in the CUE and CCD formats.

### Floppy Disks and Floppy Disk Images

Parallels Workstation Extreme can use two types of floppy disks:

- Real diskettes inserted into a real floppy disk drive that is connected to the virtual machine.
- Floppy disk image files with the `.fdd` extension connected to the virtual machine.

Parallels Workstation Extreme treats floppy disk images like real diskettes. Parallels Workstation Extreme supports floppy disk image files that have .fdd extension and 1.44 MB size.

With Parallels Workstation Extreme, you can also create an image of a blank floppy using Floppy Disk pane (p. 131) of the **Virtual Machine Configuration** dialog (p. 109).

---

**Note:** Parallels Workstation Extreme cannot create images of real diskettes.

---

## Serial Port Settings

In the **Serial Port** pane, you can configure the virtual machine serial port settings.

Using serial ports, you can establish a connection between

- the virtual machine and the host computer devices (using a real port) or
- between two virtual machines located on the same host computer (using a socket).

If you want to connect your virtual machine to the host computer device, you should create a serial port emulated by a real port. The **Serial Port** list comprises the devices on the host computer that are available for connection. The connected device, being used in any virtual machine, cannot be used by the host computer. To be able to use it in the host computer, you should first disconnect it from the virtual machine. To do that, use the virtual machine status bar (p. 36).

If you want to connect two virtual machines with each other, you need to create a serial port emulated by a socket in each virtual machine. The names of the serial ports should be identical. The connection between the virtual machines via serial ports is bidirectional. It means that the working modes of the sockets set during the port creation can be changed later in the **Serial Port** pane.

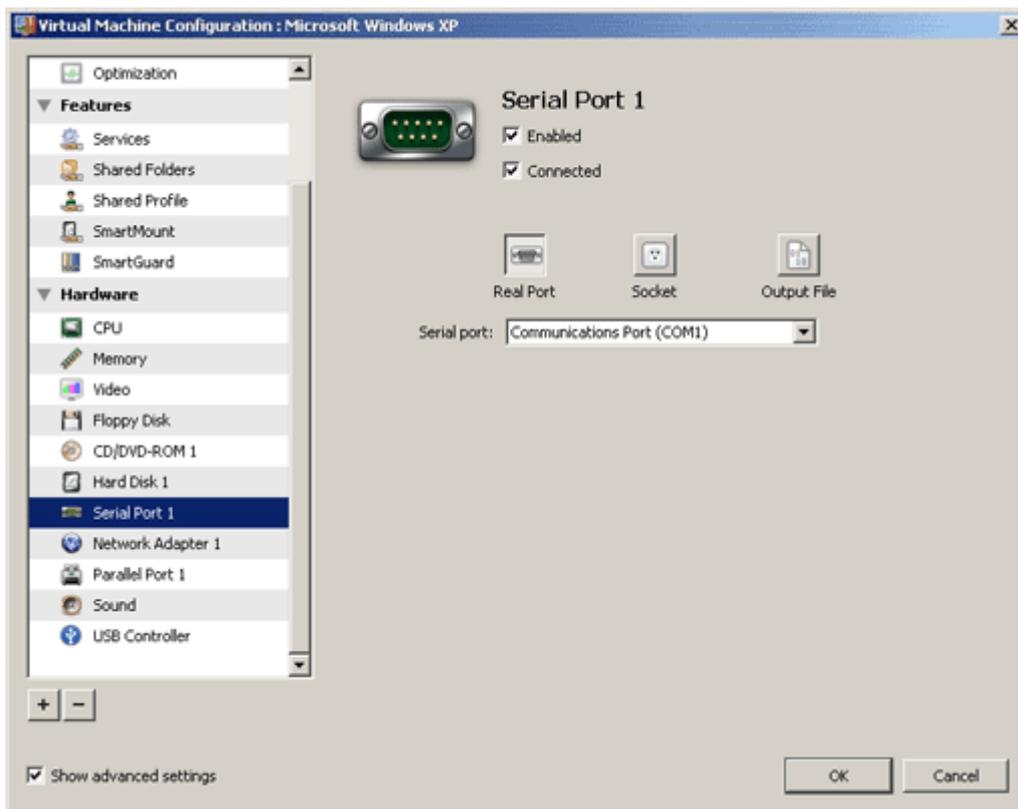
If you need to log the performance activity of your virtual machine or to record the data from it and use this information later on, you can connect your virtual machine serial port to an output file on the physical server. You will be able to view and analyze the activity history of the virtual machine any time you need it by exploring this file.

You can add a new serial port to your virtual machine using **Add Hardware Assistant**. For the instruction on how to create serial ports, refer to **Adding and Removing Devices**.

---

**Note:** You can connect up to four serial ports to a virtual machine.

---



**Enabled.** Select this option if you want to enable this serial port in the virtual machine. To temporarily disable the serial port without deleting it from the virtual machine configuration, clear this option.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

**Connected.** Select this option if you want the virtual machine to start up with the serial port connected.

Serial ports can be emulated by the following devices:

- **Real Port.** Select this option to connect the virtual machine serial port to one of the existing serial ports on the host computer. In this case, you will need to choose the appropriate port on the host computer in the **Serial port** list.
- **Socket.** Select this option to connect two virtual machines through the sockets. When connecting the virtual machine to a socket, you can use the default path to the socket or type a new one in the **Socket** field. You can also configure the role the virtual machine will play in the connection by selecting the necessary role in the **Mode** list. Selecting **Server** enables you to use this virtual machine to direct the other one. Selecting **Client** enables you to direct this virtual machine from the other one.

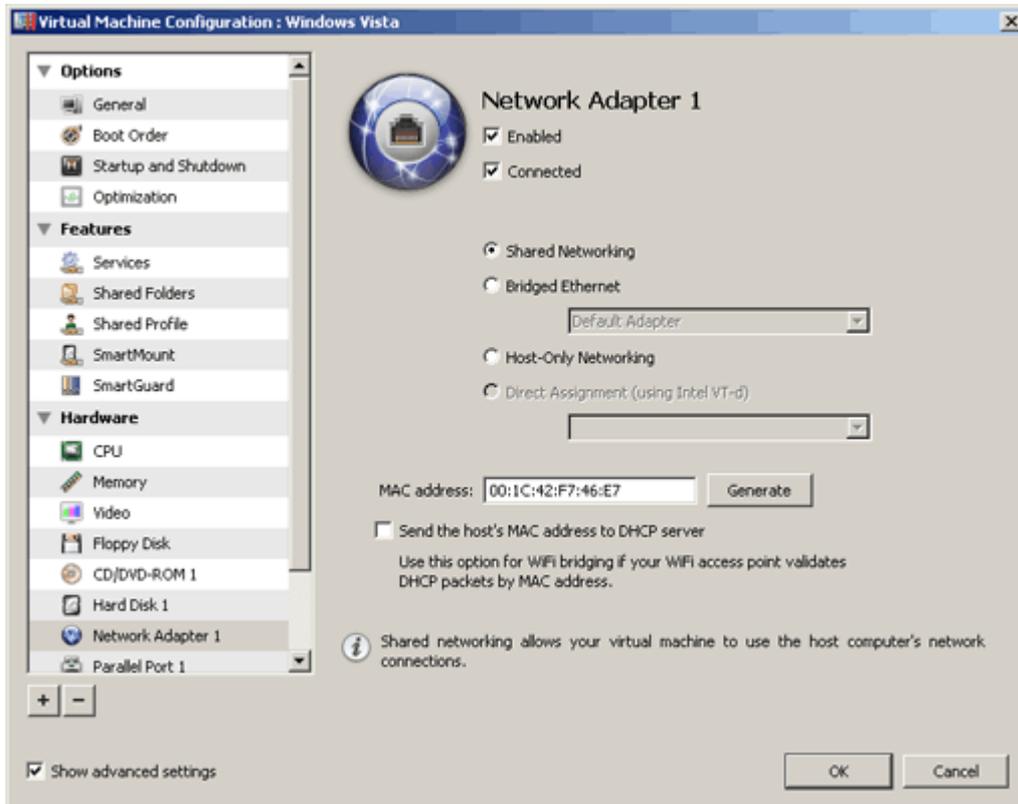
---

**Note:** If you change the socket mode of the first virtual machine, make sure that the socket mode of the second virtual machine is also modified.

- **Output File.** Select this option to connect the virtual machine serial port to an output file. You can accept the default path or type your own one in the **File** field. You can also use the **Choose** button to locate the necessary file.

## Network Adapter Settings

The Network Adapter pane of Virtual Machine Configuration allows you to manage the virtual machine's network settings.



**Enabled.** Select this option if you want to enable this network adapter in the virtual machine. If you want to temporarily disable the network adapter without deleting it from the virtual machine configuration, clear the **Enabled** check box.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

---

**Connected.** Select this option if you want the virtual machine to start up with this network adapter connected.

You can choose one of the following types of networking for the virtual machine network adapter:

- **Shared Networking.** Select this option to enable the Network Address Translation (NAT) feature for the virtual machine. In this case, your virtual machine will share whatever network connection is currently used by the host computer.  
See *Shared Networking* (p. 173) to learn how to configure this type of networking.
- **Bridged Networking.** Select this option to allow the virtual machine to access the local network and Internet through one of the network adapters installed on the host computer. In this case, the virtual machine is treated as a stand-alone computer on the network and should be configured in the same way as a real one. You can choose the physical adapter where the virtual machine adapter will be bridged in the list below the **Bridged Networking** option.  
See *Bridged Ethernet Networking* (p. 175) to learn how to configure this type of networking.
- **Host-Only Networking.** Select this option to allow the virtual machine to connect to the host computer and the virtual machines residing on it and to make it invisible outside the host computer.  
See *Host-Only Networking* (p. 176) to learn how to configure this type of networking.
- **Direct Assignment (using Intel VT-d).** Select this option to allow the virtual machine to access the local network and Internet through a PCIe network adapter with the help of the Intel VT-d technology. See *Networking Using a PCIe Adapter* (p. 177) to learn how to configure this type of networking.

In the **MAC address** field, you can change the MAC address currently assigned to the virtual machine. MAC addresses are automatically generated during the virtual machine creation. However, you can modify the default MAC address by typing another value in the **MAC address** field or clicking the **Generate** button. When entering a new MAC address, make sure that it is unique within your network.

## WiFi Bridging Support

To be able to connect to wireless networks from your virtual machine:

- 1 Select the **Bridged Ethernet** option.
- 2 Choose the WiFi adapter from the drop-down list and click **OK** to apply the changes.

After you perform these steps, your virtual machine will be able to connect to the Internet through the WiFi adapter of your host computer.

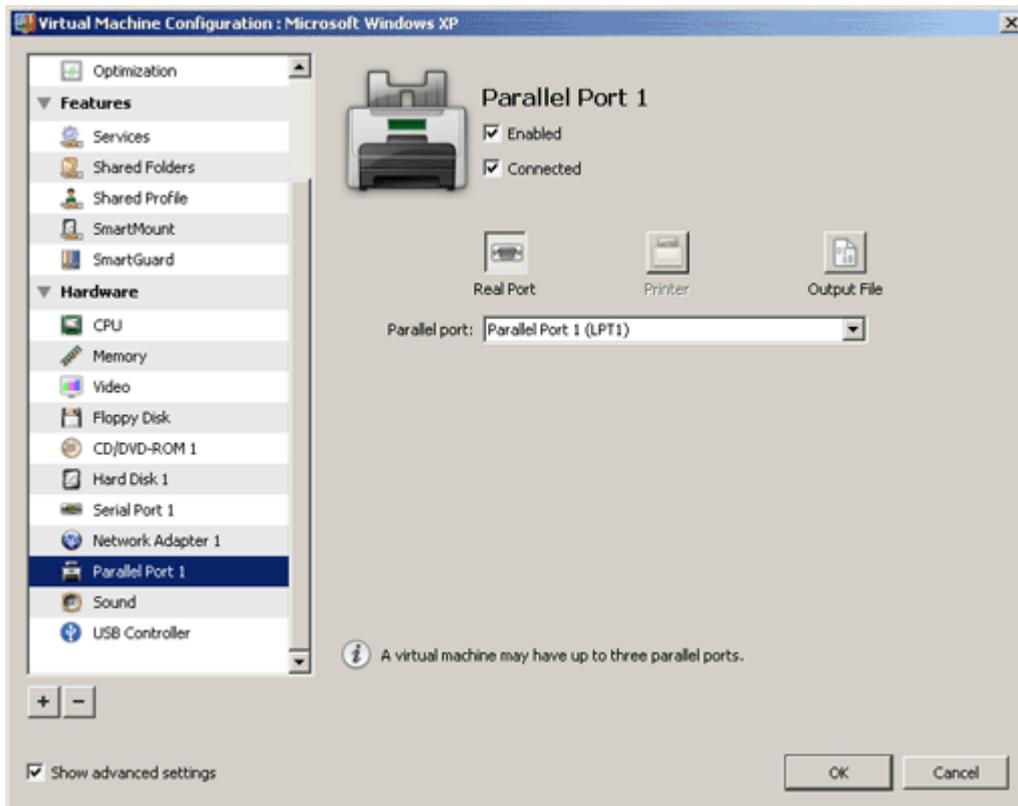
When you try to connect to the Internet via WiFi, and the WiFi Access Point has the **Validate DHCP packets** option enabled, you may experience problems with connecting to the Internet. In this case, enable the **Send the host's MAC address to DHCP server** option to ensure that your virtual machine gets an IP address for accessing the Internet.

**Note:** Enabling the Send the host's MAC address to DHCP server option will not work with some DHCP servers - your virtual machine may get the same IP address as the host computer has.

If you cannot configure your virtual machine to work in the Bridged Ethernet mode, you can consider using another networking mode: Shared Networking mode (p. 173) or Host-Only Networking mode (p. 176).

## Parallel Port Settings

On the Parallel Port pane of Virtual Machine Configuration, you can configure the virtual machine's parallel port settings. A virtual machine can have up to three parallels ports.



**Enabled.** Select this option if you want to enable this parallel port in the virtual machine. To temporarily disable the parallel port without deleting it from the virtual machine configuration, clear this option.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

---

**Connected.** Select this option if you want the virtual machine to start up with the parallel port connected.

A parallel port can be emulated by one of the following devices:

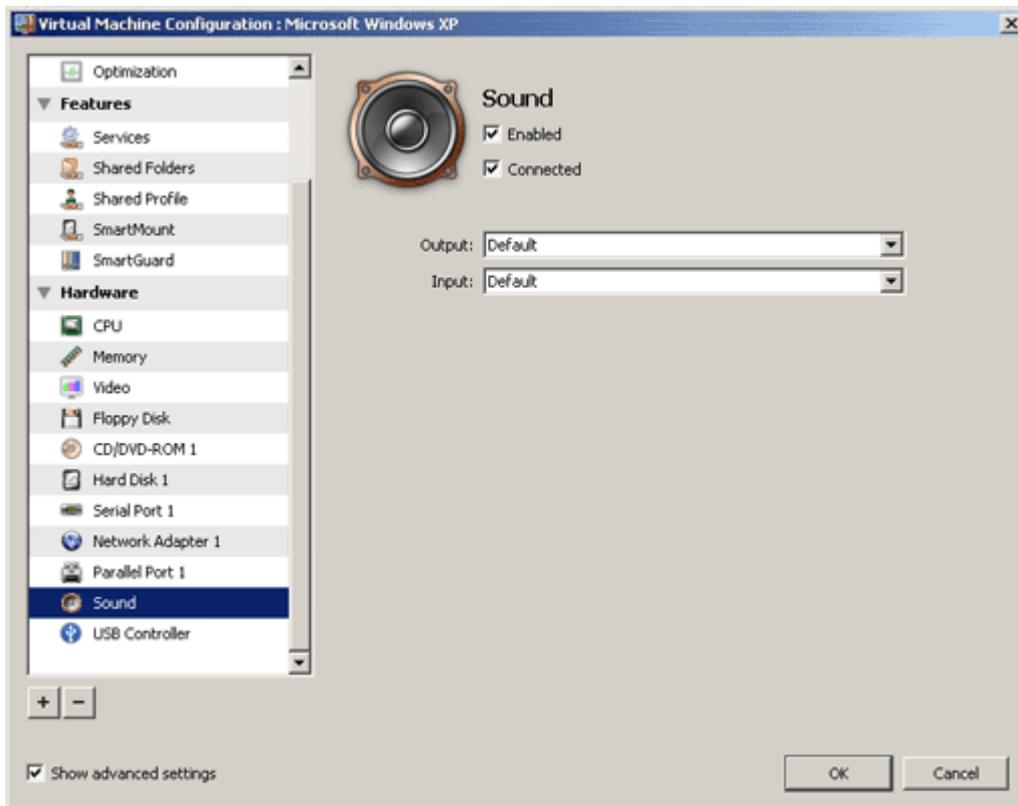
- **Real Port.** Select this option to connect one of the host computer parallel ports to the virtual machine parallel port. In this case, you will need to specify the appropriate physical port in the **Parallel port** field.
- **Printer.** Select this option to connect a printer using the virtual machine parallel port. In this case, you will need to select the appropriate printer in the **Printer** list.

By default, the HP Color LaserJet 8500 PS printer supporting PostScript is installed in Windows virtual machines, irrespective of the real printer model and version. In most cases, modern printers support PostScript and that is why you should disregard the printer name you see in the Windows printing wizard and complete the procedure. As long as you have a printer connected to the host computer, the documents will be printed on this printer.

- **Output File.** Select this option to emulate the parallel port by using an output file. In this case, a new output file with the default name will be created in the virtual machine folder. The path to the output file will be displayed in the **File** field. If you want to use another output file, type the full path to it in the **File** field or use the **Choose** button to locate the file.

## Sound Settings

The Sound pane of Virtual Machine Configuration allows you to configure the virtual machine sound device parameters.



**Enabled.** Select this option if you want to enable the sound device in the virtual machine. To temporarily disable operations with the sound device without deleting it from the virtual machine configuration, clear this option.

---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

---

**Connected.** Select this option to have the sound device automatically connected on the virtual machine startup.

**Output.** Use the output list to choose the necessary device. You can choose one of the following devices:

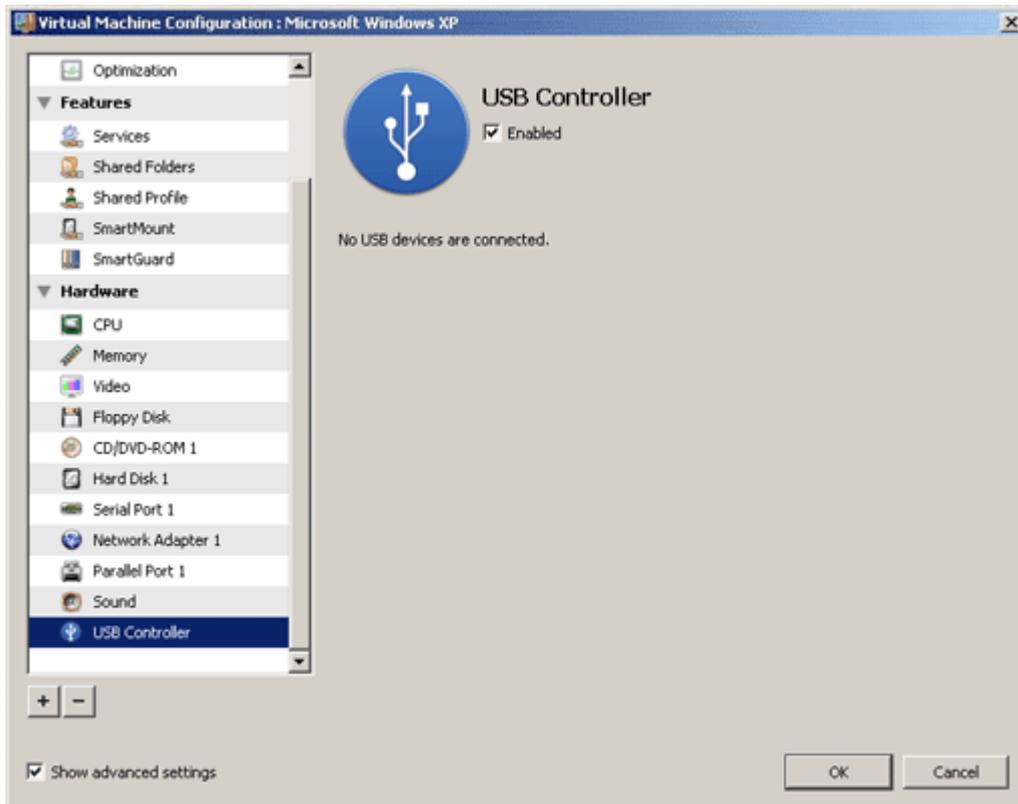
- **Default.** Select this option if you want to use the input device set as default in the primary operating system.
- **Null device.** Select this option if you want to mute the output device.
- **Built-in output.** Select this option if you want to use one of the output devices connected to the primary operating system.

