



# 5.7 TREND MICRO<sup>™</sup> Virtual Analyzer Image Preparation Tool

## User's Guide

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<https://docs.trendmicro.com>

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This documentation introduces the main features of the tool and/or provides installation instructions for a production environment. Read through the documentation before installing or using the tool.

Detailed information about how to use specific features within the tool may be available at the Trend Micro Online Help Center and/or the Trend Micro Knowledge Base.

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# Chapter 1

## About this Guide

This User's Guide provides information on how to prepare custom Virtual Analyzer images in the following topics:

- *Windows OVA File Creation Using New Virtual Machine Images on page 2-1*
- *Windows OVA File Creation Using Converted Virtual Hard Disk Drives on page 3-1*
- *Linux OVA File Preparation on page 4-1*
- *Virtual Analyzer Image Preparation Tool on page 5-1*

# Document Conventions

The documentation uses the following conventions:

**TABLE 1-1. Document Conventions**

CONVENTION	DESCRIPTION
UPPER CASE	Acronyms, abbreviations, and names of certain commands and keys on the keyboard
<b>Bold</b>	Menus and menu commands, command buttons, tabs, and options
<i>Italics</i>	References to other documents
Monospace	Sample command lines, program code, web URLs, file names, and program output
<b>Navigation &gt; Path</b>	The navigation path to reach a particular screen  For example, <b>File</b> > <b>Save</b> means, click <b>File</b> and then click <b>Save</b> on the interface
 <b>Note</b>	Configuration notes
 <b>Tip</b>	Recommendations or suggestions
 <b>Important</b>	Information regarding required or default configuration settings and product limitations
 <b>WARNING!</b>	Critical actions and configuration options

## Audience

This User Guide is intended for administrators who need to create custom sandbox images for Virtual Analyzer. The document assumes a working knowledge of networks and information security, including the following topics:

- Deploying and administering Deep Discovery or TippingPoint products
- Using Oracle VM VirtualBox™ or VMware™ products

## Terminology

TERMINOLOGY	DESCRIPTION
Open Virtual Appliance (OVA)	A ready-to-use software package (operating system with applications) that does not require additional configuration or installation. Virtual Analyzer supports only image files in the Open Virtual Appliance (OVA) format.
Sandbox image	A template used to deploy sandbox instances in Virtual Analyzer. A sandbox image includes an operating system, installed software, and other settings necessary for that specific computing environment.
Sandbox instance	A single virtual machine based on a sandbox image.
Virtual Analyzer	A secure virtual environment that manages and analyzes objects submitted by integrated products and administrators. During analysis, Virtual Analyzer rates the characteristics in context and then assigns a risk level to the object based on the accumulated ratings.
Virtual Analyzer Sensors	A collection of utilities that execute and detect malware, and record all behavior in Virtual Analyzer.
Virtual Machine Disk (*.vmdk)	A file format used in virtual machines like VMware Workstation or Oracle VM VirtualBox.



# Chapter 2

## Windows OVA File Creation Using New Virtual Machine Images

Learn how to create a Virtual Analyzer-supported OVA file in the following topics:

- *Required Software on page 2-2*
- *Downloading and Installing VirtualBox on page 2-6*
- *Creating Windows Virtual Machine Images on page 2-7*
- *Modifying the Virtual Machine Environment on page 2-27*
- *Reducing the Size of VirtualBox Disk Images on page 2-36*
- *Exporting Virtual Machine Images to OVA Files on page 2-37*

# Creating Windows OVA Files Using New Virtual Machine Images

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## Procedure

1. Prepare the operating system and required applications.  
For details, see [Required Software on page 2-2](#).
2. Download and install VirtualBox.  
For details, see [Downloading and Installing VirtualBox on page 2-6](#).
3. Create a virtual machine image.  
For details, see [Creating Windows Virtual Machine Images on page 2-7](#).
4. Modify the environment of the virtual machine image.  
For details, see [Modifying the Virtual Machine Environment on page 2-27](#).
5. Reduce the size of the VirtualBox Disk Image.  
For details, see [Reducing the Size of VirtualBox Disk Images on page 2-36](#).
6. Export the virtual machine image to an OVA file.  
For details, see [Exporting Virtual Machine Images to OVA Files on page 2-37](#).

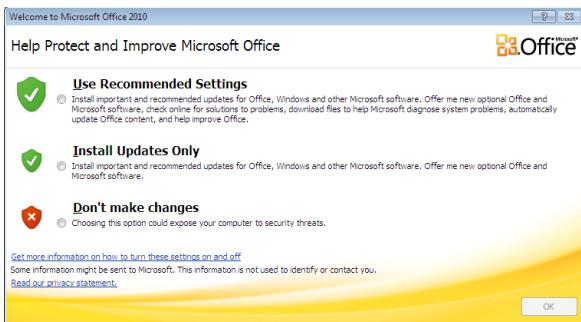
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## Required Software

The following software must be installed on the virtual machine to achieve satisfactory detection results.

**TABLE 2-1. Required Applications**

SOFTWARE	DESCRIPTION
Operating system	<p>Virtual Analyzer supports the following operating systems:</p> <p>Windows XP, Windows 7, Windows 8/8.1, Windows 10 Version 1909 and before, Windows Server 2003/2003 R2, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019.</p> <p><b>Important</b></p> <ul style="list-style-type: none"><li>• Package the installer as an ISO file.</li><li>• Activate Windows with a valid product key after the tool has validated and modified virtual machine settings. Do not activate Windows before that.</li><li>• Use a computer name that reflects your organizations' naming scheme.</li><li>• Disable automatic updates.</li><li>• Trend Micro recommends using the English version of the listed operating systems.</li><li>• For Windows 7 and Windows Server 2008/2008 R2, updates KB4474419 and KB4490628 must be installed.</li></ul>

Software	Description
Office suite	<p>Virtual Analyzer supports the following office suites:</p> <p>Office 2003 (32-bit), Office 2007 (32-bit), Office 2010 (32-bit and 64-bit), Office 2013 (32-bit and 64-bit), Office 2016 (32-bit and 64-bit), and Office 2019 (32-bit and 64-bit)</p> <hr/> <p><b>Important</b></p> <ul style="list-style-type: none"> <li>For Office 2007 and above, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, and Microsoft Publisher must be installed.</li> <li>Activate Microsoft Office with a valid product key after the tool has validated and modified virtual machine settings. Do not activate Microsoft Office before that.</li> <li>After installation, open all Microsoft Office applications and verify that the main editing screen is displayed. If any confirmation dialog or welcome screen displays, make any selection to close the screen and display the main editing screen.</li> </ul>  <p><b>FIGURE 2-1. Help Protect and Improve Microsoft Office</b></p> <ul style="list-style-type: none"> <li>Verify that your license allows you to virtualize the applications. For details, see <a href="https://support.office.com">https://support.office.com</a>.</li> <li>Disable automatic updates.</li> <li>Enable macros. For details, see <a href="#">Enable or disable macros in Office files</a></li> </ul>

Software	Description
Internet Explorer	Internet Explorer must be configured as the default web browser of the operating system. For Windows 8.1 and before, the tool will configure the setting. For Windows 10, the setting must be configured manually before the tool is used to validate the image.
Adobe Reader	<p>Install the version of Adobe Reader that is most widely used in your organization. To download the most current version of Adobe Reader, go to <a href="http://www.adobe.com/downloads/">http://www.adobe.com/downloads/</a>.</p> <p>If you do not install Adobe Reader, Virtual Analyzer:</p> <ul style="list-style-type: none"> <li>Installs Adobe Reader 8, 9, and 11 on all Windows XP and Windows Server 2003/2003 R2 images during importing.</li> <li>Installs Adobe Reader 9, 11, and DC on all Windows 7 and newer images during import.</li> <li>Uses all versions during analysis.</li> </ul> <hr/> <p> <b>WARNING!</b></p> <p>This consumes additional computing resources.</p> <hr/> <p>Configure Adobe Reader to manually check for and install updates. For details, see <a href="https://helpx.adobe.com/acrobat/kb/reader-acrobat-updater-settings.html">https://helpx.adobe.com/acrobat/kb/reader-acrobat-updater-settings.html</a>.</p>
.NET Framework	Install .NET Framework 3.5 or later if the operating system is Windows XP or Windows Server 2003.



### Note

Trend Micro recommends installing the following software on the virtual machine to improve detection results.

- .NET Framework 4.0 in addition to .NET Framework 3.5
- Java SE Runtime Environment 8
- LibreOffice 6.4.7 or later, with macro security level set to low

**Important**

- Do not install VMware tools to avoid triggering the anti-virtual machine functions of some malware.
- Do not install any anti-malware software on the virtual machine to ensure normal operation of Virtual Analyzer.

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## Downloading and Installing VirtualBox

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### Procedure

1. Download the latest version of VirtualBox from <https://www.virtualbox.org/wiki/Downloads>.

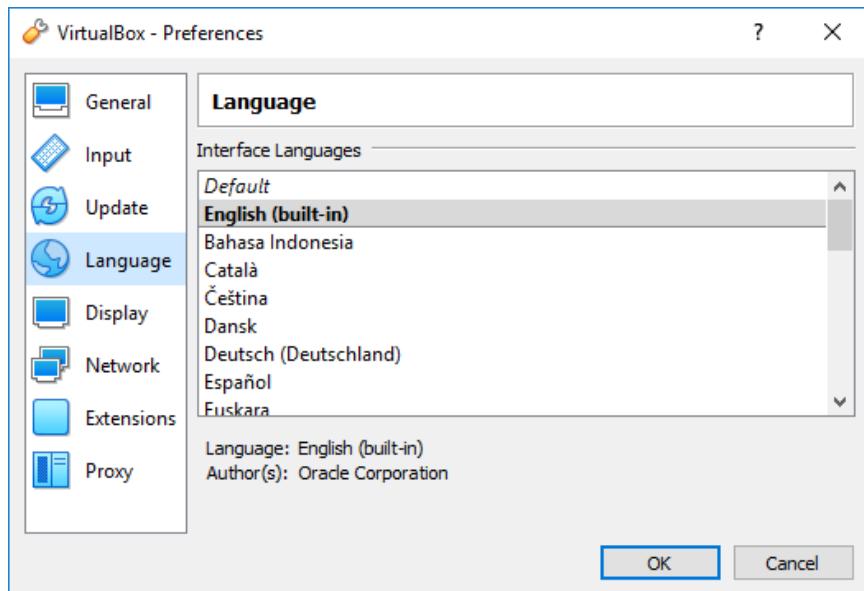
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**Note**

The VirtualBox Open Source Edition is licensed under the GPL V2. The full text of the license is available at <http://www.gnu.org/licenses/old-licenses/gpl-2.0.html>.

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2. Configure the language settings using one of the following methods:
  - Install VirtualBox with English as the default language.
  - After installation, go to **File > Preferences > Language** and then select **English**.



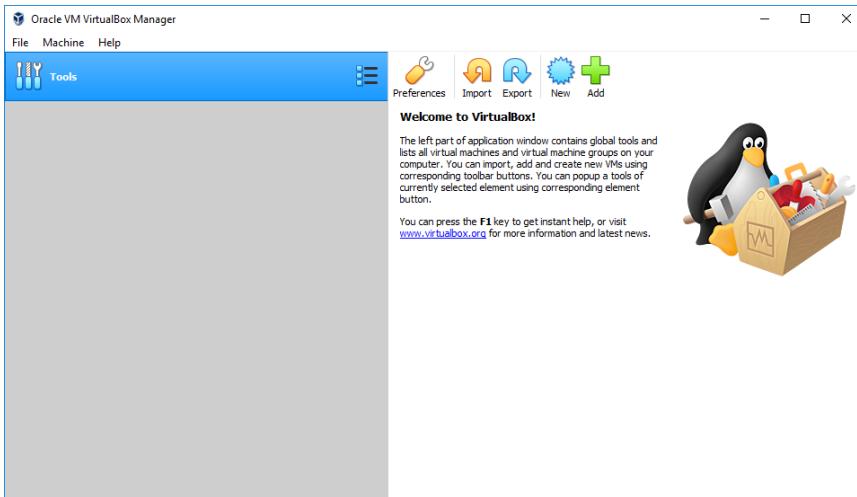
**FIGURE 2-2. Language Settings**

## Creating Windows Virtual Machine Images

### Procedure

1. Open VirtualBox.

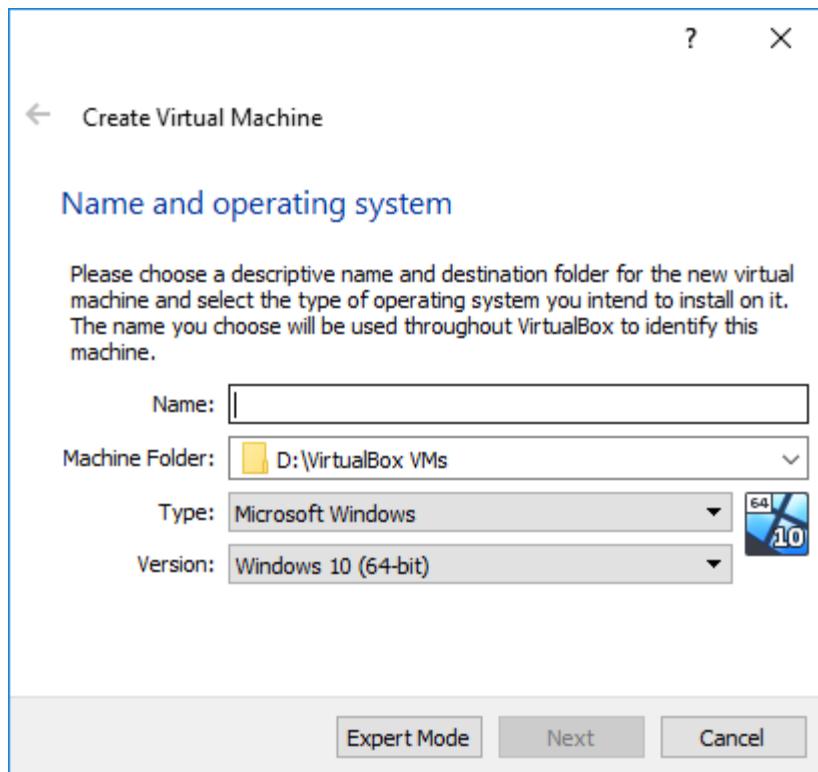
The **VirtualBox Manager** window opens.



**FIGURE 2-3. VirtualBox Manager**

2. Click **New**.

The **Create Virtual Machine** window opens.

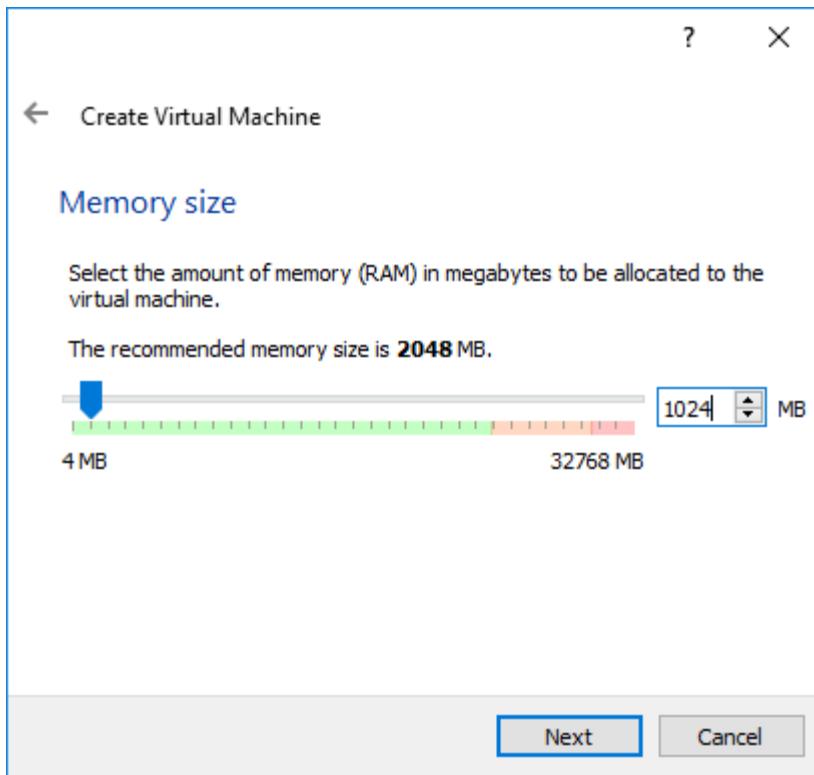


**FIGURE 2-4. Create Virtual Machine**

3. On the **Name and operating system** screen, configure the following:
  - **Name:** Type a permanent name for the virtual machine.
  - **Type:** Select **Microsoft Windows**.
  - **Version:** Select **Windows XP, Windows 2003, Windows 7, Windows 8, Windows 8.1, Windows 10, Windows 2008/2008 R2, Windows 2012/2012 R2, Windows 2016, or Windows 2019**.

4. Click **Next**.

The **Memory size** screen appears.



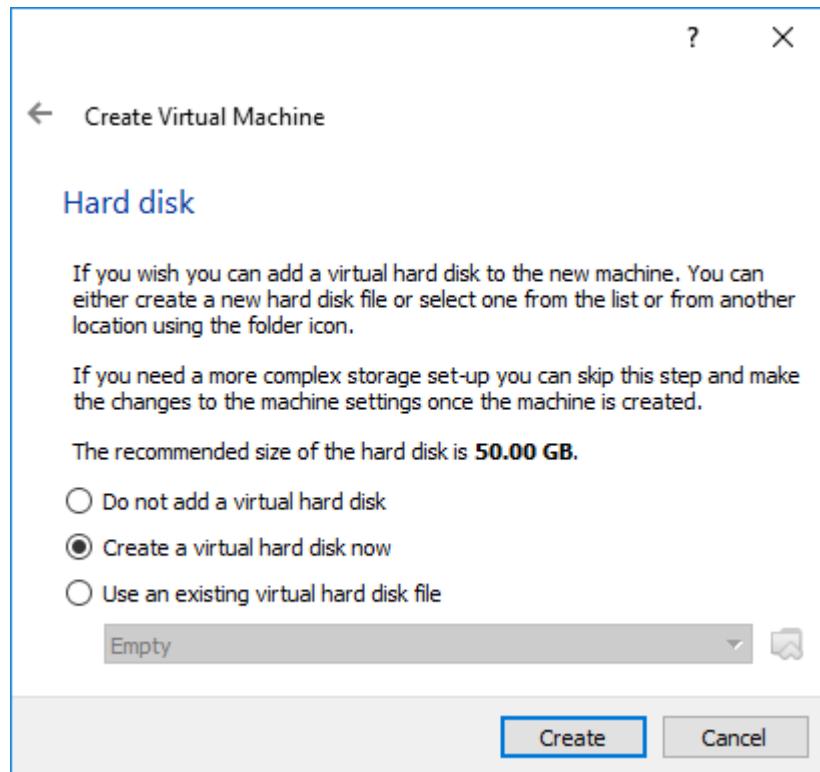
**FIGURE 2-5. Memory Size**

5. Specify the recommended memory size for your operating system.

- Windows XP and Windows Server 2003: 512 MB
- Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019: 1024 MB

6. Click **Next**.

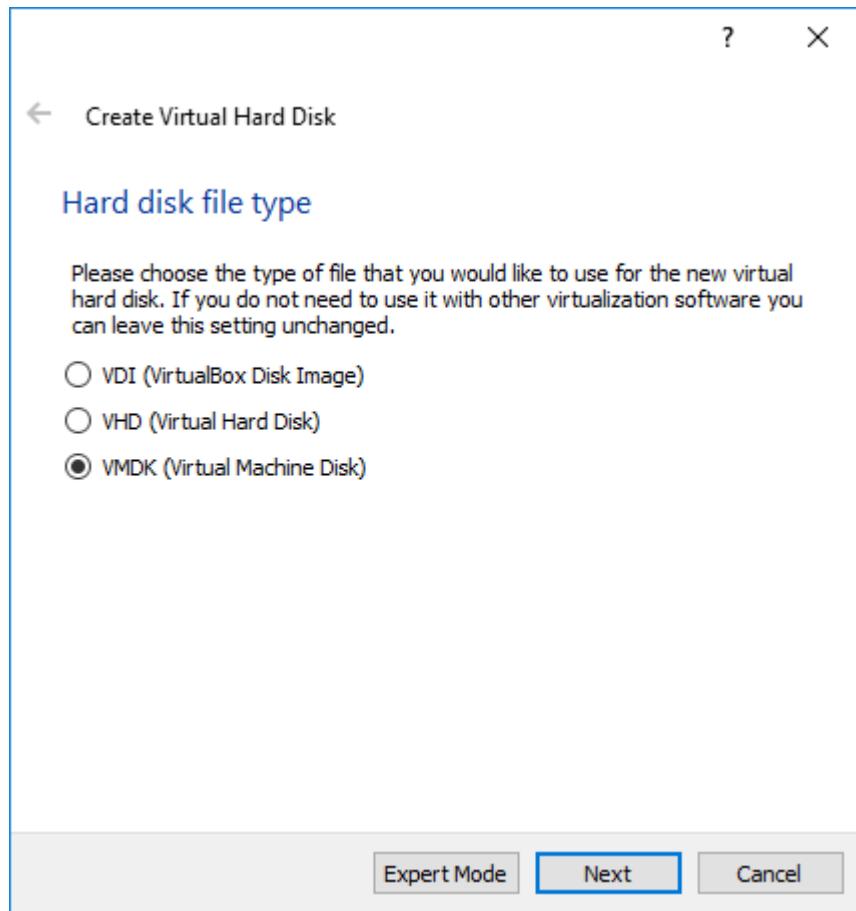
The **Hard disk** screen appears.



**FIGURE 2-6. Hard Disk**

7. Select **Create a virtual hard disk now** and then click **Create**.

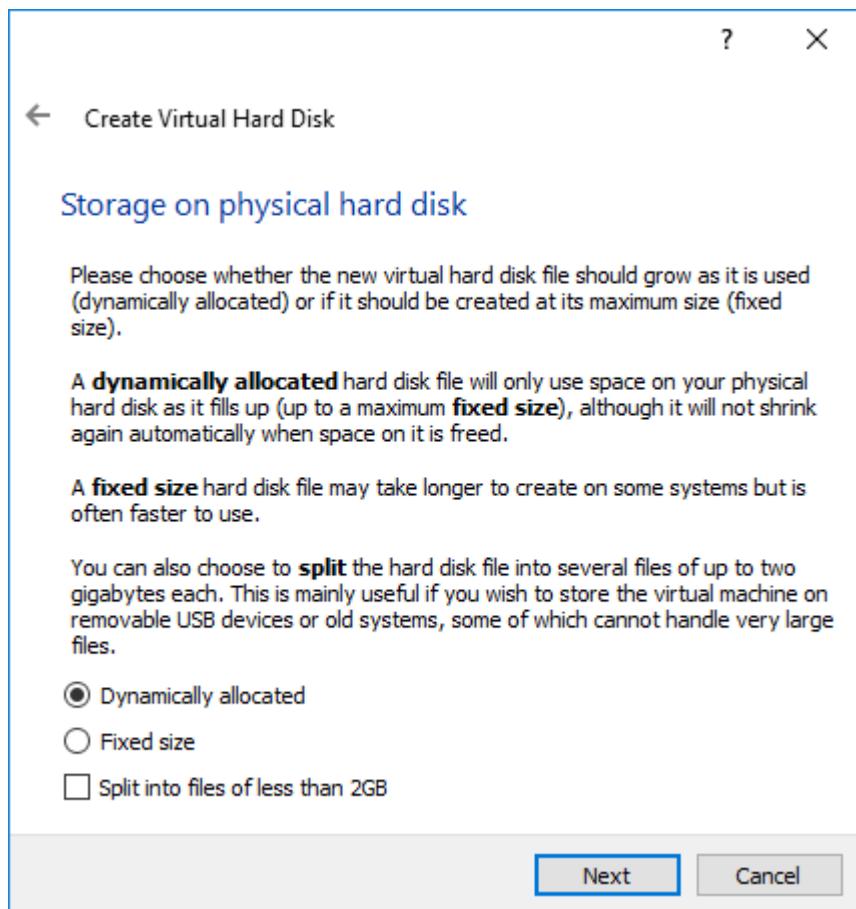
The **Hard disk file type** screen appears.



**FIGURE 2-7. Hard Disk File Type**

8. Select **VDI (VirtualBox Disk Image)** or **VMDK (Virtual Machine Disk)** and then click **Next**.

The **Storage on physical hard disk** screen appears.



**FIGURE 2-8. Storage on Physical Hard Disk**

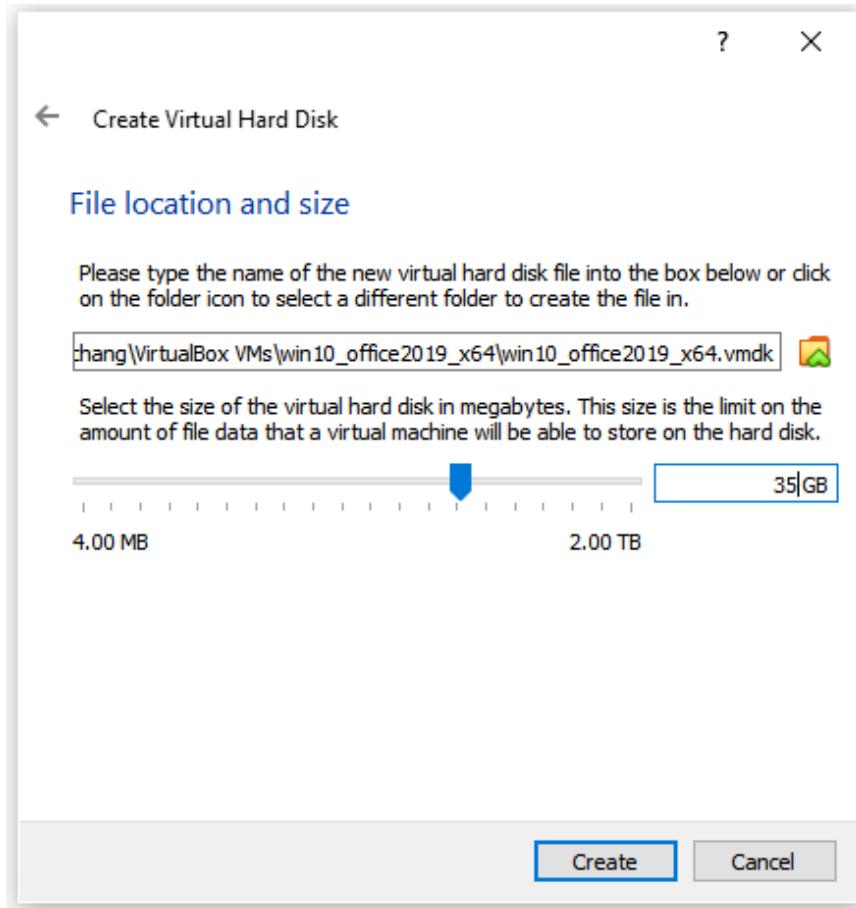
9. Select **Dynamically allocated** and then click **Next**.



**Important**

Do not select **Fixed size** or **Split into files of less than 2GB**.

The **File location and size** screen appears.



**FIGURE 2-9. File Location and Size**

10. (Optional) Click the folder icon to change the path of the virtual disk file.
11. Specify the virtual disk size for your operating system.
  - Windows XP and Windows Server 2003: 15 GB

- Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019: 35 GB

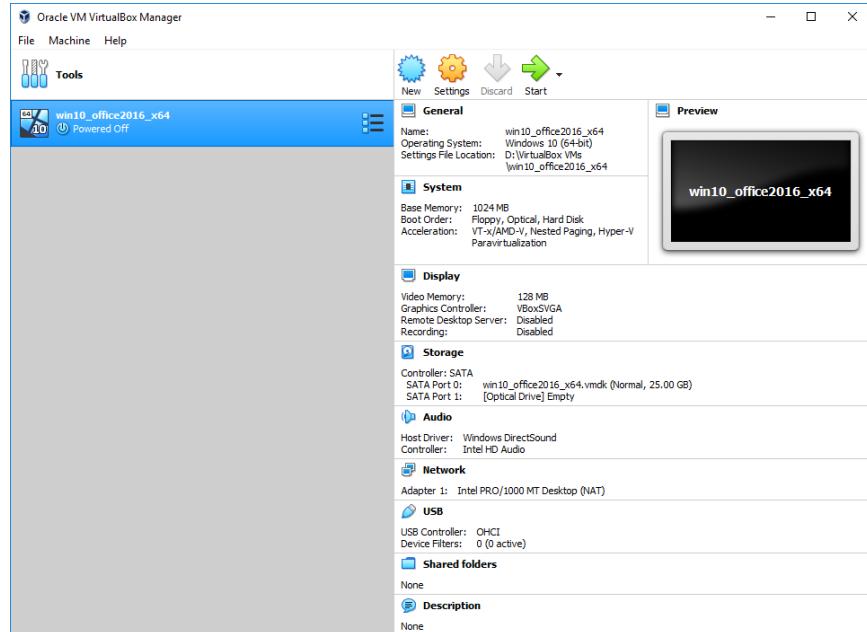


### Note

Trend Micro recommends specifying a larger virtual disk size if you intend to install additional software.

## 12. Click **Create**.

VirtualBox creates the virtual machine. The new virtual machine appears in the left pane of the VirtualBox Manager screen.

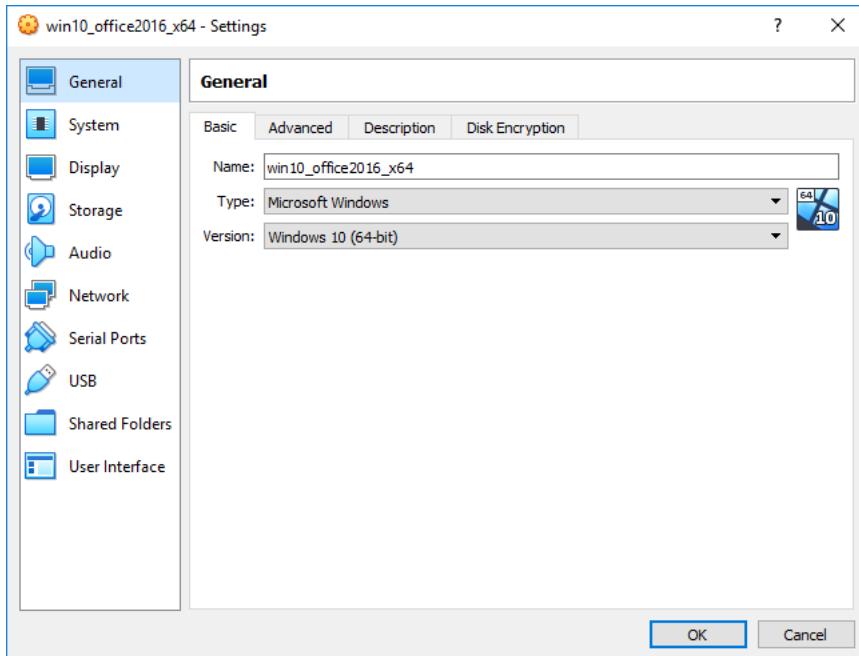


**FIGURE 2-10. Newly-created Virtual Machine**

Ensure that the virtual machine is not in any group.

