
Parallels Software International, Inc.

Parallels Workstation

2.1

User Guide



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CHAPTER 1

Preface

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About This Guide

This guide provides necessary information on how to install, configure and use Parallels™ Workstation.

Who Should Read This Guide

Anyone interested in creating a virtualized x86 PC environment in which multiple guest operating systems and associated application software can run.

Opening Parallels Workstation Help

To open this guide select **Help/Contents** in the Parallels Workstation menu.

Context-Sensitive Help

To access help topics that directly relate to the Parallels Workstation window you are currently working with, press **F1** on your keyboard.

Some windows, such as for example Configuration Editor and Preferences, contain **Help** button that opens appropriate topic.

PDF version

A `.pdf` version of this guide is included into Parallels Workstation distribution.

Note: You should have Adobe Acrobat installed on your computer to be able to open Parallels Workstation User Guide in `.pdf` format.

In **Windows primary OS** to open `.pdf` version of the User Guide select Windows **Start** menu --> **Programs** --> **<Parallels Folder Name>** --> **User Guide**.

In **Linux primary OS** you may find `.pdf` version of the User Guide on your hard disk at the following path:
`/usr/lib/parallels/doc/parallels_workstation_user_guide.pdf`.

CHAPTER 2

Introduction

This chapter provides common information on the Virtual Machine technology that is used by Parallels Workstation and will familiarize you with the main characteristics of a Virtual Machine created by Parallels Workstation.

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Virtual Machine Technology Overview

Virtual Machine (VM) technology provides the following main features:

- Enables multiple guest operating systems (OSes) and their applications to simultaneously run on a single computer.
- Creates a number of Virtual Machines, each with a full set of standard virtual hardware. Operating systems and applications are isolated inside these Virtual Machines and share physical hardware resources.
- Offers an opportunity to switch between operating systems without rebooting and to consolidate and virtualize a computing environment, resulting in reduced hardware costs, lower operating expenses, and increased productivity.

Notes: 1. Hereafter, "primary operating system" (primary OS) denotes the operating system that controls the I/O devices of the computer and that loads when the real computer is turned on.

2. "Guest operating system" (guest OS) is an operating system that runs under Virtual Machine control. One primary OS and multiple guest OSes can be run at the same time on a single real computer.

About Parallels Workstation

Parallels™ Workstation is the most powerful, easiest-to-use, cost-effective desktop virtualization solution available today. It empowers any user, from experienced professional developers to sales executives and casual home users, with the ability to create completely networked, totally secure independent Virtual Machines on a single physical machine.

Parallels Workstation 2.1 is powered by a lightweight hypervisor, a thin layer of software that is between part of the host computer's hardware and the primary operating system. The Lightweight Hypervisor controls some of the host computer's hardware resources, resulting in dramatically more stable, more secure, and higher-performing Virtual Machines.

Parallels Workstation sophisticated virtualization engine enables each Virtual Machine to operate identically to a stand-alone computer. Each Virtual Machine works as with its own processor, RAM, floppy and CD drives, I/O devices, and hard disk – everything a physical computer contains. See the Virtual Machine Equipment (see page 9) topic for the full list of Parallels Virtual Machine devices.

Intel virtualization technology (VT-x) is fully supported by Parallels Workstation. See the Intel Virtualization Technology (VT-x) Support (see page 8).

Parallels Workstation has a set of special tools (utilities and drivers) that enhances the performance and functionality of your guest operating system (mouse synchronization tool, clipboard synchronization tool, etc.). See the Parallels Tools Overview (see page 69) for the full list of tools with their descriptions.

Intel Virtualization Technology (VT-x) Support

Intel Virtualization Technology (VT-x), which is incorporated in the newest Intel processors, provides enhancements implemented into processor architecture that are specially designed for platforms running multiple operating systems. VT-enabled processors facilitate more efficient Virtual Machine partitioning and more precise virtual processor simulation. An extended set of processor instructions performs on a hardware level tasks previously realized programmatically, thus reducing virtualization overhead and improving Virtual Machine performance, security and stability. To learn more about Virtualization Technology see Intel site <http://www.intel.com/technology/computing/vptech/>.

Intel Virtualization Technology is fully supported by Parallels Workstation. If Parallels Workstation detects a VT-enabled CPU, support is automatically turned on. VT-x support can be manually enabled or disabled through a Virtual Machine configuration setting available in the VM Flags (see page 97) section of **General Options**. If you run a guest OS with VT-x enabled, the **Virtualization mode** flag in the **About Parallels Workstation** screen shows *Intel VT-x*. See the Additional Information (see page 128) section of the **About Parallels Workstation** screen.

Virtual Machine Equipment

Parallels Workstation virtualizes a full set of the standard PC hardware including:

- CPU: Intel Pentium II or AMD Duron;
- Generic motherboard compatible with Intel i815 chipset;
- RAM up to 1500 MB;
- VGA and SVGA with VESA 3.0 support;
- 1.44 MB floppy drive (mapped to a physical drive or to an image file);
- Up to four IDE devices, that may be either virtual hard drives (from 20 MB up to 128 GB each, mapped to image file), or CD/DVD-ROM drives (mapped to physical drive or to image file), or both hard drives and CD/DVD-ROM drives;
- Ethernet virtual network card compatible with RTL8029. Parallels Workstation for Windows supports bridging to wireless network adapters;
- Up to four serial (COM) ports (mapped to real port, to pipe or to output file);
- Up to three bi-directional parallel (LPT) ports (mapped to real port, to printer or to output file);
- 2-port USB 1.1 controller;
- AC'97-compatible sound card. Sound recording is supported;
- 104-key Windows enhanced keyboard;
- PS/2 wheel mouse.

Supported Guest Operating Systems

Parallels Workstation supports a number of guest operating systems and can be easily upgraded to support any other x86 compatible guest operating system.

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

Microsoft Windows Guest Operating Systems:

- Windows 2003 Standard Edition SP0
- Windows 2003 Standard Edition SP1
- Windows 2003 Enterprise Edition SP0
- Windows 2003 Enterprise Edition SP1
- Windows 2003 Web Edition SP0
- Windows 2003 Web Edition SP1
- Windows XP SP2 Professional
- Windows XP SP2 Home
- Windows XP SP1 Professional
- Windows XP SP1 Home
- Windows XP SP0 Professional
- Windows XP SP0 Home
- Windows 2000 Professional Edition SP4
- Windows 2000 Server SP4
- Windows 2000 Advanced Server SP4
- Windows NT Workstation 4.0 SP6
- Windows NT Server 4.0 SP6
- Windows ME
- Windows 98
- Windows 95
- Windows 3.11
- Windows 3.1

Linux Guest Operating Systems:

- Red Hat Enterprise Linux WS4
- Red Hat Enterprise Linux AS4
- Red Hat Enterprise Linux WS3
- Red Hat Enterprise Linux ES4
- Red Hat Enterprise Linux ES3
- Red Hat Linux 9

- Red Hat Linux 8
- Red Hat Linux 7.3
- Debian Linux 3.1
- Fedora Core Linux 4
- Fedora Core Linux 3
- SUSE Linux 10
- SUSE Linux 9.3
- SUSE Linux 9.2
- SUSE Linux 9.1
- SUSE Linux 9.0
- Mandriva Linux 10.1
- Mandriva Linux 10
- Mandriva Linux 9.2

FreeBSD Guest Operating Systems:

- FreeBSD 5.4
- FreeBSD 5.3
- FreeBSD 4.5
- FreeBSD 4.1

OS/2 and eComStation Guest Operating Systems:

- OS/2 warp 4.5
- OS/2 warp 4
- OS/2 warp 3
- eComStation 1.2
- eComStation 1.1

Sun Solaris Guest Operating Systems:

- Solaris 10
- Solaris 9

MS-DOS Guest Operating Systems:

- MS-DOS 6.22

CHAPTER 3

Installing Parallels Workstation

This chapter provides information on the process of installing Parallels Workstation onto computers running both the Linux and Windows operating systems.

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System Requirements

Note. Before installing the product, please make sure that all computers where you wish to install and run Parallels Workstation meet the hardware and software requirements described in this section.

Hardware Requirements

The physical computer running Parallels Workstation should meet the following hardware requirements:

- 400 MHz or faster processor which supports the Pentium II instruction set. 1.5 GHz or faster is recommended.
- 32-bit or 64-bit platform. Note that to run Parallels Workstation 2.1 on 64-bit platform you should have a 32-bit primary OS installed on it.
- Memory to run the primary OS plus memory required for each guest operating system and its applications. Please see your primary and guest operating systems documentation for their memory requirements. 1 GB or more is recommended.
- Hard disk with 20 MB of free disk space is required for product installation. Disk space required for Virtual Machines should be estimated according to volume of data you suppose to store on virtual hard disks.
- Any SVGA video card with an 8-bit display adapter supported by your primary OS. 16-bit color depth or higher is recommended.
- Optional: a 3.5" floppy drive, CD-ROM drive, DVD-ROM drive.
- If you intend to access Internet in Virtual Machine, you should have an Ethernet adapter installed on your computer that is supported by your primary OS: Windows 2000/XP/2003 or Linux. The adapter should provide the promiscuous mode. At present, almost every 10/100/1000 Ethernet card can support the promiscuous mode.
- Optional: serial port, parallel port, USB controller.

Software Requirements

If one of the following primary operating systems is running on your computer, Parallels Workstation can be successfully installed on it.

Microsoft Windows Primary Operating Systems:

- Windows 2003 Standard Edition SP0
- Windows 2003 Standard Edition SP1
- Windows 2003 Enterprise Edition SP0
- Windows 2003 Enterprise Edition SP1
- Windows 2003 Web Edition SP0
- Windows 2003 Web Edition SP1
- Windows XP SP2 Professional
- Windows XP SP2 Home
- Windows 2000 Professional Edition SP4
- Windows 2000 Server SP4

You should have Internet Explorer version 5.0 or higher installed on your computer.

Linux Primary Operating Systems:

- Fedora Core Linux 4 stock 2.6.11-1.1369_FC4
- Red Hat Enterprise Linux WS4 stock 2.6.9-5
- Red Hat Enterprise Linux AS4 stock 2.6.9-5
- Red Hat Enterprise Linux ES4 stock 2.6.9-5
- Red Hat Linux 9 stock 2.4.20-8
- Debian Linux 3.1 stock 2.6.8-2-386
- SUSE Linux 9.3 2.6.11.4-20a
- SUSE Linux 9.2 stock 2.6.8-24.11
- SUSE Linux 9.1 stock 2.6.4-52
- SUSE Linux 9.0 stock 2.4.21-69
- SUSE Linux 10.0 stock 2.6.13-15
- Mandriva Linux 10 stock 2.6.3-7

The following software packages should be installed:

- Sources of currently installed kernel (if you didn't install the kernel manually, then you should install kernel-sources package from your distribution);
- glibc [glibc]
- gcc [gcc], ld [binutils] (included in any development package)
- X Window System including
 - xf86vidmode extension (for fullscreen only)
 - XKB extension (for keyboard national layouts and leds support)
- Qt 3.0.5 library multithreaded [qt3]

PAE Support

Current version of the Parallels Workstation supports up to 4 GB PAE (Physical Address Extension). If your processor supports more than 4 GB PAE:

- In Windows primary OS on the first starting a Virtual Machine you will be prompted to create a new configuration with 4 GB PAE in boot.ini.
- In Linux primary OS kernel PAE setting should be changed manually.

See **Troubleshooting** section in Starting a Virtual Machine (on page 130) topic.

Installing Parallels Workstation in Windows

This section contains information on installing Parallels Workstation onto computer running Windows and all the related processes.

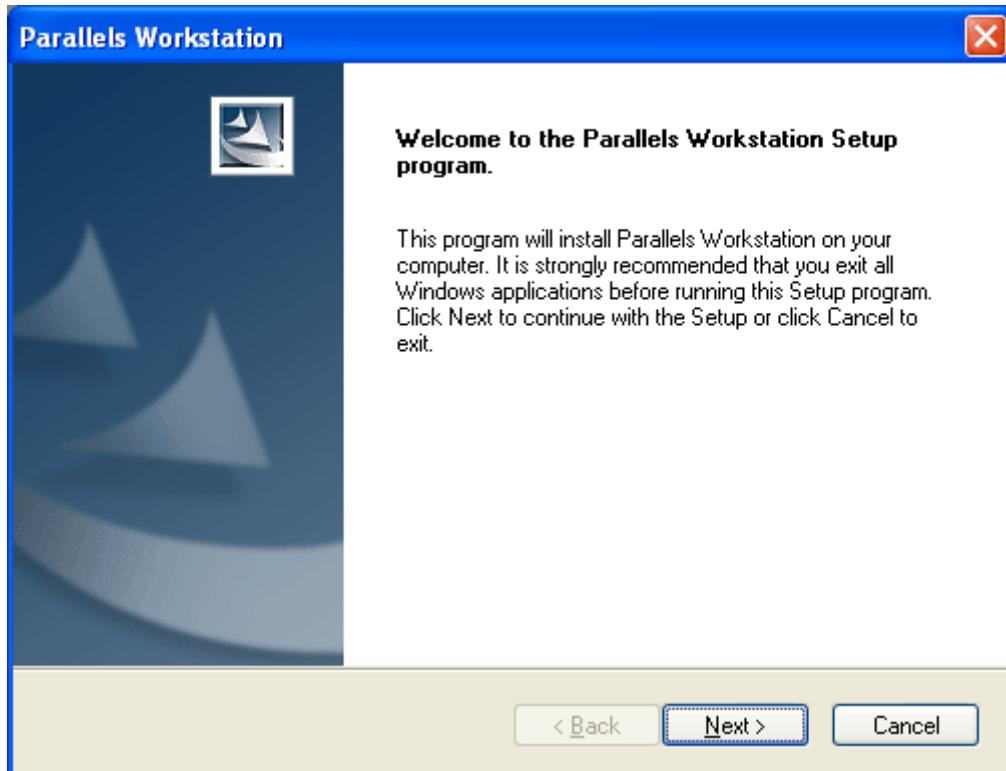
Parallels Workstation for Windows: Step-by-Step Installation

Note: You must have Power User or Administrator rights to be able to install the Parallels Workstation on a computer running Windows.

To install Parallels Workstation:

- 1 Download Parallels Workstation installation file from Parallels site.
 - To download a trial version access the Parallels Download Center <http://www.parallels.com/en/download>.
 - To buy a full-scale version visit the Parallels Buy Online page <http://www.parallels.com/en/buyonline>.
Select the **Windows EXE** file for downloading.

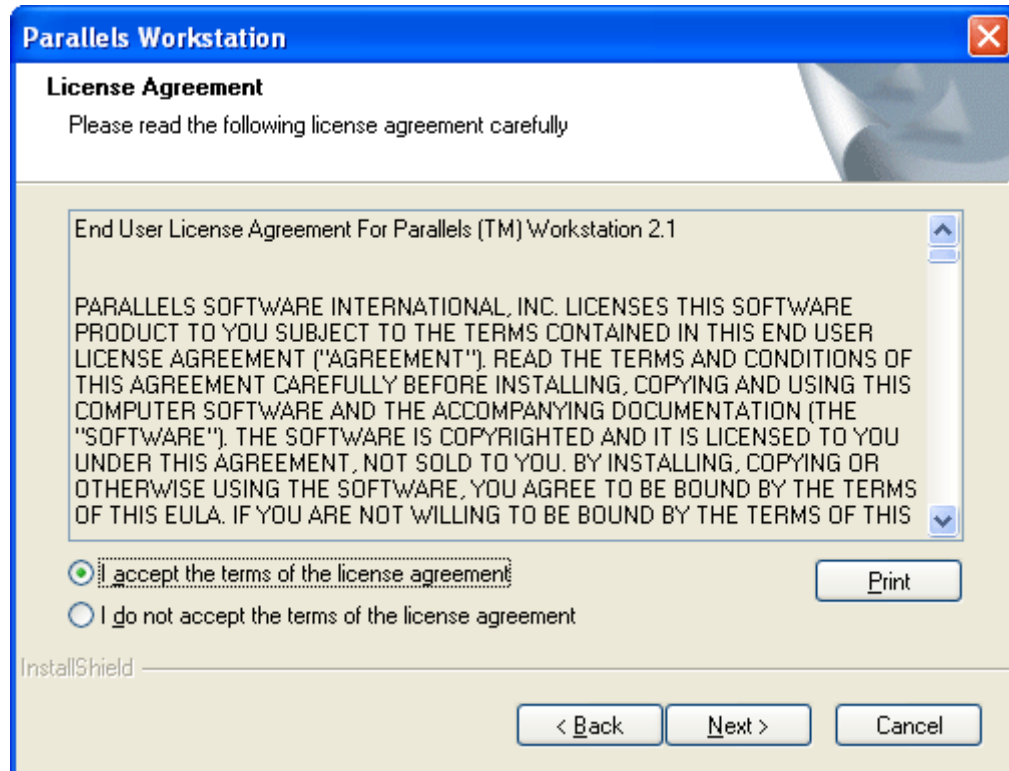
- 2 Locate the downloaded self-extracting `Parallels-Wst-2.1.xxxx-Win.exe` file and double-click it. The **Parallels Setup Wizard** greets you with the following screen.



Click **Next** button to display user license agreement which you must accept to continue installing Parallels Workstation.

- 3 On the **License Agreement** screen use either the PgDn key or the down arrow ↓ key on your keyboard to read the entire agreement. Select the **I accept the terms of the license agreement** option. The **Next** button becomes enabled; click it to proceed with the installation.

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



- 4 In the **User Registration** screen you can enter your contact information that will be used for sending you a trial activation key. Please enter your **E-mail** and **User name**. Specifying **Company name** is optional. Check **I want to receive news from Parallels to my E-mail** if you want to be informed about new Parallels products. You will be sent a free trial activation key soon after this.

If you prefer to register on Parallels site, click the **Register on site** button.

To buy Parallels Workstation and receive a permanent activation key, use the **Buy** button.

If you want to put off the registration, click **Skip registration** to proceed to next step.

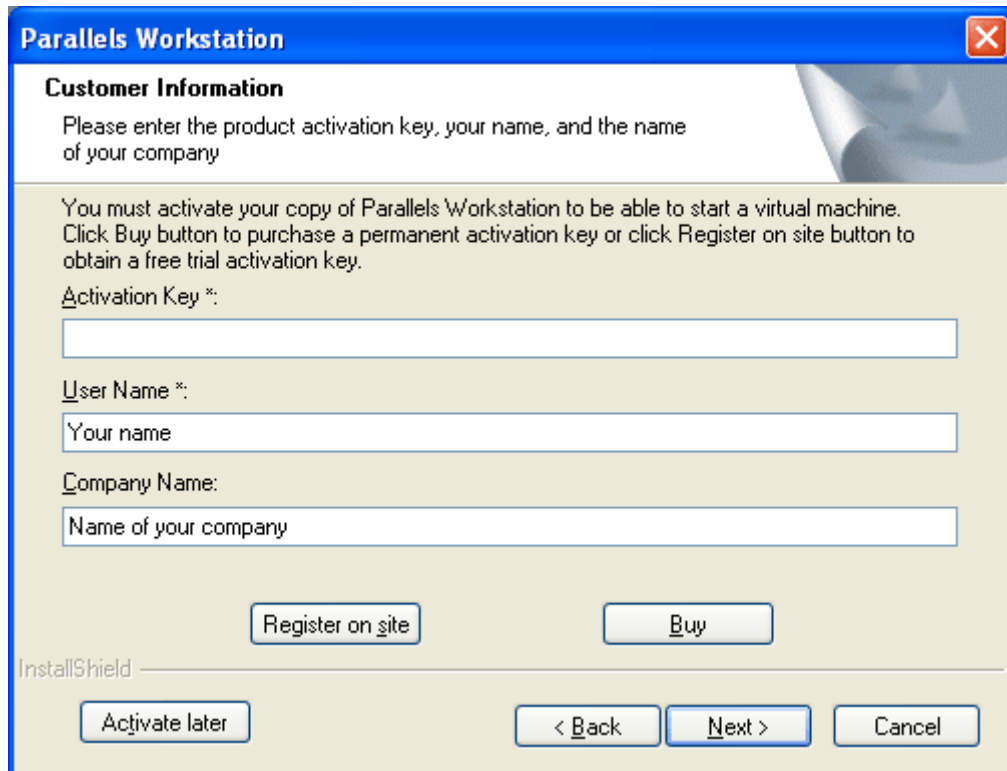
Note. The **User registration** screen does not appear if you reinstall Parallels Workstation.

- 5 In the **Customer Information** screen, you can activate your copy of the Parallels Workstation. To do this, enter your **Activation key**. Entering **User Name** and **Company Name** is optional. **Register on site** and **Buy** buttons are provided for obtaining a trial activation key and a permanent activation key respectively. The **Register on site** button opens the Parallels site where you can register and get a trial activation key; the **Buy** button opens the Parallels online store where you can purchase a permanent activation key.

When finished, click the **Next** button to move to the **Choose Destination Location** screen.

Notes. 1. You are not obligated to specify activation information right now. It is possible to do it later in the installed application in the Activate Product (see page 22) window. To skip this step, click the **Activate later** button.

2. The **Customer Information** screen may not appear if you reinstall Parallels Workstation after removing it. If you chose to save license information when removing, this step will be omitted.



Parallels Workstation

Customer Information

Please enter the product activation key, your name, and the name of your company

You must activate your copy of Parallels Workstation to be able to start a virtual machine. Click Buy button to purchase a permanent activation key or click Register on site button to obtain a free trial activation key.

Activation Key *:

User Name *:

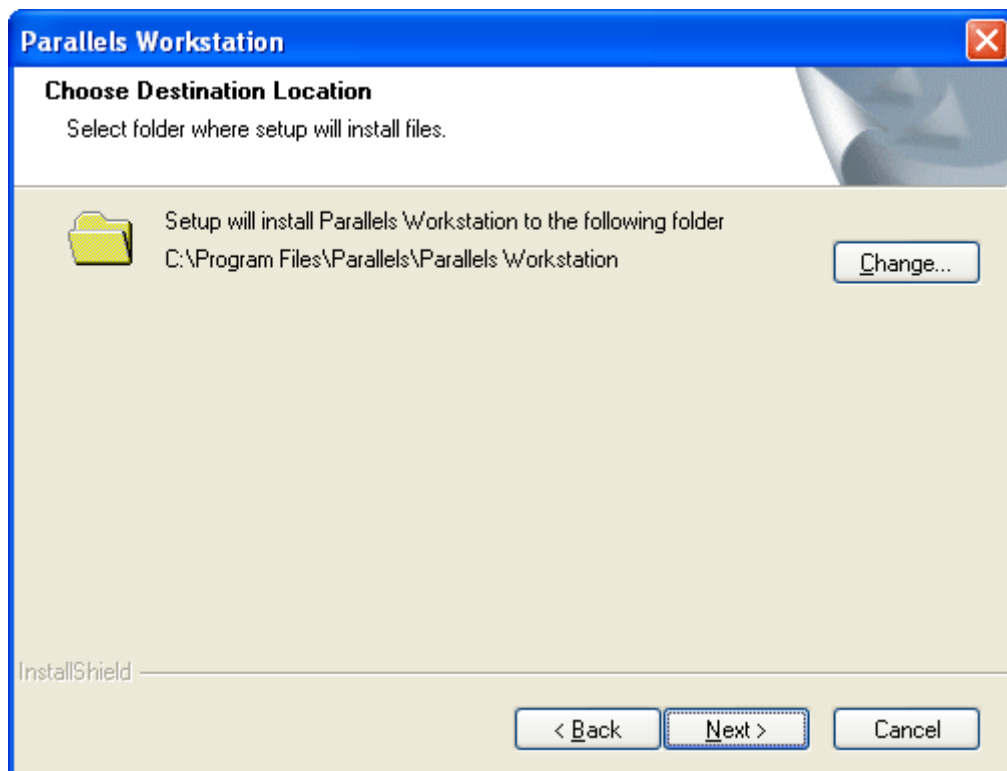
Company Name:

Register on site Buy

InstallShield

Activate later < Back Next > Cancel

- 6 On the **Choose Destination Location** screen you should specify a directory where Parallels Workstation will be installed. If you are not satisfied with the default folder, click the **Change** button to find another one.



Parallels Workstation

Choose Destination Location

Select folder where setup will install files.

Setup will install Parallels Workstation to the following folder

C:\Program Files\Parallels\Parallels Workstation

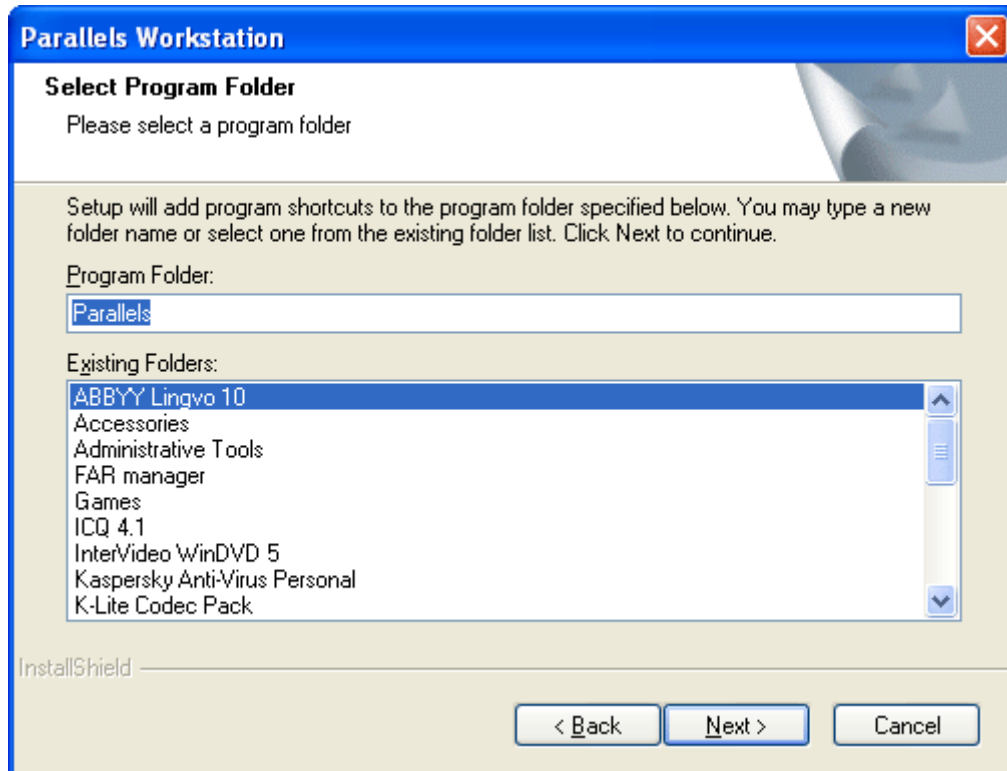
Change...

InstallShield

< Back Next > Cancel

Press the **Next** button to display the **Select Program Folder** window.

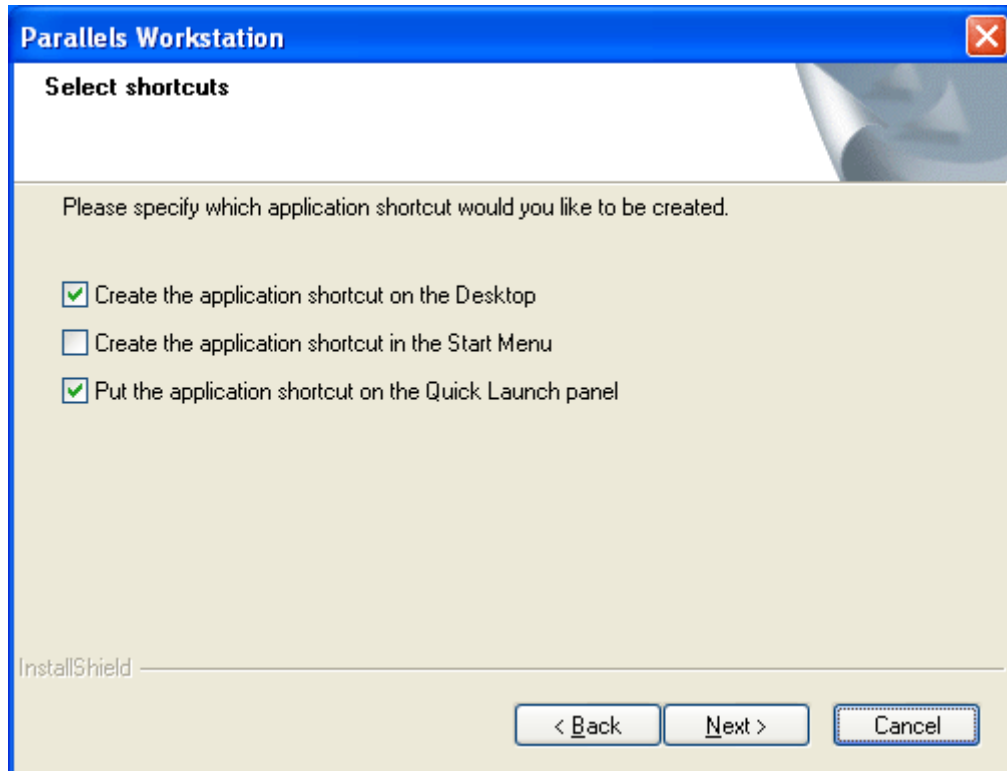
- 7 In this window you have to define the name of the Parallels Workstation folder in the **Programs** list of the Windows **Start** menu.



By default, setup wizard offers to create a new folder called **Parallels**. However you may choose one of the folders currently existing in the **Programs** list and presented in the **Existing Folders** list on this screen.

Click **Next** to proceed.

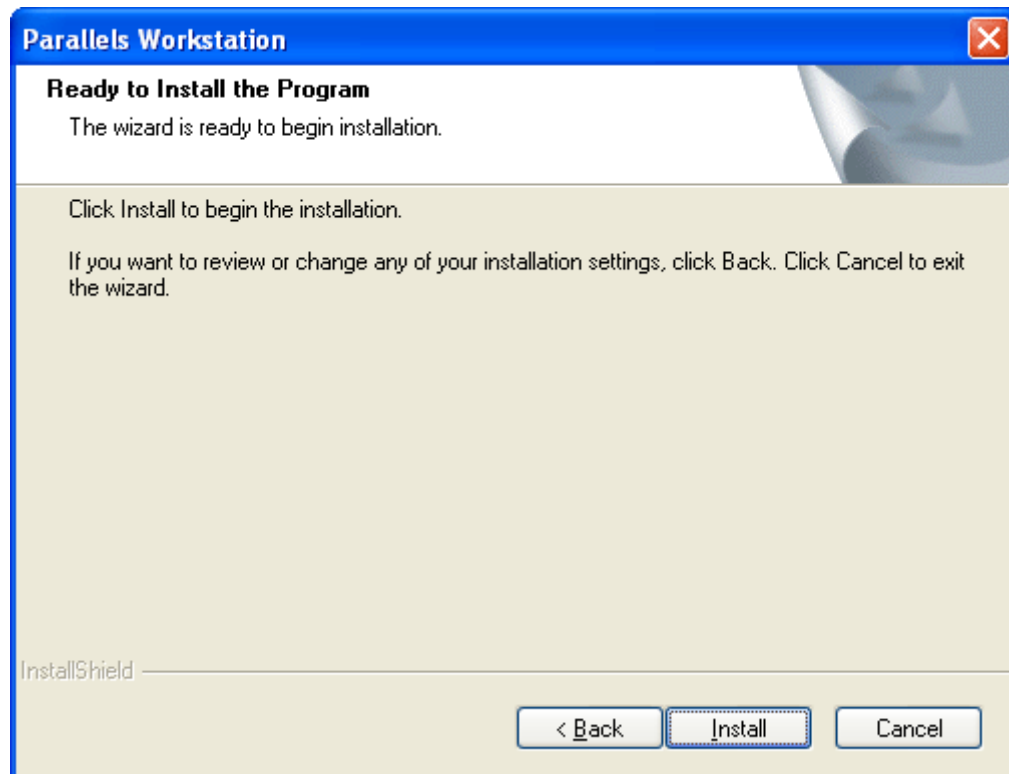
- 8 On the **Select shortcuts** screen, specify where Parallels Workstation shortcuts should be added. The first option, **Create the application shortcut on the Desktop** adds Parallels Workstation icon on the Windows desktop. The second option, **Create the application shortcut in the Start menu** adds an additional link into program folders list above the folders. The third option, **Put the application shortcut on the Quick Launch panel** adds Parallels Workstation icon to the Windows Quick Launch panel located in the Taskbar.



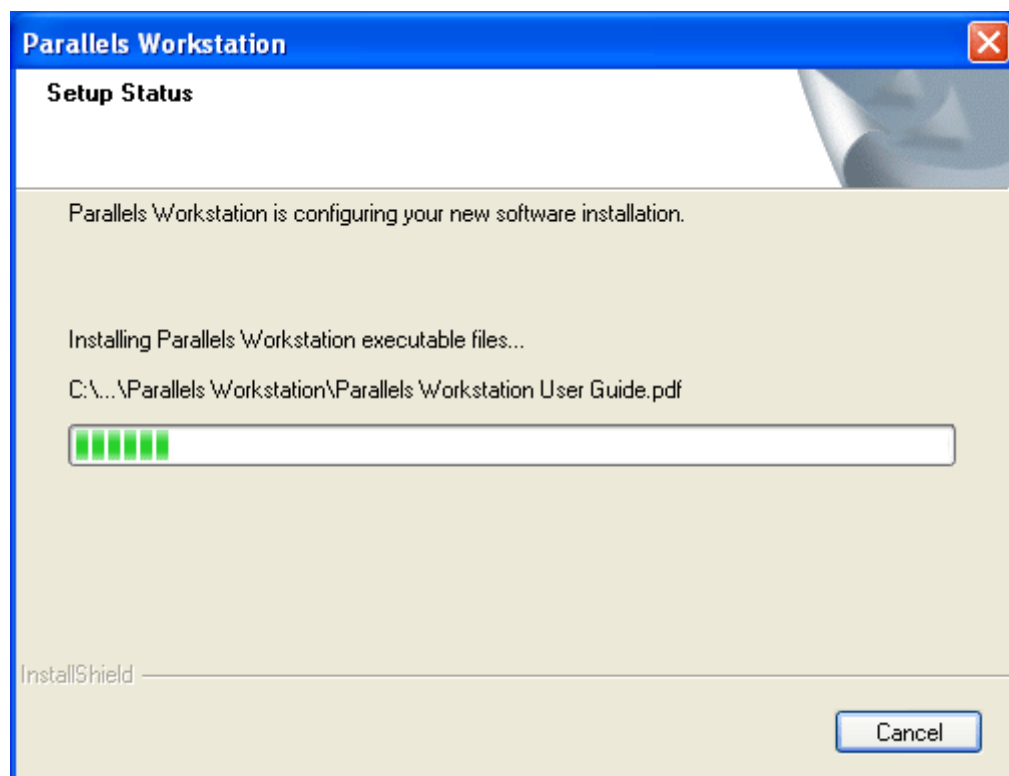
Click **Next** to move to the **Ready to Install the Program** screen.

If you are satisfied with the information entered, click **Install** to start the Parallels Workstation installation.

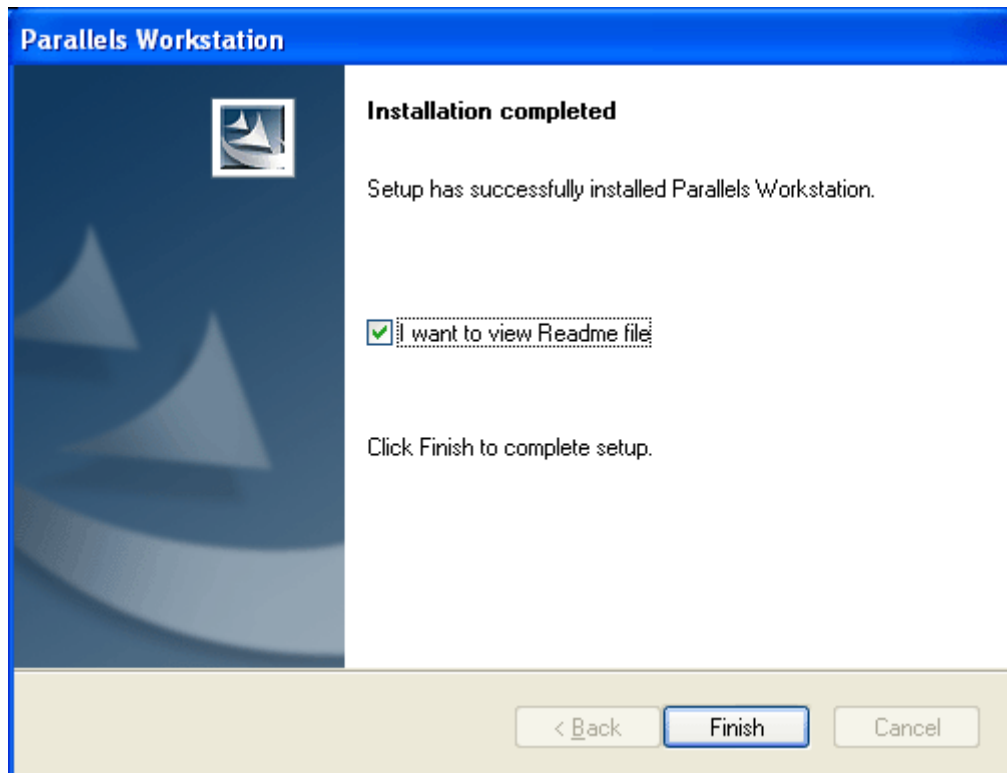
You can return to the previous steps by clicking the **Back** button.



Installation progress is shown in the **Setup Status** window.



- 9 When Parallels Workstation is installed, the wizard displays its final screen.



To complete the installation, click **Finish**. If you check **I want to view Readme file** option, the Readme file will be opened in Notepad.

Starting Parallels Workstation

To start Parallels Workstation in Windows:

- Select **Programs --> <Parallels Folder Name> --> Parallels Workstation** in the Windows **Start** menu, where **<Parallels Folder Name>** denotes the name of the Parallels Workstation folder in Windows **Start** menu that you have specified while installing.
- You may also start Parallels Workstation by double-clicking its icon on the desktop, by single-clicking its shortcut in **Start** menu, or by single-clicking its icon in the Quick Launch panel, if you have added the corresponding shortcuts during installation.

When you start Parallels Workstation for the first time, the auto-update feature asks you if you want to perform regular automatic check for updates. See Auto-Updating Parallels Workstation in Windows (see page 31) for more information about the auto-update feature.

Activating Parallels Workstation in Windows

The installation wizard allows you to enter your activation key during Parallels Workstation installation. If you have not done this, perform the following steps:

- 1 Click **Help** in the Parallels Workstation main menu and select **Activate Product**.
- 2 In the **Activate Product** window fill in the following fields:
 - In the **Activation key** field, type the key provided to you. When you fill in this field, the **Activate** button becomes active.

- Specify your name and name of your company in the **User Name** and **Company Name** fields. Information taken from Windows system settings is automatically prompted here. These fields are optional.



- 3 Click the **Activate** button. If you have entered a valid activation key, the following confirmation message will be displayed: "Parallels Workstation has been activated successfully. Thank you!" From this point on your copy of the Parallels Workstation is active and you may use all of its features and capabilities.

The **License information** box describes your current activation status: inactive, active trial, expired trial, active permanent, expired permanent. If you have an active copy, trial or permanent, all license-related information is displayed here. The same information is contained in the License information (see page 127) group in **About Parallels Workstation** window and is described in the appropriate topic.

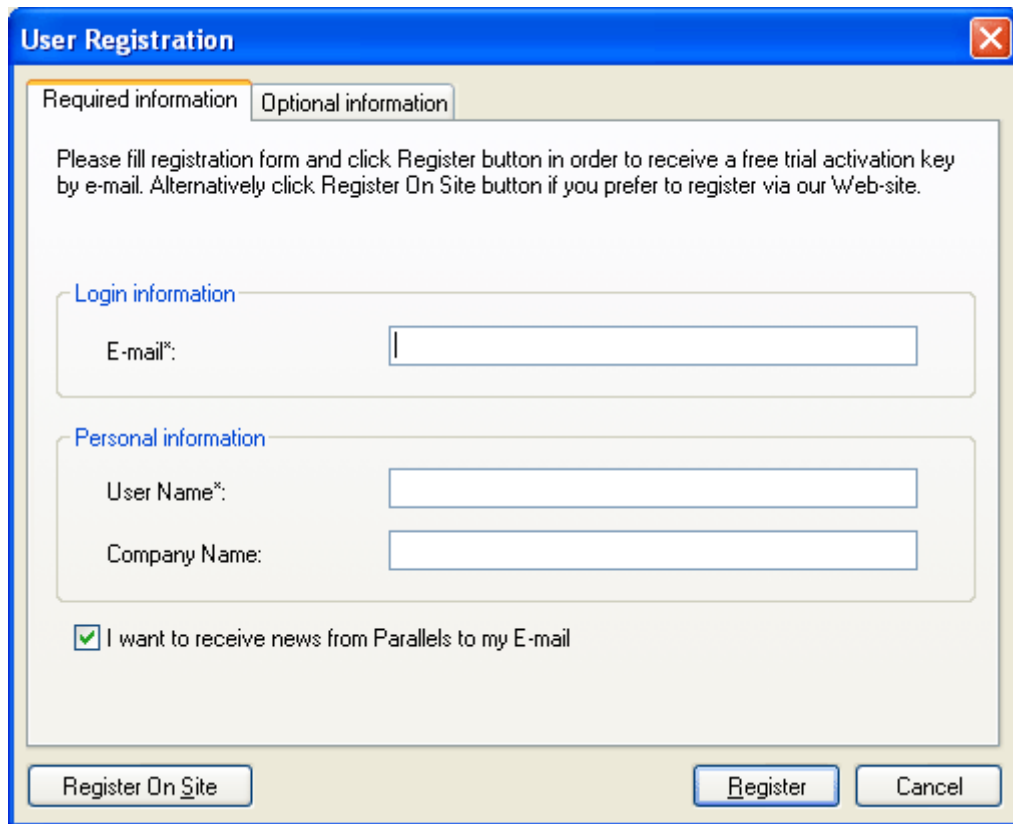
Getting an Activation Key

If you do not have a key, you can obtain one by clicking the **Evaluate** or **Buy** button that are provided in the **Activate Product** window.

To get an evaluation key:

- 1 Click the **Evaluate** button to open the **User Registration** window.

- 2 In the **User Registration** window, specify your e-mail and your name. Entering the name of your company and optional information in the respective tab is not necessary. Specify if you want to receive news from Parallels to your e-mail.



The image shows a 'User Registration' dialog box with a blue title bar and a close button (X) in the top right corner. It has two tabs: 'Required information' (selected) and 'Optional information'. Below the tabs is a text area with instructions: 'Please fill registration form and click Register button in order to receive a free trial activation key by e-mail. Alternatively click Register On Site button if you prefer to register via our Web-site.' The form is divided into two sections: 'Login information' and 'Personal information'. The 'Login information' section has an 'E-mail*' label and a text input field. The 'Personal information' section has 'User Name*' and 'Company Name' labels, each with a text input field. Below these sections is a checkbox labeled 'I want to receive news from Parallels to my E-mail', which is checked. At the bottom of the dialog are three buttons: 'Register On Site', 'Register', and 'Cancel'.

- 3 Click the **Register** button to send this information to Parallels. You will be sent a free trial activation key to your e-mail in a short time.

Alternatively, you may register on Parallels site. Use the **Register on site** button to proceed to creation of the account on site. You will receive a free trial activation key on your e-mail soon after this.

To get a permanent activation key:

Click the **Buy** button to open the Parallels Online Store where you can purchase a permanent activation key.

Uninstalling Parallels Workstation in Windows

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

Note: You must have Power User or Administrator rights to be able to uninstall the Parallels Workstation on a computer running Windows.

- 1 Open the Windows **Start** menu, select **Control Panel**, select **Add/Remove Programs**, and then select **Parallels Workstation**.

- 2 Click the **Remove** button (it may be combined with other buttons in different Windows versions) to begin uninstalling.
- 3 When you are asked "Do you want to completely remove the selected application and all of its features?", click **Yes**.
- 4 The Wizard asks whether you want to retain activation information: "You have license information of the Parallels Workstation stored in the Windows registry. Setup can save it for the future use, or remove it completely. It is recommended to keep the license if you plan to install the product again. Do you want to keep license?"

If you choose to save it, you will not be asked to enter an activation key next time you install Parallels Workstation.

Installing Parallels Workstation in Linux

This section describes installing Parallels Workstation onto computer running Linux and all the related processes.

Parallels Workstation for Linux: Step-by-Step Installation

Notes: 1. Make sure that the required packages and libraries enlisted in the software requirements (see page 13) for the Linux primary OS are installed on your system.

2. To install Parallels Workstation on a Linux computer, you need **root** privileges.

To install Parallels Workstation:

- 1 Download the Parallels Workstation installation file from Parallels site.
 - To download a trial version access the Parallels Download Center <http://www.parallels.com/en/download>.
 - To buy a full-scale version visit the Parallels Buy Online page <http://www.parallels.com/en/buyonline>.

Depending on what file types your system supports, download the **RPM package**, or **DEB package**, or **TZG archive** respectively.

- 2 Launch the **Terminal** program.

- 3 Run the

su

command to gain **root** privileges. Enter the password to the **root** account when you are asked for it.

- 4 If **.rpm** is supported in your system:

- Locate the **.rpm** package file **Parallels-2.1.xxxx-lin.i386.rpm**.
- To start installing Parallels Workstation, issue the following command:

```
rpm -i Parallels-2.1.xxxx-lin.i386.rpm
```

Proceed to step 7.

5 If `.deb` is supported in your system:

- Locate the `.deb` package file `Parallels-2.1.xxxx-lin.deb`.
- To start installing Parallels Workstation, issue the following command:

```
dpkg -i Parallels-2.1.xxxx-Lin.deb
```

Proceed to step 7.

6 If both `.rpm` and `.deb` are not supported in your system:

- Locate the `.tgz` package file `Parallels-2.1.xxxx-lin.tgz` and extract it into any existing directory:

```
tar -xvpf Parallels-2.1.xxxx-lin.tgz -C <directory name>
```

- Go to the directory where you unpacked the `.tgz` file and issue the next command

```
cd parallels-2.1.xxxx-lin
```

- Run the following command

```
./install.sh
```

7 After the installation completes, you should run the post-installation script. Issue the following command:

```
parallels-config
```

8 When prompted, press `Enter` on the keyboard.

9 Read the license agreement up to the end by pressing `Spacebar` on your keyboard. To accept the agreement, type `"y"` or `"yes"` (in either upper or lowercase) and press `Enter`.

10 The Parallels Workstation configuration procedure configures, compiles and installs drivers. After the process is finished you will be informed about the successful completion.

11 In the **Terminal**, issue the

```
exit
```

command to leave the `root` account. You can now run Parallels Workstation!

Troubleshooting

If you receive a "Can not configure!" or "Can not compile!" message (note that you should have kernel sources installed), you can view log file and try to fix problem yourself. The log file is named `/usr/lib/parallels/comp.log.<log number>.error`

If you can not fix the problem yourself, please send the log file and problem description to reports@parallels.com. We will assist you as soon as possible.

Starting Parallels Workstation

To start Parallels Workstation in Linux:

- Log in, launch the **Terminal** program and run

```
parallels
```

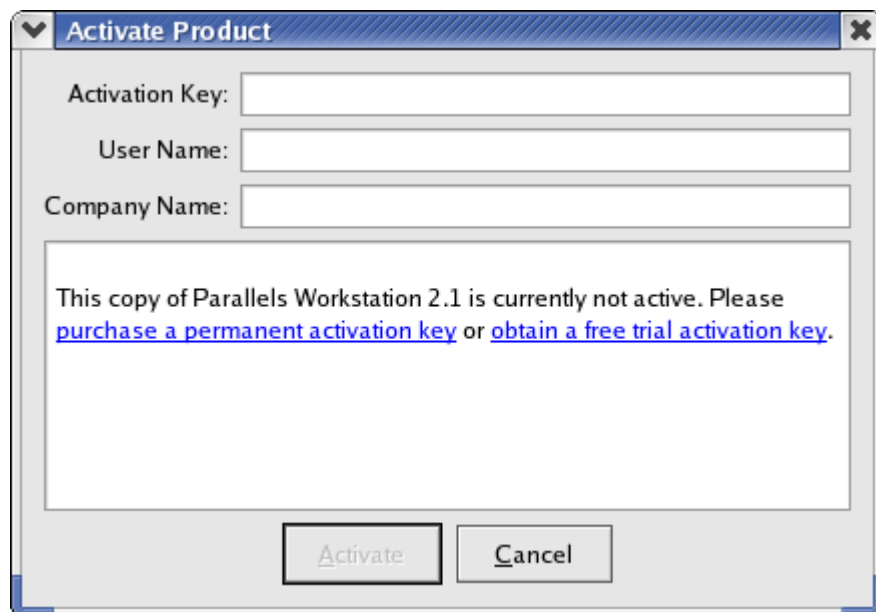
in the command line.

When you start Parallels Workstation for the first time, the auto-update feature asks you if you want to perform regular automatic check for updates. See [Auto-Updating Parallels Workstation in Linux](#) (see page 37) for more information about the auto-update feature.

Activating Parallels Workstation in Linux

To activate Parallels Workstation in Linux do the following:

- 1 Click **Help** in the Parallels Workstation main menu and select **Activate Product**.
- 2 In the **Activate Product** window, fill in the following fields:
 - In the **Activation key** field type the key provided for you. When you fill in this field, the **Activate** button becomes active.
 - Specify your name and name of your company in the **User Name** and **Company Name** fields. These fields are optional.



- 3 Click the **Activate** button. If you have entered a valid activation key, the following confirmation message will be displayed: "Parallels Workstation has been activated successfully. Thank you!" From this point on, your copy of the Parallels Workstation is active and you may use all of its features and capabilities.

The **License information** box describes your current activation status: inactive, active trial, expired trial, active permanent, expired permanent. If you have an active copy, trial or permanent, all license-related information is displayed here. The same information is contained in the License information (see page 127) group in **About Parallels Workstation** window and is described in the appropriate topic.

Getting an Activation Key

If you do not have an activation key, follow the links in the License information text to get one.

To get an evaluation key:

- 1 Click the **"obtain a free trial activation key"** link to open the **User Registration** window.

- 2 In the **User Registration** window, specify your e-mail and your name. Entering name of your company and optional information in the respective tab is not necessary. Specify if you want to receive news from Parallels to your e-mail.



The image shows a 'User Registration Form' window with two tabs: 'Required information' and 'Optional information'. The 'Required information' tab is active. The window contains the following elements:

- A message: 'Please fill registration form and click **Register** button in order to receive a free trial activation key by e-mail. Alternatively click **Register On Site** button if you prefer to register via our Web-site.'
- A 'Login Information' section with an 'E-mail *:' text box.
- A 'Personal Information' section with 'User Name *:' and 'Company Name:' text boxes.
- A checkbox labeled 'I want to receive news from Parallels to my e-mail' which is checked.
- Three buttons at the bottom: 'Register On Site', 'Register', and 'Cancel'.

- 3 Click the **Register** button to send this information to Parallels. You will be sent a free trial activation key to your e-mail in a short time.

Alternatively, you may register on Parallels site. Click the **Register on site** button to proceed to creation of the account on site. You will receive a free trial activation key on your e-mail soon after this.

To get a permanent activation key:

- 1 Click the “**purchase a permanent activation key**” hyperlink to open the Parallels Online Store.

Uninstalling Parallels Workstation in Linux

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

Note: To uninstall Parallels Workstation on a computer running Linux you need root privileges.

To uninstall Parallels Workstation in Linux:

- 1 If .rpm is supported in your system, run the command

```
su -c "rpm -e Parallels"
```

Enter the root password.

- 2 If .deb is supported in your system, run the command

```
su -c "dpkg -r Parallels"
```

Enter the root password.

- 3 If both .rpm and .deb are not supported in your system:

- In the **Terminal**, run the command

```
su
```

to gain root privileges. Enter the password to the root account when you are asked for it.

- Go to installation directory and run

```
./uninstall.sh
```

script.

- Leave the root account by running the following command

```
exit
```

CHAPTER 4

Updating Parallels Workstation

This chapter discusses how to update your Parallels Workstation 2.0 to 2.1 version for both Windows and Linux installations.

In This Chapter

Updating Parallels Workstation in Windows.....	30
Updating Parallels Workstation in Linux.....	36

Updating Parallels Workstation in Windows

Update procedure in Windows primary OS consists of the following steps:

1 Getting known about a new update.

We recommend that you use the auto-update feature incorporated into Parallels Workstation to be informed when new update is available. Auto-update feature regularly checks the Parallels server and informs when the update is found. See the Auto-Updating Parallels Workstation in Windows (see page 31).

Instead you may check for new updates using Update Wizard or manually on Parallels site.

2 Downloading and installing Parallels Workstation update.

There are two ways to download an update:

- Using the Update Wizard.

If you use the auto-update feature, it informs you when the update is available and launches the Parallels Update Wizard for downloading. If you do not use the auto-update feature, you are able to start Parallels Update Wizard manually. See the Update Wizard in Windows (see page 32).

After you download the update using Update Wizard, the latter automatically launches the Setup Wizard for installation.

- Manually from Parallels site.

If you have downloaded the update manually, perform an ordinary Parallels Workstation installation. See Parallels Workstation for Windows: Step-by-Step Installation (see page 14).

Auto-Updating Parallels Workstation in Windows

Parallels Workstation includes an auto-update feature. When starting Parallels Workstation for the first time, you will receive a notification which asks if you agree for Parallels Workstation to perform regular checks for updates: "Parallels Workstation is configured to automatically check for updates every week. To do this your host computer should be connected to the Internet. You may choose another checking period or disable this feature in the Preferences/Common screen." We recommend you to turn this feature on so you will be automatically informed when Parallels Workstation updates are released.

Parallels Workstation will regularly access the Parallels FTP server and will check if a newer version than the one currently installed is available. By default, update checking is performed once a week. Checks are performed in background mode, meaning that you will not be notified until an update is found. If Parallels Workstation detects that update is available, auto-update asks for installation confirmation with the following message: "A newer version of the Parallels Workstation is available. Do you want to start Parallels Update Wizard?" If you want to update, click **Yes** to launch the Parallels Update Wizard that will download the update.

Requirements to Your Computer

To be able to use auto-update feature:

- your computer must be connected to Internet.

Note. If you have firewall and/or antivirus software installed in your primary operating system, they may display warnings when Parallels Workstation tries to access Internet for update. Please configure them properly to allow Parallels Workstation to perform checks.

Configuring Auto-Update

You can specify the frequency of update checks, i.e. daily, weekly, or monthly, in the **Automatically checks for update** option in the Common (see page 81) tab of the **Preferences** window. Auto-update checking can be disabled by selecting *Don't check* in the same setting. You can enable the auto-update feature at a later time by revisiting this menu.

Update Wizard in Windows

Updates for Parallels Workstation for Windows can be downloaded using the Parallels Update Wizard. For information on auto-updating Parallels Workstation, see Auto-updating Parallels Workstation in Windows (see page 31).

The Wizard accesses the Parallels FTP server, checks if a newer version than the one currently installed is available, downloads the newest version (if any), and starts installation, if the user decides to do it immediately. To use this feature, your primary operating system must be connected to the Internet.

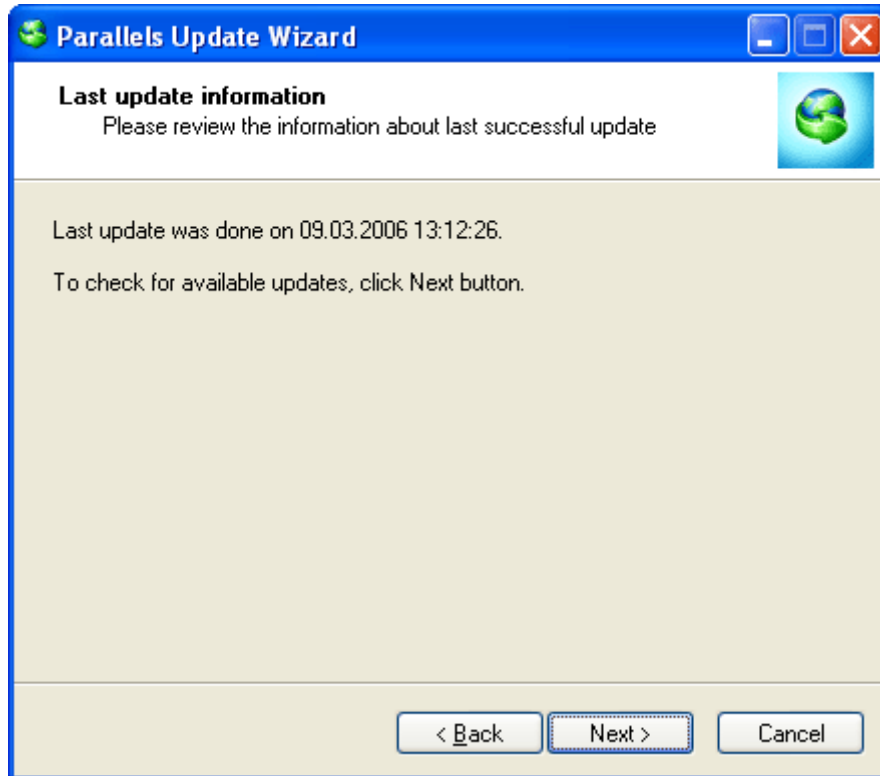
To update Parallels Workstation:

- 1 Start the Parallels Update Wizard either by selecting **Check for Updates** in the **Help** menu, or by selecting **All Programs -- > <Parallels Folder> -- > Check for Updates** in the Windows **Start** menu.