**Input.** Use the input list to choose the necessary device. You can choose one of the following devices:

- **Default.** Select this option if you want to use the input device set as default in the primary operating system.
- **Null device.** Select this option if you want to mute the input device.
- **Built-in input.** Select this option if you want to use one of the input devices connected to the primary operating system.

## USB Settings

In the USB Controller pane of the Virtual Machine Configuration dialog, you can enable the USB controller support in your virtual machine. A virtual machine can emulate only one USB controller, which provides you with the possibility to connect up to eight USB 2.0 and eight USB 1.1 devices to the virtual machine.



**Enabled.** Select this option to allow using USB devices in the virtual machine. If you want to temporarily disable USB operations without deleting the USB controller from the virtual machine configuration, clear this option.

If the USB controller is disabled, such USB devices as keyboard, mouse, microphone will still be available to the virtual machine with other emulated subsystems, such as sound, keyboard or mouse emulation, etc.

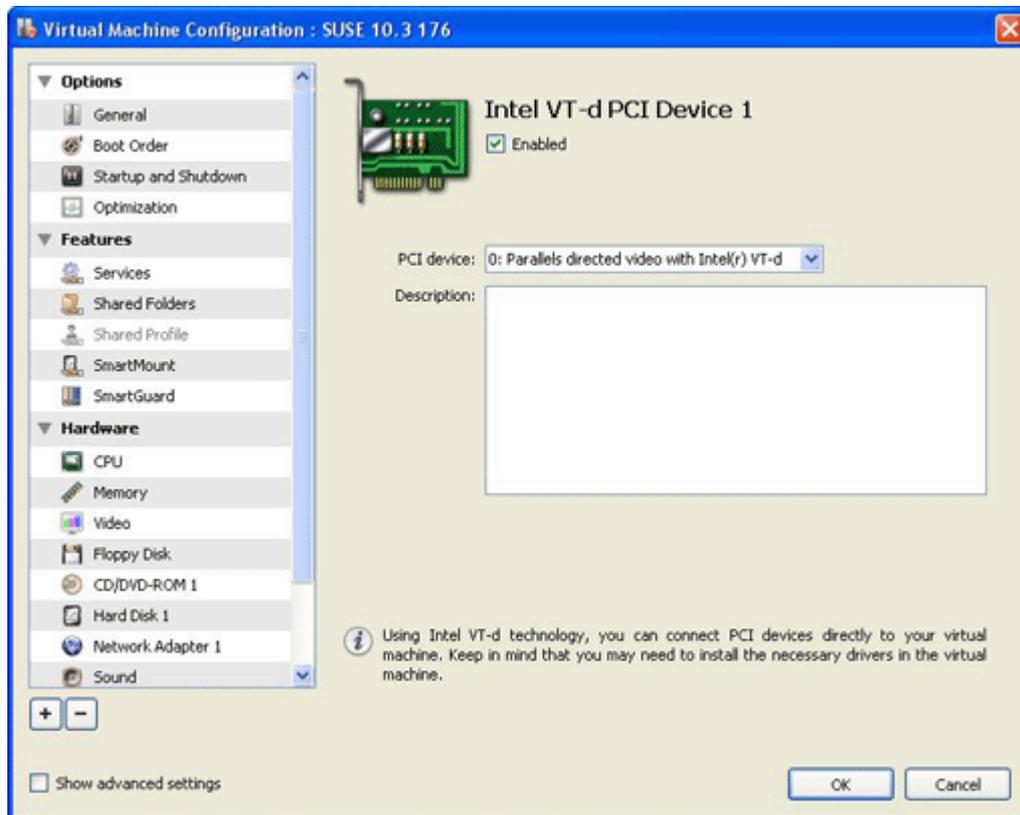
---

**Note:** The **Enabled** option can be selected or cleared only when the virtual machine is stopped.

---

## Intel VT-d PCI Device Settings

To view and edit the settings of an Intel VT-d PCI device used by the virtual machine, use the Intel VT-d PCI device pane of the Virtual Machine Configuration dialog.



Select the Enabled option to enable this PCI device in the virtual machine. If you want to temporarily disable the device, clear this option.

The PCI Device list displays the PCI devices available in the hardware configuration of the host computer. You may change the device connected to the virtual machine's PCI device by choosing it from the list.

---

**Note:** If you start the virtual machine with the PCI device disabled, you cannot change this option when the virtual machine is running.

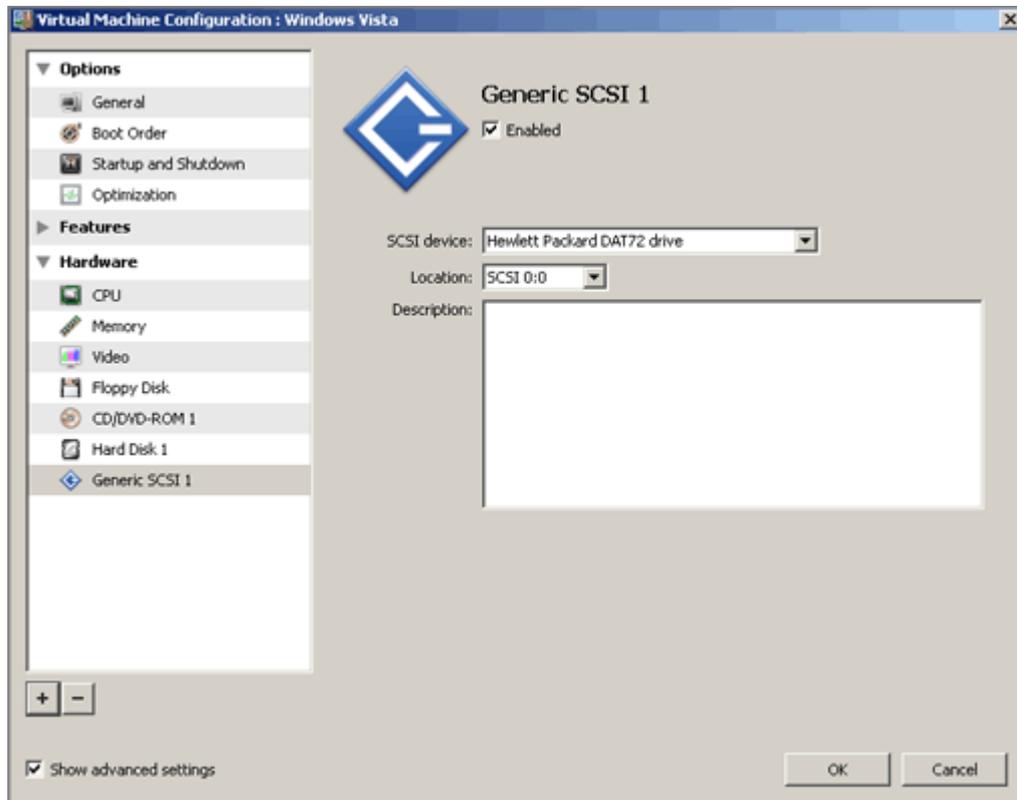
---

For the instructions on adding Intel VT-d PCI devices to virtual machines, see [Adding Intel VT-d PCI Devices](#) (p. 169).

For more information about using Intel VT-d PCI devices in Parallels virtual machines, see [Using Intel VT-d PCI Devices in Parallels Virtual Machines](#) (p. 101).

## Generic SCSI Device Settings

To view and edit the settings of a generic SCSI device used by the virtual machine, use the Generic SCSI pane of the Virtual Machine Configuration dialog.



Select the **Enabled** option to enable this SCSI device in the virtual machine. If you want to temporarily disable the device, clear this option.

The **SCSI device** list displays the SCSI devices available in the hardware configuration of the host computer. You may change the device connected to the virtual machine's SCSI device by choosing it from the list.

You may add a brief description of the device in the **Description** field.

---

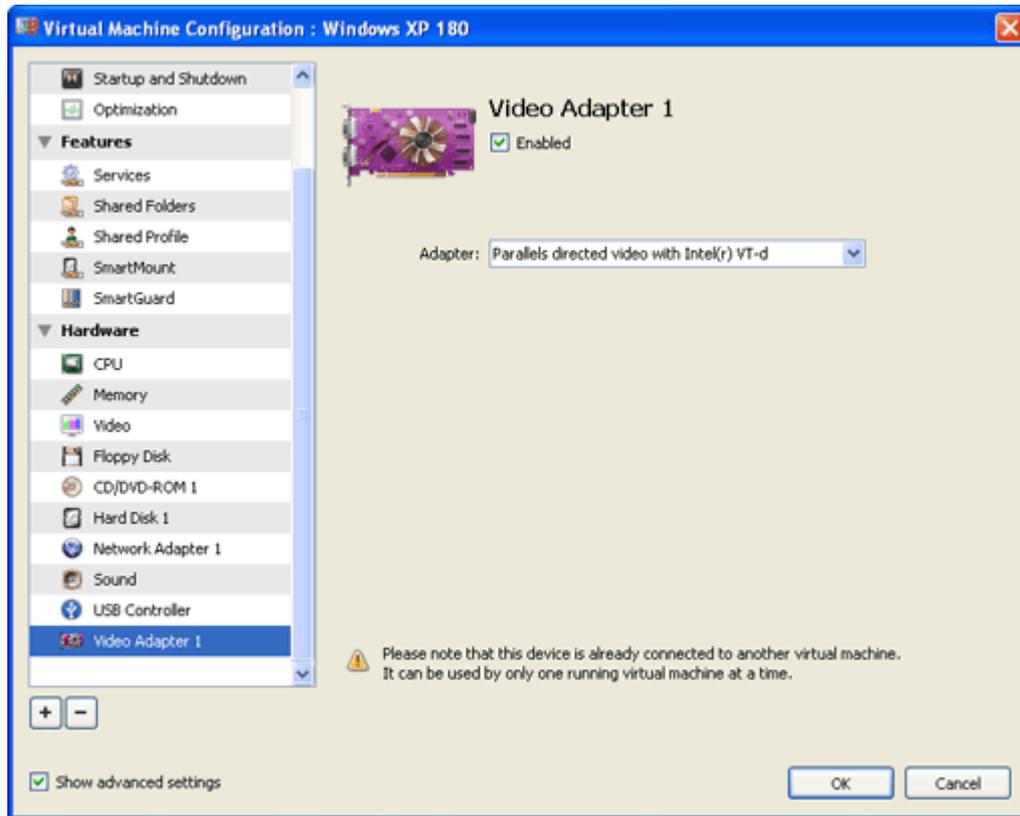
**Note:** If you start the virtual machine with the SCSI device disabled, you cannot change this option when the virtual machine is running.

---

For the instructions on adding generic SCSI devices to virtual machines, see [Adding a Generic SCSI Device](#) (p. 170).

## Video Adapter

To view and configure the virtual machine video adapter settings, use the **Video Adapter** pane of Virtual Machine Configuration. Before using a PCIe video adapter device in the virtual machine, you should assign it to your virtual machines in the **Intel VT-d** pane (p. 51) of Parallels Workstation Extreme Preferences.



**Enabled.** Select this option if you want to enable this video adapter in the virtual machine. If you want to temporarily disable the video adapter without deleting it from the virtual machine configuration, clear the **Enabled** check box.

---

**Note:** If the video adapter is assigned to the host computer in the **Intel VT-d** pane (p. 51) of Parallels Workstation Extreme Preferences, you will not be able to use this video adapter with the virtual machine.

---

In the **Adapter** list, you can choose the physical video adapter that will be used by your virtual machine.

For the instructions on adding a directly assigned video adapter to virtual machines, see **Adding a Video Adapter** (p. 163).

---

## Adding and Removing Devices

Adding new devices to the virtual machine configuration is easier than connecting new devices to a real computer. Removing or disconnecting devices is also easy. The following virtual devices can be added to the configuration or removed from it:

- virtual hard disk drive (p. 152)
- CD/DVD-ROM drive (p. 158)
- floppy disk drive (p. 160)
- network adapter (p. 161)
- video adapter (p. 163)
- sound device (p. 164)
- serial port (p. 166)
- parallel port (p. 167)
- USB controller (p. 168)
- generic SCSI (p. 170)

Any of the aforementioned devices can be added to the corresponding virtual machine only when it is stopped.

## Add Hardware Wizard

You can add new devices to your virtual machines using Add Hardware Wizard. The wizard allows you to add only one device at a time.

---

**Note:** To be able to connect any virtual device to a real one, you should have system privileges to access the real device. Otherwise, the real device will not appear in the list of available devices even though it is installed on your computer.

---

To add a new device to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 The **Select Device** window displays the list of virtual hardware devices that can be added to the virtual machine. Select the device to be added to your virtual machine and click **Next**.

---

**Note:** If the virtual machine does already have the allowed number of devices of a particular type, the corresponding device icon is dimmed in the **Select Device** window.

---



- 4 Follow the wizard's instructions to add and configure the selected device.

If you want to add a device that will have typical settings to the virtual machine, select the device and click the **Add Typical Device** button in the **Select Device** window.

## Adding a Virtual Hard Disk Drive

You can add to your virtual machine a real hard disk, an existing hard disk image, or create a new, blank one.

---

**Note:** A virtual machine can have up to four IDE devices (hard disks or CD/DVD-ROM drives) and 15 SCSI devices (hard disks or CD/DVD-ROM drives).

---

To add a hard disk to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Hard Disk** and click **Next**

To add a hard disk that will have a typical configuration, choose the **Hard Disk** icon and click the **Add Typical Device** button. The wizard will create a typical hard disk ready for use.

---

**Note:** A typical virtual hard disk is in the *expanding* format (p. 136) and its capacity is 32 GB.

---

- 4 In the **Add Hard Disk** window, select the resource for the new virtual hard disk and click **Next**. You can choose one of the following options:
  - **New image file.** In this case, the wizard will create a new image that will emulate the hard disk.
  - **Existing image file.** In this case, an existing image file will be added to the virtual machine configuration and used to emulate the hard disk. If you selected this option, go to Step 7.
  - **Real disk.** In this case, one of the host computer's real hard disks will be added to the virtual machine configuration. If this disk has an operating system installed, you will be able to boot the virtual machine from this disk.

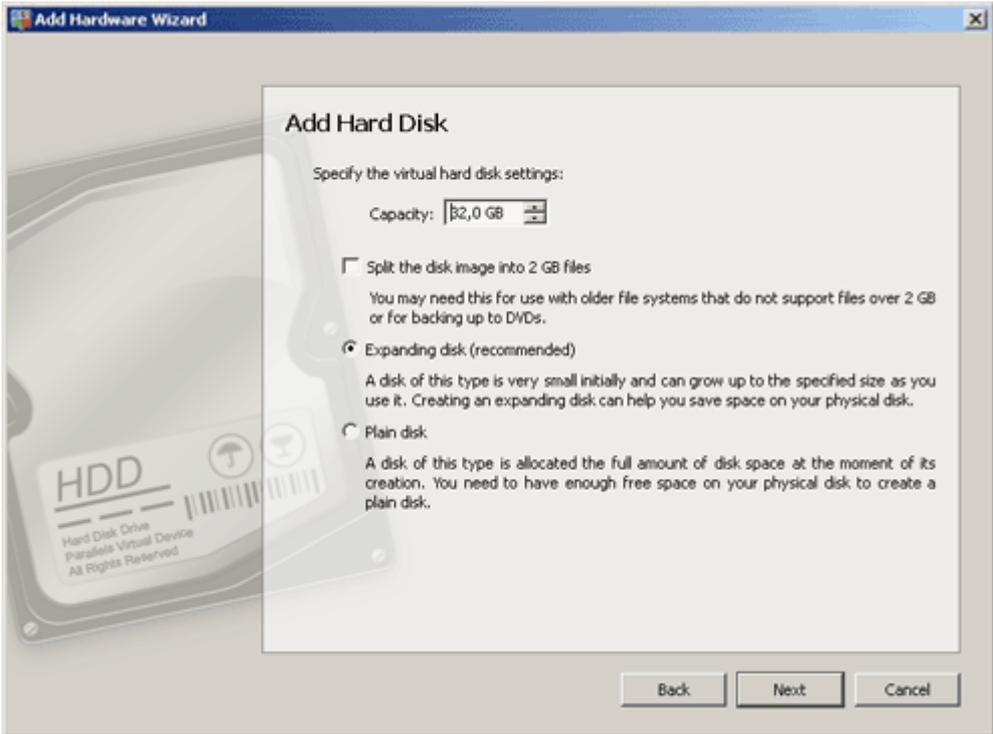
---

**Note:** The virtual machine boot sequence can be configured in the **Boot Order** pane (p. 112) of **Virtual Machine Configuration**.

---

If you selected this option, go to Step 8.

- 5 If you selected the **New image file** option, on the next step you need to set the virtual hard disk size in the **Capacity** field and define its format. You can choose one of the following formats for the disk: *Expanding* or *Plain*. If you want the virtual hard disk to be splitted, select the **Split the hard disk image into 2 GB files** option. For more information on hard disk formats, refer to **Support of Virtual and Real Disks** (p. 136).



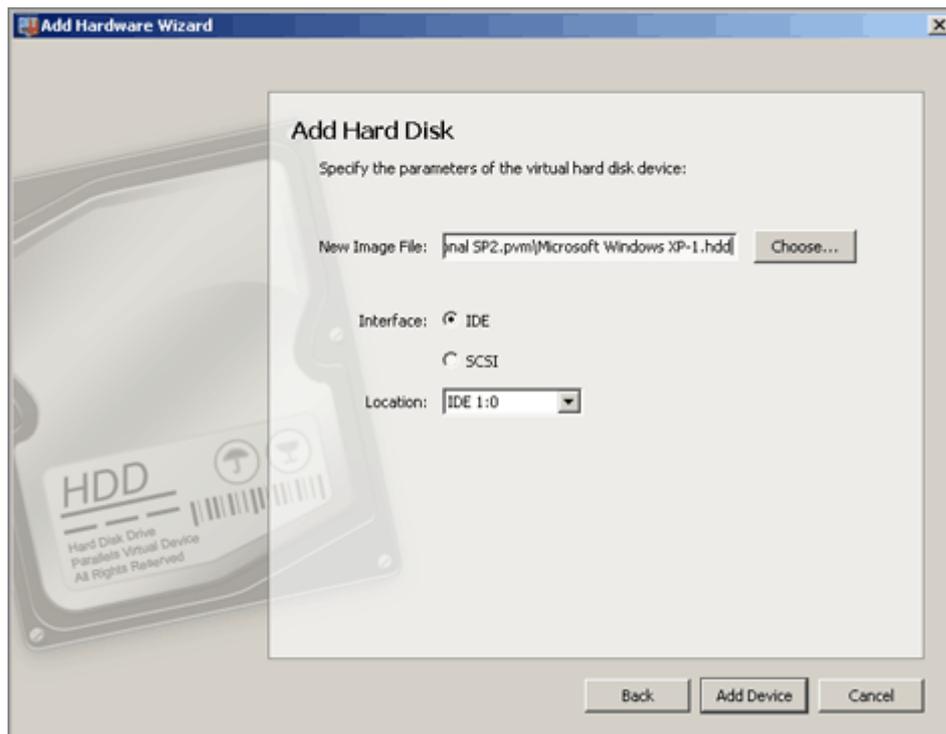
When you are ready, click Next.