**13. Click **Settings**.**

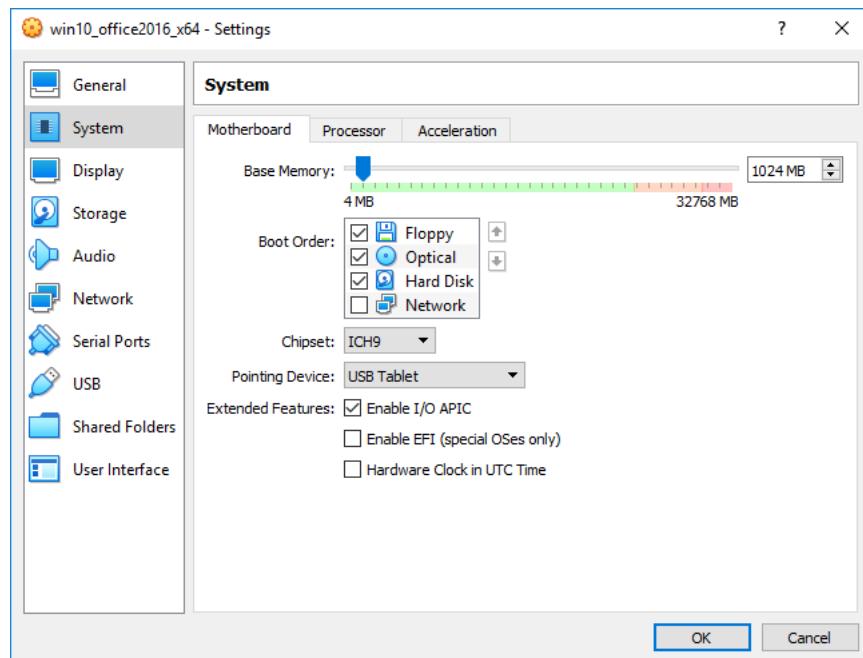
The **Settings** window opens.



**FIGURE 2-11. VirtualBox Settings**

**14. In the left pane, click **System**.**

The **System** screen appears.



**FIGURE 2-12. System Screen**

15. On the **Motherboard** tab, configure the following:
  - **Chipset:** Select **ICH9**
  - **Pointing Device:** Select **USB Tablet**
  - **Extended Features:**
    - Select **Enable I/O APIC**
    - (Optional) Select **Enable EFI (special OSes only)** if you want to create an EFI-compatible image. EFI-compatible images are only supported by the following products: Deep Discovery Inspector 5.6 and later, Deep Discovery Email Inspector 3.6 and later, Deep Discovery Analyzer 6.8 and later, Deep Discovery

Director 5.1 and later, Deep Discovery Web Inspector 2.5 and later

16. Go to the **Processor** tab and then select **Enable PAE/NX**.
17. Go to the **Acceleration** tab and then select **Enable Nested Paging**. If you are using VirtualBox 5.2 and before, select **Enable VT-x/AMD-V** as well.

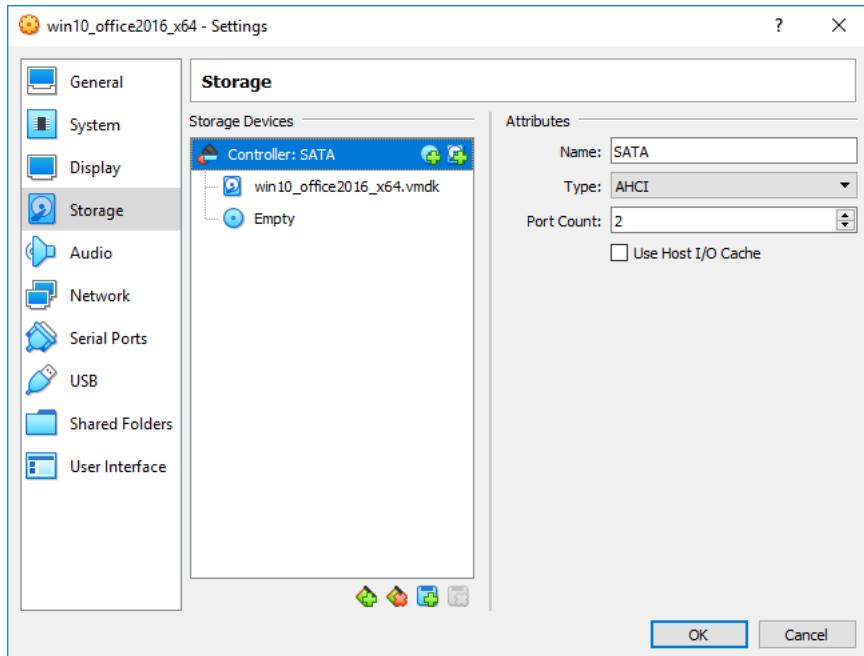


- The **Acceleration** tab is only available if the processor of the host system supports virtualization technology and the virtualization setting is enabled in the BIOS of the host system.
- VirtualBox 6.0 and later automatically enables VT-x/AMD-V if the processor of the host system supports virtualization technology and the virtualization setting is enabled in the BIOS of the host system.

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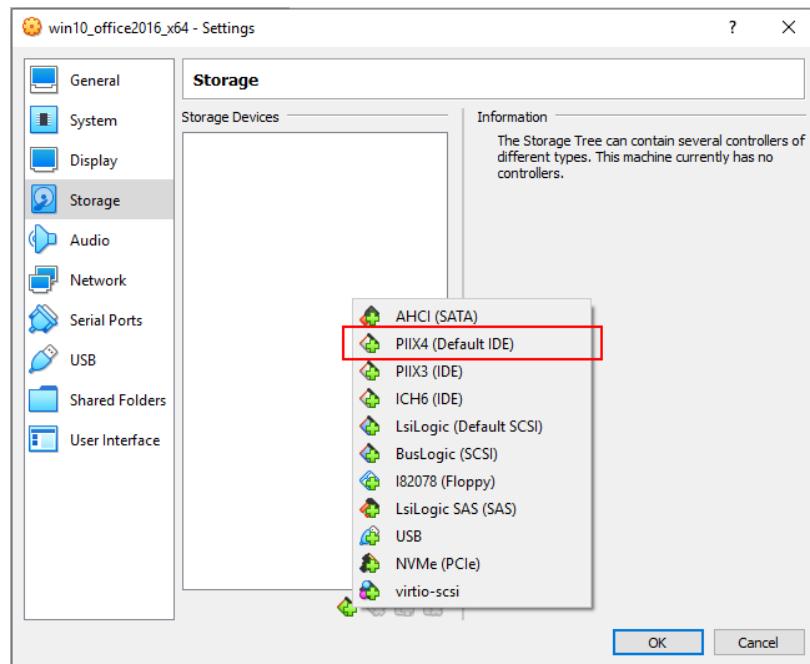
18. In the left pane, click **Storage**.

The **Storage** screen appears.



**FIGURE 2-13. Storage Screen**

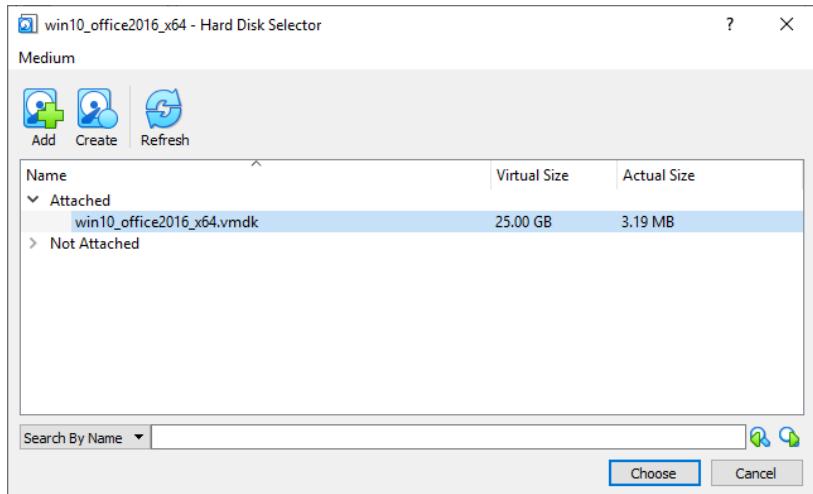
19. If **Controller: SATA** appears under **Storage Tree**, remove the SATA controller and then add an IDE controller.
  - a. Click **Controller: SATA** and then click  to remove the default controller.
  - b. Click  and then select **PIIX4 (Default IDE)**.



**FIGURE 2-14. Add Storage Controller**

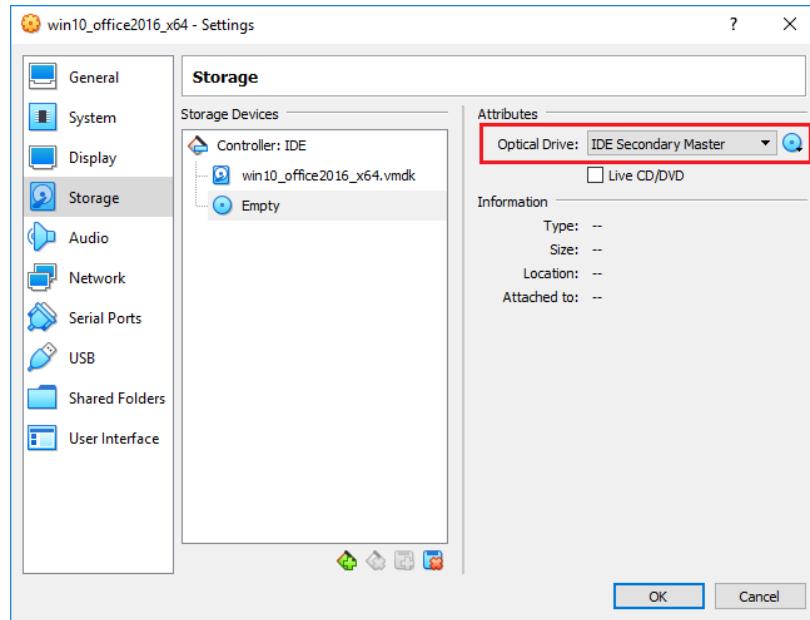
c. Click **Controller: PIIX4** and then click .

The following window appears:



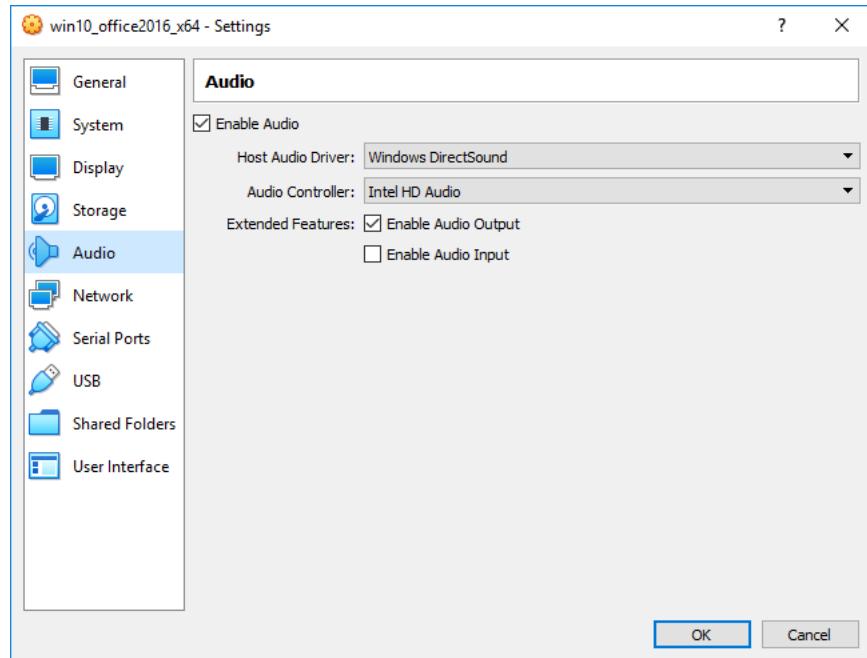
**FIGURE 2-15. Hard Disk Selector**

- d. Select the virtual hard disk file that you previously created and then click **Choose**.
- e. Under **Attributes**, verify that **Hard Disk** is **IDE Primary Master**.
- f. Under **Storage Tree**, click **Controller: IDE** and then click .
- g. In the **Optical Disk Selector** window, click **Leave Empty**.
- h. Under **Attributes**, verify that **CD/DVD Drive** is **IDE Secondary Master**.



**FIGURE 2-16. IDE Secondary Master**

20. Under **Attributes**, click , and then select **Choose a virtual CD/DVD disk file....**
21. Select the ISO file containing the operating system installer.  
The ISO file is available as a device.
22. Verify that there is only one **Controller: IDE** controller. Remove any other controllers by clicking on the controller and then clicking .
23. (Optional) In the left pane, click **Audio** and verify that **Enable Audio** is enabled.



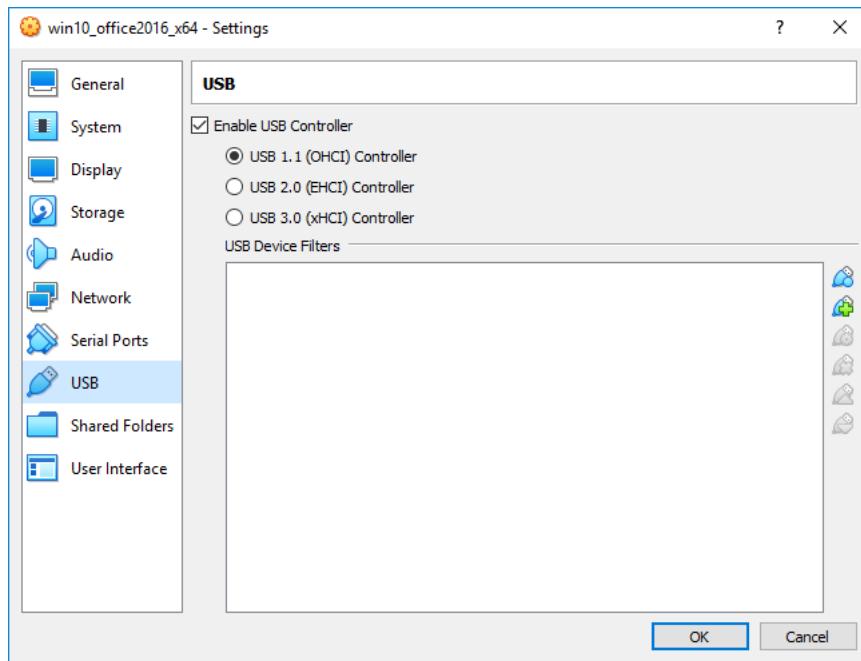
**FIGURE 2-17. Audio Options Settings**

24. In the left pane, click **USB** and then select **Enable USB Controller**.



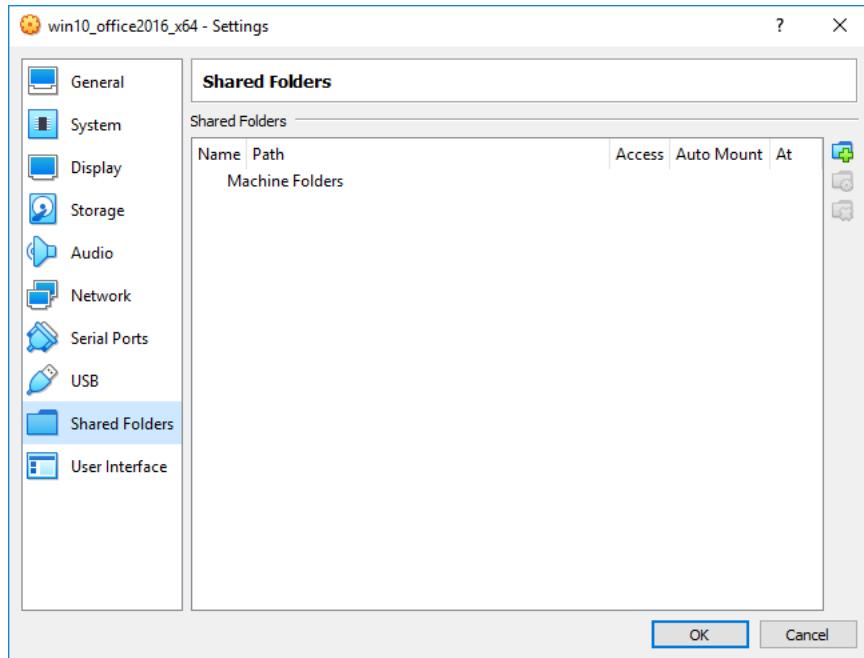
**Important**

Verify that **USB 1.1 (OHCI) Controller** is selected.



**FIGURE 2-18. Enable USB Controller**

25. In the left pane, click **Shared Folders** and then verify that no folders are shared.

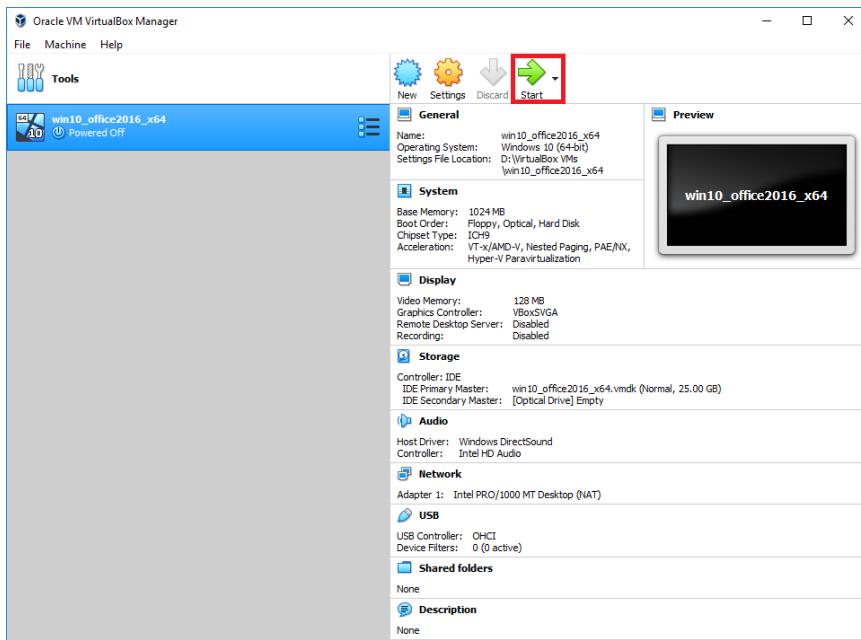


**FIGURE 2-19. Shared Folders Settings**

**26.** Click **OK**.

The **Settings** window closes.

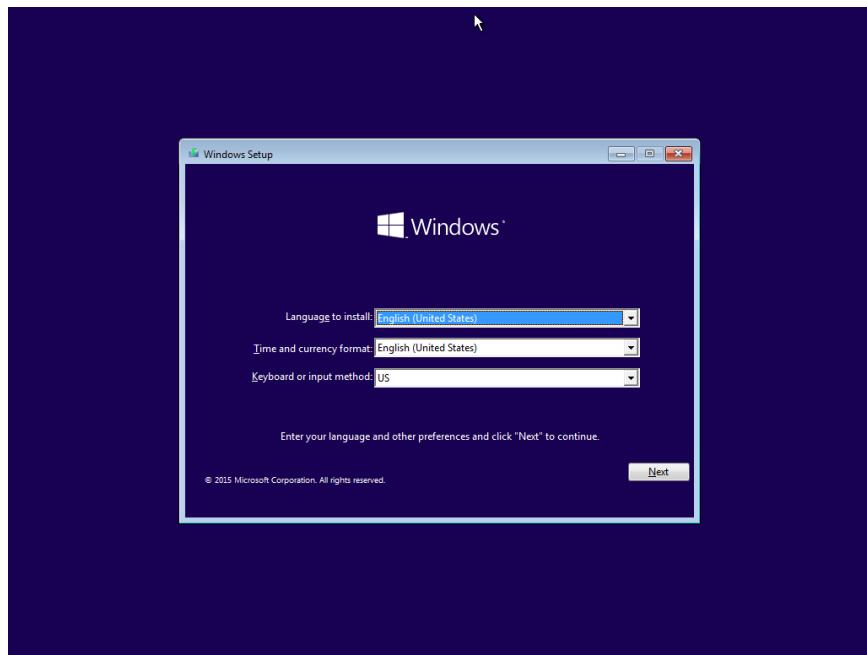
**27.** On the **VirtualBox Manager** screen, click  to power on the image.



**FIGURE 2-20. VirtualBox Manager**

The installation process starts.

28. Follow the on-screen instructions to install the guest operating system.



**FIGURE 2-21. Operating System Installation Process**

29. Install Microsoft Office and other software to achieve satisfactory detection results.

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## Modifying the Virtual Machine Environment

Modify the virtual machine environment to run Virtual Analyzer Sensors, a collection of utilities that execute and detect malware, and record all behavior in Virtual Analyzer.

- *Modifying the Virtual Machine Environment (Windows XP and Windows Server 2003) on page 2-28*

- *Modifying the Virtual Machine Environment (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019) on page 2-30*

## Modifying the Virtual Machine Environment (Windows XP and Windows Server 2003)

### Procedure

1. Open a Command Prompt window (cmd.exe) using an account with administrator privileges.
2. Perform the following tasks:

Task	Steps
Set the "Administrator" logon password to "1111".	<p>Type <b>net user "Administrator" 1111</b>.</p>
Configure automatic logon from the "Administrator" account.	<p>a. Type the following commands:</p> <ul style="list-style-type: none"> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultUserName /t REG_SZ /d Administrator /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultPassword /t REG_SZ /d 1111 /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v AutoAdminLogon /t REG_SZ /d 1 /f</b></li> </ul> <p>b. Restart the image.</p>

TASK	STEPS
	<p> <b>Note</b> No logon prompt is displayed and the “Administrator” account is automatically used to log on.</p>  <p>The image shows the Windows XP Start menu. The title bar says "Administrator". The menu lists various icons for Internet Explorer, Microsoft Office Outlook, MSN, Windows Media Player, Windows Messenger, Microsoft Office Excel 2003, Tour Windows XP, and the Files and Settings Transfer Wizard. On the right, there is a sidebar with links to My Documents, My Recent Documents, My Pictures, My Music, My Computer, Control Panel, Set Program Access and Defaults, Printers and Faxes, Help and Support, Search, and Run... At the bottom, there are "Log Off" and "Turn Off Computer" buttons, and a "start" button.</p>
<b>FIGURE 2-22. Windows XP Administrator Account</b>	
View all user accounts.	Type <b>net user</b> .
Delete non-built-in user accounts one at a time.	Type <b>net user "&lt;username&gt;" /delete</b> . Example: <b>net user "test" /delete</b>
View all network adapters with an active link	Type <b>wmic nic where "netconnectionstatus=2" get netconnectionid /value</b> . Example output: <b>NetConnectionID=Local Area Connection</b>

TASK	STEPS
Verify the DHCP status of all installed network adapters	<p>Type <b>netsh interface ip show config</b>.</p> <p>The configuration of all installed network adapters displays. Verify that the value for <b>DHCP enabled:</b> is <b>Yes</b>.</p>
Configure a network adapter to use DHCP	<p>Type <b>netsh interface ip set address name="&lt;network adapter&gt;" dhcp</b>.</p> <p>Example: <b>netsh interface ip set address name="Local Area Connection" dhcp</b></p>
Disable Windows Firewall.	<p>Type <b>netsh firewall set opmode mode=DISABLE</b>.</p> <p> <b>Note</b> Windows Firewall slows down the installation of Virtual Analyzer Sensors.</p>

3. Restart the virtual machine.

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## Modifying the Virtual Machine Environment (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019)

### Procedure

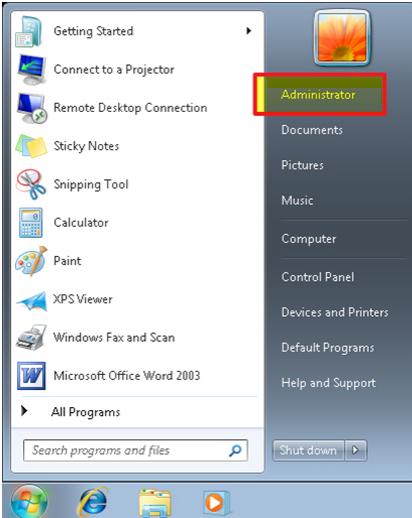
1. Open a Command Prompt window (cmd .exe) using an account with administrator privileges.
2. Perform the following tasks:

TASK	STEPS
Enable the “Administrator” account	Type <b>net user “Administrator” /active:yes</b> .

TASK	STEPS
Set the logon password for the “Administrator” account to “1111”	Type <b>net user "Administrator" 1111</b> .
Configure automatic logon from the administrator account	<p>a. Type the following commands:</p> <ul style="list-style-type: none"> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultUserName /t REG_SZ /d Administrator /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultPassword /t REG_SZ /d 1111 /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v AutoAdminLogon /t REG_SZ /d 1 /f</b></li> </ul> <p><b>Note</b> Each time the image starts, the logon prompt is bypassed and the “Administrator” account is automatically used to log on to the system.</p> <p><b>Note</b> In Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019, launch the <b>Local Security Policy</b> snap-in (secpol.msc) to disable the <b>Password must meet complexity requirements</b> Local Security Setting.</p> <p>• Restart the image.</p>

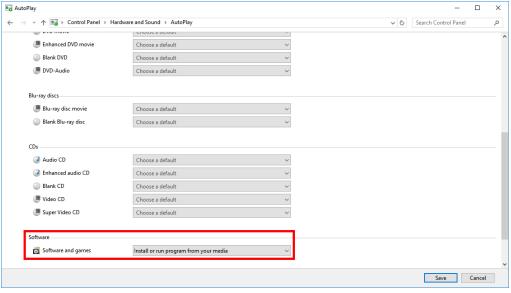


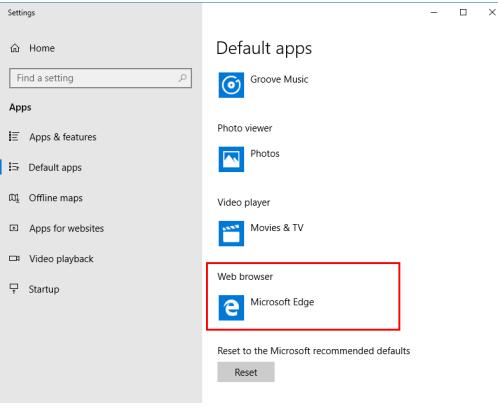
**FIGURE 2-23. Disable Password must meet complexity requirements**

TASK	STEPS
	<p>No logon prompt is displayed and the “Administrator” account is automatically used to log on.</p> 
View all user accounts	Type <b>net user</b> .
Delete non-built-in user accounts one at a time	Type <b>net user "&lt;username&gt; /delete</b> . Example: <b>net user "test" /delete</b>
View all network adapters with an active link	Type <b>wmic nic where "netconnectionstatus=2" get netconnectionid /value</b> . Example output: <b>NetConnectionID=Local Area Connection</b>
Verify the DHCP status of all installed network adapters	Type <b>netsh interface ip show config</b> . The configuration of all installed network adapters displays. Verify that the value for <b>DHCP enabled:</b> is <b>Yes</b> .

Task	Steps
Configure a network adapter to use DHCP	<p>Type <b>netsh interface ip set address name="&lt;network adapter&gt;" dhcp</b>.</p> <p>Example: <b>netsh interface ip set address name="Local Area Connection" dhcp</b></p>
Disable Windows Firewall	<p>Type <b>netsh advfirewall set allprofiles state off</b>.</p> <p> <b>Note</b> Windows Firewall slows down the installation of Virtual Analyzer Sensors.</p>
(Optional) Install Adobe Flash in Windows Server 2016 and Windows Server 2019	<p>For Windows Server 2016: Type <b>C:\&gt; dism /online /add-package /packagepath:"C:\Windows\servicing\Packages\Adobe-Flash-For-Windows-Package~31bf3856ad364e35~amd64~~10.0.14393.0.mum"</b></p> <p>For Windows Server 2019: Type <b>C:\&gt; dism /online /add-package /packagepath:"C:\Windows\servicing\Packages\Adobe-Flash-For-Windows-Package~31bf3856ad364e35~amd64~~10.0.17763.1.mum"</b></p>

3. Perform the following tasks using the Windows graphical user interface:

TASK	STEPS
Configure AutoPlay	<p>a. Open the Windows <b>Start</b> menu, type <b>Control Panel</b> into the search box and press ENTER.</p> <p>b. In the <b>Control Panel</b>, go to <b>Hardware and Sound &gt; AutoPlay</b>.</p>  <p><b>FIGURE 2-25. AutoPlay</b></p> <p>c. For <b>Software and games</b>, select <b>Install or run program from your media</b>.</p> <p>d. Click <b>Save</b>.</p>

TASK	STEPS
Configure default web browser on Windows 10	<p>Internet Explorer should come pre-installed on Windows 10. To configure Internet Explorer as the default web browser, perform the following:</p> <ol style="list-style-type: none"> <li data-bbox="633 355 1184 404">a. Open the Windows <b>Start</b> menu, type <b>Default apps</b> and press ENTER.</li> <li data-bbox="633 421 1184 470">b. Under <b>Web browser</b>, select the current web browser.</li> </ol>  <p><b>FIGURE 2-26. Default apps</b></p> <ol style="list-style-type: none"> <li data-bbox="633 948 1184 997">c. In the <b>Choose an app</b> context menu, select <b>Internet Explorer</b>.</li> <li data-bbox="633 1013 1184 1062">d. If the <b>Before you switch</b> dialog appears, select <b>Switch anyway</b>.</li> </ol>
(Optional) Change the display resolution	<p>Trend Micro recommends setting the screen resolution to at least <b>1152 x 864</b> to avoid triggering the anti-virtual machine functions of some malware.</p> <ol style="list-style-type: none"> <li data-bbox="633 1192 1184 1241">a. Open the Windows <b>Start</b> menu, type <b>Display settings</b> and press ENTER.</li> <li data-bbox="633 1258 1184 1307">b. Under <b>Resolution</b>, select <b>1152 x 864</b> or any higher resolution.</li> <li data-bbox="633 1323 1184 1372">c. In the prompt that appears, click <b>Keep changes</b>.</li> </ol>

4. Restart the virtual machine.

---

## Reducing the Size of VirtualBox Disk Images

---

### Procedure

1. Uninstall unnecessary applications and optional Windows components.
2. Run **Disk Cleanup** to free up space on the hard disk.

The utility searches for files and data that you can safely delete, including:

- Temporary Windows and Internet files
- ActiveX controls, Java applets, and other downloaded program files
- Files in the Recycle Bin

For details, see the Microsoft Help: <http://windows.microsoft.com/en-us/windows/delete-files-using-disk-cleanup#delete-files-using-disk-cleanup=windows-7>.

3. Use **Deployment Image Servicing and Management (DISM)** to free up space on the hard disk.

DISM is a command-line utility that can be used to free up disk space by managing the Windows Component Store (WinSxS directory).

For details, see the Microsoft Developer resource website: <https://msdn.microsoft.com/en-us/windows/hardware/commercialize/manufacture/desktop/clean-up-the-winsxs-folder>

- a. Open a Command Prompt window.



#### Note

Depending on the Windows version, not all of the following commands may be supported.

---

- b. Type **dism /Online /Cleanup-Image /SPSuperseded**.
  - c. Type **dism /Online /Cleanup-Image /StartComponentCleanup /ResetBase**.
4. Download **SDelete** and then zero out the free space on the hard disk.

**SDelete** is a free command-line utility that securely deletes existing files and permanently erases file data in unallocated clusters of a disk. The utility can also ensure that even encrypted files cannot be recovered by overwriting all addressable locations with new and random characters.

- a. Download **sdelete.zip** from the Windows Sysinternals website:  
<https://technet.microsoft.com/en-us/sysinternals/sdelete.aspx>
- b. Extract **sdelete.exe**.
- c. Open a Command Prompt window.
- d. Go to the folder that contains **sdelete.exe**.
- e. Type **sdelete -z [drive letter]**.

**SDelete** zeroes the free space on the hard disk.

5. Shut down the virtual machine.
6. Open a Command Prompt window on the host system.
7. Type "**C:\Program Files\Oracle\VirtualBox\VBoxManage.exe" modifyhd [path\[vm\_name.vdi] --compact**".

The virtual hard disk drive size is reduced.