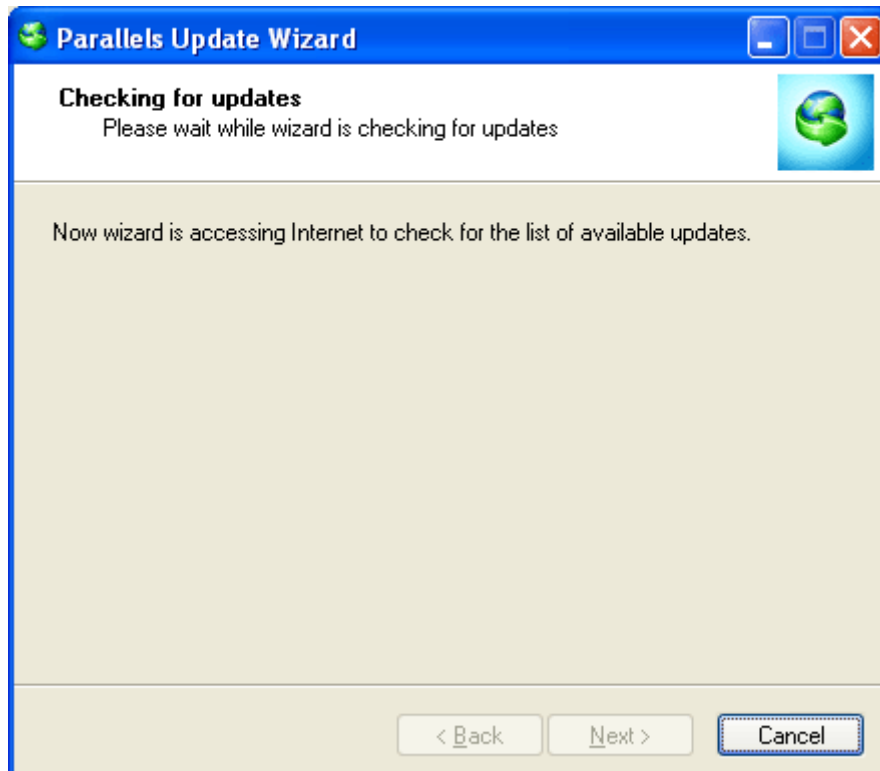
The Wizard will welcome you. Click **Next** to proceed.



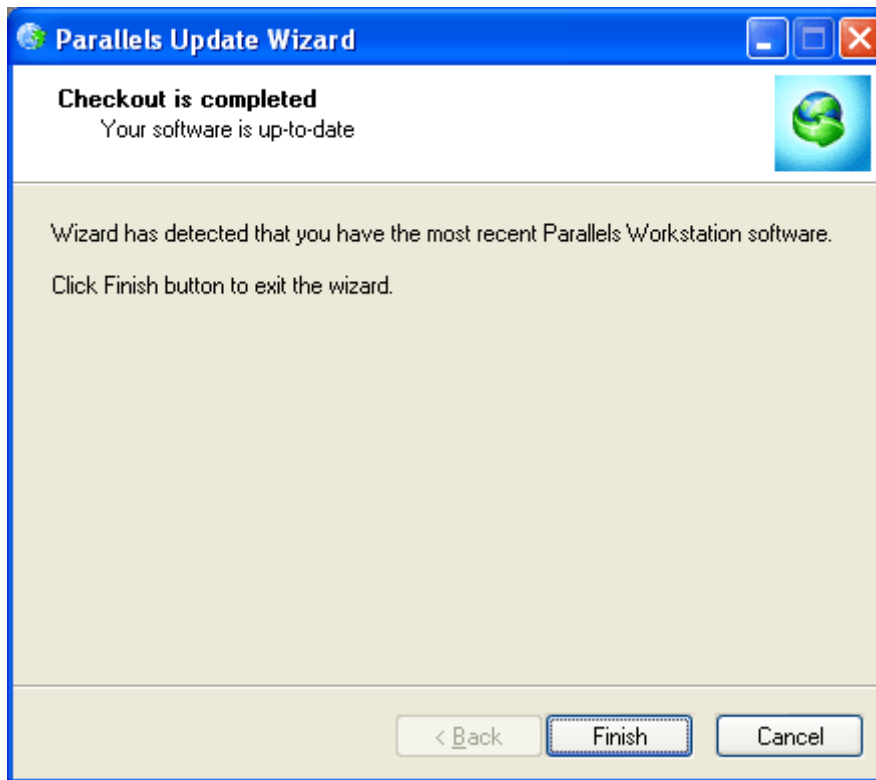
- 2 The Wizard checks when your copy of the Parallels Workstation was last updated and displays the exact date and time of the update. If you have not previously updated your installation, the Wizard will inform you that "Update wizard has detected that your Parallels Workstation software has never been updated before". Click **Next** to check for available updates.



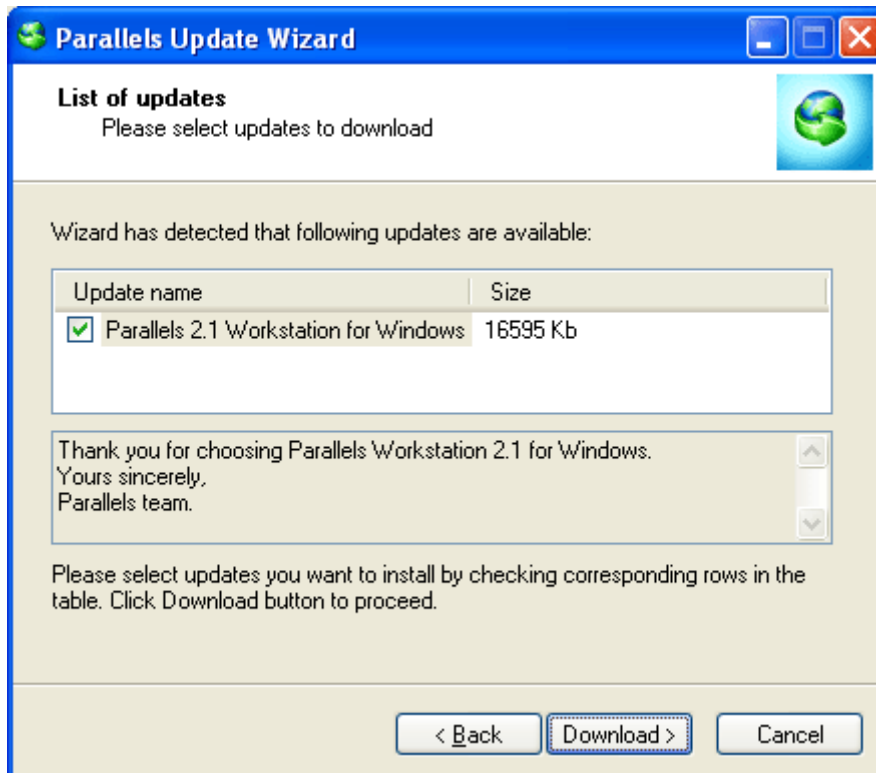
- 3 While accessing the FTP server, the Wizard displays the following screen.



- 4 When the wizard gets the version numbers of available updates, it compares them with the installed version. If it can not find a more recent version than the one that is currently installed, the wizard displays the following screen. Click **Finish** to exit the wizard.

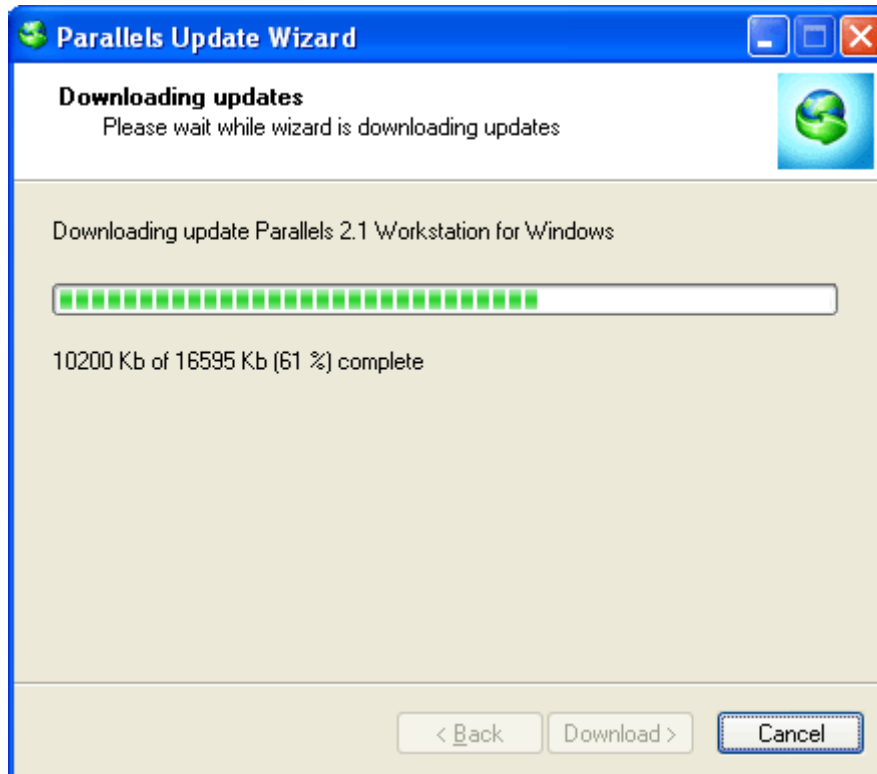


- 5 If the wizard finds a more recent version of Parallels Workstation than the one currently installed, the number of the newest version is displayed in the following screen.

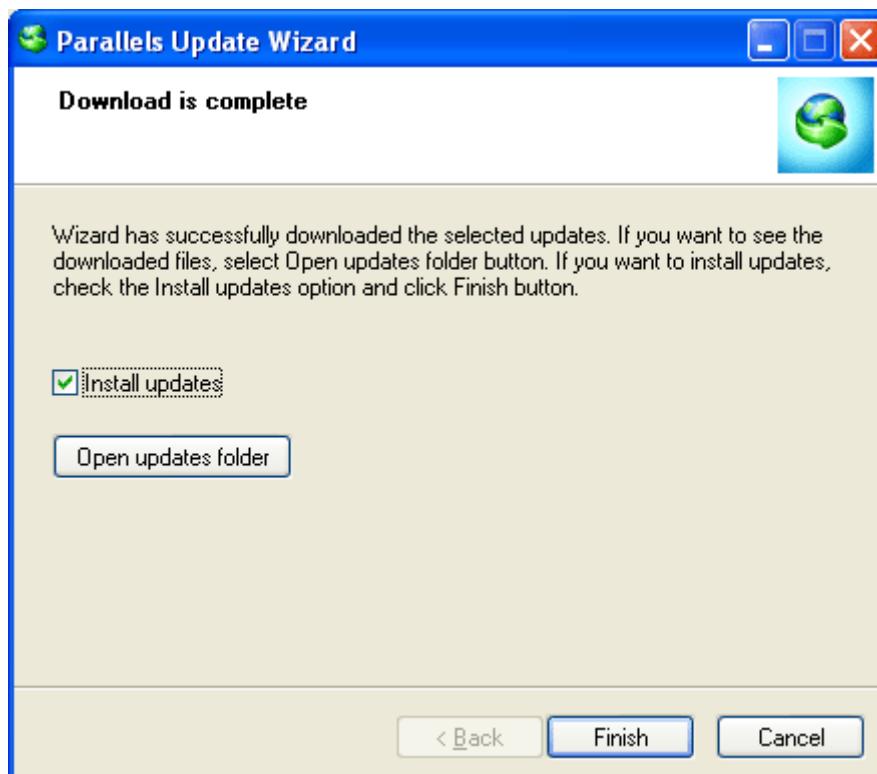


Make sure that the newest version is checked and click **Download**.

- 6 While downloading, the Wizard displays the following screen.

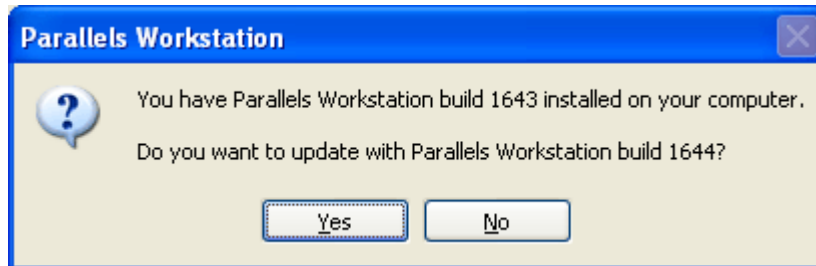


- 7 When the Wizard finishes downloading you may open the folder where the new update was placed using the **Open updates folder** button.



Before installing, close all Parallels Workstation instances. (If you haven't closed all Parallels Workstation windows, you will be notified later that you have to do it with the following message: "Please close all running instances of the Parallels Workstation before start installing the downloaded update. Do you want to begin installing?") After you have closed all Parallels Workstation instances, return to the **Download is completed** wizard screen, make sure that **Install updates** option is checked, and click **Finish** button.

- 8 The Update Wizard closes itself and starts the **Installation Wizard**. The Installation Wizard asks for confirmation for replacing the current version with the newer one.



Click **Yes**. The Installation Wizard performs the installation of the update. When it is finished, the Wizard may ask you to restart the computer. If this is the case, agree to restart.

Updating Parallels Workstation in Linux

Update procedure in Linux primary OS consists of the following steps:

- 1 Getting known about a new update.

We recommend that you use the Auto-update feature incorporated in Parallels Workstation to be informed when new update is available. Auto-update feature regularly checks the Parallels server and informs when the update is found. See Auto-Updating Parallels Workstation in Linux (see page 37).

Instead you may check for new updates using Update Wizard or manually on Parallels site.

- 2 Downloading Parallels Workstation update.

There are two ways to download an update:

- Using the Update Wizard.

If you use the Auto-update feature, it informs you when the update is available and launches the Parallels Update Wizard for downloading. If you do not use the Auto-update feature, you are able to start Parallels Update Wizard manually. See the Update Wizard in Linux (see page 38).

- Manually from Parallels site.

- 3 Installing the update.

After you have the update downloaded to your computer, you need to install it. See the Installing Update (see page 42) topic for guidelines.

If you need to install an older version of Parallels Workstation than the one currently installed, in some operating systems it requires to perform a different command than an newer version installation.

Auto-Updating Parallels Workstation in Linux

Parallels Workstation includes an auto-update feature. When starting Parallels Workstation for the first time, you will be asked if you agree for Parallels Workstation to perform regular checks for updates: "Parallels Workstation is configured to automatically check for updates every week. To do this your host computer should be connected to the Internet. You may choose another checking period or disable this feature in the Preferences/Common screen." We recommend you to turn this feature on so you will be automatically informed when Parallels Workstation updates are released.

Parallels Workstation will regularly access the Parallels FTP server and will check if a newer version than the one currently installed is available. By default, update checking is performed once a week. Checks are performed in background mode, meaning that you will not be notified until an update is found. If Parallels Workstation detects that update is available, auto-update asks for installation confirmation with the following message: "A newer version of the Parallels Workstation is available. Do you want to start Parallels Update Wizard?" If you want to update, click **Yes** to launch the Parallels Update Wizard that will download the update.

Requirements to Your Computer

To be able to use auto-update feature:

- your computer must be connected to Internet.

Note. If you have firewall and/or antivirus software installed in your primary operating system, they may display warnings when Parallels Workstation tries to access Internet for update. Please configure them properly to allow Parallels Workstation to perform checks.

Configuring Auto-Update

You can specify the frequency of update checks, i.e. daily, weekly, or monthly, in the **Automatically checks for update** option in the Common (see page 81) tab of the **Preferences** window. Auto-update checking can be disabled by selecting *Don't check* in the same setting. You can enable the auto-update feature at a later time by revisiting this menu.

Update Wizard in Linux

Parallels Workstation includes a Parallels Update Wizard which assists in downloading updates. The wizard accesses the Parallels FTP server, checks if a newer version than the one currently installed is available and downloads it (if one is found). The Update Wizard automatically selects the package suitable for your Linux primary OS.

To be able to use the Parallels Update Wizard:

- Your Linux primary operating system must be connected to the Internet.

To download the update:

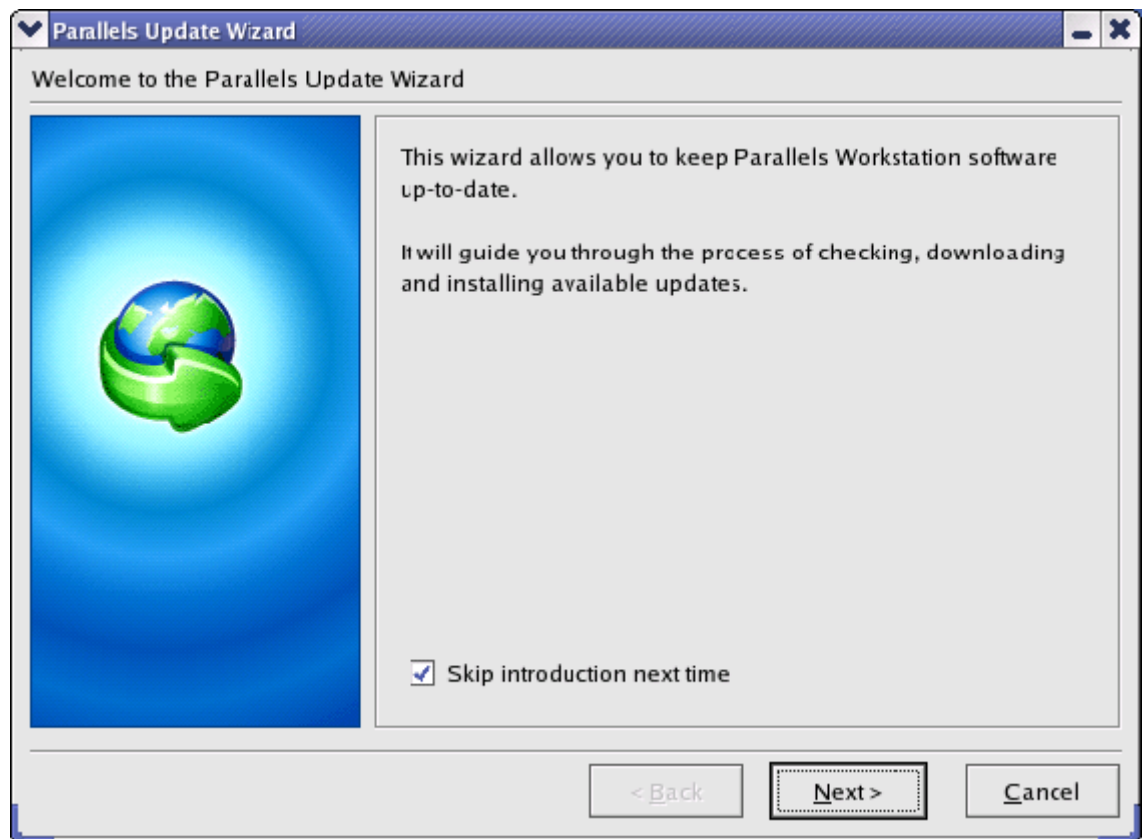
- 1 Start the Parallels Update Wizard.

The Parallels Update Wizard can be started automatically, by auto-update feature (see Auto-Updating Parallels Workstation in Linux (see page 37)), or manually by one of the following methods:

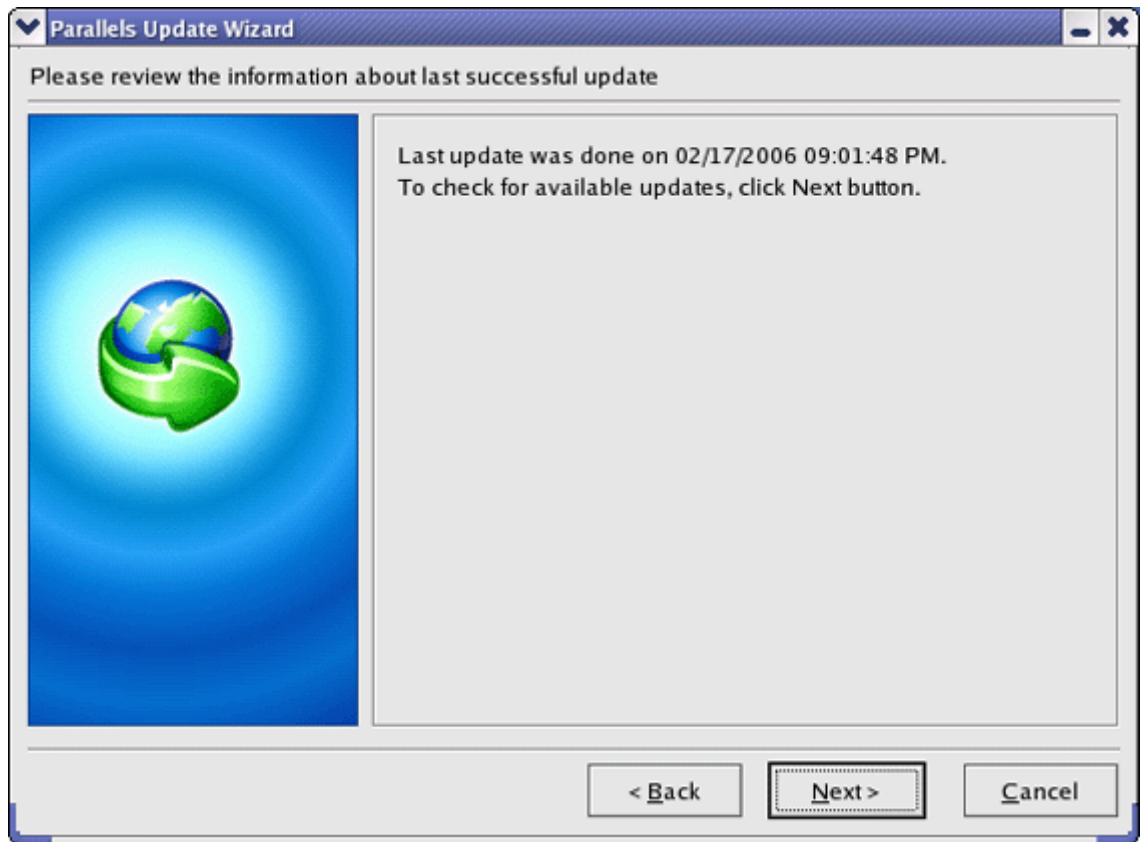
- select **Help/Check for Updates** in the Parallels Workstation menu,
- in the **Terminal**, issue the command:

updatewizard

- 2 The wizard welcomes you. Click **Next** to proceed.



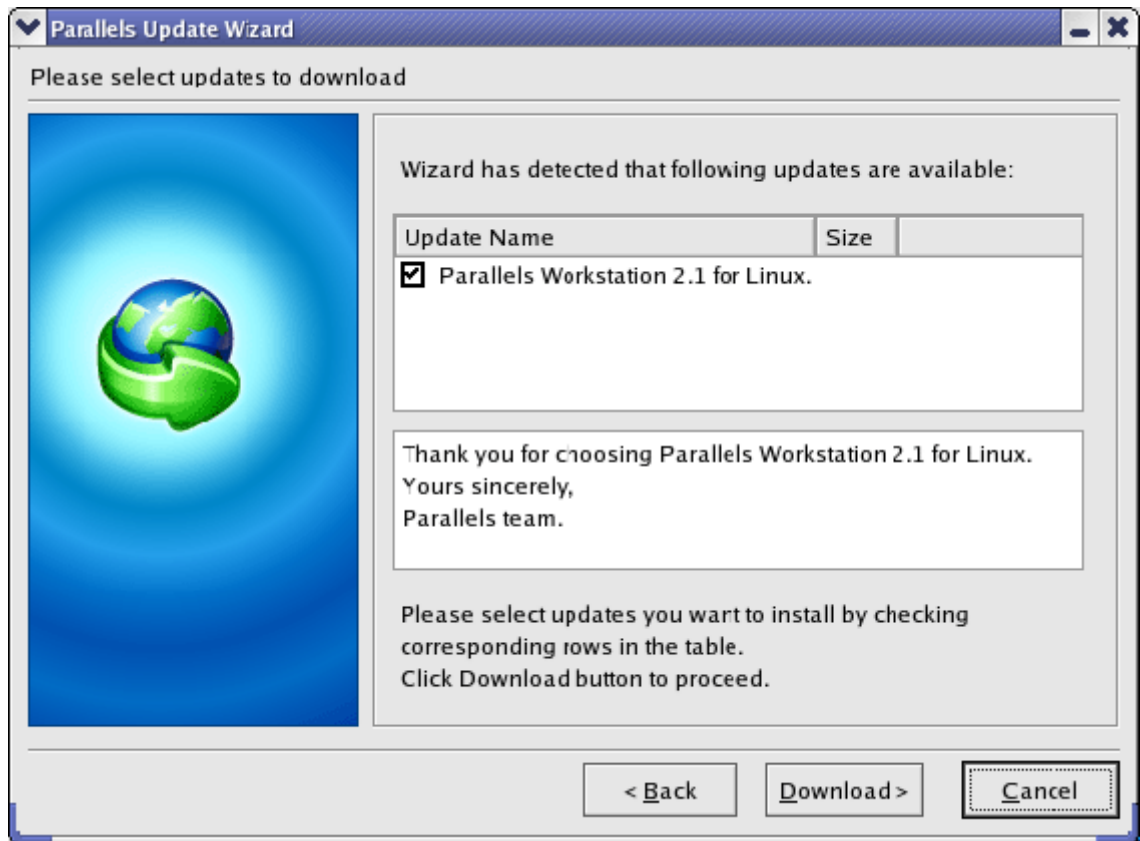
- 3 The wizard checks when your copy of the Parallels Workstation was last updated and displays the exact date and time of the update.



If you have not previously updated your installation, the Wizard will inform you that "Update wizard has detected that your Parallels Workstation software has never been updated before". Click **Next** to check for available updates.

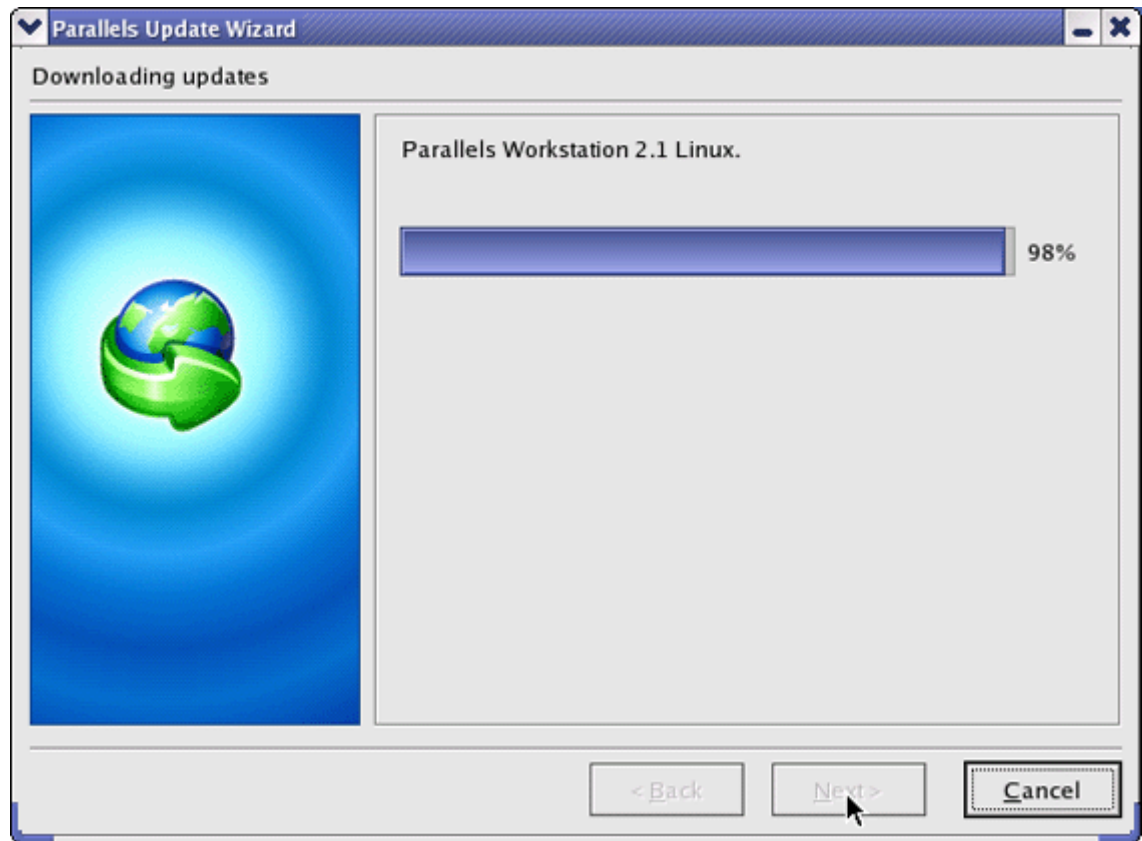
- 4 When the wizard gets versions numbers of available updates, it compares them with the installed version. If it can not find a more recent version than the one that is currently installed, the wizard informs you that "Wizard has detected that you have the most recent Parallels Workstation software".

If the wizard finds a more recent version of Parallels Workstation than the one currently installed, the number of the newest version is displayed in the following screen.

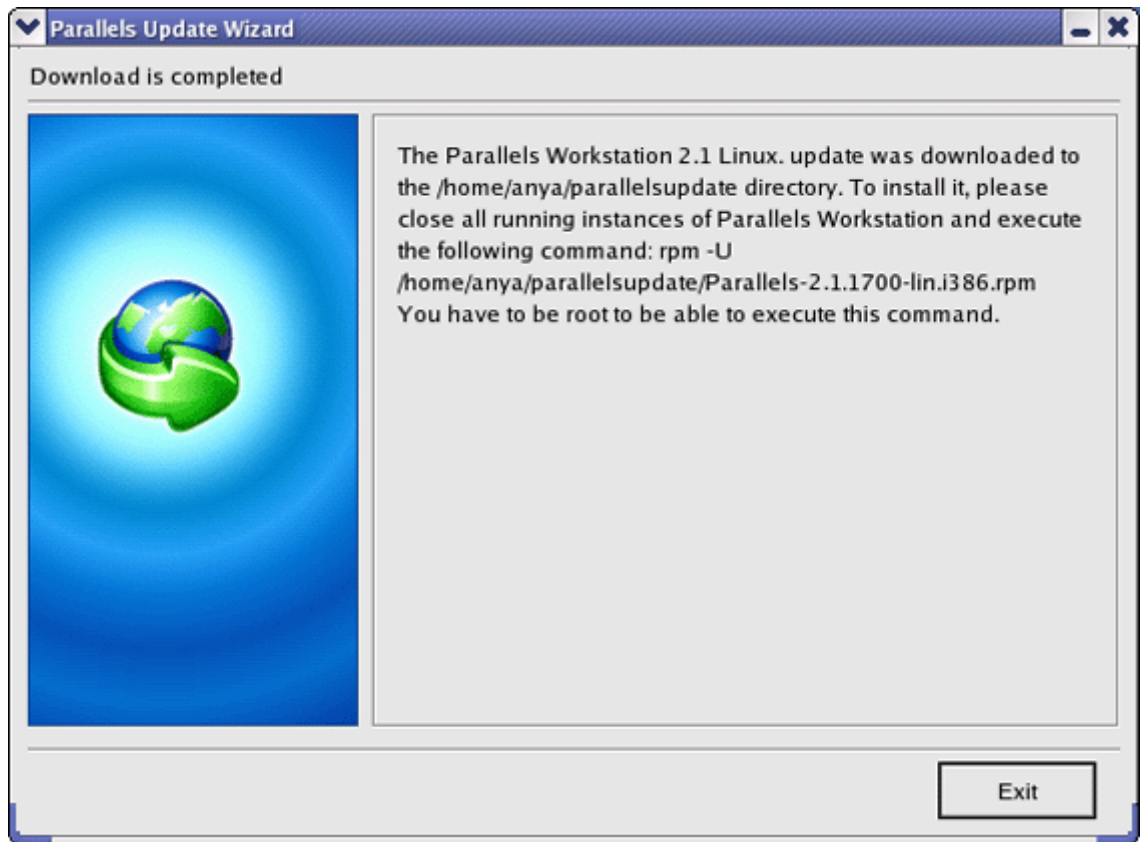


Make sure that the newest version is checked and click **Download**.

- 5 While downloading, the Wizard displays the following screen.



- When the download is complete, the wizard displays the command(s) you should execute to install the update. Proceed to Installing Update (see page 42) to complete the installation.



Installing an Update

Note: To update Parallels Workstation on a Linux computer, you need root privileges.

Updating From an RPM Package

The update feature removes the Parallels Workstation version currently installed on your computer and installs a new one.

To update the Parallels Workstation, you should perform the following operations:

- 1 Launch the **Terminal** program.

- 2 Run the

su

command to gain root privileges for installation. Enter password to the root account when you are asked for it.

- 3 Issue the following command to start installing the update:

rpm -U ~/parallelsupdate/parallels-2.1.xxxx-lin.i386.rpm

If you are trying to update to a version that is the same or older than the currently installed one, you will be warned that the package is already installed, or that a newer package is already installed, respectively. Look below this procedure for the guidelines on installing older version of the Parallels Workstation.

- 4 After the installation completes, you should run the post-installation script. Issue the following command:

```
parallels-config
```

- 5 When prompted, press Enter on the keyboard.
- 6 Read the license agreement up to the end by pressing Spacebar on your keyboard. To accept the agreement, type Y and press Enter.
- 7 The Parallels Workstation configuration procedure configures, compiles and installs drivers. After the process is finished you will be informed about the successful completion. You can now run the new version of the Parallels Workstation.

- 8 In the **Terminal**, issue the

```
exit
```

command to leave the root account.

To update to a previous version of the Parallels Workstation on a computer supporting .rpm:

- perform steps 1-2 from the procedure described above;
- move to the directory where the installation package is located:

```
cd <installation directory>
```

- issue the following command to start installing:

```
rpm -U --oldpackage Parallels-2.1.xxxx-lin.i386.rpm
```

- perform steps 4-8 of the updating procedure.

Updating From DEB and TGZ Packages

To update Parallels Workstation on a computer supporting .deb or .tgz, perform the steps related to your Linux primary system from the Parallels Workstation installation procedure. See the Parallels Workstation for Linux: Step-by-Step Installation (see page 25) topic.

Troubleshooting

If you receive "Can not configure!" message or "Can not compile!" message (note that you should have kernel sources installed), you can view log file and try to fix problem yourself. Log file is named /usr/lib/parallels/comp.log.<log number>.error

If you can not fix the problem yourself, please send the log file and problem description to reports@parallels.com. We will assist you as soon as possible.

CHAPTER 5

Interface Basics

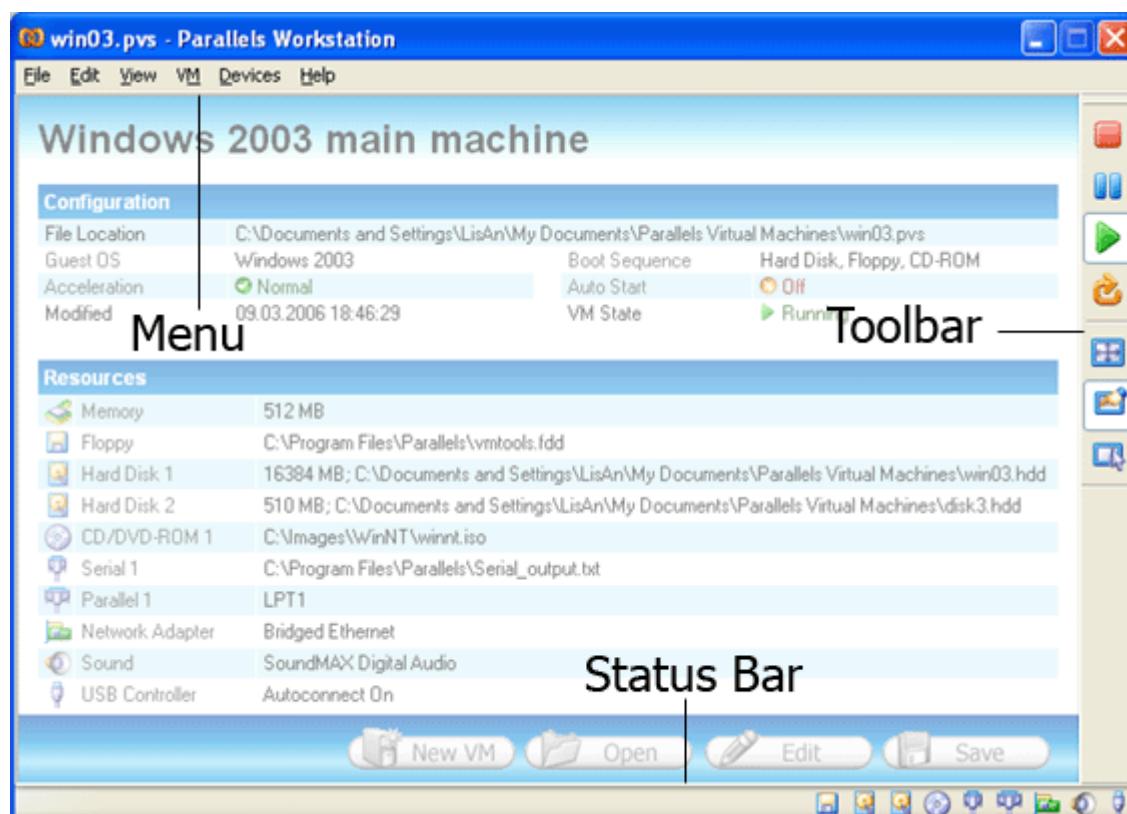
This chapter provides information about Parallels Workstation window and its controls.

In This Chapter

Main Window	44
Property Page	46
Console View	47
Status Bar	48
Text Size	49
Making Screenshots	49

Main Window

The Parallels Workstation window displays an opened Virtual Machine and a set of visual tools for managing machine behavior. When a Virtual Machine is not started its property page is only seen. Each running Virtual Machine has its own console that acts as a real computer monitor.



Controls available in both property page and console view are the following:

- Parallels Workstation menu;
- Toolbar;
- Status bar (on page 48).

The toolbar is located to the right of the Parallels Workstation window by default. However, it can be attached to any of the four window borders. Just drag it from a current position to another border and drop when toolbar frame changes its shape. Parallels Workstation will keep this toolbar position next time you launch the system.

Note that if you drop the toolbar when it is not docked to the window border, this position will not be restored on the next Parallels Workstation session.

Toolbar buttons are active mainly when Virtual Machine is turned on. They are discussed in the Starting Virtual Machine (on page 130), Shutting Down and Resetting Virtual Machine (on page 132), Pausing Virtual Machine (see page 134), Suspending Virtual Machine (see page 134), Switching Virtual Machine to Fullscreen Mode (on page 132), and Console View (on page 47) topics. When a guest OS is not started, only the **Power on** button is active letting you to start the machine (on page 130).

If you click the **Power On** or **Pause** button it becomes visibly pressed reflecting the current Virtual Machine state. On the picture above the **Power On** button is pressed which means the guest OS is launched and operating. The **Console View** button is visibly pressed when you look at the console of the running guest OS. If you look at the property page of the running Virtual Machine, this button is on the same level with the toolbar.

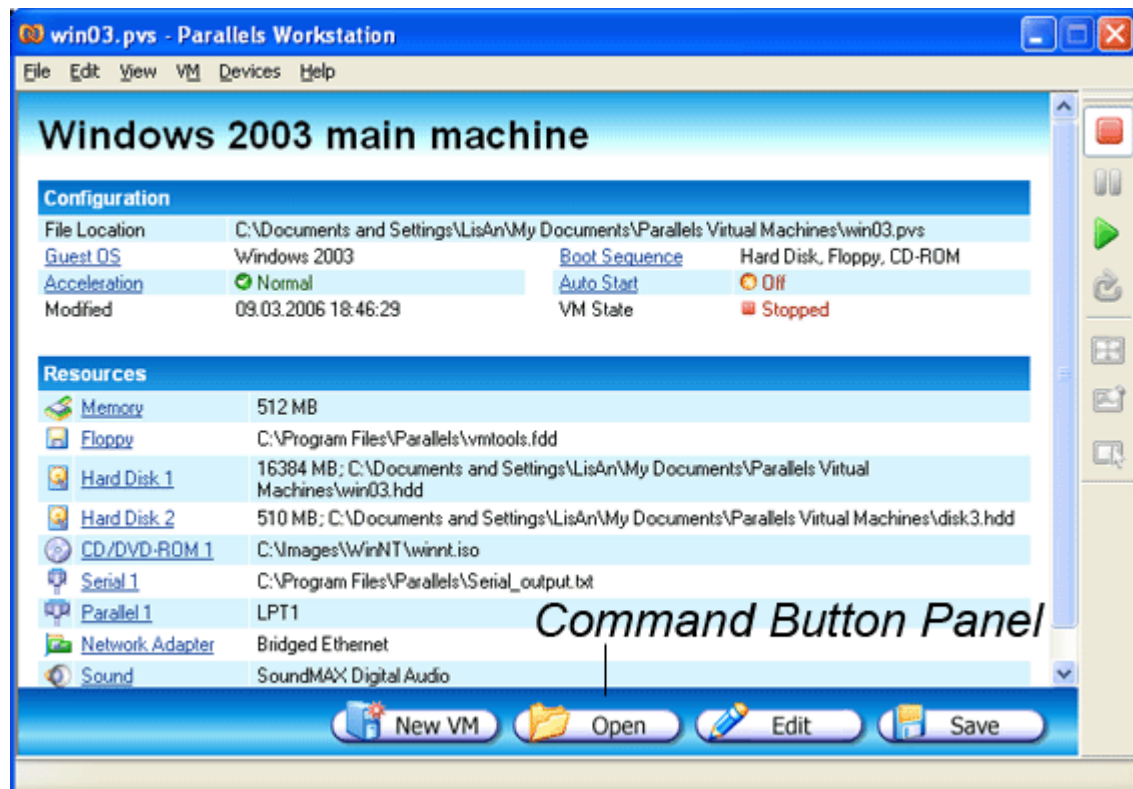
You can simplify the Parallels Workstation window by hiding some of its components. If you don't need the toolbar or the status bar, click **Toolbar** or **Status Bar** in the **View** menu. You can make them visible at any time by the same action. Visible window elements are marked with checkmarks.

Parallels Workstation allows you to modify text size (on page 49) on the property page and make screenshots (on page 49) of the console while Virtual Machine is active.

Property Page

When you open an existing Virtual Machine or create a new one its property page is displayed. The upper part of the page displays virtual machine name, name of the configuration file with the path, and general VM settings: guest operating system type and version (regardless of it is installed or not), acceleration level, last modification date, and others. Those settings that may be changed are link-looked and if click on any of them the Configuration Editor (on page 94) will be opened on the appropriate page. (The name of the Virtual Machine is not linked to Configuration Editor, however it can be changed on the General Options (on page 95) tab.)

The **Configuration Details** part shows all devices connected to the Virtual Machine and their current options. To edit any device simply click device name. The Configuration Editor (on page 94) will open the tab corresponding to the device.



The Command Button panel in the bottom of the property page contains buttons for creating a new Virtual Machine (on page 50), browsing hard disk for a Virtual Machine to open (see page 92), editing Virtual Machine configuration (on page 94), and also saving opened Virtual Machine configuration (see page 94).

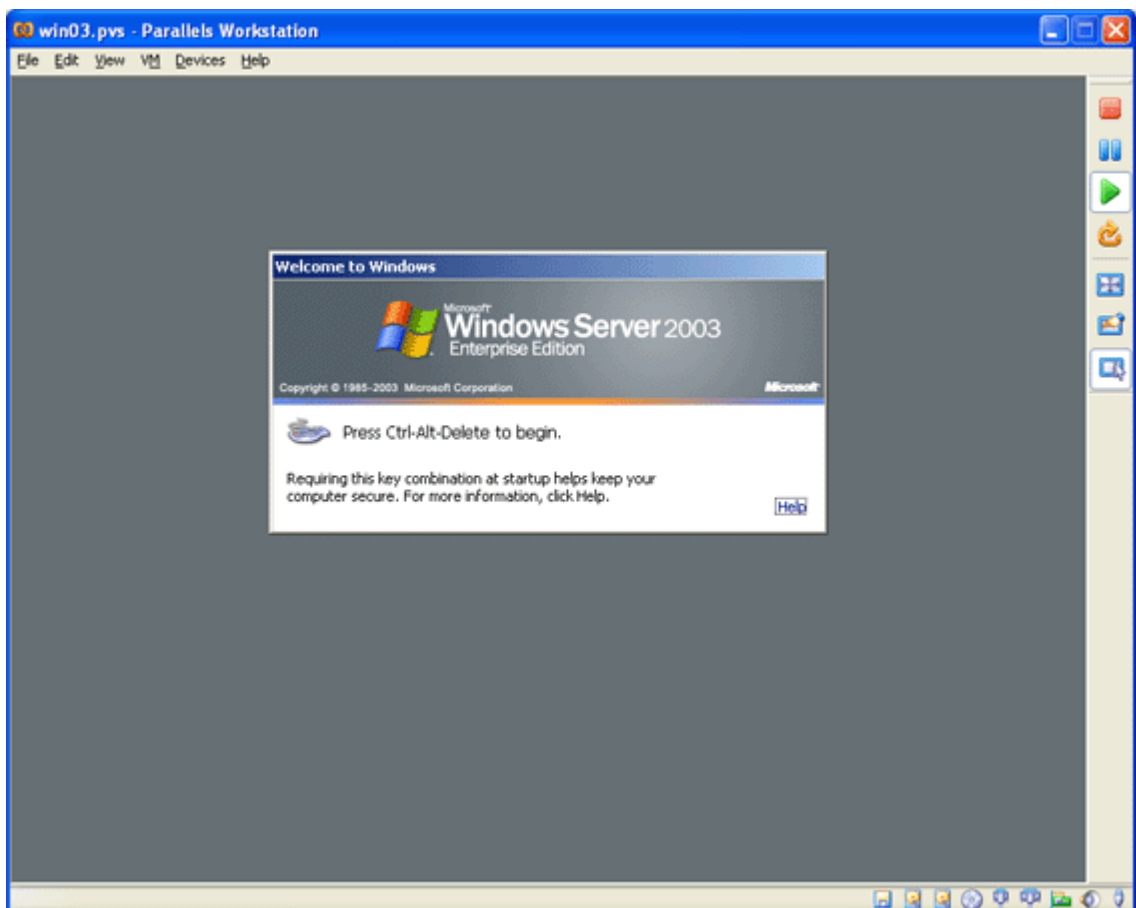
The property page remains available when guest OS is running. You may open it to check the VM configuration. However, the Command Button panel will be disabled.

Console View

You interact with a running Virtual Machine via its console which is opened when you start the Virtual Machine (on page 130). If you have guest operating system installed it will be displayed on the console exactly like the primary OS is displayed on a real monitor.

During guest OS execution all toolbar buttons and many of the menu commands become active. The Configuration Editor is inaccessible.

To switch to the property page click **VM Property Page View** button  on the toolbar or select **Console View** in the **View** menu. To return to console view click **Console View** button  or select **Console View** in the **View** menu.



Guest operating systems can be executed in fullscreen mode when Parallels Workstation menu, toolbar, and status bar are hidden. For detailed information see Switching Virtual Machine to Fullscreen Mode (on page 132).

Status Bar

The status bar displays information when Virtual Machine is running. Left part of the status bar displays prompt on the menu entry currently pointed by cursor.

Each device (except memory) connected to the Virtual Machine is presented as an icon on the right of the status bar.



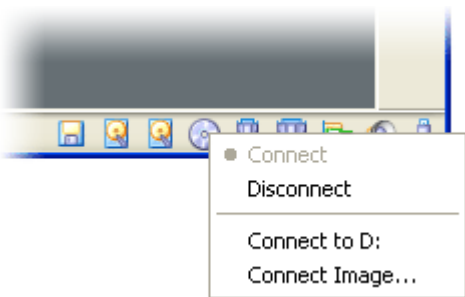
The following devices put their icons onto the status bar:

- hard disk ,
- CD/DVD-ROM ,
- floppy disk drive ,
- network adapter ,
- serial port ,
- parallel port ,
- sound device ,
- USB devices .

When a device is involved in the current process it is indicated by small green circle (when reading is being performed) or orange circle (when writing is being performed) on its icon. Example: hard disk icons when reading  and when writing  operations are being performed respectively.

If a device can be connected/disconnected when running guest OS (on page 136) (CD/DVD-ROM, floppy drive, network adapter, serial and parallel ports, a sound device, and USB), these operations can be executed using the device context menu. Right-click on the device icon to display its context menu and select the command you need.

The picture below shows the context menu of the CD/DVD-ROM drive.



Text Size

Parallels Workstation allows to adjust text size of the property page. Use **View/Text Size/Increase Text Size** and **Decrease Text Size** commands. To return to initial text size click **Reset Text Size** command.

Making Screenshots

Parallels Workstation allows you to make screenshots of the guest operating system window when guest OS is running. Click **Console Screenshot** in the **VM** menu. Type or select a name and a directory to store the screenshot file. Parallels Workstation saves screenshots as **.bmp** files in Windows primary OS and as **.png** files in Linux primary OS.

CHAPTER 6

Creating Virtual Machine

This chapter discusses the tasks you should complete to create a new Virtual Machine. They are:

- creating a Virtual Machine configuration,
- guest operating system installation,
- installing the Parallels Tools - in Windows, OS/2 and eComStation guest OSes.

The procedure of creating Virtual Machines is similar both for Windows and Linux-based Parallels Workstation installations.

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Creating Virtual Machine Configuration

This section discusses Virtual Machine configuration and the process of creating a new Virtual Machine.

Understanding Virtual Machine Configuration

Each Virtual Machine hardware configuration is defined by a special Parallels Workstation configuration file having the .pvs extension. It contains all the information about virtual devices attached to the Virtual Machine and files connected to it. In general two files make up a Virtual Machine, a configuration file and a hard disk image file (several virtual hard disks can be attached). Other files may not be attached.

The following table explains all file types that may be related to a Virtual Machine:

.pvs	This is a Virtual Machine configuration file. One configuration file defines one Virtual Machine. One instance of Parallels Workstation can run only one opened configuration file, i.e. only one Virtual Machine. To run several Virtual Machines, you should launch several instances of Parallels Workstation. Typical configuration file can be easily generated using New Virtual Machine Wizard (see page 52).
.sav	This is a Virtual Machine saved state file. This file is created when you suspend a Virtual Machine and contains the state of the guest OS and its applications in the moment when suspend was invoked. See the Suspending Virtual Machine (see page 134) for more information.
.hdd	This is a virtual hard disk of a Parallels Workstation Virtual Machine. When you create a new Virtual Machine, the New VM wizard prompts to place new virtual hard disk and .pvs configuration file into the same directory, however you may store these files in different folders. You may also attach to configuration a virtual hard disk that was initially created for another Virtual Machine. More information about virtual hard disks can be found in the Hard Disk Images (see page 89) topic.
.iso	This is a CD or DVD-ROM image file. .iso image file is treated by an operating system as a real CD/DVD disc. More information about .iso images is given in the CD/DVD Real Discs and Images (see page 90) topic.
.fdd	This is floppy disk image file created by Parallels Workstation. .fdd image file is treated by an operating system as a real floppy disk. More information about .fdd images is given in the Floppy Disk Images (see page 90) topic.
.txt	Serial and parallel ports can be emulated via output .txt files. See Serial Port Options (on page 106) and Parallel Port Options (on page 108).

New Virtual Machine Wizard

There is a special **New Virtual Machine Wizard** in Parallels Workstation that provides a means for creating new Virtual Machines for both new and experienced users.

The wizard offers three methods of creating a Virtual Machine: **Typical**, **Custom**, and **Blank**. They differ in time for specifying settings and requirements for user experience with Parallels Workstation. Regardless of what method is selected, you will be able to configure ready Virtual Machine using Configuration Editor (on page 94).

Typical Virtual Machine

Typical method is designed for new users and for fast Virtual Machine creation. When choosing this method you only need to specify:

- type and version of the guest operating system that will be installed;
- name of the Virtual Machine;
- directory for storing the Virtual Machine configuration file and a name of the configuration file.

A Virtual Machine is created with the most common parameters for the selected guest operating system. A new hard disk image is created with predefined size and format, standard amount of memory is allocated, and so on. User can later change the settings and add new devices using Configuration Editor.

Custom Virtual Machine

When creating custom Virtual Machine configuration the wizard allows you to set Virtual Machine parameters directly in the process of creation. This is intended for experienced users. When creating custom Virtual Machine configuration the user is asked to define:

- type and version of the guest operating system that will be installed;
- amount of RAM that Virtual Machine will use;
- whether you want to create a new virtual hard disk, attach an existing one, or not to add disk at all. In the first case you should specify parameters of the new disk, its size and type, and where to store disk file. When attaching an existing disk you have to locate disk image file. If you select not to add hard disk at all you are able to do it later in Configuration Editor;
- type of networking in the Virtual Machine. If you select Bridged Ethernet, the Wizard will ask to choose network adapter that should be connected to the virtual device;
- name of the Virtual Machine;
- directory for storing the Virtual Machine configuration file and a name of the configuration file.

CD/DVD-ROM drive, floppy drive, and sound device (if it is supposed for the selected guest OS) are added automatically, serial port is included in some guest OS. Other additional devices can be added in Configuration Editor.

Sound device and serial port are included for the same guest operating systems as for typical Virtual Machine configurations and are listed in the Creating Typical Virtual Machine (on page 53) topic.

Blank Virtual Machine

Blank Virtual Machine has only memory in its configuration after creation. When you select this method wizard's **Next** button changes to **Finish**, and after you click it wizard creates the machine immediately. Nothing else need to be defined. Devices can be added to blank configuration manually in the Configuration Editor.

Creating Typical Virtual Machine

After you get acquainted with Virtual Machine configuration options you may use the Wizard to create special configurations.

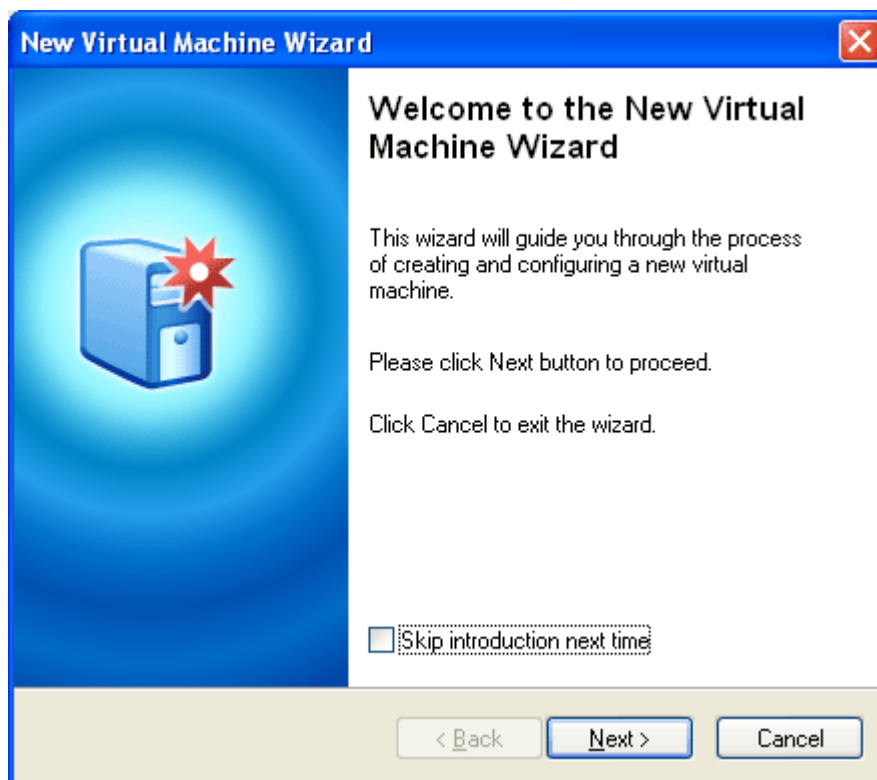
Typical Virtual Machine includes memory, hard disk drive, floppy drive, CD/DVD-ROM, and network adapter as obligatory devices. Amount of memory and hard disk size vary for different guest OSes. Windows 98/ME/2000/XP/2003 and all of the Linux typical configurations include USB controller. Most of the typical configurations include a sound device (except FreeBSD and MS-DOS), OS/2 typical configuration includes serial port.