- 6 In the next window, you can configure the location of the hard disk image file and specify its interface type. You can choose one of the following interface types for the disk:
  - If you select the IDE option, you will be able to define the IDE device identifier in the Location list.
  - If you select the SCSI option, you will be able to select the SCSI device identifier in the Location list.

---

**Note:** The SCSI 7:0 location is not available for selecting, since it is occupied by the SCSI controller itself.

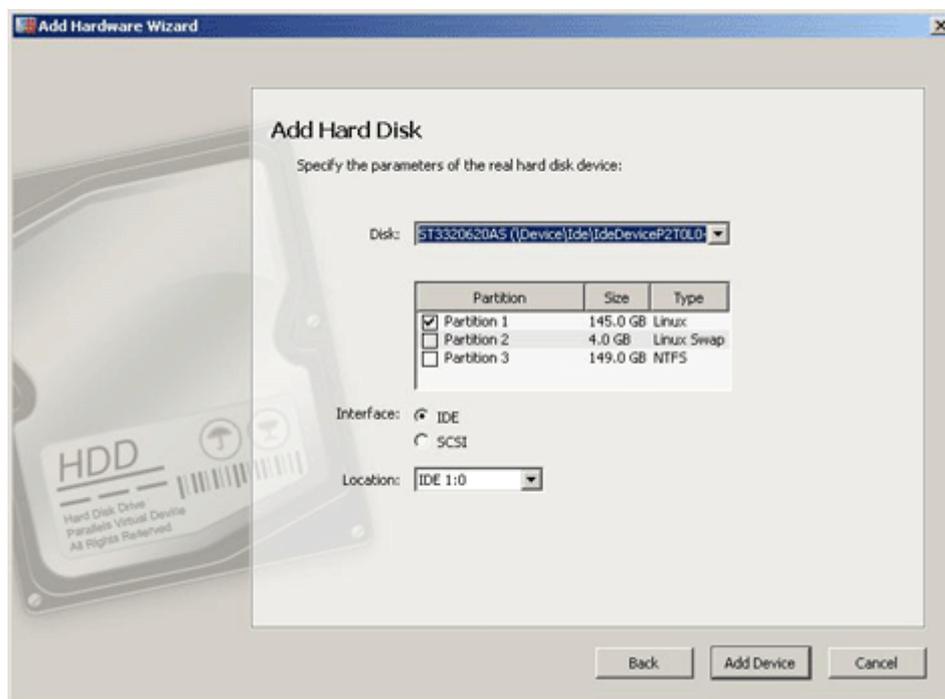
---



**Note:** In some Linux distributions (e.g. RHEL 5.3), the SCSI driver may be not installed. In this case, you should install this driver in your Linux guest OS to be able to use the SCSI controller.

Click **Add Device** to add a new hard disk to the virtual machine.

- 7 If you selected the **Existing image file** option in Step 4, in the **Add Hard Disk** window you will need to specify the full path to the image file you wish to use in your virtual machine. You can type the path manually or use the **Choose** button to locate the image file. You will also need to specify the interface type and the corresponding device identifier.
- 8 If you selected the **Real disk** option in Step 4, in the **Add Hard Disk** window you will need to specify which hard disk and its partitions you want to add to the virtual machine. You will also need to specify the interface type and the corresponding device identifier.



If you added a new blank virtual hard disk, you need to initialize it before you can use it. For more information about initializing the newly added disk, see [Initializing the Newly Added Disk](#) (p. 156).

If you added an existing disk, make sure that its file system is compatible with the guest OS installed in the virtual machine.

## Initializing the Newly Added Disk

After you added a new blank virtual hard disk to the virtual machine configuration, it will be invisible to the operating system installed inside the virtual machine until the moment you initialize it.

### Initializing the New Virtual Hard Disk in Windows

To initialize the new virtual hard disk in a Windows guest OS, you will need the Disk Management utility available through:

- In Windows Vista: Start > Control Panel > System and Maintenance > Administrative Tools > Create and Format Hard Disk Partitions > Disk Management.
- In Windows XP: Start > Control Panel > Administrative Tools > Computer Management > Storage > Disk Management.

When you open the Disk Management utility, it automatically detects that a new hard disk was added to the configuration and launches **Initialize and Convert Disk Wizard**:

- 1 In the introduction window, click **Next**.
- 2 In the **Select Disks to Initialize** window, select the newly added disk and click **Next**.
- 3 In the **Select Disks to Convert** window, select the newly added disk and click **Finish**.

The added disk will appear as a new disk in the Disk Management utility window, but its memory space will be unallocated. To allocate the disk memory, right-click this disk name in the Disk Management utility window and select **New Simple Volume** in Windows Vista or **New Volume** in Windows XP. The **New Simple Volume Wizard**/**New Volume Wizard** window will appear. Follow the steps of the wizard and create a new volume in the newly added disk.

After that your disk will become visible in **Computer/My Computer** and you will be able to use it as a data disk inside your virtual machine.

### Initializing the New Virtual Hard Disk in Linux

Initializing the new virtual hard disk in a Linux guest OS comprises two steps: allocating the virtual hard disk space and mounting this disk in the guest OS.

To allocate the space, you will need to create a new partition on this virtual hard disk, using the `fdisk` utility.

---

**Note:** To use the `fdisk` utility, you need the `root` privileges.

---

- 1 Launch Terminal.
- 2 To list the IDE disk devices present in your virtual machine configuration, enter:

```
fdisk /dev/hd*
```

---

**Note:** If you added a SCSI disk to the virtual machine configuration, use the `fdisk /dev/sd*` command instead.

---

- 3 By default, the second virtual hard disk appears as `/dev/hdc` in your Linux virtual machine. To work with this device, enter:

```
fdisk /dev/hdc
```

---

**Note:** If this is a SCSI disk, use the `fdisk /dev/sdc` command instead.

---

**4** To get extensive information about the disk, enter:

```
p
```

**5** To create a new partition, enter:

```
n
```

**6** To create the primary partition, enter:

```
p
```

**7** Specify the partition number. By default, it is 1.

**8** Specify the first cylinder. If you want to create a single partition on this hard disk, use the default value.

**9** Specify the last cylinder. If you want to create a single partition on this hard disk, use the default value.

**10** To create a partition with the specified settings, enter:

```
w
```

When you allocated the space on the newly added virtual hard disk, you should format it by entering the following command in the terminal:

```
mkfs -t <FileSystem> /dev/hdc1
```

---

**Note:** `<FileSystem>` stands for the file system you want to use on this disk. It is recommended to use `ext3` or `ext2`.

---

When the added virtual hard disk is formatted, you can mount it in the guest OS.

**1** To create a mount point for the new virtual hard disk, enter:

```
mkdir /mnt/hdc1
```

---

**Note:** You can specify a different mount point.

---

**2** To mount the new virtual hard disk to the specified mount point, enter:

```
mount /dev/hdc1 /mnt/hdc1
```

When you mounted the virtual hard disk, you can use its space in your virtual machine.

## Adding a CD/DVD-ROM Drive

To the virtual machine configuration, you can add a virtual CD/DVD-ROM drive that is either connected to a real CD/DVD-ROM on your physical computer or to an existing image file.

---

**Note:** A virtual machine can have up to four IDE devices (hard disks or CD/DVD-ROM drives) and 15 SCSI devices (hard disks or CD/DVD-ROM drives).

---

To add a new CD/DVD-ROM drive to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **CD/DVD-ROM** and click **Next**.

To add a CD/DVD-ROM drive that will have a typical configuration, choose the **CD/DVD-ROM** icon and click the **Add Typical Device** button. The wizard will create a typical CD/DVD-ROM drive ready for use.

- 4 In the **Add CD/DVD-ROM** window, select the resource for the new CD/DVD-ROM drive and click **Next**. You can choose between the following options:
  - **Real Device:** select this option if you wish to add a real CD/DVD-ROM drive to your virtual machine.
  - **Image File:** select this option if you wish to use an existing image file as a virtual CD/DVD-ROM drive inside your virtual machine.

---

**Note:** Parallels Workstation Extreme supports ISO image files and may also support CD/DVD disc images in the CUE and CCD formats.

---

If you want the device to be connected to the virtual machine automatically at startup, select the **Connected** option. If you clear this option, the drive will be enabled in the configuration, but not connected to the virtual machine. You can connect it later when running the virtual machine.

- 5 Your next window will be different depending on what option (**Real Device** or **Image File**) you chose in the previous step:
  - If you chose to add a real device, select the corresponding device from the list in the **Drive Name** field.
  - If you chose to use an image file, type the path to the corresponding file in the **Image File** field or use the **Choose** button to locate the file.

In both cases, you should specify the interface type for the CD/DVD-ROM device or image file:

- **IDE.** Using this interface type, you can connect up to four virtual devices (hard disks or CD/DVD drives) to the virtual machine.
- **SCSI.** Using this interface type, you can connect up to 15 virtual devices (hard disks or CD/DVD drives) to the virtual machine.

---

**Note:** In some Linux distributions (e.g. RHEL 5.3), the SCSI driver may be not installed. In this case, you should install this driver in your Linux guest OS to be able to use the SCSI controller.

---

You can also define the device position in the **Location** list or accept the position offered by Add Hardware Wizard.

---

**Note:** The SCSI 7:0 location is not available for selecting, since it is occupied by the SCSI controller itself.

---

If you selected the **Real Device** option, you can connect your physical computer CD/DVD-ROM drive directly to your virtual machine. In this case, you will be able to fully use this CD/DVD-ROM drive in the virtual machine (e.g. record data on discs). For these purposes, select the **Passthrough** option.

---

**Note:** If you connect your physical computer CD/DVD-ROM drive directly to your virtual machine, this drive will not be available in the primary OS.

---



When you are ready, click the **Add Device** button to add a new virtual CD/DVD-ROM drive to your virtual machine.

## Adding a Floppy Disk Drive

You can add an existing floppy disk drive or floppy disk image to your virtual machine. You can also create a new floppy disk image and add it to the virtual machine.

---

**Note:** Any virtual machine can have only one floppy disk drive.

---

To add a floppy disk to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Floppy Disk** and click **Next**.
- 4 In the **Add Floppy Disk** window, select the resource for the new virtual floppy disk and click **Next**. You can choose one of the following resources for the floppy disk:
  - **Real Floppy Disk**. In this case, the wizard will use a real disk to emulate the floppy disk drive.
  - **Existing Image File**. In this case, the wizard will use an existing image file for the floppy disk drive emulation.
  - **New Image File**. In this case, the wizard will create a new image that will emulate the floppy disk drive. To create a new floppy disk drive and add it to your virtual machine, just click **Add Device** in the **Add Floppy Disk** window.

If you want the device to be connected to the virtual machine automatically at startup, select the **Connected** option. If you clear this option, the drive will be enabled in the configuration, but not connected to the virtual machine. You can connect it later when running the virtual machine.

- 5 Your next window will be different depending on what option (**Existing Image File** or **Real Floppy Disk**) you selected in the previous step:
  - If you selected **Existing Image File**, you will need to specify the location of the corresponding image file and click **Add Device** to add a new floppy disk drive to your virtual machine.
  - If you selected **Real Floppy Disk**, specify the floppy disk drive on your physical computer and click **Add Device** to add a new floppy disk drive to your virtual machine.

## Adding a Network Adapter

A virtual machine can have up to 16 virtual network adapters simultaneously.

To add a network adapter to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Network Adapter** and click **Next**.

To add a network adapter that will have a typical configuration, choose the **Network Adapter** icon and click the **Add Typical Device** button. The wizard will add a typical network adapter ready for use.

- 4 In the **Add Network Adapter** window, select the type of networking you want to use in the virtual machine. The current version of Parallels Workstation Extreme allows you to choose one of the following networking types:
  - **Shared Networking.** If you select this option, the virtual machine will use the host computer's network connections and will be visible only for the host computer and the other virtual machines running on this server. This option is selected by default.
  - **Bridged Networking.** If you select this option, the virtual machine will be visible on the network as a separate computer.
  - **Host-Only Networking.** If you select this option, the virtual machine will be able to access only the host computer and the virtual machines running on it.
  - **Direct Assignment (using Intel VT-d).** If you select this option, the virtual machine will be able to access the local network and Internet through a PCIe network adapter. This option is available only if you have a PCIe network adapter and the Intel VT-d technology is enabled in your host computer.

If you want the device to be connected to the virtual machine automatically at startup, select the **Connected** option. If you clear this option, the drive will be enabled in the configuration, but not connected to the virtual machine. You can connect it later when running the virtual machine.

If you choose the **Shared Networking** or **Host-Only Networking** option, click **Add Device** to add a new shared networking adapter to the virtual machine.

If you choose the **Bridged Networking** option, click **Next** and proceed to Step 6.

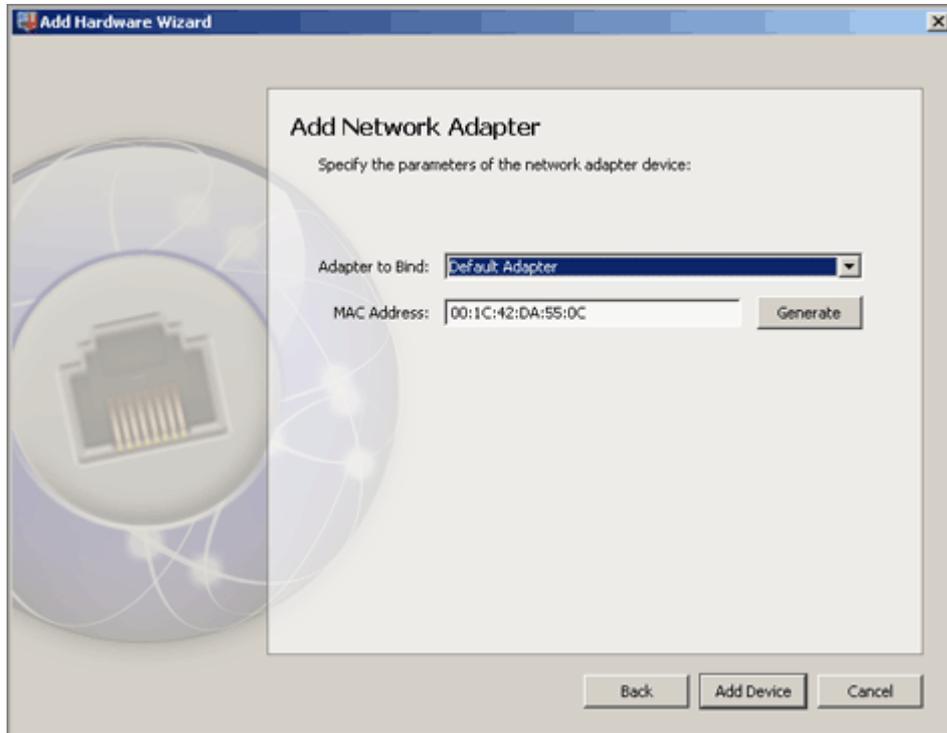
If you choose the **Direct Assignment (using Intel VT-d)** option, click **Next** and select the PCIe network adapter you want to use in the **Adapter** list on the next screen. Click **Add Device** to add the adapter to the virtual machine. After adding the PCIe adapter, you should start the virtual machine and install the manufacturer's driver for this PCIe device inside it. The driver should support the Intel VT-d technology.

---

**Note:** Before adding the PCIe network adapter, you should assign it to your virtual machines in the **Intel VT-d** pane (p. 51) of Parallels Workstation Extreme Preferences.

---

- 5 If you chose the **Bridged Networking** option, on the next step you will need to specify the virtual network adapter properties. The wizard will prompt you to specify the adapter to use. Select the appropriate adapter in the **Adapter to Bind** list and specify the MAC address in the **MAC Address** field. If you wish Add Hardware Wizard to generate the MAC address for you, click the **Generate** button.



Click the **Add Device** button to add a new network adapter to the virtual machine.

## Adding a Video Adapter

If your computer has an Intel VT-d chipset and an additional PCIe video adapter (except for the one used by the host computer) in its configuration, you can add this video adapter to your virtual machine. The virtual machine will directly access this video adapter without using the resources of the primary OS. Before adding a video adapter to the virtual machine, you should assign it to your virtual machines in the **Intel VT-d** pane (p. 51) of Parallels Workstation Extreme Preferences.

---

**Note:** You are recommended to have at least two video adapters: if you reassign one device to your virtual machines, the other device will be left to the physical computer. Keep in mind that if you assign your video adapter to a virtual machine, this adapter will be invisible to your primary OS.

---

To add a video adapter to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Video Adapter** and click **Next**.
- 4 In the **Add Video Adapter** window, select the appropriate adapter in the **Adapter** list. Click the **Add Device** button to add the video adapter to your virtual machine configuration.
- 5 Start the virtual machine and install the manufacturer's driver for this PCIe device inside the virtual machine. The driver should support the Intel VT-d technology.

---

**Note:** Parallels Workstation Extreme officially supports the NVIDIA Quadro® FX 3800, 4800, and 5800 video cards for virtual machines. For these video cards, use the latest drivers available on the manufacturer's website.

---

**Notes:** 1. If the video adapter is assigned to the host computer in the **Intel VT-d** pane (p. 51) of Parallels Workstation Extreme Preferences, you will not be able to enable it in the virtual machine configuration until you assign it to your virtual machines.

2. You can assign one video adapter to several virtual machines but only one virtual machine can use this adapter at a time.

---

## Adding a Sound Device

Parallels Workstation Extreme allows you to add sound devices to your virtual machines.

---

**Note:** Any virtual machine can have only one sound device.

---

To add a sound device to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Sound** and click **Next**.

To add a sound device that will have a typical configuration, click the **Add Typical Device** button. The wizard will add a typical sound device ready for use.

- 4 In the **Add Sound** window, specify the sound input and output devices the virtual machine will use:

**Output device.** Use the output list to choose the necessary device:

- **Default.** Select this option if you want to use the input device set as default in your primary OS.
- **Null Device.** Select this option if you want to mute the output device inside the virtual machine.
- **Built-in Output.** Select this option if you wish to use other output devices connected to your primary OS.

**Input device.** Use the input list to choose the necessary device:

- **Default.** Select this option if you want to use the input device set as default in your primary OS.
- **Null Device.** Select this option if you want to mute the input device inside the virtual machine.
- **Built-in Input.** Select this option if you wish to use other input devices connected to your primary OS.

You can also select the **Activated** option to have the sound device automatically activated on the virtual machine startup.



When you are ready, click the **Add Device** button to add a new sound device to your virtual machine.

## Adding a Serial Port

You can add to your virtual machine a serial port that will be connected to a real port on your physical computer, a socket, or an output file.