---

## Exporting Virtual Machine Images to OVA Files

A virtual machine image comprises many uncompressed files. The files must be combined into a single OVA file to avoid issues when importing.



**Important**

Verify that the size of the created OVA file is supported by your product.

For details, go to <https://docs.trendmicro.com/en-us/home.aspx#Enterprise>.

---

**Procedure**

1. On the VirtualBox Manager screen, power off the virtual machine.

**Note**

Verify that the CD/DVD drive is empty before powering off and exporting.

---

2. Go to **File > Export Appliance**.

The **Export Virtual Appliance** window appears.

3. Select the virtual machine image to export and click **Next**.

The **Appliance settings** screen appears.

4. Configure the following:

- **File:** Accept the default name and path or click  to select a different file.
- **Format:** Select **OVF 1.0**.

**Important**

Format options include OVF 0.9, 1.0 and 2.0. Virtual Analyzer does not support OVF 2.0.

---

- **MAC Address Policy:** Select **Include only NAT network adapter MAC addresses**.

5. Click **Next**.

The **Virtual system settings** screen appears.

6. Verify that the **License** field is empty and then click **Export**.

---

VirtualBox creates the OVA file.



# Chapter 3

## Windows OVA File Creation Using Converted Virtual Hard Disk Drives

Learn how to prepare and import an Windows OVA file in the following topics:

- *Modifying the Virtual Machine Environment on page 3-7*
- *Exporting Virtual Machine Images on page 3-18*
- *Converting VMware ESXi Virtual Hard Disk Drives on page 3-25*
- *Creating Virtual Machine Images Using Converted Virtual Hard Disk Drives on page 3-32*
- *Configuring Virtual Machine Images on page 3-49*
- *Exporting Virtual Machine Images to OVA Files on page 3-54*

# Creating Windows OVA Files Using Converted Virtual Hard Disk Drives

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## Procedure

1. Prepare Adobe Reader.  
For details, see [Preparing Adobe Reader on page 3-6](#)
2. Modify the environment of the virtual machine image.  
For details, see [Modifying the Virtual Machine Environment on page 3-7](#).
3. Export the virtual machine image.  
For details, see [Exporting Virtual Machine Images on page 3-18](#).
4. Convert the virtual hard disk drive of the exported image to the VirtualBox format.  
For details, see [Converting VMware ESXi Virtual Hard Disk Drives on page 3-25](#).
5. Create a new virtual machine image using the converted virtual hard disk drive.  
For details, see [Creating Virtual Machine Images Using Converted Virtual Hard Disk Drives on page 3-32](#).
6. Configure the new virtual machine image.  
For details, see [Configuring Virtual Machine Images on page 3-49](#).
7. Export the virtual machine image to an OVA file.  
For details, see [Exporting Virtual Machine Images to OVA Files on page 3-54](#).

---

## Required Software

The following software must be installed on the virtual machine to achieve satisfactory detection results.

**TABLE 3-1. Required Applications**

SOFTWARE	DESCRIPTION
Operating system	<p>Virtual Analyzer supports the following operating systems: Windows XP, Windows 7, Windows 8/8.1, Windows 10 Version 1909 and before, Windows Server 2003/2003 R2, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019.</p> <p><b>Important</b></p> <ul style="list-style-type: none"><li>• Package the installer as an ISO file.</li><li>• Activate Windows with a valid product key after the tool has validated and modified virtual machine settings. Do not activate Windows before that.</li><li>• Use a computer name that reflects your organizations' naming scheme.</li><li>• Disable automatic updates.</li><li>• Trend Micro recommends using the English version of the listed operating systems.</li><li>• For Windows 7 and Windows Server 2008/2008 R2, updates KB4474419 and KB4490628 must be installed.</li></ul>

Software	Description
Office suite	<p>Virtual Analyzer supports the following office suites:</p> <p>Office 2003 (32-bit), Office 2007 (32-bit), Office 2010 (32-bit and 64-bit), Office 2013 (32-bit and 64-bit), Office 2016 (32-bit and 64-bit), and Office 2019 (32-bit and 64-bit)</p> <hr/> <p><b>Important</b></p> <ul style="list-style-type: none"> <li>For Office 2007 and above, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, and Microsoft Publisher must be installed.</li> <li>Activate Microsoft Office with a valid product key after the tool has validated and modified virtual machine settings. Do not activate Microsoft Office before that.</li> <li>After installation, open all Microsoft Office applications and verify that the main editing screen is displayed. If any confirmation dialog or welcome screen displays, make any selection to close the screen and display the main editing screen.</li> </ul>  <p><b>FIGURE 3-1. Help Protect and Improve Microsoft Office</b></p> <ul style="list-style-type: none"> <li>Verify that your license allows you to virtualize the applications. For details, see <a href="https://support.office.com">https://support.office.com</a>.</li> <li>Disable automatic updates.</li> <li>Enable macros. For details, see <a href="#">Enable or disable macros in Office files</a></li> </ul>

SOFTWARE	DESCRIPTION
Internet Explorer	Internet Explorer must be configured as the default web browser of the operating system. For Windows 8.1 and before, the tool will configure the setting. For Windows 10, the setting must be configured manually before the tool is used to validate the image.
Adobe Reader	<p>Install the version of Adobe Reader that is most widely used in your organization. To download the most current version of Adobe Reader, go to <a href="http://www.adobe.com/downloads/">http://www.adobe.com/downloads/</a>.</p> <p>If you do not install Adobe Reader, Virtual Analyzer:</p> <ul style="list-style-type: none"> <li>Installs Adobe Reader 8, 9, and 11 on all Windows XP and Windows Server 2003/2003 R2 images during importing.</li> <li>Installs Adobe Reader 9, 11, and DC on all Windows 7 and newer images during import.</li> <li>Uses all versions during analysis.</li> </ul> <hr/> <p> <b>WARNING!</b></p> <p>This consumes additional computing resources.</p> <hr/> <p>Configure Adobe Reader to manually check for and install updates. For details, see <a href="https://helpx.adobe.com/acrobat/kb/reader-acrobat-updater-settings.html">https://helpx.adobe.com/acrobat/kb/reader-acrobat-updater-settings.html</a>.</p>
.NET Framework	Install .NET Framework 3.5 or later if the operating system is Windows XP or Windows Server 2003.



### Note

Trend Micro recommends installing the following software on the virtual machine to improve detection results.

- .NET Framework 4.0 in addition to .NET Framework 3.5
- Java SE Runtime Environment 8
- LibreOffice 6.4.7 or later, with macro security level set to low

**Important**

- Do not install VMware tools to avoid triggering the anti-virtual machine functions of some malware.
- Do not install any anti-malware software on the virtual machine to ensure normal operation of Virtual Analyzer.

---

## Preparing Adobe Reader

Perform the following steps if Adobe Reader is installed on the virtual machine.

---

### Procedure

1. Disable automatic updates.

For details, see <http://helpx.adobe.com/acrobat/kb/disable-automaticupdates-acrobat-reader.html>.

2. Install the necessary Adobe Reader language packs so that Virtual Analyzer can process files authored in languages other than those supported in your native Adobe Reader.

For example, if you use the English version of Adobe Reader and you expect to analyze files authored in East Asian languages, install the Asian and Extended Language Pack.

3. Start Adobe Reader.

---

**Important**

Perform this step before exporting the virtual machine.

---

## Modifying the Virtual Machine Environment

Modify the virtual machine environment to run Virtual Analyzer Sensors, a collection of utilities that execute and detect malware, and record all behavior in Virtual Analyzer.

- *Modifying the Virtual Machine Environment (Windows XP and Windows Server 2003) on page 3-7*
- *Modifying the Virtual Machine Environment (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019) on page 3-9*
- *Uninstalling VMware Tools on page 3-16*

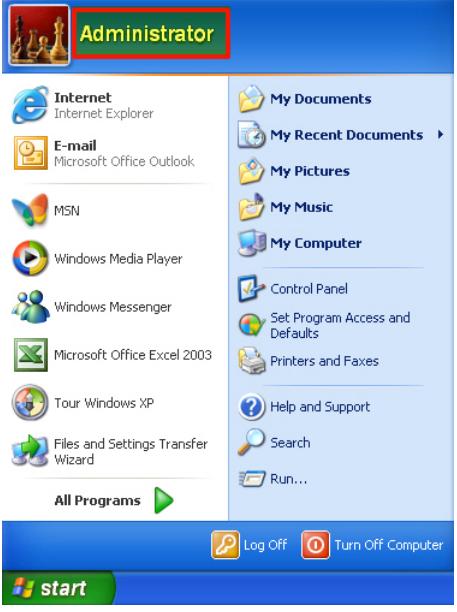
### Modifying the Virtual Machine Environment (Windows XP and Windows Server 2003)

---

#### Procedure

1. Open a Command Prompt window (cmd .exe) using an account with administrator privileges.
2. Perform the following tasks:

Task	Steps
Set the "Administrator" logon password to "1111".	Type <b>net user "Administrator" 1111</b> .
Configure automatic logon from the "Administrator" account.	<ol style="list-style-type: none"><li>Type the following commands:<ul style="list-style-type: none"><li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultUserName /t REG_SZ /d Administrator /f</b></li><li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultPassword /t REG_SZ /d 1111 /f</b></li></ul></li></ol>

TASK	STEPS
<p><b>Note</b></p> <p>The logon prompt is bypassed and the “Administrator” account is automatically used to log on to the system every time the virtual machine starts.</p>	<ul style="list-style-type: none"> <li>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v AutoAdminLogon /t REG_SZ /d 1 /f</li> </ul> <p>b. Restart the image.</p> <hr/> <p><b>Note</b></p> <p>No logon prompt is displayed and the “Administrator” account is automatically used to log on.</p>
	
	<p><b>FIGURE 3-2. Windows XP Administrator Account</b></p>
View all user accounts.	Type <b>net user</b> .
Delete non-built-in user accounts one at a time.	Type <b>net user "&lt;username&gt;" /delete</b> .

Task	Steps
	Example: <code>net user "test" /delete</code>
View all network adapters with an active link	Type <code>wmic nic where "netconnectionstatus=2" get netconnectionid /value</code> . Example output: <b>NetConnectionID=Local Area Connection</b>
Verify the DHCP status of all installed network adapters	Type <code>netsh interface ip show config</code> . The configuration of all installed network adapters displays. Verify that the value for <b>DHCP enabled:</b> is <b>Yes</b> .
Configure a network adapter to use DHCP	Type <code>netsh interface ip set address name="<network adapter="">" dhcp</network></code> . Example: <code>netsh interface ip set address name="Local Area Connection" dhcp</code>
Disable Windows Firewall.	Type <code>netsh firewall set opmode mode=DISABLE</code> .
	 <b>Note</b> Windows Firewall slows down the installation of Virtual Analyzer Sensors.
Uninstall VMware Tools.	For details, see <a href="#">Uninstalling VMware Tools on page 3-16</a> .

3. Restart the virtual machine.

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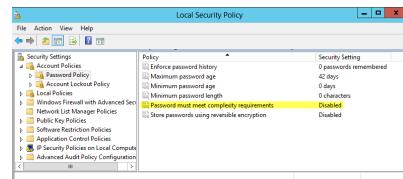
## Modifying the Virtual Machine Environment (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019)

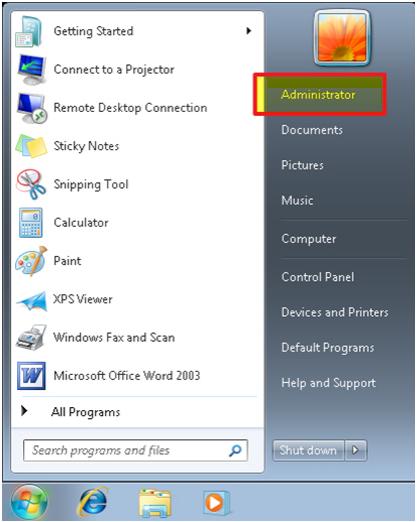
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### Procedure

1. Open a Command Prompt window (cmd.exe) using an account with administrator privileges.
2. Perform the following tasks:

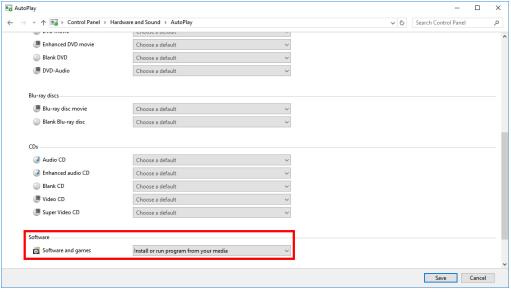
TASK	STEPS
Enable the “Administrator” account.	Type <b>net user “Administrator” /active:yes</b> .
Set the logon password for the “Administrator” account to “1111”.	Type <b>net user "Administrator" 1111</b> .
<p>Configure automatic logon from the administrator account.</p> <p> <b>Note</b> Each time the image starts, the logon prompt is bypassed and the “Administrator” account is automatically used to log on to the system.</p>	<p>a. Type the following commands:</p> <ul style="list-style-type: none"> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultUserName /t REG_SZ /d Administrator /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v DefaultPassword /t REG_SZ /d 1111 /f</b></li> <li>• <b>REG ADD "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon" /v AutoAdminLogon /t REG_SZ /d 1 /f</b></li> </ul>

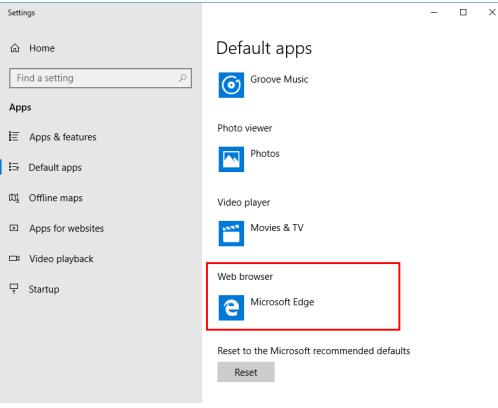
TASK	STEPS
	<p> <b>Note</b></p> <p>In Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019, launch the <b>Local Security Policy</b> snap-in (secpol.msc) to disable the <b>Password must meet complexity requirements</b> Local Security Setting.</p>  <p><b>FIGURE 3-3. Disable Password must meet complexity requirements</b></p> <ul style="list-style-type: none"><li>• Restart the image.</li></ul>

TASK	STEPS
	<p>No logon prompt is displayed and the “Administrator” account is automatically used to log on.</p> 
View all user accounts.	Type <b>net user</b> .
Delete non-built-in user accounts one at a time.	Type <b>net user "&lt;username&gt;" /delete</b> . Example: <b>net user "test" /delete</b>
View all network adapters with an active link	Type <b>wmic nic where "netconnectionstatus=2" get netconnectionid /value</b> . Example output: <b>NetConnectionID=Local Area Connection</b>
Verify the DHCP status of all installed network adapters	Type <b>netsh interface ip show config</b> . The configuration of all installed network adapters displays. Verify that the value for <b>DHCP enabled:</b> is <b>Yes</b> .

Task	Steps
Configure a network adapter to use DHCP	<p>Type <b>netsh interface ip set address name="&lt;network adapter&gt;" dhcp</b>.</p> <p>Example: <b>netsh interface ip set address name="Local Area Connection" dhcp</b></p>
Disable Windows Firewall.	<p>Type <b>netsh advfirewall set allprofiles state off</b>.</p> <p> <b>Note</b> Windows Firewall slows down the installation of Virtual Analyzer Sensors.</p>
(Optional) Install Adobe Flash in Windows Server 2016 and Windows Server 2019	<p>For Windows Server 2016: Type <b>C:\&gt; dism /online /add-package /packagepath:"C:\Windows\servicing\Packages\Adobe-Flash-For-Windows-Package~31bf3856ad364e35~amd64~~10.0.14393.0.mum"</b></p> <p>For Windows Server 2019: Type <b>C:\&gt; dism /online /add-package /packagepath:"C:\Windows\servicing\Packages\Adobe-Flash-For-Windows-Package~31bf3856ad364e35~amd64~~10.0.17763.1.mum"</b></p>

3. Perform the following tasks using the Windows graphical user interface:

TASK	STEPS
Configure AutoPlay	<p>a. Open the Windows <b>Start</b> menu, type <b>Control Panel</b> into the search box and press ENTER.</p> <p>b. In the <b>Control Panel</b>, go to <b>Hardware and Sound &gt; AutoPlay</b>.</p>  <p><b>FIGURE 3-5. AutoPlay</b></p> <p>c. For <b>Software and games</b>, select <b>Install or run program from your media</b>.</p> <p>d. Click <b>Save</b>.</p>

TASK	STEPS
Configure default web browser on Windows 10	<p>Internet Explorer should come pre-installed on Windows 10. To configure Internet Explorer as the default web browser, perform the following:</p> <ol style="list-style-type: none"> <li data-bbox="633 355 1184 404">a. Open the Windows <b>Start</b> menu, type <b>Default apps</b> and press ENTER.</li> <li data-bbox="633 421 1184 470">b. Under <b>Web browser</b>, select the current web browser.</li> </ol>  <p><b>FIGURE 3-6. Default apps</b></p> <ol style="list-style-type: none"> <li data-bbox="633 943 1184 992">c. In the <b>Choose an app</b> context menu, select <b>Internet Explorer</b>.</li> <li data-bbox="633 1008 1184 1057">d. If the <b>Before you switch</b> dialog appears, select <b>Switch anyway</b>.</li> </ol>
(Optional) Change the display resolution	<p>Trend Micro recommends setting the screen resolution to at least <b>1152 x 864</b> to avoid triggering the anti-virtual machine functions of some malware.</p> <ol style="list-style-type: none"> <li data-bbox="633 1192 1184 1241">a. Open the Windows <b>Start</b> menu, type <b>Display settings</b> and press ENTER.</li> <li data-bbox="633 1258 1184 1307">b. Under <b>Resolution</b>, select <b>1152 x 864</b> or any higher resolution.</li> <li data-bbox="633 1323 1184 1372">c. In the prompt that appears, click <b>Keep changes</b>.</li> </ol>

TASK	STEPS
Uninstall VMware Tools.	For details, see <a href="#">Uninstalling VMware Tools on page 3-16</a> .

---

4. Restart the virtual machine.

---

## Uninstalling VMware Tools

VMware Tools will attempt to connect to a VMware ESXi host, which might prevent VirtualBox from importing the virtual machine image.

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### Procedure

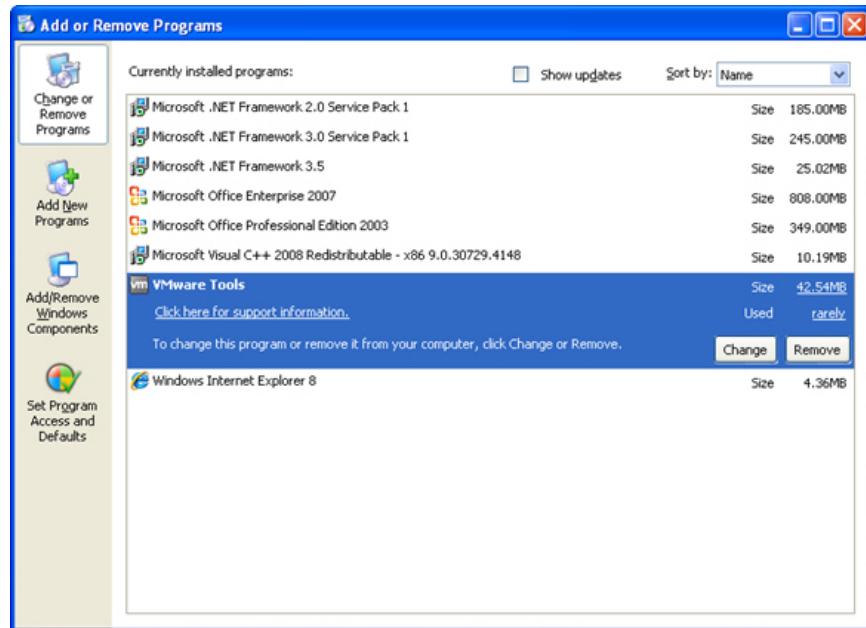
1. Go to **Start > Control Panel**.

The **Control Panel** screen appears.

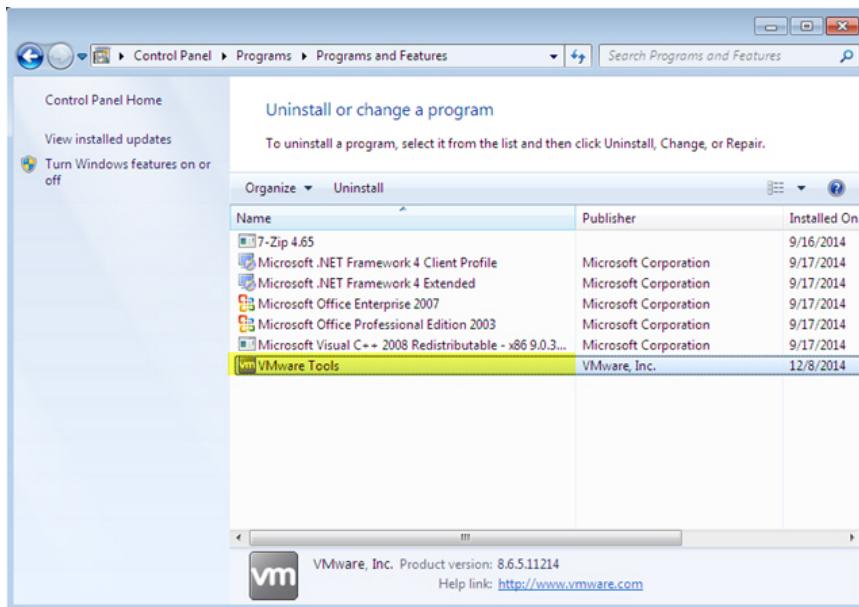
2. Check the list of installed programs.

- Windows XP and Windows Server 2003: Click **Add or Remove Programs**.
- Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019: Click **Programs and Features**.

A list of installed programs appears.



**FIGURE 3-7. Add or Remove Programs (Windows XP)**



**FIGURE 3-8. Add or Remove Programs (Windows 7)**

3. Select **VMware Tools** and then click **Remove** (Windows XP or Windows Server 2003) or **Uninstall** (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, or Windows Server 2019).
4. Click **Yes** to uninstall VMware Tools.
5. Click **Yes** to restart Windows.

---

VMware Tools is uninstalled.

## Exporting Virtual Machine Images

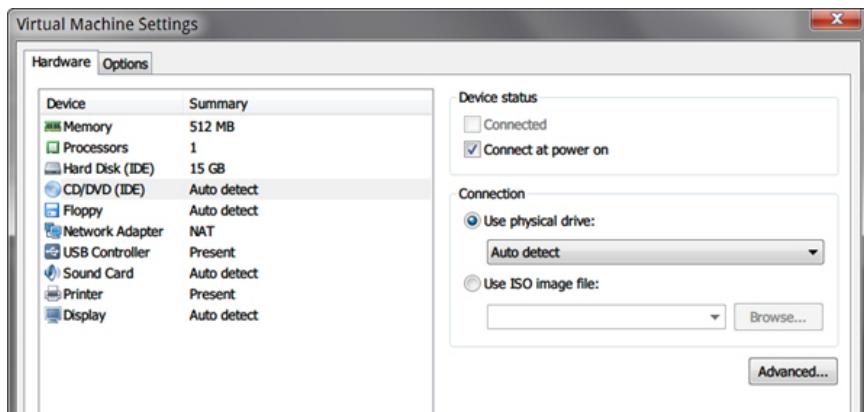
You must verify and modify some settings before exporting a virtual machine image from VMware ESXi or Workstation.

- [Verifying Virtual Machine Settings on VMware Workstation on page 3-19](#)
- [Exporting Virtual Machine Images on VMware ESXi on page 3-21](#)
- [Converting VMware ESXi Virtual Hard Disk Drives on page 3-25](#)

## Verifying Virtual Machine Settings on VMware Workstation

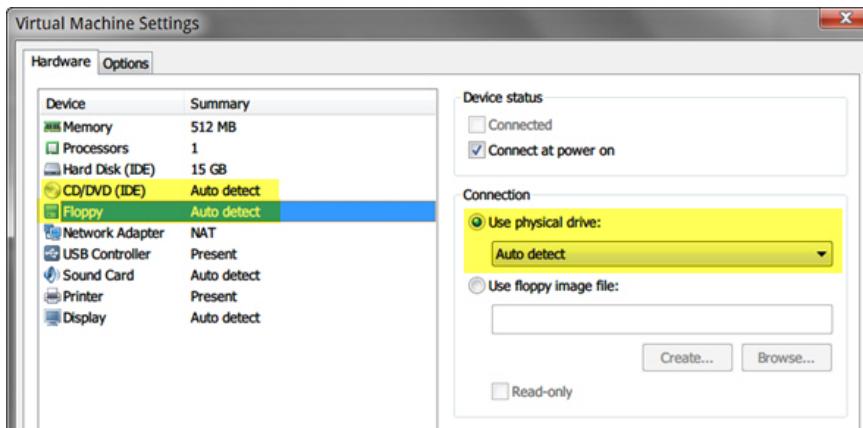
### Procedure

1. Shut down the virtual machine.
2. In the left pane, right-click the virtual machine and then select **Settings**.  
The **Virtual Machine Settings** screen appears.



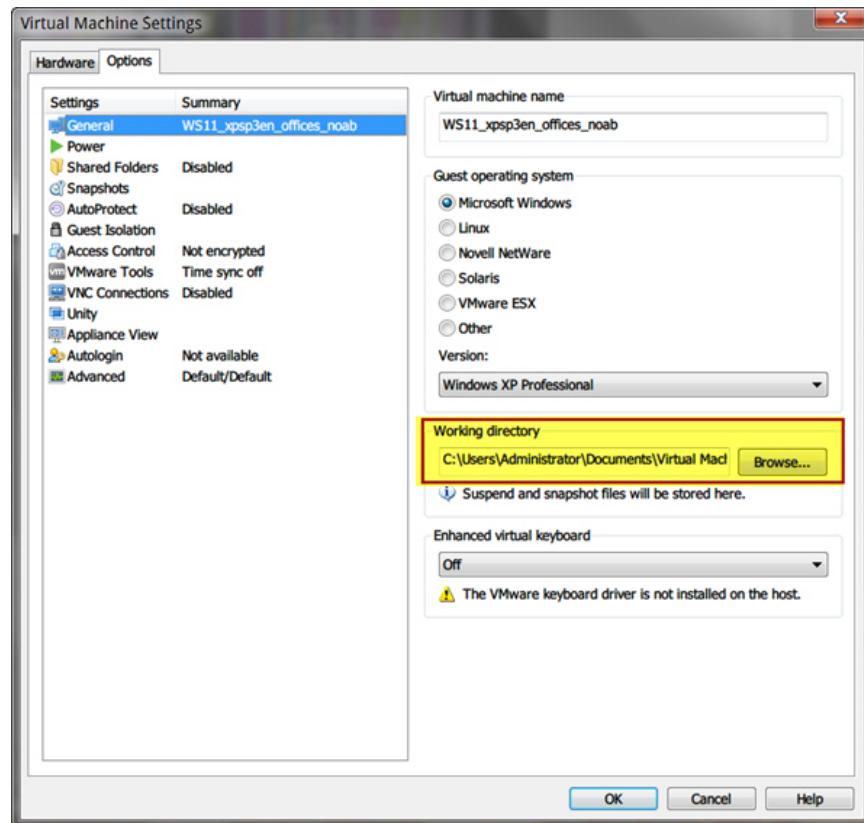
**FIGURE 3-9. Virtual Machine Settings**

3. On the **Hardware** tab, verify the following:
  - **CD/DVD (IDE): Connection is Use physical drive.**
  - **Floppy: Connection is Use physical drive.**



**FIGURE 3-10. Virtual Machine Settings - Hardware**

4. Go to the **Options** tab and then click **General**.
5. In the right pane, under **Working directory**, locate the Virtual Machine Disk (\*.vmdk).

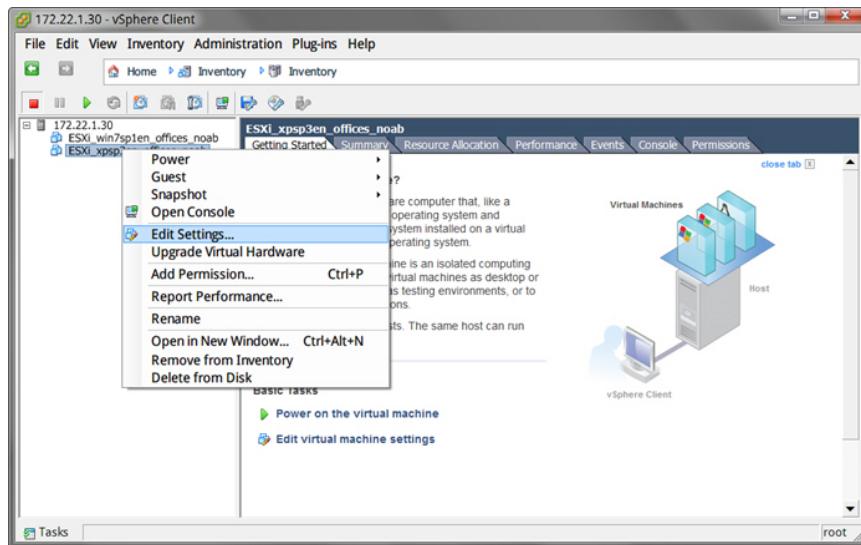


**FIGURE 3-11. Working Directory**

## Exporting Virtual Machine Images on VMware ESXi

### Procedure

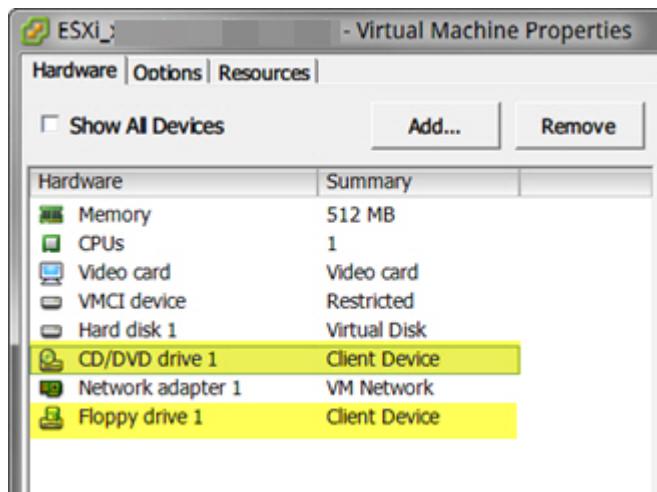
1. Shut down the virtual machine.
2. In the left pane, right-click the virtual machine and then select **Edit Settings**.



**FIGURE 3-12. Edit Settings**

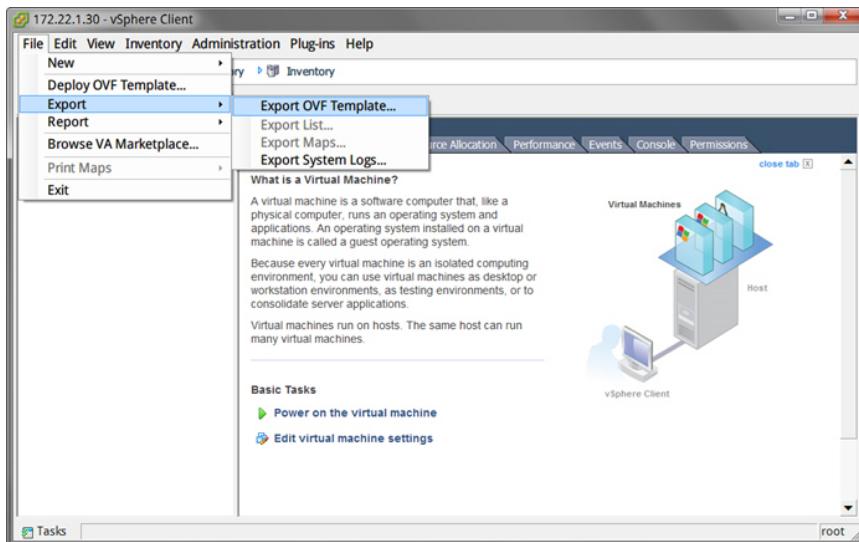
The **Virtual Machine Properties** screen appears.