Look in the following table for memory amount and hard disk size provided for different guest operating systems. Virtual hard disk for typical Virtual Machine is always created in expanding format (see page 89).

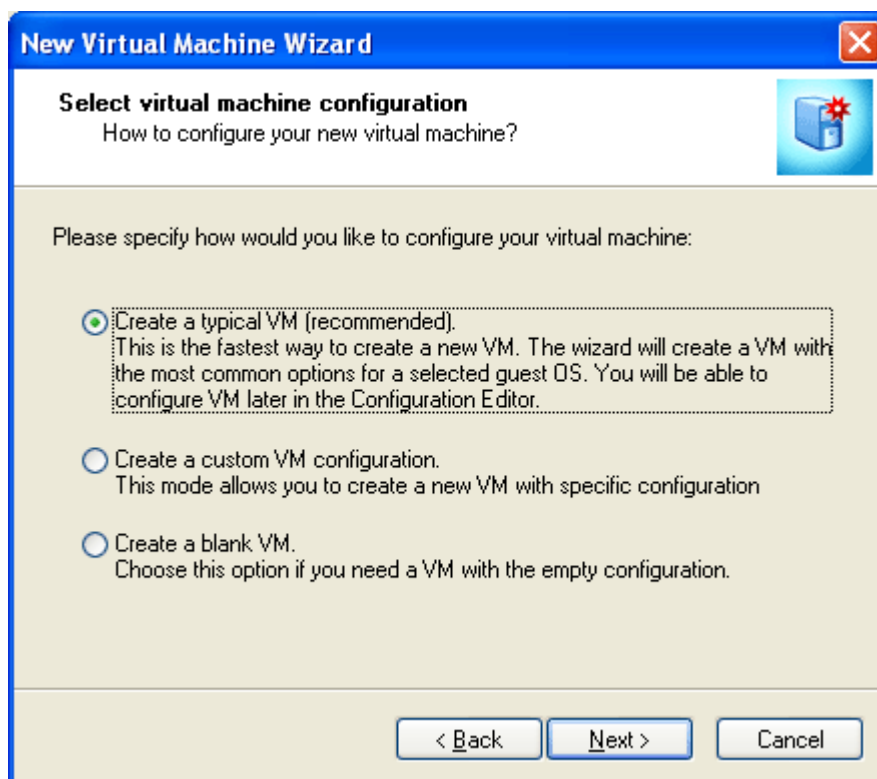
	Win 95	Win NT	Win 2003	Win 3.11	Win others	Linux	FreeBSD	OS/2	eCs	DOS	Other
RAM, MB	128	128	384	64	256	256	256	128	256	32	256
HDD, GB	2	4	4	2	4	4	4	2	4	2	4

To create a typical Virtual Machine:

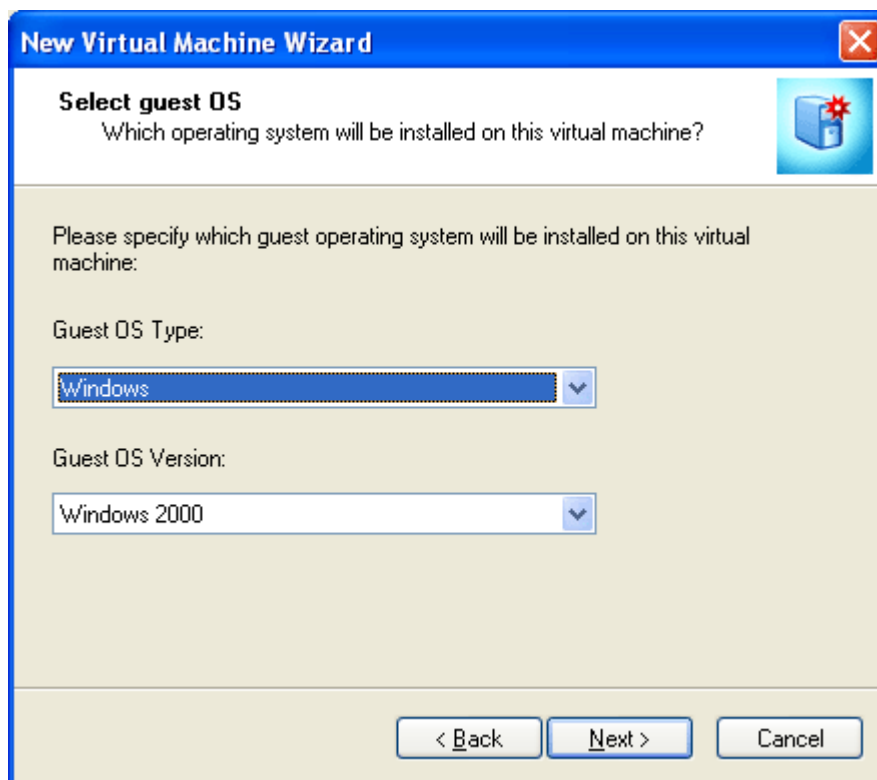
Open the Parallels Workstation. Click  button or select **New VM** in **File** menu. The New Virtual Machine Wizard welcomes you.



Click **Next** button.

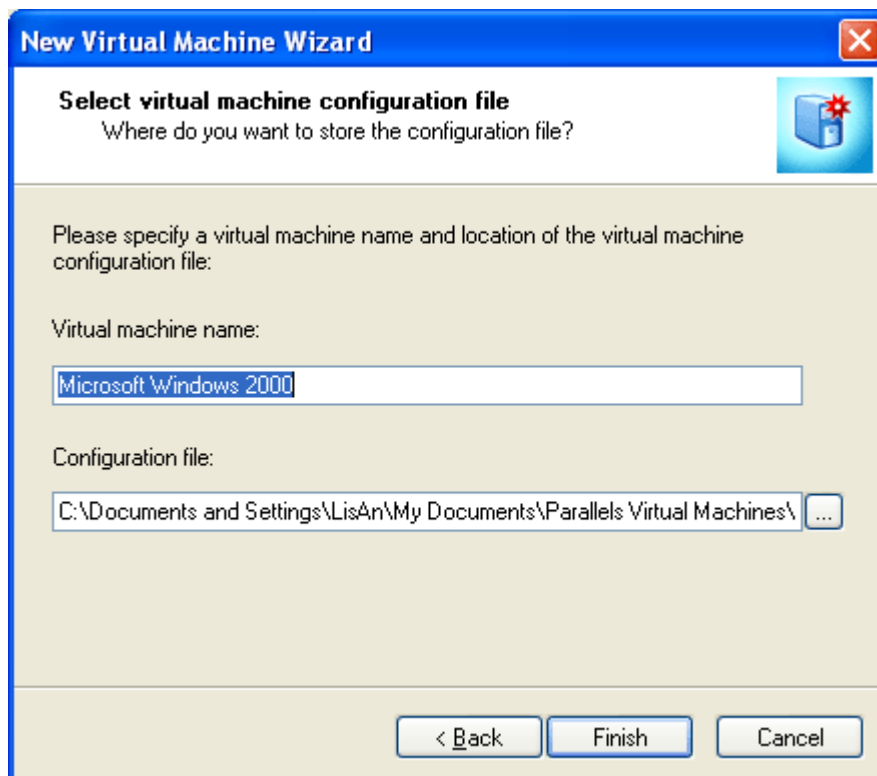


On this step the first option, **Create a typical VM**, is selected. If you are going to create a typical Virtual Machine, nothing needs to be changed on this screen. Click **Next** button to go to the next step.



Here you should specify the type and the version of the guest operating system you want to install on the new Virtual Machine.

When the guest operating system is specified, click **Next** button.



In this last step you should define a name for the Virtual Machine and indicate in which folder on the hard disk the Virtual Machine configuration file should be stored. By default the wizard will put it into standard place with a standard name. (The default folder for Parallels Virtual Machines is specified in the Preferences/Common (see page 81) window.)

Enter a descriptive name for the Virtual Machine in the **Virtual machine name** field. The name should be no longer than 50 characters.

In the **Configuration file** field the default path and name for the configuration file is shown. If you do not like the default name or path you may browse your file system to locate an appropriate folder and name. You can also make changes directly in the field.

Click **Finish** to begin the process of creating your new Virtual Machine, or click **Back** to examine settings on the previous steps.

After you click **Finish**, the new configuration is generated and opened in the Parallels Workstation window. Property page (see page 46) is displayed. You may continue with installing guest operating system (see page 65) on the new Virtual Machine.

CHAPTER 7

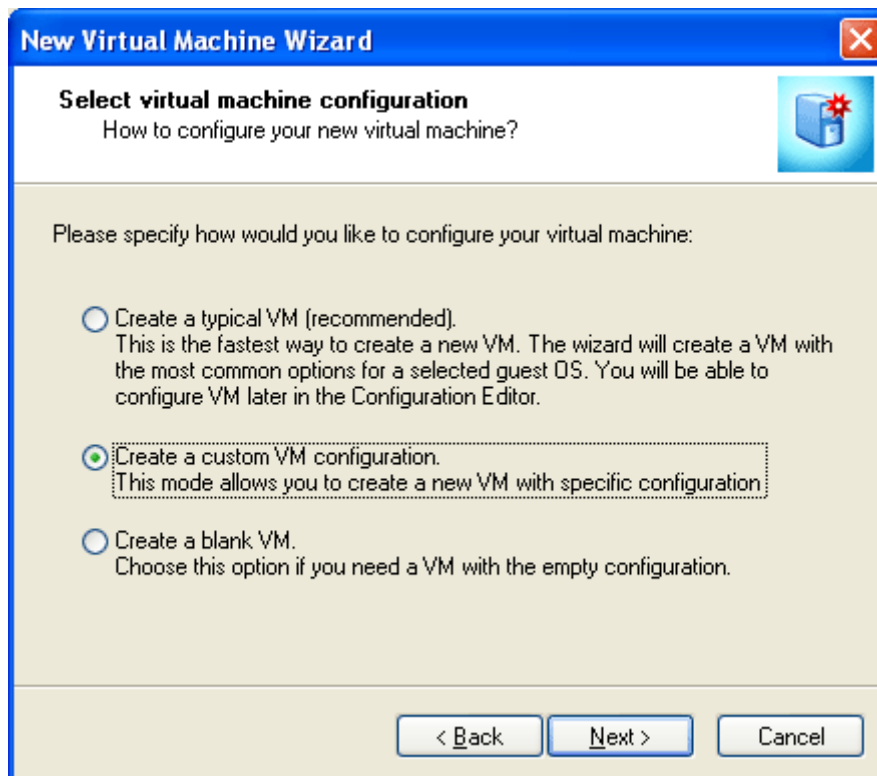
Creating a Custom Virtual Machine

- 1 Open the Parallels Workstation. Click  button on the Command Button panel or select **New VM** in **File** menu. The New Virtual Machine Wizard welcome screen will appear.

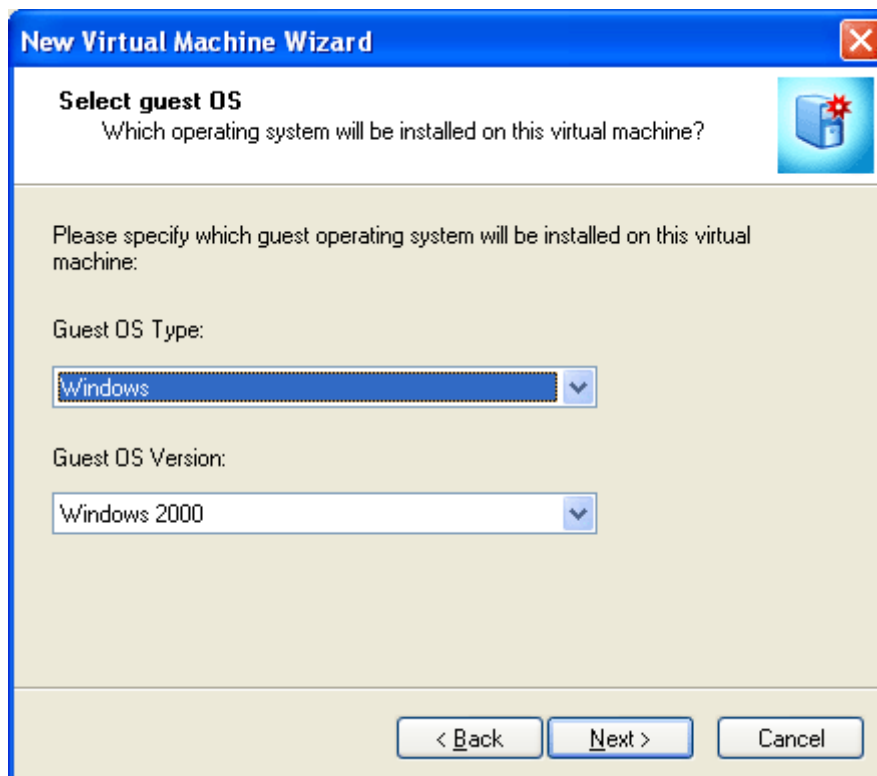


Click **Next** button.

- 2 Select **virtual machine configuration** screen is opened. Select the second option, **Create a custom VM configuration**. Click **Next** to proceed.



- 3 On the **Select guest OS** screen you should specify the type and version of the guest operating system you want to install on the new Virtual Machine. When it is done click the **Next** button to move to the next step.

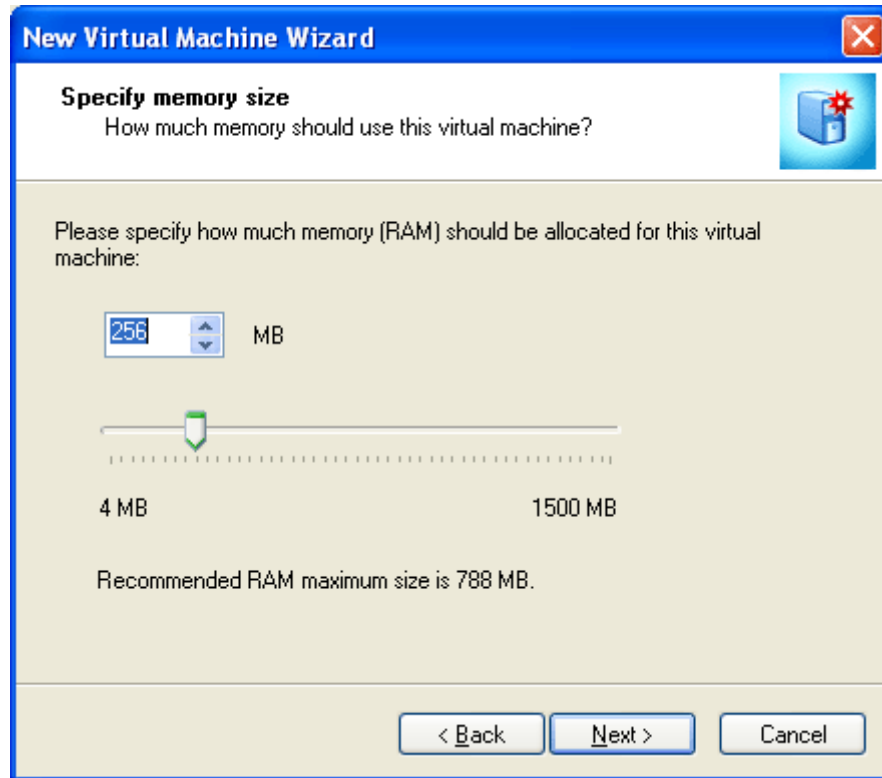


- 4 On the **Specify memory size** screen you should set the amount of RAM for the new machine. You can choose any value from 4 to 1500 MB. We strongly recommend that you allocate no more than the half of the physical RAM installed on your computer.

Memory size should be in multiples of 4 MB. You will receive error notification and will not be able to go further until specify a value that meets this condition.

To set memory value use slider, spin buttons, or type a value directly into the field.

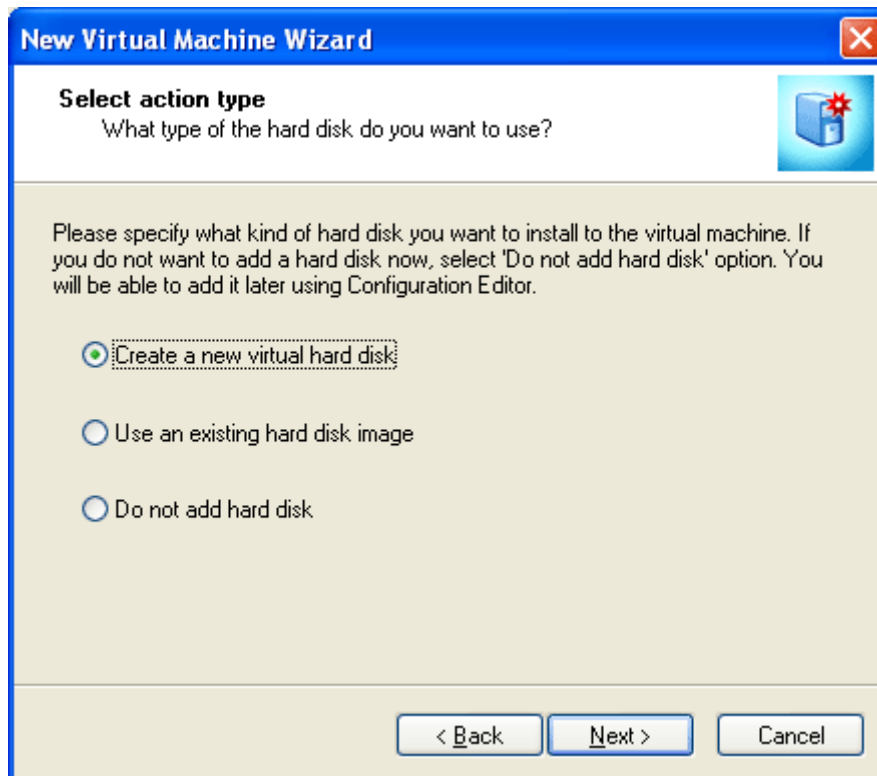
Click **Next** to move to the next step.



- 5 On the **Select action type** screen you have to decide whether you want to create a new virtual hard disk, attach to the machine an existing one, or not to add disk at all. After specifying what wizard should do, click **Next**.

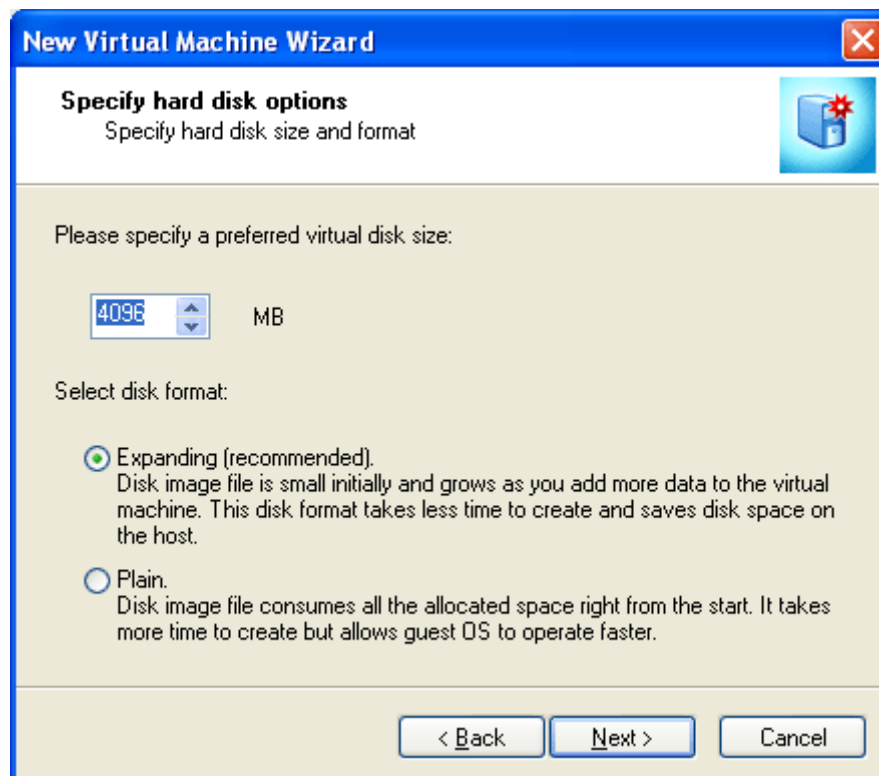
If you have selected to use an existing hard disk image, go to the step 8 of the current instructions.

If you have decided not to add disk at all, proceed to the step 9.



- 6 If you selected to create a new virtual disk on the previous step, you should specify its size and format. Disk formats are shortly explained on this wizard screen, more detailed description is given in the Hard Disk Images (see page 89) topic.

After specifying the data required, click **Next**.

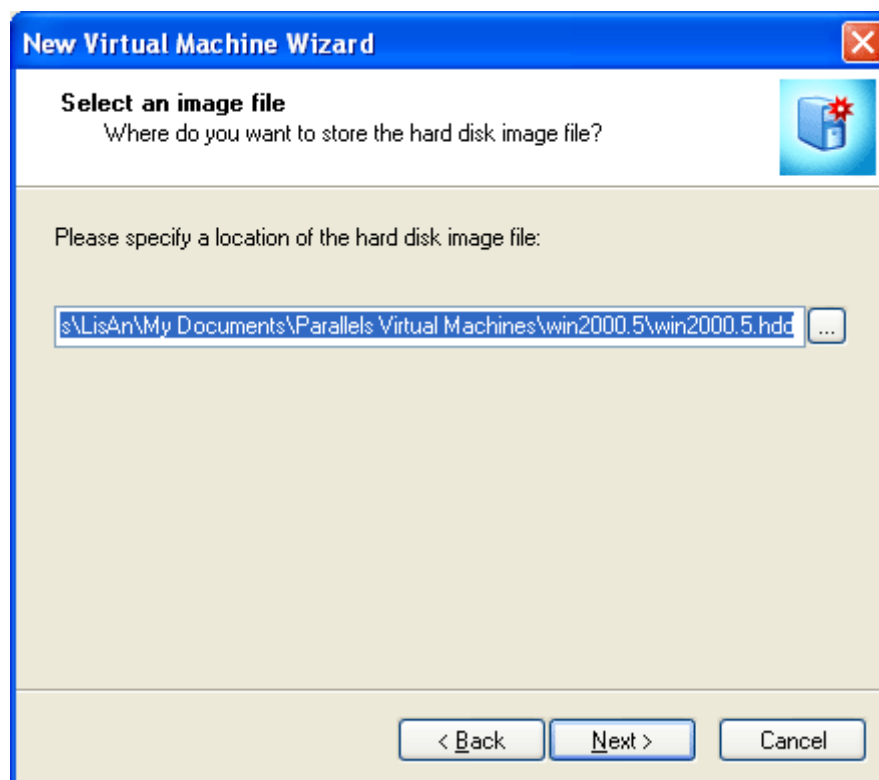


- 7 On the **Select an image file** screen you should determine the path where the virtual disk image should be stored, and the name of the disk.

The Wizard prompts to store new hard disk image under the default path that is specified on the Common tab (see page 81) in the **Preferences** window, in a separate folder. Files of each Virtual Machine are proposed to store in a separate folder, that are named in the following format <guest OS>.<number of the machine of the same version - 1>.

For instance, the first Windows 2000 Virtual Machine is proposed to store in the \win2000\ folder. For the second Windows 2000 VM \win2000.1\ folder is offered, and so on.

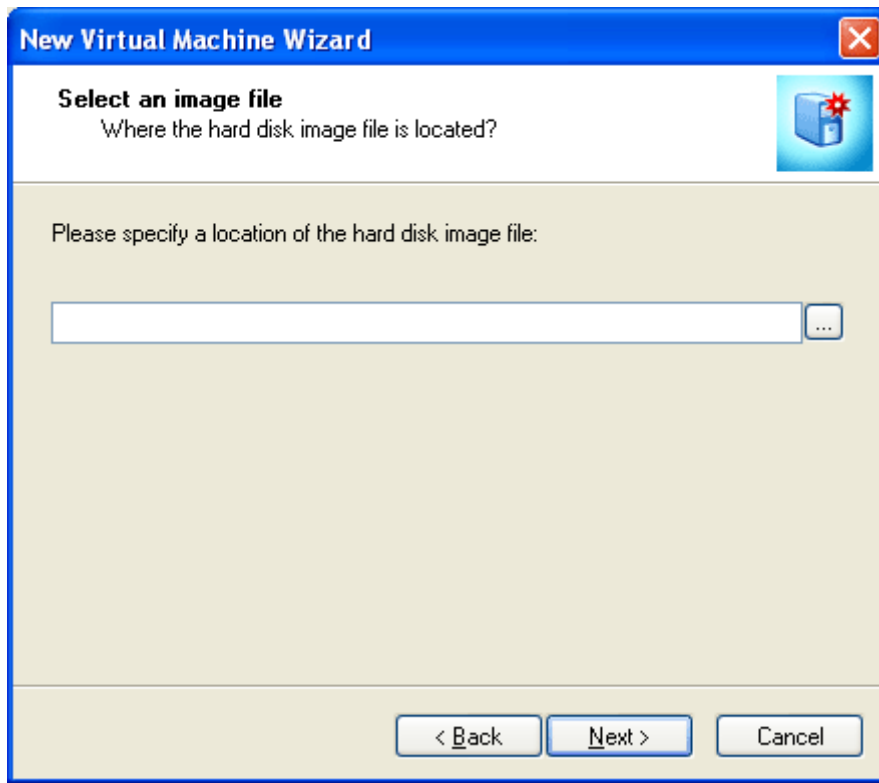
If you don't like the default name or path you may browse for the right folder and name, as well as make corrections directly in the field.



After you click **Next** the wizard checks if the specified folder exists, if it is not, a permission for creation is asked: "Directory <name> does not exists. Do you want it to be created automatically?" Click **Yes**.

Go to the step 9 of the current instructions.

- 8 Since you decided to attach to the new VM an existing hard disk image (on the step 5) you have to specify where this disk image is stored. Use **Browse** button to locate it or type the file name with its path directly in the field.



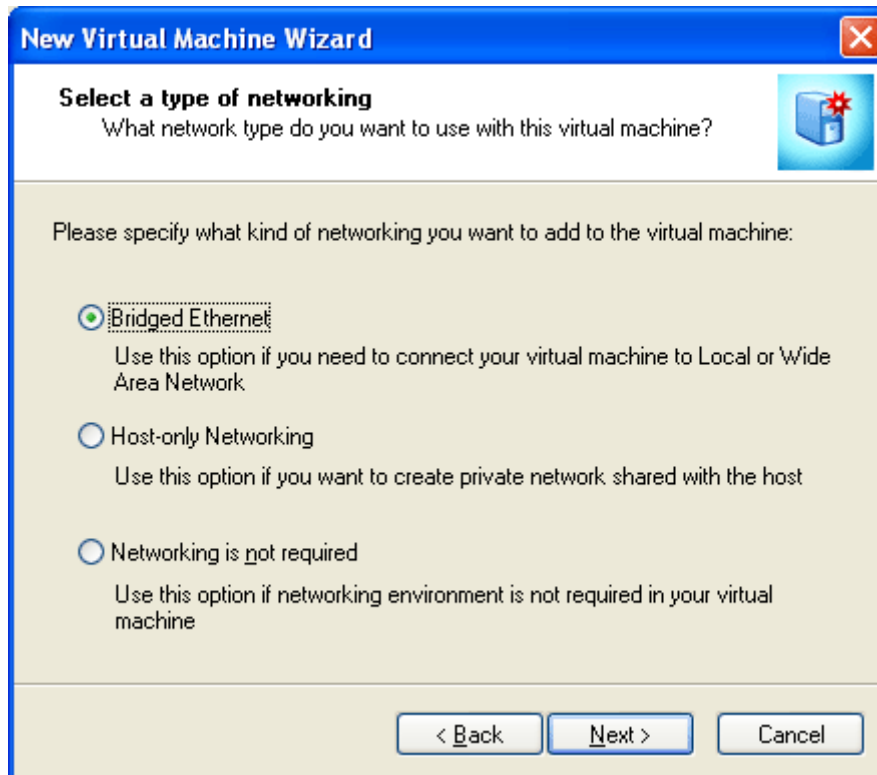
After you click **Next** the wizard searches disk for the specified file, and if it does not find the file, you are notified that "The specified file <file name> does not exist. Please select a different file."

- 9 Here you will specify type of networking for the new Virtual Machine.

Select **Bridged Ethernet** if you want to access Internet inside the Virtual Machine.

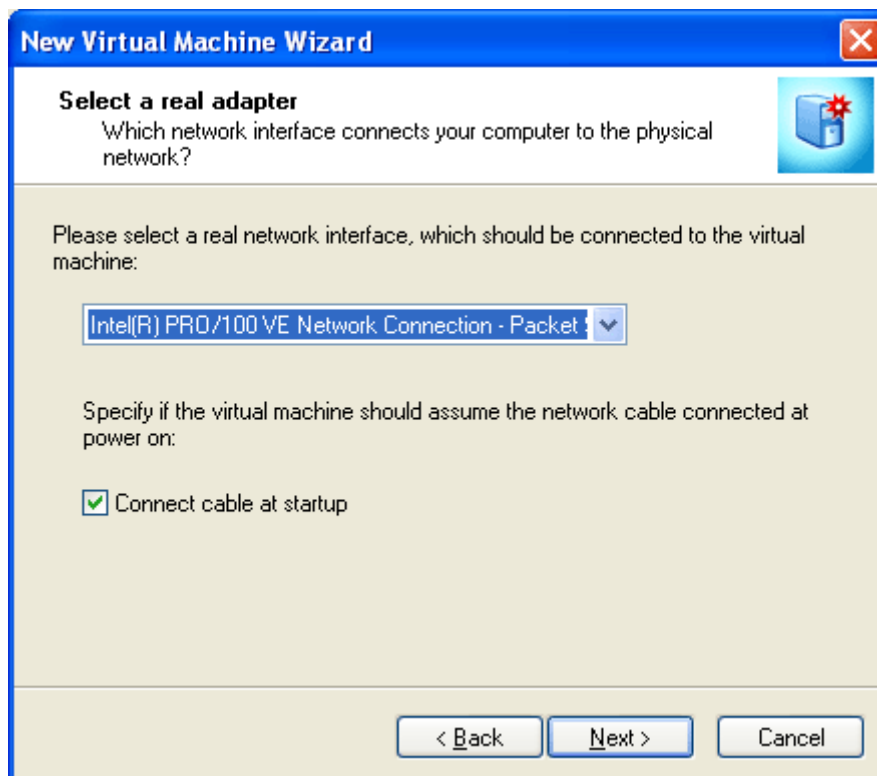
Select **Host-only Networking** if you want to create a virtual network or you don't want to access network outside your local computer. See Networking in Virtual Machine (see page 117) for detailed information about Bridged Ethernet and Host-only types of networking.

If you do not have physical network interface card or do not need network adapter in this Virtual Machine, select **Networking is not required** option.



Click **Next**. If you have selected **Host-only Networking** or **Networking is not required** proceed to the step 11 of the current instructions.

- 10** If you have selected **Bridged Ethernet** type of networking for the new machine, on this screen you should specify which real adapter should be connected to the virtual drive. Select one in the list and click **Next**.

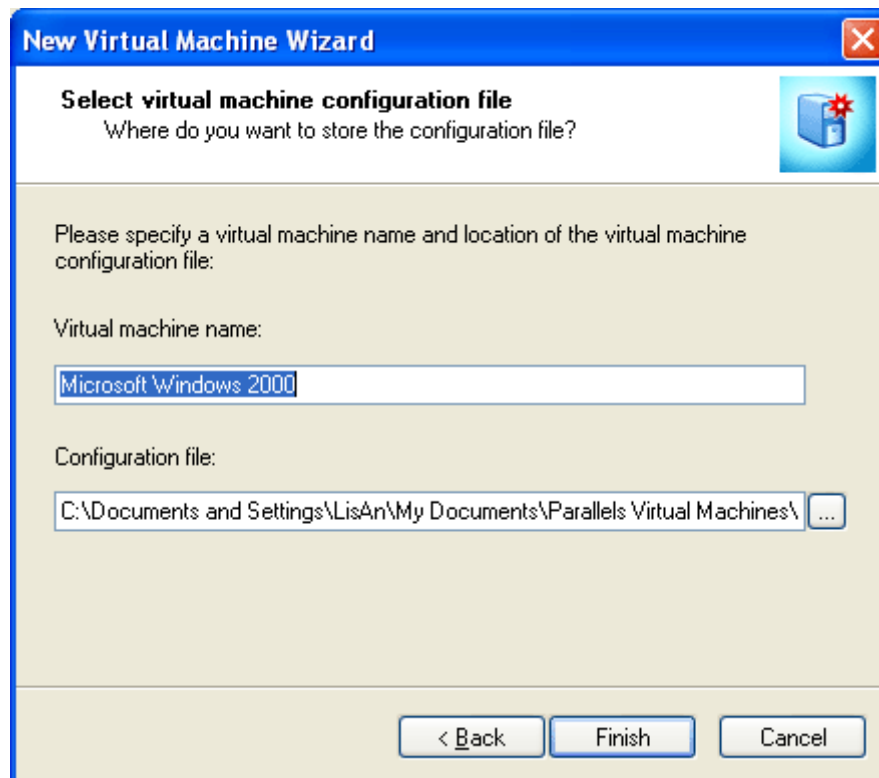


- 11** On the **Select virtual machine configuration file** screen you should determine the name of the Virtual Machine and folder where the Virtual Machine configuration file should be stored and with what file name.

Specify a descriptive name for the machine in the **Virtual machine name** field. The name should be no longer than 50 symbols.

In the **Configuration file** field the default path and name for the configuration file is shown. The Wizard offers to store the configuration file in the same folder with the new hard disk image (if you have created new virtual hard disk for the machine). The name of folder is described in the step 7 of the current instructions.

If you don't like the default name or path you may browse for the right folder and name, as well as make corrections in the field directly.



Click **Finish** after you specified the path and the name for the configuration file. If the folder does not exist the wizard displays notification: "Directory <name> does not exists. Do you want it to be created automatically?" Click **Yes**.

New configuration will be created and opened in the Parallels Workstation window.

Installing Guest OS

This section discusses how to install an operating system on a Virtual Machine. If guest operating system or its components needs specific conditions it is also described here.

Installing a Guest Operating System on a Virtual Machine

Before starting guest operating system installation, the Virtual Machine should be configured and the guest OS distributive should be connected to it. In addition to installation from real disks (CD/DVD or floppy), the guest OS distributive may reside in image file(s) (an .iso image of CD/DVD or an .fdd image of a floppy disk). Note that CD/DVD and floppy images can be made using the Parallels Image Tool included in Parallels Workstation distribution. See the Using the Parallels Image Tool (see page 154) chapter.

Note: To install a guest OS from any physical disk when running Linux primary OS, you should have system privileges to access the corresponding device of your host computer. Otherwise you will not be able to connect CD/DVD-ROM or floppy drive of your Virtual Machine to proper physical device.

General Steps:

- 1 Start Parallels Workstation.
- 2 Open or create a Virtual Machine configuration intended for installing guest OS.

To install from a physical CD/DVD or CD/DVD .iso image:

- 1 Select CD/DVD-ROM drive and open its options tab.

On the Virtual Machine property page (see page 46) click on the desired CD/DVD-ROM drive to open its CD/DVD-ROM Options (on page 104) in **Configuration Editor**. Make sure that the **Enabled** and the **Connect at startup** options are selected.

- 2 Connect the CD/DVD-ROM drive to the guest OS distribution.

If you install from a real CD/DVD:

Select the **Use real CD/DVD-ROM** and specify which real drive to connect to the virtual device in the **CD/DVD-ROM Drives** list.

Insert the CD/DVD disk with the operating system distribution into the appropriate drive of your computer.

If you install from an .iso image file:

Check the **Use image file** option and specify the path to the .iso distribution file in the **Image File** field.

- 3 Specify the IDE slot for the virtual CD/DVD-ROM. In the **Connect to** list select **0:1**.
- 4 Save the Virtual Machine configuration. See Saving Virtual Machine Configuration (see page 94) subtopic in the **Editing Virtual Machine Configuration** topic.
- 5 Start Virtual Machine by clicking **Power On**  on the toolbar. Follow the installation instructions for the operating system.

To install from a physical floppy disk or an .fdd floppy image:

- 1 Select floppy drive and open its options tab.
On the Virtual Machine property page (see page 46) click on the **Floppy** resource to open Floppy Options (on page 99) in **Configuration Editor**. On the options tab make sure that the **Enabled** and the **Connect at startup** options are selected.
- 2 Connect the floppy drive with the guest OS distribution.
If you install from a real floppy disk:
Select the **Use real floppy** option and specify which real drive to connect to the virtual device in the **Floppy Drives** list.
Insert the floppy disk with the operating system distribution into the appropriate drive of your computer.
If you install from an .fdd image file:
Check the **Use image file** option and specify the path to the .fdd distribution file in the **Image File** field.
- 3 Save the Virtual Machine configuration. See Saving Virtual Machine Configuration (see page 94) subtopic in the **Editing Virtual Machine Configuration** topic.
- 4 Start the Virtual Machine by clicking **Power On**  on the toolbar. Follow the installation instructions for the operating system.

When Installing on Non-empty Hard Disk

If you install a guest operating system onto a hard disk where guest OS was installed previously, you have to change booting sequence when configuring Virtual Machine for installation.

- On the **Booting Options** tab of the General Options (on page 95) set boot sequence to **CD-ROM, Hard Disk, Floppy** or **Floppy, Hard Disk, CD-ROM**, if you install from CD/DVD or floppy media respectively.

During installation when guest OS will be going to reboot for the first time, return boot sequence to booting from hard disk.

- When Virtual Machine is off, set **Hard Disk, Floppy, CD-ROM** sequence, save settings and start the guest OS.

Configuring X Window System in FreeBSD Guest OS

If you want to use X Window System graphic shell in FreeBSD guest OS, you should configure it manually. Running automatic configuration command `X -probeonly` or `X -configure` may not work. X Window System can be configured using `xorgconfig` text utility or `xorgcfg` graphical utility. You need `root` privileges to run them.

To start manual configuration:

- 1 Issue one of the following commands in the command line:

```
su -l root -c xorgconfig
```

or

```
su -l root -c xorgcfg
```

2 Enter the `root` password when you are asked for it.

When performing configuration set the following:

- 1** Select *Generic VESA compatible* video card.
- 2** Select *4096K* of video memory.
- 3** Select screen resolution for a color depth. You may specify single resolution for any color depth. For instance, specify 640x480 resolution for 8-bit color, 800x600 resolution for 16-bit color, and so on. Do not specify several resolutions for a color depth, because X Window on startup will select the greatest one.

You may set a single resolution for a specific color depth (for instance, if you are going to work with 16-bit color only, select any single resolution for it), and later select for your configuration only this specific color depth.

- 4** Select preferred color depth for your configuration.

CHAPTER 8

Installing Parallels Tools

Parallels Workstation includes specially developed tools that help you use your Virtual Machines in the most comfortable and efficient way. The current version of Parallels Workstation is supplied with tools for the following guest operating systems:

- Windows versions 95, 98, ME, NT, 2000, XP, 2003;
- OS2 and eComStation;
- Solaris.

We provide PRL8029 driver for Solaris guest OS that should be installed if you want the Solaris Virtual Machine to support networking.

Most of the tools are located on the CD image `VMTOOLS.ISO`, however OS/2 network drivers that are conveniently installed during guest OS installation are also located on the floppy disk image `VMTOOLS.FDD`. Both CD and floppy images can be found in the directory, where Parallels Workstation is installed.

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Windows NT Tools Installation	73
OS/2 and eComStation Tools Installation.....	75
Solaris Network Driver Installation	77
Upgrading Parallels Tools in Parallels Workstation 2.0 Virtual Machine	78
Uninstalling Parallels Tools in Windows Guest OSes	79

Parallels Tools Overview

Tool	Description
Clipboard Synchronization Tool	The Clipboard Synchronization Tool syncs the guest OS clipboard and the primary OS clipboard, allowing you to easily exchange texts and pictures between the primary OS and the guest OS. Currently you can exchange with only .bmp pictures having up to 128KB size. In you enable the Clipboard Synchronization Tool in all of your guest OSes, all of them will share the same clipboard with primary OS. In all the Windows guest OSes this tool is installed automatically when you perform Parallels Tools installation. In OS/2 and eComStation you must install it manually.
Time Synchronization Tool	The Time Synchronization Tool allows guest OS to keep the same system time as the primary OS. Without this tool the guest OS system time may differ from the primary OS system time. This tool also allows you to maintain a constant difference between the guest OS system time and the primary OS system time. You may configure this tool while guest OS is running. See the Time Synchronization Tool Options (see page 143) to learn how to do it. Note that before starting the Parallels Time Synchronization Tool any other time synchronization services must be stopped in order to avoid potential conflicts.
Video Driver	The best graphical mode available in Windows NT and 2000 guest operating systems without this driver is 16-color VGA with 640x480 resolution. The video driver allows Parallels Workstation to use SVGA graphical modes in guest OS monitors. In Windows XP/2003 the video driver is required for mouse tool and is chosen automatically when you select the mouse tool installation. Note that if you install video driver you would not be able to use VGA modes. To return to VGA you should uninstall the Parallels Tools.

Tool	Description
Mouse Synchronization Tool	The Mouse Synchronization Tool enables the mouse to be captured and released without a special hot key combination defined in the Hot Key Combinations (see page 87) tab of the Preferences window. Using this tool makes mouse movements smoother and improves system reaction on mouse. This tool is especially effective when running Parallels Workstation on a remote terminal.
Sound Driver	Parallels Tools pack includes AC'97 sound driver for those guest operating systems that do not contain standard AC'97 driver. Sound drivers for Windows XP/2003 are not included into Parallels Tools pack since these operating systems contain sound drivers in their installations.
Disk Compacting Tool	Parallels Workstation uses virtual hard disks of the two types, plain and expanding. Expanding virtual disks grow in size as you work with them. The Disk Compacting Tool reduces the size of expanding virtual hard disks by cleaning up unused disk space. See Compacting Virtual Disk (see page 149) for guidelines on using this tool. This tool does not reduces the size of plain virtual disks.
Network Adapters and Drivers:	
Parallels Network Adapter Driver	This Ethernet driver for RTL8029 adapter is specially developed for Parallels Workstation to improve network performance. We recommend that you install this driver whenever it is possible.

Tool	Description
▪ RTL8029	CD with Parallels Tools includes native Realtek (all except for Solaris driver) drivers for RTL8029 network adapter for many different operating systems. They are located in the <code>Drivers\Network\RTL8029</code> directory of the <code>vmtools.iso</code> CD image. Some guest operating systems, for instance Windows 2000, contain an RTL8029 driver in their distributions, whereas others like Windows 2003 and OS/2 do not include this driver at all. Note. Unlike other guest OSes Solaris guest OS requires RTL8029-compatible driver to be installed to support networking. Otherwise networking will be impossible. RTL8029-compatible driver for Solaris has been created by an independent developer and is distributed under the terms of BSD license. Slightly modified version of this driver is included into Parallels Workstation 2.1 distribution.

The table below shows which tools for which guest operating system have been developed.

	Clipboard	Time	Video	Mouse	Sound	Disk Compacting	Network Adapters and Drivers:	
							Parallels Network Adapter Driver	RTL8029
Win 95	+	+	+		+	+		+
Win 98	+	+	+		+	+		+
Win ME	+	+	+		+	+		+
Win NT	+	+	+		+	+		+
Win 2000	+	+	+	+	+	+	+	+
Win XP	+	+	+	+		+	+	+
Win 2003	+	+	+	+		+	+	+
OS/2 & eCS	+			+	+			+
Solaris								+
Other guest OSes								+

In Windows guest OSes you can control the tools during guest OS execution. See the Parallels Tools Center (see page 141) section to learn how to do this.

Windows Tools Installation

To install Parallels Tools in Windows guest OS do the following:

- 1 Make sure that the Virtual Machine configuration includes a CD/DVD-ROM drive and it is enabled (the **Enabled** checkbox is selected). See CD/DVD-ROM Options (on page 104).
- 2 Start your guest operating system and log in. In order to install tools properly do not begin the installation until OS completes its startup and you log in.
- 3 Select the **Install Parallel Tools** in the Parallels Workstation **VM** menu.
- 4 You are warned about necessity of having guest OS fully started and being logged in: "You can install the Parallels Tools only if the guest operating system is running and you are logged in. If you are not logged in now, select Cancel and run Parallels Tools installation later." If you are logged in, click **OK** to start installing.
- 5 Parallels Tools Setup wizard starts and greets you. Click **Next** to move to **Choose Destination Location** screen. If you do not like the default directory, select another one using **Change** button. Then click **Next**.
- 6 On the **Setup Type** screen you should choose between the *complete* setup and a *custom* one. The complete setup installs all of the tools available for your guest OS. If you select custom setup, **Select Components** screen asks you to select desired tools from all the tools available for your guest OS.
- 7 Choose the program folder on the **Select Program Folder** screen, then **Check Setup Information** screen displays the options selected. If they are correct, click **Next** to begin the installation.
- 8 After the wizard copies tools, **Installation Completed** screen asks if you want to restart the computer now. In all of the Windows guest OSes except 98 and NT you must restart Virtual Machine after this setup procedure. Accept the selected option and click **Finish**. The Virtual Machine will be restarted and ready for work with the tools installed.

Notes: 1. In Windows 98 guest OS Sound Driver requires additional steps to perform after this setup. Proceed to Windows 98 Sound Driver Installation (see page 73).

2. In Windows NT guest OS proceed to Windows NT Tools Installation (see page 73) to complete setup in this guest OS.

Troubleshooting When Installing Tools

Parallels Tools installation is invoked by Windows AUTORUN feature for CD/DVD-ROM drive. It is enabled by default, however if you have disabled it manually, nothing happens after you select **Install Parallels Tools** command. (In any way `vmtools.iso` CD image will be connected to the Virtual Machine CD-ROM drive, however it is not visible for user.) To solve this problem do one of the following:

- Enable AUTORUN function for CD-ROM drive in guest Windows.
- Start tools installation manually.

Open the contents of the `vmtools.iso` in Windows Explorer, find `PrlTools.exe` file, and start it.

Windows 98 Sound Driver Installation

Sound Driver for Windows 98 guest OS requires additional steps to perform immediately after the general Parallels Tools installation described in the Windows Tools Installation (on page 72) topic.

To install AC'97 Sound Driver in Windows 98:

- 1 Open the Control Panel. To do this, click the Start system menu, select the Settings item, and then Control Panel.
- 2 Double click the System icon to open the System Properties window. In the System Properties window select the Device Manager tab.
- 3 Locate the PCI Multimedia Audio Device in the hardware list. Select it and click the Properties button.
- 4 In the PCI Multimedia Audio Device Properties window click the Reinstall Driver button.
- 5 In the Update Device Driver Wizard select the Sound, video and game controllers list item and click the Next button.
- 6 In the second wizard screen select the second option, Display a list of all the drivers in a specific location, so you can select the driver you want, and click Next.
- 7 On the screen asking you to select type of device click Next button.
- 8 In the next wizard screen click the Have Disk button. The Install From Disk window is opened, in the Copy manufacturer's file from: field type the following path "C:\Program Files\Parallels\Parallels Tools\Sound" and click OK.
- 9 In the Select Device window select the AC'97 Audio and click OK.
- 10 In the Update Device Driver Wizard click the Next button. When wizard asks, insert disc (or connect CD-ROM image file) with your Win98 distribution and type path to it in the field Copy files from. Click OK button. After wizard finishes copying files, click Finish button in its window.
- 11 Close the windows with AC'97 audio properties and system properties.
- 12 Restart the Virtual Machine if wizard asks you to do this for the new settings to take effect.

Windows NT Tools Installation

To install Parallels Tools in Windows NT:

- Perform the installation procedure described in the Windows Tools Installation (on page 72) topic. It is enough to install such tools as Clipboard Synchronization and Mouse Synchronization Tools.
- Perform the specific steps for Windows NT Video Driver and Sound Driver stated below.

Video Driver Installation

To install the Video Driver do the following:

- 1 Open the Control Panel. For this click the **Start** system menu, select the **Settings** item, and then **Control Panel**.

- 2 Double click the **Display** icon to open the **Display Properties** window.
- 3 In the **Display Properties** window select the **Settings** tab. Then click the **Display Type** button.
- 4 In the **Display Type** window select the **Change** button.
- 5 In the **Change Display** window select the **Manufacturers --> Parallels** and **Display --> Parallels Video Driver**. Click **OK**.
- 6 In the **Third-party Drivers** window click **Yes**.
- 7 **Installing Driver** window informs you about successfully completed installation. Click **OK**.
- 8 Click **Close** button in the **Display Type** window.
- 9 Click **Close** button in the **Display Properties** window.
- 10 Click **Yes** button in the **System Settings Change** window to restart the guest OS.

Note: You must restart Virtual Machine after this setup procedure.

AC'97 Sound Driver Installation

To install AC'97 Sound Driver do the following:

- 1 Open the Control Panel. For this click the **Start** button in the system menu. Then select the **Settings** item, and then **Control Panel**.
- 2 Double click the **Multimedia** icon to open the **Multimedia Properties** window.
- 3 In the **Multimedia Properties** window select the **Devices** tab. Then select the **Audio Devices** from **Multimedia devices:** tree. Click **Add** button.
- 4 In the **Add** window select the **Unlisted or Updated Driver** from **List of Drivers**. Click **OK**.
- 5 In the **Install Driver** window click the **Browse** button and select the sound driver path.
If you have installed Parallels Parallels Tools to the default location, select **C:\Program Files\Parallels\Parallels Tools\Sound**.
If you have installed Parallels Tools to another directory, you should locate this directory.
Click **OK**. Then click **OK** in the **Install Driver** window.
- 6 In the **Third-party Drivers** window click **Yes**.
- 7 **Add Unlisted or Updated Driver** window informs you that you are about to install AC'97 Audio Driver. Click **OK**.
- 8 Click **OK** in the **About AC97 Audio Driver** window.
- 9 Click **OK** in the **System Settings Change** window.
- 10 Click **Close** button in the **Display Type** window.

Note: You must restart Virtual Machine after this setup procedure.

OS/2 and eComStation Tools Installation

All of the OS/2 and eComStation tools can be installed from `vmtools.iso` CD image. Network drivers can also be installed from the floppy disk during operating system installation. The latter is easier in most cases.

Before starting the installation you should connect the CD-ROM image with Parallels Tools to your Virtual Machine CD-ROM drive. Do the following:

- Select **Install Parallels Tools** in the Parallels Workstation **VM** menu.

Mouse Synchronization Tool Installation

The Mouse Synchronization Tool consists of the mouse driver and the video filter.

Note: To install the Mouse Synchronization Tool you should have a VESA video driver installed, such as SDD or GENGRADD. For instructions on how to do this refer to OS/2 documentation.

To install the mouse tool:

- 1 Click the **Drives** icon on the system panel. Select the CD-ROM drive and **Drivers\Mouse\OS2** directory on it.
- 2 Launch the `INSTALL.COM` batch file. The `INSTALL.COM` copies files and makes necessary modifications to the `CONFIG.SYS` file.
- 3 Restart the guest OS/2 operating system.

Note: Mouse Synchronization Tool increases performance of the guest OS/2 operating system under Citrix.

Clipboard Synchronization Tool Installation

In OS/2 and eComStation you must launch the Clipboard Synchronization Tool manually. This tool is not a tool itself but an ordinary application, and should be treated as such. If you want the Clipboard Synchronization tool to start automatically when your guest operating system is started:

- include the tool file `Pr1Clip.exe` into autostart group (`startup.cmd` file or else, as it is done in your operating system).

Clipboard Synchronization Tool is located in the **ClipBrd\OS2** directory on CD-ROM with Parallels Tools.

Sound Driver Installation

Note: Before installing Sound Driver you should have multimedia support installed in OS/2 guest OS.

To install the Sound Driver do the following:

- 1 Click the **System Setup** icon on the system panel.

- 2 Select **Install/Remove** line, and then select **Multimedia Application Install**.
- 3 In the **IBM Multimedia Presentation Manager/2 - Installation** window choose CD-ROM drive, then **Drivers\Sound\OS2** directory. Select **ALC Codec** feature and click **Install** button.
- 4 Restart the OS/2 guest operating system.

Network Driver Installation

Below we consider the installation of the Realtek RTL8029 driver inside the OS/2 Warp version 4.0.

- 1 Click the **System Setup** icon on the system panel.
- 2 Click the **MPTS Network Adapters and Protocol Services** icon to open the **Multi-Protocol Transport Services** window.
- 3 Click **Configure**.
- 4 In the **Configure** window that opens, click **Configure** again to open the **Adapter and Protocol Configuration** window.
- 5 Click **Other adapters** button below the **Network Adapters** section of the window to open the **Copy Additional Network Adapter Drivers** window.
- 6 Specify the path to the Parallels driver on CD-ROM disc image. The path should be:
`<CD-ROM drive>\Drivers\Network\RTL8029\NDIS20S2`
- 7 Click **OK**. The Parallels network adapter driver will be copied. After this you can see the name **RTL8029 PCI Ethernet Adapter** included in **Network Adapters** list. Select this name.
- 8 Click **Change** in the **Network Adapters** section of the window to change the current network adapter into the selected one.
- 9 Click **OK** when the prompt message "Are you sure you want to change this network adapter?" is displayed. After you click OK, the **RTL8029 PCI Ethernet Adapter** appears in the appropriate field of the **Current Configuration** section of the window. Now if you click **Edit** in the **Current Configuration** section of the window, you will see that you do not need to configure any this driver properties, because it is self-configurable.
- 10 Click **OK** when finished.
- 11 Close both the **Configure** and **Multi-Protocol Transport Services** windows.
- 12 Click **Exit** in **Update CONFIG.SYS** window.

Exit the configuration program and restart guest OS.

Solaris Network Driver Installation

Unlike other guest OSes Solaris does not support RTL8029 network driver emulated in virtual machines. To add RTL8029 support to a Solaris Virtual Machine you need to install RTL8029 network adapter driver. We have created the special `network.sh` script that helps you to do this, or you may install and configure the driver manually. Both ways are described below.

Before Installing the Driver

Before installing the driver perform the following steps:

- 1 Make sure that the Virtual Machine configuration includes a CD/DVD-ROM drive and it is enabled. See CD/DVD-ROM Options (on page 104).
- 2 Start your guest operating system.
- 3 Connect the CD image with tools, `vmtoolsd.iso`, to CD/DVD-ROM drive of the Virtual Machine:
 - right-click the CD/DVD-ROM icon on the status bar and select **Connect image** menu item (instead you may select **Devices/CD/DVD-ROM <number> --> Connect Image** in Parallels Workstation menu);
 - browse for `vmtoolsd.iso` in the folder where you installed Parallels Workstation.

Proceed to installing RTL8029 network driver using the `network.sh` script or manually.

To install RTL8029 network driver using `network.sh` script:

- 1 In the shell, run the
`cd /cdrom/PRLTOOLS/Drivers/Network/RTL8029/SOLARIS/`
 command to move to the respective directory.
- 2 Issue the following command to begin installing the driver
`./network.sh`
- 3 You are sequentially informed that the driver is being extracted, compiled and installed. When it is finished, you are asked "Will you receive IP addresses from DHCP server?" If IP addresses on your network are managed by DHCP server proceed to step 4, otherwise proceed to step 5.
- 4 If IP addresses on your network are managed by DHCP server, type "Y" and the script will configure the DHCP client. Proceed to step 6.
- 5 If IP addresses on your network are NOT managed by DHCP server, type "N" and then specify an IP address for your Virtual Machine, network address, network mask, and default gateway IP address when you are asked for them.
- 6 Restart the guest operating system by issuing the command
`init 6`

To install RTL8029 network driver manually:

- 1 In the shell, issue the following command to get `root` privileges:
`su`

Enter the password to the `root` account when you are asked for it.