---

**Note:** A virtual machine can have up to four serial ports.

---

To add a serial port to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Serial Port** and click **Next**.

To add a serial port that will have a typical configuration, click the **Add Typical Device** button. The wizard will add a typical serial port ready for use.

- 4 In the **Add Serial Port** window, specify the resource to be used for the serial port emulation and click **Next**. You can choose one of the following resources:
  - **Real Port.** Select this option to connect the virtual machine's serial port to the serial port of the physical computer. You will be able to choose the serial port in the next window.
  - **Output File.** Select this option to connect the virtual machine's serial port to an output file. You will be able to locate the file in the next window.
  - **Socket.** Select this option to create and connect the virtual machine's serial port to a socket of the physical computer.

---

**Note:** When you connect two virtual machines via serial ports, both virtual machines should have serial ports emulated by sockets with the identical names.

---

If you want the device to be connected to the virtual machine automatically at startup, select the **Connected** option. If you clear this option, the drive will be enabled in the configuration, but not connected to the virtual machine. You can connect it later when running the virtual machine.

- 5 In the next window, specify the resource properties:
  - If you chose **Real Port**, specify the port to be used for the virtual serial port device in the **Serial Port** list.
  - If you chose **Output File**, define the file to be used for the virtual serial port device in the **Output File** field or leave the default file offered by **Add Hardware Wizard**.
  - If you chose **Socket**, specify the name of the socket to be used for the virtual serial port device and its mode. The socket mode defines the role the virtual machine will play when establishing a network connection to another computer. It can be set to one of the following: **Server** or **Client**. The **Server** socket enables you to use the given virtual machine to direct the other one. The **Client** socket enables you to direct the given virtual machine from the other one.

---

**Note:** When you establish a connection between two virtual machines, one virtual machine socket should function in the **Server** mode, and the other one - in the **Client** mode.

---

When you are ready, click the **Add Device** button to add a new serial port to your virtual machine.

## Adding a Parallel Port

You can add a parallel port to your virtual machine that will be connected to a real port, a printer, or an output file.

---

**Note:** A virtual machine can have up to three parallel ports.

---

To add a parallel port to a virtual machine:

**1** Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.

**2** Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.

**3** In the **Select Device** window, select **Parallel Port** and click **Next**.

To add a parallel port that will have a typical configuration, click the **Add Typical Device** button. The wizard will add a typical parallel port ready for use.

**4** In the **Add Parallel Port** window, specify the resource to be used for the parallel port emulation and click **Next**. You can choose one of the following resources:

- **Real Port.** Select this option to connect the virtual machine's parallel port to a real parallel port of your physical computer.
- **Output File.** Select this option to emulate the parallel port by using an output file. In this case, a new output file with the default name will be created in the virtual machine's folder.
- **Printer.** Select this option to connect a printer using the virtual machine's parallel port.

If you want the device to be connected to the virtual machine automatically at startup, select the **Connected** option. If you clear this option, the drive will be enabled in the configuration, but not connected to the virtual machine. You can connect it later when running the virtual machine.

**5** In the next window, specify the resource properties:

- If you chose the **Real Port** option on the previous step, you should choose the appropriate parallel port name in the **Parallel Port** list.
- If you chose the **Output File** option on the previous step, you should set the path to the corresponding file in the **Output File** field. You can leave the file offered by **Add Hardware Wizard** or specify another one by using the **Choose** button or manually typing the full path to it in the field provided.
- If you chose the **Printer** option on the previous step, you should choose the appropriate printer name in the **Printer** list.

Click the **Add Device** button to add a new parallel port to your virtual machine.

## Adding a USB Controller

You can add a USB controller to your virtual machine. USB controllers installed inside your virtual machines allow USB devices plugged into the USB drives of your physical computer to be automatically connected to the corresponding virtual machines.

---

**Note:** A virtual machine can have only one USB controller. If you removed it for any reason, you can add it back to the configuration.

---

To add a USB controller to a virtual machine:

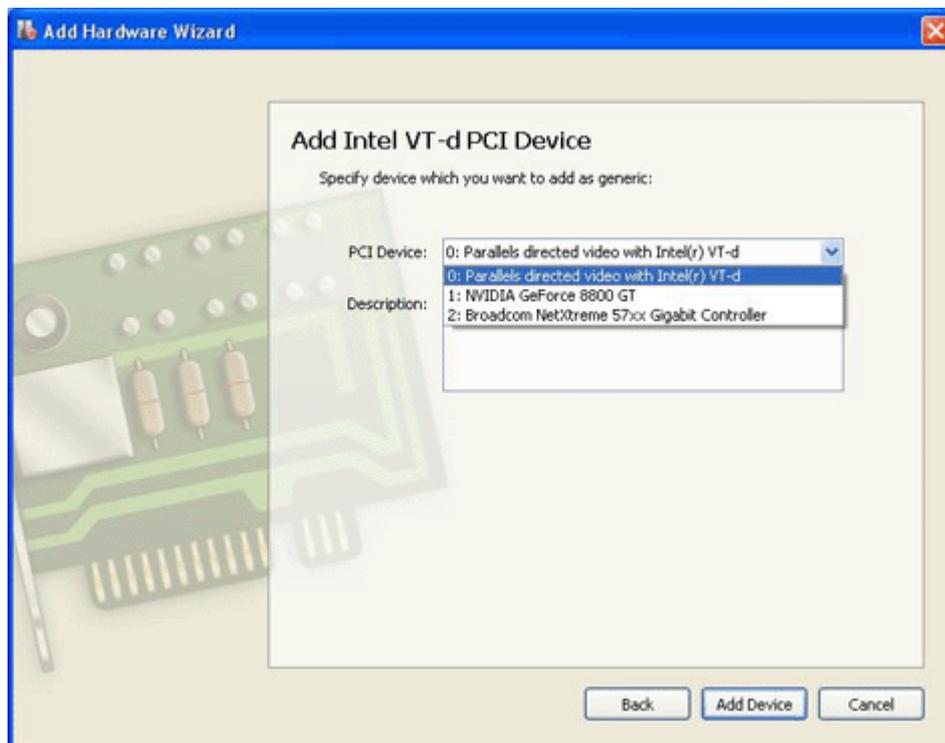
- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **USB Controller** and click **Add Device**.

## Adding Intel VT-d PCI Devices

If the host computer's hardware includes Intel VT-d chipset, you can add a physical Intel VT-d PCI device (p. 101) to your virtual machine. Before adding an Intel VT-d PCI device to a virtual machine, you should assign it to your virtual machines in the Intel VT-d pane (p. 51) of Parallels Workstation Extreme Preferences.

To add an Intel VT-d PCI device to a virtual machine:

- 1 In the Virtual Machine Configuration dialog, click the Add button  to launch Add Hardware Wizard.
- 2 In the Introduction window, click Next.
- 3 In the Select Device window, select Intel VT-d PCI Device and click Next.
- 4 In the next window, select the device to connect to the virtual machine from the PCI Device list and click Add Device. You may also type a brief description of the added device in the Description field.



- 5 When the PCI device is added to the virtual machine configuration, you need to start the virtual machine and install an appropriate driver for this PCI device. After that you will be able to use it with your virtual machine.

The maximum number of PCI devices you can add to your virtual machine is 8.

## Adding a Generic SCSI Device

If the host computer's hardware includes any SCSI device (except for SCSI hard disks or CD/DVD-ROM drives), you can add to your virtual machine a generic SCSI device.

---

**Note:** 1. A virtual machine can have up to four IDE devices and 15 SCSI devices.

2. Red Hat Linux Enterprise 4.7 and 5.3 guest OSs do not support SCSI controller.

---

To add a generic SCSI device to a virtual machine:

- 1 Choose **Configure** from the **Virtual Machine** menu to open the **Virtual Machine Configuration** dialog.
- 2 Click the **Add** button  in the bottom part of the **Virtual Machine Configuration** dialog to launch **Add Hardware Wizard**.
- 3 In the **Select Device** window, select **Generic SCSI** and click **Next**.

To add a generic SCSI device that will have a typical configuration, choose the **Generic SCSI** icon and click the **Add Typical Device** button. The wizard will create a typical SCSI device ready for use.

- 4 In the **Add Generic SCSI** window, choose the SCSI device you want to add to your virtual machine from the **SCSI Device** list.

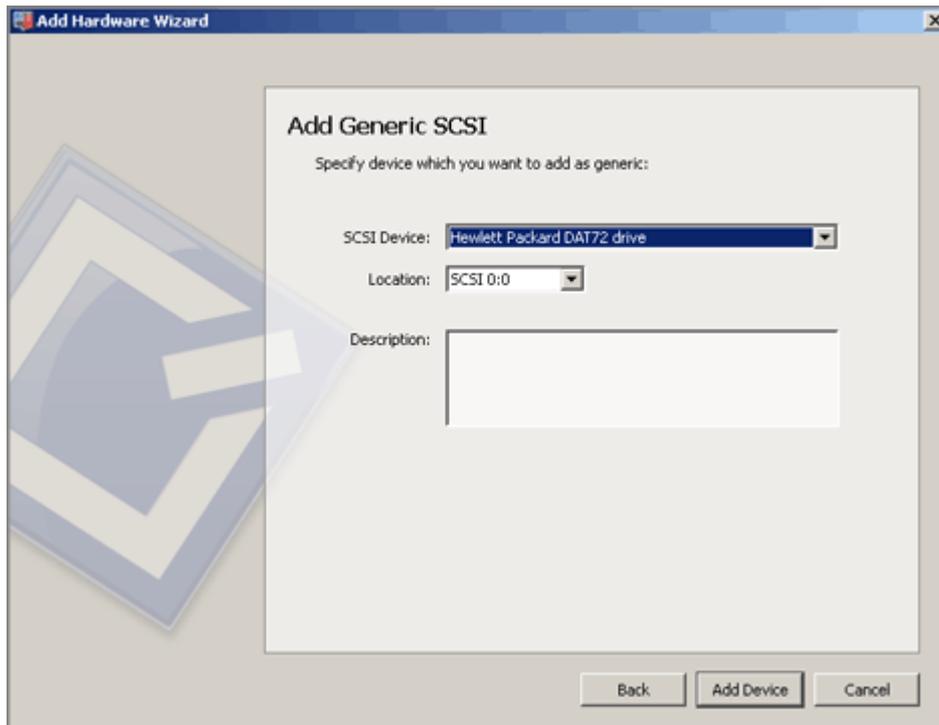
You can also define the device position in the **Location** list or accept the position offered by **Add Hardware Wizard**.

---

**Note:** The SCSI 7:0 location is not available for selecting, since it is occupied by the SCSI controller itself.

---

You may also type a brief description of the added device in the **Description** field.



When you are ready, click the **Add Device** button to add a generic SCSI device to your virtual machine.

## Removing Devices

Most virtual machine devices can be removed from the virtual machine configuration (except for the main memory, CPU, and video memory).

---

**Note:** You can disable any device, except for the memory, without removing it from the virtual machine configuration. To this effect, clear the **Enabled** option on the corresponding device's pane in Virtual Machine Configuration.

---

To remove a device:

- 1 Open the virtual machine the virtual device of which you wish to remove. Make sure that the virtual machine is stopped.
- 2 Open Virtual Machine Configuration by choosing **Edit Configuration** from the **Virtual Machine** menu.
- 3 Select the device you wish to remove and click the **Remove** button  in the bottom part of the **Virtual Machine Configuration** dialog.

---

**Note:** If you accidentally click the **Remove** button , click **Cancel** in Virtual Machine Configuration. Once you click **OK**, the device will be removed.

---

---

## Networking in a Virtual Machine

To configure networking in your virtual machines, you should first configure networking for Parallels Workstation Extreme. You should also configure Parallels Workstation Extreme networking to have the possibility to send problem reports and get Parallels Workstation Extreme updates. If you have a network connection on your physical computer and do not use a proxy server, the Parallels Workstation Extreme network connection is set automatically. If you use a proxy server for network connections on your host computer, you should provide this proxy server settings in the **Proxy Server** pane (p. 52) of Parallels Workstation Extreme Preferences.

After setting networking for Parallels Workstation Extreme, you should configure networking for your virtual machines. Parallels Workstation Extreme allows you to use the following types of networking in your virtual machines:

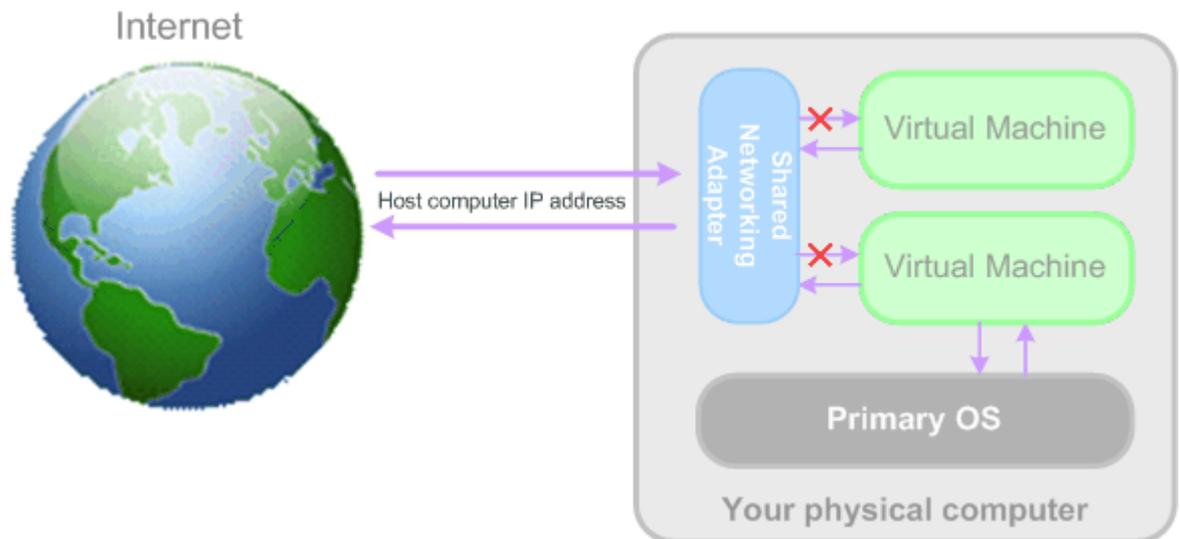
- **Shared Networking** (p. 173). This type of networking allows the virtual machine to use the current network connections of your physical computer.
- **Bridged Ethernet** (p. 175). This type of networking allows the virtual machine to use one of the physical computer's network adapters, which makes it appear as a separate computer on the network the physical computer belongs to.
- **Host-only networking** (p. 176). This type of networking allows the virtual machine to access only the physical computer and other virtual machines residing on it.
- **Networking using a PCIe network adapter** (p. 177). This type of networking allows the virtual machine to access the local network and Internet through an Intel VT-d PCIe network adapter.

By default, the virtual machine uses Shared Networking, because configuring it requires minimal effort from the users. The Bridged Ethernet networking mode is more complex, and you may need to contact your system administrator to set it up properly.

Detailed information on these types of networking and the way to configure them is provided in the following subsections.

## Shared Networking

By default, all virtual machines created using the *Express Windows* and *Typical* modes are set to work in the Shared Networking mode. In this mode your virtual machine can access other computers on your local network and the Internet by using the IP address of the physical computer. The virtual machine itself does not have its own IP address on the network. This mode allows you to specify port forwarding rules (p. 43) for the virtual machines running on the host computer, which can be especially useful when running HTTP, FTP, or other types of servers in virtual machines.



The Shared Networking mode does not require any additional configuration. With this mode enabled, your virtual machine will share whatever network connection your physical computer uses at the moment.

You may wish to use the Shared Network mode in the following cases:

- your computer accesses the Internet via a modem or another non-Ethernet device
- you need to access the Internet from inside your virtual machine but are concerned about security
- you have problems with working in the Bridged Ethernet mode

To configure your virtual machine to use Shared Networking:

- 1** Open the Virtual Machine Configuration dialog by choosing **Virtual Machine > Configure**.
- 2** Select **Network Adapter** in the **Hardware** list.
- 3** On the **Network Adapter** pane, make sure that the **Enabled**, **Connected** and **Shared Networking** options are selected.

---

**Note:** In the **MAC address** field, you can change the MAC address currently assigned to the virtual machine. MAC addresses are automatically generated during the virtual machine creation. However, you can modify the default MAC address by typing another value in the **MAC address** field or clicking the **Generate** button. When entering a new MAC address, make sure that it is unique within your network.

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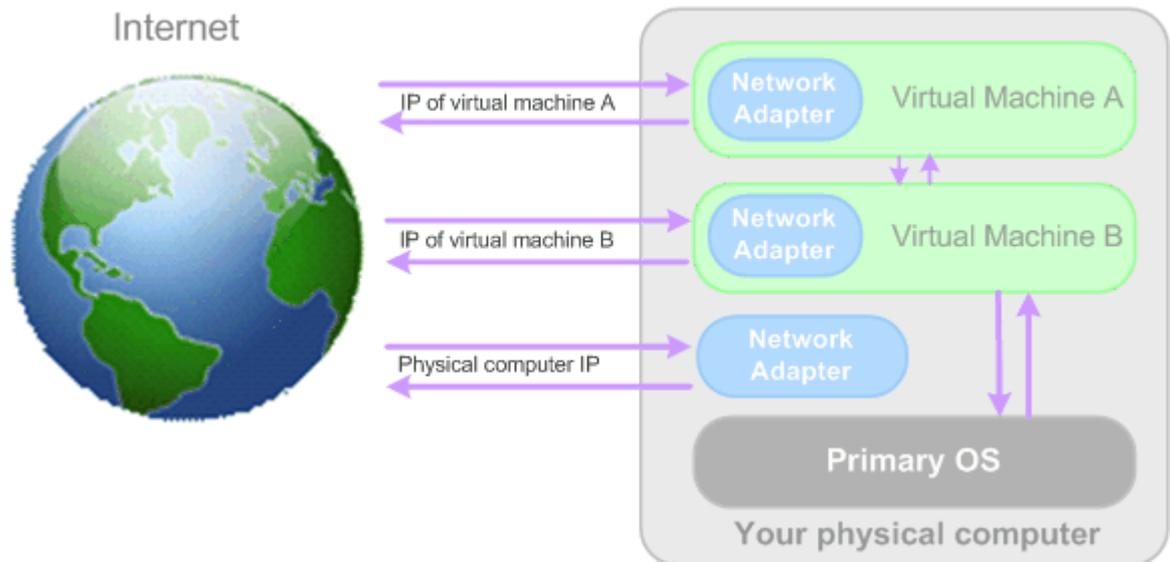
- 4** Click **OK**.

For the information about troubleshooting networking problems, refer to the Parallels knowledge base <http://kb.parallels.com/> available at the Parallels website.

## Bridged Ethernet Networking

When operating in the Bridged Ethernet mode, your virtual machine appears on the network as a stand-alone computer with its own IP address and network name.

**Note:** The Bridged Ethernet networking mode is more complex than the Shared Networking mode (p. 173), and you may need to contact your system administrator to configure it properly.



To configure your virtual machine to work in the Bridged Ethernet mode:

- 1 Open the **Virtual Machine Configuration** dialog by choosing **Virtual Machine > Configure**.
- 2 Select **Network Adapter** in the **Hardware** list.
- 3 On the **Network Adapter** pane, make sure that the **Enabled**, **Connected** and **Bridged Ethernet** options are selected.
- 4 Select the appropriate network adapter from the list. To connect the virtual machine's adapter to the active network adapter of your physical computer, choose **Default Adapter**.