3. On the **Hardware** tab, verify the following settings:
  - **CD/DVD drive 1: Client Device**
  - **Floppy drive 1: Client Device**



**FIGURE 3-13. Virtual Machine Properties - Hardware**

4. In the left pane, select the virtual machine and then go to **File > Export > Export OVF Template**.



**FIGURE 3-14. OVF Template**

The **Export OVF Template** screen appears.

- Configure the following settings:
  - Name:** Type a name for the virtual machine image.



**Note**

(Optional) Click the **folder** icon to change the path of the OVF template files.

- Format:** Select **Folder of files (OVF)**.



**Important**

Verify that **Include image files attached to floppy and CD/DVD devices in the OVF package** is not selected.

- Click **OK**.

## Converting VMware ESXi Virtual Hard Disk Drives

VirtualBox does not support the virtual hard disk drive format (\*.vmdk) of VMware ESXi images. Use one of the following tools to convert the disks:

- *Using VMware vCenter Converter Standalone on page 3-25*
- *Using QEMU on page 3-31*

### Using VMware vCenter Converter Standalone

---

#### Procedure

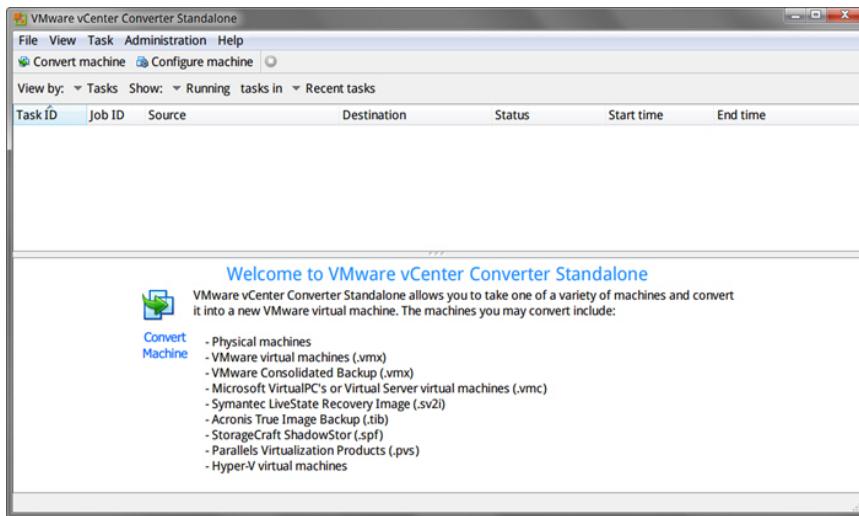
1. Download VMware vCenter Converter Standalone from [https://my.vmware.com/web/vmware/info/slug/infrastructure\\_operations\\_management/vmware\\_vcenter\\_converter\\_standalone/5\\_5#product\\_downloads](https://my.vmware.com/web/vmware/info/slug/infrastructure_operations_management/vmware_vcenter_converter_standalone/5_5#product_downloads).



#### Note

VMware vCenter Converter Standalone 5.0 does not support vCenter Server and ESXi versions later than 5.0. Download and install a version later than 5.0.1.

2. Open VMware vCenter Converter Standalone and then click **Convert machine**.

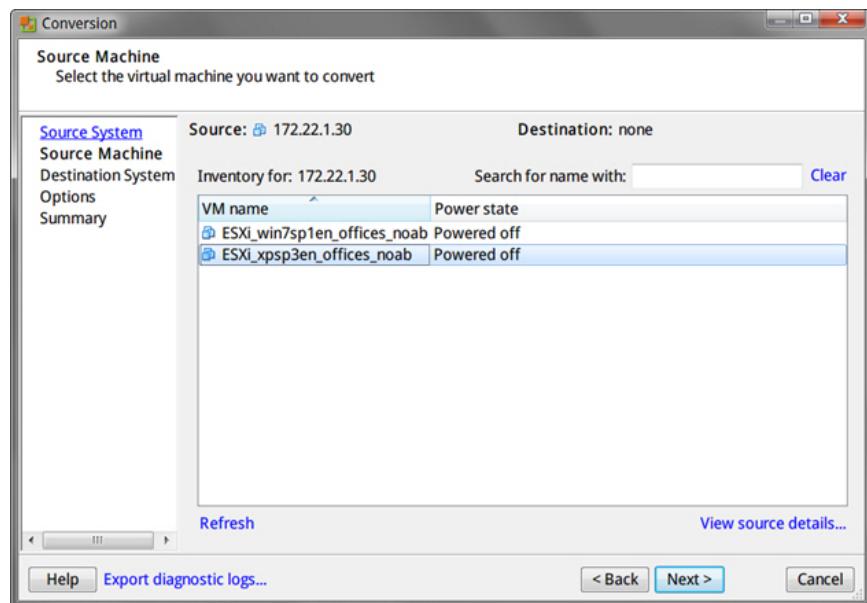


**FIGURE 3-15. VMware vCenter Converter Standalone**

The **Conversion** window opens.

3. On the **Source System** screen, configure the following:
  - a. **Select source type:** Select **VMware Infrastructure virtual machine**.
  - b. **Server:** Type the ESXi server IP address.
  - c. **User name, Password:** Type the credentials that provide administrator access to the VMware server.
4. Click **Next**.

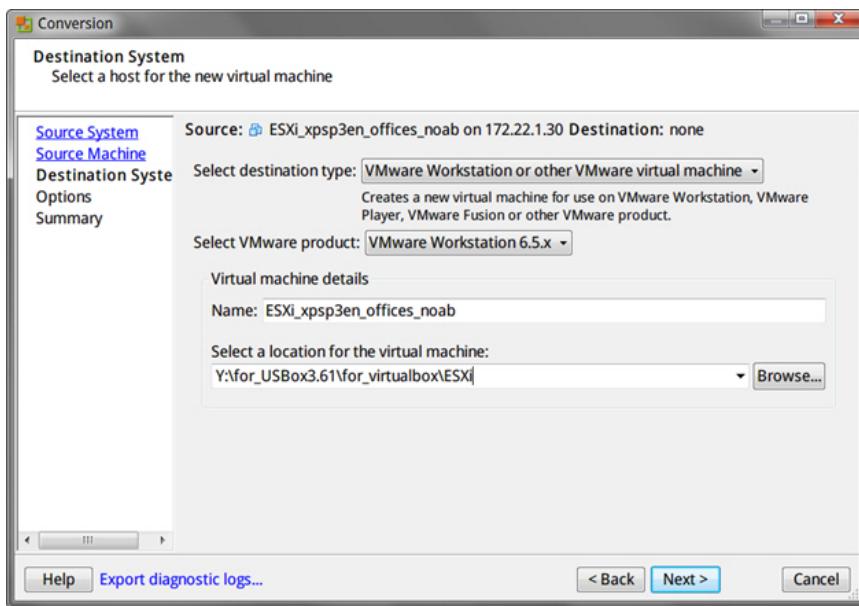
The **Source Machine** screen appears.



**FIGURE 3-16. Conversion > Source Machine**

5. Select the virtual machine that you want to convert and then click **Next**.

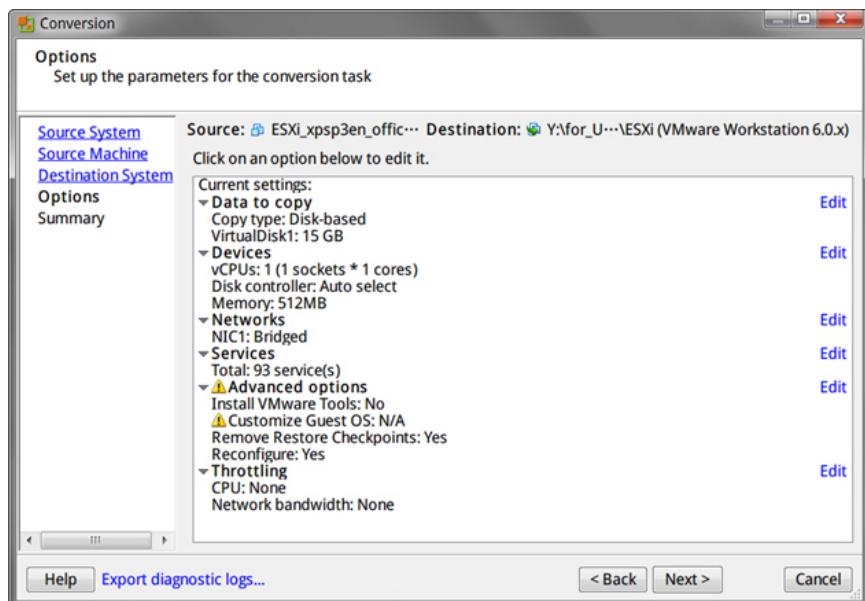
The **Destination System** section appears.



**FIGURE 3-17. Conversion > Destination System**

6. Configure the following and then click **Next**.
  - a. **Select destination type:** Select **VMware Workstation or other VMware virtual machine**.
  - b. **Select VMware product:** Select **VMware Workstation 6.5.x**.
  - c. **Virtual machine details:** Accept the default name and location or click **Browse** to select a different file.

The **Options** screen appears.



**FIGURE 3-18. Conversion > Options**

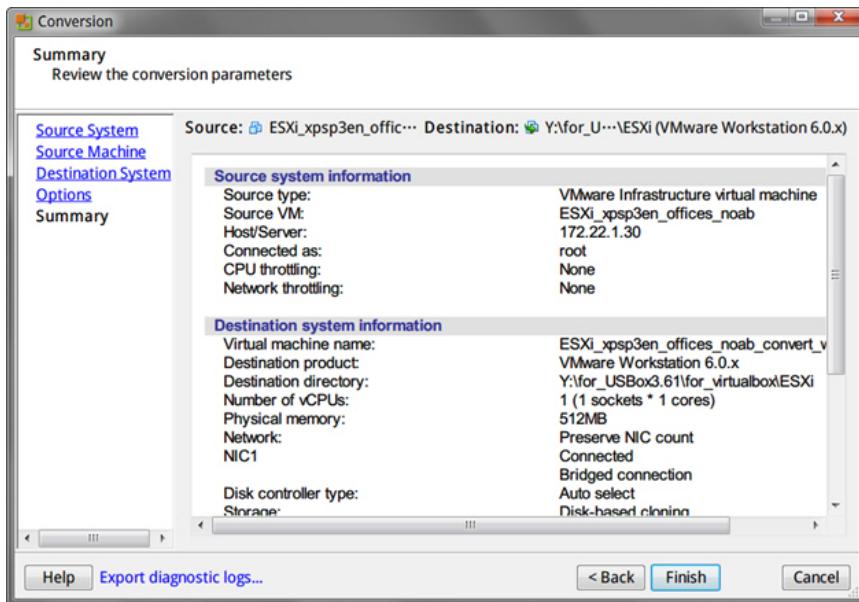
7. Verify the settings and then click **Next**.



### Important

Verify that **Install VMware Tools** is set to **No**.

The **Summary** screen appears.



**FIGURE 3-19. Conversion > Summary**

8. Verify the information and then click **Finish**.

VMware vCenter Converter Standalone converts the Virtual Machine Disk (\*.vmdk).

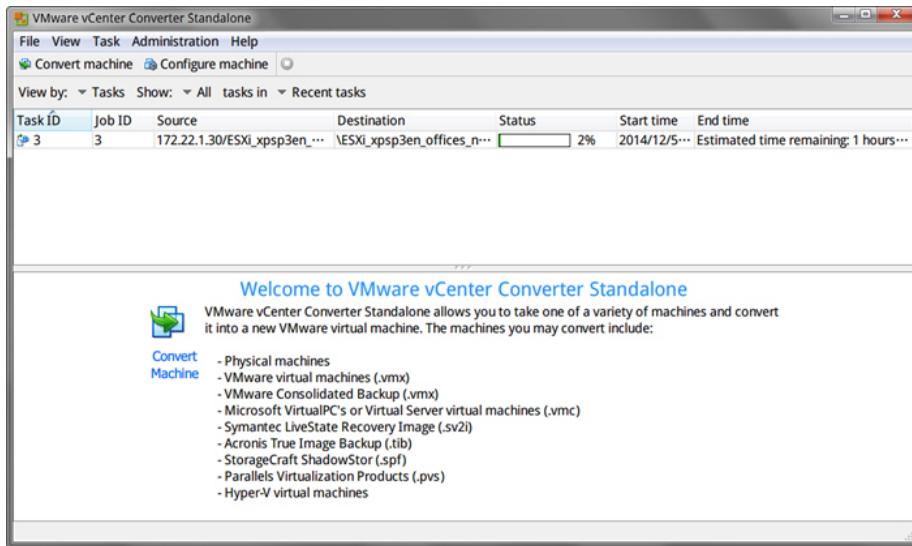


FIGURE 3-20. Image Conversion Progress

## Using QEMU

For details on QEMU, see [http://wiki.qemu.org/Main\\_Page](http://wiki.qemu.org/Main_Page).

### Procedure

1. Download the latest version of QEMU from <http://qemu.weilnetz.de/w64/>.
2. Install QEMU with the default settings.
3. Open a Command Prompt window (cmd.exe) using an account with administrator privileges.
4. Convert the Virtual Machine Disk (\*.vmdk) by typing the following command:

qemu-img.exe convert [-f fmt] [-O output\_fmt] filename  
output\_filename.

For example:

```
"C:\Program Files\qemu\qemu-img.exe" convert -f vmdk -O vmdk  
C:\ESX_xpsp3en_offices_noab.vmdk C:\ESX_xpsp3en_offices_noab_converted.vmdk
```

---

The \*.vmdk file can be used to create an OVA file using VirtualBox.

## Creating Virtual Machine Images Using Converted Virtual Hard Disk Drives

Use VirtualBox to create a new virtual machine image.

- *Downloading and Installing VirtualBox on page 2-6*
- *Creating Virtual Machine Images Using VirtualBox on page 3-33*

## Downloading and Installing VirtualBox

---

### Procedure

1. Download the latest version of VirtualBox from <https://www.virtualbox.org/wiki/Downloads>.

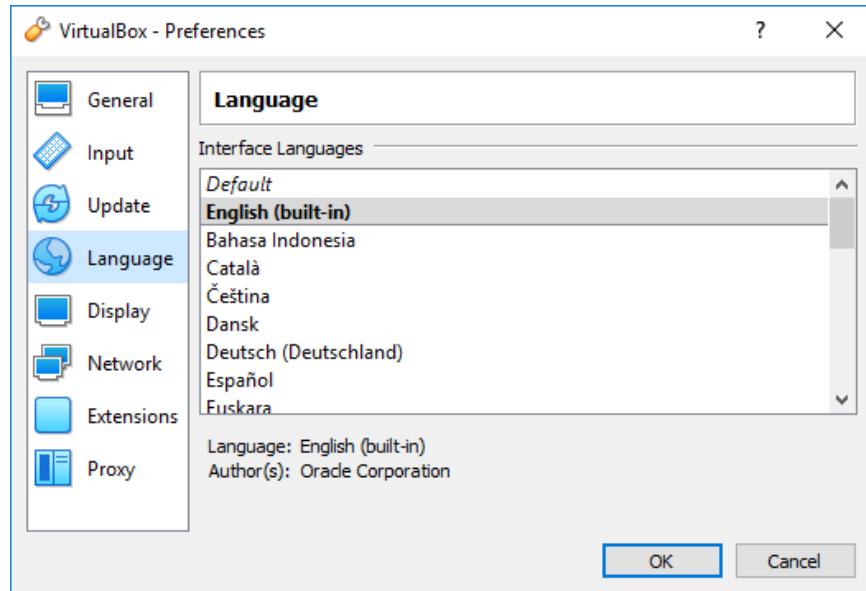


#### Note

The VirtualBox Open Source Edition is licensed under the GPL V2. The full text of the license is available at <http://www.gnu.org/licenses/old-licenses/gpl-2.0.html>.

---

2. Configure the language settings using one of the following methods:
  - Install VirtualBox with English as the default language.
  - After installation, go to **File > Preferences > Language** and then select **English**.



**FIGURE 3-21. Language Settings**

---

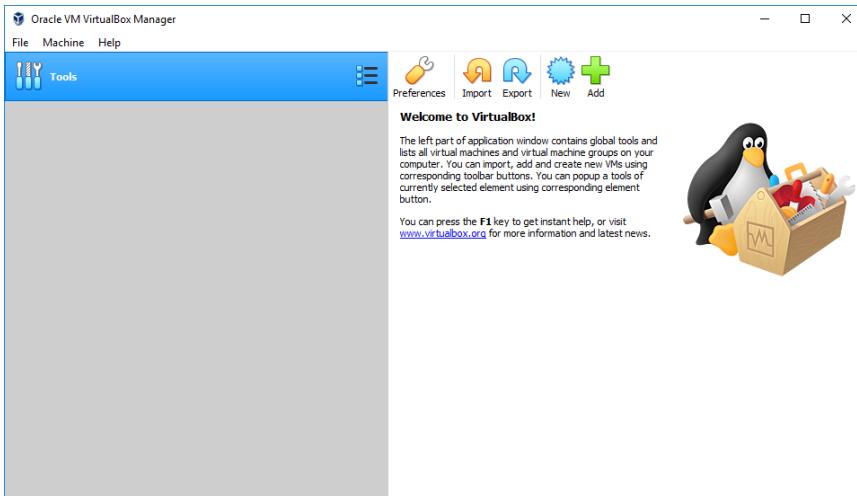
## Creating Virtual Machine Images Using VirtualBox

---

### Procedure

1. Open VirtualBox.

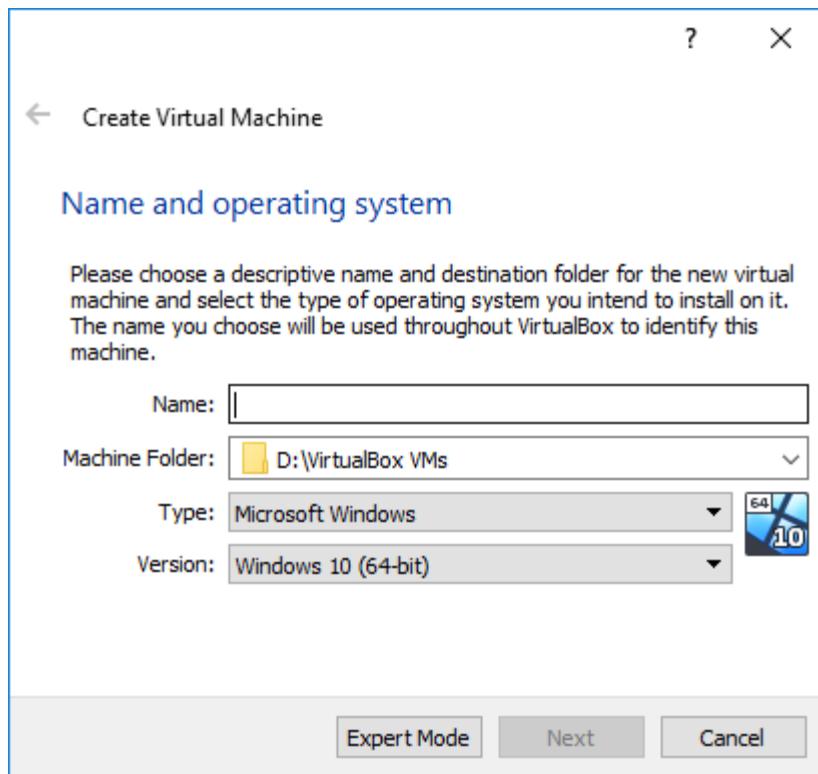
The **VirtualBox Manager** window opens.



**FIGURE 3-22. VirtualBox Manager**

2. Click **New**.

The **Create Virtual Machine** window opens.

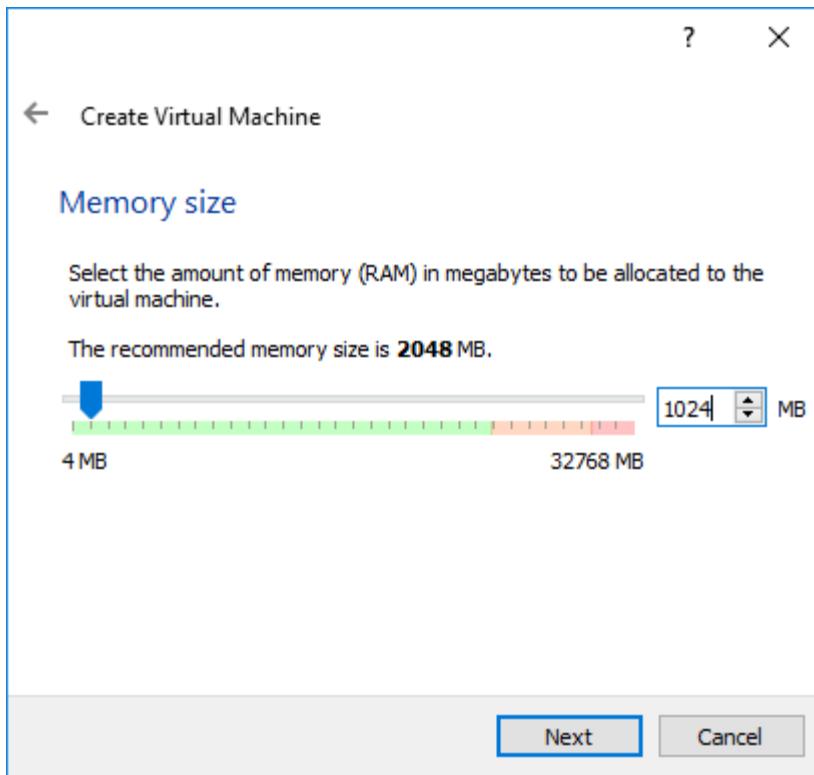


**FIGURE 3-23. Create Virtual Machine**

3. On the **Name and operating system** screen, configure the following:
  - **Name:** Type a permanent name for the virtual machine.
  - **Type:** Select **Microsoft Windows**.
  - **Version:** Select **Windows XP, Windows 2003, Windows 7, Windows 8, Windows 8.1, Windows 10, Windows 2008/2008 R2, Windows 2012/2012 R2, Windows 2016, or Windows 2019**.

4. Click **Next**.

The **Memory size** screen appears.



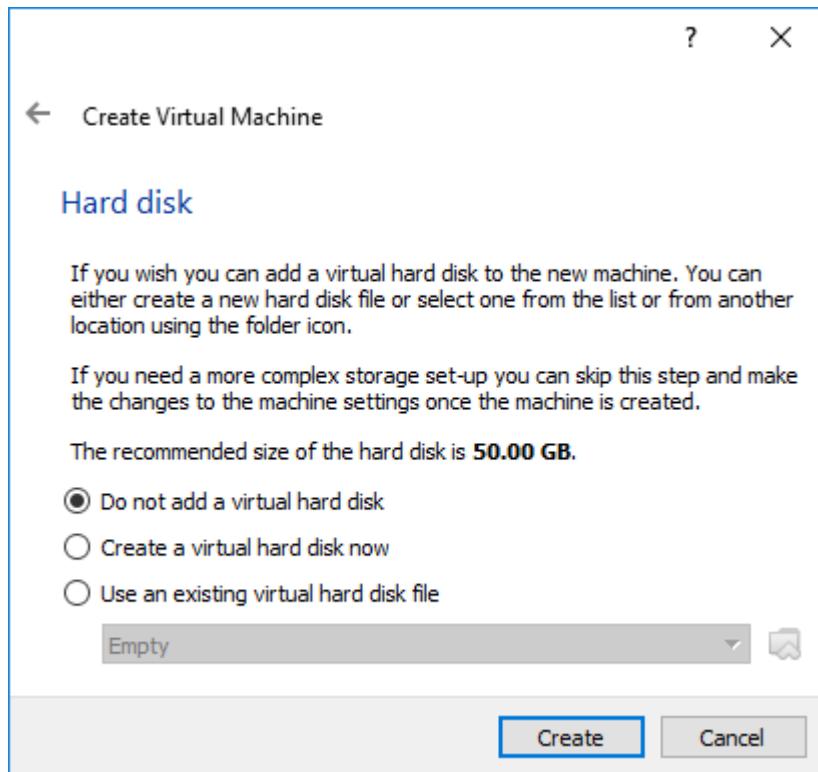
**FIGURE 3-24. Memory Size**

5. Specify the recommended memory size for your operating system.

- Windows XP and Windows Server 2003: 512 MB
- Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019: 1024 MB

**6. Click **Next**.**

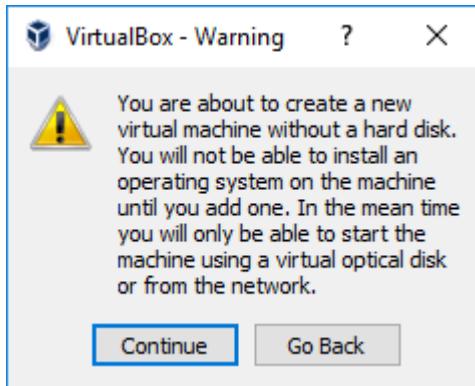
The **Hard disk** screen appears.



**FIGURE 3-25. Hard Disk**

**7. Select **Do not add a virtual hard disk** and then click **Create**.**

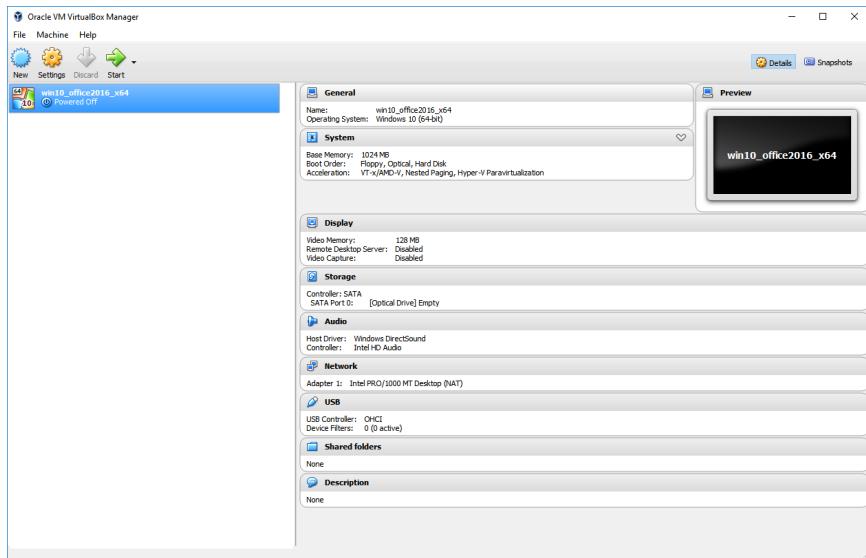
The following message appears:



**FIGURE 3-26. Warning**

8. Click **Continue**.

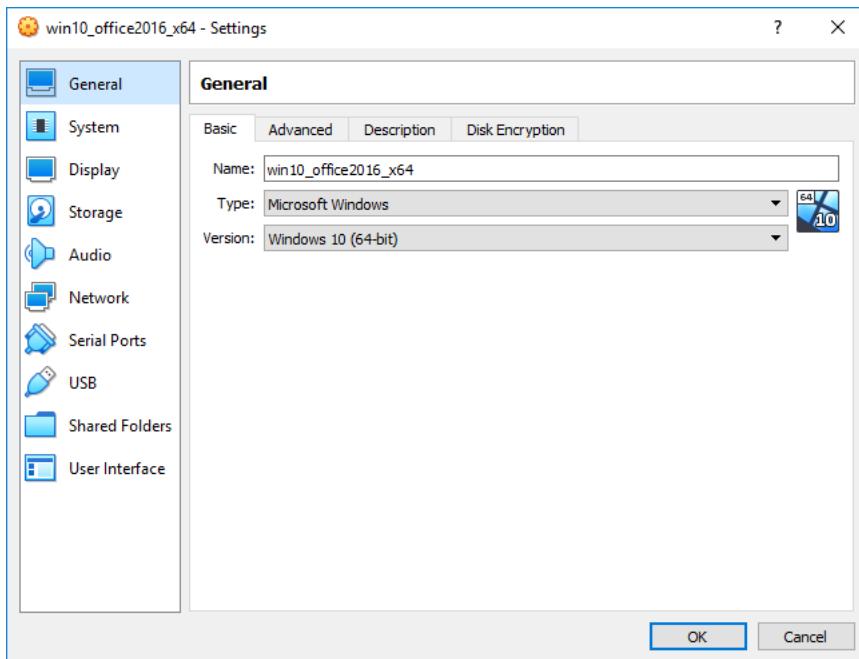
VirtualBox creates the virtual machine. The new virtual machine appears in the left pane.



**FIGURE 3-27. Newly-created Virtual Machine**

9. Click **Settings**.

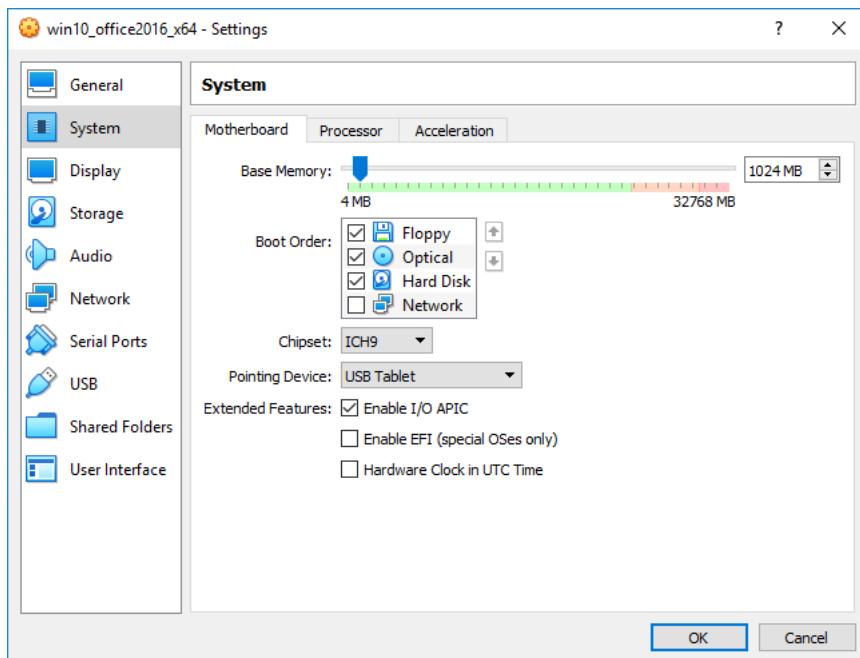
The **Settings** window opens.



**FIGURE 3-28. VirtualBox Settings**

10. In the left pane, click **System**.

The **System** screen appears.



**FIGURE 3-29. System Screen**

11. On the **Motherboard** tab, configure the following:
  - **Chipset:** Select **ICH9**.
  - **Pointing Device:** Select **USB Tablet**.
  - **Extended Features:**
    - Select **Enable I/O APIC**
    - (Optional) Select **Enable EFI (special OSes only)** if you want to create an EFI-compatible image. EFI-compatible images are only supported by the following products: Deep Discovery Inspector 5.6 and later, Deep Discovery Email Inspector 3.6 and later, Deep Discovery Analyzer 6.8 and later, Deep Discovery

Director 5.1 and later, Deep Discovery Web Inspector 2.5 and later

12. Go to the **Processor** tab and then select **Enable PAE/NX**.
13. Go to the **Acceleration** tab and then select **Enable VT-x/AMD-V** and **Enable Nested Paging**.