2 As a `root` run the following commands:

```
cd /tmp
gzcat /cdrom/PRLTOOLS/Drivers/Network/RTL8029/SOLARIS/ni0.8.11.tgz | tar
xf -
cd ni-0.8.11
/usr/ccs/bin/make install
./addni.sh
```

3 If IP addresses on your network are managed by DHCP server issue the following commands:

```
touch /etc/hostname.ni0
touch /etc/dhcp.ni0
```

If IP addresses on your network are NOT managed by DHCP server, see the Solaris System Administration Guide.

4 Leave the `root` account by running the command

```
exit
```

5 Restart the guest operating system by issuing the command

```
init 6
```

Upgrading Parallels Tools in Parallels Workstation 2.0 Virtual Machine

If you have a Virtual Machine which is:

- created by Parallels Workstation 2.0,
- with Windows 98/ME/NT/2000/XP/2003 guest OS installed,
- with Parallels Tools provided for Parallels Workstation 2.0 installed

you may use Parallels Tools Center and the newly developed tools, such as Time Synchronization Tool, after upgrading Parallels Tools. To upgrade Parallels Tools:

- 1 Make sure that the Virtual Machine configuration includes a CD/DVD-ROM drive and it is enabled (the **Enabled** checkbox is selected). See the CD/DVD-ROM Options (on page 104).
- 2 Start your guest operating system and log in. In order to install tools properly do not begin the installation until OS completes its startup and you log in.
- 3 Select the **Install Parallel Tools** in the Parallels Workstation **VM** menu.
- 4 You are warned about necessity of having guest OS fully started and being logged in: "You can install the Parallels Tools only if the guest operating system is running and you are logged in. If you are not logged in now, select Cancel and run Parallels Tools installation later." If you are logged in, click **OK** to start installing.
- 5 Parallels Tools Setup wizard starts and informs you that you have the Parallels Tools 2.0 already installed in your Virtual Machine and they will be updated. Click **Next** to move to the **Setup Type** screen.
- 6 In the **Setup Type** screen you should choose between the *complete* setup and a *custom* one. The complete setup installs all of the tools available for your guest OS. If you select custom setup, **Select Components** screen asks you to select desired tools from all the tools available for your guest OS.

- 7 In the **Ready to Install** screen you are able to return back to review installation settings. When you are ready, start installation by clicking the **Install** button.
- 8 After the wizard copies tools, **Installation Completed** screen asks if you want to restart the computer now. Accept the selected option and click **Finish**.

Windows NT

In Windows NT guest OS, readmes for continuing installation of the video and audio drivers will be opened. Close them since re-installation of the drivers is not needed.

Uninstalling Parallels Tools in Windows Guest OSes

To uninstall Parallels Tools in all Windows guest operating systems except Windows NT and sound driver for Windows 98, you should activate the same wizard as when installing. Do the following:

- 1 Select **Install Parallel Tools** in the Parallels Workstation **VM** menu.
- 2 Parallels Tools Setup wizard performs the diagnostics of the operating system and asks **Do you want to completely remove the selected application and all of its components?** Click **Yes** to begin the process.
- 3 After the wizard removes the tools, the **Uninstallation Completed** window asks if you want to restart the computer now. Accept the selected option and click **Finish**. The Virtual Machine will be restarted.
- 4 After the OS is started up, the **System Settings Change** screen asks **Do you want to restart your computer now?** Click **Yes**. When the Virtual Machine is restarted once more, the tools are completely uninstalled.

Note: After uninstalling Parallels Tools and restarting the Virtual Machine, the guest operating system may display a warning that it should be restarted once more. In this case restart the guest operating system one more time to ensure its correct functioning.

Uninstalling Sound Driver for Windows 98

The sound driver for Windows 98 can be uninstalled by installing another sound driver.

Uninstalling Tools in Windows NT

In Windows NT Parallels Tools can be uninstalled using standard operating system techniques.

CHAPTER 9

Managing Virtual Machines

This chapter discusses multiple ways to change a Virtual Machine configuration and provides information on setting user preferences, using virtual disks, and creating a host-only network.

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Setting Parallels Workstation Preferences

Settings that affect more than one Virtual Machine, such as default directory for storing Virtual Machine files, memory used by all simultaneously running Virtual Machines, and others, are collected under the single menu entry. To edit general preferences click **Preferences** in the Parallels Workstation **Edit** menu.

Common, user interface preferences, and hot key combinations are assigned for each user. Memory and network preferences concern all users that work on a particular computer and all Virtual Machines they launch.

Common Preferences

Settings on this tab can be different for each user of your computer.

Workspace:

Default directory for virtual machines. A directory proposed by Parallels Workstation to a user for saving new configuration files and hard disk images is specified on this tab in the **Default directory for virtual machines** field. It is possible to choose another location when creating configuration file or hard disk image.

Two options, **Load last VM** and **Show dialog if no last VM is loaded**, determine what happens on Parallels Workstation startup. By default both options are selected and the application starts with the last used Virtual Machine configuration opened. If this configuration is already opened by another instance of Parallels Workstation or the configuration file cannot be found on the given path (for instance, it have been moved to another folder or deleted), then **Startup Options** dialog is opened on Parallels Workstation startup.

If the **Load last VM** option is selected while the **Show dialog if no last VM is loaded** option is turned off, Parallels Workstation will open a blank Virtual Machine on startup if it is unable to open the last used Virtual Machine.

If **Load last VM** option is not selected while **Show dialog if no last VM is loaded** is turned on, Parallels Workstation always starts with Startup Options dialog.

If both options are turned off, the Parallels Workstation starts with a blank Virtual Machine.

More information about what happens during Parallels Workstation startup can be found in the Selecting and Opening Virtual Machine (on page 91) and Startup Options Dialog (see page 93) topics.

Automatically check for updates setting controls an auto-update feature checking period. Specify *Every day*, *Every week*, or *Every month* to perform automatic check for update with that period. By choosing *Don't check* you disable the auto-update. See Auto-Updating Parallels Workstation in Windows (see page 31) or Auto-Updating Parallels Workstation in Linux (see page 37) for auto-update feature description.

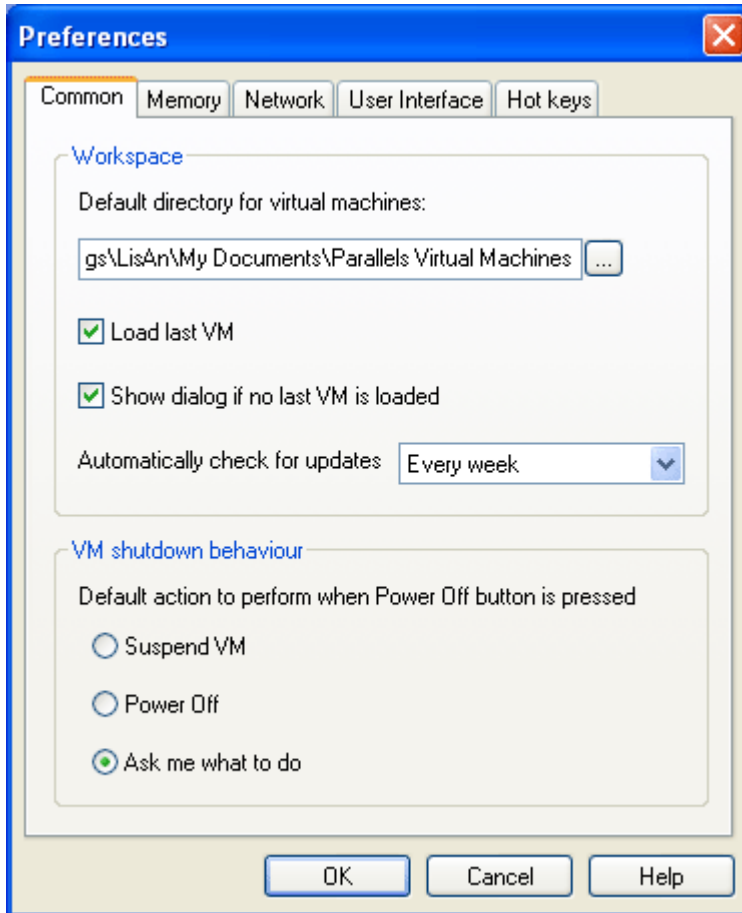
VM shutdown behaviour:

Radio buttons in this group control the reaction on pressing the **Power Off**  button on the Parallels Workstation toolbar.

- If you definitely want that all Virtual Machines should be suspended, select the **Suspend VM** radio button.
- If you definitely want that all Virtual Machines should be stopped, select the **Power Off** radio button.
- When you are unsure if you want Virtual Machines to stop or suspend on the action, select the **Ask me what to do** radio button. You will be asked to choose an action to perform with Virtual Machine every time you press the **Power Off**  button.

See the Suspending Virtual Machine (see page 134) topic to learn about suspending/resuming Virtual Machines.

Common tab in Windows primary OS looks as follows:

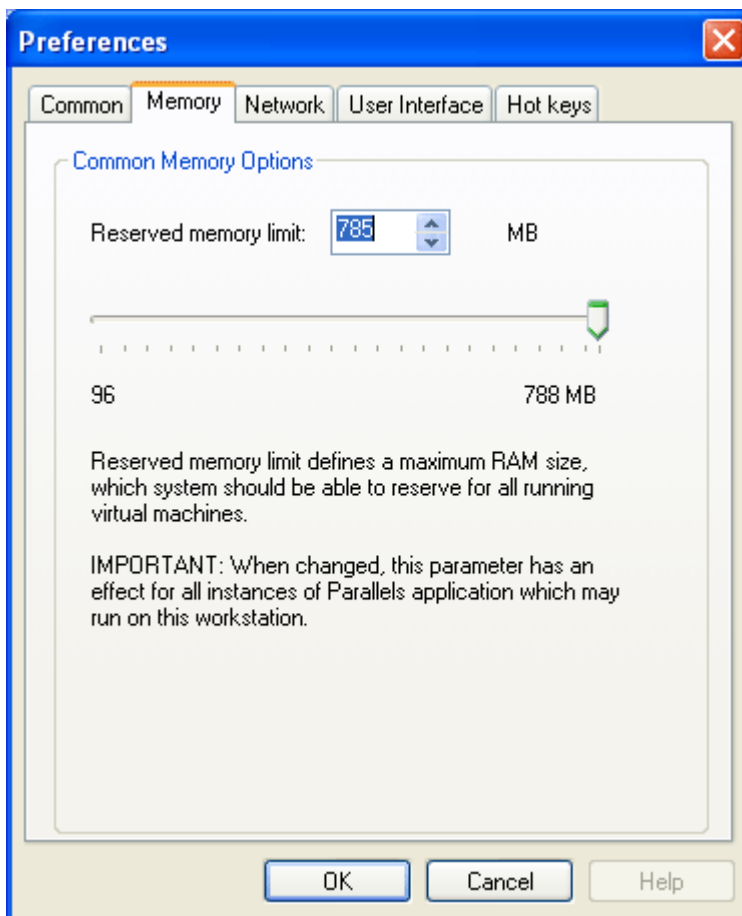


Memory Preferences

On this tab maximum amount of physical memory (RAM) that system should reserve to all simultaneously running Virtual Machines on your computer can be adjusted. This setting applies to all users of your computer.

The maximum memory allowed depends on physical RAM size of your computer. Some memory must be reserved for your primary operating system. From the remainder you can select the maximum RAM allowed for Parallels Workstation. If you have one instance of Virtual Machine running, it may use all the memory allocated here. In case of several simultaneously running Virtual Machines this memory will be shared between them. Memory for a specific Virtual Machine is set on the Memory tab (see page 98) in **Configuration Editor**.

Memory amount should be multiple of 4. If it doesn't then you will receive error notification when trying to save memory options. To set an appropriate memory amount you may use the slider, the spin buttons in the **Reserved memory limit** field, or type a value directly into the field.



Network Preferences

Parallels Workstation provides host-only network accessible only to a primary system and virtual machines running on it. Methods of configuring different types of host-only network are discussed in the Creating Host-Only Network (see page 118) topic.

The **Network** tab is intended for specifying a range of IP addresses to be assigned to Virtual Machines by Parallels DHCP server when configuring host-only network with dynamic IPs.

The **Scope start address** and **Scope end address** values determine the first and the last IP addresses. First address of this scope DHCP server usually assigns to itself. The second address is usually given to the primary system. Others are assigned to Virtual Machines. **Scope start address** and **Scope end address** should belong to the same subnet.

Subnet mask should be set in the **Scope mask** field.

Note. Before changing DHCP scope settings make sure that there is no virtual machine running in Host-only networking mode.

To check the networking mode of a running Virtual Machine:

- 1 Point the mouse cursor to the network adapter icon  in the status bar,
- 2 Check the **Mode** line in the inscription.

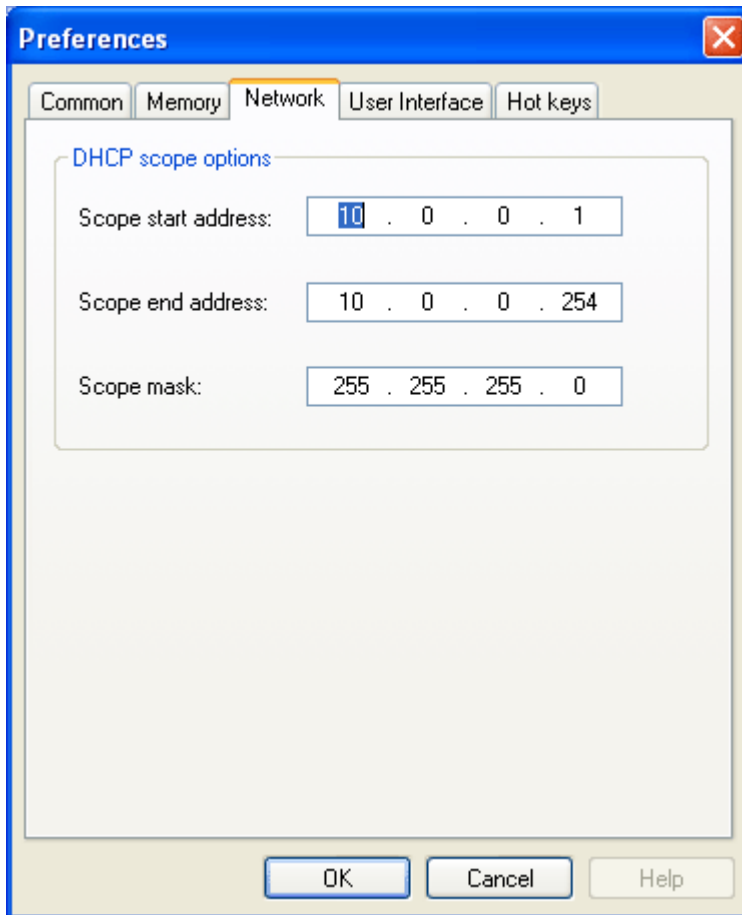
Changing Network Preferences in Linux Primary OS

To edit settings on this tab in Linux primary OS you need `root` privileges. Users with other than `root` privileges can only view them.

To edit settings on the **Network** tab:

- 1 In the Terminal, run the command
`su -c parallels`
 to get `root` privileges. Enter the password to the `root` account when you are asked for it.
- 2 Start Parallels Workstation by issuing the command
`parallels`
- 3 In the Parallels Workstation menu, select **Edit/Preferences/Network** and enter new settings on the **Network** tab.
- 4 Close Parallels Workstation.
- 5 In the **Terminal**, run the
`exit`
 command to leave the `root` account.

- 6 Start Parallels Workstation as a normal user to continue work with it.



User Interface Preferences

User interface preferences can be different for each user of your computer.

Linux primary OS:

Parallels Workstation for Linux allows user to select preferable font, its size and other parameters to be used in system dialogs. Click **Browse** button near **Dialog font** field and choose new font if you wish to.

To restore the default font and its size use the **Default font** button.

To disable tooltips deselect **Show tooltips** checkbox which is selected by default.

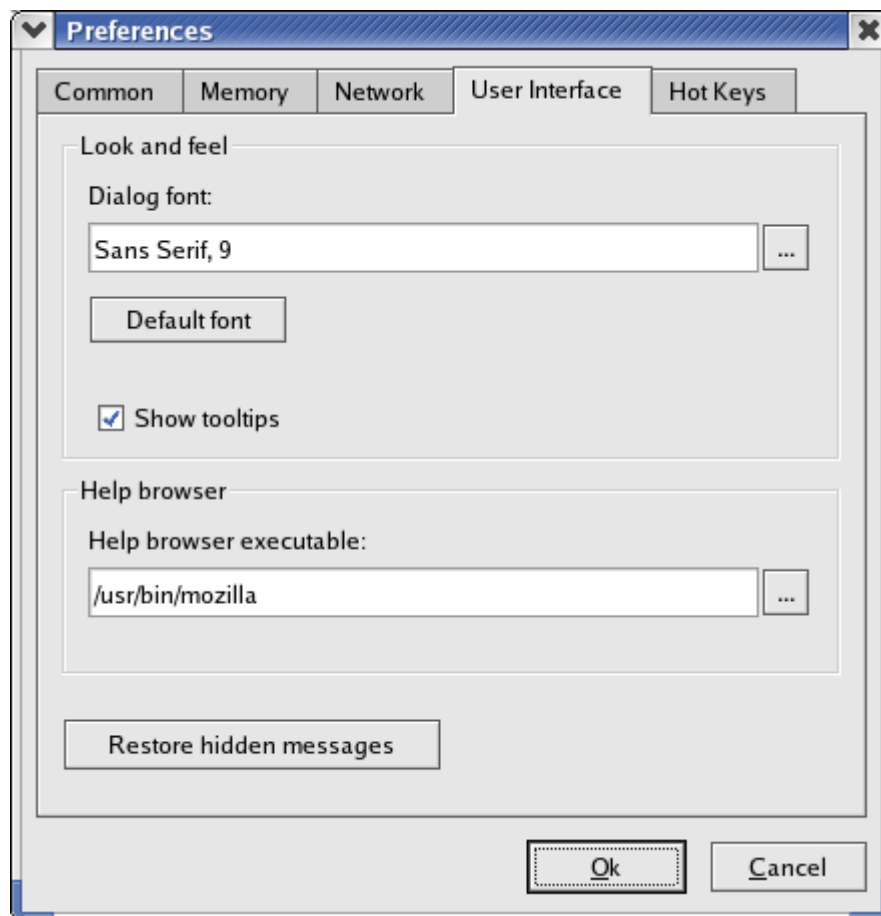
The **Help Browser Executable** field shows the path to an executable file of web browser used for displaying help for Parallels Workstation. By default help is displayed in Mozilla web browser. If it is not installed on your computer or you prefer another browser, locate its executable file using browse button.

Windows and Linux primary OSES:

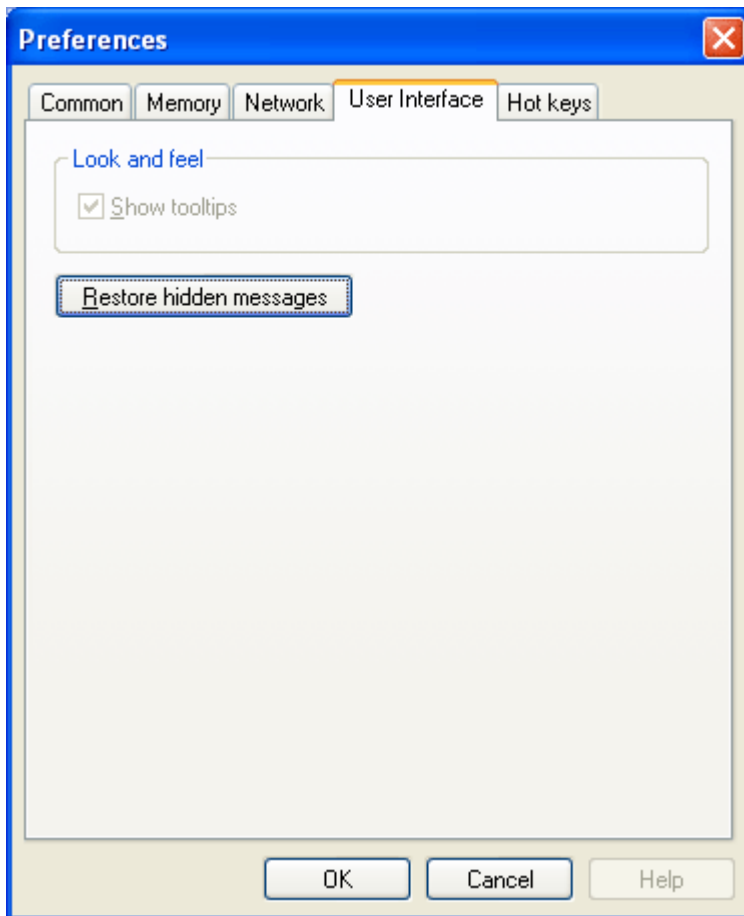
If the Parallels Workstation wants to attract user's attention to an operation that is going to be performed or to some situation, it displays a message that contains a description and a **Do not show this message again** checkbox. If you select this checkbox, in the same situation the message would not be displayed. **Restore hidden messages** button on this tab allows to reactivate all suppressed messages.

The system does not allow to suppress messages reporting potentially dangerous situations.

The appearance of the **User Interface** tab in Linux primary OS:



The appearance of the **User Interface** tab in Windows primary OS:



Hot Key Combinations

Parallels Workstation allows to define two hot key combinations:

- For releasing a keyboard and mouse that are captured in the Virtual Machine screen. The default hot key is **Ctrl+Alt**.
- For switching a Virtual Machine screen from the Parallels Workstation default window size to the fullscreen mode and back. The default hot key is **Alt+Enter**.

You can set your own hot key combinations different for each case. Key combination should include one or more special keys (**Ctrl**, **Alt** and **Shift**), plus an ordinary key can be added.

To define new key combination, you should perform the following operations:

- Select checkboxes of one or more special keys;
- To add an ordinary key select the **Custom** checkbox, place input focus to the field for an ordinary key (the extreme right field), then press the key you want to use on your keyboard.

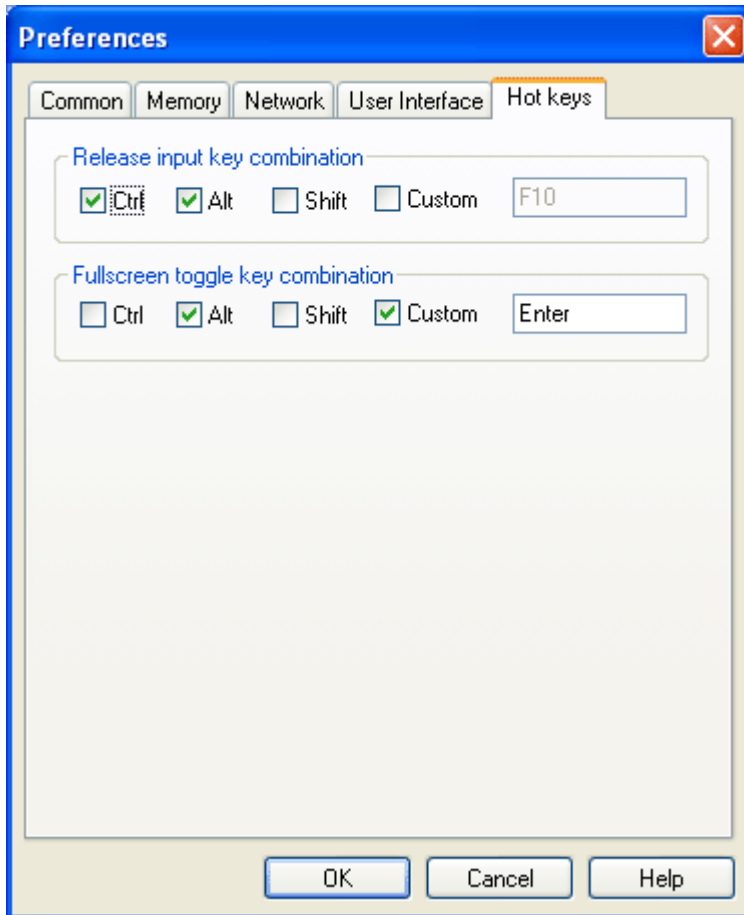
Some keys and key combinations are prohibited to assign as Parallels Workstation hot keys.

In Windows primary OS: The **Tab** and the **Pause** keys are prohibited to use as custom keys.

In Linux primary OS: The Pause key is prohibited to use as a custom key and also the following key combinations are prohibited since they are Linux OS hot keys:

- Ctrl+Alt+Backspace
- Ctrl+Alt+ any key in the range of F1-F12, i.e. Ctrl+Alt+F1 - Ctrl+Alt+F12

Hot key combinations can be different for each user of your computer.



Notes. 1. You can free the mouse and the keyboard from the virtual machine screen without pressing hot key combination, if you install the Parallels Tools. See Installing Parallels Tools (see page 68) section to learn if this package is available for your guest operating system, and Capturing and Releasing the Keyboard and the Mouse (see page 131) topic.

2. See also Switching a Virtual Machine to Fullscreen Mode (on page 132) for information on running Virtual Machine in fullscreen mode.

Using Virtual and Real Disks

In this section all types of disks handled by Parallels Workstation virtual machines are discussed.

Hard Disk Images

File Type

The current version of the Parallels Workstation creates and uses only virtual hard disks stored in .hdd files. The size of virtual disk can be set within the range from 20 MB to 128 GB.

Physical hard disks are inelegible to use. To transfer data from real hard drive to Virtual Machine, an image of a real hard drive can be made using Parallels Image Tool (see page 154).

Format of The Virtual Disk

A virtual hard disk can be one of the two formats: **plain** or **expanding**.

plain Disk of this format occupies all the allocated space right from the moment it is created. It takes more space on the real hard disk and more time to create as compared with an expanding virtual hard disk, but allows guest OS to operate faster.

expanding Disk of this format is small initially and grows as you add applications and data to the Virtual Machine. It takes less time to create and saves disk space.

We recommend that you use the Disk Compacting Tool to keep the size of the expanding disk as small as possible and save space on the host hard disk. See the Compacting Virtual Disk (see page 149) topic.

Disk format is set when you create a hard disk image. If you need to change disk format after the hard disk file is created, a copy of the disk in another format can be made using Parallels Image Tool (see page 163).

Hard disk images of both formats are stored in .hdd files, however structure of disk file is different. Format of the virtual hard disk is displayed in the **Disk format** field on the Advanced (see page 102) tab of **Hard Disk Options**.

Creating New Virtual Hard Disk

A new virtual hard disk is created and attached to the new Virtual Machine when creating a custom Virtual Machine (see page 57) if you select **Create a new virtual hard disk** option on the step 6.

To add new virtual hard disk to an existing Virtual Machine use Add Device Wizard (see page 114).

You may also replace current virtual hard disk in an opened Virtual Machine configuration by a new one using **Recreate** button on the Hard Disk Options (see page 101) tab in **Configuration Editor**.

Besides creating new empty disk, an image of a real hard drive with all the data inside can be created using Parallels Image Tool (see page 154). This feature is intended mainly for migrating data from real hard drive to Virtual Machine.

Floppy Disks and Disk Images

Parallels Workstation can access real floppy disks, or create and use floppy image files that appears to Virtual Machine floppy drive as real diskettes. Floppy disk images used by Parallels Workstation have the `.fdd` format.

An `.fdd` image of a real diskette can be created using Parallels Image Tool (see page 154), a special tool for creating images of different real media that is installed along with Parallels Workstation. Blank floppy disk image can be created using **Recreate** button on the Floppy Options (on page 99) tab of the Configuration Editor.

CD/DVD Real Discs and Images

Parallels Workstation can access real CD/DVD discs, or create and use CD/DVD images files that appear to CD/DVD-ROM drive of a Virtual Machine as real discs. Parallels Workstation uses CD/DVD discs in `.iso` format. Images in this format can be created by many applications, particularly by Parallels Image Tool (see page 154), a special tool for creating images of different real media that is installed along with Parallels Workstation.

There is a set of limitations on using CD/DVD-ROMs in Parallels Workstation in that it allows the use only of single-session CD and DVD-ROMs. Multisession disks cannot be handled. Sound from audio CDs cannot be reproduced. Neither CD nor DVD discs can be written.

Selecting and Opening Virtual Machine

When you launch Parallels Workstation, the last used Virtual Machine is opened by default. This option is controlled by the **Load last VM** setting on the Common tab (see page 81) of the **Preferences** window. You may turn this option off, to start Parallels Workstation with **Startup Options** dialog, which is discussed in the separate topic Startup Options Dialog (see page 93), or with blank Virtual Machine. In these cases last used machine can be opened via recently used list.

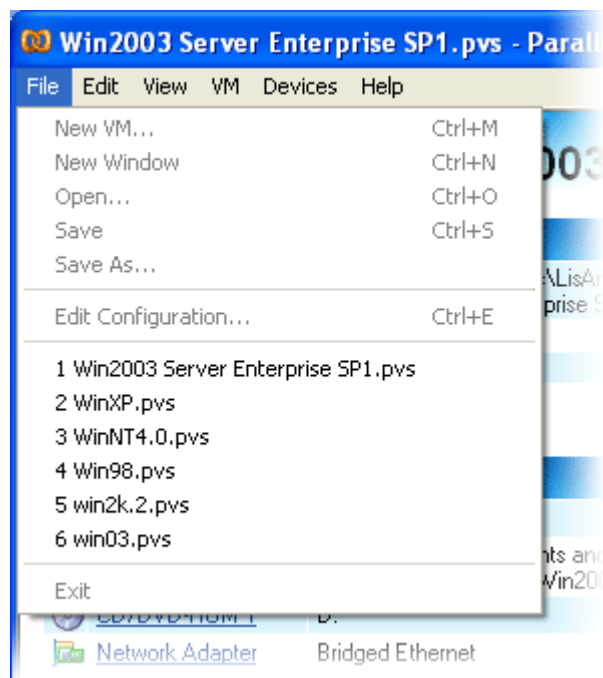
The ways to open Virtual Machines other than the last used one are the following:

- List of recently used configurations;
- Browsing hard disk for a configuration;
- Open Virtual Machine in a new window.

Opening Recently Used Configuration

The list of recently used configurations in the **File** menu displays six most recently used configuration files. Use this method to open a Virtual Machine you recently worked with.

If the required Virtual Machine is not shown in the recently used list, you may find it browsing hard disk for its configuration file manually.



Browsing Hard Disk for a Configuration

To select a Virtual Machine that is not represented in the recently used list, you should perform the following operations:

- 1 Click the  icon on the Command Button panel at the bottom of the Parallel Workstation window or select **Open** in the **File** menu.
- 2 Browse for a desired configuration file and click **OK**. After the configuration file is opened, its file name appears in the Parallels Workstation title bar, name of Virtual Machine and full configuration file name with path are displayed on the property page (see page 46).

Opening Virtual Machine in a New Window

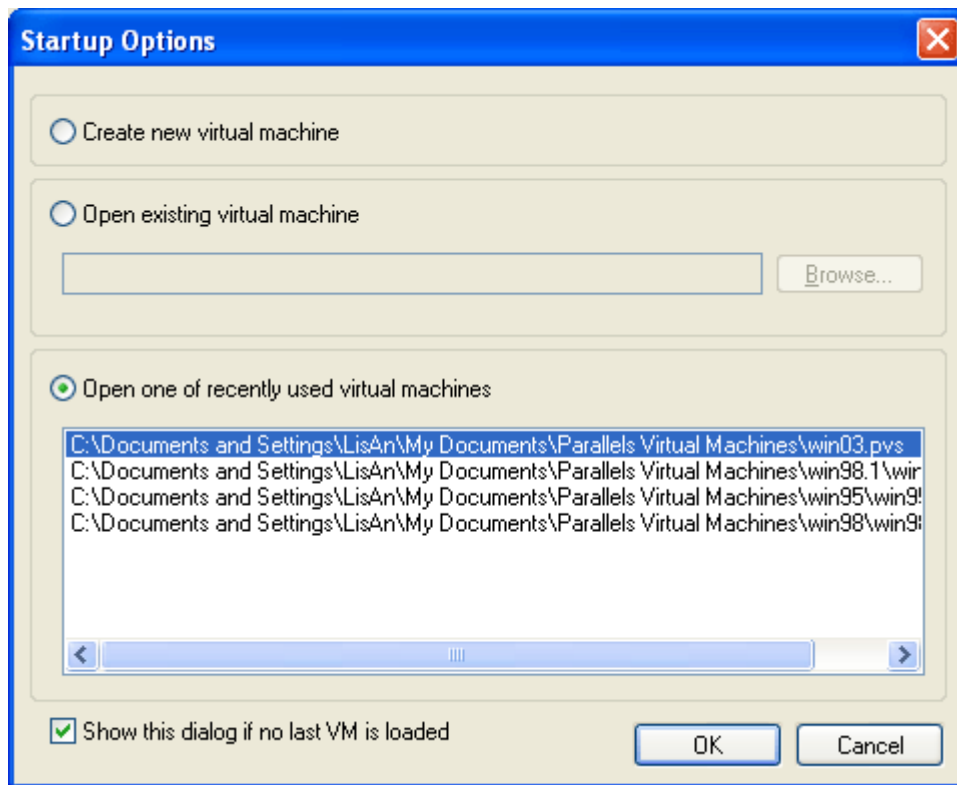
You may open an additional instance of the Parallels Workstation using menu item of the current Parallels Workstation window. To do this:

- Select **New Window** command in the **File** menu.

Since last used Virtual Machine is blocked by that Parallels Workstation instance where you issue this command, new window is opened with the Startup Options (see page 93) dialog, if the appropriate option is selected on in the **Common** tab of the **Preferences** window, or with a blank Virtual Machine.

Startup Options Dialog

Startup Options dialog that is displayed upon Parallels Workstation startup assists in easily opening Virtual Machine or proceeding to creation of a new one. If this is the first time you launch Parallels Workstation this dialog is opened automatically.



To open one of the recently used Virtual Machines, select **Open one of recently used virtual machines** option, then select one of the Virtual Machines in the window and click **OK**. List of the recently used Virtual Machines is empty when you launch Parallels Workstation for the first time.

To open an existing Virtual Machine that is not in the recently used list, select **Open existing virtual machine** option, then click **Browse** button and locate desired configuration file.

To create new Virtual Machine, select **Create new virtual machine** option and click **OK**. New Virtual Machine wizard (see page 52) will be opened.

If you close the window by clicking **Cancel** button, blank Virtual Machine will be opened.

The **Startup Options** dialog is displayed when you launch Parallels Workstation for the first time. Other cases of appearing the dialog depend on settings on the Common tab (see page 81) of **Preferences** window. By default both **Load last VM** and **Show dialog if no last VM is loaded** options on this tab are selected and the dialog is displayed when Parallels Workstation can not open the last used VM.

You may configure Parallels Workstation so that **Startup Options** dialog is opened on each startup. If **Show dialog if no last VM is loaded** is selected while **Load last VM** is not selected, the **Startup Options** dialog is always displayed when you launch the Parallels Workstation.

Show this dialog if no last VM is loaded option in this dialog is an analog of the **Show dialog if no last VM is loaded** option on the Common tab (see page 81) of **Preferences** window. Whenever you check/uncheck one of them, another is checked/unchecked automatically.

Editing Virtual Machine Configuration

Configuration of an existing Virtual Machine can be changed in the **Configuration Editor**. In this section we consider editing settings of devices already included in the configuration and general Virtual Machine settings. Adding and removing devices are discussed in the separate section, **Adding New Devices to Virtual Machine** (see page 114).

Changing Device Settings

To change device settings:

- 1 Open the Virtual Machine you wish to make changes to.
- 2 Display the **Configuration Editor** by clicking  button on the Command Button panel, or select **Edit Configuration** in the **File** menu, or just click device name in the **Resource Name** list.
- 3 Choose the hardware which parameters you want to alter in the left part of the Configuration Editor window. (**Options** resource contains general Virtual Machines settings.) Tabs corresponding to the selected resource are displayed.

Note: In Linux primary OS to be able to connect any virtual device to a real one, you should have system privileges to access real device. Otherwise real device will not appear in the list of available devices despite it is installed on your computer.

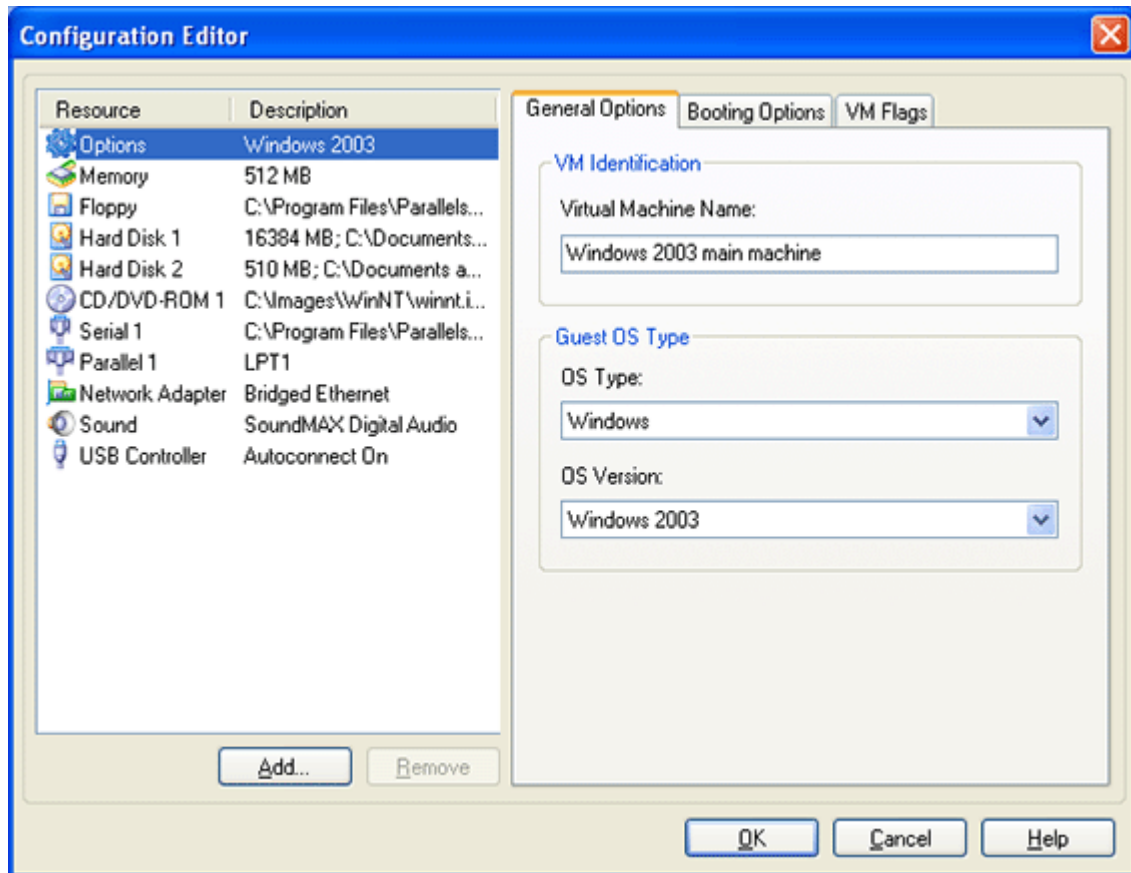
Saving Virtual Machine Configuration

After you have changed devices settings and are satisfied with them, save the Virtual Machine configuration:

- 1 Click **OK** on **Configuration Editor** screen, then click the  button on the Command Button panel or select **Save** in the **File** menu. The file will be saved in its current location and with the current name.
- 2 To save configuration into another location or with another name select **Save As** in the **File** menu. After you have saved the file, its new file name appears in the title bar, full new name with path appears on the property page (see page 46).

General Options

Under **Options** general Virtual Machine settings are collected.



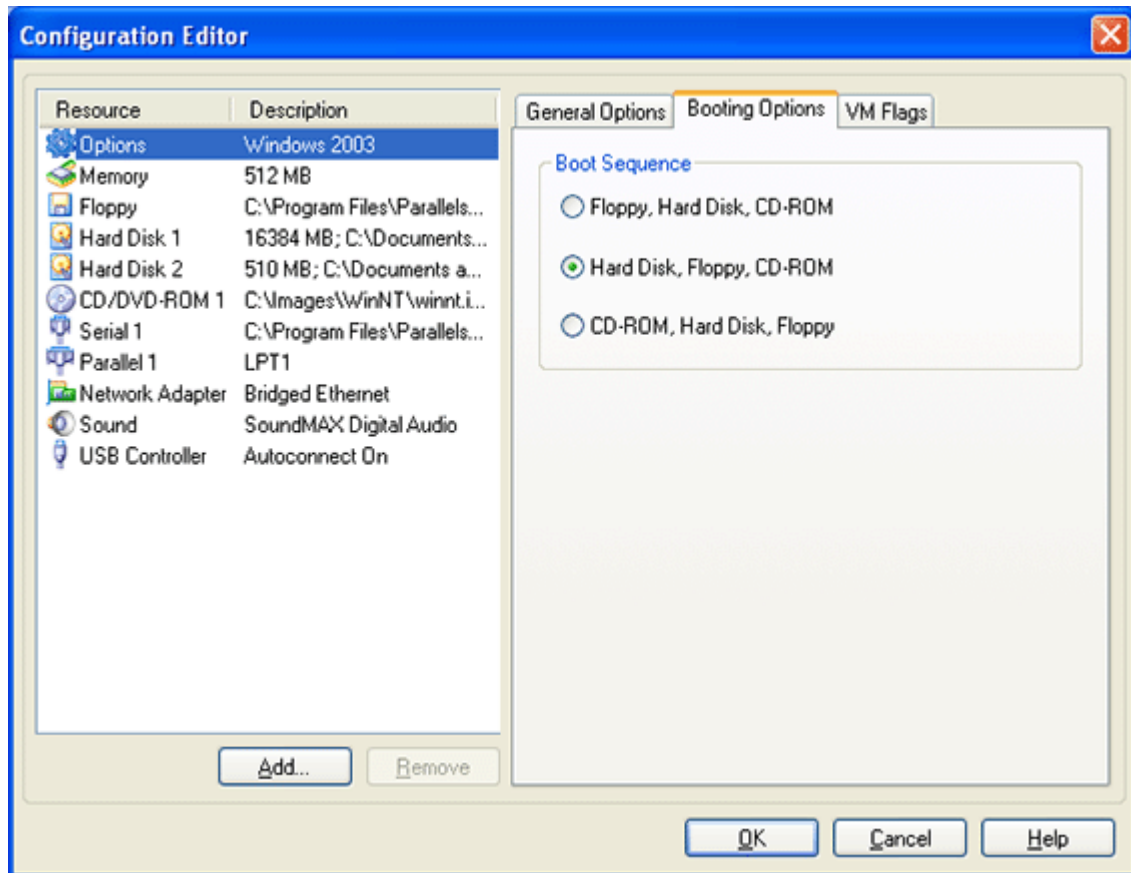
VM Identification:

Virtual machine name field shows the name of the machine that has been specified when creating and can be changed. Its name should be descriptive, and its length should be no more than 50 symbols. The name of the Virtual Machine is displayed on its property page (see page 46).

Guest OS Type:

Here you can specify an operating system to be installed on the Virtual Machine (if you didn't choose the right one while creating the machine or want to install another OS). Be careful to choose the right operating system. If settings on this tab do not correspond with the operating system actually installed this may cause problems varying from slow performance to work fail.

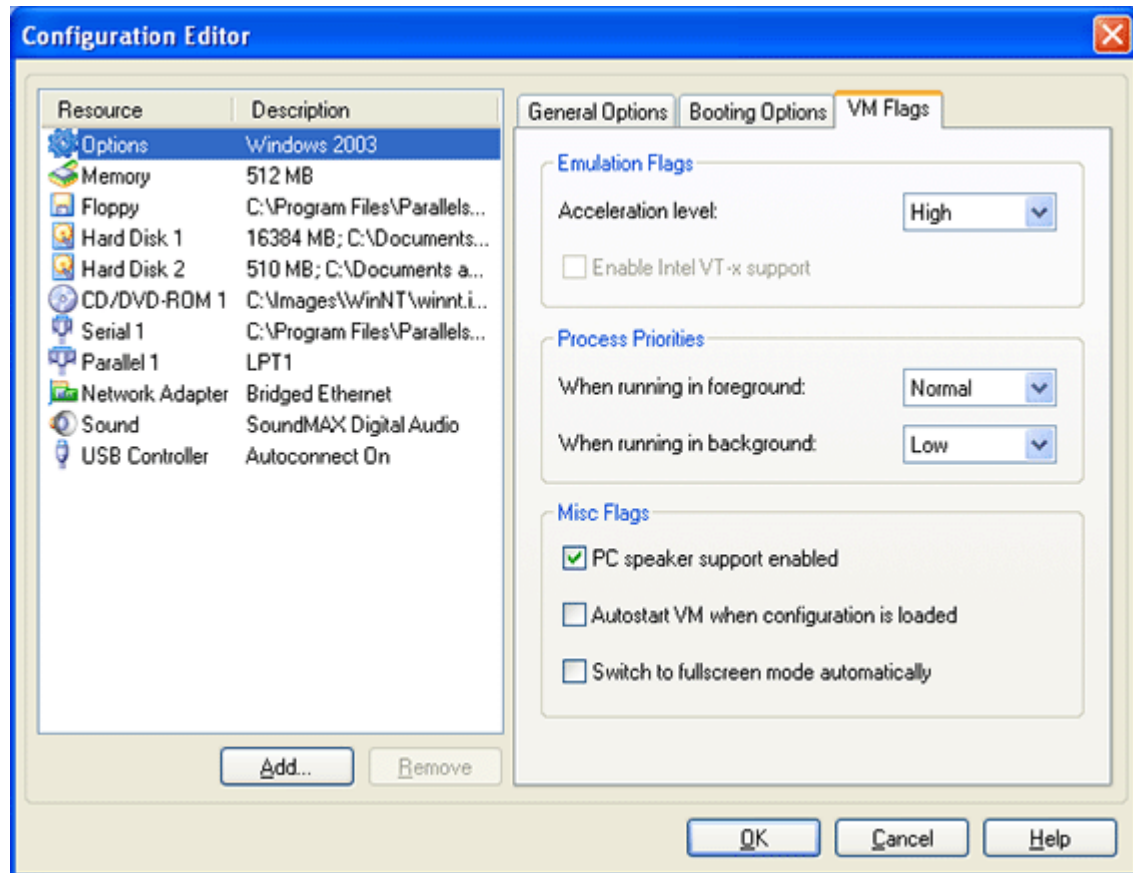
Booting Options



On the **Booting Options** tab you can select the order of devices from which the Virtual Machine will try to boot one-by-one. You can choose one of the three predefined sequences - [**Floppy, Hard drive, CD-ROM**], [**Hard drive, Floppy, CD-ROM**], [**CD-ROM, Hard drive, Floppy**]. During its startup, the Virtual Machine checks media in the first device of the boot sequence and tries to boot from it. If the media is not found or is not bootable, the Virtual Machine will proceed with the next device in the boot sequence, and so on.

Note: Please make sure that a boot disk (Floppy disk, Hard Disk, CD-ROM) is available and configured correctly. If you select a boot disk that does not exist, then after starting up the guest operating system and BIOS loading, you will see the error message “No boot device available, press ENTER to continue”. In this case, stop the guest operating system, correct the configuration of your floppy or the corresponding IDE drive and try to start again.

VM Flags



VM Flags tab contains various options that influence the performance of the Virtual Machine and startup configuration options.

Emulation flags:

Acceleration level. Acceleration enables a number of the guest OS specific performance optimization techniques. We recommend to select the *High* level. If you notice incorrect guest operating system behaviour while running with high acceleration, for example when installing software, shut the OS down and lower acceleration level. Note that without acceleration at all (*Disabled* level) the Virtual Machine runs very slowly. We recommend turning acceleration on after finishing the process that caused problems.

Enable Intel VT-x Support option is available for editing if you have Intel processor with Virtualization Technology on your host computer. By default VT-x support is enabled. See Intel Virtualization Technology (VT-x) Sup (see page 8)port to learn about VT-x support in Parallels Workstation. If you run guest OS with VT-x support, it is indicated in the **About Parallels Workstation** screen (see the Additional Information (see page 128) section).

Process priorities:

Note: Process priorities options are available in Windows primary OS only.

When running in foreground. This option specifies priority of the Virtual Machine process when running in the foreground mode, i.e. when the Virtual Machine window is active.

When running in background. This option specifies priority of the Virtual Machine process when running in the background mode, i.e. when the Virtual Machine window is inactive.

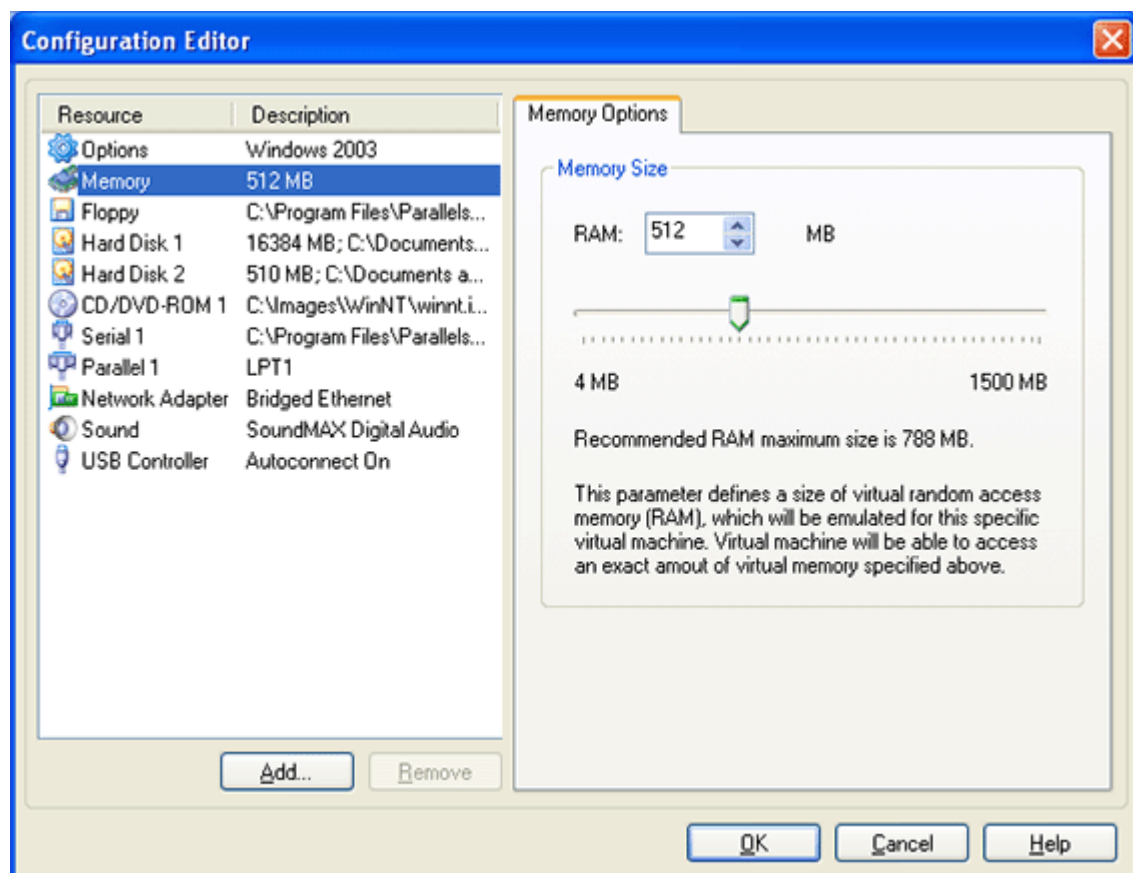
Misc flags:

PC speaker support enabled. If this option is enabled Virtual Machine can indicate its actions by PC speaker sounds.

Autostart VM when configuration is loaded. After you open the Virtual Machine configuration file, the VM will be automatically started.

Switch to fullscreen mode automatically. As soon as Virtual Machine is started, it will run in the fullscreen mode.

Memory Options



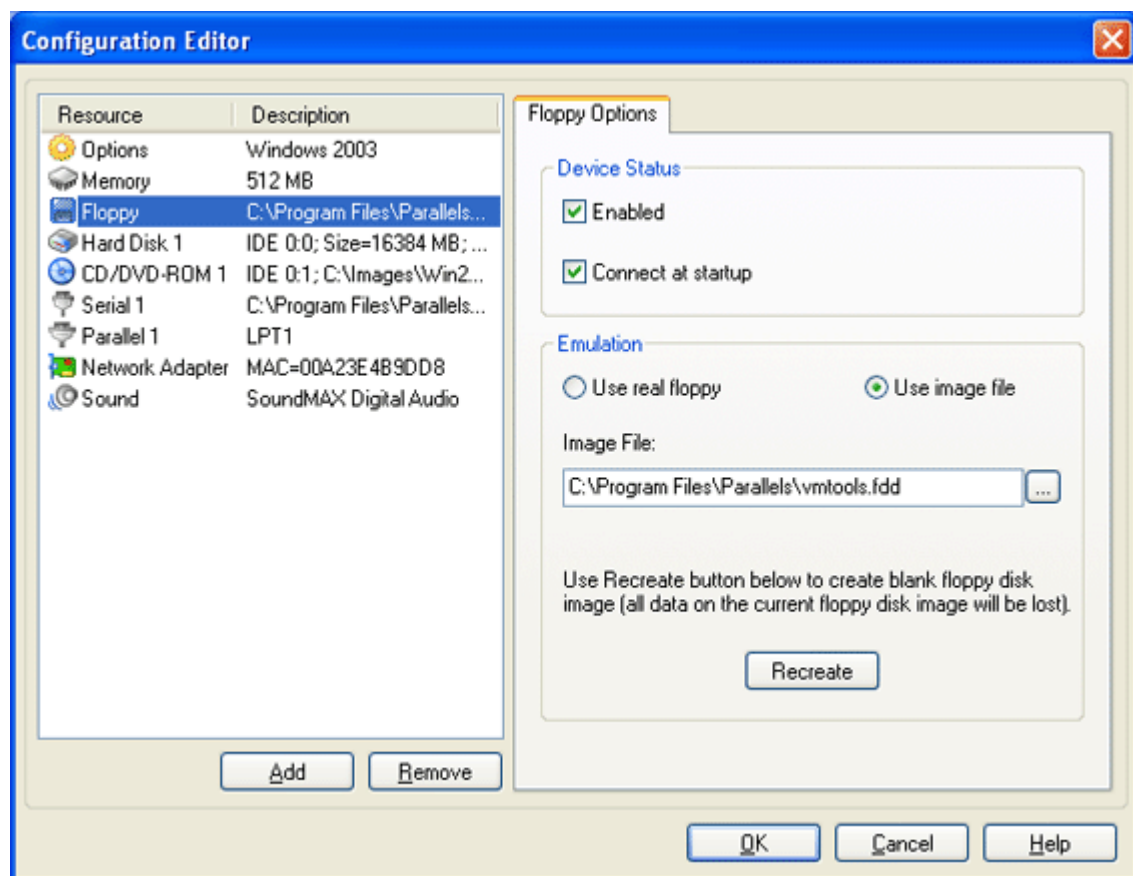
The **Memory Size** parameter describes the size of virtual memory (RAM) to be allocated for the the Virtual Machine. You can choose any value from 4 to 1500 MB. We recommend you not to exceed the recommended maximum because this is the limit of the physical RAM that your system should reserve for Virtual Machines. If this amount is not enough the redundant memory is swapped to disk, thus slowing down both guest OS and primary OS performance.

Recommended memory maximum size is specified on this tab below the slider. This value can be adjusted on the Memory tab (on page 83) in the **Preferences** window.

To set memory size for the current Virtual Machine use slider, spin buttons in the **RAM** field, or type a value directly into the field. Memory size should be multiple of 4. If it doesn't then when trying to save memory options you will receive an error notification.

Floppy Options

A Virtual Machine floppy disk drive can be connected to a real floppy drive as well as to floppy disk image. To get information on floppy disk images used by Parallels Workstation read Floppy Disk I (see page 90)images topic.



Device status:

To temporarily disable floppy drive operations without deleting it from configuration, deselect **Enabled** checkbox.

Note: If you start the operating system with the floppy drive disabled, you cannot change this option when Virtual Machine is running.

If the floppy drive is enabled, it can be connected/disconnected while VM is running. Media that the floppy drive accesses can also be changed.

To start guest OS with the floppy disk inserted, select the **Connect at startup** checkbox.

Emulation:

If you have the physical floppy drive(s) on your computer, then you can select **Use real floppy** radio button and the floppy device name will be shown in the **Floppy Drives** list. You can select one of them (for example, A:).