**Note:** In the **MAC address** field, you can change the MAC address currently assigned to the virtual machine. MAC addresses are automatically generated during the virtual machine creation. However, you can modify the default MAC address by typing another value in the **MAC address** field or clicking the **Generate** button. When entering a new MAC address, make sure that it is unique within your network.

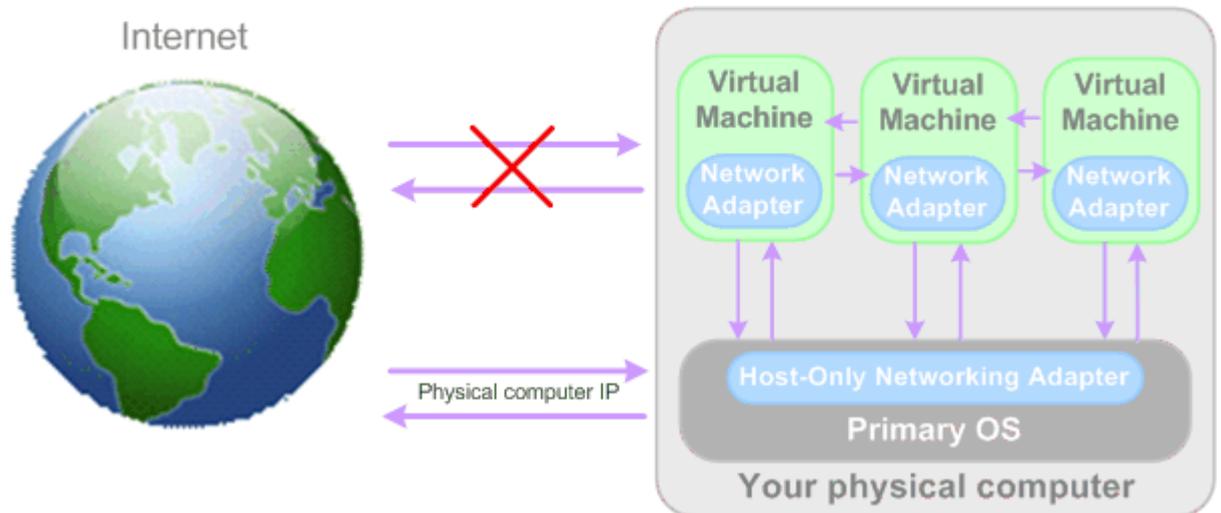
- 5 Click **OK**.

If you cannot configure your virtual machine to function in the Bridged Ethernet mode, you can consider using another networking mode: **Shared Networking** (p. 173), **Host-Only Networking** (p. 176), or **Networking using a PCIe Adapter** (p. 177).

For the information about troubleshooting networking problems, refer to the Parallels knowledge base <http://kb.parallels.com/> available at the Parallels website.

## Host-Only Networking

Parallels Workstation Extreme provides a closed network that is accessible only to the primary operating system and virtual machines running on it. The primary operating system is connected to this network via the Parallels Host-Only Networking adapter automatically created on the physical computer during the Parallels Workstation Extreme installation. The addresses for the virtual machines connected to this network are provided by the Parallels DHCP server.



To configure your virtual machine to use Host-Only Networking:

- 1 Open the Virtual Machine Configuration dialog by choosing **Virtual Machine > Configure**.
- 2 Select **Network Adapter** in the **Hardware** list.
- 3 On the **Network Adapter** pane, make sure that the **Enabled**, **Connected** and **Host-Only Networking** options are selected.

---

**Note:** In the **MAC address** field, you can change the MAC address currently assigned to the virtual machine. MAC addresses are automatically generated during the virtual machine creation. However, you can modify the default MAC address by typing another value in the **MAC address** field or clicking the **Generate** button. When entering a new MAC address, make sure that it is unique within your network.

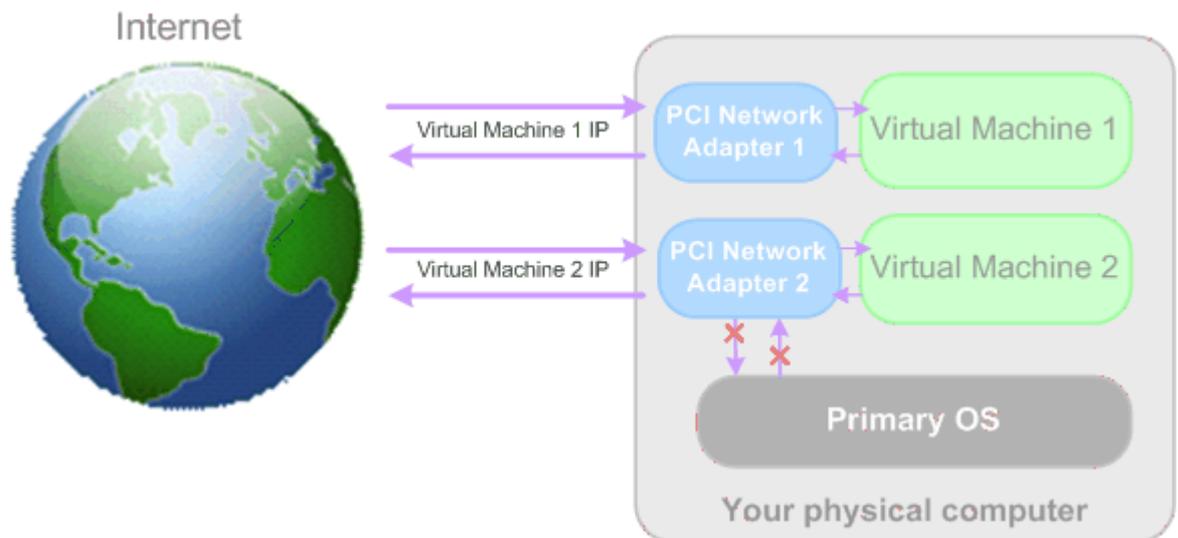
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- 4 Click **OK**.

For the information about troubleshooting networking problems, refer to the Parallels knowledge base <http://kb.parallels.com/> available at the Parallels website.

## Networking Using a PCIe Network Adapter

If your computer has an Intel VT-d chipset, you can use a PCIe network adapter to connect your virtual machine to the local network and Internet. The virtual machine will directly access the PCIe network adapter without using the resources of the primary OS. Before adding a PCIe network adapter device to the virtual machine, you should assign it to your virtual machines in the Intel VT-d pane (p. 51) of Parallels Workstation Extreme Preferences.



To configure your virtual machine to use the PCIe network adapter:

- 1 Open the Virtual Machine Configuration dialog by choosing **Virtual Machine > Configure**.
- 2 Select **Network Adapter** in the **Hardware** list.
- 3 On the **Network Adapter** pane, make sure that the **Enabled** and **Direct Assignment (using Intel VT-d)** options are selected.
- 4 Select the appropriate PCIe network adapter from the list. Click **OK**.
- 5 Start the virtual machine and install the manufacturer's driver for this PCIe device inside the virtual machine. The driver should support the Intel VT-d technology.

After performing these steps you will be able to use the PCIe network adapter directly from the guest OS.

---

**Note:** You can assign one PCIe network adapter to several virtual machines but only one virtual machine can use one PCIe network adapter at a time.

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## CHAPTER 8

# Managing Virtual Machines

This chapter provides the information on cloning, removing from the registered VMs list, and deleting your virtual machines.

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## Cloning a Virtual Machine

An exact copy of a virtual machine can be created using Clone Virtual Machine Wizard. The clone is a separate virtual machine that includes as many virtual hard disks as were connected to the original machine. The wizard places the cloned virtual machine into a default folder, but you may specify a different one.

In the virtual machine clone, the names of all devices, drivers, and virtual hard disk images remain the same as they were in the original machine. All connections between the devices in the cloned VM will be the same as in the original virtual machine.

If a device in the original machine was connected to an external resource, this device in the clone will be connected to the same resource. The only exception is serial/parallel port log files. If such files are used by the original virtual machine, Parallels Workstation Extreme creates a new set of empty log files for the clone.

If the original virtual machine has a snapshot tree, the virtual machine clone will have the same structure of snapshots.

If a network adapter was enabled in the original configuration, Parallels Workstation Extreme generates a new Mac address for the clone.

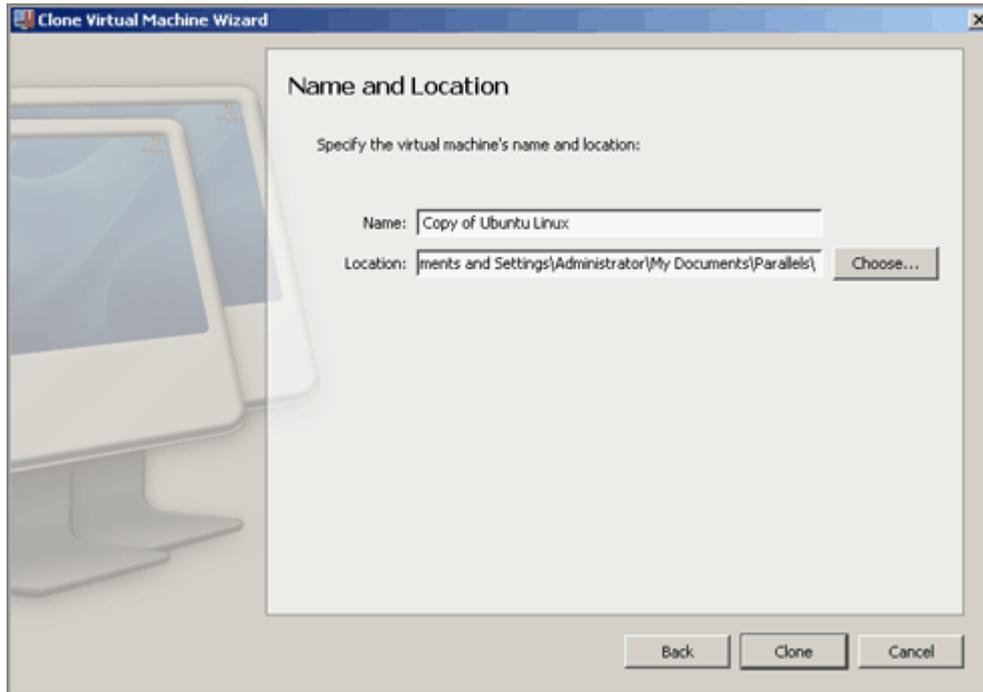
You can also make a clone of a clone, and give it a unique name. The resulting clone will have the same configuration and the same devices connected as the initial clone.

Unlike snapshots (p. 191), a virtual machines and its clones are used separately and there is no any connection between them after the clones creation. If you need to delete an initial virtual machine from which you have made clones, you can do it without any threat to the clones.

Before cloning a virtual machine, make sure that the virtual machine is turned off. If the virtual machine is running, the Clone option in the File menu is disabled.

To make a clone of a virtual machine:

- 1 Open the virtual machine you want to clone.
- 2 From the File menu, select **Clone** or right-click the virtual machine name in the virtual machines list and select **Clone** in the context menu. The **Clone Virtual Machine Wizard** window appears. If you do not want the **Introduction** window to appear in future, select **Always skip introduction**. Click **Next**.
- 3 In the **Name and Location** window, specify the name and folder for the virtual machine clone. The name suggested by the wizard is made by adding "Copy of" to the original virtual machine name. You can specify another name but it should not be longer than 50 characters.



Click **Clone** to start the process.

- 4 When the copying is complete, the **Cloning Finished** window appears. Click **Done** to close the wizard.

---

## Removing a Virtual Machine

When you launch Parallels Workstation Extreme, you can see the currently registered virtual machines in the Parallels Workstation Extreme sidebar.

If a virtual machine is not used, it can be temporarily removed from the list. When you need this virtual machine again, you will be able to add it to the list again.

To temporarily remove a virtual machine from the virtual machines list, perform the following operations:

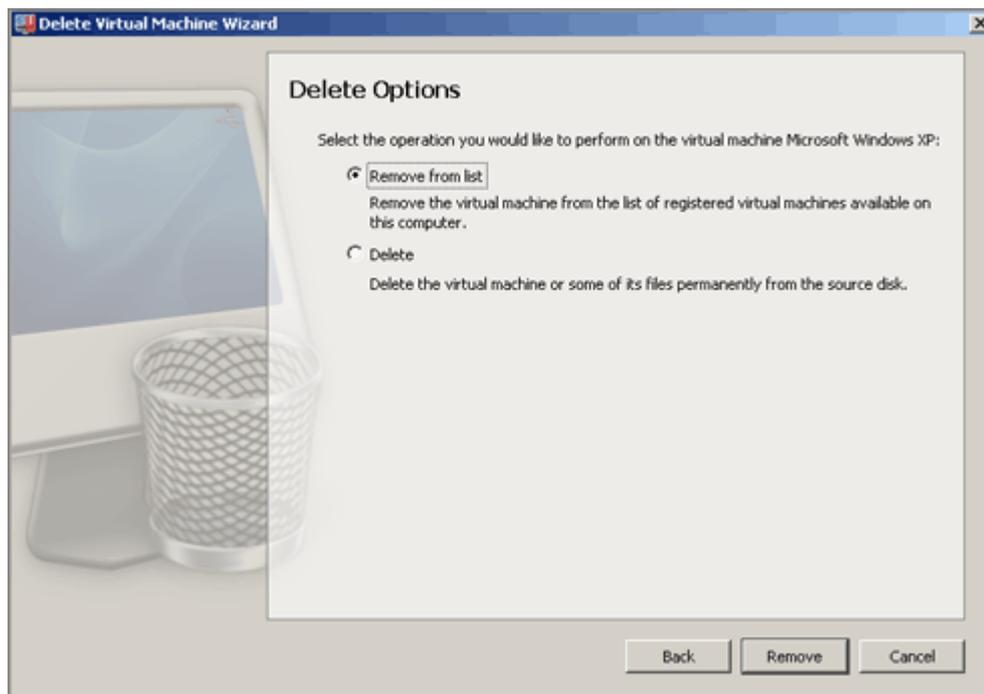
- 1 Launch Parallels Workstation Extreme, choose the virtual machine you want to remove in the virtual machines list, right-click its name, and choose **Remove** from the context menu.

---

**Note:** The virtual machine you want to delete should be stopped or the **Remove** option will be disabled.

---

- 2 The **Delete Virtual Machine Wizard** introductory window appears. If you do not want this window to appear the next time you start this wizard, select **Always skip introduction**. Click **Next**.
- 3 Select the **Remove from list** option and click **Remove**.



- 4 The wizard removes the virtual machine from the virtual machines list. If the operation was successful, the **Removal Succeeded** window appears.
- 5 Click **Done** to close the wizard.

---

## Deleting a Virtual Machine

You can delete a virtual machine using the Delete Virtual Machine wizard or by deleting its file manually.

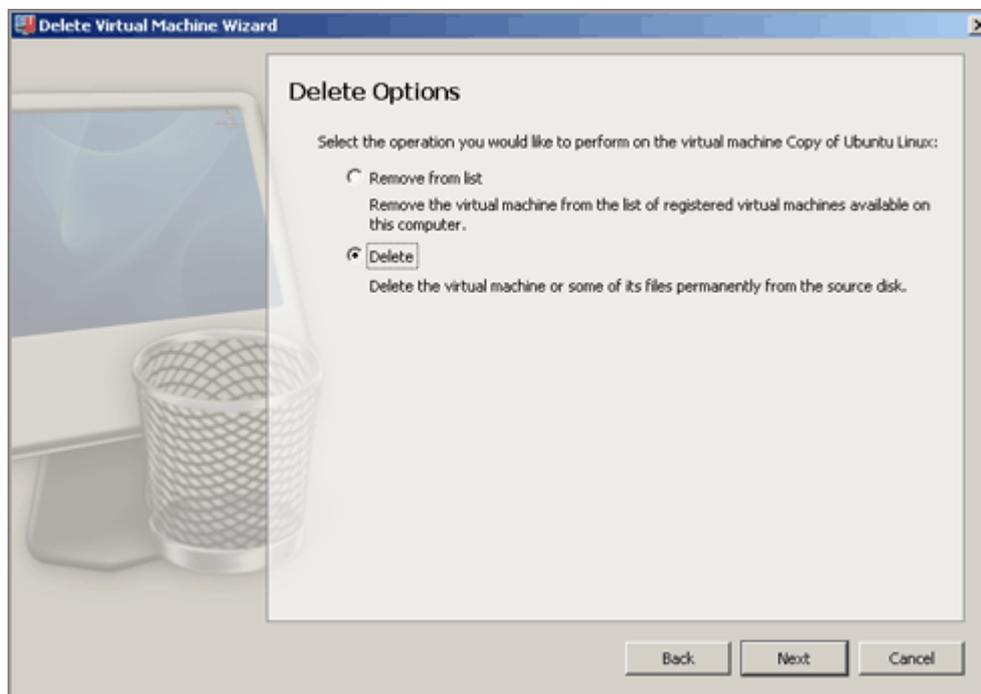
The Delete Virtual Machine wizard removes the following virtual machine files by default:

- configuration file
- virtual hard disk file(s)
- snapshots
- floppy disk image file(s), if any
- output files of serial and parallel ports, if any
- folder where this virtual machine files are stored

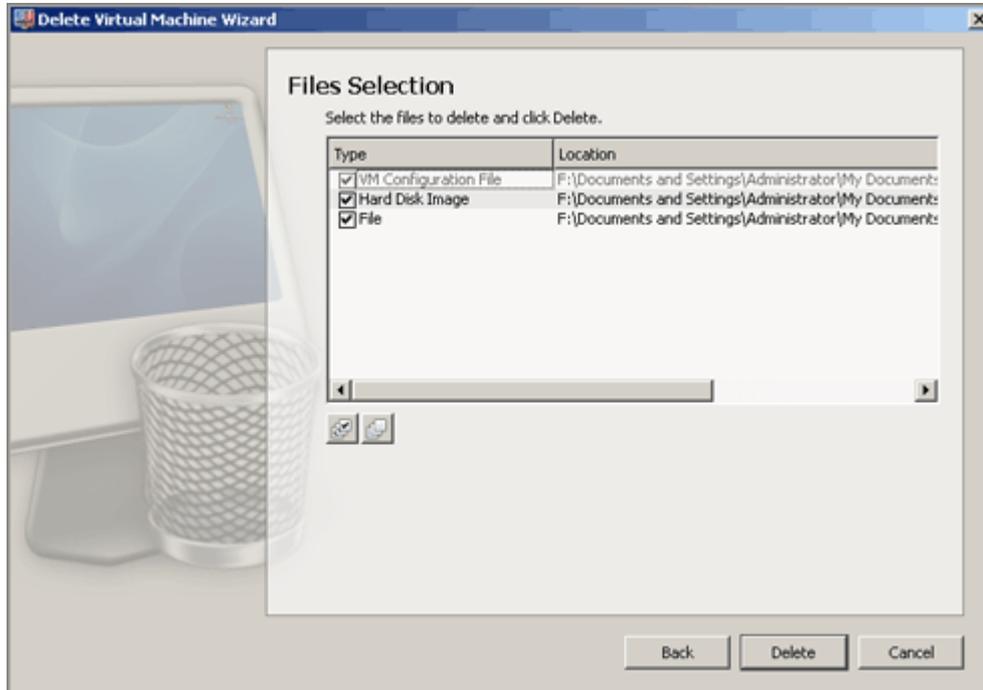
The wizard can delete an open virtual machine that is not running. If it is running, the Remove command in the context menu is disabled.