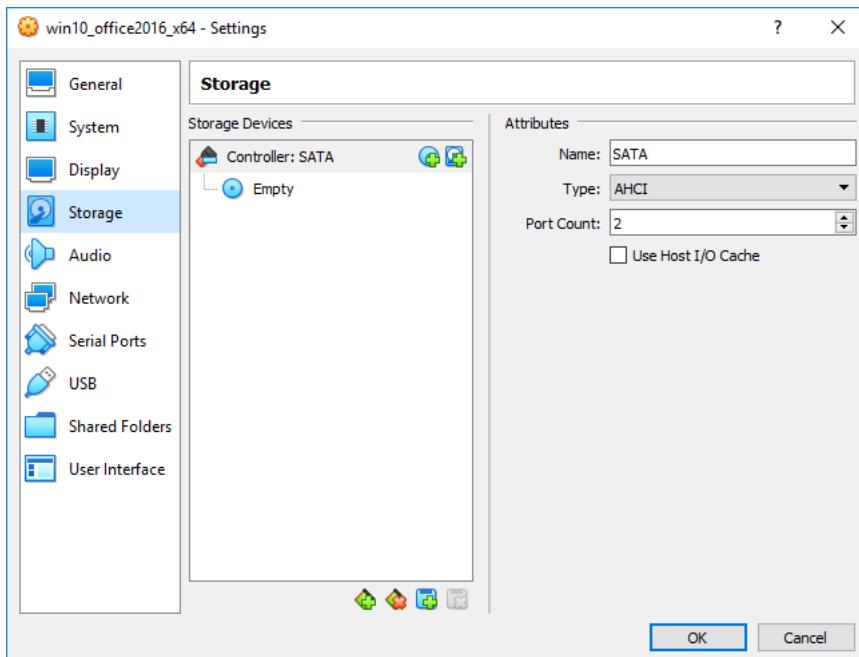


#### Note

The **Acceleration** tab is only available if the processor of the host system supports virtualization technology and the virtualization setting is enabled in the BIOS of the host system.

14. In the left pane, click **Storage**.

The **Storage** screen appears.



**FIGURE 3-30. Storage Screen**

15. If **Controller: SATA** appears under **Storage Tree**, remove the SATA controller and then add an IDE controller.

- a. Click **Controller: SATA** and then click  to remove the default controller.
- b. Click  and then select **PIIX4 (Default IDE)**.

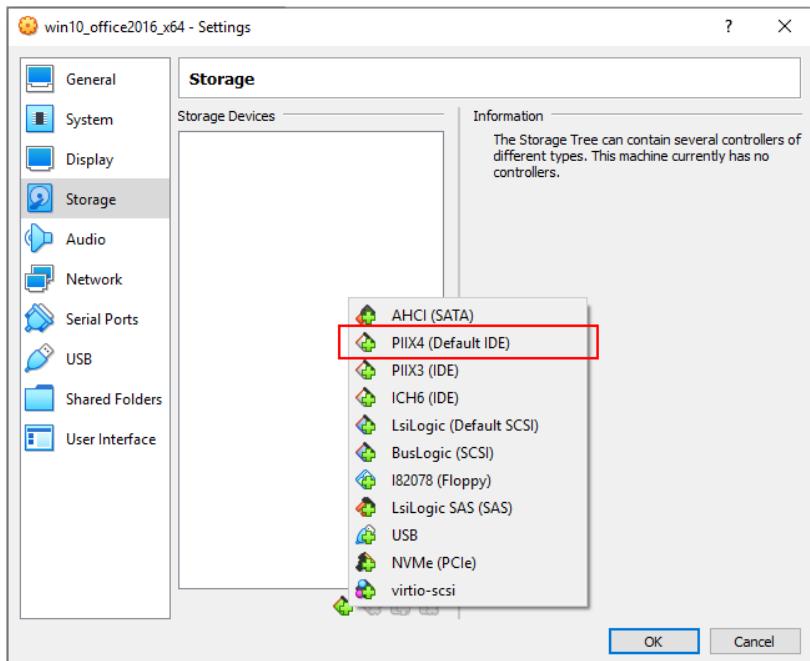
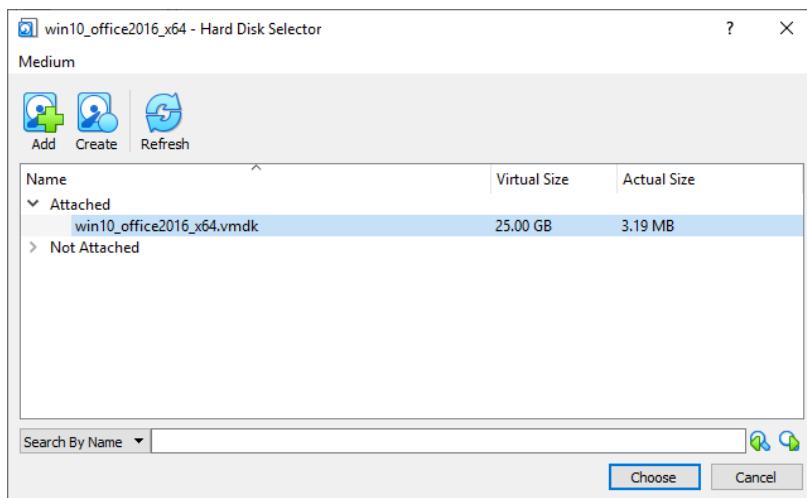


FIGURE 3-31. Add Storage Controller

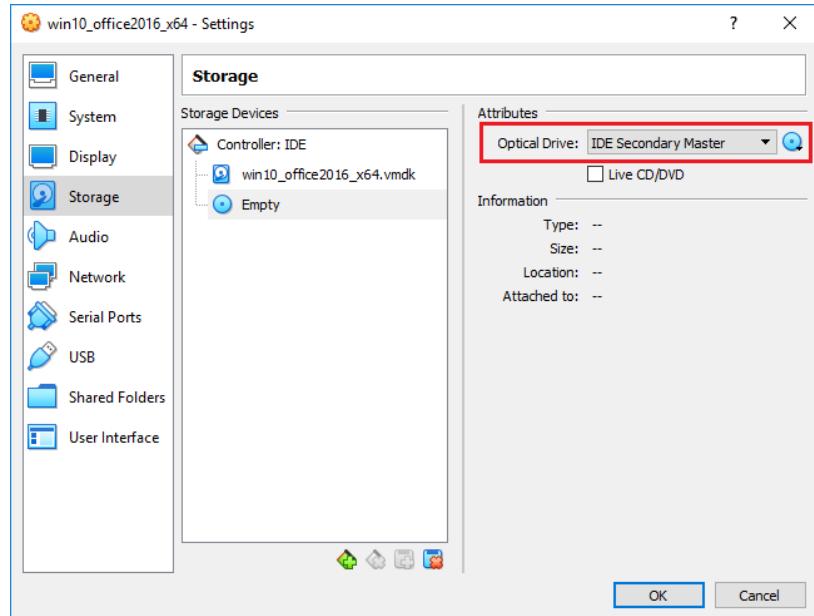
- c. Click **Controller: PIIX4** and then click .

The following window appears:



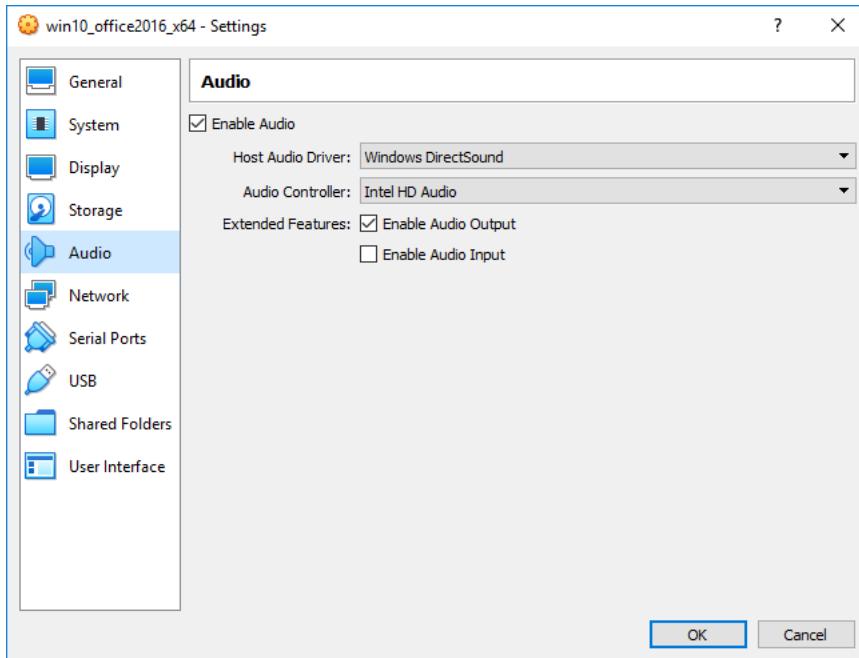
**FIGURE 3-32. Hard Disk Selector**

- d. Select the converted \*.vmdk file and then click **Choose**.
- e. Under **Attributes**, change the name to **IDE**.
- f. Under **Storage Tree**, click **Controller: IDE** and then click .
- g. In the **Optical Disk Selector** window, click **Leave Empty**.
- h. Under **Attributes**, verify that **CD/DVD Drive** is **IDE Secondary Master**.



**FIGURE 3-33. IDE Secondary Master**

16. (Optional) In the left pane, click **Audio** and verify that **Enable Audio** is enabled.



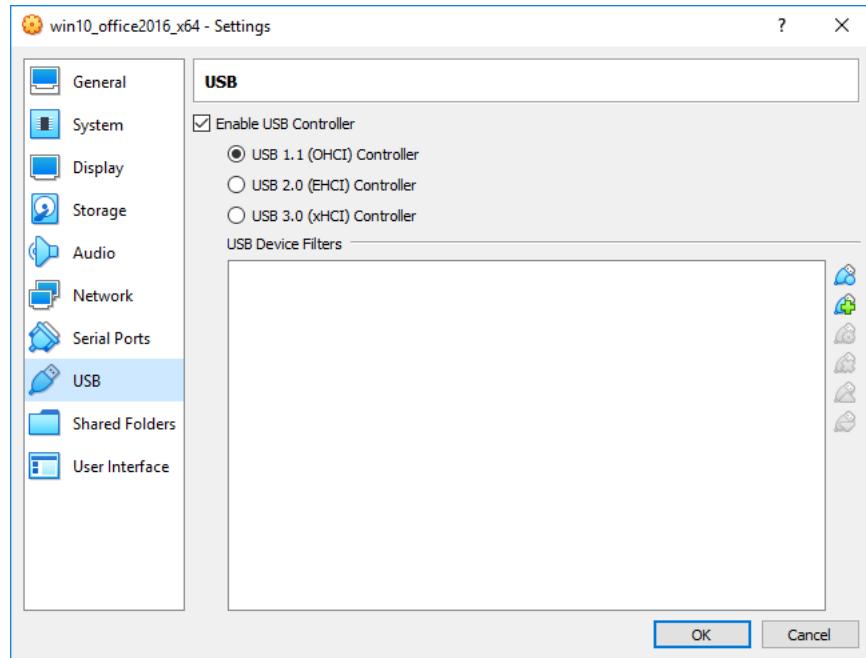
**FIGURE 3-34. Audio Options Settings**

17. In the left pane, click **USB** and then select **Enable USB Controller**.



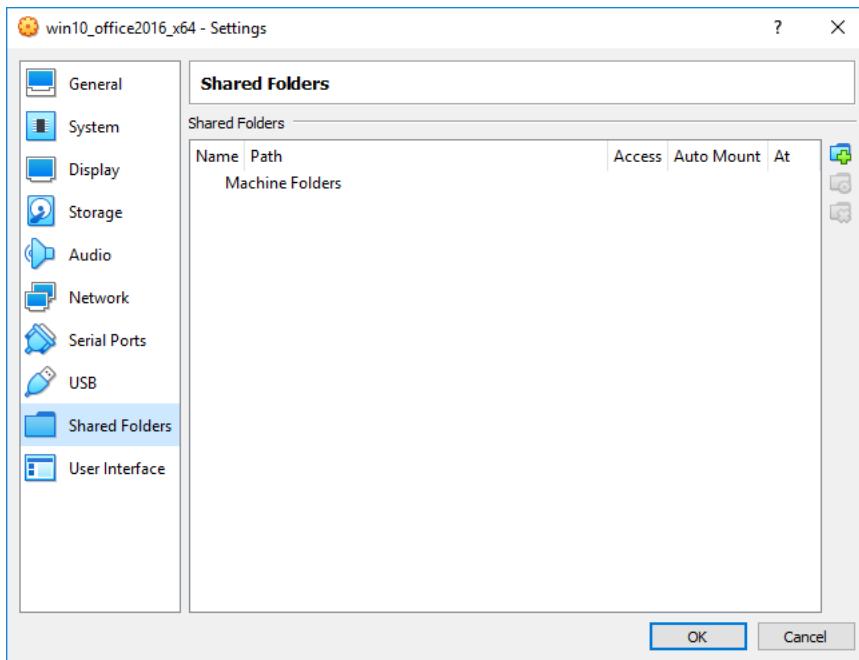
**Important**

Verify that **USB 1.1 (OHCI) Controller** is selected.



**FIGURE 3-35. Enable USB Controller**

18. In the left pane, click **Shared Folders** and then verify that no folders are shared.

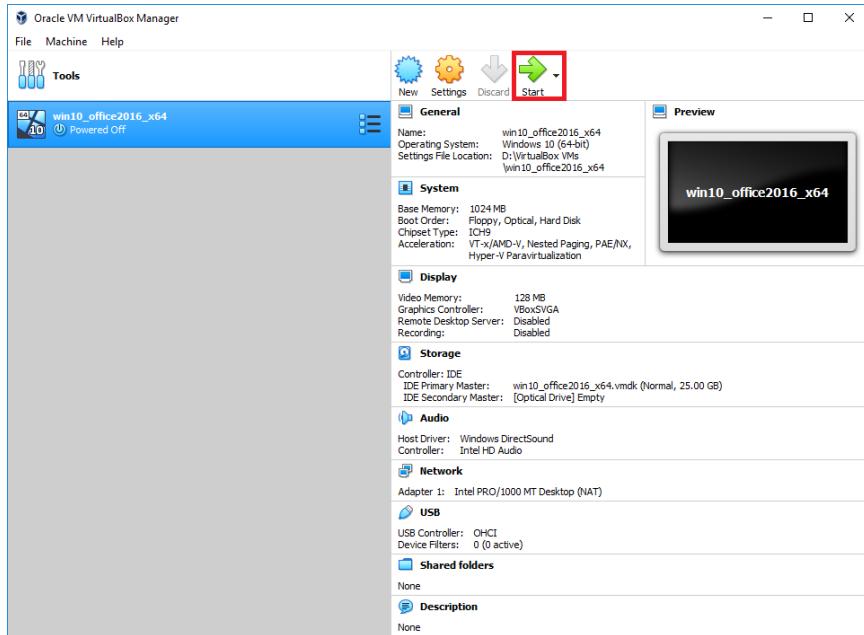


**FIGURE 3-36. Shared Folders Settings**

19. Click **OK**.

The **Settings** window closes.

20. On the **VirtualBox Manager** screen, click  to power on the image.



**FIGURE 3-37. VirtualBox Manager**

21. Install Microsoft Office and other software to achieve satisfactory detection results.

## Configuring Virtual Machine Images

Configure virtual machine images that were created using converted virtual hard disk drives to avoid importing issues.

- *Configuring Virtual Machine Images (Windows XP and Windows Server 2003) on page 3-50*
- *Configuring Virtual Machine Images (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019) on page 3-53*

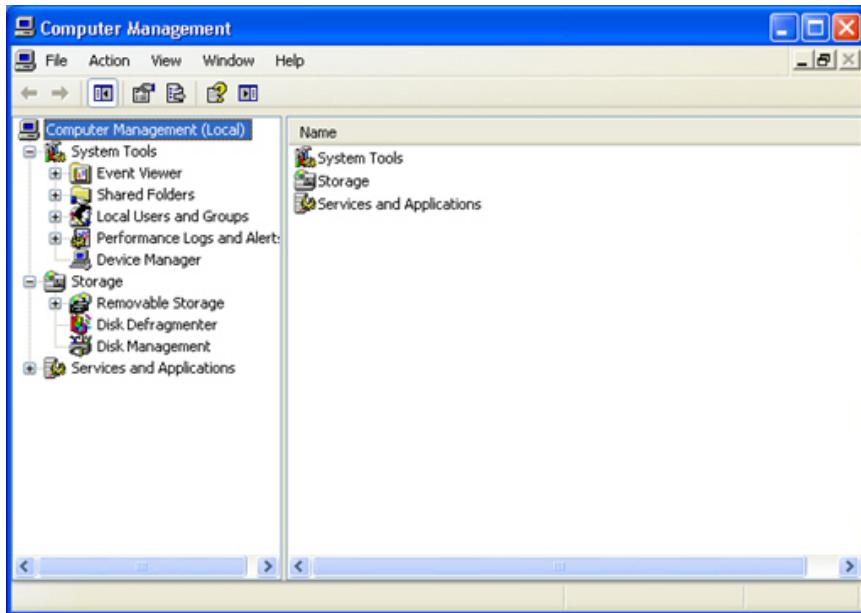
## Configuring Virtual Machine Images (Windows XP and Windows Server 2003)

---

### Procedure

1. On the guest operating system, click **Start**, right-click **My Computer**, and then click **Manage**.

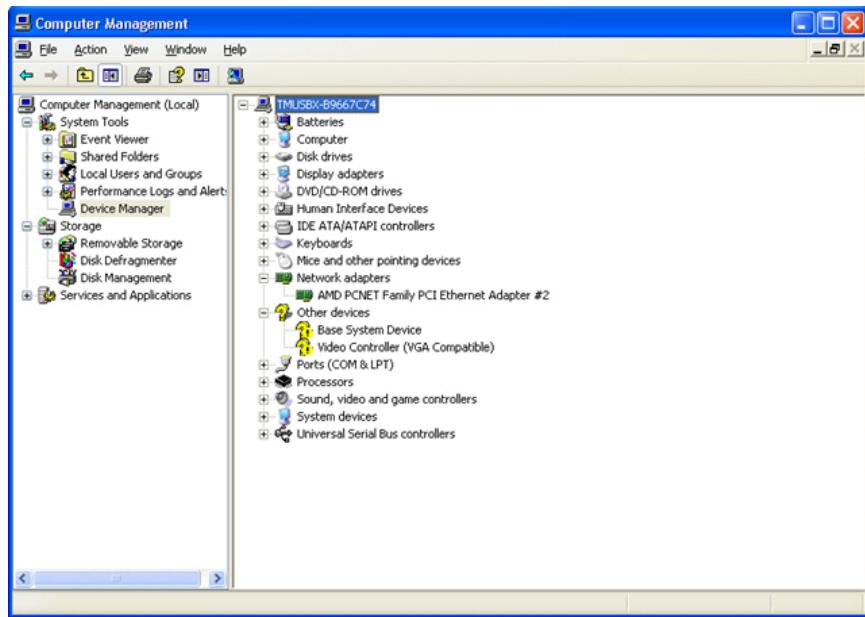
The **Computer Management** screen appears.



**FIGURE 3-38. Computer Management**

2. In the left pane, click **Device Manager**.

A list of devices appears.



**FIGURE 3-39. Device Management - Network Adapter Window**

3. In the right pane, click **Network adapters** and then verify that the network adapter driver is ready.
4. Open a Command Prompt window (cmd.exe) using an account with administrator privileges.
5. Disable the **Found New Hardware Wizard** by typing the following commands:

- Windows XP 32-bit:

```
reg add "HKEY_LOCAL_MACHINE\Software\Policies\Microsoft\Windows\DeviceInstall\Settings" /v SuppressNewHWUI /t REG_DWORD /d 1 /f
```

- Windows XP 64-bit or Windows Server 2003:

```
reg add "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet
\Devices\PlugPlay\Parameters" /v SuppressUI /t
REG_DWORD /d 1 /f
```



**FIGURE 3-40. Found New Hardware Wizard**

6. Restart the image and then verify that the **Found New Hardware Wizard** does not appear.
7. Power off the image.

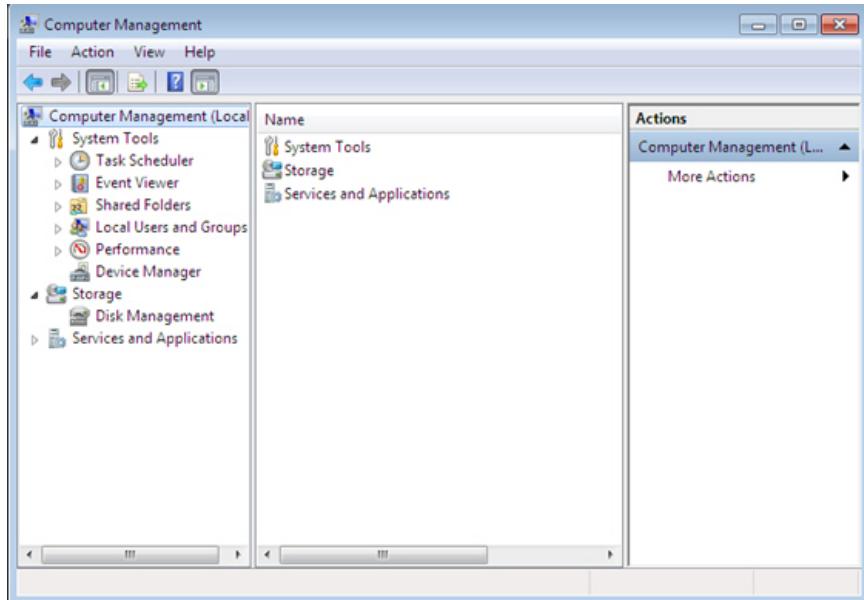
---

## Configuring Virtual Machine Images (Windows 7/8/8.1/10, Windows Server 2008/2008 R2, Windows Server 2012/2012 R2, Windows Server 2016, and Windows Server 2019)

### Procedure

1. On the guest operating system, click **Start**, right-click **Computer**, and then click **Manage**.

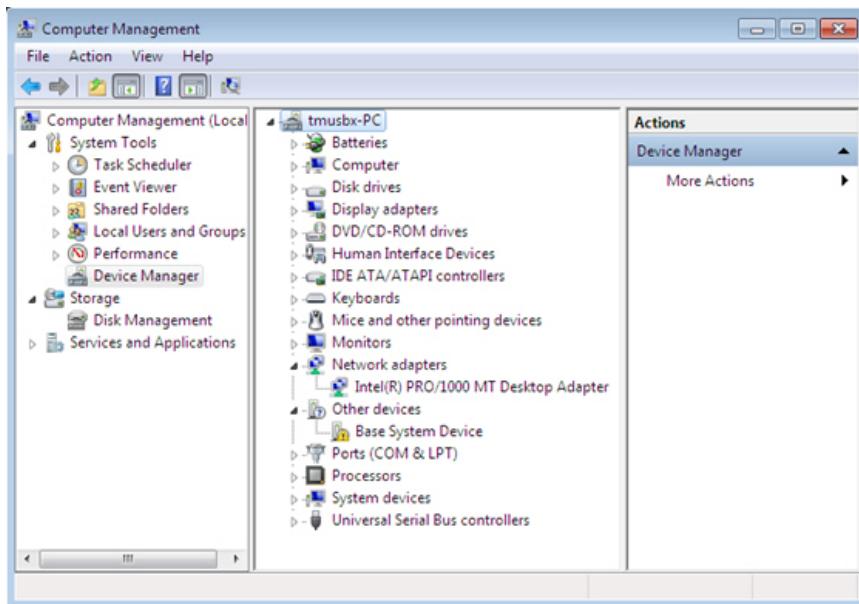
The **Computer Management** screen appears.



**FIGURE 3-41. Computer Management**

2. In the left pane, click **Device Manager**.

A list of devices appears.



**FIGURE 3-42. Device Management - Network Adapter**

3. In the right pane, click **Network adapters** and then verify that the network adapter driver is ready.
4. Power off the image.

## Exporting Virtual Machine Images to OVA Files

A virtual machine image comprises many uncompressed files. The files must be combined into a single OVA file to avoid issues when importing.



### Important

Verify that the size of the created OVA file is supported by your product.

For details, go to <https://docs.trendmicro.com/en-us/home.aspx#Enterprise>.

---

## Procedure

1. On the VirtualBox Manager screen, power off the virtual machine.

**Note**

Verify that the CD/DVD drive is empty before powering off and exporting.

---

2. Go to **File > Export Appliance**.

The **Export Virtual Appliance** window appears.

3. Select the virtual machine image to export and click **Next**.

The **Appliance settings** screen appears.

4. Configure the following:

- **File:** Accept the default name and path or click  to select a different file.
- **Format:** Select **OVF 1.0**.

**Important**

Format options include OVF 0.9, 1.0 and 2.0. Virtual Analyzer does not support OVF 2.0.

---

- **MAC Address Policy:** Select **Include only NAT network adapter MAC addresses**.

5. Click **Next**.

The **Virtual system settings** screen appears.

6. Verify that the **License** field is empty and then click **Export**.

---

VirtualBox creates the OVA file.



# Chapter 4

## Linux OVA File Preparation

There are two methods to prepare a Virtual Analyzer-supported Linux OVA file.

- Use the **Predefined Linux Virtual Analyzer Image** from Trend Micro.

The **Predefined Linux Virtual Analyzer Image** is based on CentOS 7.8, comes with all required packages installed and optimized system settings.

Download the **Predefined Linux Virtual Analyzer Image** from the Trend Micro Download Center, or obtain a copy from your support provider.

After customization, use the tool to validate the image.

- Create your own Virtual Analyzer-supported Linux OVA file from scratch.
  - *Required Software on page 4-3*
  - *Downloading and Installing VirtualBox on page 4-7*
  - *Creating Linux Virtual Machine Images on page 4-8*
  - *Modifying the Virtual Machine Environment (CentOS 7.8) on page 4-30*
  - *Reducing the Size of VirtualBox Disk Images on page 2-36*

- *Exporting Virtual Machine Images to OVA Files on page 4-31*

# Creating Linux OVA Files Using a Predefined Linux Virtual Analyzer Image

---

## Procedure

1. Prepare the operating system and required applications.  
For details, see [Required Software on page 4-3](#).
2. Download and install VirtualBox.  
For details, see [Downloading and Installing VirtualBox on page 4-7](#).
3. Create a virtual machine image.  
For details, see [Creating Linux Virtual Machine Images on page 4-8](#).
4. Modify the environment of the virtual machine image.  
For details, see [Modifying the Virtual Machine Environment \(CentOS 7.8\) on page 4-30](#).
5. Reduce the size of the VirtualBox Disk Image.  
For details, see [Reducing the Size of VirtualBox Disk Images on page 2-36](#).
6. Export the virtual machine image to an OVA file.  
For details, see [Exporting Virtual Machine Images to OVA Files on page 4-31](#).

---

## Required Software

The following software must be installed on the virtual machine to achieve satisfactory detection results.



**TABLE 4-1. Required Software**

SOFTWARE	DESCRIPTION
Operating system	<p>Virtual Analyzer supports the following operating system:</p> <p>CentOS 7.8.2003</p> <p> <b>Note</b> The CentOS 7.8.2003 Installation ISO CentOS-7-x86_64-Everything-2003.iso must be provided during image validation to enable automatic installation of missing Linux packages.</p> <p> <b>Important</b></p> <ul style="list-style-type: none"><li>• Use a host name that reflects your organizations' naming scheme.</li><li>• Trend Micro recommends using the English version of the operating system.</li></ul>

The following packages must be installed on the virtual machine to achieve satisfactory detection results.

**TABLE 4-2. Required Packages**

REPOSITORY	DESCRIPTION
yum	<ul style="list-style-type: none"><li>• glibc-2.17-307.el7.1</li><li>• glibc-devel-2.17-307.el7.1</li><li>• glibc-2.17-307.el7.1.i686</li><li>• glibc-devel-2.17-307.el7.1.i686</li><li>• libstdc++-4.8.5-39.el7</li><li>• libstdc++-devel-4.8.5-39.el7</li><li>• libstdc++-4.8.5-39.el7.i686</li><li>• libstdc++-devel-4.8.5-39.el7.i686</li><li>• gcc-4.8.5-39.el7</li><li>• gcc-c++-4.8.5-39.el7</li><li>• libgcc-4.8.5-39.el7</li><li>• zlib-1.2.7-18.el7</li><li>• openssl-1.0.2k-19.el7</li><li>• libcurl-7.29.0-57.el7</li><li>• libcurl-devel-7.29.0-57.el7</li><li>• zip-3.0-11.el7</li><li>• unzip-6.0-21.el7</li><li>• dos2unix-6.0.3-7.el7</li><li>• net-tools-2.0-0.25.20131004git.el7</li><li>• file-5.11-36.el7</li><li>• tcsh-6.18.01-16.el7</li><li>• sysvinit-tools-2.88-14.ds1.el7</li><li>• binutils-2.27-43.base.el7</li><li>• binutils-2.27-43.base.el7</li><li>• glibc-common-2.17-307.el7.1</li><li>• bash-4.2.46-34.el7.x86_64</li></ul>

REPOSITORY	DESCRIPTION
yum	<ul style="list-style-type: none"><li>• samba-4.10.4-10.el7</li><li>• samba-client-4.10.4-10.el7</li><li>• samba-common-4.10.4-10.el7</li><li>• kernel-devel-3.10.0-1127.el7.x86_64</li><li>• systemtap-runtime-4.0-11.el7</li><li>• systemtap-4.0-11.el7</li><li>• systemtap-devel-4.0-11.el7</li><li>• libpcap-1.5.3-12.el7</li><li>• libpcap-devel-1.5.3-12.el7</li><li>• python-devel</li></ul>
debuginfo	<ul style="list-style-type: none"><li>• kernel-3.10.0-1127.el7.x86_64</li><li>• glibc-devel</li><li>• libstdc++</li><li>• libgcc</li><li>• zlib</li><li>• openssl</li><li>• libcurl</li></ul>

**Important**

- Do not install newer or older versions of the packages.
- Do not install any VMware and VirtualBox tools to avoid triggering the anti-virtual machine functions of some malware.
- Do not install any anti-malware software on the virtual machine to ensure normal operation of Virtual Analyzer.

## Downloading and Installing VirtualBox

---

### Procedure

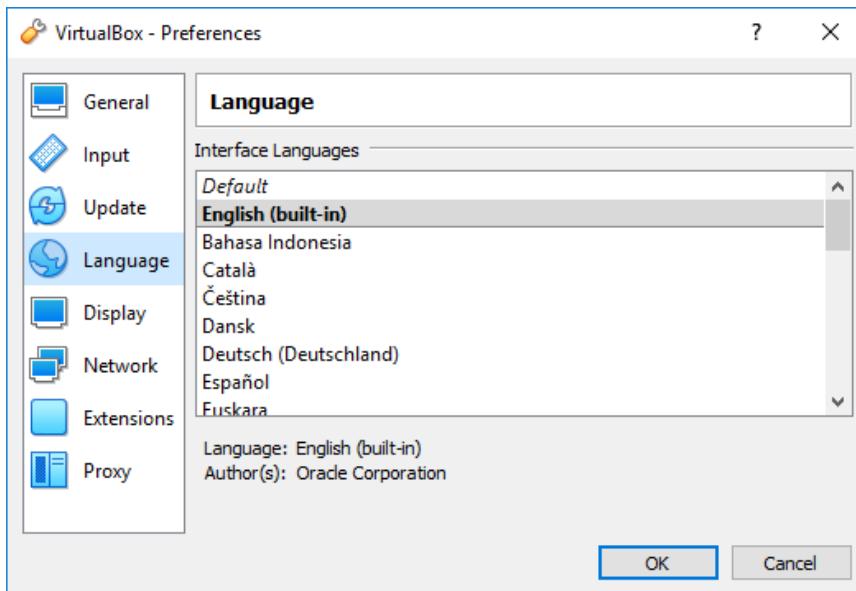
1. Download the latest version of VirtualBox from <https://www.virtualbox.org/wiki/Downloads>.