Note: In Linux primary OS to be able to connect Virtual Machine floppy drive to a real floppy drive, you should have system privileges to access real device. Otherwise real floppy will not appear in the list of available devices despite it is installed on your computer.

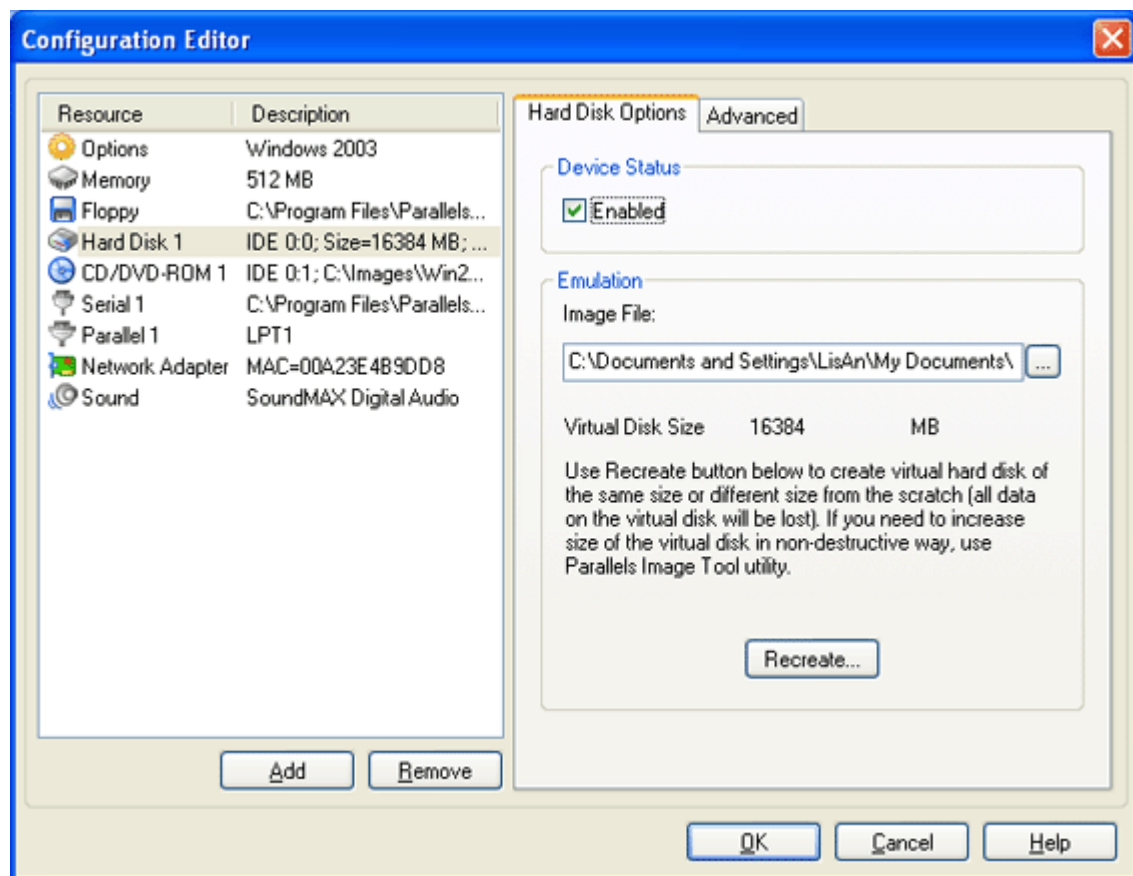
To use a floppy disk image (the `.fdd` file), select **Use image file** radio button. A new field, **Image File**, appears. Specify the path to a disk image file or click **Browse** button and locate the file.

Parallels Workstation allows to create blank floppy image. Type the file name in the **Image File** field and click **Recreate** button. The size of a floppy disk image equals 1.44 MB. The default extension for a floppy disk is `.fdd` and the corresponding file is created in the directory specified in the **Image File** field.

Hard Disk Options

The current version of the Parallels Workstation allows Virtual Machines to only use hard disk images in .hdd format. Read Hard Disk Images (see page 89) topic to get acquainted with disk format and other its options.

Up to four IDE devices (hard disks and CD/DVD-ROM drives) can be connected to a Virtual Machine currently. This means, that there can be no more than four hard drives plus CD/DVD-ROM drives, i.e., it doesn't matter how many of IDE devices will be hard drives and how many will be CD/DVD-ROMs.



Device status:

To temporarily disable operations with this hard drive without deleting it from configuration, deselect **Enabled** checkbox.

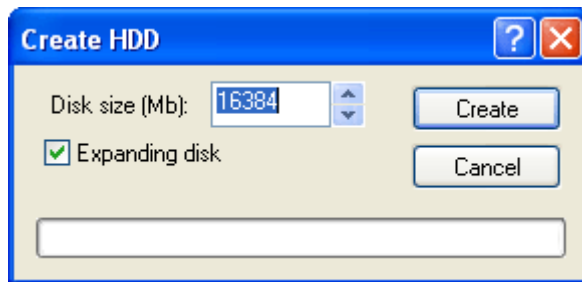
Emulation:

If you want to change hard drive connected to your Virtual Machine, you may choose another .hdd file in the **Image File** field.

Recreate button deletes an old hard disk and creates a new one. Use this opportunity if you want to create a disk from the scratch. If you want to replace current hard disk with a new one do the following:

- 1 Click **Recreate** button.

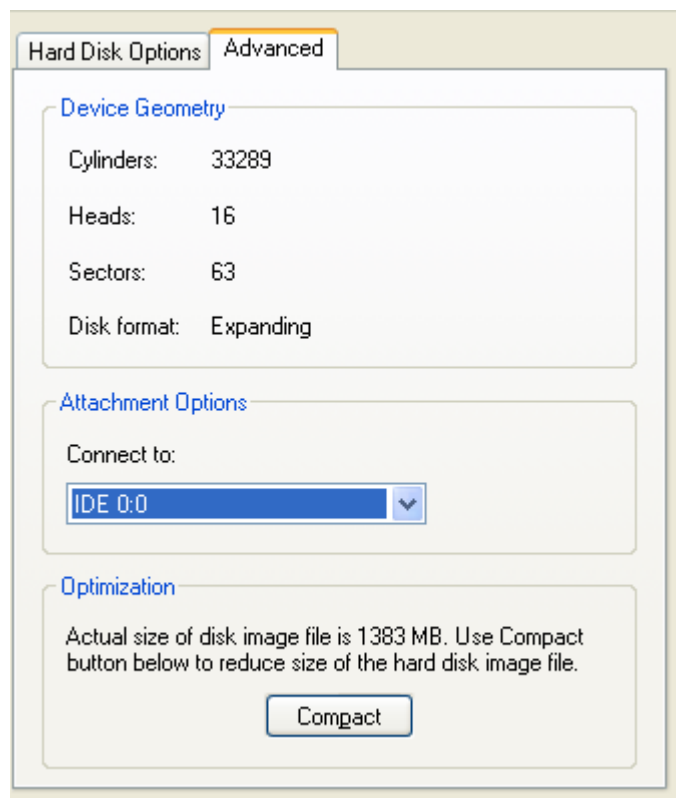
- 2 **Create HDD** window appears. You can specify **Disk size** and whether the disk should be expanding (see page 89) one or plain (see page 89) one. Select **Expanding disk** checkbox if you want the hard disk to be expanding.



- 3 Click **Create**.
- 4 You are asked to confirm that you are going to create a new disk instead of the old one. Click **Yes**. A new empty disk is connected to your Virtual Machine.

Note: If while using a hard disk you discover that its size is insufficient, you may increase disk capacity using the Parallels Image Tool (see page 154).

Advanced



Device Geometry:

Fields **Cylinders**, **Heads**, and **Sectors** in this group show geometry of a virtual HDD. Note that the geometry concerns virtual disk, not a real one where virtual disk is stored.

Disk format label indicates virtual hard disk format. See the Format of The Virtual Disk (see page 89) in **Hard Disk Images** topic.

Attachment Options:

Choose IDE slot to connect to the HDD image in the **Connect to** field. If you want the HDD to be startup one select *IDE 0:0*.

Note that if you set two startup drives at once - hard disk (IDE 0:0) and CD/DVD-ROM (IDE 0:1) - guest OS will try to boot according to sequence set on the Booting Options (see page 96) tab under the **General Options**.

Optimization:

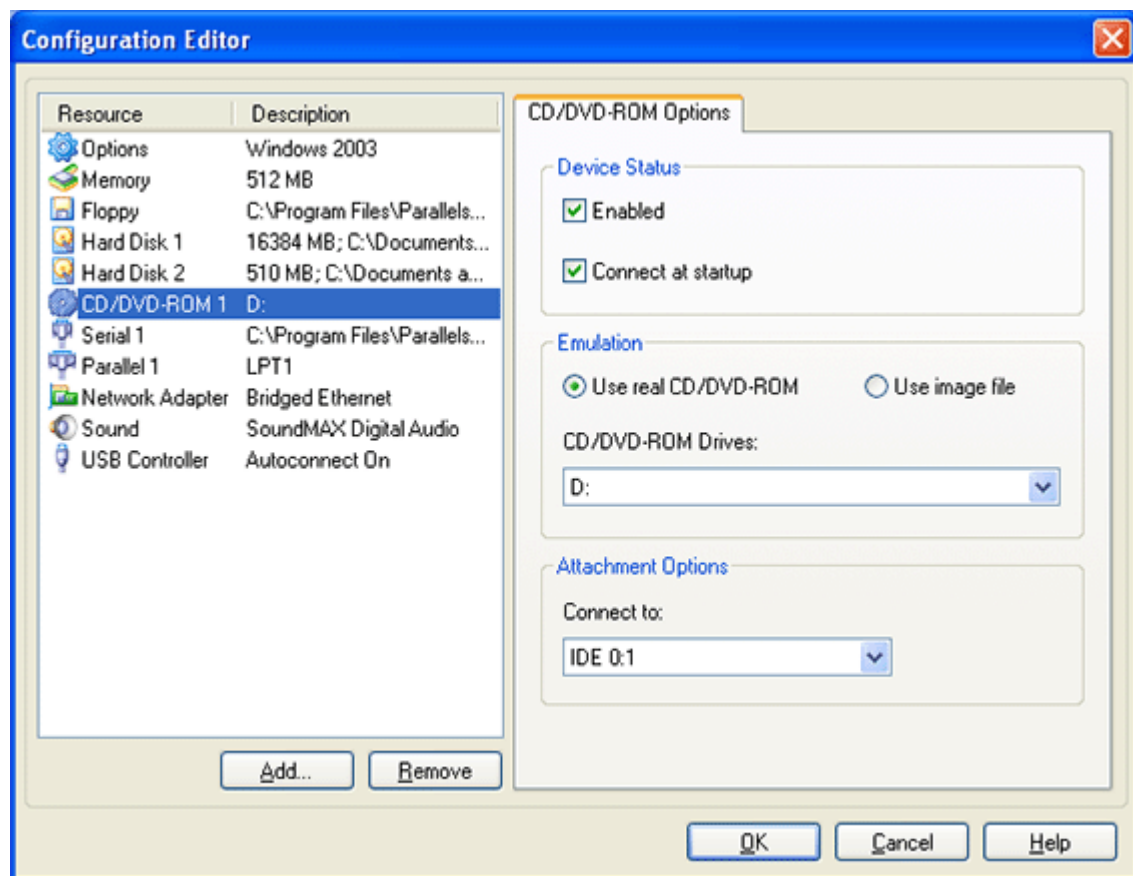
If the selected disk is an expanding-type disk, **Compact** button starts the process of compacting of the disk. See the Compacting Virtual Disk (see page 149) topic for information on this feature.

Compact button is disabled for plain virtual disks.

CD-ROM options

Virtual Machine CD/DVD-ROM drive can be connected to a real CD/DVD-ROM drive of your computer as well as to CD/DVD .iso image. To get information on using CD/DVD images in Parallels Workstation look in CD/DVD Real Discs and Images (see page 90) topic.

The current version of the Parallels Workstation allows up to four IDE devices (hard disks and CD/DVD-ROM drives) to be connected to a Virtual Machine. This means, that there can be no more than four hard drives plus CD/DVD-ROM drives, i.e., it doesn't matter how many IDE devices will be hard drives and how many will be CD/DVD-ROMs.



Device Status:

If you wish to temporary disable a CD/DVD-ROM drive without deleting it from configuration, deselect **Enabled** checkbox.

Note: If you start the operating system with the CD/DVD-ROM drive disabled, you cannot change this option when Virtual Machine is running.

If the CD-DVD-ROM drive is enabled, it can be connected/disconnected while VM is running. Media that CD/DVD-ROM drive access can be changed also.

If CD/DVD-ROM drive is enabled, you can select **Connect at startup** checkbox to start the guest OS with CD/DVD disc inserted.

Emulation:

If you have a physical CD/DVD-ROM on your computer, you can use it in the Virtual Machine. In this case, select **Use real CD/DVD-ROM** checkbox, the name of the physical CD/DVD-ROM (for example, D :) will be shown in the **CD/DVD-ROM drives** drop-down menu and available for selecting.

Note: In Linux primary OS to be able to connect Virtual Machine CD/DVD-ROM drive to a real CD/DVD-ROM drive, you should have system privileges to access real device. Otherwise real CD/DVD-ROM drive will not appear in the list of available devices despite it is installed on your computer.

If you want to use CD/DVD image (e.g., the .iso file), select **Use image file** flag. As you select it, another field where you can enter the CD/DVD image file name appears below. Specify the path to your CD/DVD image file or click the **Browse** button and locate the CD/DVD image file.

Attachment Options:

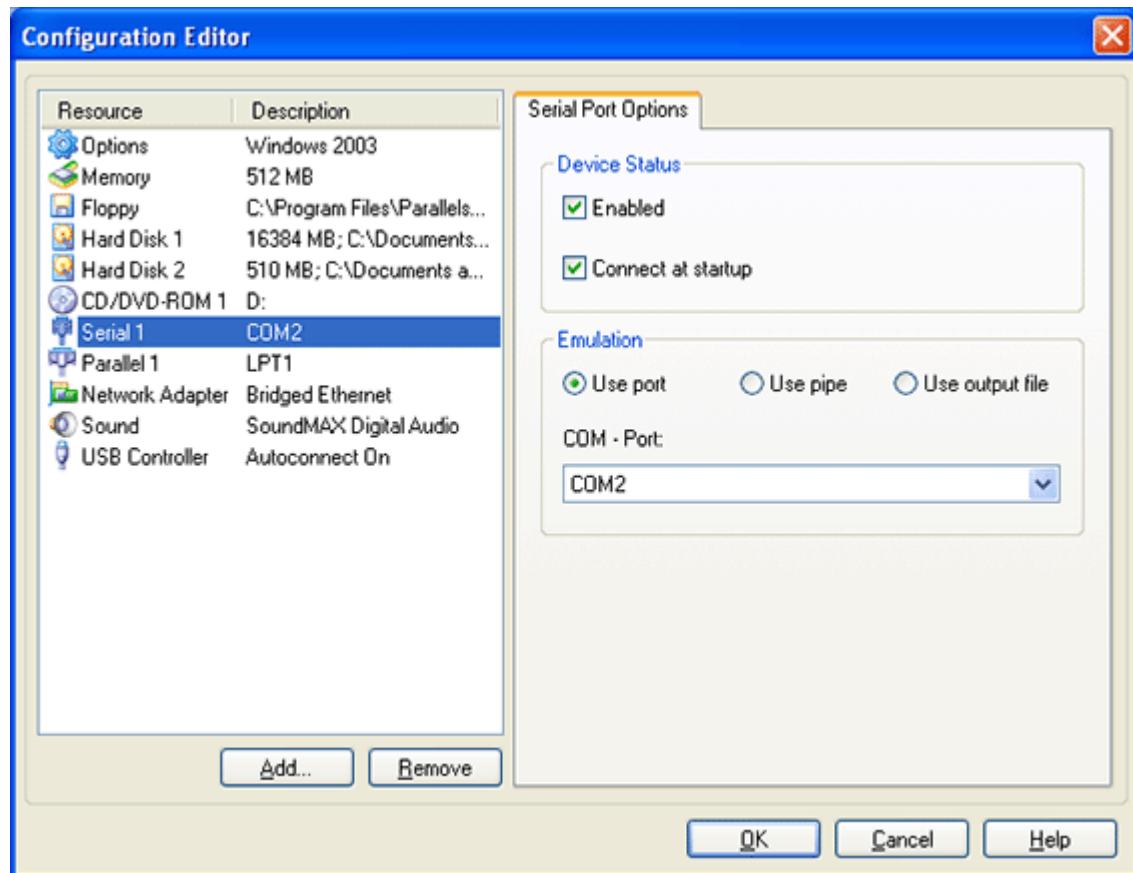
Choose IDE slot to connect to CD/DVD-ROM image in the **Connect to** list. If you want the CD/DVD-ROM to be startup drive select **IDE 0:1** in the list.

Note that if you set two startup drives at once - hard disk (IDE 0:0) and CD/DVD-ROM (IDE 0:1) - guest OS will try to boot according to sequence set on the Booting Options (see page 96) tab of the **General Options**.

Serial Port Options

Parallels Workstation allows up to four serial ports to be connected to a Virtual Machine.

Serial Port Options in Windows primary OS:



Device status:

If you wish to temporary disable operations with serial port without deleting it from configuration, deselect the **Enabled** checkbox.

Note: If you start the operating system with the serial port disabled, it can not be connected/disconnected while VM is running.

If you have enabled the port, you can select the **Connect at startup** checkbox to start the guest OS with this port connected.

Emulation:

Parallels Workstation suggests three methods of serial port emulation:

- connect it to a physical device (**Use port** option),
- use an output file (**Use output file** option),
- the third option is different in the Windows and Linux versions of Parallels Workstation. In the Windows primary OS it will be a named pipe (**Use pipe** option). In the Linux version socket technology instead of pipe is used (**Use socket** option).

These methods are described below:

- 1** If you have selected **Use port**, the drop-down list **COM - Port** displays the list of available real COM ports. Select one of them to connect to the virtual port.

Note: In Linux primary OS to be able to connect Virtual Machine serial port to a real serial port, you should have system privileges to access the real device. Otherwise the real serial port will not appear in the list of available devices despite it is installed on your computer.

- 2** If you have selected **Use output file**, you can attach the existing file using **Browse** button or create a new one.
- 3 Windows primary OS.** If you have selected **Use pipe**, the **Pipe name** field appears containing a default pipe name. Use it or type a new name that should subject to the following rules. The name should begin with `\\.\pipe\`, i.e. it should be in the form `\\.\pipe\<name>`. If a name doesn't conform to this rule, you will get the error message: "`<Port name> will be disconnected. Reason: The filename, directory name, or volume label syntax is incorrect`" when the Virtual Machine is started.

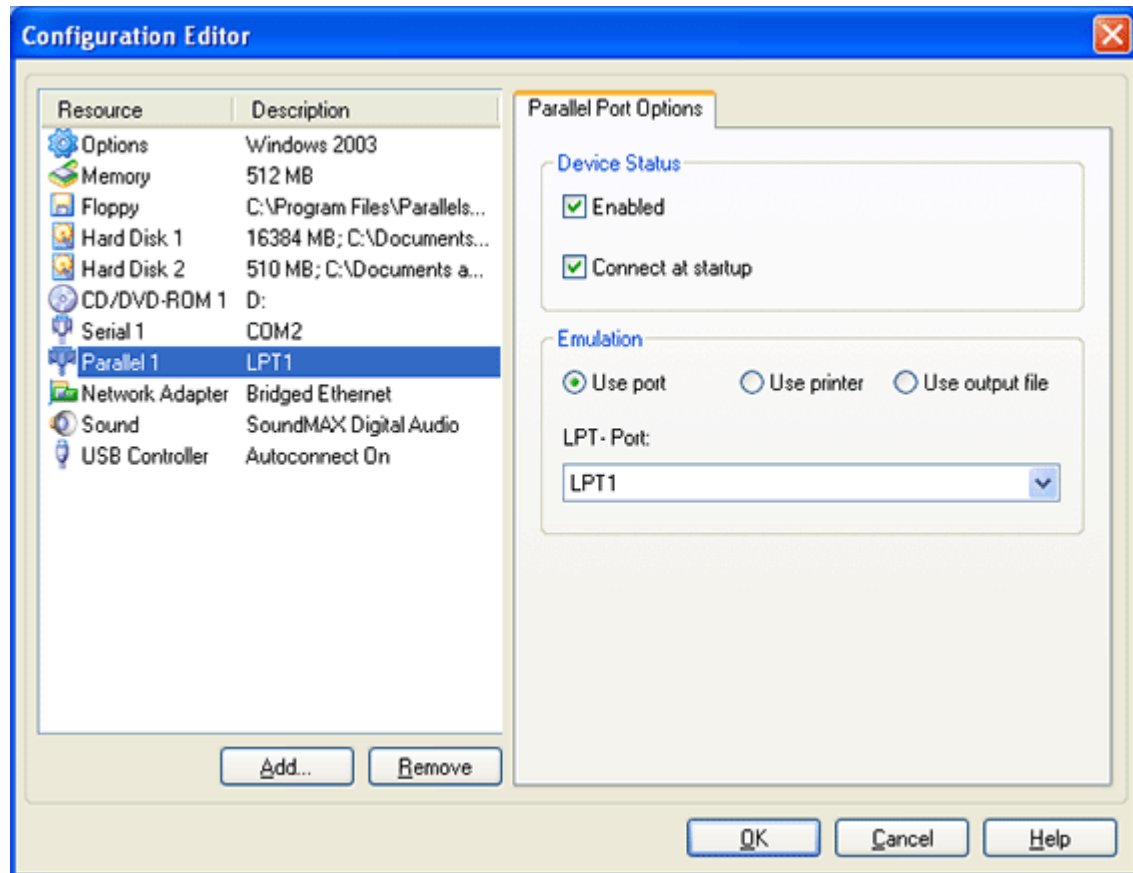
In the second field select a role at this end of the pipe.

Linux primary OS. If you have selected **Use socket**, the **Socket Name** field appears containing a default socket name. Use it or type a new name that should subject to the following rules. The name should begin with `/tmp/`, i.e. it should be in the form `/tmp/<socket>`. If a name doesn't subject to the rule, then after Virtual Machine is started you will get the error message: "`Com Port <number>: Unable to open <port name> device`".

In the second field select a role at this end of the socket.

Parallel Port Options

Parallels Workstation allows up to three parallel ports to be connected to a Virtual Machine.



Device status:

If you wish to temporarily disable operations with parallel port without deleting it from configuration, deselect **Enabled** checkbox.

If the parallel port is enabled, it can be connected/disconnected while VM is running.

Note: If you start the operating system with the parallel port disabled, you cannot change this option when Virtual Machine is running.

If you have enabled a port, you can select the **Connect at startup** checkbox to start the guest OS with this port connected.

Emulation:

Parallels Workstation suggests three methods of emulating parallel port in Windows primary OS and two methods in Linux one:

- attaching to a physical LPT port - **Use port**.

If you select this option, the drop-down **LPT - Port** list displays real LPT ports available on your computer. Select one of them to connect to the virtual port.

Notes. 1. In Linux primary OS to be able to connect Virtual Machine parallel port to a real parallel port, you should have system privileges to access the real device. Otherwise the real parallel port will not appear in the list of available devices despite it is installed on your computer.

2. Running a Virtual Machine with its parallel port connected to a real LPT port blocks the access to this real LPT port. If a physical printer cable is attached to this LPT port, other Virtual Machines and the primary OS will not be able to print via this printer. For more information on this issue see Problem with Printing (see page 189).

- attaching to a printer - **Use printer**. This method is available in Windows primary OS only.

If you select **Use printer** and have a physical printer connected to your computer, **Printers** list displays all the printers available within your Windows primary OS. Select one of them to connect to the parallel port.

When using this way of printing, Parallels Workstation composes a printer job and transfers it to the primary OS which guides further process.

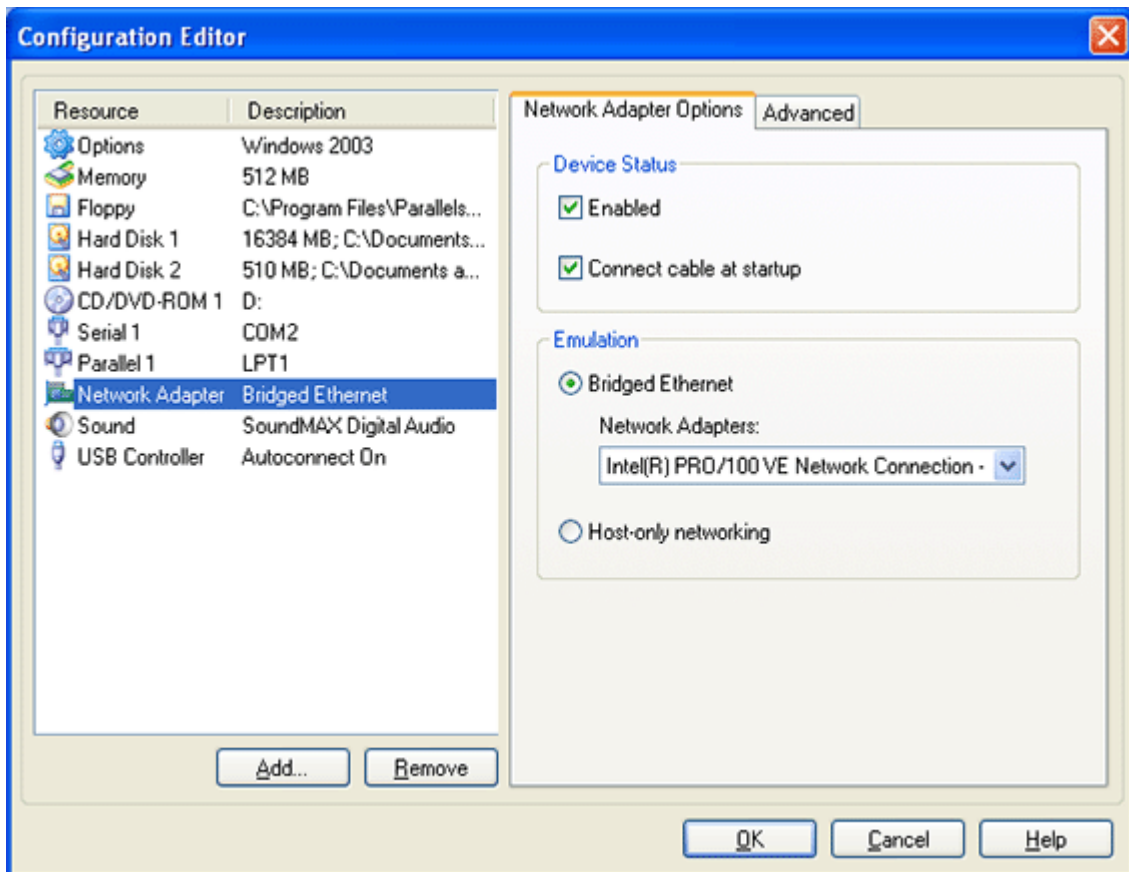
- attaching to an output file - **Use output file**.

If you select this option, you can attach to parallel port an existing file or create a new one. Click the **Browse** button and locate the file.

Network Adapter Options

In the current version of Parallels Workstation a RTL8029 (NE2000 compatible PCI card) network adapter is supported.

In Linux guest OS to be able to access external network in the Virtual Machine, **ne2k-pci** driver should be loaded into Linux kernel. It is included by default, however if you are going to recompile the kernel remember to select **ne2k-pci** component. In FreeBSD guest OS you need to have **if_ed.ko** module loaded.



Device Status:

If you wish to temporarily disable network support in Virtual Machine without deleting network adapter from configuration, deselect **Enable** checkbox. When **Enabled** checkbox is selected, options and fields for configuring network become active.

Emulation:

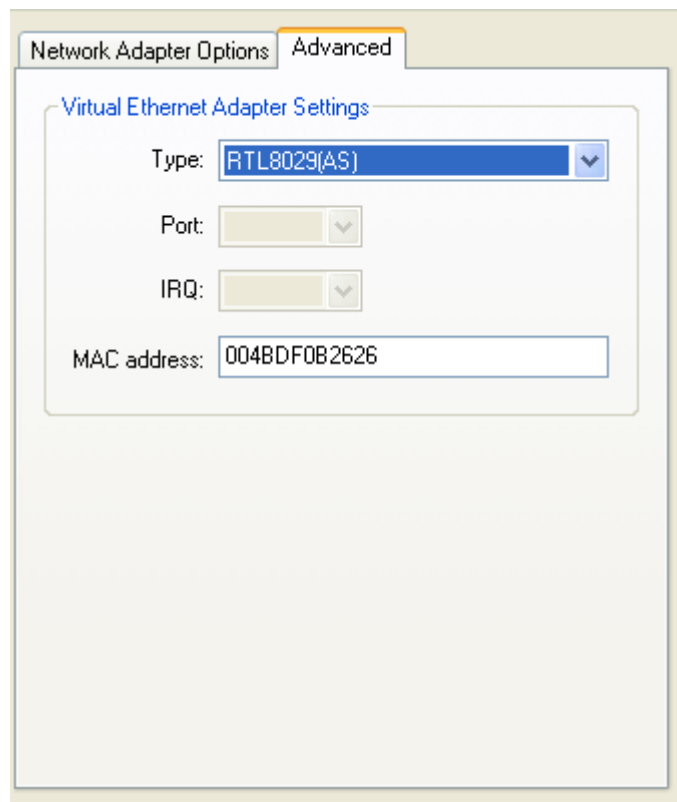
In the **Emulation** group, you can select the type of network adapter to be used in your guest OS. You can choose between the **Bridged Ethernet** and **Host-only networking**.

Bridged Ethernet type of networking is intended to access local network and Internet using physical Ethernet adapter of your computer. A Virtual Machine is treated as a separate computer and should be configured the same way as a real one.

If you select the **Bridged Ethernet** radio button, the **Network Adapters** drop-down list will show a list of all physical network adapters available on your computer. Choose one of them to connect to your virtual adapter.

Select **Host-only networking** if you want to emulate a network inside your computer, or you don't want to access a network outside your local computer, or you don't have physical network interface card. When you set this option, the primary OS and other Parallels Workstation Virtual Machines inside it are visible, thus making possible to imitate a network that includes primary OS and a number of Virtual Machines. The Creating Host-Only Network (see page 118) topic discusses how to configure a host-only network.

Advanced



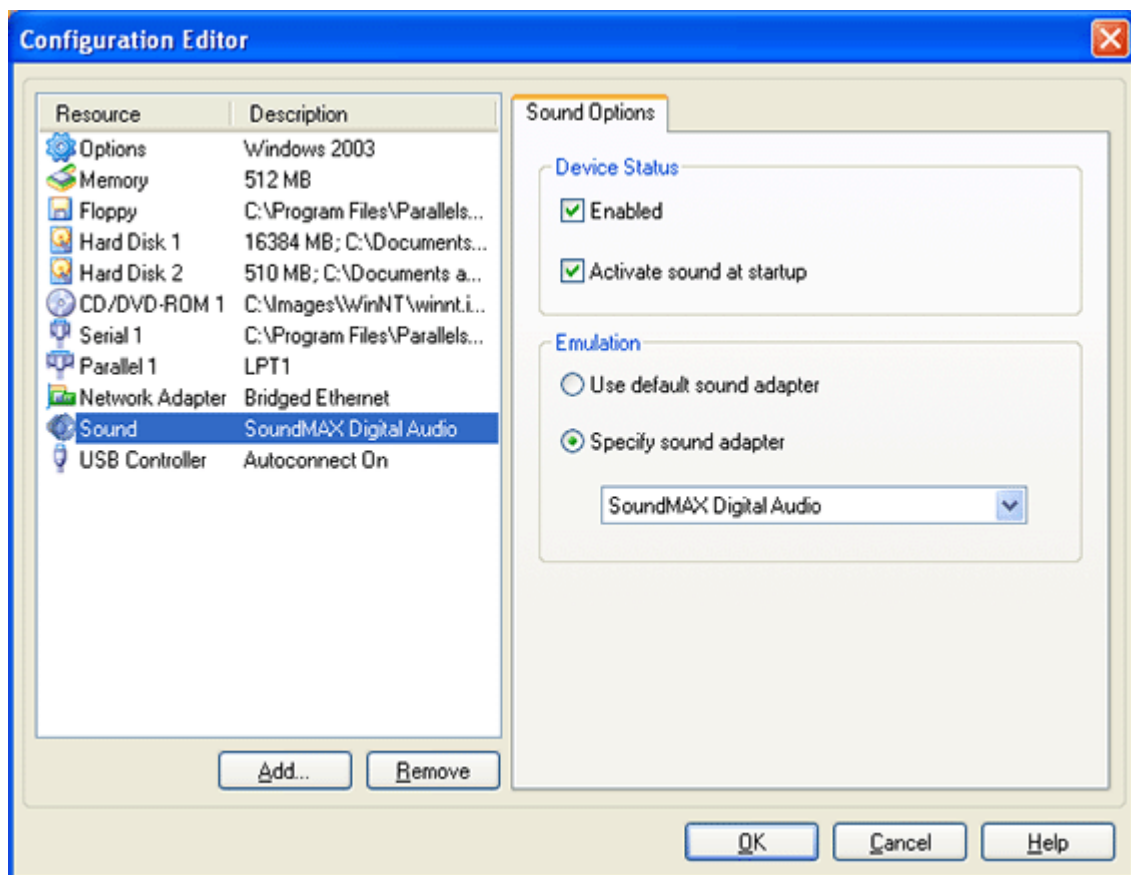
This tab allows you to specify a network driver to be used in your guest OS. In the current version of the Parallels Workstation RTL8029 driver for Ethernet adapter is supported. It is already selected in the **Type** field.

You can find native Realtek RTL8029 drivers for many different guest OSes in the Parallels Tools (see page 68) pack shipped together with the Parallels Workstation.

In Windows 2000/XP/2003 guest operating systems you can improve network performance by installing specially developed PRLETH driver that can be found in the Parallels Tools (see page 68) pack.

A **MAC address** is generated automatically but can be changed manually. If you decide to change it, please make sure that the number is unique inside your network.

Sound Options



Parallels Workstation virtualizes the Realtek AC'97 compatible sound card.

Device status:

If you wish to temporarily disable operations with a sound device without deleting it from configuration, deselect **Enabled** checkbox.

Note: If you start the operating system with the sound device disabled, you cannot change this option when Virtual Machine is running.

If the sound device is enabled, it can be connected/disconnected while VM is running.

To start guest OS with the sound device activated, select the **Activate sound at startup** checkbox.

Emulation:

Note. If you are not satisfied with the quality of sound issued, a special AC'97 sound driver (see page 69) is available for Windows 95/98/ME/NT/2000 guest OSes and for OS/2 and eComStation guest OSes. You can install it instead of standard one.

Windows primary OS:

If you want the Virtual Machine automatically select the default sound adapter select **Use default sound adapter** option. Instead you may specify the particular sound adapter in the **Specify sound adapter** list.

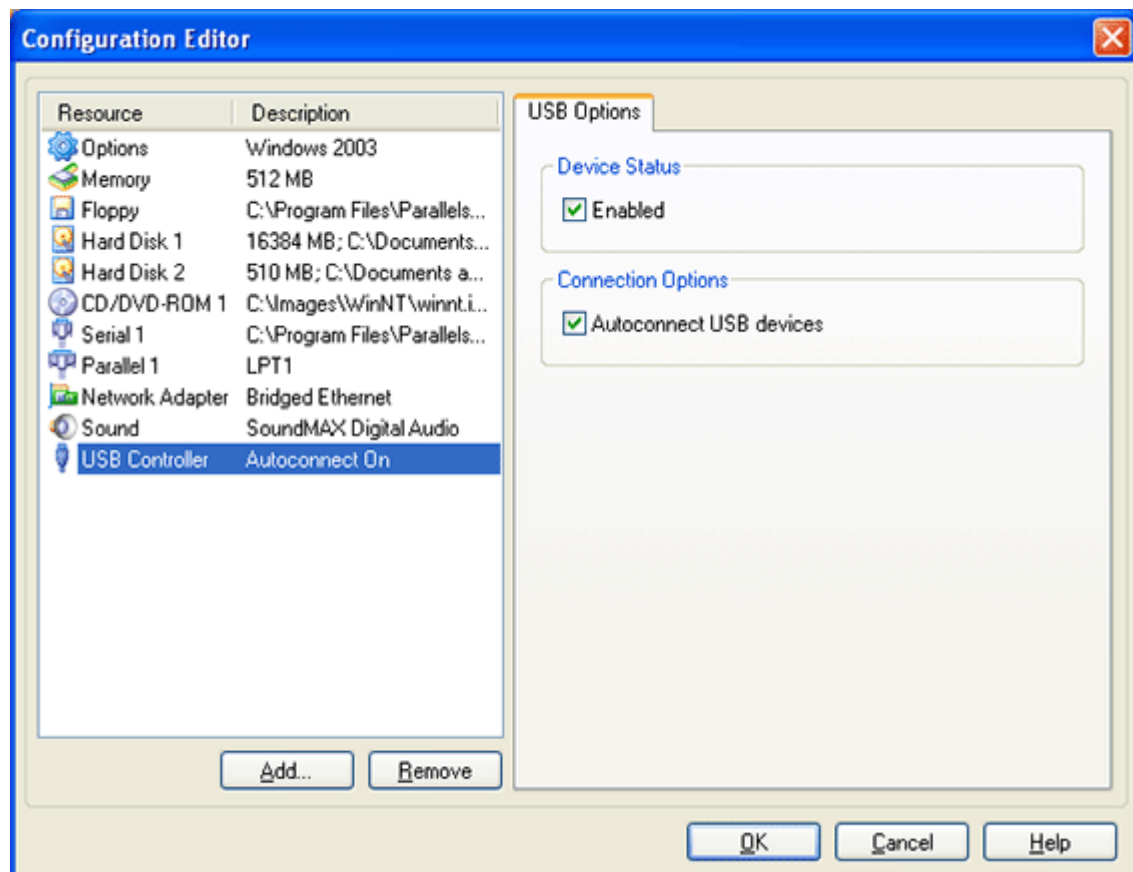
Linux primary OS:

After the sound is enabled, the **Output Device** field appears containing a list of sound adapters and virtual sound devices available on your real computer. If you don't want to produce sound but sound card is required by guest OS applications, you can select **Loopback**.

Notes: In Linux primary OS to be able to connect Virtual Machine sound drive to a real sound drive, you should have system privileges to access the real device. Otherwise the real sound device will not appear in the list of available devices despite it is installed on your computer.

Linux version of the Parallels Workstation allows to select **Mixer Device**.

USB Options



Device status:

If you wish to temporarily disable USB operations without deleting it from configuration, deselect the **Enabled** checkbox.

Note: If you start the operating system with the USB disabled, you cannot change this option when Virtual Machine is running.

If the USB is enabled, USB devices can be connected/disconnected to Virtual Machine while it is running.

Connection Options:

Autoconnect USB devices. Select this option if you want the running Virtual Machine to capture new USB devices connected to your host computer. New device are captured if there are no more than one USB device currently active.

Adding New Devices to Virtual Machine

Virtual Machine technology allows adding new devices to a Virtual Machine, to be the same as connecting new devices to a real computer. Virtual Machine configuration can include the following devices:

- up to four IDE devices - virtual hard disks and CD/DVD-ROM drives;
- a floppy drive;
- a network adapter;
- up to four serial ports;
- up to three parallel ports;
- a sound device.

New devices are added using **Add Hardware Wizard**. Device of any type (except hard disks) can be connected to a real drive as well as to virtual media. In addition, if you add a floppy drive, a new blank .fdd image can be created at the same time and connected to the drive. When adding virtual hard disk you may choose between connecting an existing hard disk image and creating a new one.

Note: In Linux primary OS 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 despite it is installed on your computer.

To add new device to the Virtual Machine do the following:

- 1 Open the Virtual Machine to which you want to add new device, then select **Edit Configuration** in the **File** menu or click  on the command button panel to open Configuration Editor.
- 2 In the lower left part of the **Configuration Editor** window click the **Add** button.

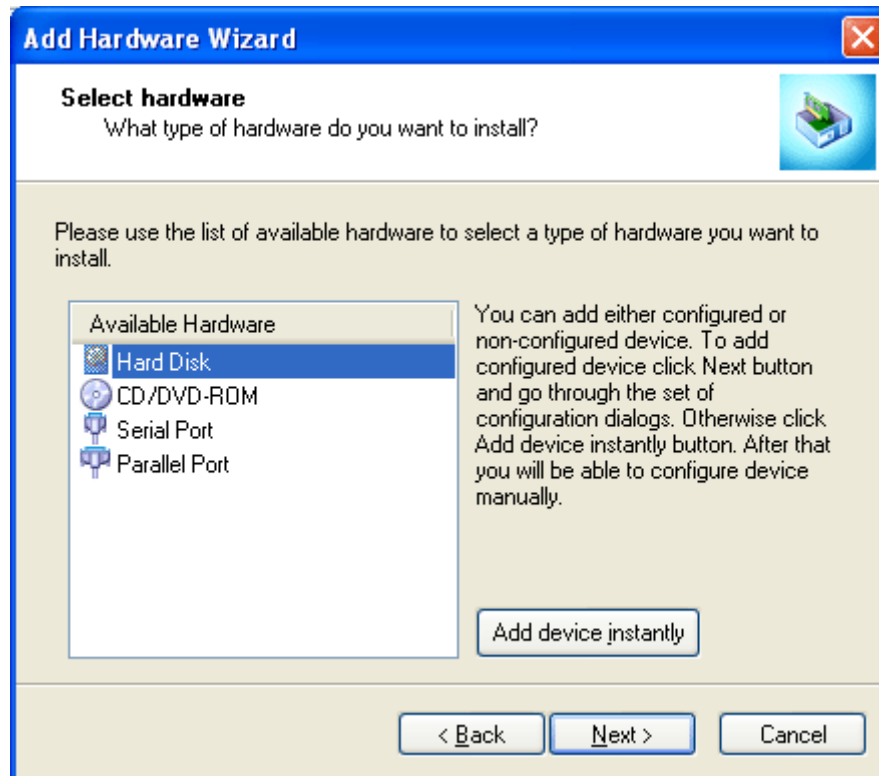
- 3 Add Hardware Wizard greets you with the **Welcome to Add Hardware Wizard** screen. Click **Next**.



- 4 On the **Select hardware** screen you should choose the device you want to add to your machine.

The **Available Hardware** list contains devices available for adding. If the VM configuration already includes the maximum allowed number of some device type, this device type will not appear in the **Available Hardware** list. For instance, only one the floppy drive is allowed.

The Wizard allows to add only one device at a time.



On this screen you may prefer to add device immediately without specifying its options, in order to save your time. (You may set options later in the Configuration Editor.) To do so, click the **Add device instantly** button after selecting the desired device. The new device is added immediately with standard options, some of them are not set at all (for example, instant hard disk has zero size).

To set options of the device being added click **Next** button.

- 5 Follow the wizard screens to configure the new device. You should select device type, media it is connected to, and options specific for the device and media type. All of them are described under the Editing Virtual Machine Configuration (on page 94) section. The last screen with options contains the **Finish** button.

Removing Devices

Any Virtual Machine device (except memory) can be removed from the configuration. Memory can not be deleted because Virtual Machine can not operate without it.

Note. Any device except memory can be disabled in Configuration Editor (on page 94) without removing it from configuration. Uncheck **Enabled** check box of the desired device.

To remove a device:

- 1 Open the Virtual Machine from which you want to remove a device, then open Configuration Editor by selecting **File/Edit Configuration** in the menu or click  on the command button panel.
- 2 Select the device you want to delete in the left part of the **Configuration Editor** window. Memory and options list entries can not be deleted. (The **Options** entry is not a device at all, it is a collection of general machine settings.)
- 3 Click **Remove** button.

Networking in Virtual Machine

Parallels Workstation allows two types of networking in Virtual Machine, Bridged Ethernet and Host-only networking. This section describes these types of networking and ways of configuring them.

Bridged Ethernet Networking

The Bridged Ethernet type of networking allows to access real network outside Virtual Machine, Local Area Network and/or Internet, via Ethernet adapter installed on host computer. The current version of the Parallels Workstation supports only Ethernet adapters. This Ethernet adapter should support promiscuous mode, as described in Hardware Requirements (see page 12).

To access LAN and Internet, configure the Virtual Machine:

- in Virtual Machine Network adapter options (on page 110) select **Bridged Ethernet** type of networking in **Emulation** group and choose proper network adapter in the list,
- configure network options in guest operating system.

Creating Host-Only Network

Parallels Workstation provides virtual network accessible only to primary operating system and virtual machines running on it. Primary operating system is attached to this network through **Parallels Host-Guest Virtual NIC** adapter installed along with Parallels Workstation. For a virtual machine to join such host-only network, guest system network adapter should be set to host-only networking. IP addresses for the primary operating system and virtual machines may be:

- dynamic (assigned by Parallels DHCP server running on host-only network);
- static (assigned manually).

Configuring Network with Dynamic IPs

IP addresses for machines in host-only network are provided by Parallels DHCP server that is started automatically whenever you launch the Parallels Workstation. DHCP server is installed along with the Parallels Workstation.

Configure network with dynamic IPs in the following way:

- 1 Open the **Configuration Editor** for the Virtual Machine and on the Network Adapter Options (on page 110) tab select the **Host-only networking** parameter.
- 2 Select **Edit/Preferences** in the Parallels Workstation menu. Specify a range of IP addresses to be assigned to Virtual Machines on the Network (see page 84) tab.

Configuring Network with Static IPs

To configure host-only network with static IP addresses you have to manually assign them to the primary operating system and to each Virtual Machine which you want to include into the network.

The Virtual Machine should be configured as follows:

- 1 Open **Configuration Editor** for the Virtual Machine and on the Network Adapter Options (on page 110) tab select the **Host-only networking** parameter.
- 2 Launch the Virtual Machine and specify the IP address by standard way for the guest operating system installed on it.

Configuring static IP address for primary operating system:

In Windows primary OS:

- 1 Open Windows **Control Panel**, select **Network Connections**.
- 2 In the **Network Connections** window right click on the Parallels Workstation network adapter, **Parallels Host-Guest Virtual NIC**, to display its context menu and select **Properties** in it.
- 3 The **Parallels Host-Guest Virtual NIC Properties** windows is displayed, in **This connection uses the following item** list select **Internet Protocol (TCP/IP)** and click **Properties** button.
- 4 In the **Internet Protocol TCP/IP Properties** window select **Use the following IP address** option, after that other options in this group become accessible. Specify **IP address** and **Subnet mask** for the primary system.

In Linux primary OS:

- 1 Open `/usr/lib/Parallels/dhcpd_configuration` file.
- 2 Settings under "[vnic0]" determine Parallels network adapter parameters. Find the string "DHCP=1". This setting means that address for the primary operating system is assigned automatically. To allow static IP change DHCP setting to 0 instead of 1. Set "DHCP=0" and save the file.
- 3 Launch the **Terminal** program and run two following commands:
`/etc/init.d/parallels stop`
and after this
`/etc/init.d/parallels start`
- 4 Specify an IP address for the primary system by means of the Linux version installed on your computer.

Using USB Devices in Virtual Machine

The current version of the Parallels Workstation emulates the 2-port USB controller 1.1. This means that up to two USB peripherals can be connected to a Virtual Machine simultaneously. Parallels Workstation currently supports bulk devices such as scanners, printers, mass storage, PDAs, etc. Isochronous devices are not supported in the current version.

Parallels Workstation lets you to connect USB devices to Virtual Machine automatically. See the USB Options (see page 113) to know how to turn this option on. And see the Connecting USB Devices (see page 140) to learn how to connect an USB device to a Virtual Machine both automatically and manually.

Making Copy of a Virtual Machine

A complete copy of a Virtual Machine can be created using **Clone Virtual Machine Wizard**. A new configuration file and new hard disk drive(s) are made. The clone includes as many hard drives as there are connected to an original machine. By default the Wizard puts new files into a new directory, but you may prefer to store them in an existing one. Copies of virtual hard disks are always placed in the same folder with the copy of the configuration file.

Auxiliary devices of the new virtual machine are connected to the same drives or disk images as the source devices. If source CD/DVD-ROM drive is connected to an .iso CD/DVD disc image file, this connection is restored in the new machine. The same is for floppy drive. However output files of serial/parallel ports, if used, are not transferred from the original VM. In the clone, they are started from scratch.

If a network adapter is included into the original configuration, a new MAC address is generated for the new adapter.

A Virtual Machine to be copied should be opened and meet the following conditions:

- The guest OS is not running. If it is running, menu item that starts the wizard is disabled.
- The Virtual Machine is not opened by another instance of the Parallels Workstation.
- It is not blank Virtual Machine. Blank Virtual Machines can not be copied.

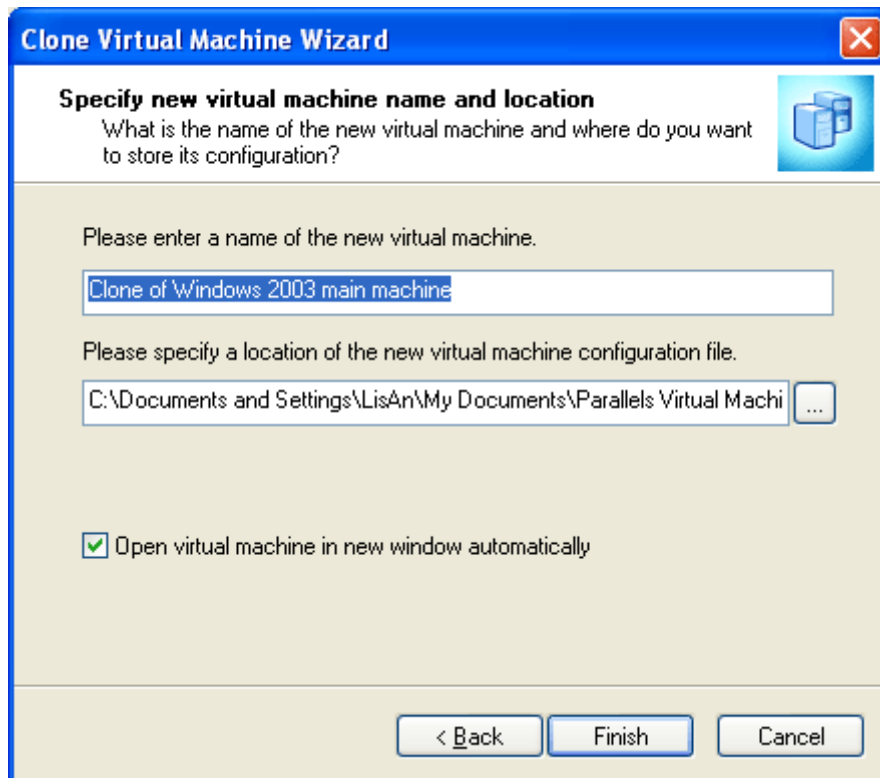
To make a clone of a Virtual Machine:

- 1 Open Virtual Machine you want to make copy of.
- 2 Select **Clone VM** in the **VM** menu. **Clone VM Wizard** is started. Click **Next**.



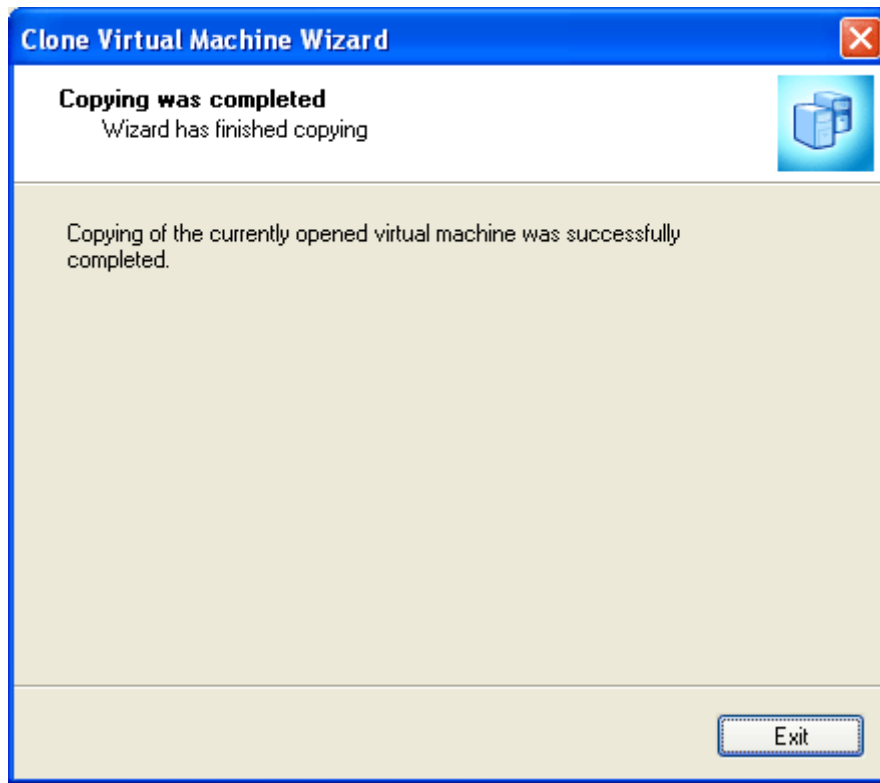
- 3 On the next step, **Specify new virtual machine name and location**, you have to specify name of the clone and path for storing its configuration file. Name and path proposed by the wizard are made by adding "Clone of" in the beginning of the original Virtual Machine name and the path. You can modify both of them. Remember that a name of the Virtual Machine should be no longer than 50 symbols.

If you select **Open virtual machine in new window automatically** option, then after new configuration is created it will be opened in a new Parallels Workstation window. Click **Finish** to start copying the machine.



If the directory for storing Virtual Machine configuration file does not exist, the confirmation for its creation may be asked: "Directory <directory name> does not exist. Do you want to be created automatically?" Click **Yes**. New directory will be created.

- 4 While the Virtual Machine is being copied, the **Copying in progress** screen indicates current state of the process. If everything is OK, the Wizard informs you that copying has been performed and new machine is ready. Click **Exit** to close Wizard's window.



The new instance of the Parallels Workstation is opened with the new virtual machine loaded, if you have selected the corresponding option on the **Specify new virtual machine name and location** screen.

Keyboard Shortcuts in Virtual Machine

Both Windows and Linux primary OSES have special hotkeys which they intercept even when the hotkeys are pressed inside guest OSES. Techniques of bypassing this problem are stated below.

Windows Primary OS

If your computer is running Windows primary OS, it will intercept `Ctrl+Alt+Del` key combination pressed in guest OS. To send `Ctrl+Alt+Del` to guest OS:

- either press `Ctrl+Alt+Ins` while the keyboard is captured inside a Virtual Machine window,
- or select **Send Ctrl+Alt+Del** in the Parallels Workstation **VM** menu.

Using Standard Hotkeys in Linux Guest OS When Primary OS is Also Linux

When both primary and guest operating systems are Linux-based the problem arises how to send standard hotkey combinations to the guest Linux OS since primary Linux OS intercepts them. To bypass this trouble

- whenever `Alt` key is used in standard combination press `Shift` instead.

To send to the guest Linux OS, for example, `Ctrl+Alt+Backspace` press `Ctrl+Shift+Backspace`. Primary Linux OS will not intercept this combination while guest Linux OS will interpret it as `Ctrl+Alt+Backspace`.

The table below shows what combinations you should press instead of standard ones.

Desired Hotkey	Combination to Press
<code>Ctrl+Alt+Backspace</code>	<code>Ctrl+Shift+Backspace</code>
combination from range <code>Ctrl+Alt+F1</code> - <code>Ctrl+Alt+F12</code>	<code>Ctrl+Shift+F1</code> - <code>Ctrl+Shift+F12</code>
<code>Ctrl+Alt+plus</code> sign or <code>Ctrl+Alt+minus</code> sign	<code>Ctrl+Shift+plus</code> sign or <code>Ctrl+Shift+minus</code> sign

Deleting a Virtual Machine

Virtual Machines can be deleted manually, however we recommend to do it using **Delete VM Wizard** that detects all the files that make up Virtual Machine and are connected to it.

The Wizard helps to remove the following Virtual Machine components and associated files:

- configuration file,
- virtual hard disk drives connected to the Virtual Machine,
- CD/DVD disc .iso images connected to the Virtual Machine (if any),
- floppy disk .fdd image connected to the Virtual Machine (if any),
- output files of serial and parallel ports (if any),
- home directory where Virtual Machine files are stored.