To delete a virtual machine:

- 1 Open the virtual machine that you want to delete.
- 2 Right-click the virtual machine name in the virtual machines list and select **Remove** in the context menu. The **Delete Virtual Machine Wizard** introductory window appears. If you do not want it to appear in future, select **Always skip introduction**. Click **Next**.
- 3 In the **Delete Options** window, select **Delete** and click **Next**.



- The wizard finds all files related to the virtual machine and displays the list of them in the Files Selection dialog. The configuration file, virtual hard disk, output files of serial and parallel ports, and the home folder are pre-selected for deleting. However, the .iso image is not selected by default, because it can be used by other virtual machines. If you want to delete it too, select it in the list.



---

**Note:** Make sure you are not going to delete the virtual hard disk that is also used by other virtual machines.

---

If you want to select all items in the list of files related to the virtual machine at a time, click the **Select All** button  displayed below the list.

If you want to clear all items in the list of files related to the virtual machine at a time, click the **Clear All** button  displayed below the list.

Review the selection and click **Delete**.

- 5 The wizard removes the selected files from the hard disk of the host computer. If the operation was successful, the **Deletion Succeeded** window appears.

The virtual machine is considered as successfully deleted if all selected components or all selected components except the home folder (if it was chosen for deleting) have been removed. If the home folder contains any other files, the folder will not be deleted.

Click **Done** to close the assistant.

### Deleting virtual machines manually

Though it is strongly recommended to use **Delete Virtual Machine** wizard for deleting your virtual machines, you may also delete virtual machines manually.

If you have virtual machines that are not registered in **Parallels Workstation Extreme** but their files are stored on your physical computer, you can permanently delete the unnecessary virtual machines by deleting their files. The virtual machine files (PVM files) are stored in the following folder by default: `C:\Documents and Settings\\My Documents\Parallels\`. Each virtual machine is represented by a single PVM file.

**Warning!** Before deleting the virtual machine manually, make sure that this virtual machine is not registered in **Parallels Workstation Extreme** and none of its files (like virtual hard disks) are used by other virtual machines.

---

## Working With Virtual Machine Templates

Parallels Workstation Extreme makes your work with virtual machines even more convenient by enabling you to create templates of Parallels virtual machines.

A template, like a virtual machine, has hardware and may have operating system and software installed. The only difference is that it cannot be started. A template can be easily converted to an ordinary virtual machine and vice versa.

Using one template, you can create as many virtual machines as you need and the disk space of the host computer allows. The virtual machines created using such a template will have the same hardware configuration, operating system, and software that this template has.

You can convert an existing virtual machine into a template or make a clone of the virtual machine that will be used as a template and continue using the original virtual machine.

## Creating a Virtual Machine Template

If you need to create a number of virtual machines with same configuration, you can create a virtual machine template and use it to create new virtual machines.

There are two ways of creating a virtual machine template:

- Convert an existing virtual machine into a virtual machine template.
- Clone an existing virtual machine to a virtual machine template.

If you choose to convert a virtual machine into a template, this virtual machine will change its operating system icon to a template icon in the list of virtual machines and it will be available as a template only. You will not be able to run it as a virtual machine.

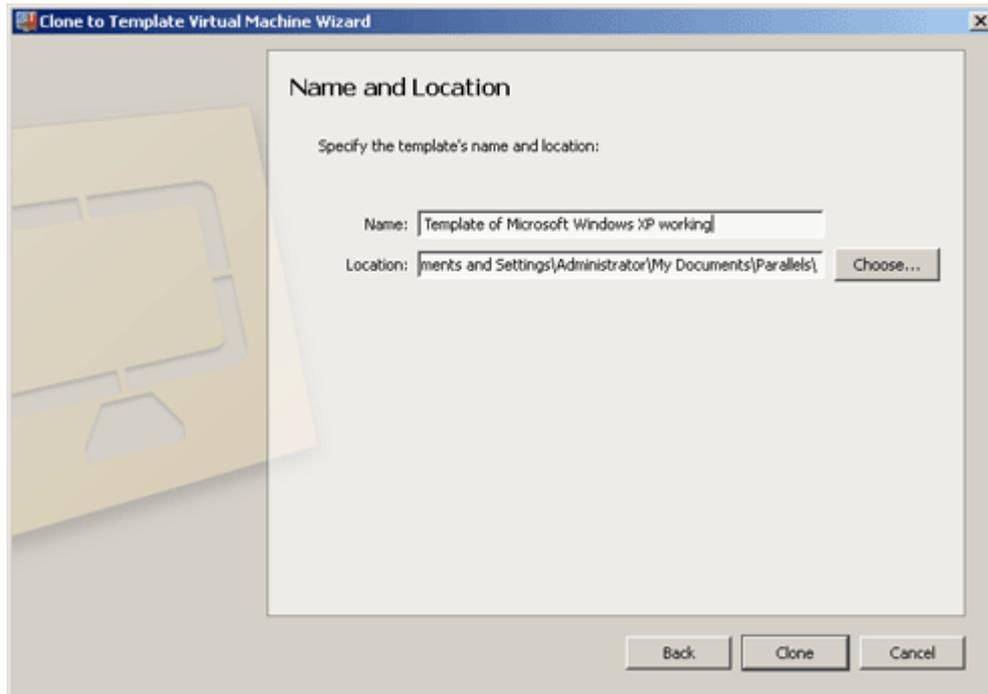
If you do not want to convert a virtual machine into a template but need to make a copy of it with the same configuration, you can make a clone of this virtual machine that will be used as a template.

To convert an existing virtual machine into a template:

- 1 Launch Parallels Workstation Extreme.
- 2 Choose the virtual machine you want to convert into a template in the left pane of the Parallels Workstation Extreme window.
- 3 Choose **Convert to Template** from the **File** menu or right-click the virtual machine's name in the left pane of the Parallels Workstation Extreme window and choose **Convert to Template** from the shortcut menu.
- 4 The virtual machine will become a template and will have a different icon indicating that it is a template.

To clone a virtual machine to a template:

- 1 Launch Parallels Workstation Extreme.
- 2 Choose the virtual machine you want to clone to a template in the left pane of the Parallels Workstation Extreme window.
- 3 Start **Clone to Template Virtual Machine Wizard** by choosing **Clone to Template** from the **File** menu or by right-clicking the virtual machine's name in the left pane of the Parallels Workstation Extreme window and choosing **Clone to Template** from the shortcut menu.
- 4 In the **Introduction** window, click **Next**. To skip this window next time you start the wizard, select **Always skip introduction**.
- 5 In the **Name and Location** window, specify the name and location for the virtual machine template and click **Clone**. You can use the **Choose** button to change the location.



- 6 In the Creation Finished window, click Done to quit the wizard.

## Deploying a Virtual Machine Template

A virtual machine template cannot be run as a virtual machine. To be able to run it as a virtual machine, you should create a virtual machine that will have the same configuration as the template has.

There are two ways of creating a virtual machine from a template:

- Convert a template into a virtual machine.
- Deploy a template to a new virtual machine.

If you convert a virtual machine template into a virtual machine, its icon will be moved from the virtual machines list, and you will be able to use it as a virtual machine.

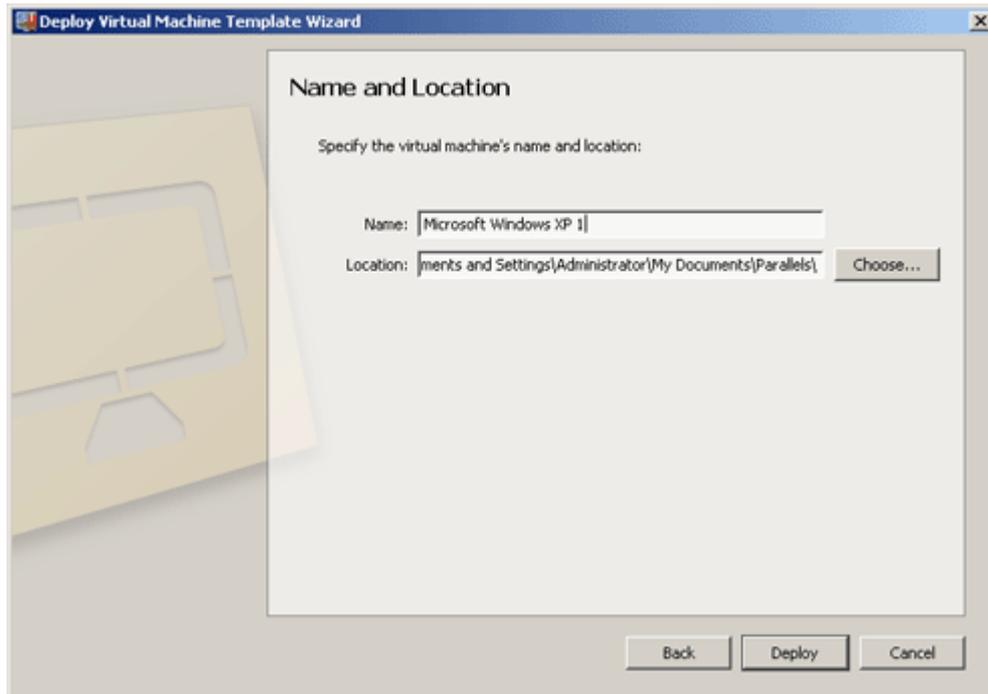
If you deploy a virtual machine template to a virtual machine, the Deploy Virtual Machine Template wizard will create a new virtual machine, but the template will not be removed from the Parallels Virtual Machines list.

To convert a virtual machine template into a virtual machine:

- 1 Launch Parallels Workstation Extreme.
- 2 Select the virtual machine template you want to convert into a virtual machine in the left pane of the Parallels Workstation Extreme window.
- 3 Choose **Convert to Virtual Machine** from the **File** menu or right-click the template's icon in the left pane of the Parallels Workstation Extreme window and choose **Convert to Virtual Machine** from the shortcut menu.
- 4 The virtual machine template will be processed into a virtual machine and will change its icon.

To deploy a virtual machine template to a new virtual machine:

- 1 Launch Parallels Workstation Extreme.
- 2 Select the virtual machine template you want to be deployed to a virtual machine in the left pane of the Parallels Workstation Extreme window.
- 3 Start Deploy Virtual Machine Template Wizard by choosing **Deploy to Virtual Machine** from the **File** menu or by right-clicking the virtual machine template's name in the left pane of the Parallels Workstation Extreme window and choosing **Deploy to Virtual Machine** from the shortcut menu.
- 4 In the **Introduction** window, click **Next**. To skip this window next time you start the wizard, select **Always skip introduction**.
- 5 In the **Name and Location** window, specify the name and location for the virtual machine and click **Deploy**. You can use the **Choose** button to change the location.



**6** In the Deployment Finished window, click Done to close the wizard.

The resulting virtual machine will have the same configuration that the original template had.

## Managing Virtual Machines From the Tray

When working with Parallels Workstation Extreme, you can use the Parallels Workstation Extreme tray icon (p. 38) to easily manage your running and paused virtual machines. This may be very useful when the Parallels Workstation Extreme window is minimized or when you use a separate display for your virtual machines.

You can manage your virtual machines by doing one of the following:

- Double-click the tray icon to bring the Parallels Workstation Extreme window (p. 31) to focus. However, it does not bring the detached virtual machine window (p. 31) to focus.
- Right-click the tray icon to open its context menu where you can see your running and paused virtual machines.

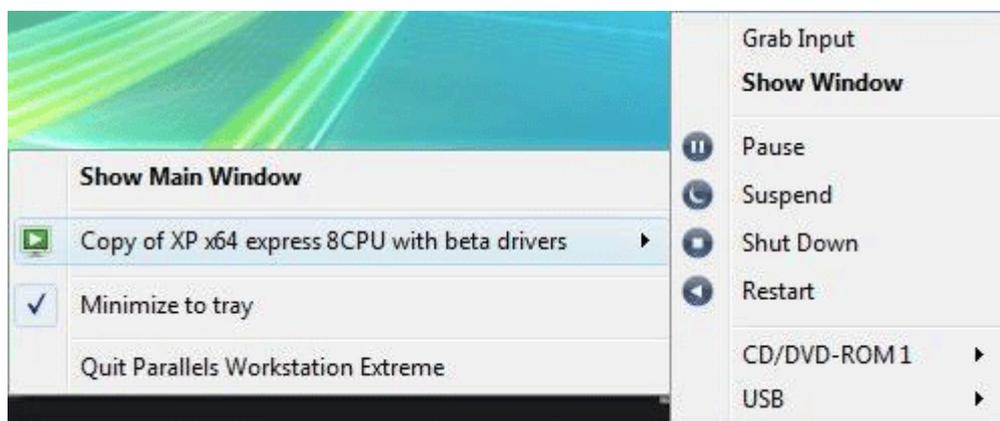
---

**Note:** Suspended and stopped virtual machines are not listed in the tray icon context menu.

---

Point to a virtual machine and do one of the following:

- Choose **Show Window** to bring the virtual machine window to focus. If this window is detached, only the detached window will be brought to focus.
- If the virtual machine is paused, choose the corresponding item to resume, suspend, shut down or restart this virtual machine.
- If the virtual machine is running, choose the corresponding item to pause, suspend, shut down or restart this virtual machine.



- If the virtual machine has a PCIe video adapter assigned, you can manage its CD/DVD-ROM drive or USB Controller. Point to the corresponding item and choose the necessary command.
- If the virtual machine has a PCIe video adapter assigned, choose **Grab Input** to grab the mouse and keyboard input to the virtual machine. It may be very useful to switch over to the virtual machine when you work with two displays: one display for the host computer, the other for the virtual machine.

---

## Optimizing Performance With Adaptive Hypervisor

If you use a lot of applications in the primary and guest OSs at a time, you may lack the CPU resources. The current version of Parallels Workstation Extreme presents you the Adaptive Hypervisor technology that helps you to distribute the CPU resources between the primary and guest OS in the most efficient way.

The Adaptive Hypervisor technology automatically allocate the host computer CPU resources between the virtual machine and primary OS applications depending on what application you are working with at the moment. If your virtual machine window is in focus, the priority of this virtual machine processes will be set higher than the priority of the primary OS's processes and as a result more CPU resources will be allocated to the virtual machine. If you switch to the primary OS window - the priority of its working applications will be set higher and the CPU resources will be relocated to the primary OS.

You can enable the Adaptive Hypervisor option in the **Optimization** pane (p. 116) of Virtual Machine Configuration. In this pane, you can also configure the host computer memory resources distribution.

---

## Working With Snapshots

A snapshot is a saved state of the virtual machine. Snapshots can be created manually or automatically when the virtual machine is running. After you make a snapshot, you can continue working with the virtual machine and revert to the created snapshot at any time of your work.

Snapshots are stored in the primary OS inside the virtual machine bundle (p. 14), in the `Snapshots` subfolder. Each snapshot has a number of files, including the `.sav` file that contains the virtual machine's state, the `.mem` file that contains the memory dump for the virtual machine, and other different files of the virtual hard disk.

---

**Note:** Snapshots are not backup copies or clones (p. 179) of your virtual machine. You cannot use them alone without your virtual machine or move them from the virtual machine bundle.

---

You may need to make snapshots in the following cases:

- If you are configuring a software that requires a lot of settings, you may want to explore the settings functions before selecting them. For testing the settings, create snapshots at branching points.
- If you want to mark milestones in the development process. If something goes wrong, you can always revert to the previous state or create a branch of snapshots starting with the particular milestone snapshot.

## Making Snapshots

Snapshots can be created manually or automatically using SmartGuard.

---

**Note:** You cannot create a snapshot manually or automatically or revert to a snapshot when your virtual machine is paused.

---

To make a snapshot manually:

- 1 Make sure that you completed all operations of installing, downloading, or writing to external devices before taking a snapshot.

---

**Note:** You can create a snapshot at any time. But it is recommended to complete all operations of installing, downloading, or writing to external devices before taking a snapshot. You should also complete or cancel any transactions performed via the virtual machine in external data bases.

---

- 2 Choose **Take Snapshot** from the **Virtual Machine** menu or use the **Take Snapshot** button



on the toolbar of your virtual machine's window. If the toolbar does not contain this button, you can add it to the toolbar. For more information, refer to the **Customizing Toolbar** section (p. 35).

---

**Note:** To make a snapshot, you can also use Snapshot Manager. Just open the manager by choosing **Snapshot Manager** from the **Virtual Machine** menu and click the **New** button. A new snapshot will be created.

---

- 3 In the **Snapshot Parameters** window, you can provide a name and a short description for the snapshot. This information and the date of creation will be visible in Snapshot Manager when you hover the pointer over the snapshot icon.
- 4 Click **OK** to take a snapshot.

After the snapshot is created, you can continue working with your virtual machine's current state or use any of its snapshots.

To revert to a snapshot, open Snapshot Manager by choosing **Snapshot Manager** from the **Virtual**

**Machine** menu or by clicking the **Snapshot Manager** button  on the toolbar of the virtual machine window.

To create snapshots automatically, configure the **SmartGuard** settings.

## Managing Snapshots

You can use Snapshot Manager to revert to a specific snapshot, as well as to manage the snapshots. To open Snapshot Manager:

- Choose **Snapshot Manager** from the **Virtual Machine** menu, or
- Click the **Snapshot Manager** button  on the toolbar of the virtual machine window.

---

**Note:** To add this button in the toolbar, you should customize it. To learn how to do that, refer to the **Customizing Toolbar** section.

---

Using Snapshot Manager, you can:

- create new snapshots and delete the unused ones
- view the snapshot tree of a particular virtual machine
- select a snapshot to revert to
- **Note:** You cannot create a snapshot manually or automatically or revert to a snapshot when your virtual machine is paused.

The **Virtual Machine Snapshots** window consists of the following areas:

- The snapshots tree pane.
- The snapshots management pane.

### Snapshots Tree Pane

Snapshot icons appear as screen shots of the guest OS window if the virtual machine was running at the time you created a snapshot.

The left icon with a flag is the *root* of the snapshots tree - it is the initial state of the virtual machine used as the reference point. You cannot delete the root icon. The root icon is visible if at least one snapshot exists. If you want to delete a snapshot which is parental for some other snapshots, you can decide whether to delete only this snapshot or delete it with all the subsequent snapshots.

All snapshots in the snapshots tree are descendants of the *root* state of the virtual machine. The first snapshot contains "differences" with respect to the root state. The second successive snapshot contains differences with respect to the first snapshot. You may want to return to one of the previous snapshots and work with it. If you then create a new snapshot, a new snapshots branch will be created.

An icon that represents the current state of the virtual machine is marked by a red flag.

When you hover the pointer over an item, you will see a tooltip message with a short description.

### Snapshots Management Pane

The snapshots management pane includes the buttons necessary for managing the snapshots.

- The **New** button. Click this button to create a new snapshot for the present state of your virtual machine.

- The **Go To** button. Select the snapshot you want to go to in the snapshots tree and click this button to move from the present state of your virtual machine to the state saved in this snapshot.

---

**Note:** Before you go to a specific snapshot, decide what you want to do with the current state of the virtual machine - by default, it will not be saved. To retain the changes made since the last snapshot, make a new snapshot.

---

- The **Delete** button. Select the snapshot you want to delete and click this button. If you delete an intermediate snapshot, the information it contains will be merged into the subsequent snapshot.

---

**Note:** You cannot delete the *root* icon. It disappears only when you delete all snapshots in the tree.

---

You can also manage snapshots by right-clicking them in the tree:

- If you right-click the icon that shows the present state of the virtual machine, you can create a new snapshot for this state.
- If you right-click any other intermediate snapshot, you can choose to go to it, to delete it alone or with all the subsequent snapshots.