**Note**

The VirtualBox Open Source Edition is licensed under the GPL V2. The full text of the license is available at <http://www.gnu.org/licenses/old-licenses/gpl-2.0.html>.

---

2. Configure the language settings using one of the following methods:
  - Install VirtualBox with English as the default language.
  - After installation, go to **File > Preferences > Language** and then select **English**.



**FIGURE 4-1. Language Settings**

---

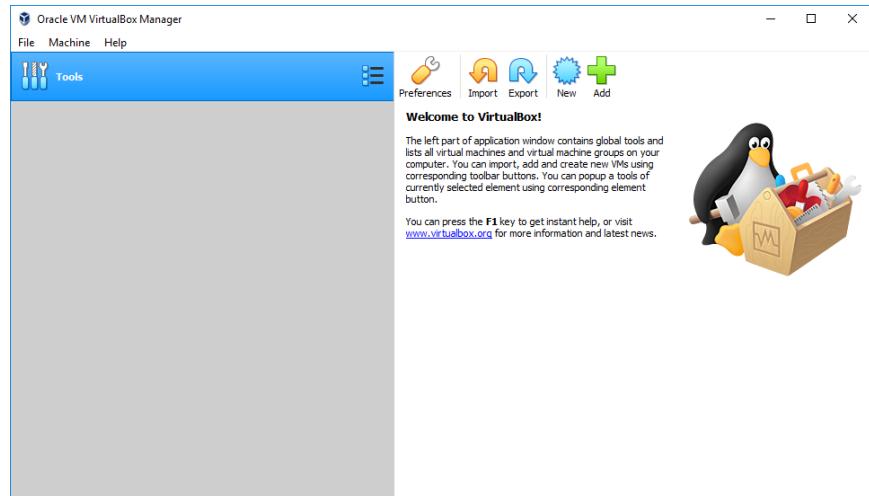
## Creating Linux Virtual Machine Images

---

### Procedure

1. Open VirtualBox.

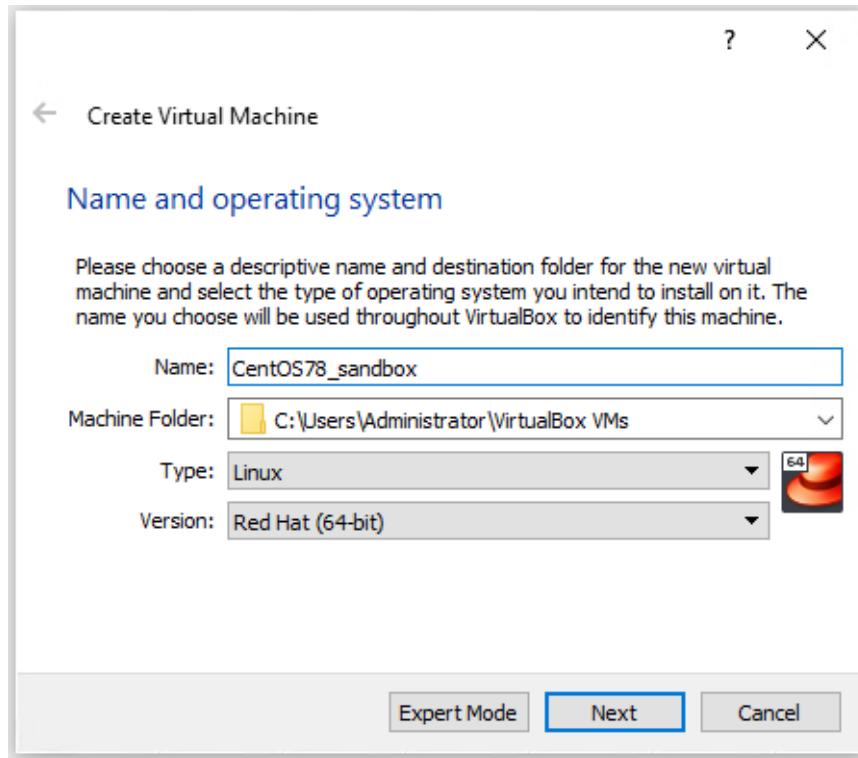
The **VirtualBox Manager** window opens.



**FIGURE 4-2. VirtualBox Manager**

2. Click **New**.

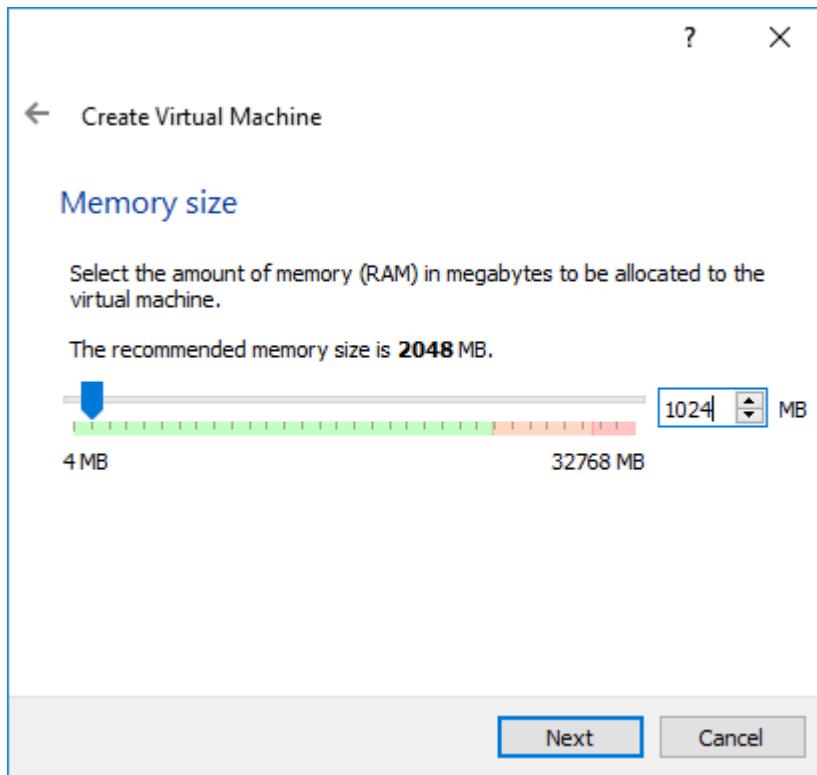
The **Create Virtual Machine** window opens.



**FIGURE 4-3. Create Virtual Machine**

3. On the **Name and operating system** screen, configure the following:
  - **Name:** Type a permanent name for the virtual machine.
  - **Type:** Select **Linux**.
  - **Version:** Select **Red Hat (64-bit)**.
4. Click **Next**.

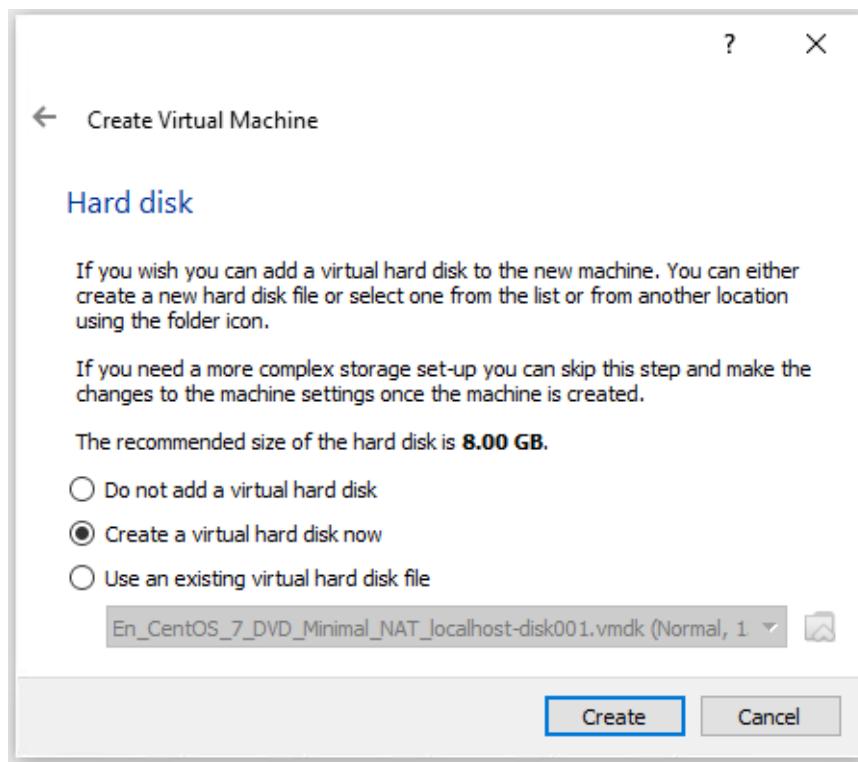
The **Memory size** screen appears.



**FIGURE 4-4. Memory Size**

5. Specify the recommended memory size for your operating system.
  - CentOS 64-bit: 1024 MB
6. Click **Next**.

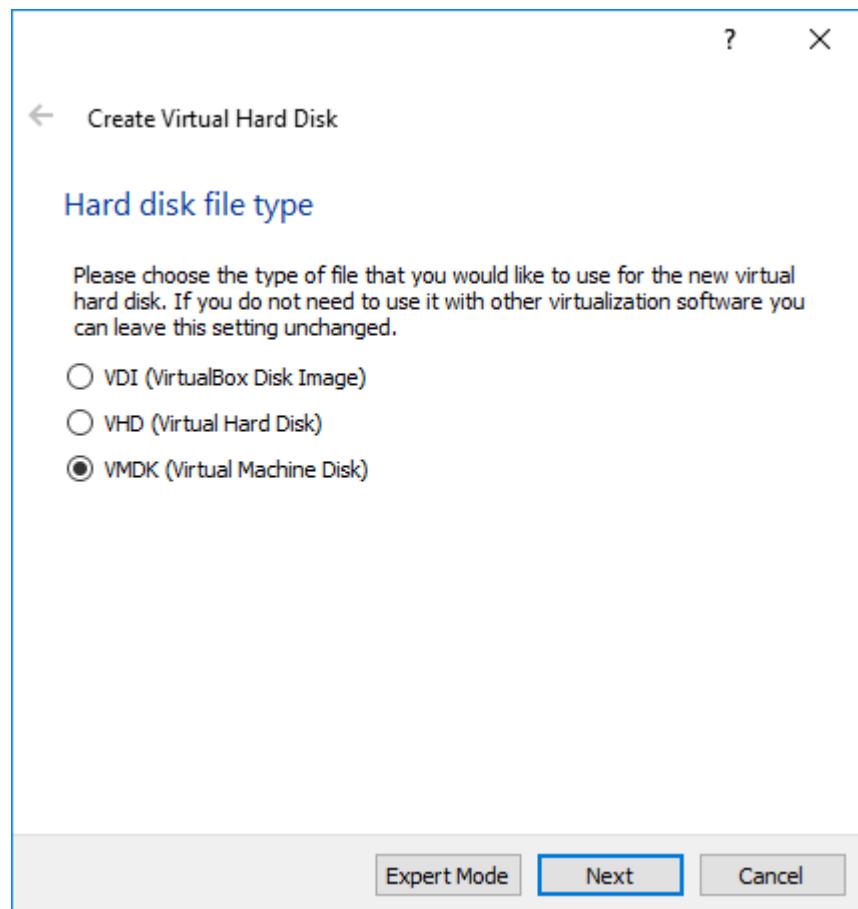
The **Hard disk** screen appears.



**FIGURE 4-5. Hard Disk**

7. Select **Create a virtual hard disk now** and then click **Create**.

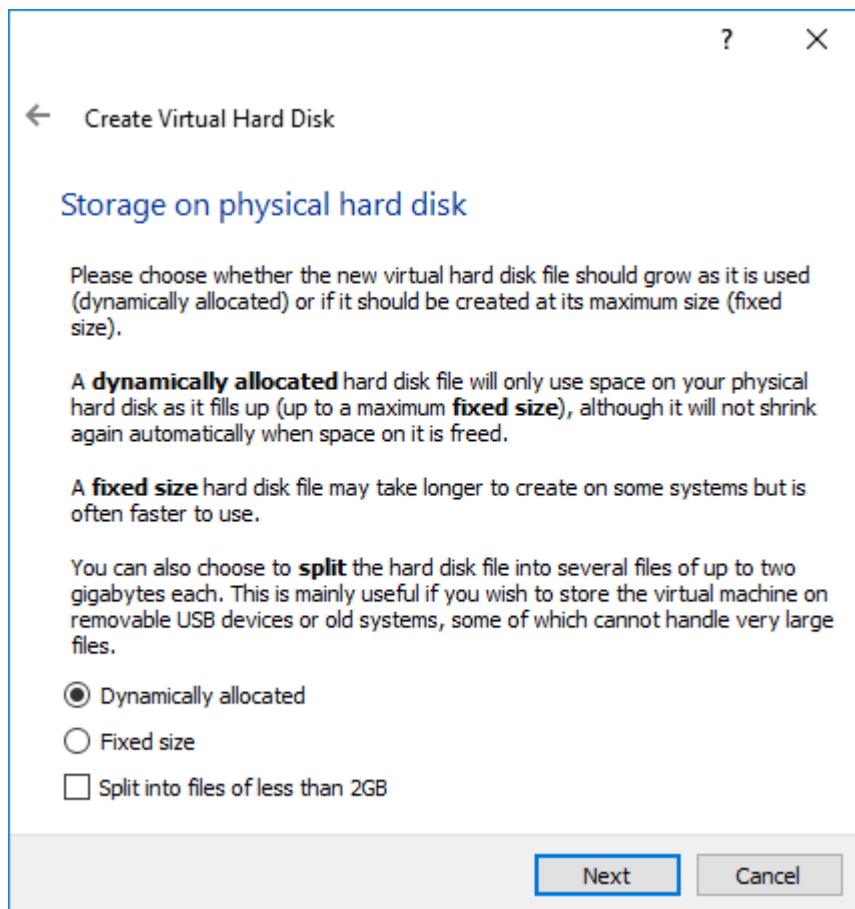
The **Hard disk file type** screen appears.



**FIGURE 4-6. Hard Disk File Type**

8. Select **VDI (VirtualBox Disk Image)** or **VMDK (Virtual Machine Disk)** and then click **Next**.

The **Storage on physical hard disk** screen appears.



**FIGURE 4-7. Storage on Physical Hard Disk**

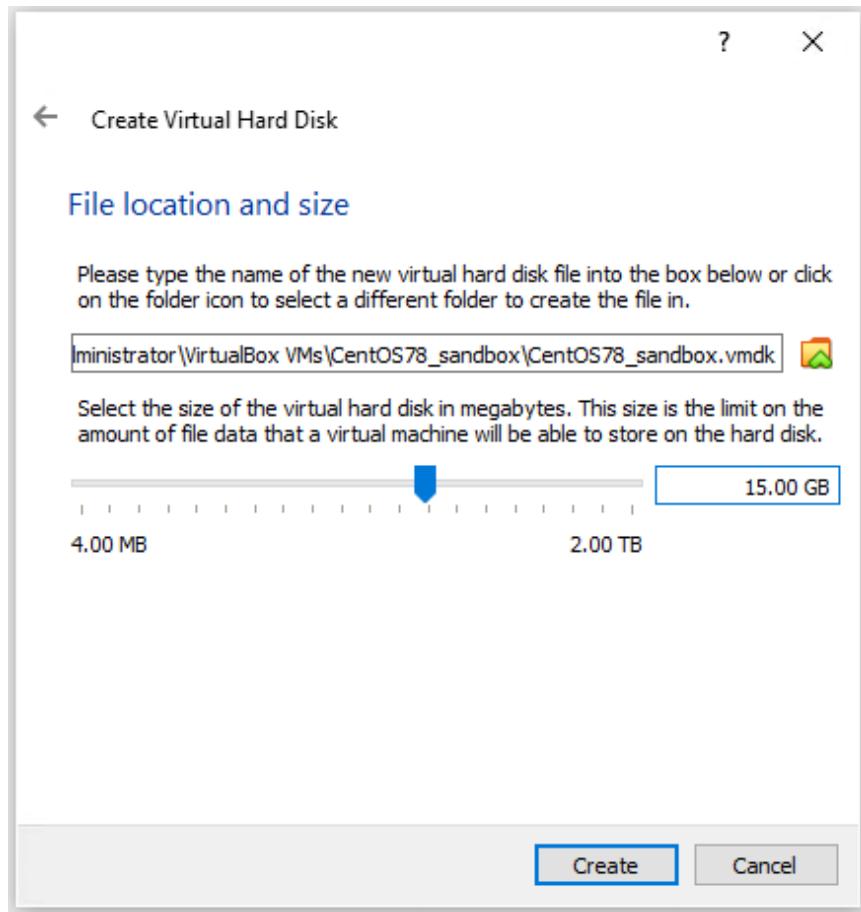
9. Select **Dynamically allocated** and then click **Next**.



**Important**

Do not select **Fixed size** or **Split into files of less than 2GB**.

The **File location and size** screen appears.

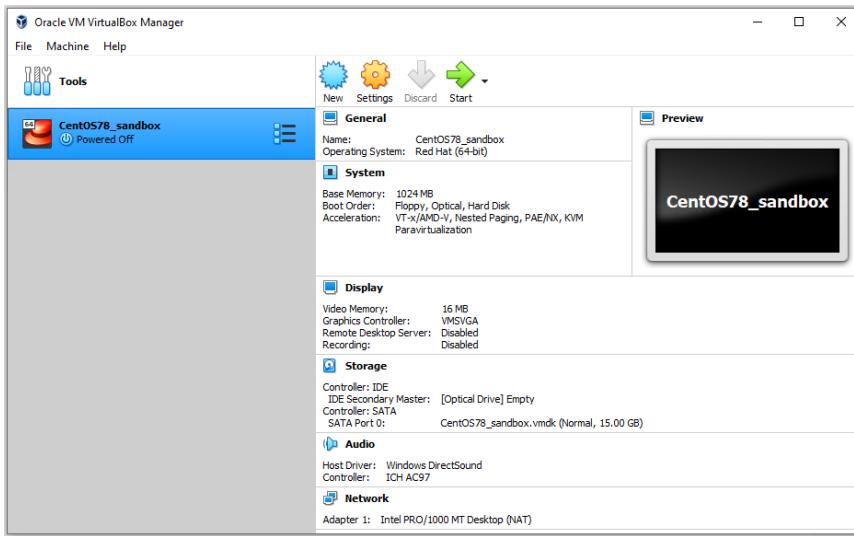


**FIGURE 4-8. File Location and Size**

10. (Optional) Click the folder icon to change the path of the virtual disk file.
11. Specify the virtual disk size for your operating system.
  - CentOS 7.8: 15 GB

**12. Click **Create**.**

VirtualBox creates the virtual machine. The new virtual machine appears in the left pane of the VirtualBox Manager screen.

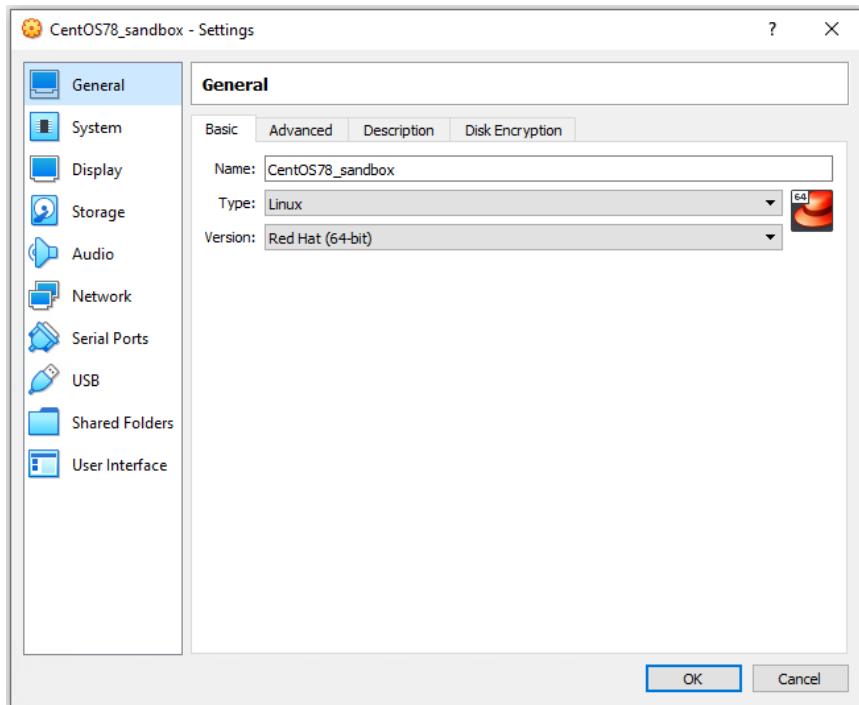


**FIGURE 4-9. Newly-created Virtual Machine**

Ensure that the virtual machine is not in any group.

**13. Click **Settings**.**

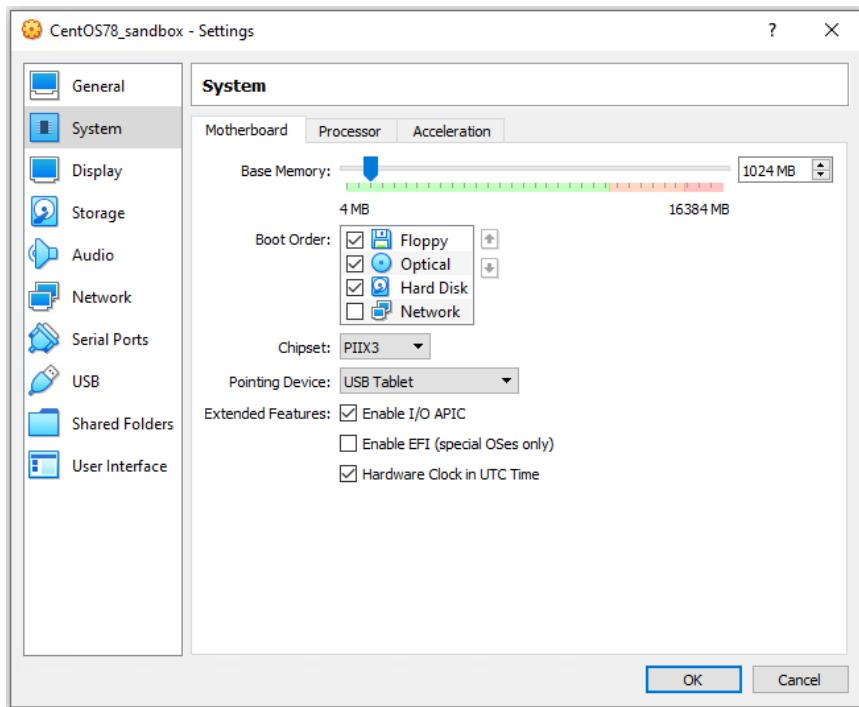
The **Settings** window opens.



**FIGURE 4-10. VirtualBox Settings**

14. In the left pane, click **System**.

The **System** screen appears.



**FIGURE 4-11. System Screen**

15. On the **Motherboard** tab, configure the following:

- **Chipset:** Select **PIIX3**
- **Pointing Device:** Select **USB Tablet**
- **Extended Features:**
  - Select **Enable I/O APIC**
  - (Optional) Select **Enable EFI (special OSes only)** if you want to create an EFI-compatible image. EFI-compatible images are only supported by the following products: Deep Discovery

Inspector 5.6 and later, Deep Discovery Email Inspector 3.6 and later, Deep Discovery Analyzer 6.8 and later, Deep Discovery Director 5.1 and later, Deep Discovery Web Inspector 2.5 and later

16. Go to the **Processor** tab and then select **Enable PAE/NX**.
17. Go to the **Acceleration** tab and then select **Enable Nested Paging**. If you are using VirtualBox 5.2 and before, select **Enable VT-x/AMD-V** as well.

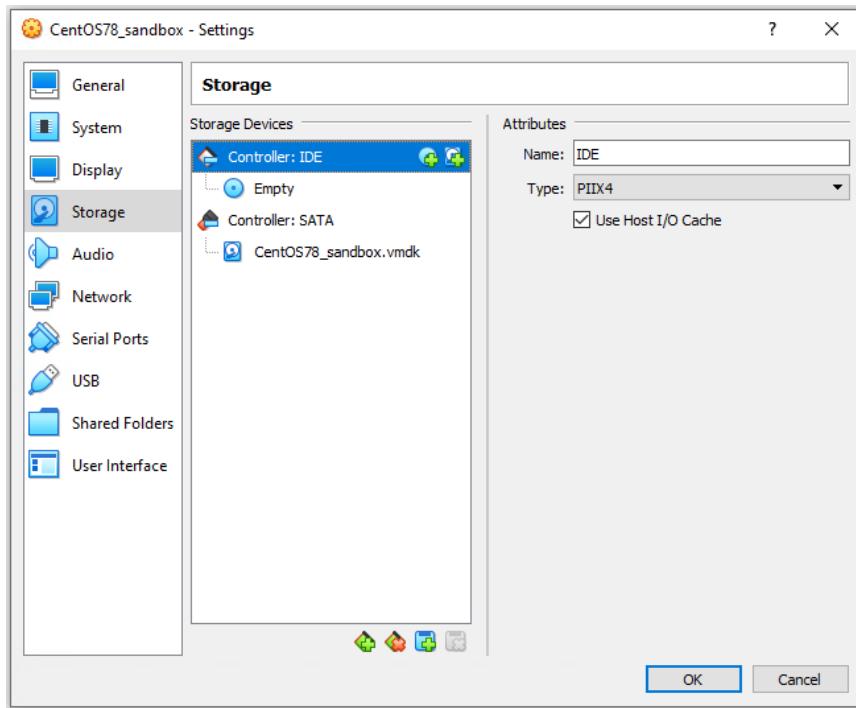


**Note**

- The **Acceleration** tab is only available if the processor of the host system supports virtualization technology and the virtualization setting is enabled in the BIOS of the host system.
- VirtualBox 6.0 and later automatically enables VT-x/AMD-V if the processor of the host system supports virtualization technology and the virtualization setting is enabled in the BIOS of the host system.

18. In the left pane, click **Storage**.

The **Storage** screen appears.



**FIGURE 4-12. Storage Screen**

19. If **Controller: SATA** appears under **Storage Tree**, remove the SATA controller and then add an IDE controller.
  - a. Click **Controller: SATA** and then click  to remove the default controller.
  - b. Click  and then select **PIIX4 (Default IDE)**.
  - c. Click **Controller: PIIX4** and then click .
  - d. Select the virtual hard disk file that you previously created and then click **Choose**.

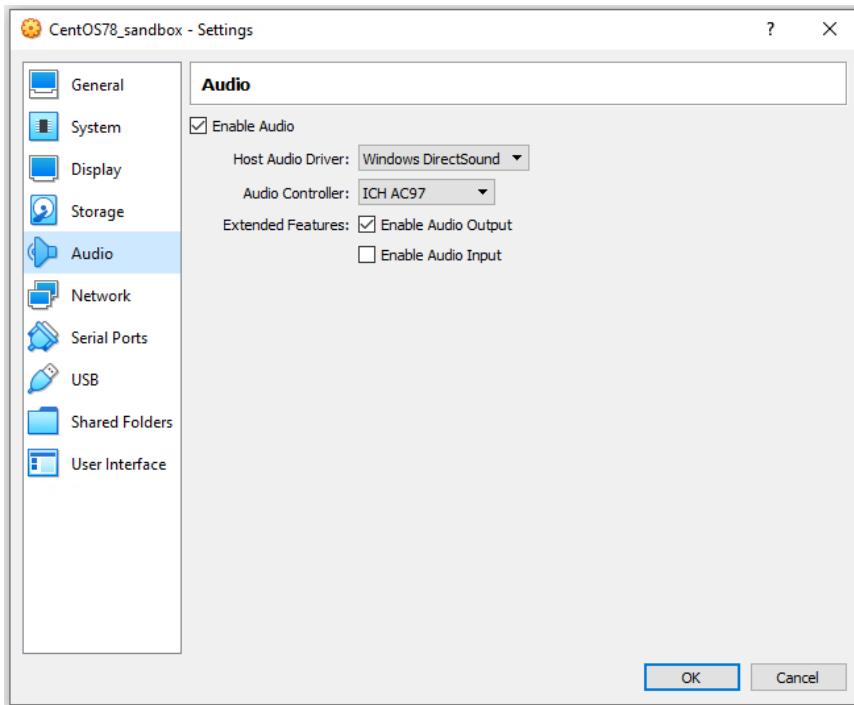
- e. Under **Attributes**, verify that **Hard Disk** is **IDE Primary Master**.
- f. Under **Storage Tree**, click **Controller: IDE** and then click .
- g. In the **Optical Disk Selector** window, click **Leave Empty**.
- h. Under **Attributes**, verify that **Optical Drive** is **IDE Secondary Master**.

20. Under **Attributes**, click , and then select **Choose a virtual CD/DVD disk file....**

21. Select the ISO file containing the operating system installer.  
The ISO file is available as a device.

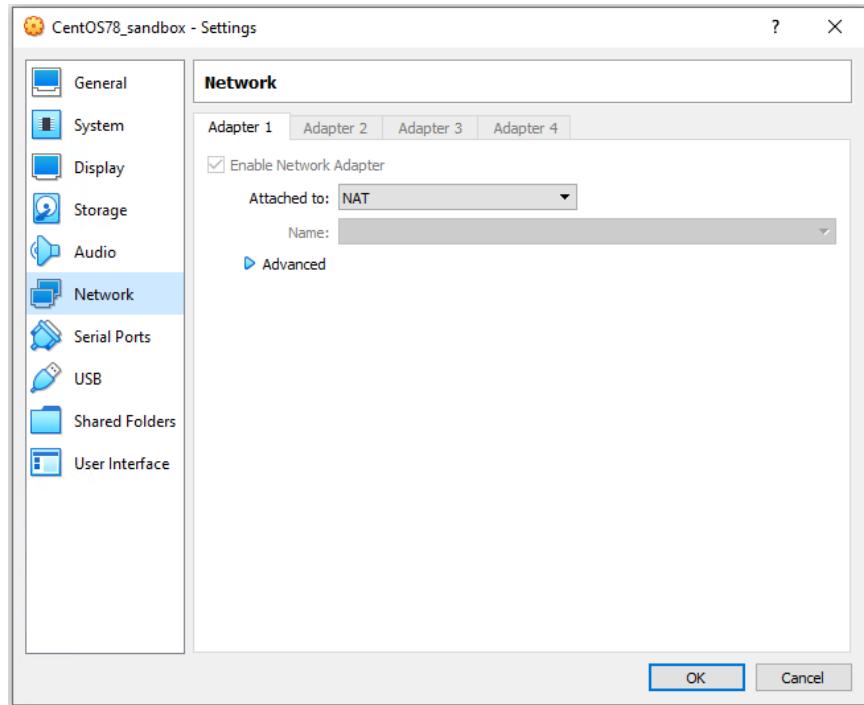
22. Verify that there is only one **Controller: IDE** controller. Remove any other controllers by clicking on the controller and then clicking .

23. (Optional) In the left pane, click **Audio** and verify that **Enable Audio** is enabled.