The Wizard can delete a currently opened Virtual Machine that meets the following conditions:

- Its guest OS is not running. If it is running, the menu item that starts the wizard is disabled.
- The Virtual Machine is not opened by another instance of the Parallels Workstation.
- The Virtual Machine is not blank.

To delete a Virtual Machine:

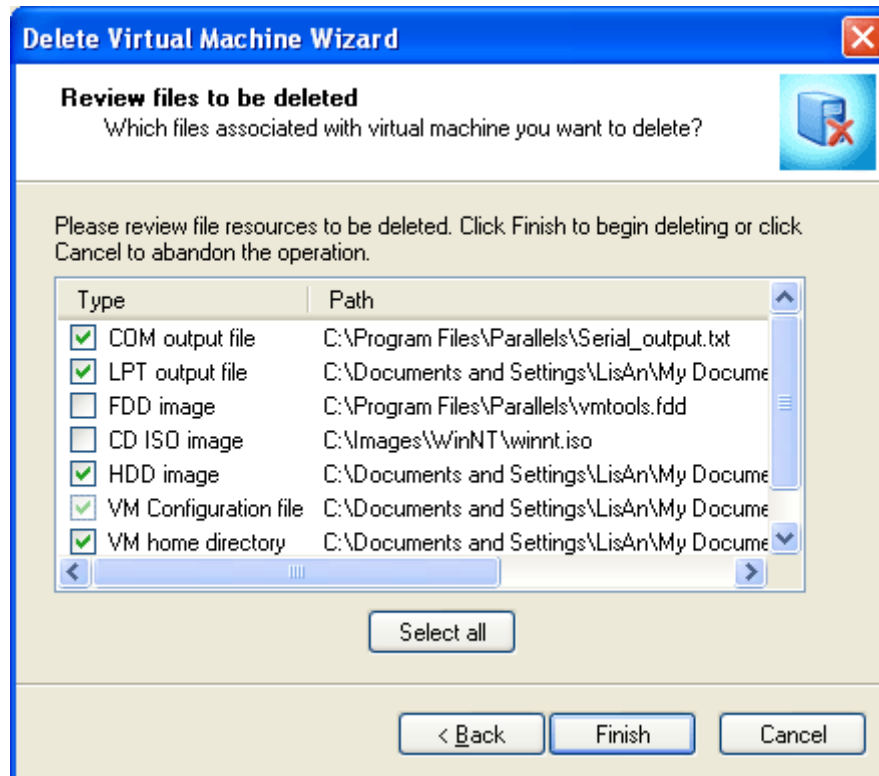
- 1 Open the desired Virtual Machine.
- 2 Select **Delete VM** in **VM** menu. The **Welcome to the Delete Virtual Machine Wizard** screen is opened.



Click **Next** to proceed to the next wizard step.

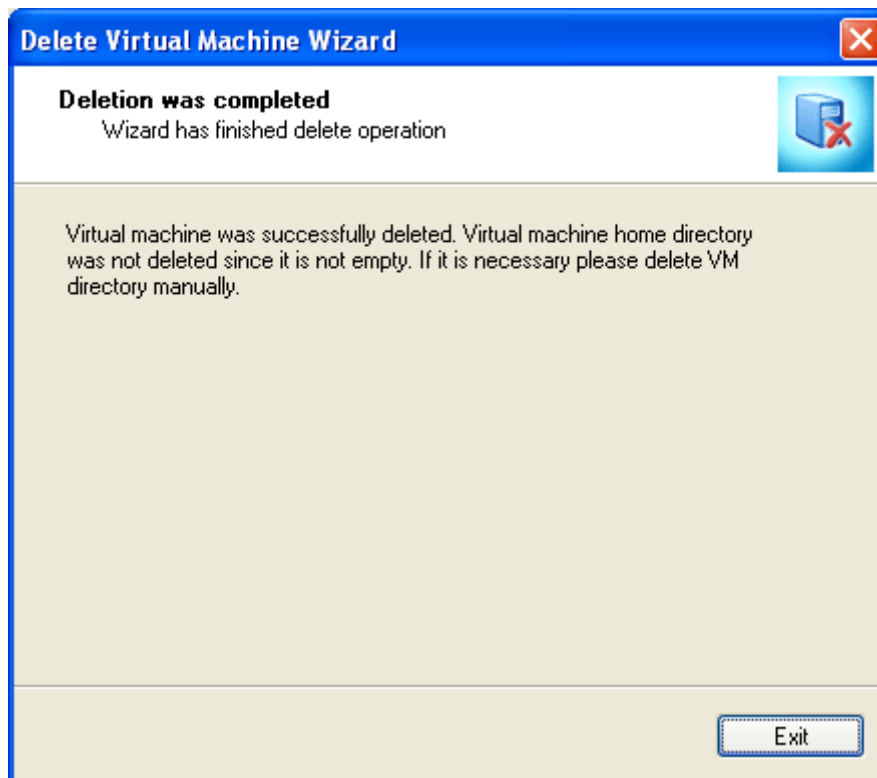
- 3 The Wizard detects all the files related to the Virtual Machine and presents them on the **Review files to be deleted** screen. Each device/file is displayed in a separate string, i.e. if two hard disks are connected to the Virtual Machine, there will be two hard disk strings on the screen. The full path is displayed for each component.

Configuration file, virtual hard disk, output files of serial and parallel ports, and home directory are pre-selected for deleting while connected CD-ROM .iso images and floppy .fdd images do not, because they can be useful for other Virtual Machines. If you do not consider them to be useful, mark them for deletion on this screen. Note that virtual hard disks can also be attached to other Virtual Machines.



Review selected files, check those that should be deleted and click **Finish** when you are ready.

- 4 The Virtual Machine wizard removes the selected files from your hard disk. If everything is OK the final wizard screen will be:



The Virtual Machine is considered to be successfully deleted if all the selected components or all selected components except home directory (if it was chosen for deleting) have been removed. If home directory contains any files it will not be deleted.

Click **Exit** to close the wizard.

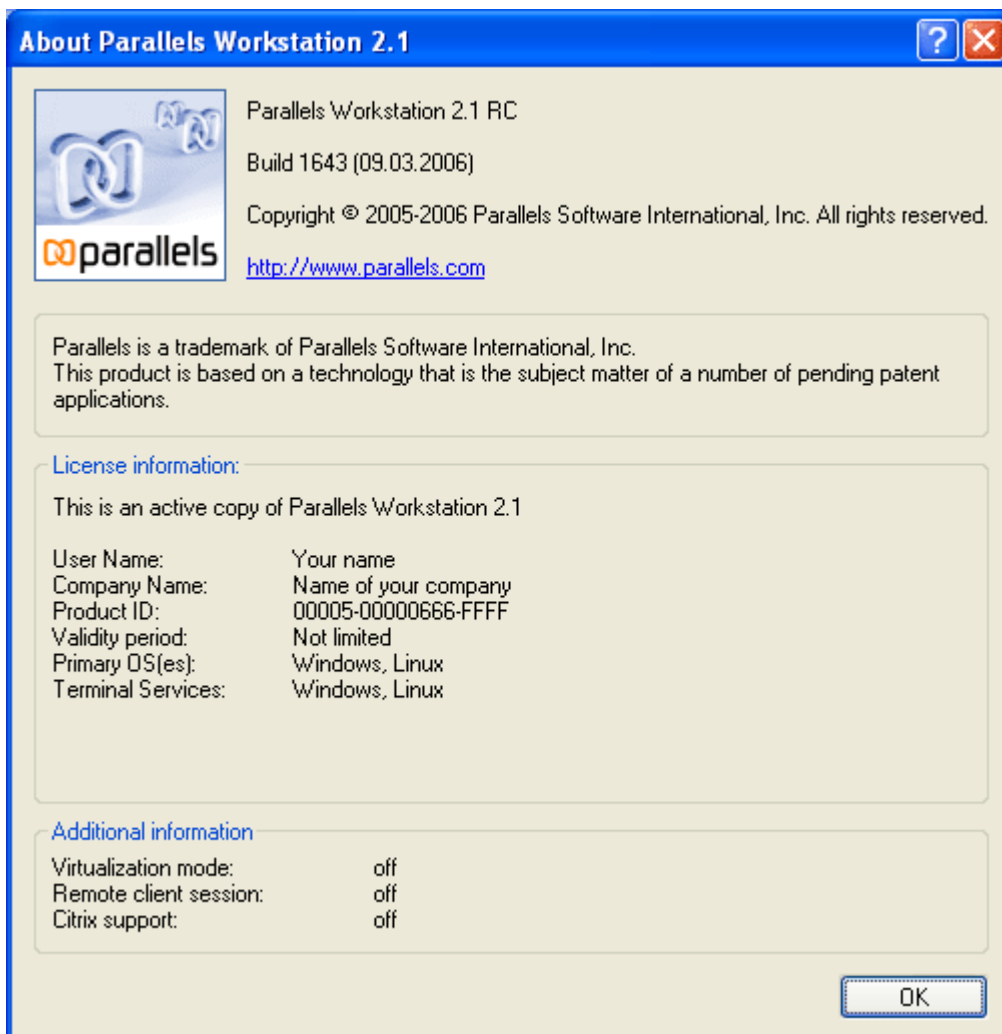
After the Virtual Machine is deleted a blank VM is opened in the Parallels Workstation screen. The deleted machine disappears from the list of recently used configurations in the **File** menu.

About Parallels Workstation Screen

The **About Parallels Workstation** window provides information on Parallels Workstation version and build you use, full name of the vendor and link to its site, copyright and trademark information. All are located in the top of the screen. License information and current status of several system settings are displayed below.

Active Copy

If you have an active copy of the Parallels Workstation, **About** screen looks as follows.



License information:

User Name and **Company Name** contain information about your name and the name of your company that you entered when installing the Parallels Workstation (in Windows) or in **Activate Product** window (in both Windows and Linux primary OSes).

Product ID displays identification number of your copy of the Parallels Workstation where the following information is encrypted: version of the Parallels Workstation, license number, and the abilities covered by your license that are displayed in **Primary OSES** and **Terminal Services** fields.

Validity period shows the date until your license is valid.

Primary OSES indicates which primary operating systems are allowed by your license.

Terminal Services displays which primary operating systems are able to access Parallels Workstation remotely.

Note: The same license information is displayed in the **Activate Product** window. See Activating Parallels Workstation in Windows (see page 22) or Activating Parallels Workstation in Linux (see page 27).

Additional information:

This group contains indicators that are active only when guest OS is running. Otherwise they are off.

Virtualization mode shows *Intel VT-x* if you work on Intel VT-enabled processor and Virtualization Technology is activated through Virtual Machine configuration setting available on the VM Flags (see page 97) tab of the **General Options**. See Intel Virtualization Technology (VT-x) Support (see page 8) for description of VT-x.

If you run without Virtualization Technology, virtualization mode indicates acceleration level. All guest OSES besides Windows NT/2000/XP/2003 run in *Software mode 0*. Windows NT/2000/XP/2003 start with *Software mode 0*, then switch to *Software mode 1* and *Software mode 2* in case **Acceleration Level** setting (on the VM Flags (see page 97) tab of the **General Options**) is set to *High*.

Remote client session indicates if the Parallels Workstation is executed on a remote server.

Citrix support active indicates whether Parallels Workstation is executed on a remote server under Citrix Metaframe with Citrix support turned on. See Citrix Support (see page 190) topic for additional information.

Inactive Copy

If you have not activated you copy of the Parallels Workstation or your license is expired, **License information** group displays relevant information.

In Windows primary OS:

Depending on whether you had previously received a trial activation key or not, **Evaluate** and/or **Buy** buttons are available at the bottom of the window prompting you to get a trial or a permanent activation key. See Activating Parallels Workstation in Windows (see page 22) for detailed description of the processes of receiving a key and activating.

In Linux primary OS:

Depending on whether you had previously received a trial activation key or not, warning text contains one or two links prompting you to get a trial or a permanent activation key. See Activating Parallels Workstation in Linux (see page 27) for detailed description of the processes of receiving a key and activating.

CHAPTER 10

Running Virtual Machine

This chapter provides information on handling a Virtual Machine while guest operating system is executed.

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Overview

When you start the Virtual Machine, the guest operating system console (on page 47) is opened and acts as a usual Virtual Machine monitor. After your keyboard and mouse are captured in the Virtual Machine screen, you can work with this Virtual Machine in the same way as you work with a standalone computer, including turning off or resetting the guest OS.

Such Parallels Workstation controls as the toolbar and the menu allows to manage Virtual Machine behavior, when you run the machine in windowed mode. Instead you can run Virtual Machine in fullscreen mode, where Parallels Workstation controls and the primary operating system are not visible.

While working in windowed mode, Parallels Workstation controls let you to do the following:

- start, turn off and reset Virtual Machine,
- switch between Virtual Machine and your host computer,
- pause and suspend Virtual Machine,
- connect and disconnect devices, change data type accessed by them,
- temporary disable separate Parallels Tools (if you have them installed),
- expand Virtual Machine console to fullscreen mode.

Starting Virtual Machine

To start a Virtual Machine:

- 1 Start Parallels Workstation. See Starting Parallels Workstation in Windows (on page 22) or Starting Parallels Workstation in Linux (see page 26).
- 2 Open a Virtual Machine configuration (on page 91).
- 3 Click the **Power On** button  on the Parallels Workstation toolbar or select **Power On** in the **VM** menu. The Virtual Machine will be switched on, its console (on page 47) will be opened in the Parallels Workstation window, and you can see the boot process of the guest OS.

Note that the Virtual Machine can be powered on only if you have a registered copy of the Parallels Workstation, regardless of it is permanent or trial status. If your copy is not registered, the "This copy of Parallels Workstation 2.1 is currently not active" warning appears. This warning displays your current activation status and prompts you to activate your copy of the product.

In Windows primary OS:

Depending on whether you had previously received a trial activation key or not, **Evaluate** and/or **Buy** buttons are available at the bottom of the window prompting you to get a trial or a permanent activation key. See Activating Parallels Workstation in Windows (see page 22) for detailed description of the processes of receiving a key and activating.

In Linux primary OS:

Depending on whether you had previously received a trial activation key or not, warning text contains one or two links prompting you to get a trial or a permanent activation key. See Activating Parallels Workstation in Linux (see page 27) for detailed description of the processes of receiving a key and activating.

Troubleshooting

In Windows Primary OS

If when starting a Virtual Machine in Windows primary OS you receive the warning "Parallels Workstation has detected that your primary operating system is running in PAE mode...", this means that your host computer configuration does not conform to Parallels Workstation requirements. Current version of the Parallels Workstation supports up to 4 GB PAE. To bypass this problem:

- Follow Parallels Workstation prompts to create new configuration with 4 GB PAE.
- Boot into this configuration. When launching Windows primary OS select the configuration that has in parentheses "for Parallels Workstation" on the **Please select the operating system to start** screen.

In the future boot into the Windows configuration without PAE to work with Parallels Workstation.

In Linux Primary OS

If when starting a Virtual Machine in Linux primary OS you receive the warning "Parallels Workstation can not be started due to VM memory mapping fail..." or when running a guest OS you receive the warning "Parallels Workstation experience problem when trying to allocate physical memory in PAE mode...", it could mean that the currently running kernel supports PAE greater than 4 GB physical memory while the current version of Parallels Workstation supports up to 4 GB PAE only. To fix the problem you have to change the auto detected PAE value to 4096MB. Do the following:

- Add to your boot loader the kernel option "mem=4096M" (refer to your boot loader documentation for details).

Capturing and Releasing the Keyboard and the Mouse

This section teaches how to capture and release input devices (like your mouse and keyboard) in a Virtual Machine.

When you power on a Virtual Machine, either during installation or normal operation, you will need to capture the computer's input devices in the Virtual Machine to interact with it exactly as if you were using a separate standalone computer. Since each Virtual Machine is independent, it will not "see" the primary OS, and consequently, you will not be able to access Parallels Workstation's menu and toolbar from inside the Virtual Machine without manually releasing your input devices to the primary OS.

To lock keyboard and mouse in a Virtual Machine screen, do one of the following:

- Point the mouse cursor to the Parallels Workstation client window and click somewhere inside the Virtual Machine screen. When the mouse is captured, it does not move out of the Parallels Workstation window.
- Alternatively, you can click **Capture Input** in the **VM** menu.

To release the keyboard and mouse to your primary OS:

- Press the hot key combination designated for releasing your keyboard/mouse (the default combination is **Ctrl+Alt**).

The keyboard and mouse will be released immediately. Now you will be able to manage your Virtual Machines using the Parallels Workstation controls, manage your primary operating system, or capture the keyboard and the mouse in another Virtual Machine.

The default hot key combination for releasing keyboard/mouse can be changed in the Hot Key Combinations (see page 87) tab of the **Preferences** window.

Note. You can free the mouse and the keyboard from the virtual machine screen without pressing hot key combination, if you install the Parallels Tools. See the Parallels Tools Overview (see page 69) to learn if this package is available for your guest operating system.

Switching Virtual Machine to Fullscreen Mode

To make working inside a Virtual Machine more comfortable, you can run a guest operating system in fullscreen mode. When running a Virtual Machine in fullscreen mode, guest OS screen occupies the whole monitor of your computer; primary OS with its applications and the Parallels Workstation menu, toolbar, and status bar are hidden.

Note: You can start a Virtual Machine in the fullscreen mode if the **Switch to fullscreen mode automatically** option is set in the VM Flags (see page 97) tab of the **General Options**.

If you want to switch to fullscreen while running a guest OS, do one of the following:

- click  toolbar button,
- or select **View/Fullscreen** in the menu,
- or press the appropriate hot key combination (**Alt+Enter** by default, unless you have defined other hot key).

To return to the windowed mode:

- press any of the hot key combinations defined (**Ctrl+Alt** or **Alt+Enter** by default).

Hot key combinations are defined in the Hot Key Combinations (see page 87) tab of the **Preferences** window.

Shutting Down and Resetting Virtual Machine

A Virtual Machine can be shut down and reset in the same ways as a usual computer. If a guest operating system is normally closed using some internal command (such as **Shut Down** in Windows), it is **STRONGLY RECOMMENDED** to shut down the machine this way to ensure safety of your data. However if you are unable to stop the guest OS this way, you may use the Parallels Workstation controls that are the analog of the **Power** and **Reset** buttons on a real hardware system box.

Configuring Parallels Workstation to Be Able to Mandatory Stop a Virtual Machine

To be able to mandatory stop a Virtual Machine you have to configure Parallels Workstation previously.

You may configure Parallels Workstation so that all the Virtual Machines will be stopped when you press the **Power Off**  button, or so that you will be asked whether you want to suspend or to power off the Virtual Machine on this action. Decide which option do you prefer and do the following:

- 1 Open the Common (see page 81) tab of the **Preferences** window.
- 2 In the **VM shutdown behaviour** group select one of the following options:
 - Select the **Power Off** radio button if you definitely want that all Virtual Machines be stopped when you press the **Power Off**  button.
 - Select the **Ask me what to do** radio button if you want to be able to choose whether the Virtual Machine will be stopped or suspended when you press the **Power Off**  button.

Mandatory Stopping a Virtual Machine

To mandatory stop a Virtual Machine if the **Power Off** configuration option is set:

- 1 Click the **Power Off**  button during guest OS execution. The Virtual Machine will be stopped immediately.

To mandatory stop a Virtual Machine if the **Ask me what to do** configuration option is set:

- 1 Click the **Power Off**  button on the Parallels Workstation toolbar or select **Power Off** in the **VM** menu. The Virtual Machine is temporarily paused.
- 2 In the **Choose action to perform** dialog click the **Power Off** button. The Virtual Machine shuts down immediately.

Resetting a Virtual Machine

To reset a Virtual Machine, do one of the following :

- Click the **Reset**  button on the Parallels Workstation toolbar or select **Reset** in the **VM** menu.

This activates a hard restart of a guest operating system. This operation often initiates the hard disk checking process inside a guest operating system the next time it is started up.

- Select **Send Ctrl+Alt+Del** in the **VM** menu or press Ctrl+Alt+Ins while the keyboard is captured inside a Virtual Machine window.

This initiates a soft restart of a guest operating system by sending a Ctrl+Alt+Del command to the Virtual Machine.

Pausing Virtual Machine

When Virtual Machine is paused, the guest OS is stopped and the Virtual Machine process is removed from the CPU processes list. Guest operating system execution can be continued at any time.

Pausing guest OS is recommended if you want to leave the Virtual Machine for a short period of time. If you want to leave it for long and especially if you need to restart your primary OS, use suspending of the VM. See the Suspending Virtual Machine (see page 134).

To pause a Virtual Machine:

- Click the **Pause**  button on the toolbar or select **Pause** in the **VM** menu.

When Virtual Machine is in pause mode its console is darkened.

To continue running the Virtual Machine:

- Click the **Continue (Power On)**  toolbar button or select **Continue** in the **VM** menu.

Suspending/Resuming Virtual Machine

State of the running Virtual Machine with all its applications inside can be saved to disk for continuing executing guest OS at a later time. This is called **suspending** of the Virtual Machine. When suspending, Virtual Machine state is saved to hard disk in a `.sav` file. After this no matter how long you will not touch it, will you shut down your host computer or not, you may return to the saved Virtual Machine at any time and continue running the guest OS from the point where you stopped.

You may configure Parallels Workstation so that all the Virtual Machines will be suspended when you press the **Power Off**  button, or so that you will be asked whether you want to suspend or to power off the Virtual Machine on this action.

Configuring Parallels Workstation for Suspending

To be able to suspend a Virtual Machine you have to configure Parallels Workstation. Do the following:

- 1 Open the Common (see page 81) tab of the **Preferences** window.
- 2 In the **VM shutdown behaviour** group select one of the following options:

Select the **Suspend VM** radio button if you definitely want that all Virtual Machines be suspended.

Select the **Ask me what to do** radio button if you want to be able to choose whether the Virtual Machine will be stopped or suspended.

Suspending a Virtual Machine

To suspend a Virtual Machine if the **Suspend VM** configuration option is set:

- 1 Click the **Power Off**  button during guest OS execution.
- 2 Progress of saving is displayed in the **Suspending VM** window. When it is finished, the Virtual Machine property page is displayed.

To suspend a Virtual Machine if the **Ask me what to do** configuration option is set:

- 1 Click the **Power Off**  button during guest OS execution.
- 2 In the **Choose action to perform** dialog click the **Suspend** button.
- 3 Progress of saving is displayed in the **Suspending VM** window. When it is finished, the Virtual Machine property page is displayed.

Note. After suspending the Virtual Machine configuration can not be changed. If you begin editing despite of warning, the `.sav` file will be deleted and you will not be able to resume the Virtual Machine.

Resuming a Suspended Virtual Machine

To resume a suspended Virtual Machine:

- 1 Open the Virtual Machine configuration by the ordinary way.
- 2 Click the **Power On**  button.
- 3 Wait until the guest OS state is resumed. Process progress is displayed in the **Resuming VM** window.

After the Virtual Machine has been resumed, its `.sav` file is deleted.

Connecting Devices When Running Virtual Machine

Despite the fact that Configuration Editor (on page 94) cannot be accessed while Virtual Machine is running, you can connect and disconnect additional devices and even choose media type they access. The following virtual devices can be connected/disconnected to the running Virtual Machine:

- CD/DVD-ROMs;
- Floppy disk;
- Network adapter;
- Parallel ports;
- Serial ports;
- Sound device;
- USB devices.

To connect/disconnect any device, it should be enabled in the Virtual Machine configuration. If you have disabled some device, you should stop the Virtual Machine first, then enable the device in Configuration Editor. After that you may restart the Virtual Machine, the device can be connected/disconnected in runtime environment.

Additionally, you can change the type of media the CD/DVD-ROM and floppy drives access.

USB Devices

If you start the Virtual Machine with the USB controller enabled, you may connect to the Virtual Machine different real USB peripherals. The USB controller itself can not be connected or disconnected.

Connecting CD/DVD-ROM Drive

If you start a guest operating system with the CD/DVD-ROM drive enabled you can connect/disconnect it and change media it accesses while running the guest OS.

Note: If the guest OS was started with the CD/DVD-ROM drive disabled, you should shut down guest OS first, then enable CD/DVD-ROM in the Configuration Editor (select the **Enabled** checkbox in the CD/DVD-ROM Options (on page 104) tab) and restart the guest OS.

All commands to control CD/DVD-ROM during guest OS execution can be found in the Parallels Workstation **Devices** menu.

- **Windows primary OS.** If you have several CD/DVD-ROM drives connected to your Virtual Machine they can be identified according their IDE numbers (**CD/DVD-ROM 00** means connected to IDE 0:0, **CD/DVD-ROM 01** means IDE 0:1 and so on).
- **Linux primary OS.** If you have several CD/DVD-ROM drives connected to your Virtual Machine, in the Devices menu they are numbered according the order of their appearance. The first appeared CD/DVD-ROM will be **CD/DVD-ROM 1**, the second one will be **CD/DVD-ROM 2** and so on.

To disable all CD/DVD-ROM operations while running guest OS click **CD/DVD-ROM --> Disconnect** in the Parallels Workstation **Devices** menu.

To reconnect CD/DVD-ROM again select **CD/DVD-ROM --> Connect** command in the **Devices** menu.

Data type accessed by the CD/DVD-ROM drive can be switched from a real CD/DVD-ROM to an image file and vice versa. Use **CD/DVD-ROM --> Connect to** and **CD/DVD-ROM --> Connect image** commands of the Parallels Workstation **Devices** menu.

Note: There is another way to perform all the actions described above. Right-click the CD/DVD-ROM icon  on the status bar (on page 48) to display CD/DVD-ROM context menu and select the required command.

Connecting Floppy Drive

If you start a guest operating system with the floppy drive enabled, you may connect/disconnect it and change its options while running the guest OS. Parallels Workstation allows to:

- connect/disconnect floppy drive,
- change media that floppy drive access.

Note: If the guest OS is started with the floppy drive disabled, you should shut down the OS first, then enable floppy in the Configuration Editor (select the **Enabled** checkbox in the Floppy Options (on page 99) tab) and restart the guest OS.

Guest operating system with a virtual floppy connected to a real floppy drive prevents the floppy from being accessed by the primary OS while guest OS is running. To disconnect the floppy drive from the primary OS without shutting the guest OS down click **Floppy --> Disconnect** in the Parallels Workstation **Devices** menu.

The floppy drive can be reconnected again by clicking **Floppy --> Connect** in the **Devices** menu.

The type of media accessed by the virtual floppy drive can be switched from a real floppy drive to image file and vice versa. Use **Floppy --> Connect to** and **Floppy --> Connect image** commands of the Parallels Workstation **Devices** menu.

Note: There is another way to perform all the actions described above. Right-click the floppy drive icon  on the status bar (on page 48) to display floppy drive context menu and select the required command.

Connecting a Network Adapter

If a network adapter is enabled in your Virtual Machine configuration, you can connect/disconnect it when running guest OS.

Note: If the guest OS is started with network adapter disabled, you should shut down the OS first, then enable network adapter in the Configuration Editor (select the **Enabled** checkbox in the Network Adapter Options (on page 110) tab) and restart the guest OS.

To connect or disconnect network adapter, do the following:

- select Parallels Workstation **Devices** menu,
- select **Network** menu item,
- then select **Connect/Disconnect** command to connect or disconnect network adapter respectively.

Note: There is another way to connect/disconnect network adapter. Right-click network adapter icon  on the status bar (on page 48) to display context menu and select the required command.

Connecting Serial/Parallel Ports

If a parallel/serial port is enabled in your Virtual Machine configuration, you can connect/disconnect port when running guest OS.

Note: If the guest OS is started with parallel/serial port disabled, you should shut down the OS first, then enable serial or parallel port in the Configuration Editor (select the **Enabled** checkbox in the Serial Port Options (on page 106) tab or Parallel Port Options (on page 108) tab) and restart the guest OS.

To connect or disconnect serial or parallel port, do the following:

- select Parallels Workstation **Devices** menu,
- select **COM** (from 1 to 4 depending on how many serial ports are enabled) or **LPT** (from 1 to 3 depending on how many parallel ports are enabled),
- then select **Connect/Disconnect** command.

Note: There is another way to connect/disconnect port. Right-click serial () or parallel () port icon on the status bar (on page 48) to display context menu and select the required command.

Connecting Sound Device

If a the sound device is enabled in Virtual Machine configuration you can connect/disconnect it when guest OS is running.

Note: If the guest OS is started with the sound device disabled, you should shut down the OS first, then enable sound device in the Configuration Editor (select the **Enabled** checkbox in the Sound Options (on page 112) tab) and restart the guest OS.

To connect or disconnect sound device, you should do the following:

- select the **Devices** in the Parallels Workstation menu,
- select **Sound** menu item,
- select **Activate** to connect the sound device (or select **Mute** to disconnect).

Note: There is another way to connect/disconnect sound device. Right-click sound device icon  on the status bar (on page 48) to display context menu and select the required command.

Connecting USB Devices

If the USB controller is enabled in Virtual Machine configuration, you can connect/disconnect USB peripherals to the running Virtual Machine. Up to two USB devices can be used by Virtual Machine simultaneously.

Parallels Workstation automatically detects all the USB devices connected to your host computer and displays them under the **Devices/USB** menu item and in the context menu for the USB controller () in the status bar. Those devices that are currently connected to the Virtual Machine are checked. Primary OS can not access an USB device while it is used by the Virtual Machine.

Note: If the guest OS is started with the USB controller disabled, you should shut down the OS first, then enable the USB controller in the Configuration Editor (select the **Enabled** checkbox in the USB Options (see page 113) tab) and restart the guest OS.

Autoconnect

If the **Autoconnect USB devices** option in the USB Options (see page 113) tab is turned on and no more than one USB device is currently active, you can connect an additional USB device to your Virtual Machine. Do the following:

- simply connect an USB device to your host computer.

If you connect to your host computer an additional USB peripheral while there are two active USB devices already, nothing will happen. However you are able to activate the newly connected device manually after deactivating any of the currently active USB devices. See the next subtopic to learn how to do it.

Manual Connect

To connect an USB device to the Virtual Machine:

- Connect an USB device to your host computer.
- Select the **Devices/USB** in Parallels Workstation menu or the context menu for the USB controller () in the status bar to display the list of all the USB devices connected to your host computer.

In the USB device list, make sure that no more than one USB device is currently active. If there are two devices checked, disconnect one of them by clicking it.

- Click the desired USB device in the list to connect it.

Note. If you follow the instructions stated above but receive the "Unable to connect USB device" message while trying to connect an USB device on a computer running Linux primary OS, see the Problem with Connecting USB Devices in Linux Primary OS (see page 187).

Parallels Tools Center

Note. Parallels Tools Center is available in Windows guest OSes only.

Parallels Workstation allows you to control statuses of Parallels Tools in all of the Windows guest OSes for which tools are provided (see the Parallels Tools Overview (see page 69) for tools descriptions and availability table). **Parallels Tools Center**, that is installed along with Parallels Tools, allows you to:

- check tools' statuses;
- temporarily disable and enable each tool separately (for those tools that can be stopped without violating guest OS executing);
- configure tool's specific parameters (for those tools that have them).

The Parallels Tools Center is organized as a collection of tabs, each of which contains settings for an individual tool. In each specific guest OS, the Parallels Tools Center contains tabs only for those tools that you have installed in your guest OS.

Parallels Tools Center is started automatically on guest OS startup; its icon is placed into the guest OS system tray.

To open Parallels Tools Center:

- click its icon  in guest OS system tray.

To restart Parallels Tools Center after disabling:

- Locate the `ParallelsToolsCenter.exe` file in the folder where you have installed the Parallels Tools and launch it.

If you installed the Parallels Tools into the default folder, this file resides in the following path:

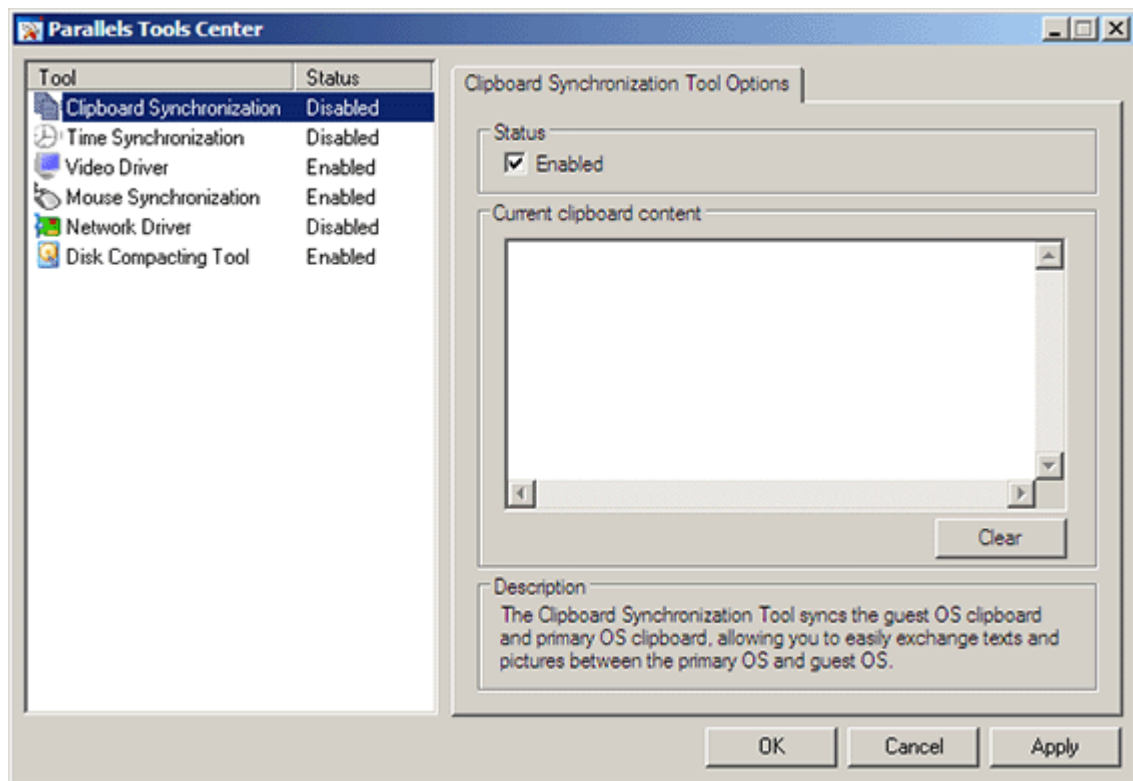
```
C:/Program Files/Parallels/Parallels
Tools/ParallelsToolsCenter.exe.
```

Using Parallels Tools Center in a Parallels Workstation 2.0 Virtual Machine

To use the Parallels Tools Center in a Virtual Machine created by Parallels Workstation 2.0:

- If you have installed in this Virtual Machine the Parallels Tools provided with Parallels Workstation 2.0, you need to upgrade this package. See the Upgrading Parallels Tools in a Parallels Workstation 2.0 Virtual Machine.
- If you have not installed the Parallels Tools in this Virtual Machine, you only need to install the Parallels Tools provided with Parallels Workstation 2.1. See the Windows Tools Installation (on page 72).

Clipboard Synchronization Tool Options



Status:

Enabled shows the current status of the Clipboard Synchronization Tool. To temporarily disable this tool, deselect this checkbox. You can enable the Clipboard Synchronization Tool by selecting this checkbox later.

Current clipboard content:

This field displays the current clipboard contents that can be scrolled.

The **Clear** button empties the clipboard contents.

Description:

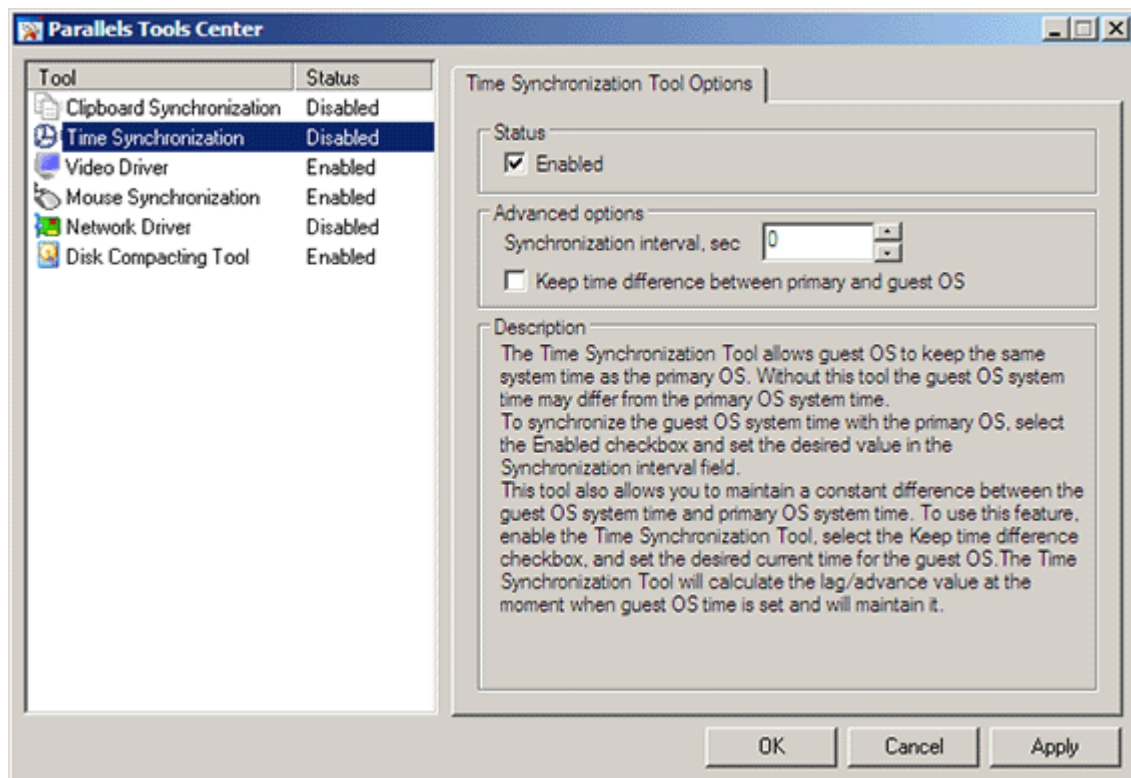
Displays the short description of the tool. For complete description see the Parallels Tools Overview (see page 69).

Activating changes:

After you have made the desired changes on the tab do one of the following:

- Click the **Apply** button to activate changes.
- Click the **OK** button to activate changes and hide the Parallels Tools Center.

Time Synchronization Tool Options



Status:

Enabled checkbox shows the current status of the Time Synchronization Tool. To temporarily disable this tool, deselect this checkbox. You can enable the Time Synchronization Tool by selecting this checkbox later.

Note: Before starting the Parallels Time Synchronization Tool any other time synchronization services must be stopped in order to avoid potential conflicts.

Advanced options:

Synchronization interval, sec. contains the period of time between two synchronization operations. Use scroll buttons in the field to set the desired value or simply enter it into the field. The interval value should be from 10 to 3600 seconds.

To synchronize the guest OS system time with the primary OS:

- select this checkbox,
- set the desired value of synchronization interval in the **Synchronization Interval** field.

Keep time difference between primary OS and guest OS checkbox allows you to maintain a constant difference between the guest OS system time and primary OS system time.

To use this feature:

- select the **Enabled** checkbox,
- select the **Keep Time Difference** option,
- in the guest OS, set the desired current time.

The Time Synchronization Tool will calculate the lag/advance value at the moment when guest OS time is set and will maintain it.

Description:

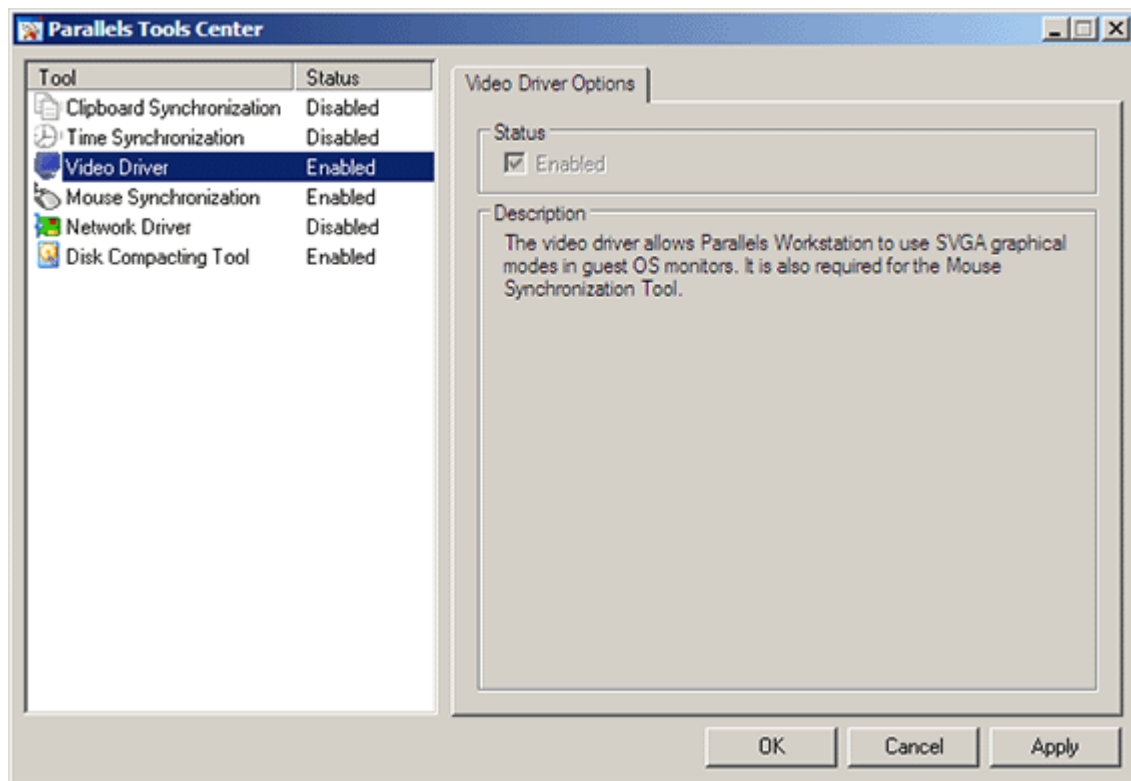
Displays the short description of the tool. For complete description see the Parallels Tools Overview (see page 69).

Activating changes:

After you have made the desired changes on the tab, do the following:

- Click the **Apply** button to activate changes.
- Click the **OK** button to activate changes and hide the Parallels Tools Center.

Video Driver Options



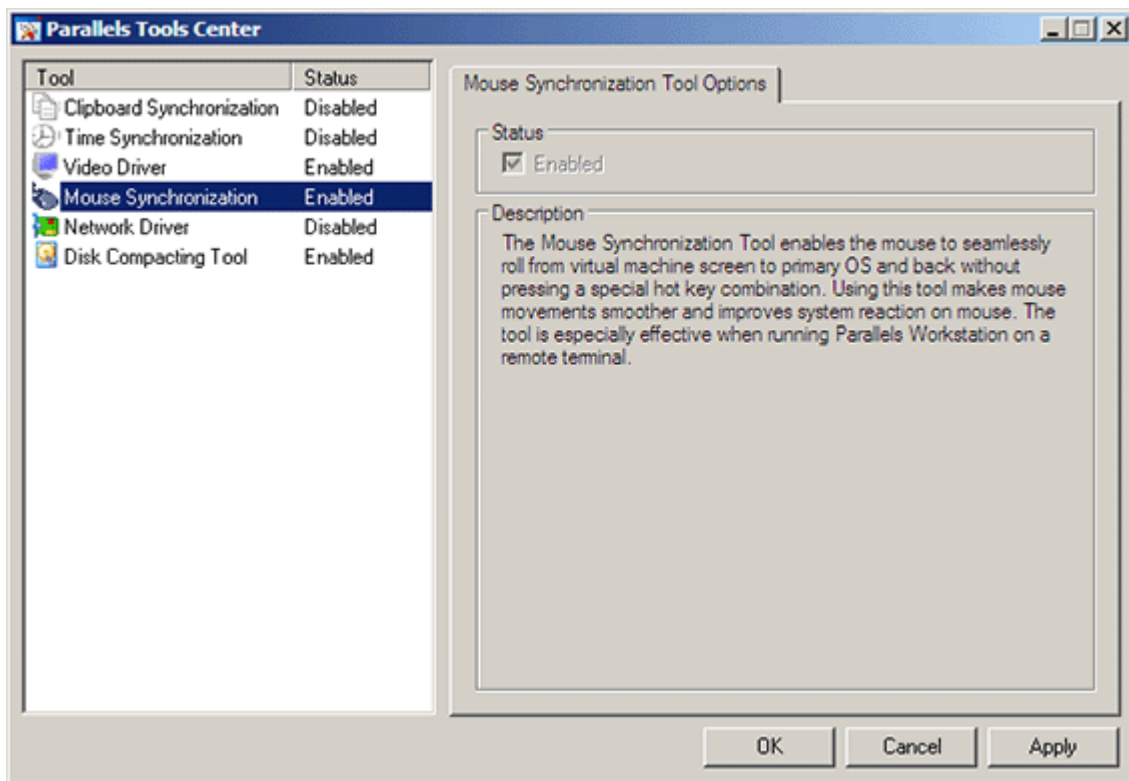
Status:

Enabled checkbox shows the current tool's status but is inaccessible for editing.

Description:

Displays the short description of the tool. For complete description see the Parallels Tools Overview (see page 69).

Mouse Synchronization Tool Options



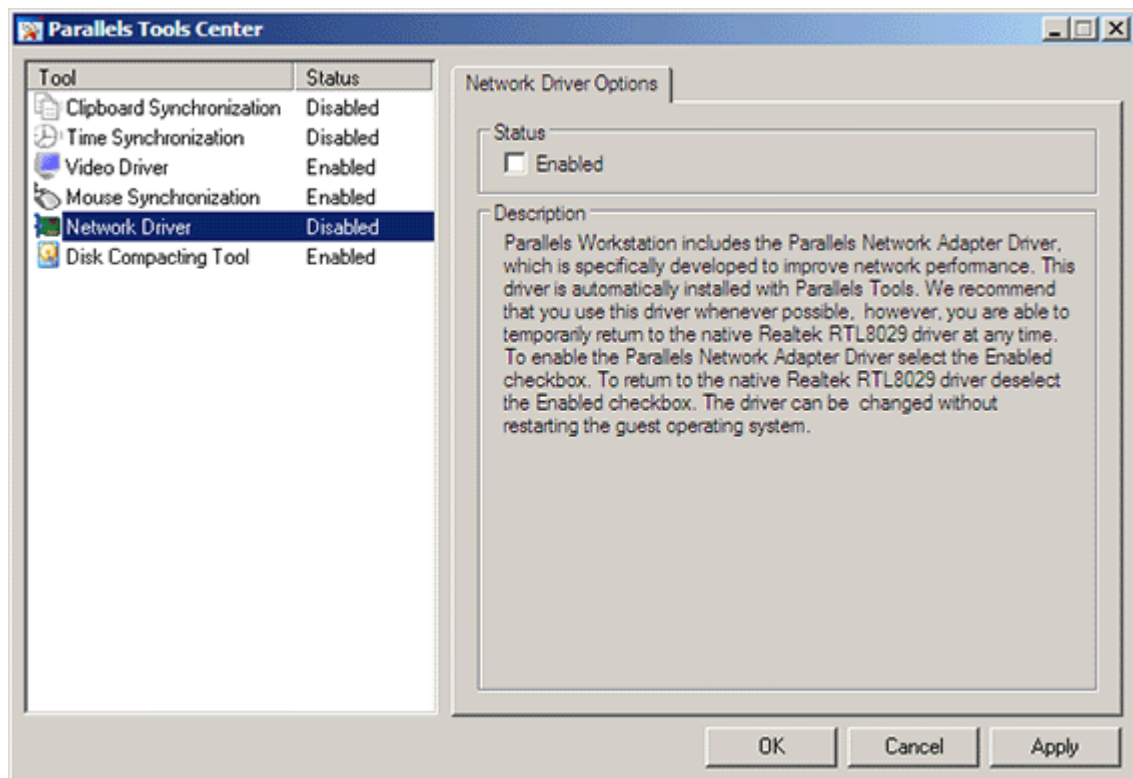
Status:

Enabled checkbox shows the current tool's status but is inaccessible for editing.

Description:

Displays the short description of the tool. For complete description see the Parallels Tools Overview (see page 69).

Network Driver Options



Status:

Enabled checkbox shows the current status of the Parallels Network Adapter Driver. If this checkbox is selected, it means that the Parallels Network Adapter Driver is active. We recommend that you use this driver whenever possible, however, you are able to temporarily return to the native Realtek RTL8029 driver at any time.

To enable the Parallels Network Adapter Driver select the **Enabled** checkbox. To return to the native Realtek RTL8029 driver deselect the **Enabled** checkbox. Drivers can be changed without restarting the guest operating system, however network connection may be temporarily lost.

Description:

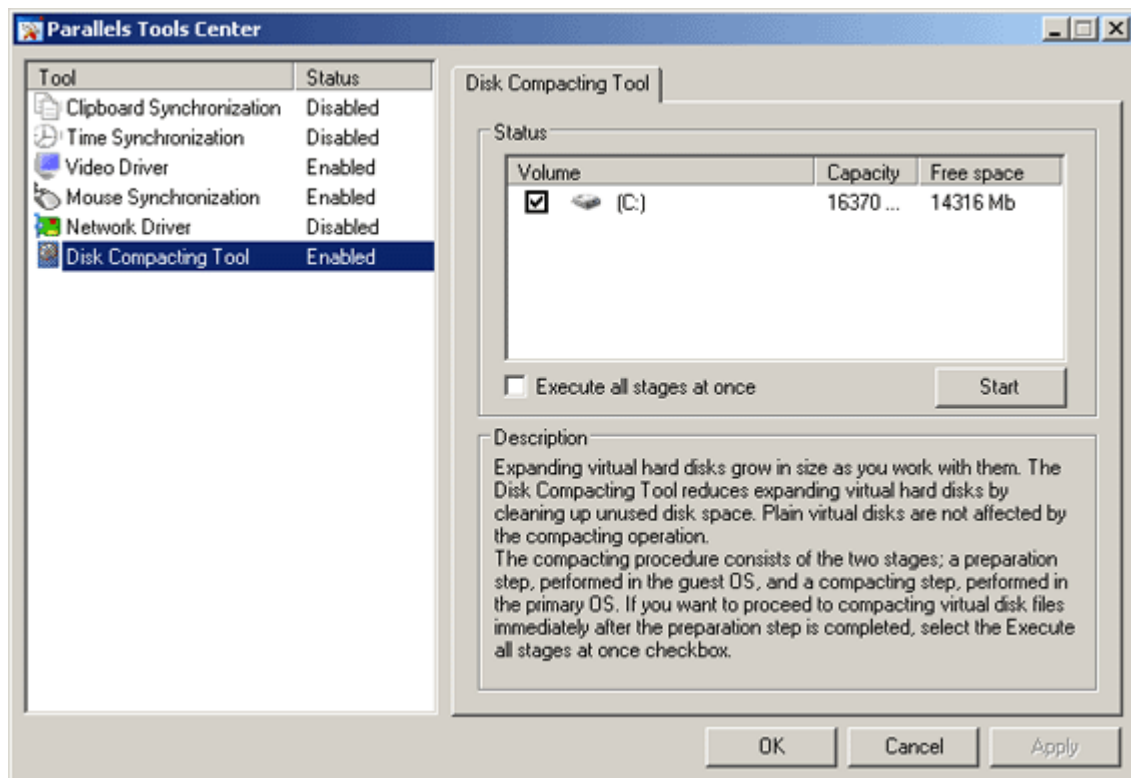
Displays the short description of the tool. For complete description see the Parallels Tools Overview (see page 69).

Activating changes:

After you have made the desired changes on the tab, do one of the following:

- Click the **Apply** button to activate changes.
- Click the **OK** button to activate changes and hide the Parallels Tools Center.

Disk Compacting Tool Options



Status:

The table displays the list of volumes located on the expanding virtual hard disks connected to your Virtual Machine and formatted with Windows file systems. Volumes formatted with other file systems are not displayed even though they may be physically located on expanding virtual hard disks. In the table you can select the volumes to be processed by the Disk Compacting Tool.

Execute all stages at once. Select this checkbox if you want to perform both stages of the compacting process one by one. See the description of the two stages of compacting process in the **Compacting Procedure** of the Compacting Virtual Disk (see page 149) topic.

Start button starts the process of preparing virtual hard disks for compacting.

Description:

Displays short description of the tool. See the complete description and guidelines in the Compacting Virtual Disk (see page 149) topic.

Compacting Virtual Disk

What Is Disk Compacting Tool

Expanding virtual disks grow in size as you work with them. Besides applications and their data every disk accumulates temporary files. The Disk Compacting Tool, included in Parallels Workstation, cleans up unused disk space occupied by temporary files thus reducing the size of expanding virtual hard disks. We recommend that you use Disk Compacting Tool from time to time to save space on the host hard disk.

Disk Compacting Tool processes the following partitions:

- volumes located on the expanding virtual hard disks and formatted with Windows file systems.

Note. Disk Compacting Tool does NOT process: 1) volumes located on expanding virtual hard disks but formatted with other than Windows file systems, 2) plain virtual disks.

Compacting Procedure

In general the compacting procedure consists of the two stages that can be performed separately:

- 1 A preparation step, performed in the guest OS, when an unused disk space is marked.

This step can be performed only in those guest OSes where Parallels Tools Center can be installed, i.e. in Windows 95/98/NT/ME/2000/XP/2003 guest OSes. See Installing Parallels Tools (see page 68) for guidelines on installing Parallels Tools package.

- 2 And a compacting step, performed in the primary OS, when the unused space is removed.

This step can be performed in two ways:

- Immediately after the preparation step is completed.

All of the selected expanding virtual disks are compacted in one operation.

This way is available in those guest OSes where the preparation step can be performed, i.e. in Windows 95/98/NT/ME/2000/XP/2003 guest OSes.

- When the Virtual Machine is powered off.

Compacting is launched for each expanding virtual disk one-by-one.

This way is available in all guest OSes.

How to Compact Expanding Virtual Disks

To compact disks in Windows 95/98/NT/ME/2000/XP/2003 guest OSes:

- 1 In the running Virtual Machine, open the **Parallels Tools Center**. See the Parallels Tools Center (see page 141) topic to learn how to do it.
- 2 In the Parallels Tools Center, open the **Disk Compacting Tool** tab.
- 3 In the Disk Compacting Tool (see page 148) tab, a table in the **Status** group displays the list of volumes that can be compacted. Select the volumes you want.

If you want to proceed to compacting immediately after the preparation step is completed, select the **Execute all stages at once** checkbox.

Click the **Start** button to begin preparing disks.

- 4 During the preparation step the **Preparing for compacting. Please wait...** message is displayed.

- 5 If you have selected the **Execute all stages at once** checkbox:

When disks are ready for compacting, Disk Compacting Tool pauses the Virtual Machine execution and starts compacting. **Compacting virtual hard disk** box is displayed.

When the process is finished, you are informed that "Process of compacting of virtual hard disk(s) has been successfully completed". Click **OK** to continue working with the Virtual Machine.

- 6 If you have NOT selected the **Execute all stages at once** checkbox:

When disks are ready for compacting, you are informed that "You are able either start compacting right now or do it when the Virtual Machine is powered off".

If you select to start compacting, the Disk Compacting Tool performs compacting as described in the step 5.

If you select to put compacting off, you may continue working with the Virtual Machine. See the subtopic below to learn how to start compacting later.

To compact expanding virtual disks in any guest OS:

- When the Virtual Machine is powered off, click the **Compact** button on the Advanced (see page 102) tab of **Hard Disk Options** for each expanding-type virtual disk. While compacting is performed, **Compacting virtual hard disk** box is displayed. When the process is finished, you are informed that "Process of compacting of virtual hard disk(s) has been successfully completed".

Setup Printer in a Virtual Machine

There are three principal methods of configuring printing in a Virtual Machine:

- Setup a network printer.

We recommend that you use this method since it provides the most stable work.

- Connect a Virtual Machine's parallel port to a parallel port of your real computer to which a printer is connected.

This is performed in Parallel Port Options (on page 108) tab. Two options are available for Virtual Machines under Windows primary OS: **Use printer** and **Use port**. We recommend you to select the **Use printer** option. When using this method, Parallels Workstation composes a printer job and transfers it to the primary OS that guides further process as if printer job was initiated by itself.

On a computer running Linux primary OS only **Use port** option is available in Virtual Machines. When using this method, Parallels Workstation itself controls the printer job.

- Setup an USB printer.

Configuring Virtual Machine for all methods of printing is given below.