### Going to a Snapshot

- 1 Launch Parallels Workstation Extreme and open a virtual machine.
- 2 Open Snapshot Manager by
  - choosing **Snapshot Manager** from the **Virtual Machine** menu, or
  - clicking the **Snapshot Manager** icon in the toolbar of the virtual machine main window.
- 3 In the **Virtual Machine Snapshots** window, choose the snapshot and click the **Go To** button. You can also right-click the snapshot and choose **Go to Snapshot** from the shortcut menu or just double-click the snapshot.

---

**Note:** If, after the Parallels Workstation Extreme update, you decided to revert to one of the snapshots made before the update, you will see the message that a new Parallels Tools update is available. We recommend you to install them to work effectively with the virtual machine.

---

- 4 If you revert to a snapshot from an unsaved state of the virtual machine, you will see the notification about that. Click **Yes** if you want to proceed without saving the state. Click **No** if you want to save the state and then go to the needed snapshot.

If you want to revert to the previous snapshot made on the same branch of snapshots, use the **Revert To Snapshot** option from the **Virtual Machine** menu or from the virtual machine main window toolbar. If you want to know to what exactly snapshot you will revert, you can always see your snapshots tree in Snapshot Manager.

---

**Note:** If you revert to the previous snapshot from an unsaved state of the virtual machine, you will see the notification about that. Click **Yes** if you want to proceed without saving the state. Click **No** if you want to save the state and then revert to the snapshot.

---

After reverting to a snapshot, it is recommended to update Parallels Tools in the virtual machine.

### Deleting a Snapshot

- 1 Launch Parallels Workstation Extreme and choose a virtual machine.
- 2 Open Snapshot Manager by
  - choosing **Snapshot Manager** from the **Virtual Machine** menu, or
  - clicking the **Snapshot Manager** button in the toolbar of the virtual machine window.
- 3 Select the snapshot you want to delete and click the **Delete** button if you want to delete only this snapshot. If you want to delete all the snapshots that come after it, right-click the snapshot and choose the **Delete Snapshot with children** option.

If you delete an intermediate snapshot, the information it contains will be merged into the snapshot that follows it.

---

**Note:** You cannot delete the root icon, but it gets automatically deleted after you delete all the other snapshots.

---

### Merging Snapshots

Merging is performed automatically when you delete any snapshot except the last one in the branch. When you delete an intermediate snapshot, the information it contains is merged into the next snapshot of the same branch.

If you delete the snapshot belonging to two branches, the information is merged into the next snapshot of each branch.

---

**Note:** If you delete the snapshot that comes after the root icon and that belongs to two branches, the branches will start from the initial state icon directly.

---

The snapshots are also merged automatically if you manage the capacity of your virtual hard disk with the help of Parallels Image Tool. Before applying any changes to the virtual hard disk, Parallels Image Tool merges and deletes all the snapshots except for the last one. Unlike merging the snapshots in Snapshot Manager, the results of merging process via Parallels Image Tool are not reflected in the snapshots tree, and the icons of already deleted snapshots are still present in the tree.

## CHAPTER 9

# Using Parallels Add-Ons

This chapter provides information on how and when you can use Parallels Transporter, Parallels Compressor, and Parallels Image Tool.

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## Using Parallels Image Tool

Virtual machines use virtual hard disks that are actually hard disk image files. After using your virtual machine for some time, you may find that your virtual machine hard disk does not fit your needs anymore, and you want to increase its capacity, or change its type and properties. Parallels designed a special utility for increasing the virtual hard disk capacity and managing its properties - Parallels Image Tool.

---

**Note:** The virtual hard disk image file can be found inside the virtual machine's PVM bundle. In the Windows primary OS PVM bundles are stored in the `C:\Documents and Settings\\My Documents\Parallels\` folder. In the Linux primary OS they are stored in the `/<username>/parallels` directory.

---

Parallels Image Tool is installed automatically during the Parallels Workstation Extreme installation.

To start Parallels Image Tool in the Windows primary OS:

- From the Windows **Start** menu, choose **Programs > Parallels > Parallels Workstation Extreme > Parallels Image Tool**.

To start Parallels Image Tool in the Linux primary OS:

- From the **Applications** menu, choose **System Tools > Parallels Image Tool**.

## Increasing the Virtual Hard Disk Capacity

If you find that the capacity of your virtual machine's hard disk does not fit your needs anymore, you can increase it using Parallels Image Tool.

To increase the capacity of the virtual hard disk:

- 1 Start Parallels Image Tool.
- 2 In the **Introduction** window, click **Continue**.
- 3 Specify the source virtual disk image file with the `.hdd` extension in the **Source Virtual Disk** window. You may type the path and file name or use the **Choose** button to locate the file. The virtual hard disk image file can be found inside the virtual machine's PVM bundle. PVM bundles are stored by default:
  - in the `/<Username>/Documents/Parallels/` folder or in the `/Users/Shared` folder in Mac OS X.
  - in the `C:\Documents and Settings\<Username>\My Documents\Parallels\` folder in the Windows primary OS.
  - in the `/<username>/parallels` directory in the Linux primary OS.

---

**Note:** The virtual machine using this virtual hard disk should be stopped before proceeding.

---

- 4 Select the **Increase the disk capacity** option in the **Select Action** window.
- 5 Specify the new capacity for the disk. The **Add the unallocated space to the last volume** check box, which is selected by default, means that the additional disk space will be added to the last volume. If you clear it, the added space will appear as unallocated space. To allocate this space, you can either create a new partition or expand an existing partition. For instructions on allocating the added space, see the **Using the Added Space** section.

---

**Note:** If you choose a hard disk used by a virtual machine that has snapshots, all snapshots, except the last one, will be deleted.

---

To start the process of increasing the disk capacity, click **Start**. You can view the operation progress in the **Processing the File** window. Clicking **Cancel** terminates the operation.

---

**Note:** If the virtual hard disk image file you specified is in the *old* format, it will be automatically converted to the *new* format.

---

- 6 After the disk image has been successfully modified, the **Execution is Completed** window appears. Click **Finish** to close Parallels Image Tool.

## Managing the Virtual Hard Disk Properties

With Parallels Image Tool, you can manage the properties of your virtual machine hard disk. You can change the virtual hard disk type from *plain* to *expanding* and vice versa, split or merge the disk parts, or merge snapshots of the virtual machine that uses this virtual hard disk.

To change the type of the virtual hard disk:

- 1 Start Parallels Image Tool.
- 2 In the **Introduction** window, click **Continue**.
- 3 Specify the source virtual disk image file with the `.hdd` extension in the **Source Virtual Disk** window. You may type the path and file name or use the **Choose** button to locate the file. The virtual hard disk image file can be found inside the virtual machine's PVM bundle. PVM bundles are stored by default:
  - in the `/<Username>/Documents/Parallels/` folder in Mac OS X.
  - in the `C:\Documents and Settings\<Username>\My Documents\Parallels\` folder in the Windows primary OS.
  - in the `/<username>/parallels` directory in the Linux primary OS.

---

**Note:** The virtual machine using this virtual hard disk should be stopped before proceeding.

---

- 4 Select the **Manage disk properties** option in the **Select Action** window.
- 5 In the **Select Operations** window, choose one or several of the following operations to perform on the disk and click **Start**:

---

**Note:** The operations with the virtual hard disk are irreversible.

---

- If the virtual hard disk image you specified is an *expanding* virtual hard disk, the **Split virtual hard disk image file** option is selected by default.
- If it is an *expanding* disk, you can select the **Convert to Plain** option.
- If it is a *plain* disk, the **Convert to Expanding** option is selected by default.
- If the hard disk image you selected has snapshots, the **Merge snapshots** option is selected by default. You cannot clear this option.

---

**Note:** The merging process deletes all the snapshots, except the last one.

Parallels Image Tool needs to merge all the snapshots of the current virtual hard disk before performing any actions with it. The information from all the snapshots will be merged to the last one, and all the other snapshots will be deleted. Parallels Image Tool does not change the snapshots tree in Snapshot Manager, so if you attempt to revert to any snapshot of the tree, it will be no longer accessible, and you can remove it manually. **Note:** If the virtual hard disk image file you specified is in the *old* format, it will be automatically converted to the *new* format.

---

You can view the operation progress in the **Processing the File** window. Clicking **Cancel** terminates the operation.

- 6 After the disk image has been successfully modified, the **Execution is Completed** window appears. Click **Finish** to close Parallels Image Tool.

## Changing the Virtual Hard Disk Format

If you want to use your virtual machine with an earlier version of Parallels Workstation Extreme, use Parallels Image Tool to convert its hard disk image file to the old format. Image Tool can be also used to convert virtual hard disk image files created with Parallels Workstation 2.2 to the new format, supported by Parallels Workstation Extreme 4.

**Warning:** If you have Parallels Tools installed on your virtual hard disk, remove them before processing the disk.

To change the format of your virtual hard disk image file:

- 1 Launch Parallels Image Tool.
- 2 In the **Introduction** window, click **Continue**.
- 3 Specify the source image file of the virtual hard disk in the **Source Virtual Disk Image File** window. You may type the path and file name or use the **Choose** button to locate the file.
- 4 In the **Select Action** window, select:
  - **Convert to the old format** if your hard disk image file is in the Parallels Workstation Extreme 4 format and click **Start**. In this case, the hard disk will be converted into the Parallels Workstation 2.2 format.
  - **Convert to the new format** if your hard disk image file is in the Parallels Workstation 2.2 format and click **Start**. In this case, the hard disk will be converted into the Parallels Workstation Extreme 4 format.

---

**Note:** If you are converting the disk to the old format, you may need to reconfigure the guest OS installed on it. To do that, you will need the installation media for the guest OS installed on the disk. You may insert it into the CD/DVD-ROM drive of your computer or select the installation media to use in the **More Options** area. When finished, click **Start**.

---

You can view the operation progress in the **Processing the File** window. Clicking **Cancel** terminates the operation.

- 5 After the disk image has been successfully modified, the **Execution is Completed** window appears. Click **Finish** to close Parallels Image Tool.

---

## Reducing the Virtual Hard Disk Size

With Parallels Image Tool, you can manage the properties of your virtual machine hard disk.

If you have an expanding virtual hard disk and need to reduce its size by removing unused space on the disk, you can compact it.

---

**Note:** A plain virtual hard disk cannot be compacted.

---

To reduce the virtual hard disks size:

- 1 Start Parallels Image Tool.
- 2 In the **Introduction** window, click **Continue**.
- 3 Specify the source virtual disk image file with the `.hdd` extension in the **Source Virtual Disk** window. You may type the path and file name or use the **Choose** button to locate the file. The virtual hard disk image file can be found inside the virtual machine's PVM bundle. PVM bundles are stored by default:
  - in the `<Username>/Documents/Parallels/` folder in Mac OS X.
  - in the `C:\Documents and Settings\<Username>\My Documents\Parallels\` folder in the Windows primary OS.
  - in the `<username>/parallels` directory in the Linux primary OS.

---

**Note:** The virtual machine using this virtual hard disk should be stopped before proceeding.

---

- 4 Select the **Compact the disk** option in the **Select Action** window and click **Start**.

---

**Note:** If the virtual hard disk has one or several snapshots, Parallels Image Tool needs to merge them before performing the required action with the disk. The information from all snapshots will be merged to the last one, and all the rest will be deleted. Parallels Image Tool does not change the snapshots tree in Snapshot Manager, so if you attempt to revert to any snapshot of the tree, it will be no longer accessible, and you can remove it manually.

---

The disk compacting procedure starts.

- 5 Click **Finish** in the **Execution is Completed** window to exit Parallels Image Tool.

---

## Using Parallels Transporter

Parallels Transporter is an easy-to-use application which helps you migrate physical or virtual computers with the whole information they contain to Parallels virtual machines on the host computer. This chapter contains an overview of Parallels Transporter usage scenarios and working principles.

Parallels Transporter is provided as a Parallels Workstation Extreme utility and installed automatically during the Parallels Workstation Extreme installation.

## Parallels Transporter Working Principles

Parallels Transporter package includes two applications:

- Parallels Transporter. This application transfers data stored on a physical computer or a volume to a Parallels virtual machine or virtual hard disk.
- Parallels Transporter Agent. This application collects essential system data on the remote computer (the *source computer*) or volume you are planning to migrate and transfers it to Parallels Transporter installed on the computer that will host the resulting virtual machine or virtual hard disk (the *host computer*).

Parallels Transporter is provided as a Parallels Workstation Extreme utility and is installed automatically on the host computer during the Parallels Workstation Extreme installation.

On the source computer, you can install a separate package containing Parallels Transporter and Parallels Transporter Agent. You can download the most recent version of Parallels Transporter package from Parallels Download Center:

- for a PC with a Windows OS installed - `Parallels-Transporter-Full-x.x.xxxx-en_US.exe`
- for a PC with a Linux OS installed - `parallels-transporter-xxxx.xxxxxx.run`

Each of these packages contains Parallels Transporter and Parallels Transporter Agent. Depending on what scenario will be used, install Parallels Transporter Agent or both on the source PC. Before you start the migration, make sure that your the host computer and the source PC are connected by a network cable and can access each other over the network. Check that you have enough free disk space on the host computer to allocate the resulting images of the migrated volumes.

For more detailed information, please refer to *Parallels Transporter User's Guide*.

## Migration Scenarios

Parallels Transporter offers you several typical migration scenarios depending on the purpose of migration. After you make up your mind and choose the scenario, you can refer to *Parallels Transporter Help* for further instructions on the selected scenario of migration.

Using Parallels Transporter, you can migrate:

- from a remote computer
- from a third-party virtual machine
- from a remote computer locally

Parallels Transporter has two migration modes:

- *Express*. This mode allows quick migration of one active volume. As a result, you will get a ready-to-use Parallels virtual machine which will have the guest operating system installed and all the applications and data you used on that volume.
- *Advanced*. This mode allows migration of several volumes at once. In one session of migration, only one active volume (if selected so) can be made bootable. The new virtual machine will be created with this volume as its virtual hard disk. Other volumes will be migrated as data disks if they have file systems supported by Parallels Transporter Agent.

### Migrating from a remote computer

In this scenario, you should use Parallels Transporter on the host computer and Parallels Transporter Agent on the PC you want to migrate.

The volume where Parallels Transporter Agent is installed is called the *active* volume. The operation is supported for the active volumes with the following operating systems:

- Windows 2000
- Windows Server 2003
- Windows XP
- Windows Vista.

Parallels Transporter can apply necessary changes only to the listed operating systems so that the images of active volumes can be bootable in Parallels virtual machines.

If you want to use a migrated disk as a boot volume (system disk) in your virtual machine you must provide an installation disc for the operating system that runs on the active volume of the source computer (you can also use an ISO image of such an installation disc). Parallels Transporter may need to reinstall a few drivers, because hardware on the source computer and default virtual hardware of a virtual machine are different.

**Warning:** If you migrate a volume with a Windows OS installed on it and want to use its image as a bootable virtual disk, please note that there may be activation problems: a Windows OS migrated to a virtual machine may detect that the hardware has changed and require that you reactivate your copy of Windows.

Parallels Transporter Agent enables you to migrate data from *non-active* volumes of a source computer and to create images of these volumes. The resulting image can be connected as a data disk to a virtual machine that has an operating system compatible with the file system on this volume. Disk images of non-active volumes with supported operating systems can be made bootable later (in a Parallels virtual machine).

### Migrating from a third-party virtual computer

You can use Parallels Transporter for converting a third-party virtual computer into a Parallels virtual machine (*Express* and *Advanced* migration modes), and for converting a third-party virtual disk to a Parallels virtual machine or disk (*Advanced* migration mode). If you select to convert the entire third-party virtual computer, the configuration of the resulting Parallels virtual machine will be the similar to the original one. This operation is supported for VMware virtual machines and Microsoft Virtual PC computers.

You can also process an already existing non-bootable Parallels virtual disk image (result of migration from a system volume of a remote PC), so that this image can be used as a bootable volume in a Parallels virtual machine (*Advanced* mode only).

### Migrating from a remote computer locally

The operation can be useful, when the computer you want to migrate and the host computer are not connected by a network. This scenario can be performed on a remote source computer that has both Parallels Transporter Agent and Parallels Transporter installed.

You should download the proper Parallels Transporter package for PC and install both Parallels Transporter and Transporter Agent on the boot volume of the remote computer. You can migrate one or several volumes during one session (*Advanced* mode) or only the active volume (*Express* mode). As a destination for storing the resulting image, you can specify an external USB drive connected to the remote computer in case you don't have local network to transfer the image right to the host computer.

---

**Note:** After the migration is finished, you are recommended to install Parallels Tools (p. 74) in your new virtual machine before starting to work with it.

---

## Starting Parallels Transporter

To start Parallels Transporter in Windows:

- If Parallels Transporter was installed together with Parallels Workstation Extreme, click the Windows **Start** menu and choose **All Programs > Parallels > Parallels Workstation Extreme > Parallels Transporter** or choose **Run Parallels Transporter** from the Parallels Workstation Extreme **File** menu.
- If Parallels Transporter was installed as a separate package, click the Windows **Start** menu and choose **All Programs > Parallels > Parallels Transporter**.

To start Parallels Transporter in Linux, click the **Applications** menu and choose **System Tools > Parallels Transporter**.

To start Parallels Transporter Agent:

- In Windows, click the Windows **Start** menu and choose **All Programs > Parallels > Parallels Transporter Agent**.
- In Linux, click the **Applications** menu and choose **System Tools > Parallels Transporter Agent**.

---

## Using Parallels Compressor

Parallels Compressor is an easy-to-use Parallels utility which will help you keep your virtual machines efficient for many purposes.

Parallels Compressor is a part of the Parallels Tools set and is installed, updated, and removed with Parallels Tools. To start Parallels Compressor, choose **Run Parallels Compressor** from the **Virtual Machine** menu.

Parallels Compressor allows users to:

- effectively clean up disk space in a virtual machine
- significantly reduce the size of virtual hard disks files
- efficiently use the resources of a physical hard disk

---

**Note:** Compressing of a virtual machine cannot be performed if the virtual machine has the **Undo disks** option enabled, or if it has snapshots. Compressing is also unavailable for the virtual machines with plain disks.

---

If, nevertheless, you want to compress the virtual machine that has snapshots, delete all the snapshots with the help of **Snapshot Manager** before you start compressing the virtual machine's disks. For more information, refer to **Managing Snapshots** (p. 193).

To compress the virtual machine with **Undo Disks** (p. 114), first disable the **Undo disks** feature in **Virtual Machine Configuration**.

## Guest Operating System Requirements

Parallels Compressor supports the following guest operating systems:

32-bit operating systems:

- Windows 2000 Server SP4, Professional SP4
- Windows XP Professional SP2, SP3, Home SP2, SP3
- Windows Server 2003 Web, Standard, Enterprise, Datacenter SP2, R2
- Windows Vista Home, Business, Ultimate, Enterprise SP0, SP1
- Windows 2008

64-bit operating systems:

- Windows XP Professional SP2
- Windows Server 2003 Web, Standard, Enterprise, Datacenter SP2, R2
- Windows Vista Home, Business, Ultimate, Enterprise SP0, SP1
- Windows 2008

## Parallels Compressor Working Principles

Compressor processes a virtual machine in the following way:

- defragments virtual disks and cleans up unused space
- compacts virtual disks

The actions performed on your particular virtual machine depend upon the running mode:

- in *automatic* mode Parallels Compressor compresses only the current system disk performing the pre-defined set of actions
- in *manual* mode you are able to choose disks to compress and actions to perform

More about running modes and other Compressor properties can be found in *Parallels Compressor Help*.