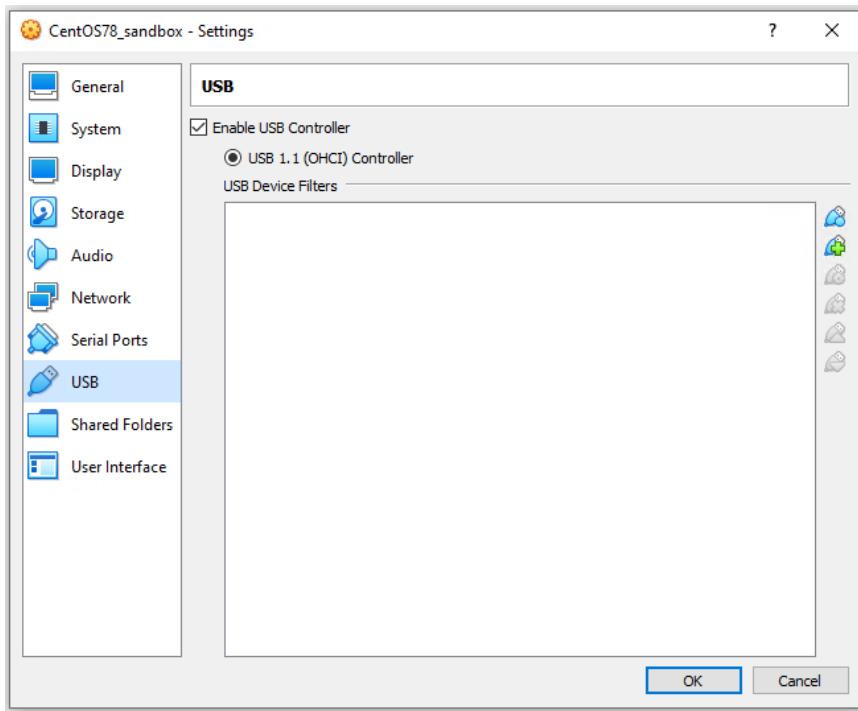
**FIGURE 4-13. Audio Options Settings**

24. In the left pane, click **Network**, go to the **Adapter 1** tab, and verify that **Enable Network Adapter** is enabled and that **Attached to** is **NAT** or **Bridged Adapter**.



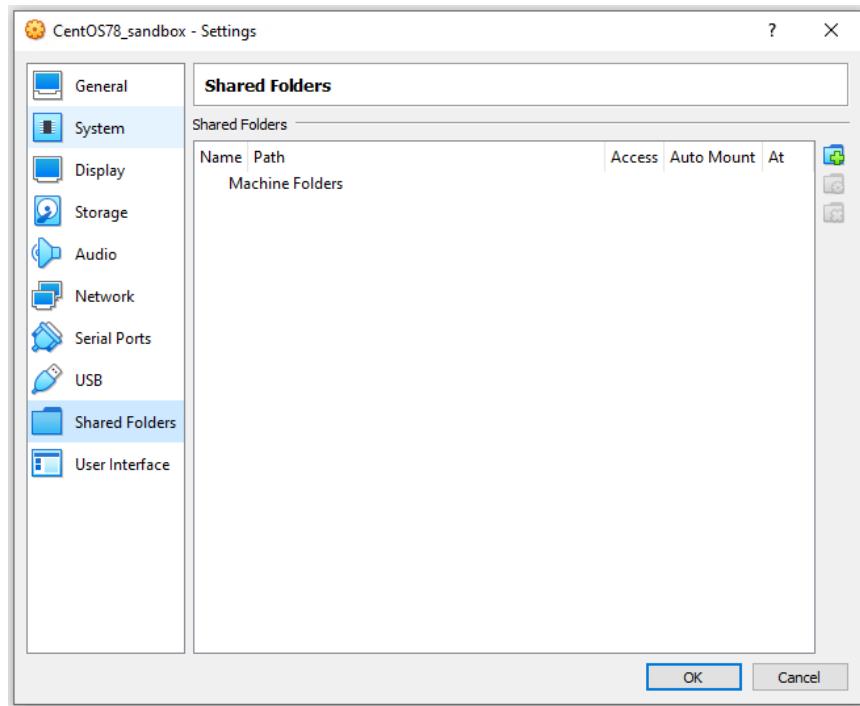
**FIGURE 4-14. Network Settings**

25. In the left pane, click **USB** and then select **Enable USB Controller**.



**FIGURE 4-15. Enable USB Controller**

26. In the left pane, click **Shared Folders** and then verify that no folders are shared.



**FIGURE 4-16. Shared Folders Settings**

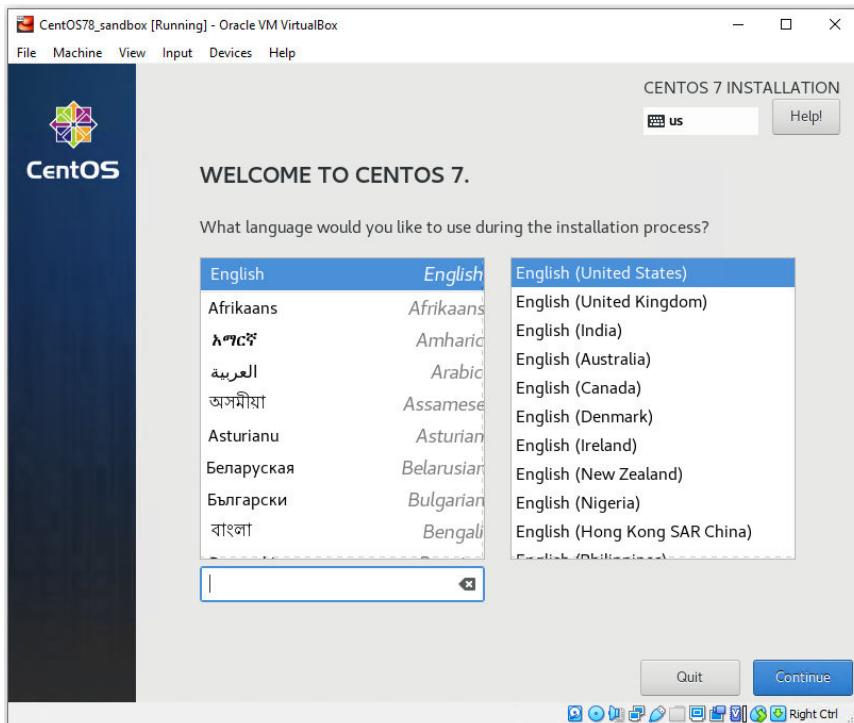
27. Click **OK**.

The **Settings** window closes.

28. On the **VirtualBox Manager** screen, click  to power on the image.

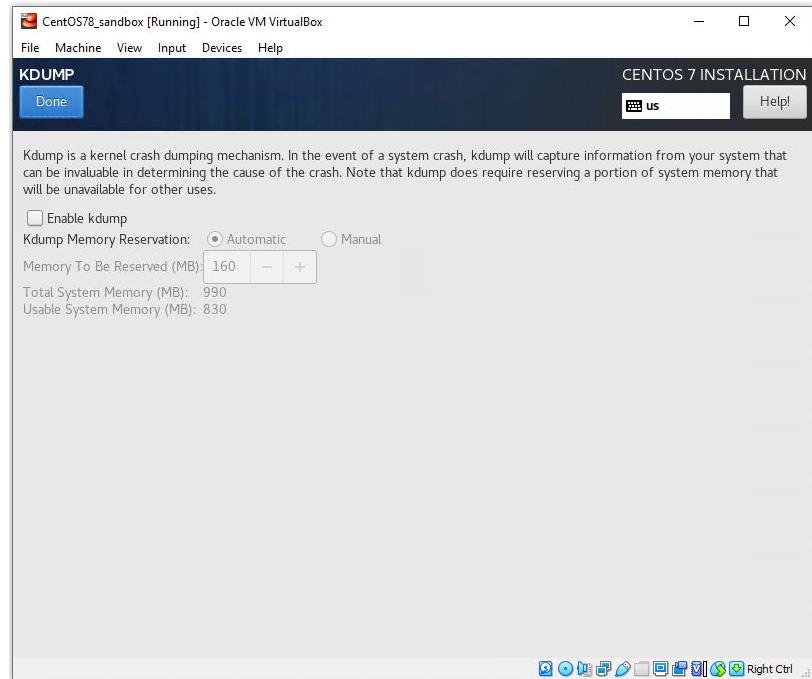
The installation process starts.

29. Follow the on-screen instructions to install the guest operating system.



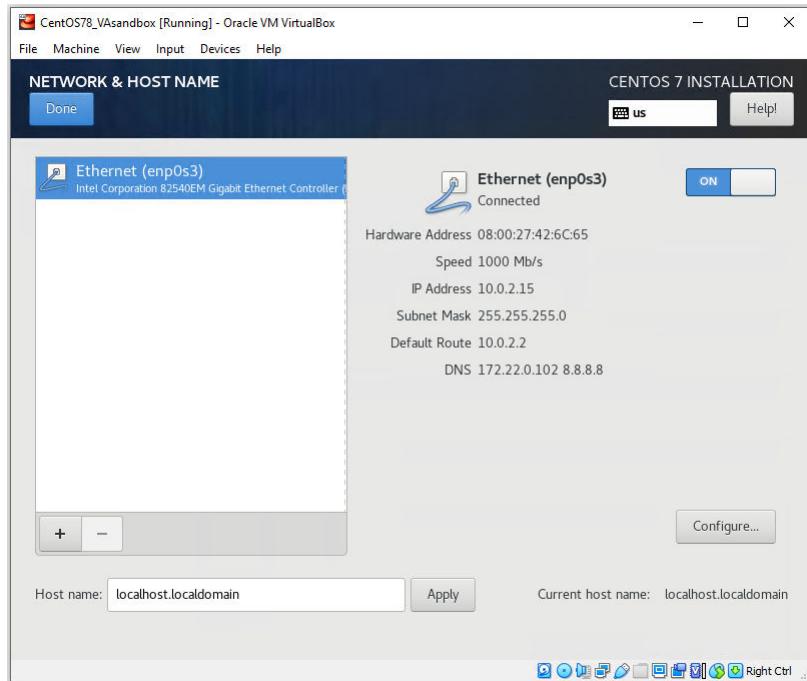
**FIGURE 4-17. Operating System Installation Process**

30. On the **Installation Summary** screen, perform the following:
  - a. Click **KDUMP**, disable **Enable kdump**, and then click **Done**.



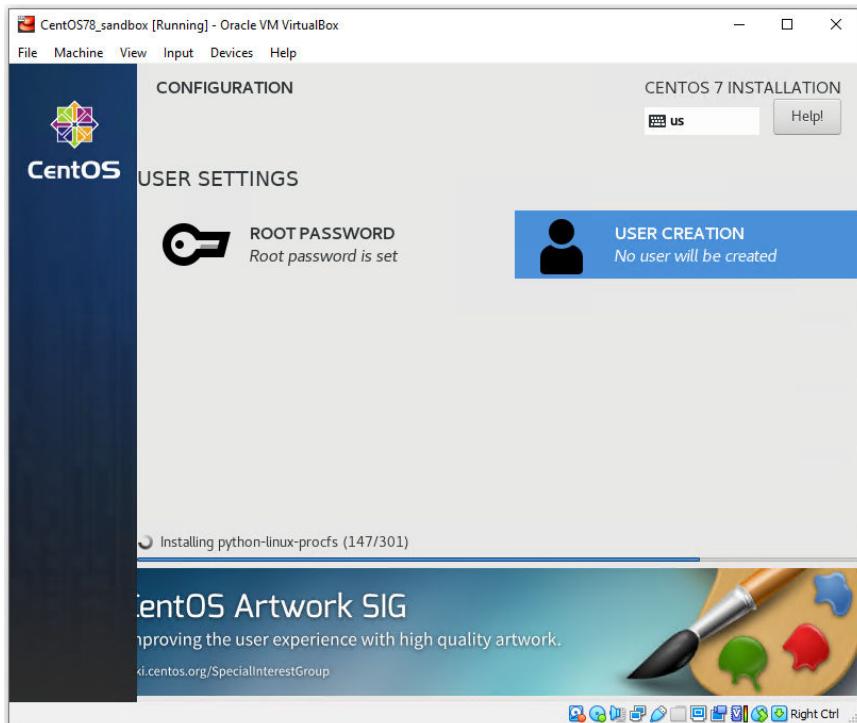
**FIGURE 4-18. Installation Summary kdump**

- a. Click **NETWORK & HOST NAME**, click the toggle to enable the network interface, configure the network settings, verify that the network interface is able to get an IP address and connect to the network, and then click **Done**.



**FIGURE 4-19. Installation Summary Network & Host Name**

31. After the **Begin Installation** screen, on the **CONFIGURATION** screen, set the **ROOT PASSWORD** to 1111.



**FIGURE 4-20. Password Configuration**



### Important

The Linux Operating System root password must be set to 1111.

## Modifying the Virtual Machine Environment

Modify the virtual machine environment to run Virtual Analyzer Sensors, a collection of utilities that execute and detect malware, and record all behavior in Virtual Analyzer.

- *Modifying the Virtual Machine Environment (CentOS 7.8) on page 4-30*

## Modifying the Virtual Machine Environment (CentOS 7.8)

### Procedure

1. Open a Terminal window and perform the following tasks:

Task	Steps
Verify that the network interface is able to get an IP address and connect to the network	<p>Type <b>nmcli</b> to check the network interface status.</p> <p> <b>Note</b> If the network interface is disconnected, type <b>ifup "&lt;network interface name&gt;"</b> to connect the network interface.</p>
Verify that the network interface is enabled on boot	<p>Edit the network interface configuration file <code>/etc/sysconfig/network-scripts/ifcfg-&lt;network interface name&gt;</code>, and modify the following line:</p> <p><code>ONBOOT=yes</code></p>
Enable and verify that sshd is running	<p>Type the following commands:</p> <ol style="list-style-type: none"> <li><b>systemctl enable sshd</b></li> <li><b>systemctl start sshd</b></li> <li><b>systemctl status sshd</b></li> </ol> <p>Verify that the ssh status is active (running)</p>
Disable SELinux	<p>Edit the SELinux configuration file <code>/etc/selinux/config</code>, and modify the following line:</p> <p><code>SELINUX=disabled</code></p>
Verify that all required packages are installed	<p>Use Virtual Analyzer Image Preparation Tool to automatically install missing packages or manually install them.</p> <p>For details, see <a href="#">Required Software on page 4-3</a>.</p>

2. Restart the virtual machine.

## Exporting Virtual Machine Images to OVA Files

A virtual machine image comprises many uncompressed files. The files must be combined into a single OVA file to avoid issues when importing.



### Important

Verify that the size of the created OVA file is supported by your product.

For details, go to <https://docs.trendmicro.com/en-us/home.aspx#Enterprise>.

## Procedure

1. On the VirtualBox Manager screen, power off the virtual machine.



### Note

Verify that the CD/DVD drive is empty before powering off and exporting.

2. Go to **File > Export Appliance**.

The **Export Virtual Appliance** window appears.

3. Select the virtual machine image to export and click **Next**.

The **Appliance settings** screen appears.

4. Configure the following:

- **File:** Accept the default name and path or click  to select a different file.
- **Format:** Select **OVF 1.0**.



### Important

Format options include OVF 0.9, 1.0 and 2.0. Virtual Analyzer does not support OVF 2.0.

- **MAC Address Policy:** Select **Include all network adapter MAC addresses**.

5. Click **Next**.

The **Virtual system settings** screen appears.

6. Verify that the **License** field is empty and then click **Export**.

---

VirtualBox creates the OVA file.

# Chapter 5

## Virtual Analyzer Image Preparation Tool

Learn how to use the Virtual Analyzer Image Preparation Tool in the following topics:

- *Overview on page 5-2*
- *Image Validation and Configuration on page 5-4*
- *System Requirements on page 5-3*
- *Using the Tool on page 5-6*
- *Troubleshooting Common Issues on page 5-25*

# Overview

The Virtual Analyzer Image Preparation Tool facilitates the creation of custom sandbox images.

**TABLE 5-1. Features**

FEATURE	DESCRIPTION
Image creation	<p>Create custom sandbox images for the following products:</p> <ul style="list-style-type: none"><li>• Deep Discovery Inspector 3.8 and later</li><li>• Deep Discovery Email Inspector 2.1 and later</li><li>• Deep Discovery Analyzer 5.1 and later</li><li>• TippingPoint Advanced Threat Protection for Networks 3.8 SP2 and later</li><li>• TippingPoint Advanced Threat Protection for Email 2.5 and later</li><li>• TippingPoint Advanced Threat Protection Analyzer 5.5 and later</li><li>• Deep Discovery Director 1.1 and later</li><li>• Deep Discovery Web Inspector 2.0 and later</li></ul>
Image validation and configuration	The tool validates and configures OVA files created using VirtualBox.

# System Requirements

**TABLE 5-2. Virtual Analyzer Image Preparation Tool System requirements**

REQUIREMENT	SPECIFICATION
Host operating system	<p>Build 3.8.1009 and later:</p> <ul style="list-style-type: none"> <li>• Windows 7 (32-bit and 64-bit)</li> <li>• Windows 8 (32-bit and 64-bit)</li> <li>• Windows 8.1 (32-bit and 64-bit)</li> <li>• Windows 10 (32-bit and 64-bit)</li> </ul> <p>Build 3.8.1240 and later:</p> <ul style="list-style-type: none"> <li>• Windows Server 2003/2003 R2</li> <li>• Windows Server 2008/2008 R2</li> <li>• Windows Server 2012/2012 R2</li> <li>• Windows Server 2016</li> <li>• Windows Server 2019</li> </ul>
	<p> <b>Important</b></p> <p>Microsoft .NET Framework 4.0 or later must be installed on the host operating system.</p>
Virtualization application	<p>Oracle™ VM VirtualBox 4.3 or later (except 5.0.6)</p> <p> <b>Important</b></p> <p>The tool does not support VirtualBox 5.0.6 because a defect prevents the first serial port from functioning properly. Trend Micro recommends using VirtualBox 5.0.7 or later.</p>

REQUIREMENT	SPECIFICATION
Hardware virtualization	<p>The hardware virtualization in the motherboard BIOS of the host operating system must be enabled to support Windows 8/8.1/10 or any 64-bit guest operating systems.</p> <p> <b>Note</b> The tool can detect hardware virtualization only on Windows 8/8.1/10 hosts.</p>

## Image Validation and Configuration

The tool automatically validates and configures the following VirtualBox image settings.

**TABLE 5-3. Validating and configuring Windows image settings**

SETTING	CORRECT CONFIGURATION
Admin password	1111
Keyboard layout	Enhanced keyboard layout: 101
Found New Hardware Wizard	Disabled
Disk defragmentation	Disabled
.NET Optimization	Disabled
CPU count	1
Memory size	<ul style="list-style-type: none"> <li>Windows XP or Windows Server 2003: 512 MB</li> <li>Other operating systems: 1024 MB</li> </ul>
PAE/NX	Enabled
Hardware virtualization	VT-x/AMD-V and nested paging enabled
Audio driver	Enabled

SETTING	CORRECT CONFIGURATION
Windows SMB service (TCP port 445)	Enabled
File and Printer Sharing for Microsoft Networks	Enabled
AutoPlay	Enabled in Windows 7/8/8.1/10
Default web browser	Internet Explorer
Microsoft Office macros	Enabled
Network adapter settings	Obtain an IP address automatically



### Important

The tool checks but does not modify the Windows and Office versions. Verify that the image meets the requirements before running the tool.

**TABLE 5-4. Validating and configuring Linux image settings**

SETTING	CORRECT CONFIGURATION
CPU count	1
Memory size	1024 MB
PAE/NX	Enabled
Hardware virtualization	VT-x/AMD-V and nested paging enabled
Audio driver	Enabled
Root password	1111
SELinux	Disabled
kdump	Disabled
sshd	Enabled
Kernel update	Disabled



### Important

The tool checks installed packages and installs missing packages by downloading them from the internet or using the user-provided CentOS 7.8.2003 Installation ISO `CentOS-7-x86_64-Everything-2003.iso`.

---

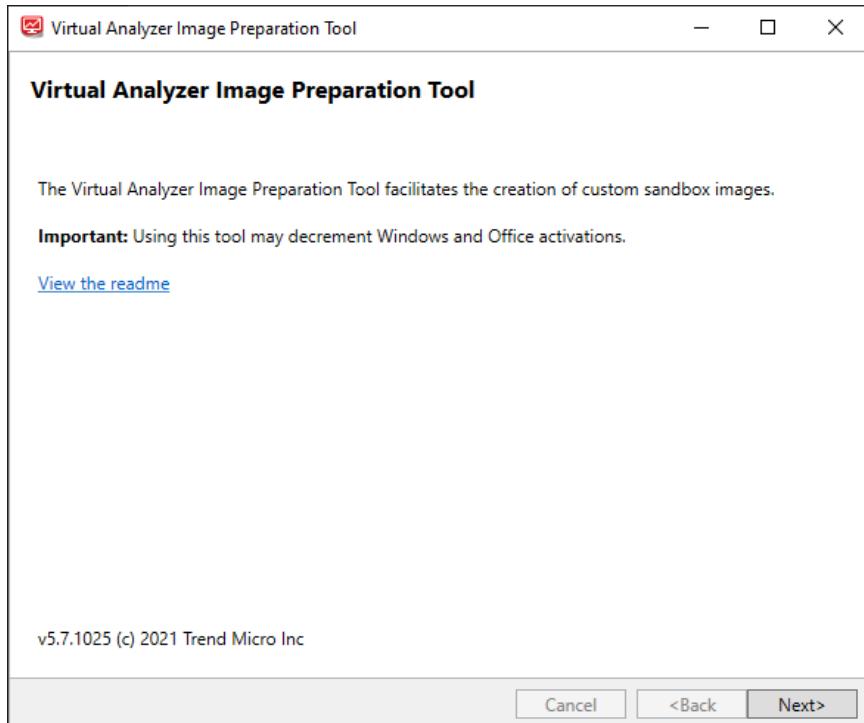
## Using the Tool

---

### Procedure

1. Download `SandboxWizard.zip` from the Trend Micro Download Center, or obtain a copy from your support provider.
2. Extract the package content to a local folder. Go to the folder and then open `SandboxWizard.exe`.

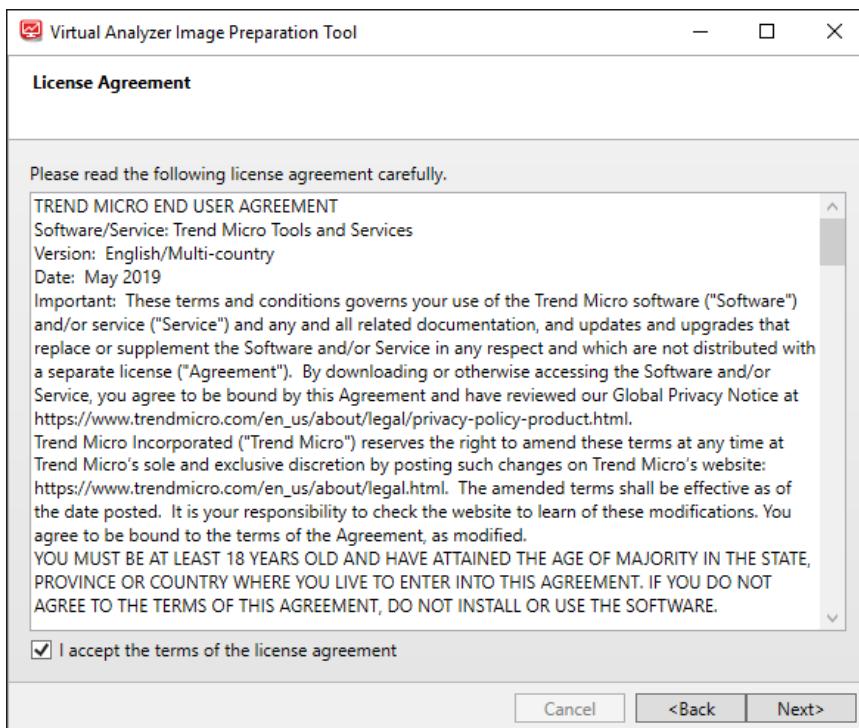
The introduction screen appears.



**FIGURE 5-1. Introduction screen**

3. Click **Next**.

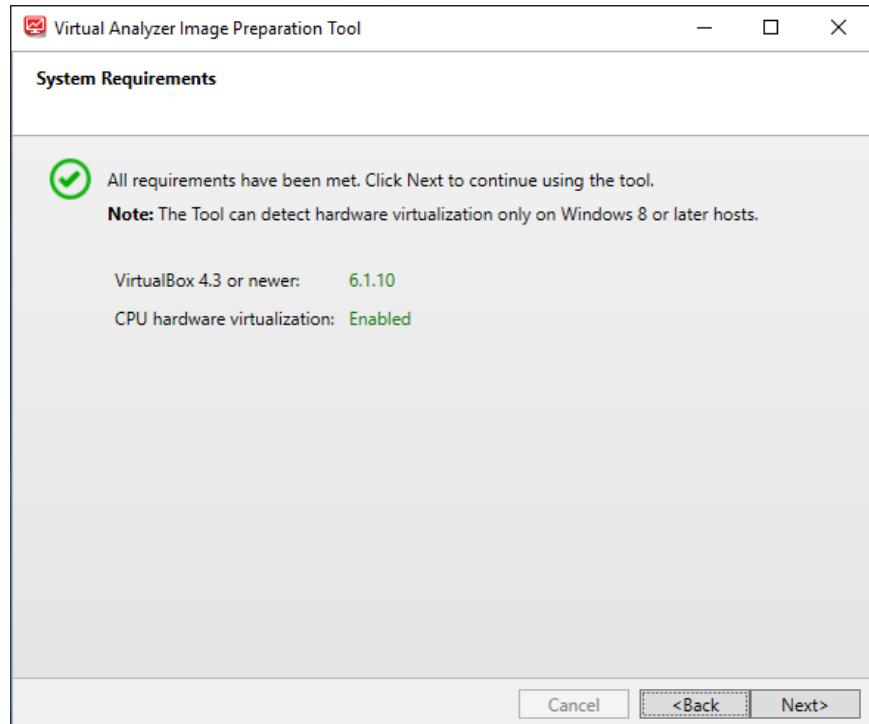
The **License Agreement** screen appears.



**FIGURE 5-2. License Agreement screen**

4. Read the license agreement. If you agree with the terms, select **I accept the terms of the license agreement** and then click **Next**.

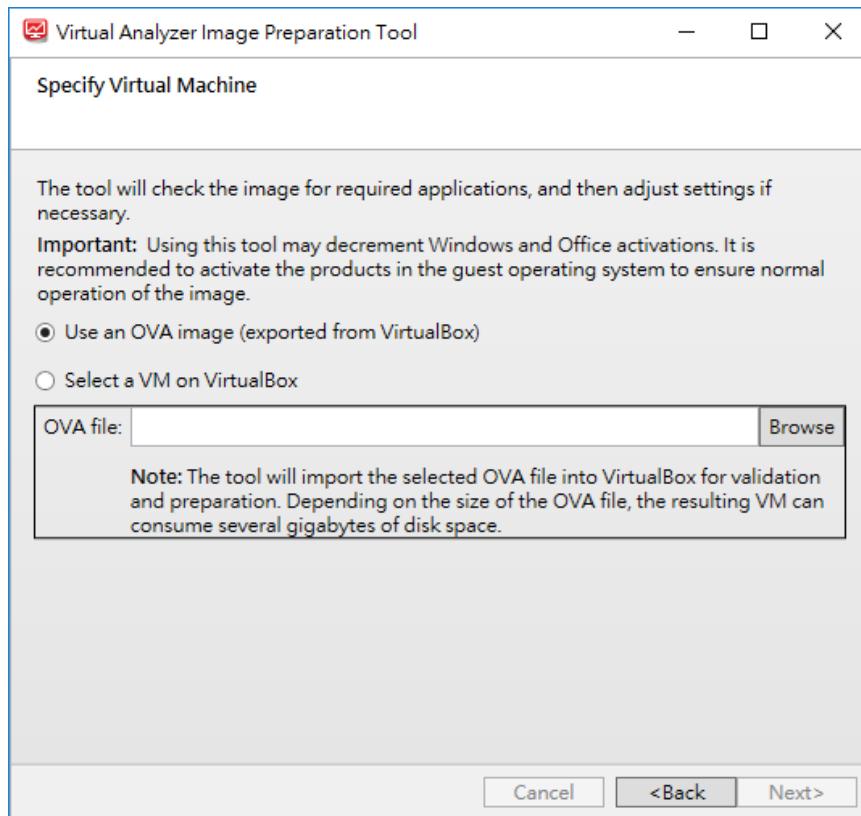
The tool checks if the computer meets the system requirements, and then the **System Requirements** screen appears.



**FIGURE 5-3. System Requirements screen**

5. Click **Next**.

The **Specify Virtual Machine** screen appears.



**FIGURE 5-4. Specify Virtual Machine screen**

6. Specify an OVA file or a virtual machine instance running on VirtualBox.
  - a. Select one of the following:
    - **Use an OVA image (exported from VirtualBox):** Select this option if you converted a Windows VMware image and then packaged it as an OVA file. For details, see [Windows OVA File Creation Using Converted Virtual Hard Disk Drives on page 3-1](#).

**Important**

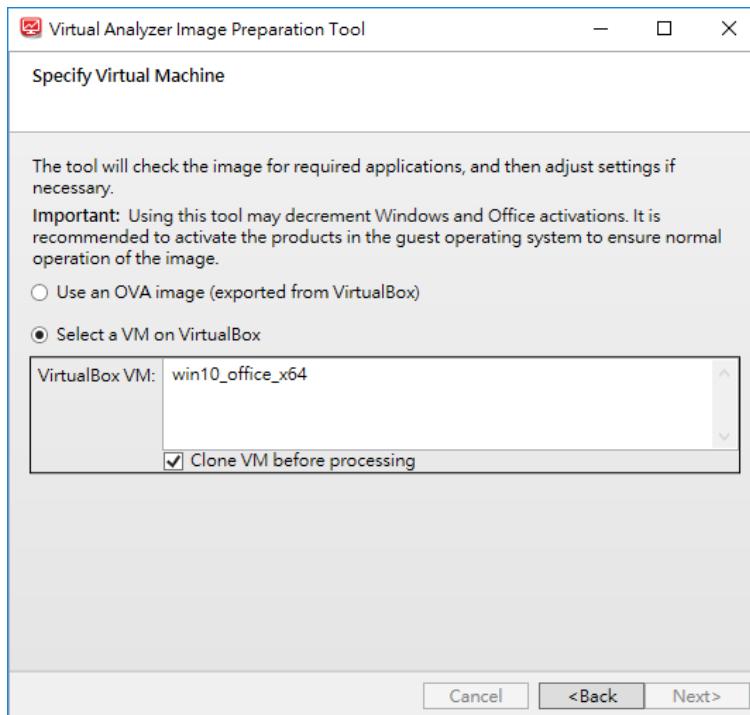
Open Virtualization Format (OVF) is a cross-platform standard for packaging and distributing software to be run in virtual machines. OVF enables the creation of ready-to-use software packages (operating systems with applications) that require no configuration or installation.

An OVF package consists of several files that can be packed into a single archive file with the extension .ova. Virtual Analyzer supports only image files in the OVA format.

---

- **Select a VM on VirtualBox:** Select this option if you want to create an image based on an existing virtual machine on VirtualBox.