Setting Up a Network Printer

Before installing a network printer in a guest OS make sure that your primary OS and the Virtual Machine complies the following requirements:

- Networking in your primary operating system is configured.
- Virtual Machine configuration includes the network adapter which is connected to a real network adapter of your computer. See the Network Adapter Options (on page 110) of your Virtual Machine; make sure that the **Enabled** and the **Connect at startup** options are selected in the **Device Status** group, in the **Emulation** group the **Bridged Ethernet** option should be selected and the real network interface should be chosen in the **Network Adapters** list.
- Networking in the guest OS is configured.
- User account from which you will setup printer has permissions to access the network printer.

In Linux or FreeBSD Guest Operating System

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

- Common UNIX Printing System (CUPS). Installation instructions can be found at CUPS site <http://cups.org/documentation.php>;
- Samba service. Installation instructions can be found at Samba site <http://us4.samba.org/samba/docs/man/Samba-HOWTO-Collection/install.html>;
- A Web browser, since we consider controlling CUPS via web interface;
- Also you have to know the `root` password.

To add a network printer in a Linux or FreeBSD guest OS:

- 1 Start your Linux or FreeBSD guest operating system.
- 2 Start Common UNIX Printing System.

In the **Terminal**, issue the command:

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

- 3 Start a Web browser and open either IP address of your Virtual Machine or `http://127.0.0.1:631`.
- 4 Select **Printers** in menu. Click the **Add printer** button below the list of available printers (if any).
- 5 You are asked for `root` password. Enter it to be able to proceed.
- 6 In the **Add New Printer** screen enter the information for easy identification of the printer: an informative printer name, location, and description.
- 7 In the **Device for <Printer Name>** screen select the *Windows Printer via Samba*.
- 8 In the **Device URI for <Printer Name>** screen specify the path to network printer in the following format:
`smb://<computer name>/<printer name>`
- 9 In the **Model/Driver for <Printer Name>** screen select the model of your printer.

- 10** CUPS performs installation. In case of success the "Printer <name> has been added successfully" message is displayed.

In Windows Guest Operating System

To add a network printer in a Windows guest OS:

- Start Windows guest operating system and log in the proper account.
- Open Windows **Start** menu, select **Settings** and then **Printers and Faxes** (or simply **Printers**) item.
- Open the Add Printer Wizard:
 - In Windows 95/98/NT/ME/2000/2003 double-click the **Add printer** icon.
 - In Windows XP click the **Add a printer** link.
- In the Add Printer Wizard:
 - In Windows 2000/XP/2003:
 - click **Next** in the first wizard's screen,
 - in the **Local or Network Printer** screen, click **A network printer, or a printer attached to another computer**.
 - In Windows 98/ME:
 - click **Next** in the first wizard's screen,
 - in the next wizard's screen asking **How is this printer attached to your computer?** click the **Network printer** option.
 - In Windows 95/NT:
 - click **Network printer/server**.
- Continue an ordinary network printer installation.

Setting Up Printing via LPT Port of Real Computer

Before setting up printing using this method make sure that:

- a printer is connected to an LPT port of your real computer.

To setup printing through a parallel port of your physical computer:

- 1** Open the Virtual Machine configuration in configuration editor (on page 94), make sure that the configuration includes a parallel port, if necessary add it.
- 2** Open the Parallels Port Options (on page 108), make sure that the **Enabled** and the **Connect at startup** options are selected.
- 3** Specify the way of emulating the parallel port in the **Emulation** group.

If your computer runs Windows primary OS, we recommend to select the **Use printer** method (it is not available in Linux primary OSes). The **Printers** list displays list of printers available in the primary OS. Specify which of them you want to use.

In Virtual Machine under Linux primary OS select the **Use port** option and then specify the real port of your physical computer to which the printer is connected in the **LPT-port** list.
- 4** Save the Virtual Machine configuration (see Saving Virtual Machine Configuration (see page 94)) and start the guest operating system.

- 5 Install the driver for your printer in the guest OS. We recommend that you use the native driver.

Setting Up an USB Printer

To setup an USB printer:

- 1 Open the Virtual Machine configuration in configuration editor (on page 94), make sure that the configuration includes an USB controller, if necessary add it.
- 2 Open the USB Options (see page 113), make sure that the **Enabled** option is selected. Select the **Autoconnect at startup** if you want the printer to be automatically captured by the Virtual Machine.
- 3 Save the Virtual Machine configuration (see Saving Virtual Machine Configuration (see page 94)) and start the guest operating system.
- 4 Connect the USB printer as a usual USB device. See the Connecting USB Devices (see page 140).
- 5 Install the native driver for the printer in the guest OS.

CHAPTER 11

Using the Parallels Image Tool

Since images of different real media are widely used for Virtual Machines, the Parallels Workstation distribution includes the special tool for creating and modifying hard disk, floppy disk, and CD/DVD images - the Parallels Image Tool.

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What Is Parallels Image Tool

The Parallels Image Tool allows you to create images of the three types of real media: hard disks, floppy disks, and CD/DVDs, and to modify existing hard disk images: to convert hard disk image to another format (see the Format of The Virtual Disk (see page 89) in the **Hard Disk Images** topic), to increase disk image size, and to defragment an expanding disk image.

Note: Blank hard disk and floppy disk images can be created in Configuration Editor on the corresponding options tabs - Hard Disk Options (see page 101) and Floppy Options (on page 99) - using the **Recreate** button located on these tabs.

With hard disk images, the Image Tool can perform the following operations:

- create an image of a real hard disk,
with existing hard disk images:
- increase disk size of an hard disk image,
- create an expanding copy of a plain hard disk image,
- create plain copy of a expanding hard disk image,
- defragment an expanding hard disk image.

With CD/DVD-ROM images, the Image Tool can perform the following operations:

- create an .iso image of a real CD/DVD-ROM.

With floppy disk images, the Image Tool can perform the following operations:

- create an image of a real diskette.

Note: In Linux primary OS some Image Tool options may be disabled depending on your system privileges.

Starting the Parallels Image Tool

The Parallels Image Tool is made in the form of wizard.

In Windows primary OS:

To run the Parallels Image Tool wizard, select **Programs --> <Parallels Folder Name> --> Parallels Image Tool** in the Windows **Start** menu where **<Parallels Folder Name>** denotes the folder you have specified while installing Parallels Workstation.

In Linux primary OS:

To run Parallels Image Tool log in, launch the **Terminal** program and run

```
imagetool
```

in the command line.

Managing Hard Disk Images

This section contains information on creating and modifying virtual hard disks using Parallels Image Tool.

Creating an Image of a Real Hard Disk

The Parallels Image Tool can create images of real hard disks. Such disks are intended mainly for migrating data from your real computer to a Virtual Machine. Since configuration of the Virtual Machine is probably different from the hardware configuration of your real computer, an operating system installed on the real disk (if it is installed) is not likely to function properly on the Virtual Machine. Thus such virtual disk is not recommended to serve as startup disk, rather it should be attached to an existing configuration as an additional one.

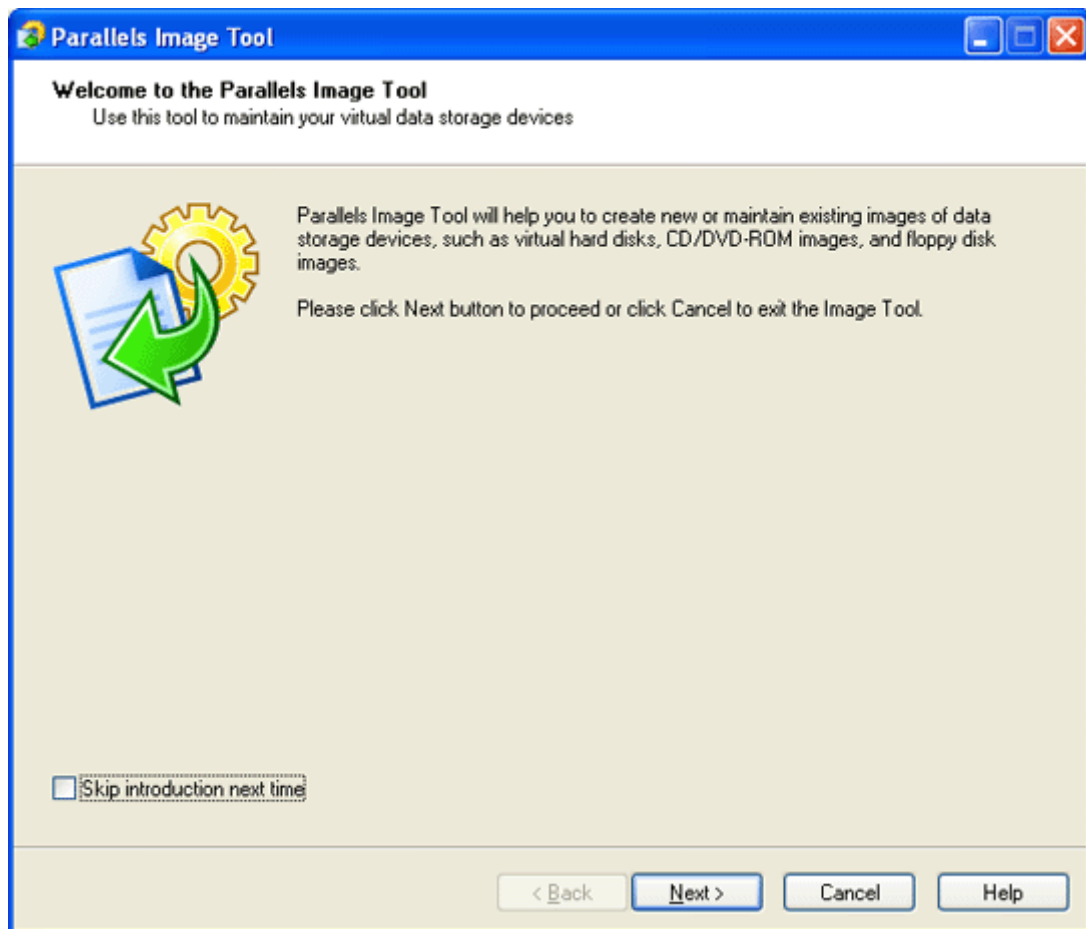
An image of a real hard disk is created in plain format only. See the Format of The Virtual Disk (see page 89) in the **Hard Disk Images** topic for description of the plain format.

Virtual hard disk in plain format occupies all its size right from the moment it is created. This means that the disk image is the same size as the real disk itself, regardless of how much space on the real disk is actually used. So, to create an image of a real hard disk you should have one real hard disk more for storing the image file. And to accommodate the image, the size of the additional hard disk should be not less than the size of the one you made a copy of.

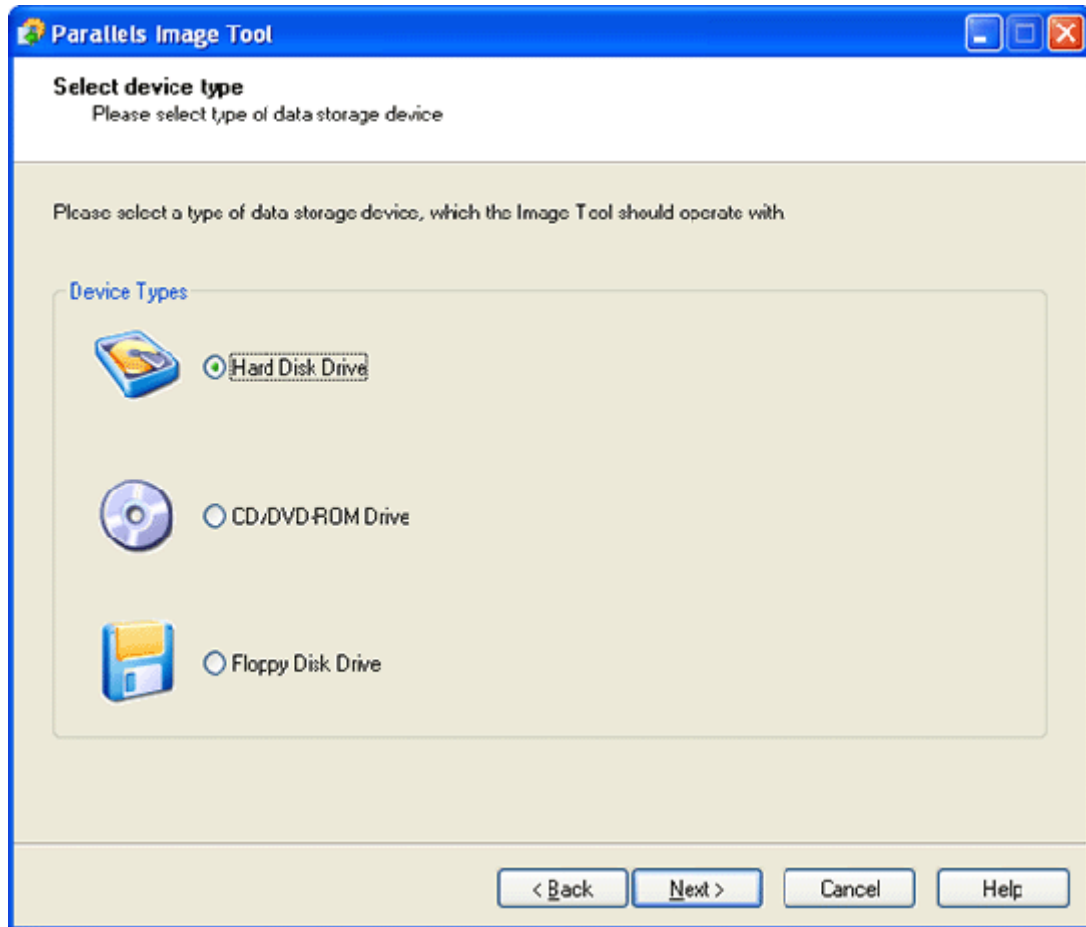
Note: In order to create an image of a real hard disk you should have an additional hard disk connected to your computer for storing image of the first one. Additional disk should be at least 5% larger than the first one.

To create an image of a real hard disk:

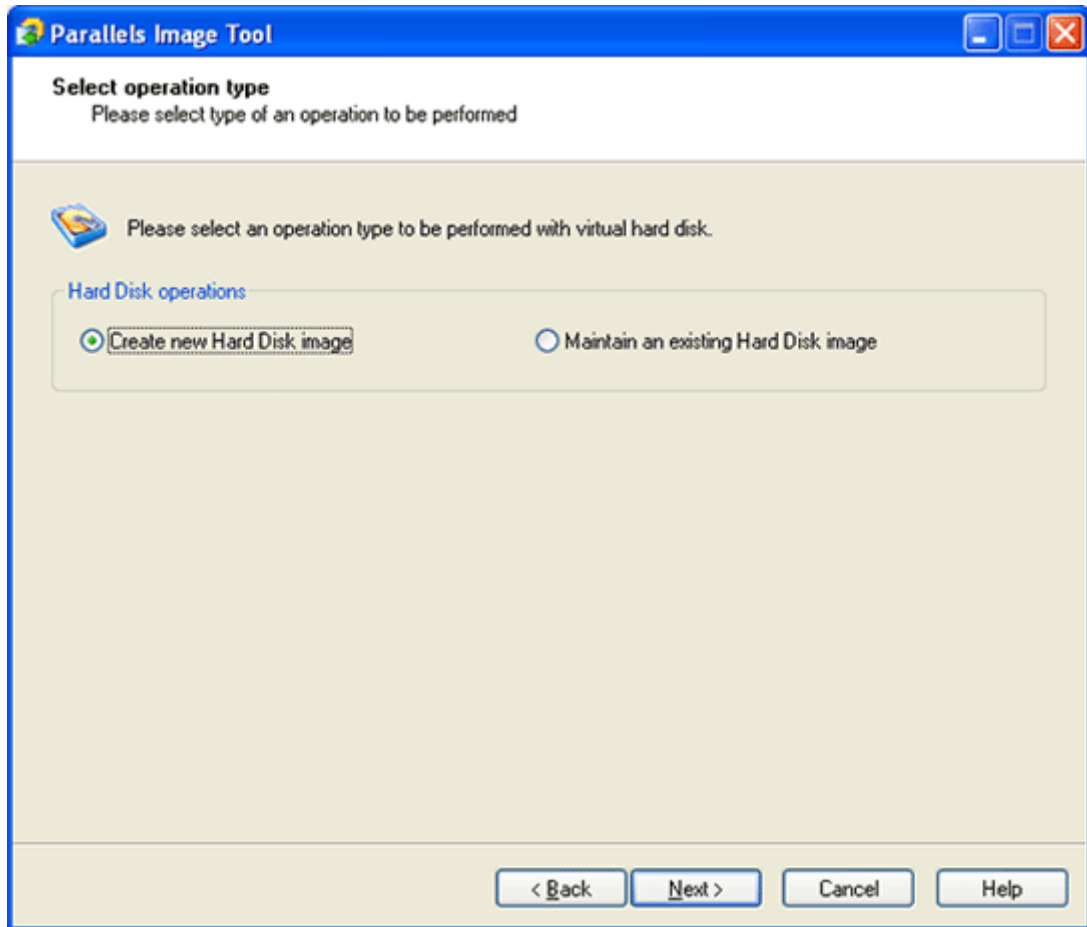
- 1 Start the Parallels Image Tool (see page 155). When starting for the first time, the Wizard greets you with the **Welcome to the Parallels Image Tool** screen. Click **Next**.



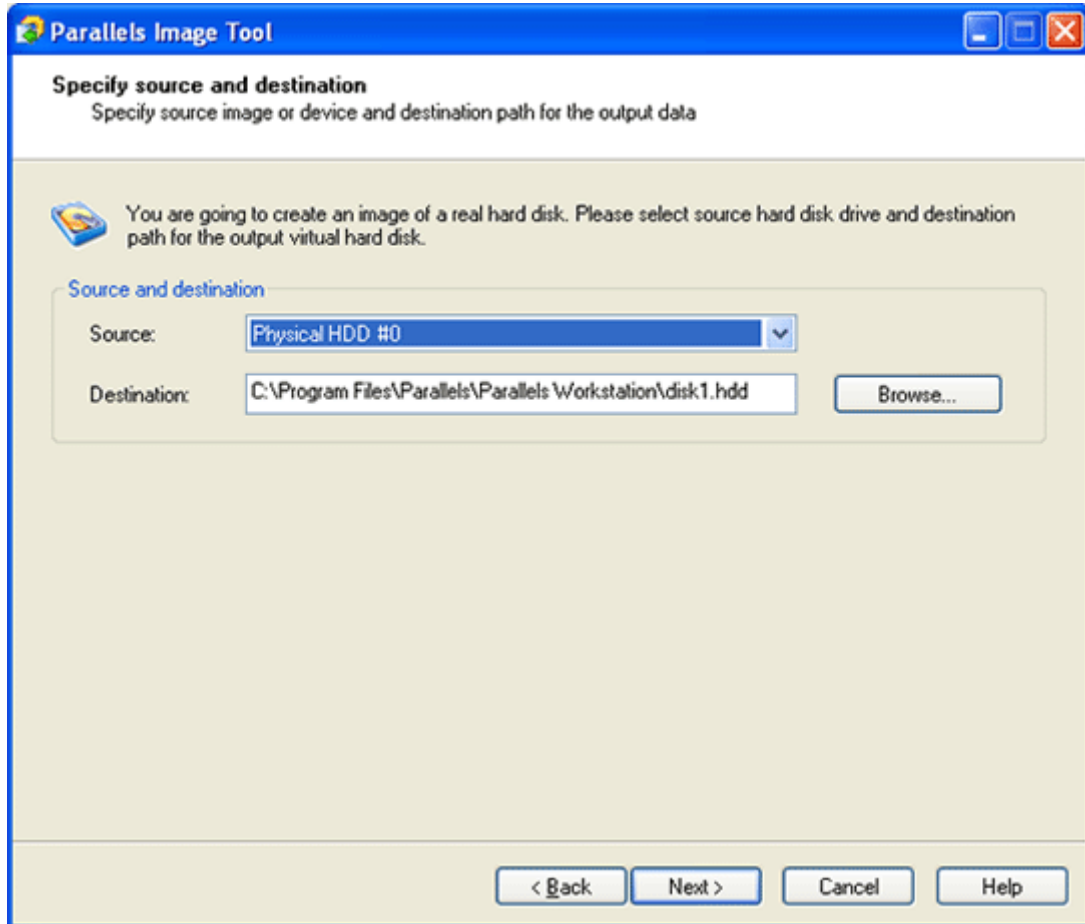
- 2 On the **Select device type** screen select the **Hard Disk Drive** option and click the **Next** button to move to the **Select operation type** screen.



- 3 On the **Select operation type** wizard screen select the **Create new Hard Disk image** option and click **Next** button.

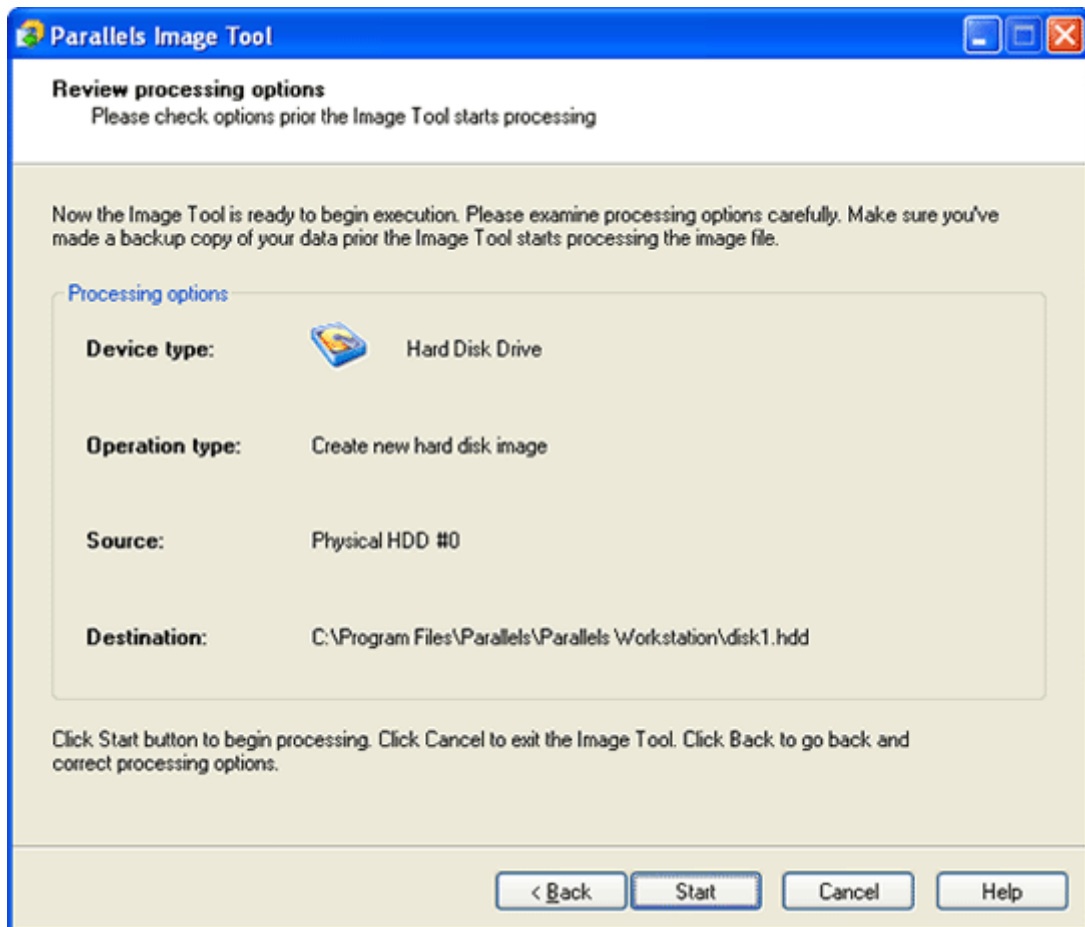


- 4 On the **Specify source and destination folder** screen do the following:
- in the **Source** field select physical hard disk to be duplicated,
 - in the **Destination** field specify destination directory and file name for the disk image file that should be located on another physical hard disk.

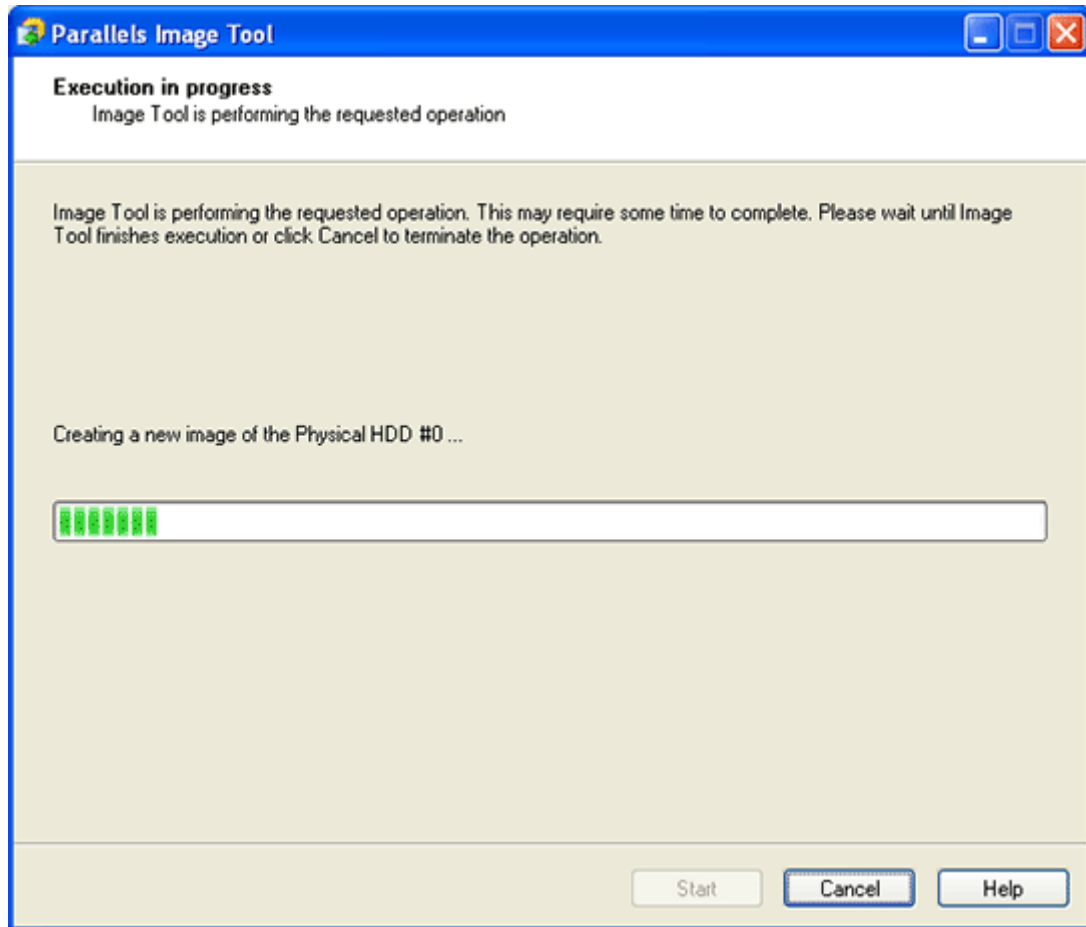


Click **Next**.

- 5 Review the settings carefully (operation type, source and destination folder) on the **Review processing options** screen. If everything is correct, click **Start** button to start creating the disk image.

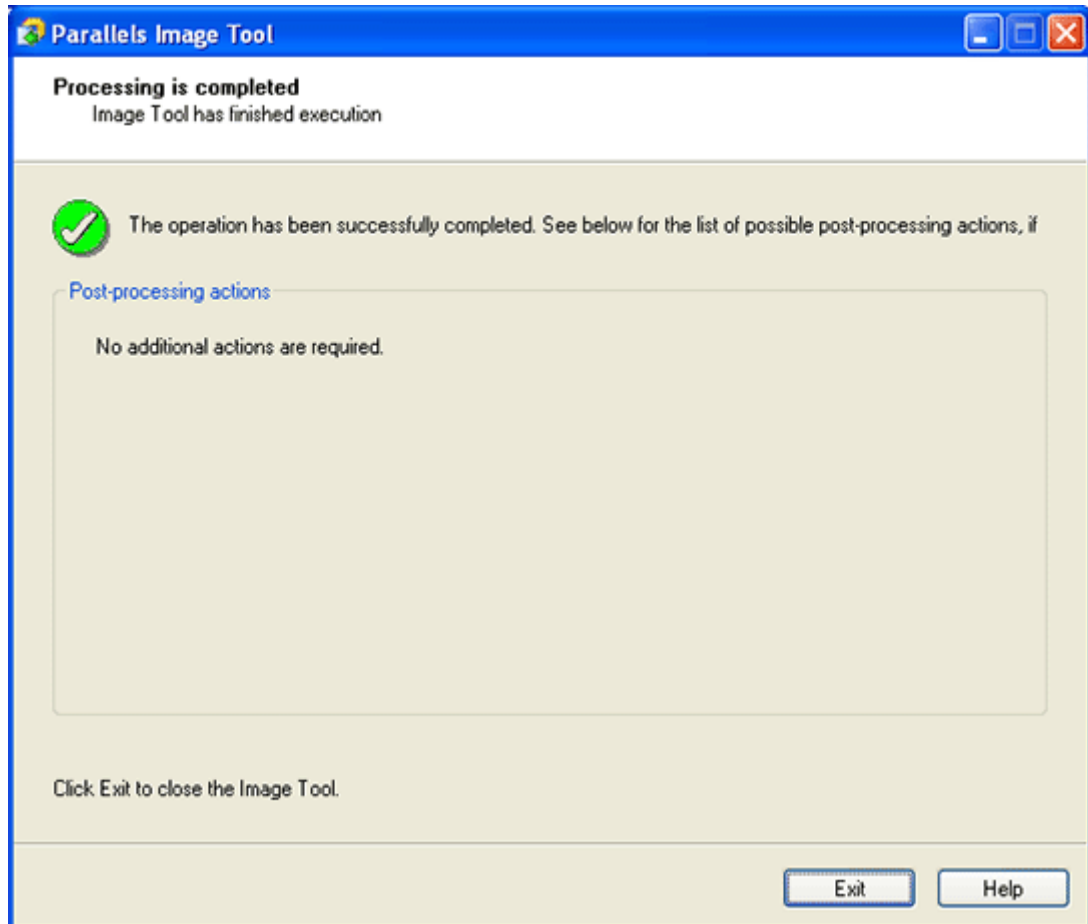


- 6 While the operation is being performed the **Execution in progress** screen is displayed.



- 7 After the disk image is ready, the **Processing is completed** screen appears. Close the wizard by clicking the **Exit** button. The disk image is now located in the destination folder specified on step 5 and you can connect it to a Virtual Machine in the Configuration Editor. See the Adding New Devices to Virtual Machine (see page 114) to know how to connect to a Virtual Machine a new hard disk image or the Hard Disk Options (see page 101) to replace one of the currently connected hard disks with the new one.

See also the Hard Disk Images (see page 89) to know concepts of using hard disk images in Parallels Workstation.



Modifying an Existing Hard Disk Image

The Parallels Image Tool allows you to modify hard disk images in the following ways:

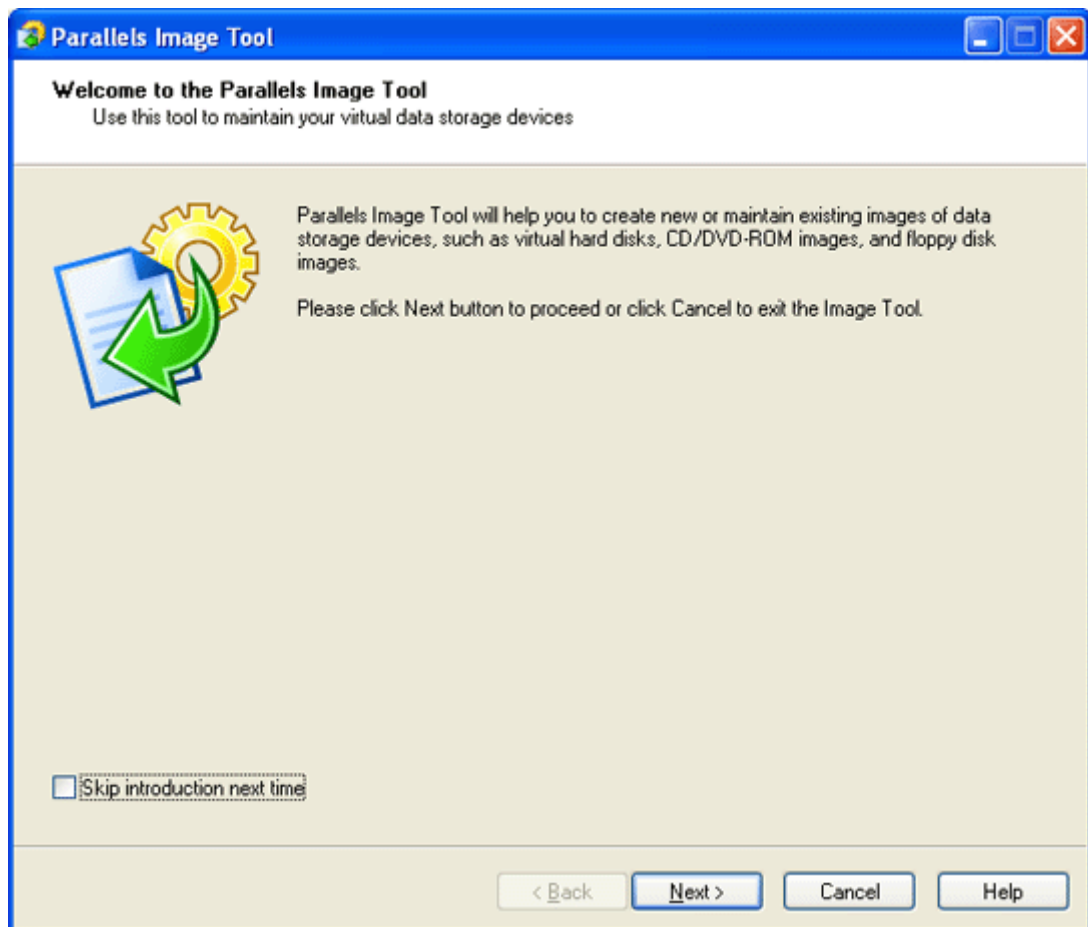
- Increase size of a hard disk image. Both expanding and plain disks can be enlarged.
- Convert a plain hard disk image to the expanding format. A copy of the plain disk in expanding format is made while original disk remains untouched.
- Convert an expanding hard disk image to the plain format. Copy of the expanding disk in plain format is made while original disk remains untouched.
- Defragment an expanding hard disk image.

All modifying operations require that source hard disk image is not in use by a running Virtual Machine.

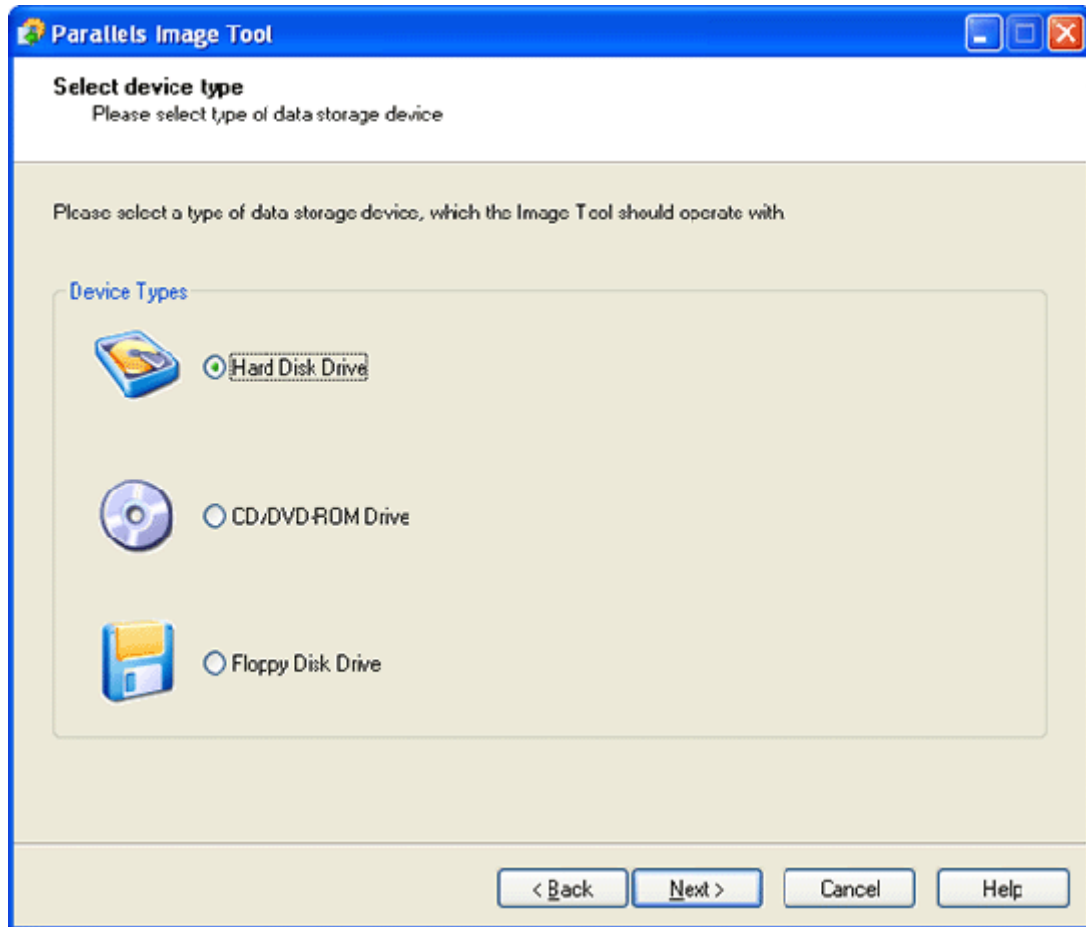
When converting and defragmenting be sure to select the source hard disk image of a proper format. To check disk format, open any Virtual Machine configuration that includes this virtual hard disk and look for **Disk format** field on the Advanced (see page 102) tab of **Hard Disk Options** in **Configuration Editor**.

To modify an existing hard disk image:

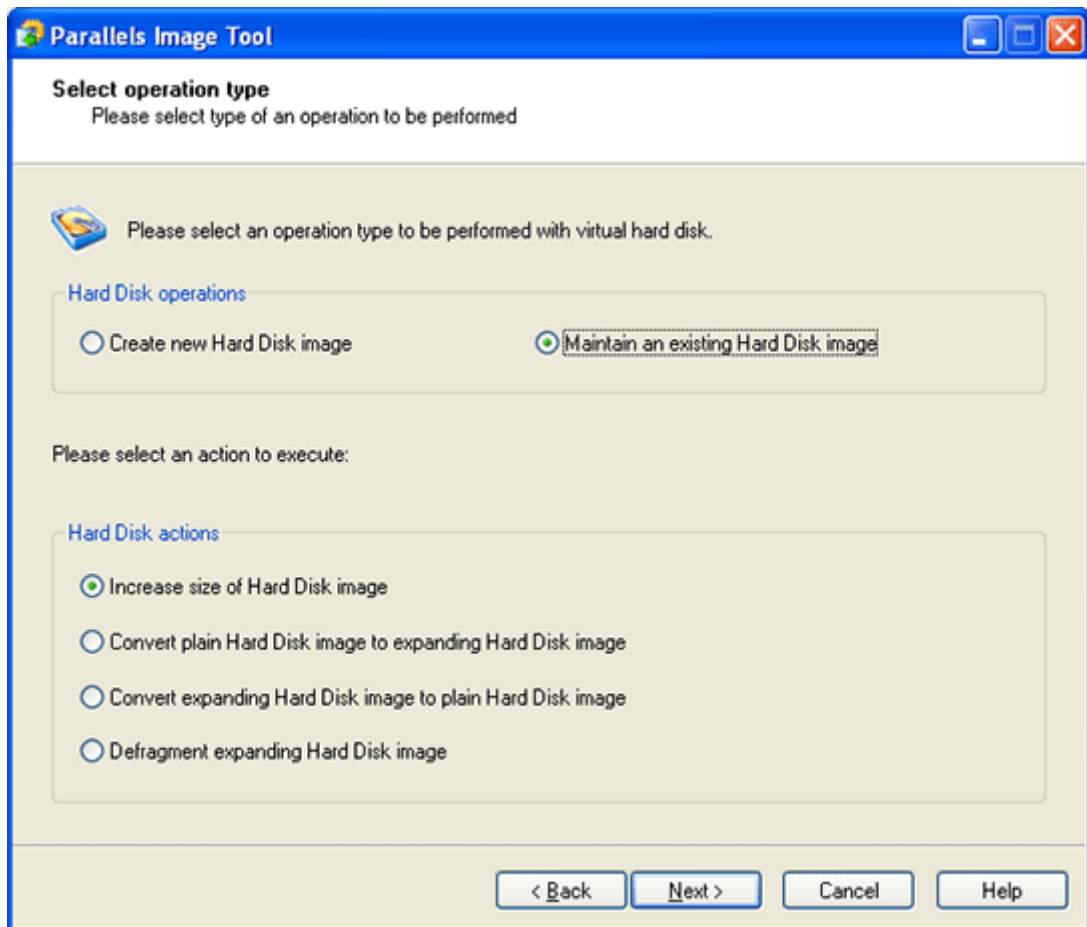
- 1 Start the Parallels Image Tool (see page 155). When starting it for the first time, the Wizard greets you with the **Welcome to the Parallels Image Tool** screen. Click **Next**.



- 2 On the **Select device type** screen select the **Hard Disk Drive** option and click the **Next** button to move to the **Select operation type** screen.



- 3 On the **Select operation type** wizard screen select the **Maintain an existing Hard Disk image** option. When you select it, the hard disk image management options appear in the lower part of the screen.

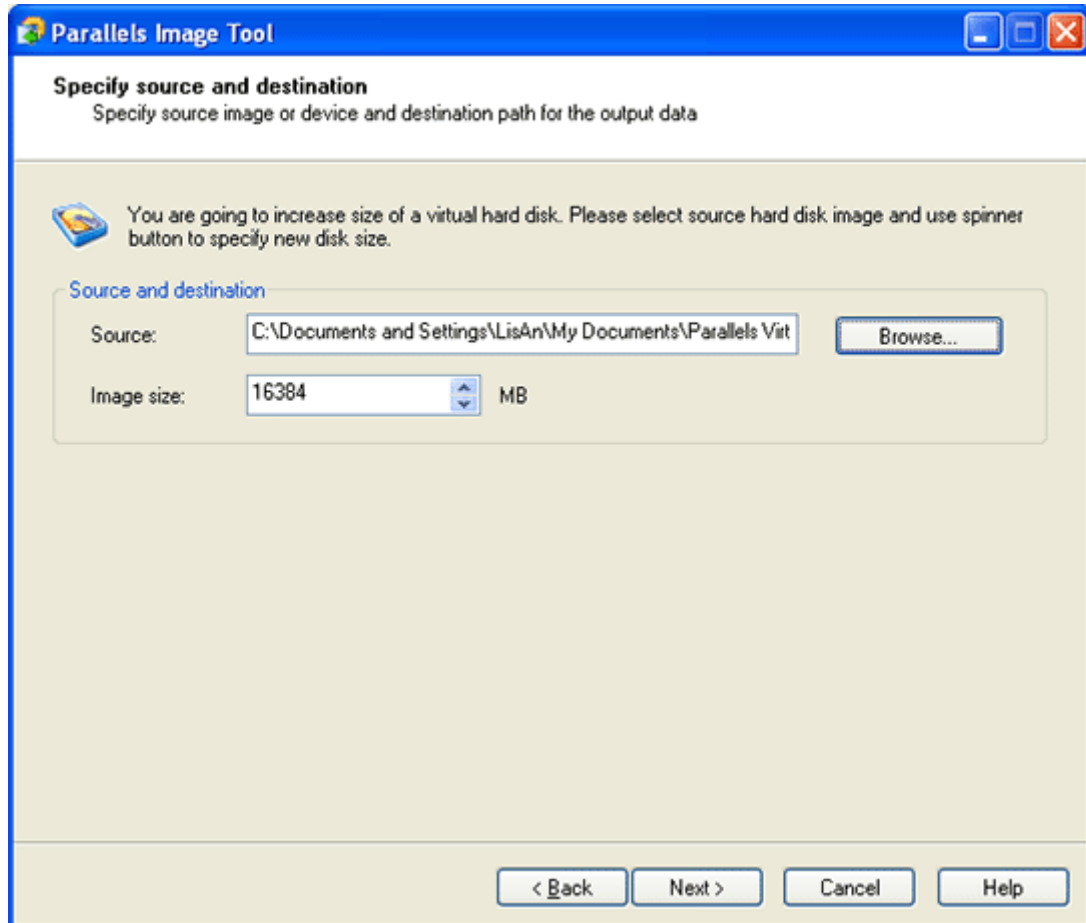


- 4 In the **Hard Disk actions** group, select what you would like to do with an existing hard disk image. The following options are available:
- **Increase size of Hard Disk image** to make a hard disk image larger.
 - **Convert plain Hard Disk image to expanding Hard Disk image** to create an expanding copy of a plain hard disk image.
 - **Convert expanding Hard Disk image to plain Hard Disk image** to create a plain copy of an expanding hard disk image.
 - **Defragment expanding Hard Disk image** to optimize files arrangement on a virtual disk and enhance disk operation speed.
- Click the **Next** button.

- 5 On the **Specify source and destination** screen specify source hard disk image and other information depending on an requested operation, if needed.

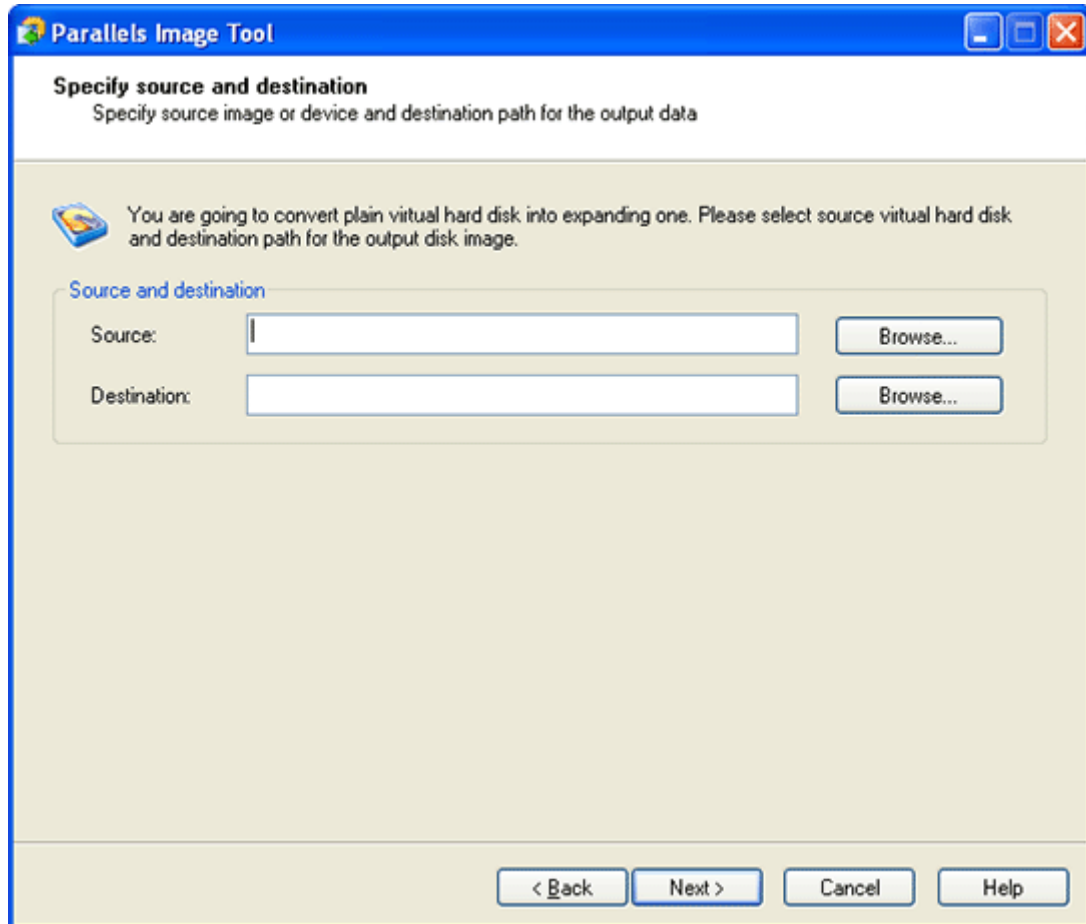
For size increasing specify a new size of the virtual hard disk using the spinner buttons next to the **Image Size** field. New size value should be greater then the previous one.

Note. Parallels Image Tool doesn't allow you to decrease image size. If the specified size is less then previous, the following warning is displayed: "The given value of the hard disk size is invalid. Correct value should be within the range from <current disk size + 1MB> to 128000MB".



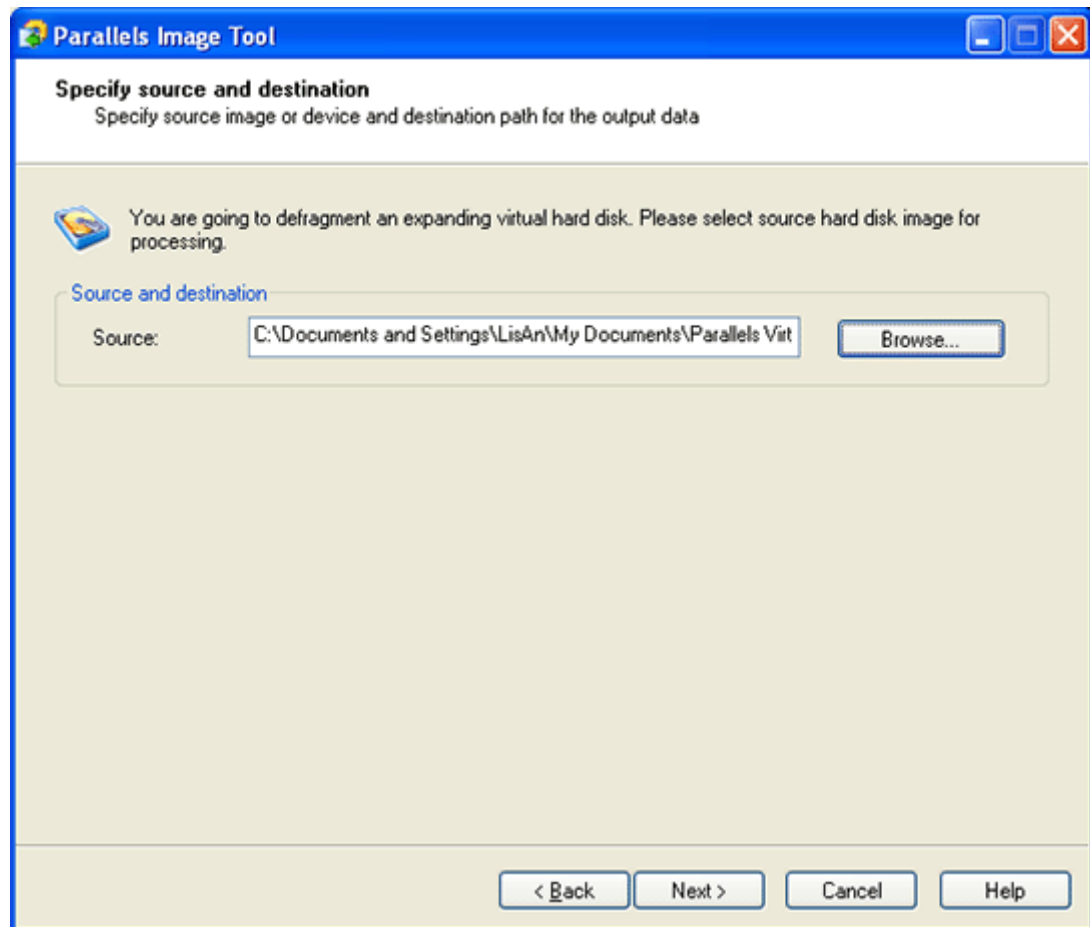
For both hard disk conversion operations besides the source disk specify a path and a name of the resulting converted image in the **Destination** field.

Note. If the format of the source disk does not correspond to the selected operation, a notification is displayed when you select the source disk.



When defragmenting an expanding hard disk specify the source hard disk image only.

Note. If the format of the source disk does not correspond to the selected operation, a notification is displayed when you select the source disk.

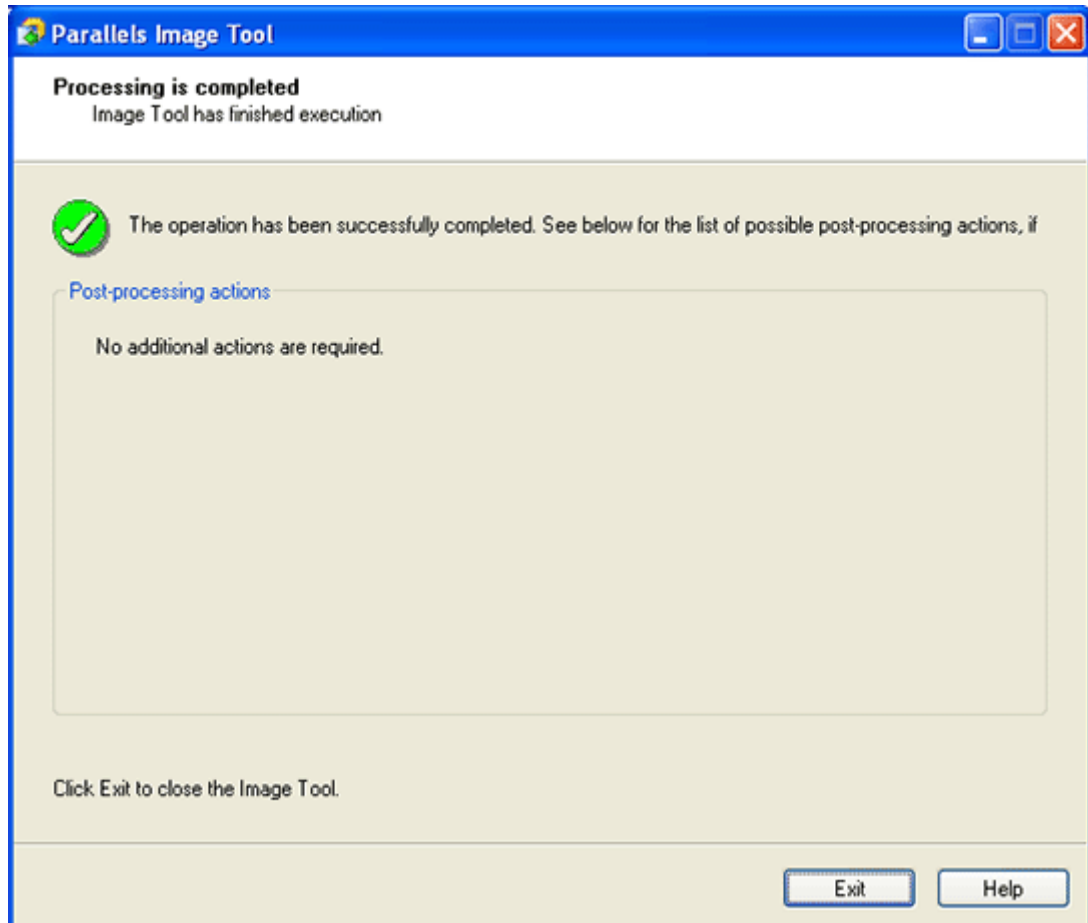


After specifying the input data click **Next**.

- 6 Review the settings carefully (operation type, source image file and destination folder, etc.) on the **Review processing options** screen. If everything is correct, click **Start** button to start the required process.

- 7 While the operation is being performed, **Execution in progress** screen is displayed. After the disk image is created, the **Processing is completed** screen appears. Close the Wizard by clicking **Exit** button. The new disk image is ready, and you can connect it to a Virtual Machine in the Configuration Editor. See the Adding New Devices to Virtual Machine (see page 114) to know how to connect to a Virtual Machine a new hard disk image or the Hard Disk Options (see page 101) to replace one of the currently connected hard disks with the new one.