### Steps of the Compression Procedure

Parallels Compressor is designed to perform the most efficient compression of a virtual machine. The procedure consists of two steps:

- a preparatory step performed in the guest operating system (deleting temporary and unnecessary files, defragmenting virtual disks and cleaning unused disk space);
- a compacting step (reducing the size of the virtual disk files) performed in the primary operating system.

## How to Run Parallels Compressor

### Before Starting Parallels Compressor

Before starting the utility, back up your virtual machine by cloning it or by copying its hard disk files to a safe location. This will allow you to restore your virtual machine in case you do not like the results of the compression.

---

**Warning:** The result of virtual machine compression is irreversible.

---

To start Parallels Compressor:

- 1 Start the virtual machine you want to compress.
- 2 Log in to the guest operating system as a user with administrator rights.

---

**Note:** To run Parallels Compressor in a virtual machine you must have administrator rights in the guest operating system.

---

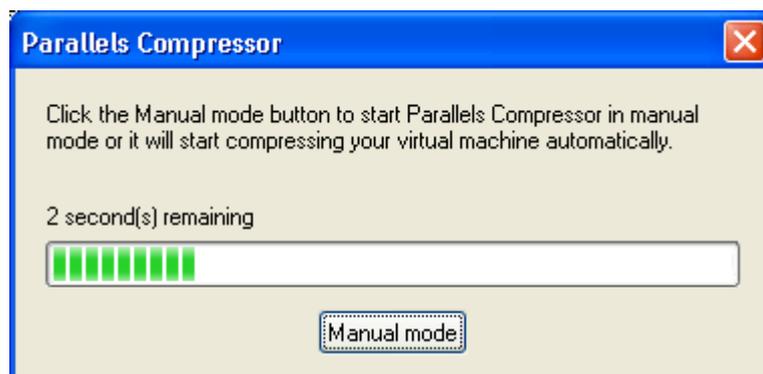
- 3 Choose Run Parallels Compressor from the **Virtual Machine** menu.

### Running Parallels Compressor

Parallels Compressor has the following running modes:

- *automatic*, the default mode. In this mode Compressor uses the default compression options.
- *manual*, Parallels Compressor runs as a wizard which helps you select the options of virtual machine compression.

When you start Parallels Compressor, you will see the dialog box with a time indicator. The time indicator shows the time remaining until Parallels Compressor will run in automatic mode (timeout is about 10 seconds).



To run Parallels Compressor:

- in *automatic* mode, do not do anything, just wait until the timeout expires.
- in *manual* mode, press the ESC key or click the **Manual Mode** button on the dialog box before the timeout expires.
- Detailed information about running Compressor in these modes is given in *Parallels Compressor Help*.

### After Compressing Is Finished

When the compressing is complete, click **Finish** to exit Parallels Compressor.

## CHAPTER 10

# Troubleshooting and Limitations

This chapter describes how to troubleshoot known issues.

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## Getting Technical Support

Our friendly technical support team is ready to help. Describe your problem and submit a FREE request to Parallels Support Team (<http://www.parallels.com/support/>).

To find solutions of common problems, explore Parallels Knowledge Base (<http://kb.parallels.com/>). This online-resource comprises valuable articles about using Parallels Workstation Extreme.

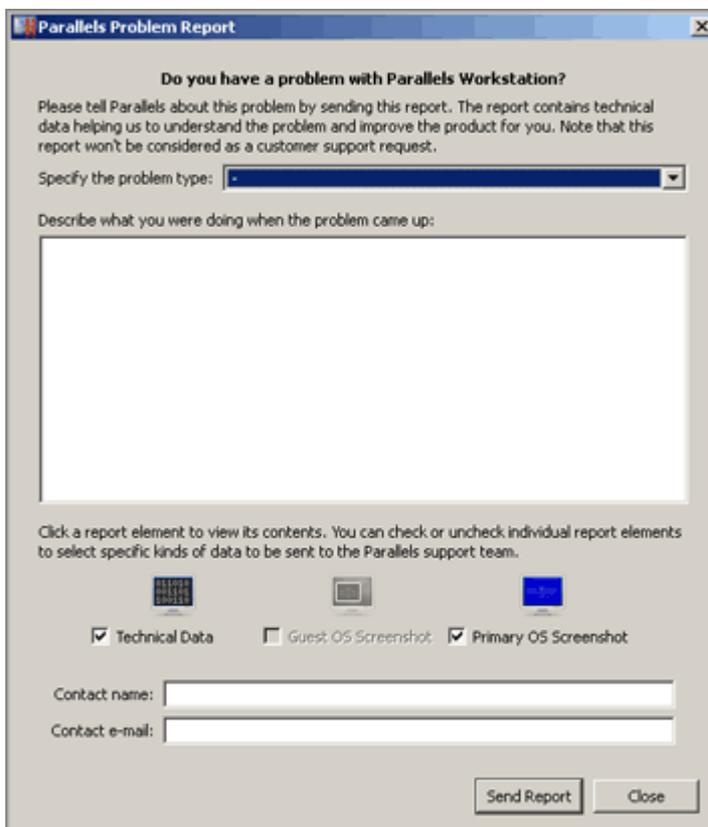
Telephone support is available on a per incident fee basis. Please visit the support team's page of the Parallels web site for details.

---

## Reporting a Problem to Parallels Team

To help improve the quality of Parallels Workstation Extreme, you can send problem reports to Parallels support team. If a fatal error occurs in a virtual machine, Parallels Workstation Extreme automatically opens the **Parallels Problem Report** window prompting you to send a report. If you notice an unusual virtual machine behavior, you can create a report manually by choosing **Report a Problem** from the **Help** menu and filling out the form. Parallels Workstation Extreme will create a status report and make a screen shot of the running virtual machine.

**Note:** Parallels team collects error reports and uses them for identifying performance issues, but does not respond to them. If you need assistance in resolving the issue, visit Parallels forum or Support page, or log us a support call.



The image shows a screenshot of the "Parallels Problem Report" dialog box. The title bar reads "Parallels Problem Report". The main text asks, "Do you have a problem with Parallels Workstation?" and explains that the report contains technical data for support. Below this is a dropdown menu for "Specify the problem type:". A large text area is provided for "Describe what you were doing when the problem came up:". At the bottom, there are three report elements with checkboxes: "Technical Data" (checked), "Guest OS Screenshot" (unchecked), and "Primary OS Screenshot" (checked). There are also input fields for "Contact name:" and "Contact e-mail:", and "Send Report" and "Close" buttons.

In the **Specify the problem type** field, you can select the type of your problem from the list. In the next field, you can add a short problem description. These two fields are optional.

The **Technical Data** option includes the `.txt` status report file that has been generated for the error. The status report contains the product version and activation data, primary and guest OSs information, virtual machine configuration and system data information, processor status, etc. Click the **Technical Data** icon to view the `.txt` file and to choose the sections that will be added to the report. The file is saved on the host computer. If you want to locate it, click the **Go To File** button.

The **Guest OS Screenshot** option includes the session screen shot of the guest OS in a `.png` format. This option is available if you create a problem report during the virtual machine session. Click the **Guest OS Screenshot** icon to see the screen shot and the path to its location on the host computer.

The **Primary OS Screenshot** option includes the session screen shot of the primary OS in a `.png` format. This screen shot is made and put on the primary OS desktop whenever you create a problem report. Click the **Primary OS Screenshot** icon to see the screen shot.

In the **Contact Name** and **Contact e-mail** fields, type your name and e-mail. This information will be used by the Parallels support team to address you for more technical details if needed.

## Sending a Report

After you revise the problem report components, click **Send Report**. The report will receive its unique id number and will be sent to the Parallels support team.

---

# Configuring Network in Linux

When setting up network in Linux, you may need to configure the DHCP client to send the virtual machine's ID in DHCP requests. For information on how to configure your DHCP client, refer to the DHCP client documentation.

For example, in Red Hat Linux guest OSs, you need to edit the DHCP client configuration file.

- 1 Open the `dhclient.conf` file and make sure that the following lines are present.

```
interface "eth0" {
    send dhcp-client-identifier 1:<MAC address>;
}
```

- 2 If there are no such lines, add them manually to the file and save it.

When the `dhclient.conf` file contains these lines, DHCP client sends the virtual machine's ID to the DHCP server. The DHCP server sends an IP address in response.

## Tip

To locate the `dhclient.conf` file, in a terminal, enter:

```
strings /sbin/dhclient | grep etc | grep dhclient.conf
```

or:

```
rpm -ql dhclient
```

---

## Switching Into the Hibernate Mode

If your running virtual machine with a Windows guest OS has an Intel PCIe network card in its configuration, you may experience problems with putting your primary OS into the Hibernate mode (the Sleep mode). To fix these problems, perform the following actions:

- 1 In the guest OS, go to Start > Control Panel > Network Connections and open Local Area Connections.
- 2 In the Local Area Connections window, click Properties.
- 3 In the General tab of the Local Area Connections Properties window, click Configure next to the network card name.
- 4 In the network card properties window, open the Power Management tab and disable the Wake on Direct Packet option in the Wake on LAN settings.

---

**Note:** These actions will help you to put your primary OS into the Hibernate mode only if Parallels Tools (p. 74) are installed in the Windows guest OS.

---

---

## Increasing the Virtual Machine Screen Resolution

In virtual machines with Linux guest operating systems installed, dynamic resolution may not work when increasing the size of the guest OS window or switching to Full Screen mode. It happens because, by default, only 3 MB of video memory are allocated to such virtual machines' video cards. If you need the virtual machine screen resolution more than 1024x768, go to the Video pane (p. 129) of Virtual Machine Configuration and increase the amount of video memory available to the virtual machine's video card up to 16 MB.

---

## Memory Usage Problems

The amount of the host computer physical memory required for each virtual machine operation can be represented as follows:

Virtual Machine Memory = *Guest OS Memory* + *Video Memory* + *Virtual Machine Monitor Memory*

- *Guest OS Memory* is the amount of RAM available to your guest OS. You can configure the guest OS memory amount in the **Memory** pane (p. 128) of Virtual Machine Configuration.
- *Video Memory* is the amount of physical memory available to the virtual machine's video card. You can adjust the video memory amount in the **Video** pane (p. 129) of Virtual Machine Configuration.
- *Virtual Machine Monitor* is the module responsible for the guest operating system virtualization. It consumes memory to perform operations of guest virtual devices and handle virtual paging emulation. The amount of memory required for the Virtual Machine Monitor operation depends on the guest OS and varies from 50 MB to 200 MB.

You can configure the whole amount of physical memory available for all running virtual machines in the **Memory** tab of the application Preferences.

### Memory Overcommitment

If you have several virtual machines running at a time, and you are trying to start one more virtual machine, you can come across the memory over commit. The application will inform you with the corresponding message. This means that all your running virtual machines require more memory that is configured in the **Memory** tab of the application Preferences. If you start one more virtual machine, this may significantly slow down all your virtual machines. To solve this problem, you can:

- stop one or several of your running virtual machines, or
- edit your virtual machines' configurations to make them consume less memory, or
- edit the application memory preferences to allocate more memory to your virtual machines.

---

## Problems With Antivirus Software

Because of the close integration with the host operating system, some actions performed by the Parallels Workstation Extreme processes may be detected as malicious by the antivirus software installed on the host computer.

However, such actions are necessary to ensure the proper functioning of Parallels Workstation Extreme. That is why you should prevent the antivirus software from blocking them. If you do not want the alerts to appear in future, perform a full system scan using the antivirus software and add these processes to the list of trusted ones if no viruses are detected. To find out how to do it, refer to your antivirus software Help.

---

**Note:** The names of Parallels Workstation Extreme processes usually start with `prl` or `parallels`.

---

---

## Installing the GCC package and kernel sources in Linux

When installing or upgrading Parallels Tools in a Linux virtual machine, you may need to install the `gcc` package and kernel sources in your Linux guest OS. Kernel sources can be either downloaded from the Internet, or installed from Linux distribution disks.

To install the `gcc` package and kernel sources in the RHEL/Fedora/CentOS Linux distribution, enter the following command in a terminal:

```
yum install gcc kernel-devel  
make
```

To install the `gcc` package and kernel sources in the Debian/Ubuntu Linux distribution, enter the following command in a terminal:

```
apt-get install gcc make linux-headers-$(uname -r)
```

For information how to install the `gcc` package and kernel sources in other Linux distributions, refer to the corresponding Linux distribution documentation.

If you still experiencing problems, try to find a solution in Parallels Knowledge Base (<http://kb.parallels.com/>) or refer to the Parallels support team <http://www.parallels.com/en/support/desktop/>.

# Glossary

This glossary defines terms and spells out abbreviations used in Parallels Workstation Extreme documentation. References to terms defined elsewhere in the glossary appear in *italics*.

**Administrator.** A user with administrative privileges.

**Activation key.** A unique set of symbols that activates the Parallels Workstation Extreme application on the host computer and lets you use the Parallels Workstation Extreme functionality to its full extent.

**Active operating system.** The operating system where Parallels Transporter Agent is launched.

**Active volume:** The volume of the physical source computer that is used as a *boot volume* for the active operating system.

**Bootable hard disk.** A disk used by the operating system to boot from, usually a disk that has an operating system installed.

**Boot Volume.** A hard disk partition from which the operating system boots.

**Boot Camp partition.** A partition on the hard disk of the host computer that can be used for installing a Windows operating system on it (for Mac host computers only).

**Bridged networking.** Virtual machine network connection mode that enables the virtual machine to appear as any other computer on the network, with its own IP address and network name.

**Configuration file.** A file specifies the virtual machine's hardware configuration, the devices it uses, and other settings. It is created automatically when you create a new virtual machine. See also *PVS file*.

**CPU.** Stands for central processing unit. It is an internal part of the computer. See also *Processor*.

**Disks in the old format.** Disks of virtual machines that were created in Parallels Desktop 2.5 and earlier or Parallels Workstation 2.2.

**Disks in the new format.** Disks of virtual machines that were created or used in Parallels hardware virtualization products starting from version 3.0.

**Expanding format.** A virtual hard disk format. An expanding virtual hard disk image file resides on your host computer and is small initially. Its size grows as you add applications and data to the *virtual machine*.

**FireWire connection.** A wired connection that enables a high-speed data transmission between computers.

**Guest operating system (guest OS).** An operating system installed inside your virtual machine.

**Host computer.** The computer that is used to run virtual machines. In case of Parallels Workstation Extreme for Mac, it is your Mac. In case of Parallels Workstation Extreme for Windows or Parallels Workstation Extreme for Linux, it is the Windows- or Linux-based physical computer where Parallels Workstation Extreme is installed. In the Parallels Transporter documentation, this term may define the computer that hosts the result of *migration*.

**Hot key.** A user-defined key or combination of keys that provides quick access to applications and commands. See also *Shortcut*.

**HDD file.** During the creation, the *virtual machine* acquires a virtual hard disk file with the `.hdd` extension. See also *virtual hard disk file*.

**Host-only networking.** Virtual machine network connection mode that creates a private network between the host computer and its virtual machines, which makes the virtual machines available from the host computer only.

**ISO Image.** A special file that contains the entire contents of a CD or DVD disc commonly used to install an operating system.

**Image file.** A single file containing the complete contents and structure of a data storage medium or device, such as a hard disk drive, CD, or DVD.

**IP address.** A unique address that is assigned to a physical computer or a virtual machine that participates in computer networking.

**Linux computer.** A physical computer that has a Linux operating system installed.

**Merged disk.** A *split* disk whose parts were merged into a single disk.

**Migration.** The process of transferring data from a physical computer or a third-party virtual machine into a Parallels virtual machine or virtual disk.

**OS.** An operating system.

**Parallels Desktop for Mac.** An application that enables you to create, manage, and use *virtual machines* on your Mac.

**Parallels Desktop for Windows.** An application that enables you to create, manage, and use *virtual machines* on a Windows-based physical computer.

**Parallels Desktop for Linux.** An application that enables you to create, manage, and use *virtual machines* on a Linux-based physical computer.

**Parallels Explorer.** An application that enables you to browse and manage the contents of your *virtual machines* without starting them.

**Parallels Image Tool.** An application that enables you to manage the capacity and properties of your *virtual machine's* hard disk.

**Parallels Mounter.** An application that enables you to to browse the contents of your *virtual machines* and *virtual hard disks* directly in Mac OS X Finder.

**Parallels Tools.** A set of Parallels utilities that ensures a high level of integration between the *primary* and the *guest* operating systems.

**Parallels Transporter.** An application that uses data of a physical or virtual computer for creating a Parallels virtual clone of this physical or virtual computer. The resulting virtual machines can be used with Parallels Workstation Extreme.

**Parallels Transporter Agent.** An application that collects data on a physical computer and transfers it to Parallels Transporter installed on the host computer.

**Parallels Workstation Extreme.** An application that enables you to create, manage, and use *virtual machines* on a Windows or Linux computer.

**PCIe device.** A video or network adapter corresponding to the PCI Express computer expansion card standard introduced by Intel in 2004.

**Plain format.** A virtual hard disk format. A plain virtual hard disk image file resides on the *host computer* and has a fixed size that cannot be changed.

**Preboot Execution Environment (PXE).** An environment to boot computers using a network interface independently of available data storage devices (like hard disks) or installed operating systems.

**Primary operating system (primary OS).** Operating system that controls the I/O devices of the computer and that is loaded when the physical computer is turned on. It is the operating system of the physical computer where the Parallels Workstation Extreme application is installed.

**Processor.** The central processing unit, or *CPU*. It is an internal part of the computer.

**PVS file.** A virtual machine *configuration file* that contains information about the virtual machine resources, devices and other settings.

**Shared networking.** Virtual machine network connection mode that allows the *virtual machine* to use the *host computer* network connections. In this mode, the virtual machine is invisible to other computers on the network the host computer belongs to.

**Shortcut.** A user-defined key or combination of keys that provides quick access to applications and commands. See also *Hot key*.

**Snapshot.** A copy of the virtual machine state at a particular point of time. The files related to snapshots are stored in a special subfolder in the virtual machine's folder.

**Source computer or source operating system:** The computer that you are going to migrate data from. On physical source computers, Parallels Transporter Agent should be installed.

**System disk.** A floppy disk that allows your computer to load the operating system.

**Split disk.** A split disk is cut into 2 GB pieces, but is stored as a single *HDD file*. Split disks allow you to transfer the data stored on a split disk piece by piece using a USB drive or other media that have limited space and cannot store a large virtual hard disk image file.

**Terminal.** In Mac OS and GNU/Linux operating systems, a utility that enables you to access the command line.

**Virtual hard disk (virtual disk).** A file or group of files that emulates the virtual machine's hard disk.

**Virtual machine.** The computer emulated using Parallels Workstation Extreme. A virtual machine has its own virtual hardware and requires an operating system to control its hardware. The installed operating system and its applications are isolated inside the virtual machine and share physical hardware resources of the *host computer*.

**Third-party virtual machine.** A virtual machine created in a third-party virtualization product, that can be converted to Parallels virtual machines with the help of Parallels Transporter.

**Virtual Machine Configuration.** Like any physical computer, a *virtual machine* has its own configuration which is set during the creation and can be later modified. The virtual machine configuration settings are stored in a *PVS file*.

**Virtual machine files.** Files stored in a *virtual machine* folder. A virtual machine has at least two files: *configuration file* and *virtual hard disk file*.

**Virtual hard disk file.** During the creation, the *virtual machine* acquires a virtual hard disk file with the *.hdd* extension. This file performs the functions of a real hard disk. See also *HDD file*.

**Virtual machine template.** A virtual machine that can be cloned to multiple virtual machines that will have the same configuration and data that the virtual machine template had.

**VM.** See *Virtual Machine*.

**Windows computer.** A physical computer that has a Windows operating system installed.

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