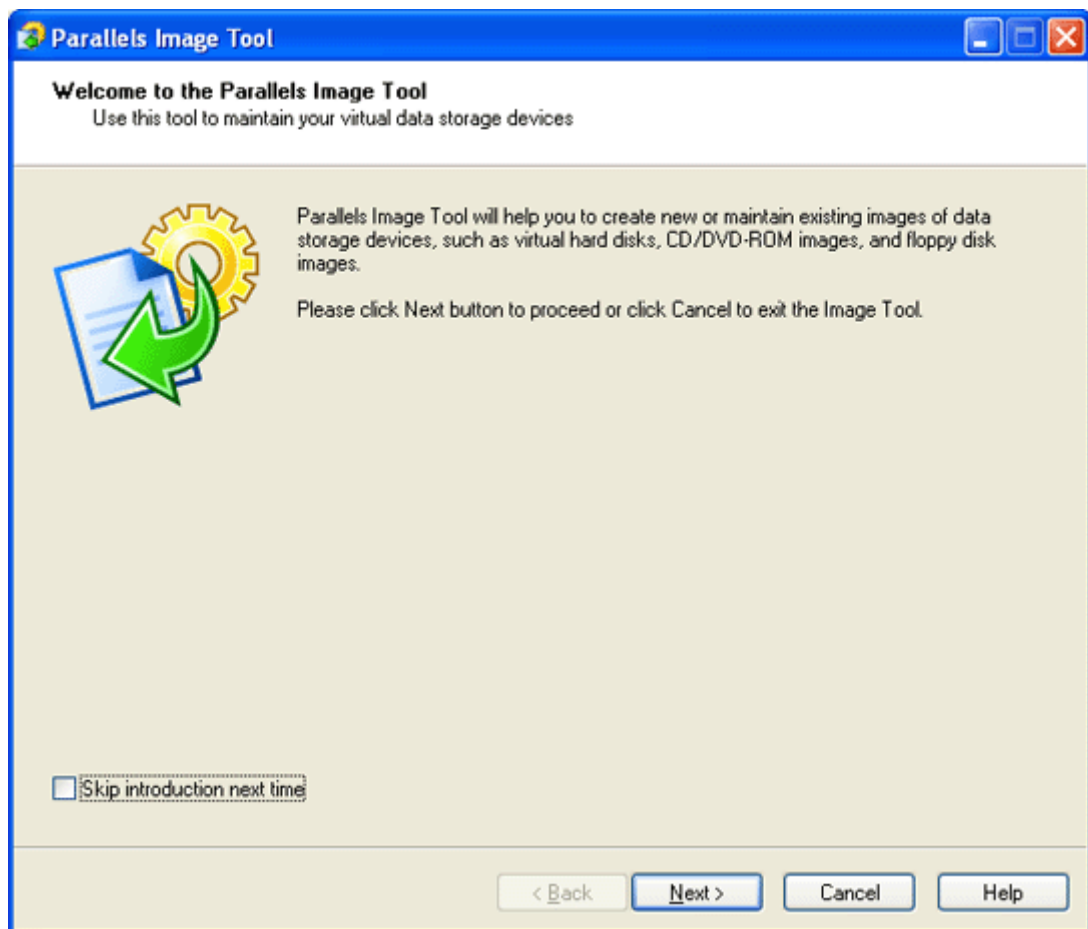
See also the Hard Disk Images (see page 89) to know concepts of using hard disk images in Parallels Workstation.



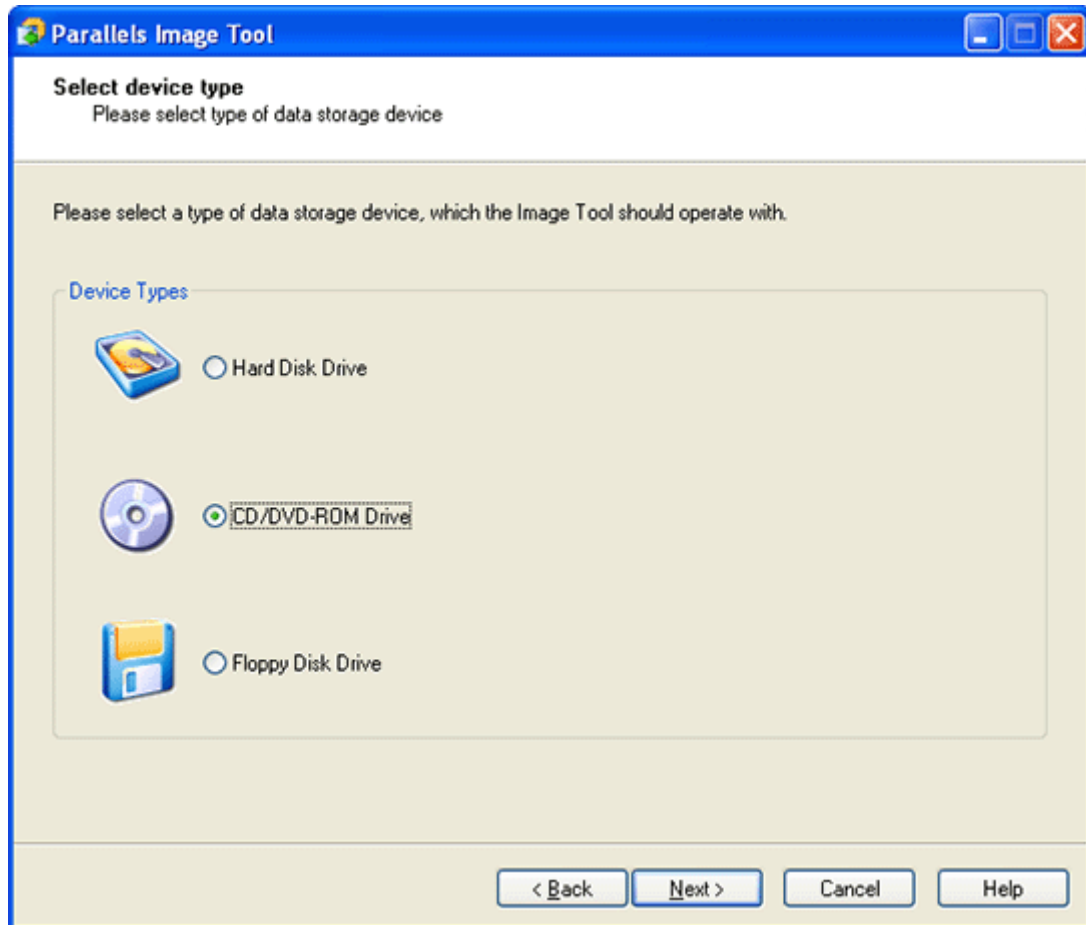
Creating CD/DVD-ROM Image

To create CD/DVD-ROM image:

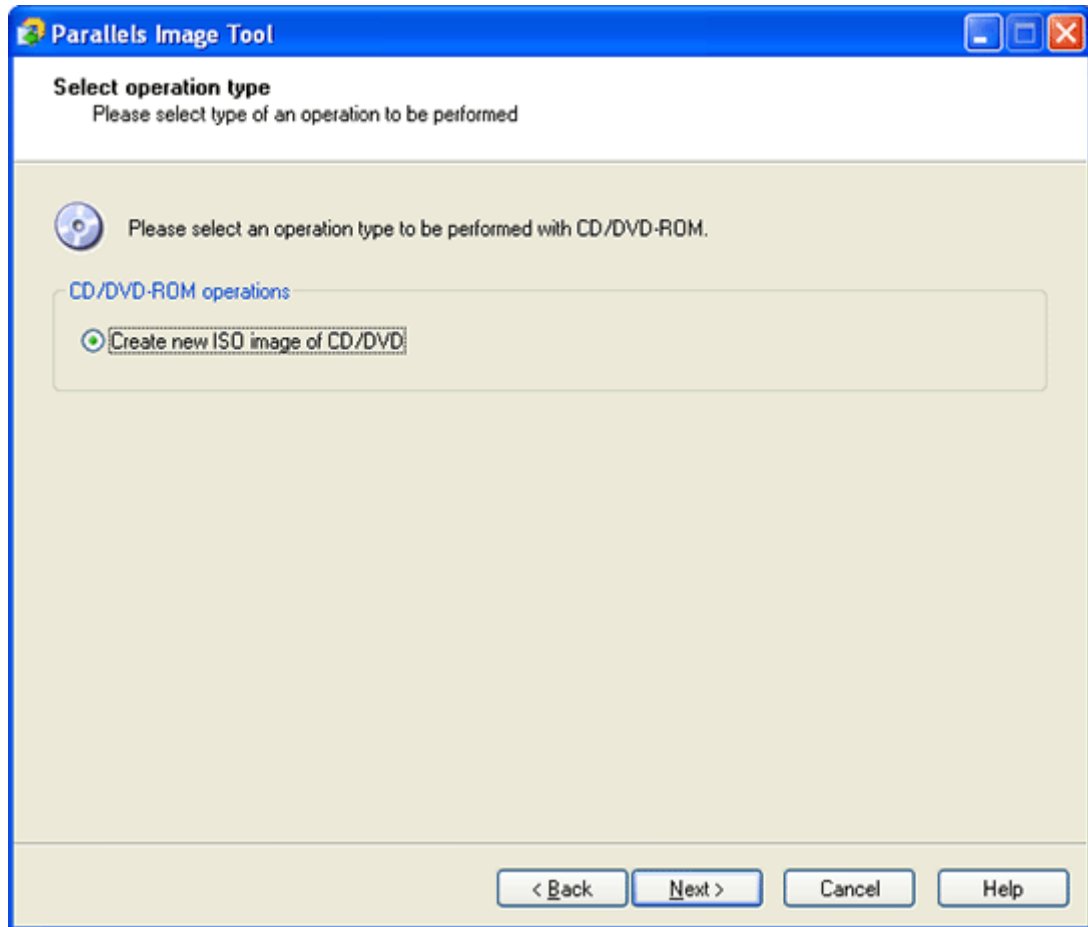
- 1 Insert the CD or DVD-ROM you want to create an image of into appropriate drive of your computer.
- 2 Start the Parallels Image Tool (see page 155). When starting it for the first time, the wizard greets you with the **Welcome to the Parallels Image Tool** screen. Click **Next**.



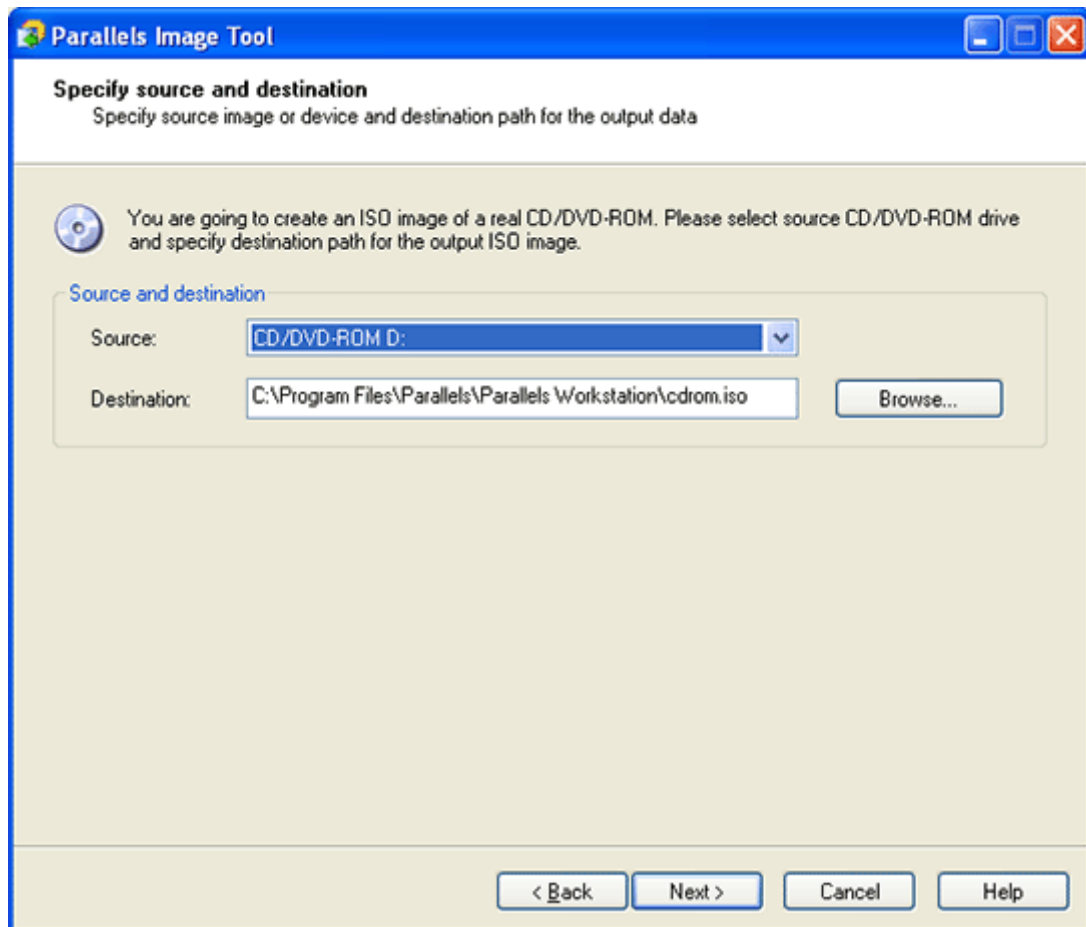
- 3 On the **Select Device Type** wizard screen select **CD/DVD-ROM Drive** option and click **Next**.



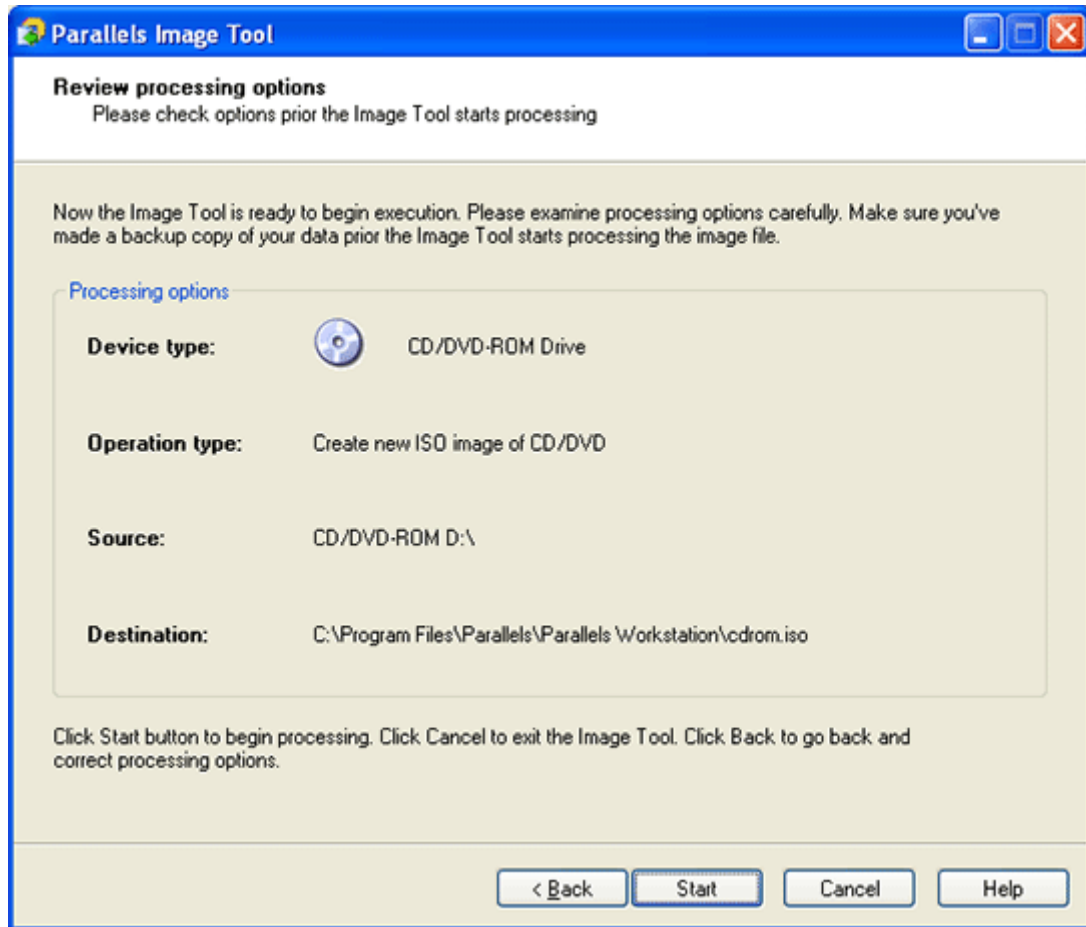
- 4 The **Select Operation Type** screen appears with the single operation **Create new ISO image of CD/DVD** already selected. Click **Next** button.



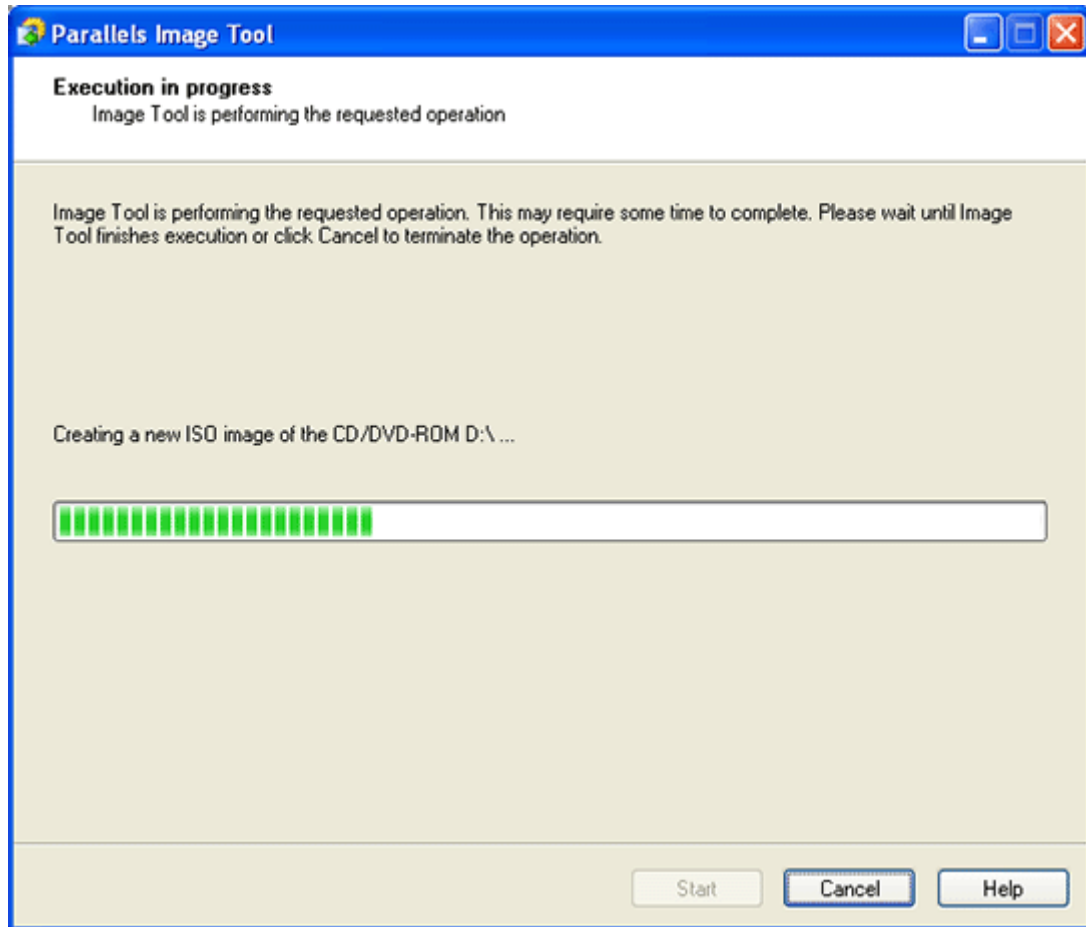
- 5 On the **Specify source and destination** screen select the source (real CD or DVD), and specify destination folder and a name of the CD/DVD image file where the wizard will put the image. Click **Next**.



- 6 Review the settings carefully (operation type, source and destination folder) on the **Review processing options** screen. If everything is correct, click **Start** button to start creating image.

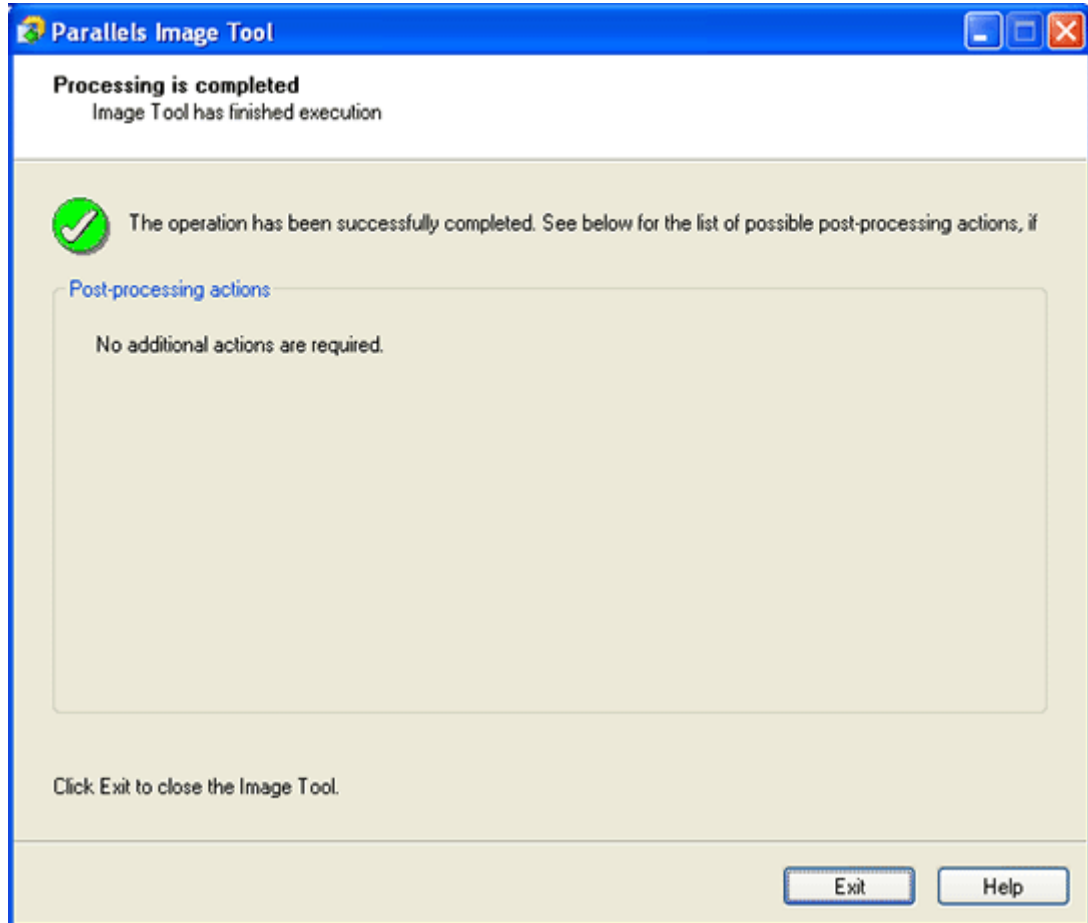


- 7 While operation is being performed, the **Execution in progress** screen is displayed.



- 8 After the disc image is created, the **Processing is completed** screen appears. Close the wizard by clicking **Exit** button. The disc image is now located in the destination folder specified on step 5 and can be connected to a Virtual Machine CD-ROM drive. See the CD/DVD-ROM Options (on page 104) to know how to connected an .iso image to CD/DVD-ROM drive of a Virtual Machine.

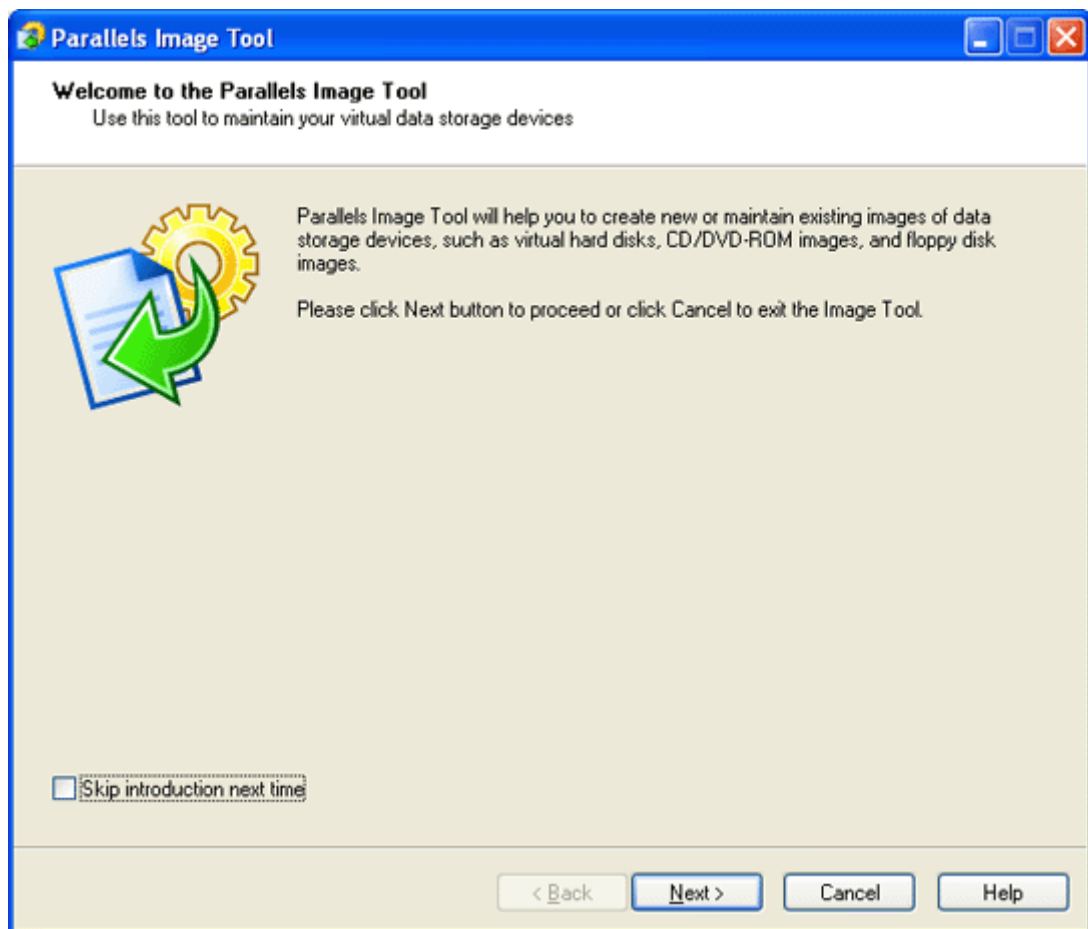
See also the CD/DVD-ROM Real Disks and Images (see page 90) to know concepts of using CD and DVD disc images in Parallels Workstation.



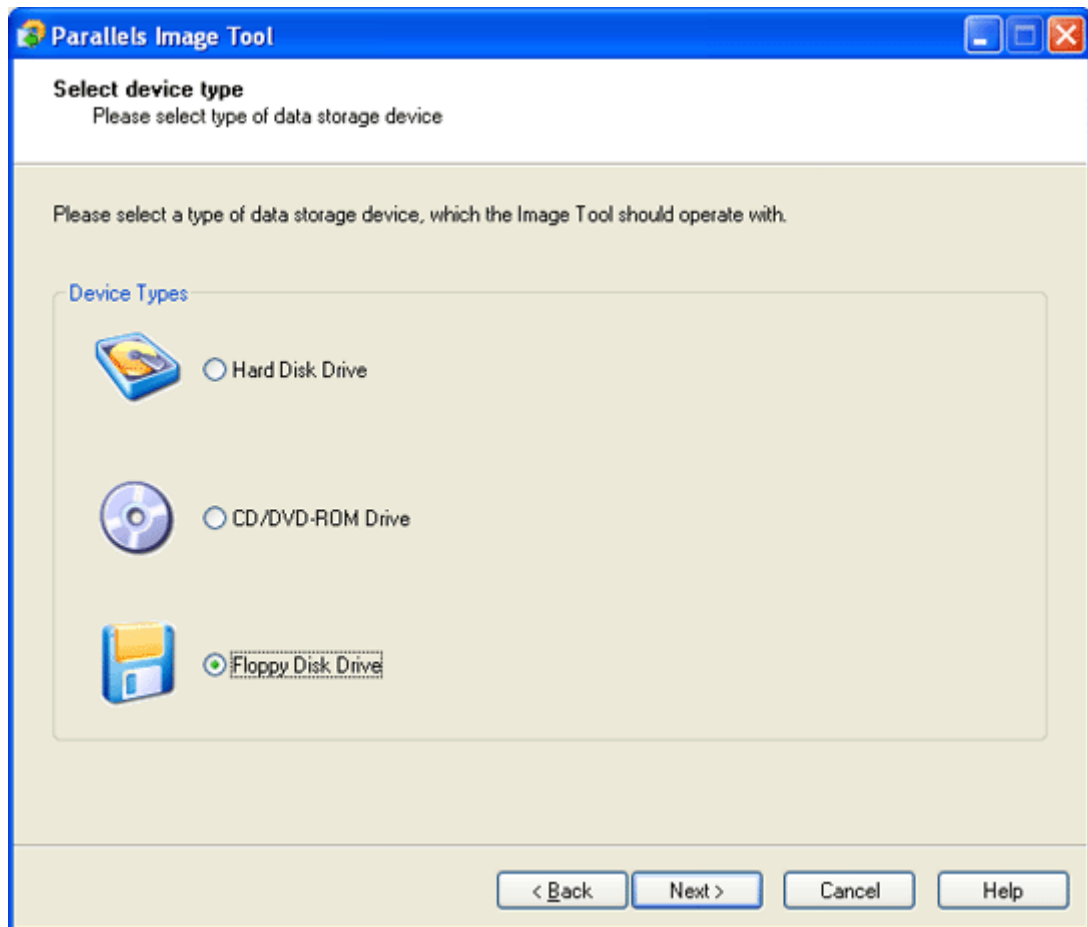
Creating Floppy Disk Image

To create a floppy disk image:

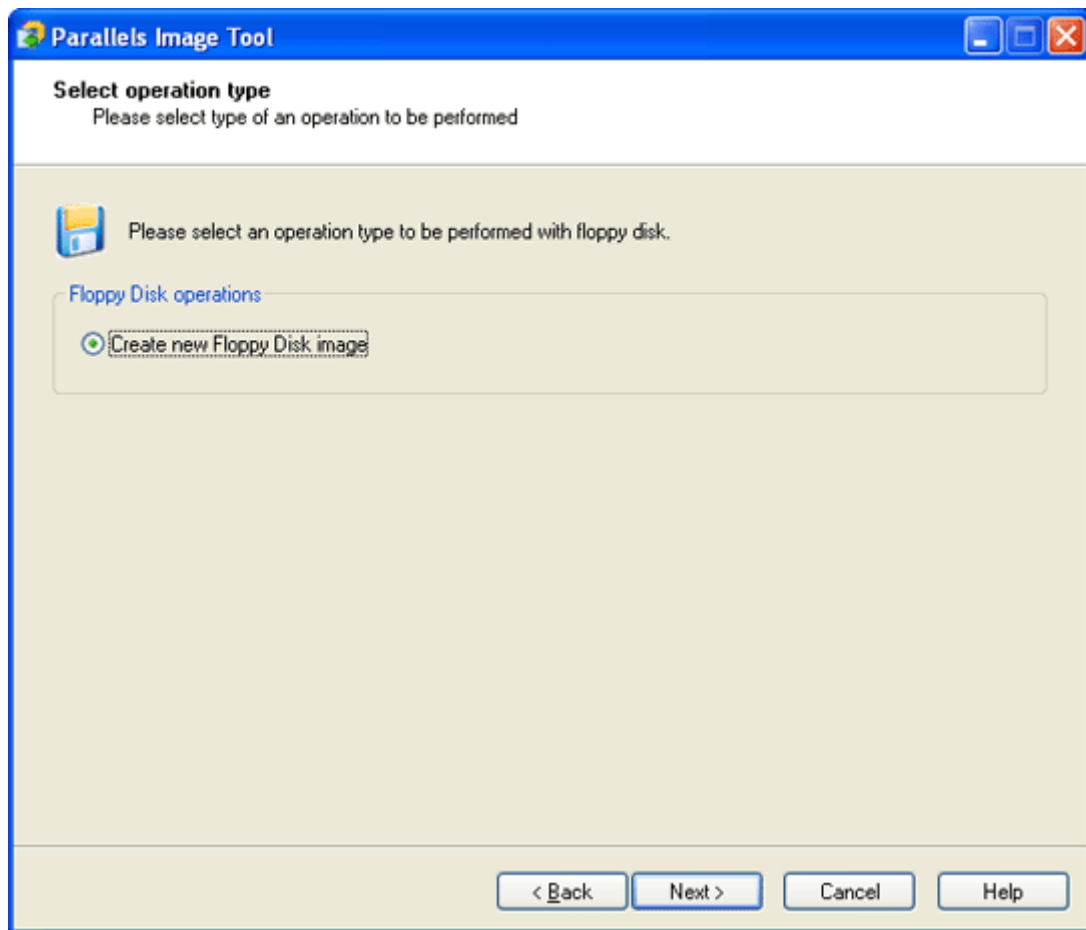
- 1 Insert the floppy disk you want to create an image of into appropriate drive of your computer.
- 2 Start the Parallels Image Tool (see page 155). When starting it for the first time, the Wizard greets you with the **Welcome to the Parallels Image Tool** screen. Click **Next**.



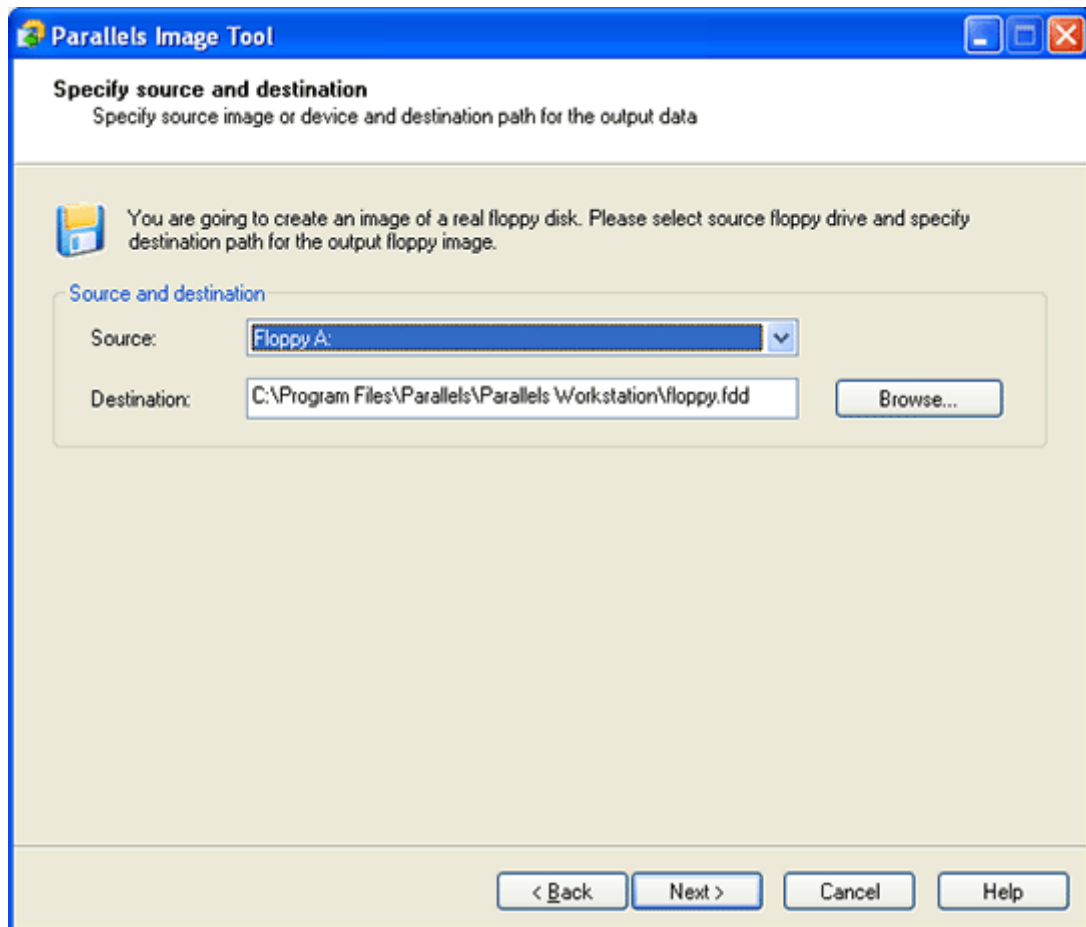
- 3 On the **Select device type** wizard screen select **Floppy Disk Drive** option and click **Next**.



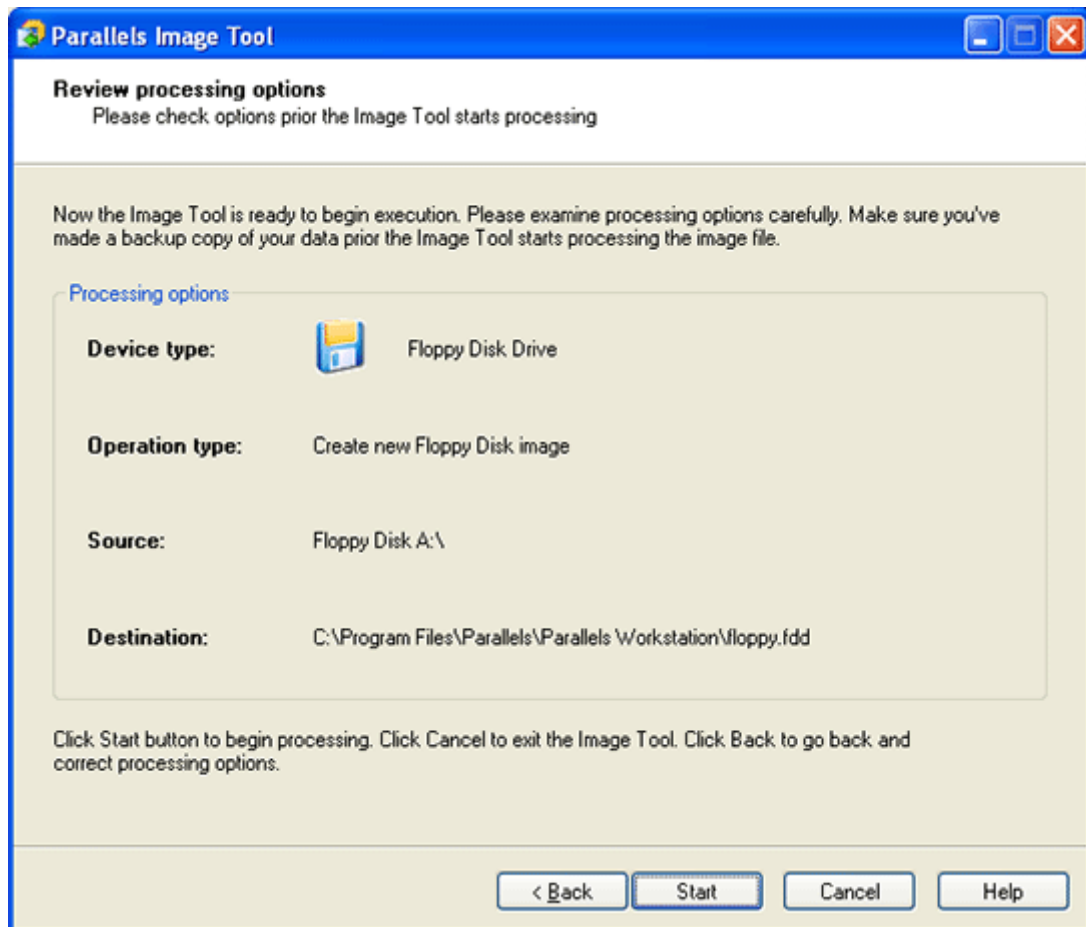
- 4 The **Select Operation Type** screen appears with the single operation **Create new Floppy Disk image** already selected. Click the **Next** button.



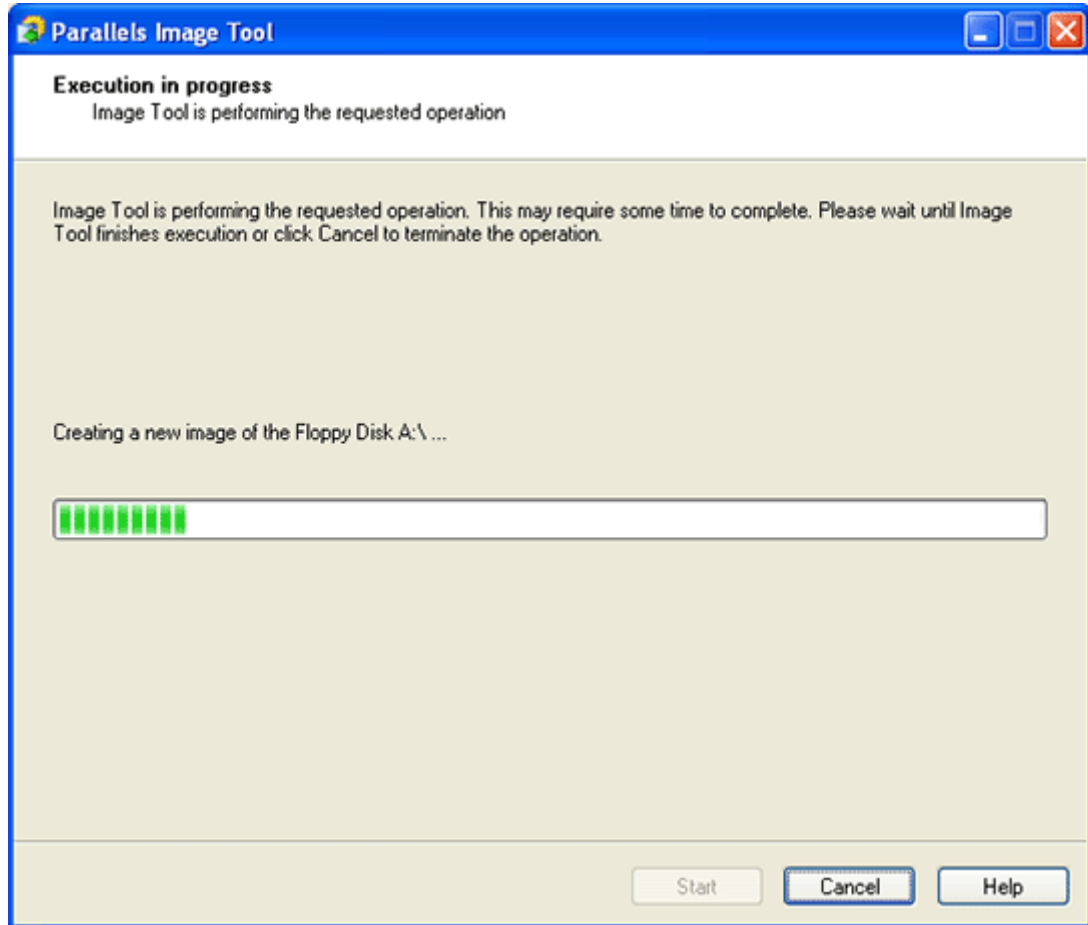
- 5 On the **Specify source and destination** screen select the source (real Floppy drive with the floppy disk inserts) and specify destination folder where the Wizard will put the floppy disk image and the name of the file. Click **Next**.



- 6 Review the settings carefully (operation type, source and destination folder) on the **Review processing options** screen. If everything is correct, click the **Start** button to start creating the disk image.

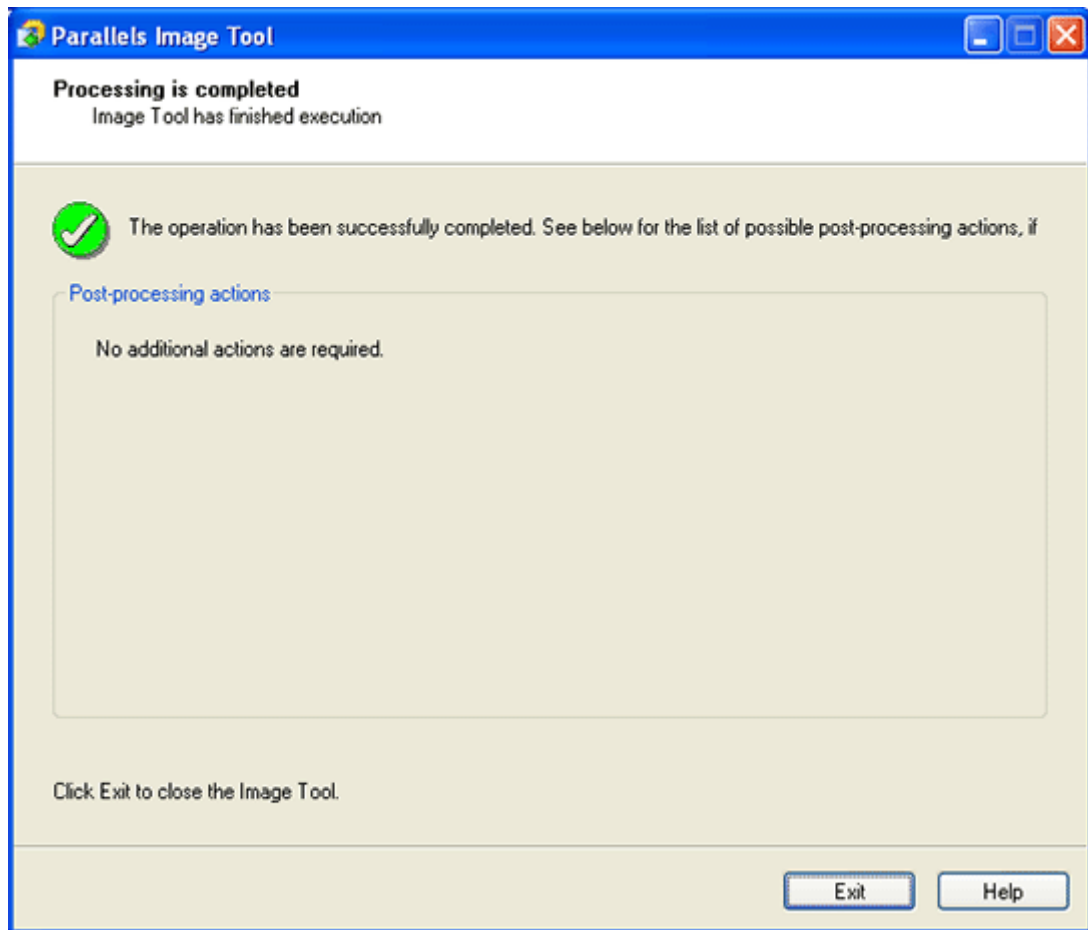


- 7 While the operation is being performed the **Execution in progress** screen is displayed.



- 8 After the disk image is created, the **Processing is completed** screen appears. Close the Wizard by clicking **Exit** button. The disk image is now located in the destination folder specified on step 5 and can be connected to a Virtual Machine floppy drive. See the Floppy Opt (on page 99)ions to know how to connected an .iso image to CD/DVD-ROM drive of a Virtual Machine.

See also the Floppy Disk Images (see page 90) to know concepts of using floppy disk images in Parallels Workstation.



CHAPTER 12

Troubleshooting and Limitations

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Reporting a Problem to Parallels Team

In order to enhance the quality of Parallels Workstation product, you are able to send feedback to Parallels Software International Inc. in the form of problem reports. In case of a fatal error inside a Virtual Machine, Parallels Workstation automatically opens **Report a Problem** window proposing user to send the report. You can decide to send a report on your own, whenever you encounter incorrect system behavior.

Automatically Generated Reports

Fatal errors in Virtual Machine leads to the automatic generation of a Virtual Machine status report, taking a console screenshot and opening **Report a Problem** window for a user to decide whether he/she wants to send the report to Parallels Software corporation. The **Report a Problem** window contains the following elements.

Report a Problem

Do you have problems with Parallels Workstation 2.1 RC?

Please tell Parallels team about this problem. We have created a report that you can send us. Report files are stored in the following directory:

C:\Program Files\Parallels\Parallels Workstation\Bugreports

Report data

The following files are included in this report:

Technical data:

Session screenshot:

If possible, please describe additional error details using the 'Problem description' box below. Press Ok button when you finish.

☒ Send report to reports@parallels.com

The **Technical data** field shows the name of the .txt status report file that have been generated in the error moment. The status report holds information on product version, your activation data, primary and guest OSes information, processor status and so on. You can correct the data if it is required. Click **View** to open the report in the text editor.

The **Session screenshot** field holds the name of the .jpg console screenshot that have been made in the error moment. To see the screenshot click **View** button.

You may add a verbal description of the situation in the **Problem description** box. The text you enter here is saved in the status report in a separate block when you close the **Report a Problem** window by clicking **OK** button.

Sending report options are different in Windows and Linux primary OSes.

Windows primary OS:

To send a report to Parallels, select **Send report to reports@parallels.com** checkbox and click **OK** button. On this command **Report a problem** window will be closed and the default e-mail client application will be activated.

If you decide not to send a report, deselect **Send report to reports@parallels.com** checkbox and click **OK** button. The status report and the screenshot are saved in the **Bugreports** directory in the Parallels Workstation folder. By default it is

C:\Program Files\Parallels\Parallels Workstation\Bugreports

directory.

Linux primary OS:

To send report to Parallels corporation, click **OK** button.

Then launch your e-mail client application, create a new letter and attach the status report and the console screenshot to it. They are located in the following directory:

/usr/lib/parallels/bugreports/

Specify the following e-mail address for the letter:

reports@parallels.com

In both Windows and Linux Primary OSes:

format of status reports names and screenshots is the following:

parallels-yyyy.mm.dd-hh.mm.ss.<txt/jpg>

Creating Report Manually

To create a problem report, select **Report a Problem** in the **Help** menu. A report with technical data available at the moment of **Report a problem** command activation is generated. If a guest OS is running, a console screenshot is made.

To send a report, perform the same actions as for automatically generated report.

In Windows primary OS click **Cancel** if you decide not to send the report.

Other elements of the **Report a problem** window are the same as for automatically generated reports in both Windows and Linux primary OSes.

Problems with Networking Inside a Virtual Machine

If you encounter any sort of problems with networking inside a Virtual Machine, varying from inability to access Internet to host-only network configuring failure, that can not be handled by adjusting Virtual Machine and Parallels Workstation settings, we recommend that you check your primary OS firewall settings. The primary OS firewall may affect Parallels Host-Guest Virtual NIC (see page 118) network adapter thus preventing host-only network functioning. It also may interfere Bridged Ethernet networking.

Problem with Connecting USB Devices in Linux Primary OS

If you receive the "Unable to connect USB device" message while trying to connect an USB device to your Virtual Machine on a computer running Linux primary OS, the most probable cause is that you do not have permissions to access USB devices. To fix the problem:

1 Check if an `usb-operating` group exists in your Linux primary OS.

2 If the group exists:

- In the **Terminal**, issue the command

```
su
```

to gain `root` privileges. Enter the password to the `root` account when you are asked for it.

- Include into this group users who have to have an access to USB devices.
- Run the

```
exit
```

command to leave the `root` account.

- Proceed to step 4.

3 If the group does not exist:

- In the **Terminal**, issue the command

```
su
```

to gain `root` privileges.

- Create a group and include into it users who have to have an access to USB devices.
- In the `/etc/fstab` file edit the string that mounts the `usbfs`. `Devgid` parameter should contain the identifier of the group created in the previous step.

```
usbfs          /proc/bus/usb  usbfs          devgid=<USB
gid>,devmode=0664 0 0
```

This option will of course only work if you have the relevant support compiled in your kernel.

- Run the

```
exit
```

command to leave the `root` account.

4 Restart your Linux primary OS.

Configuring Display for Fullscreen Mode

If you receive a poor picture or incorrect system behavior when switching a guest operating system to fullscreen mode, this can be fixed by configuring your primary OS settings.

Windows primary OS:

When guest OS is running in fullscreen mode, physical display is switched to guest OS resolution with the highest possible frequency. If your physical videocard or physical monitor do not support the resolution or frequency requested by the guest OS, substitute video mode that matches best is set instead. In some cases substitute mode may not work, or you are warned of an inability to switch to fullscreen mode. To fix the situation, correct primary OS display settings:

- 1 Open **Display Properties** window by selecting in Windows **Start** menu the **Settings/Control Panel/Display**. Make sure that the **Hide modes that this monitor cannot display** option is selected in the **Setting** tab. If not, select it and apply the settings.
- 2 If the option in the previous item is selected but problem remains, make sure that the proper monitor and videocard drivers are installed in the primary system. Reinstall them in case of necessity.

Linux primary OS:

When a guest OS is running in fullscreen mode, the physical display is switched to guest OS resolution with the highest possible frequency. If X Window System is not configured for the mode requested by guest OS, substitute mode that matches best is set instead. The situation is worse if the physical monitor does not support the requested mode while it is configured in X Window System. Parallels Workstation can not know that the monitor does not support the requested mode and will try to switch to it. This may lead to poor picture quality in fullscreen mode.

If display picture in fullscreen mode is unusable:

- 1 Stop the guest OS,
- 2 Reconfigure X Window System to exclude resolution/frequency inconsistent with your monitor, and restart X Window.

Interaction between Virtual Machines of Other Vendors and Parallels Network Adapter

If in addition to Parallels Workstation you have installed on your computer Virtual Machine software developed by vendors other than Parallels Software International Inc., a problem with a network adapter for an external Virtual Machine is possible. Alternative virtual software may assume Parallels virtual network adapter, **Parallels Host-Guest Virtual NIC**, to be a real network interface and connect an external Virtual Machine network adapter to it. This problem is especially probable if the external Virtual Machine chooses network adapter automatically.

If the problem described above occurs, you will receive an error when trying to access Internet in an external Virtual Machine. To solve the problem:

- Open this Virtual Machine configuration and select a physical network adapter.

The Parallels Workstation adds Parallels Host-Guest Virtual NIC network adapter to the list of network adapters in primary operating system during the installation process. This adapter is required for host-only network (see page 118).

Problem with Printing

If you have a physical printer connected to an LPT port of your computer but you can not print from primary operating system and/or several Virtual Machines despite the printer being properly connected and configured, this may be caused by the following reason: the running Virtual Machine's parallel port is connected to a real LPT port which is blocking this LPT port. If printer cable is attached to that port of a physical computer, no other Virtual Machine as well as primary operating system can access printer.

To solve the problem:

- find a Virtual Machine from where you can print,
- disconnect its parallel port which is connected to the real LPT port. See Connecting Serial/Parallel Port (see page 139).

Documents that have been sent for printing in primary OS or other Virtual Machines while you were unable to print are accumulated in the spooler and will be printed according to the sequence they arrived. If you run several Virtual Machines with their parallel ports connected to printer through the same physical LPT port, you may be required to consequently disconnect their parallel ports to print all the documents.

SoftICE Keyboard Problem

If you run Parallels Workstation simultaneously with Compuware SoftICE debugger from Compuware Driver Studio, keyboard problems may arise. Problems usually occur when starting SoftICE from the Windows command line while Parallels Workstation is already running.

Note. Since SoftICE is a Windows application this issue may appear in Windows primary OS only.

To fix the problem:

- 1 Open SoftICE Settings, select Troubleshooting part. Check Do not patch keyboard driver option.
- 2 Restart your computer.

Citrix Support

Parallels Workstation for Windows supports Citrix remote access tools. If the support is set, Citrix ICA Client will intercept most of the standard hot key presses and send them to Parallels Workstation instead of primary Windows OS. It allows using Ctrl+Alt to switch between applications inside Windows guest OS, press Win key to open Start menu, etc.

Note: Linux version of Parallels Workstation does not support Citrix.

Parallels Workstation includes special .dll libraries to be installed on both server and client sides.

To install Citrix support in the Parallels Workstation for Windows, please do the following steps on client side:

- 1 Locate the IOHooksCitrixClient.dll file on the server hard disk in the directory where you have installed Parallels Workstation. Copy this file to you local machine into the directory, where you have installed the Citrix ICA Client.
- 2 Modify the module.ini file in the Citrix ICA Client directory in the following way:
 - a search for the string beginning from VirtualDriver and add to the end of the list a new element, IOHooksCitrixClient, for example:

```
VirtualDriver = Thinwire3.0, ... ,ICACTL, IOHooksCitrixClient
```

- b Add the following strings to the end of the module.ini file:

```
[IOHooksCitrixClient]
DriverName = IoHooksCitrixClient.dll
DriverNameWin32 = IoHooksCitrixClient.dll
Resolution = 10
```

- 3 Restart the Citrix ICA client.

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