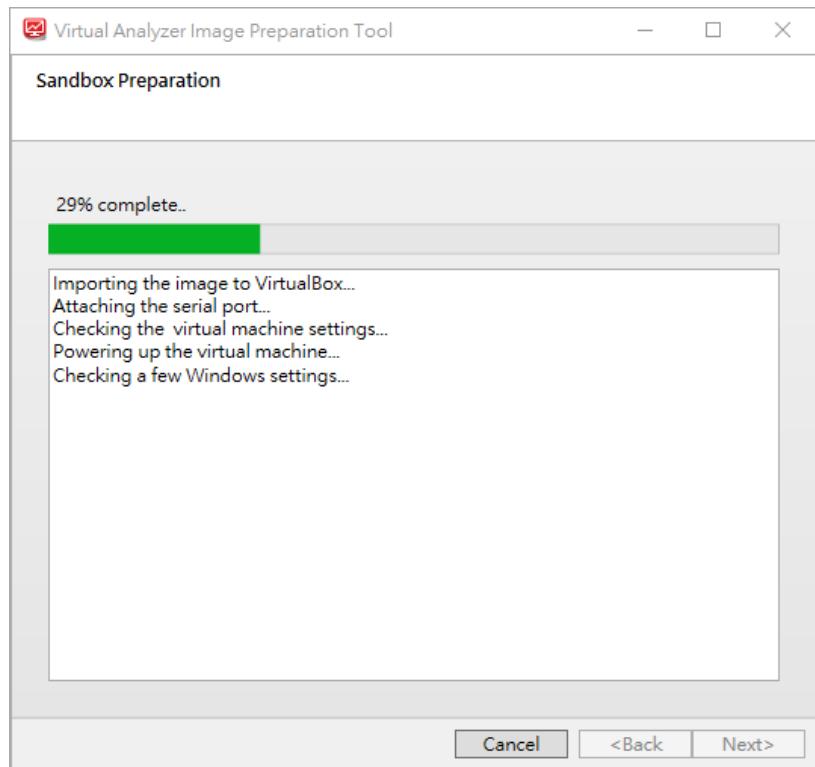
For example:



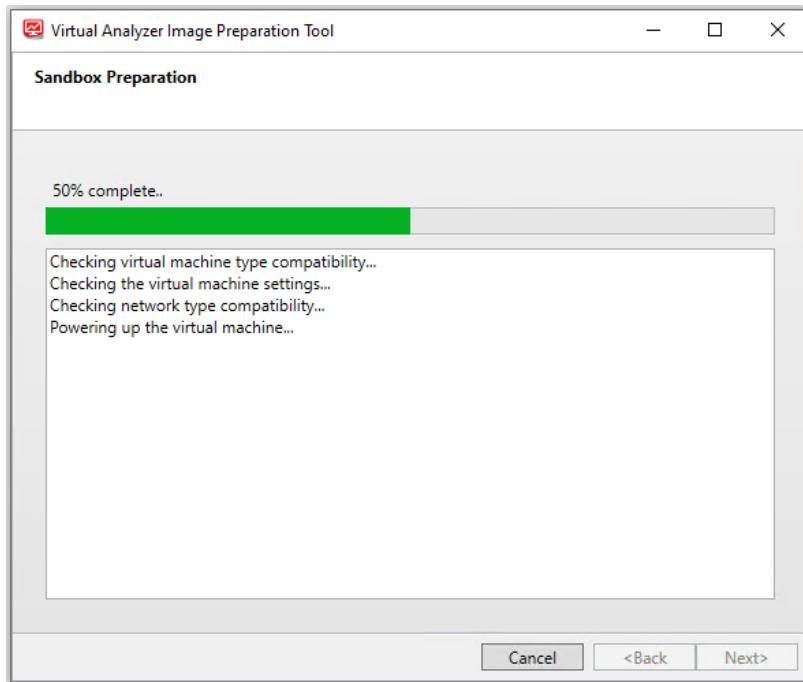
**FIGURE 5-5. Specify Virtual Machine screen - Select a VM on VirtualBox**

- b. Select **Clone VM before processing** to create a new copy of the virtual machine with its own set of individual snapshots. Cloning allows quick creation of duplicate environments for testing. You can run as many clones as the memory and processors on the system allow.
7. Click **Next**.

The **Sandbox Preparation** screen appears.



**FIGURE 5-6. Sandbox Preparation screen for Windows images**

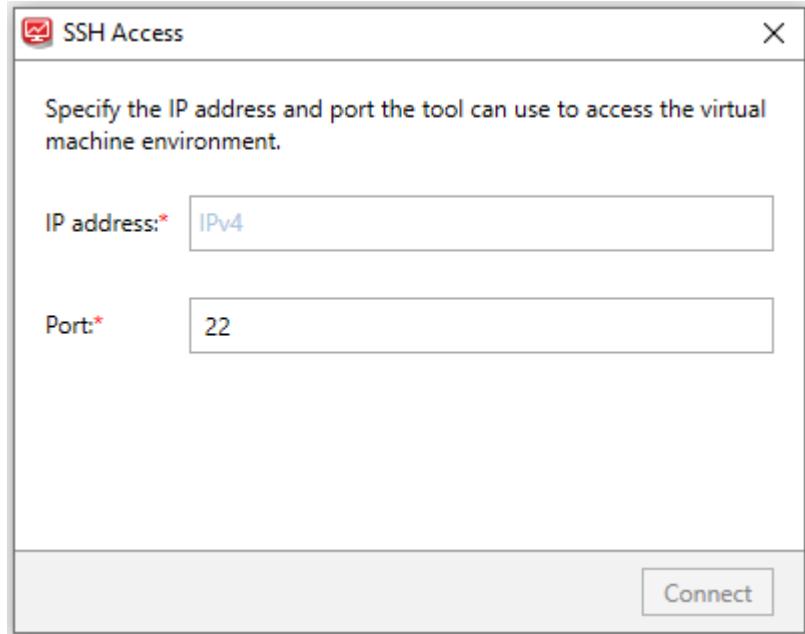


**FIGURE 5-7. Sandbox Preparation screen for Linux images**

If the Linux virtual machine network adapter is attached to **NAT**, the tool automatically modifies settings using SSH.

If the Linux virtual machine network adapter is attached to **Bridged Adapter**, the **SSH Access** dialog appears. Specify the IP address and

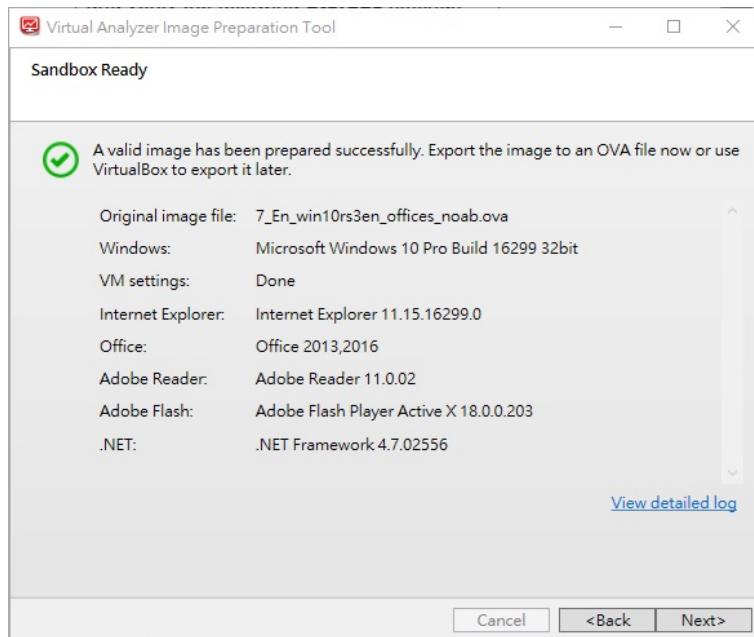
port the tool can use to access the virtual machine environment and then click **Connect**.



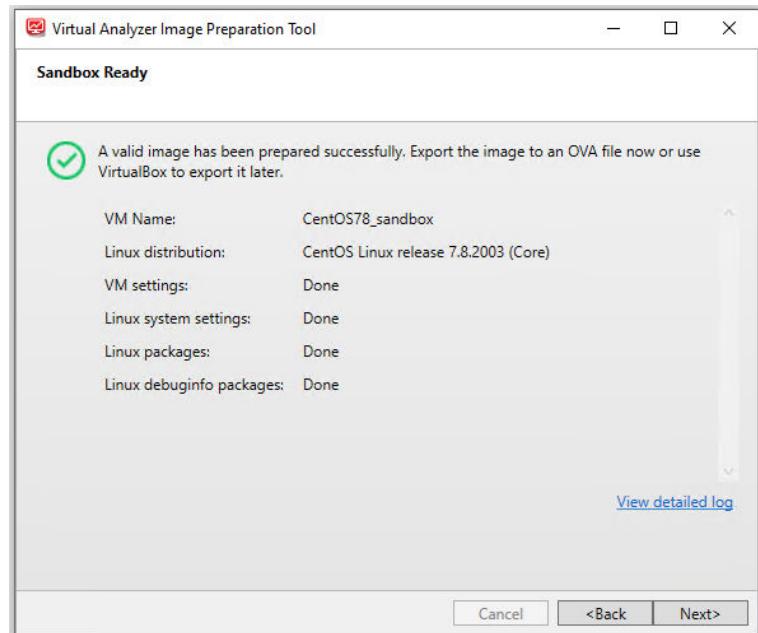
**FIGURE 5-8. SSH Access screen for Linux images**

The tool modifies incorrectly configured settings. For a list of settings that the tool validates, see *Image Validation and Configuration on page 5-4*. For solutions to issues that occur during this phase, see *Troubleshooting Common Issues on page 5-25*.

8. Perform one of the following actions depending on the screen that appears:
  - The **Sandbox Ready** screen appears when the tool has successfully validated and configured all settings.



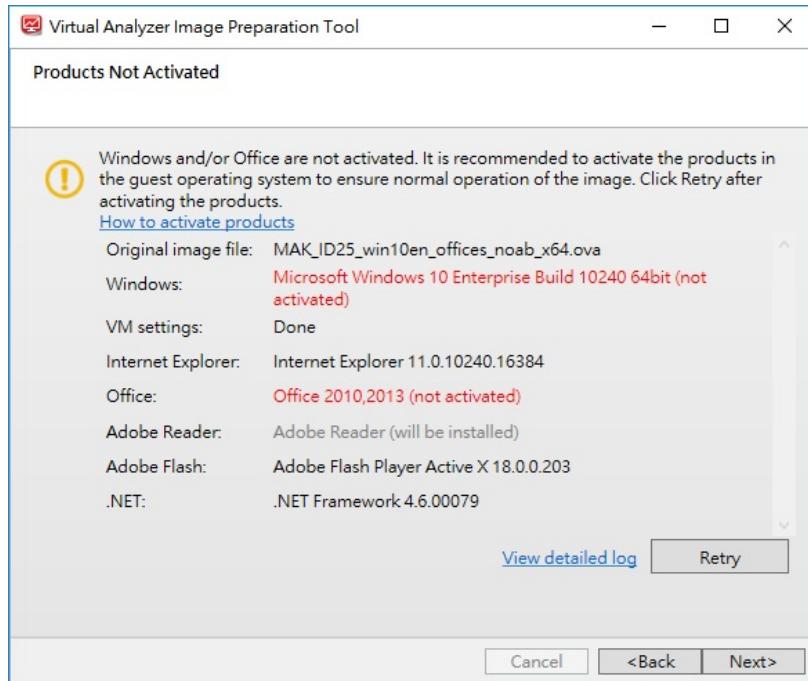
**FIGURE 5-9. Sandbox Ready screen for Windows images**



**FIGURE 5-10. Sandbox Ready screen for Linux images**

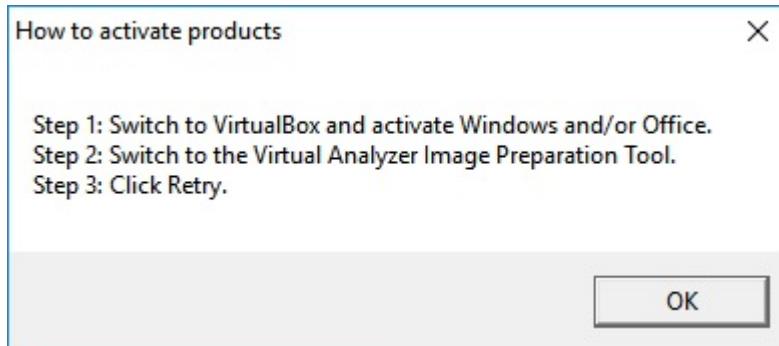
Click **Next** to continue.

- The **Products Not Activated** screen appears when the tool detects that Windows and/or Office are installed but not activated.



**FIGURE 5-11. Products Not Activated screen for Windows images**

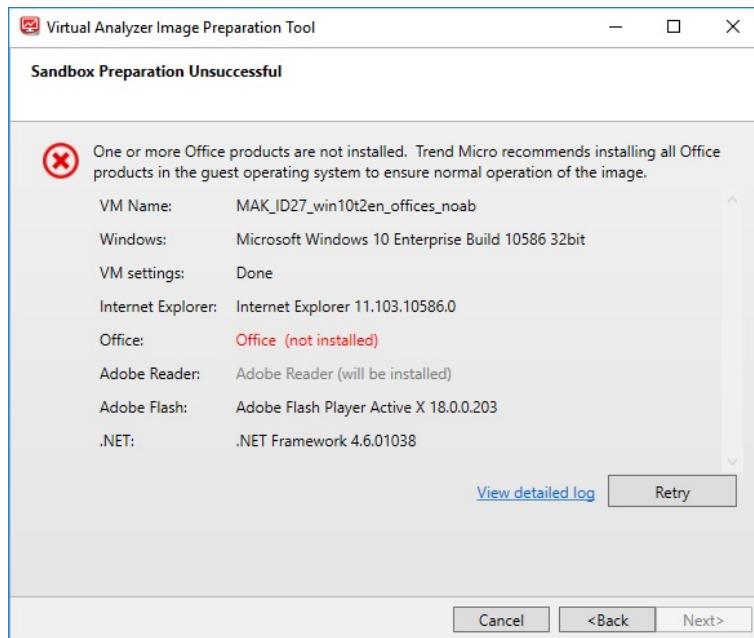
Click **How to activate products** to learn to how to activate Windows and/or Office in the guest operating system.



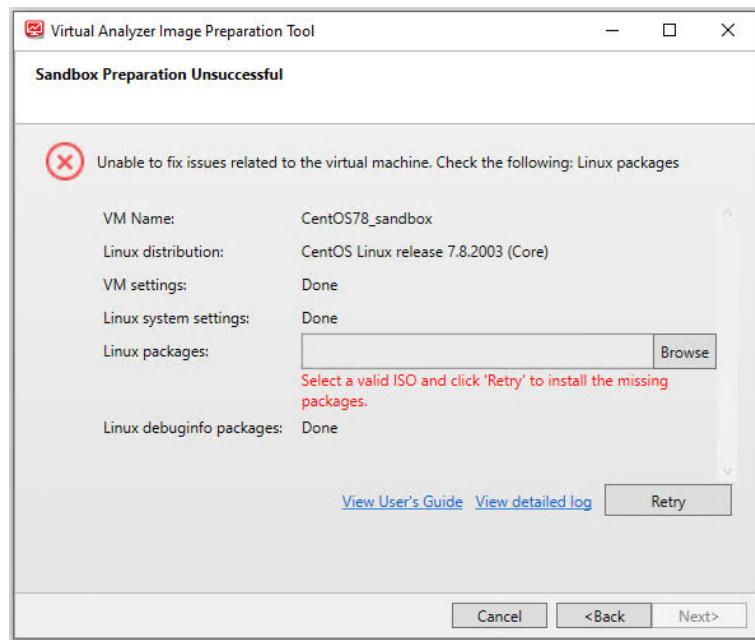
**FIGURE 5-12. How to activate products dialog**

Click **Retry** after activating the products, or click **Next** to continue without activating the products. It is recommended to activate the products in the guest operating system to ensure normal operation of the image.

- The **Sandbox Preparation Unsuccessful** screen appears when the tool is unable to fix issues encountered during preparation.



**FIGURE 5-13. Sandbox Preparation Unsuccessful screen for Windows images**



**FIGURE 5-14. Sandbox Preparation Unsuccessful screen for Linux images**

If required packages are missing, perform one of the following actions to install the missing packages:

- Manually install missing packages and then click **Retry**.
- Click **Browse**, select the CentOS 7.8.2003 Installation ISO `CentOS-7-x86_64-Everything-2003.iso`, and then click **Retry**.

Click **View detailed log** and perform any recommended actions before running the tool again.

Click **Retry** to try preparing the sandbox again, or **Cancel** to exit the tool.

If no issues arise, the **Specify the OVA image path and file name** screen appears.

If issues arise and are not resolved, see [Troubleshooting Common Issues on page 5-25](#).

---

**Note**

SandboxWizard.exe saves logs in the \log folder where you run the tool. Logs use the following naming convention: d:\SandboxWizard\log \VATool-yyyymmddhhmmss\_output.txt

For example: d:\SandboxWizard\log \VATool-20170925025520\_output.txt

---

**9. Configure the following settings:**

- Specify the path and file name that the tool uses when saving the OVA file.

---

**Note**

The tool uses the following naming convention when saving an OVA file: VATool-20170925025520.ova

---

- (Optional) Enable **Remove the image from VirtualBox after exporting.**

Disable this option if you want to keep the image in VirtualBox even after exporting.

---

**Important**

Unused images consume valuable disk space which may impact performance.

---

- (Optional) Enable **Compress the image for uploading to Deep Discovery Director.**

---

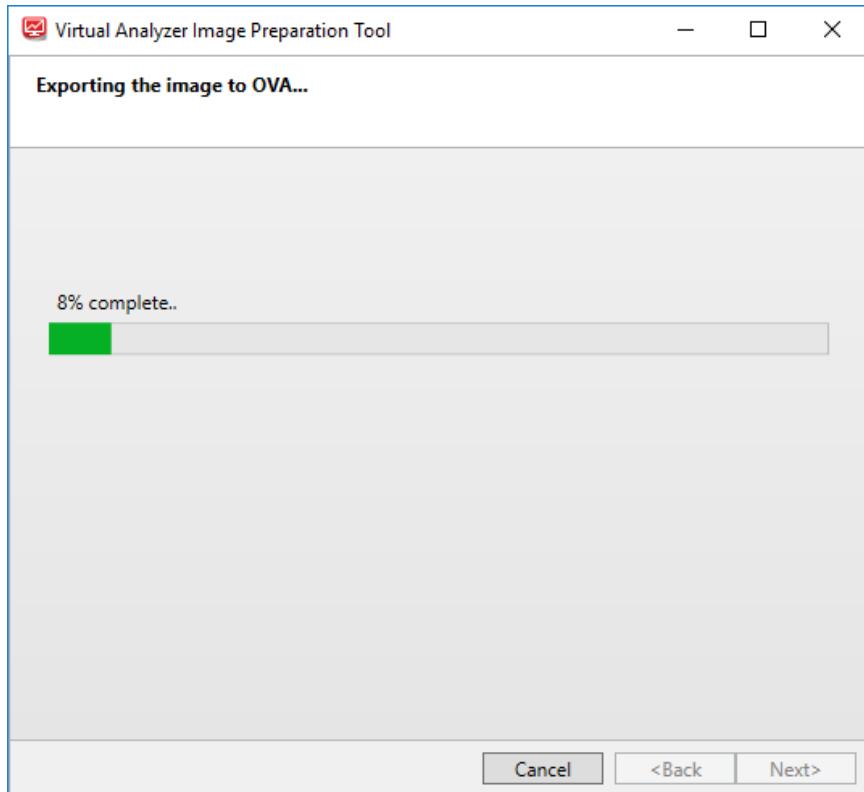
**Important**

Only Virtual Analyzer images compressed in TAR format by the Virtual Analyzer Image Preparation Tool can be uploaded to and deployed from Deep Discovery Director.

---

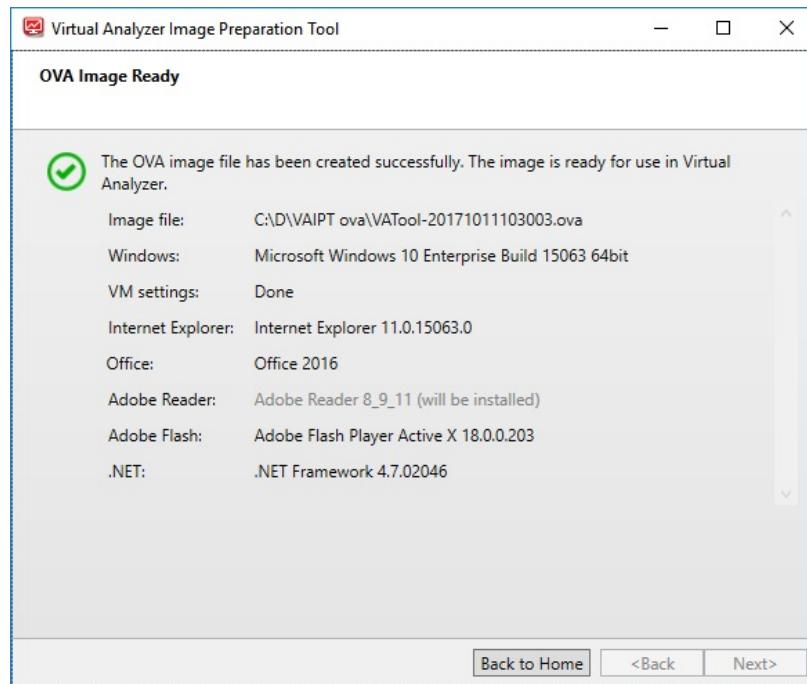
**10. Click **Next**.**

The **Export the image to OVA** screen appears and the tool exports the OVA file.

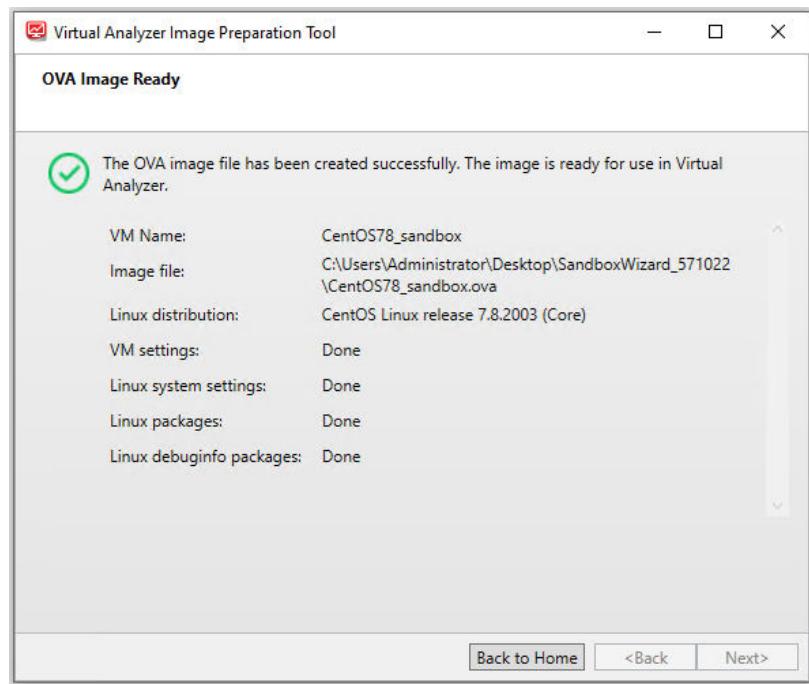


**FIGURE 5-15. Export the image to OVA screen**

The **OVA Image Ready** screen appears when the export process completes.



**FIGURE 5-16. OVA Image Ready screen for Windows images**



**FIGURE 5-17. OVA Image Ready screen for Linux images**

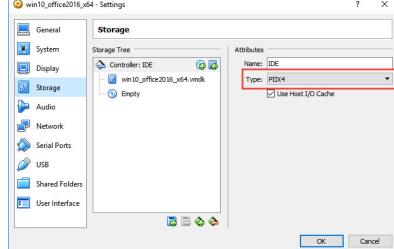
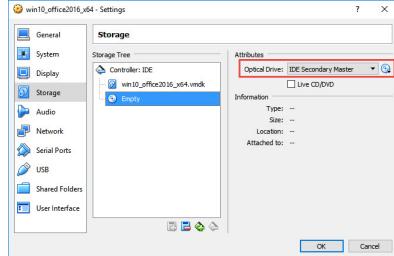
11. Click the **Close** button in the upper right corner to exit the tool or click **Back to Home** to create another image.

## Troubleshooting Common Issues

**TABLE 5-5. Common Issues When Using the Tool to Validate Windows Images**

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to upload an OVA file.	The image does not meet the minimum or maximum size requirements.	Verify that the size of the OVA file is supported by your product.

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to prepare a virtual machine image.	The image was not created using VirtualBox.	Install a supported VirtualBox version. For details, see <i>System Requirements on page 5-3</i> .
	VirtualBox is not installed on the computer.	
	The image uses an unsupported operating system.	Use a supported operating system. For details, see <i>Required Software on page 2-2</i> .
	VirtualBox is unresponsive.	Refer to the VirtualBox documentation. <a href="https://www.virtualbox.org/manual/ch12.html#idp54271008">https://www.virtualbox.org/manual/ch12.html#idp54271008</a>

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to start the VirtualBox installation CD/DVD.	Settings are incorrectly configured.	<p>Open the imported image using VirtualBox and verify the following <b>Storage</b> settings.</p> <ul style="list-style-type: none"> <li>• Select <b>Controller: IDE</b> and verify that the specified type is <b>PIIX4</b>.</li> </ul>  <p><b>FIGURE 5-18. Controller: IDE must be set to PIIX4</b></p> <ul style="list-style-type: none"> <li>• Select the optical disc icon and verify that the specified <b>CD/DVD drive</b> is <b>IDE Secondary Master</b>.</li> </ul>  <p><b>FIGURE 5-19. CD/DVD drive is set to IDE Secondary Master</b></p>

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to enter the desktop of the guest operating system.	Group policy settings are incorrectly configured.	Click <b>OK</b> on the <b>Virtual Analyzer Image Preparation Tool Test</b> screen to enter the desktop of the guest operating system.



ISSUE	CAUSE	RECOMMENDED ACTION
Unable to start SandboxWizard.exe in the guest image.	AutoPlay settings are incorrectly configured.	<ol style="list-style-type: none"><li>1. Open VirtualBox.</li><li>2. On the <b>VirtualBox Manager</b> screen, click  to power on the image.</li><li>3. On the guest operating system, perform the following:<ol style="list-style-type: none"><li>a. Go to <b>Control Panel &gt; Hardware and Sound &gt; AutoPlay</b>.</li><li>b. Select <b>Install or run program from your media</b> from the <b>Software and games</b> drop-down menu.</li><li>c. Click <b>Save</b>.</li><li>d. Open the <b>Local Group Policy Editor</b>.</li><li>e. Go to <b>Computer Configuration &gt; Administrative Templates &gt; Windows Components &gt; AutoPlay Policies</b>.</li><li>f. Select <b>Not configured</b> to disable AutoPlay.</li></ol></li></ol>

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to prepare a Windows 7 or Windows Server 2008/2008 R2 virtual machine image.	Updates KB4474419 and KB4490628 are not installed.	<p>Manually install the updates.</p> <ol style="list-style-type: none"> <li>1. Open VirtualBox.</li> <li>2. On the <b>VirtualBox Manager</b> screen, click  to power on the image.</li> <li>3. On the guest operating system, perform the following:             <ol style="list-style-type: none"> <li>a. Open a web browser and go to the <b>Microsoft Update Catalog</b> site.</li> <li>b. Search for KB4474419 and KB4490628 and download the correct update files for the guest operating system.</li> <li>c. Install the updates.</li> </ol> </li> </ol>

**TABLE 5-6. Common Issues When Using the Tool to Validate Linux Images**

ISSUE	CAUSE	RECOMMENDED ACTION
Unable to prepare a virtual machine image.	The VirtualBox virtual machine type is not supported.	<p>Use the correct virtual machine type.</p> <ul style="list-style-type: none"> <li>• Type: Linux</li> <li>• Version: Red Hat (64-bit)</li> </ul>
Unable to connect to the virtual machine environment.	sshd is not running in virtual machine environment.	Start sshd in virtual machine environment.
	The virtual machine environment's network interface is not connected.	Verify network interface is connected on boot.
Unable to install required packages with specified ISO.	The specified ISO is not the correct installation ISO.	<p>Download the CentOS 7.8.2003 Installation ISO CentOS-7-x86_64-Everything-2003.iso:</p> <p><a href="https://vault.centos.org/">https://vault.centos.org/</a></p>

## Sample Logs

**Windows image preparation successful. Missing app detected.**

-----  
Trend Micro Inc(TM) Virtual Analyzer Image Preparation Tool  
Detailed Log  
-----

### 1. Overview

Result	Preparation successful
Completed	2019-12-13 03:43:13
Virtual machine name	VATool-20191213032810(in VirtualBox)
	- OK

### 2. Hardware settings

Processor Count	1	- OK
Memory Size	1024	- OK
Host Audio Driver	"dsound"	- OK
Audio Controller	"dsound"	- OK
Nested Paging	"on"	- OK
Large Page	"on"	- OK
CPU Execution Cap	100	- OK
PAE/NX	"on"	- OK
ACPI	"on"	- OK
HPET	"off"	- OK
I/O APIC	"on"	- OK
Use UTC	"off"	- OK
Chipset	"ich9"	- OK
USB	"on"	- OK
USB EHCI	"off"	- OK
VT-x	"on"	- OK
Pointing Device	"usbtablet"	- OK
NIC	"nat"	- OK
IDE Controller		- OK
CD/DVD drive		- OK
VMDK/VDI		- OK

### 3. Windows and applications

Windows	Microsoft Windows 10 Enterprise Build 17134 32bit	- OK
Office		
2013	Microsoft Excel 2013	- OK
	Microsoft PowerPoint 2013	- OK
	Microsoft Word 2013	- OK
	Microsoft Publisher 2013	- OK
2016	Microsoft Excel 2016	- OK
	Microsoft PowerPoint 2016	- OK
	Microsoft Word 2016	- OK
	Microsoft Publisher 2016	- OK
.NET	.NET Framework 4.7.03056	- OK
Internet Explorer	Internet Explorer 11.112.17134.0	- OK
Adobe Flash	Adobe Flash Player Active X 30.0.0.113	- OK
Adobe Reader	Adobe Reader	- will be installed

## Windows image preparation unsuccessful. Some items must be fixed manually.

Trend Micro Inc(TM) Virtual Analyzer Image Preparation Tool  
Detailed Log

### 1. Overview

Result	Preparation unsuccessful. Some items need to be fixed manually.	
Error Reason	One or more Office products are not installed.	
Completed	2019-12-13 09:44:45	
Virtual machine name	VATool-20191213092157(in VirtualBox)	- OK

### 2. Hardware settings

Processor Count	1	- OK
Memory Size	1024	- OK
Host Audio Driver	"null"	- OK
Audio Controller	"null"	- OK
Nested Paging	"on"	- OK
Large Page	"off"	- OK
CPU Execution Cap	100	- OK
PAE/NX	"on"	- OK
ACPI	"on"	- OK
HPET	"on"	- OK
I/O APIC	"on"	- OK
Use UTC	"off"	- OK
Chipset	"ich9"	- OK
USB	"on"	- OK
USB EHCI	"off"	- OK
VT-x	"on"	- OK
Pointing Device	"usbttablet"	- OK
NIC	"natnetwork"	- OK
NAT Network	"NatNetwork"	- OK
IDE Controller		- OK
CD/DVD drive		- OK
VMDK/VDI		- OK

### 3. Windows and applications

Windows	Microsoft Windows 10 Enterprise Build 17134 64bit - Installed	
Office	Microsoft Excel 2019 - Installed	
2019	Microsoft PowerPoint 2019 - Error: not installed	
	Microsoft Word 2019 - Error: not installed	
	Microsoft Publisher 2019 - Installed	
.NET	.NET Framework 4.7.03056 - OK	
Internet Explorer	Internet Explorer 11.112.17134.0 - OK	
Adobe Flash	Adobe Flash Player Active X 32.0.0.207 - OK	
Adobe Reader	Adobe Reader - will be installed	

## Linux image preparation successful.

Trend Micro Inc(TM) Virtual Analyzer Image Preparation Tool  
Detailed Log

### 1. Overview

Result	Preparation successful	
Completed	2021-01-01 12:00:00	
Virtual Machine Name	CentOS78_sandbox(in VirtualBox)	- OK

### 2. Hardware Settings

Processor count	1	- OK
Memory size	1024	- OK
Host Audio Driver	null	- OK
Audio Controller	null	- OK
IDE Controller		- OK
CD/DVD Drive		- OK
VMDK/VDI		- OK

### 3. Linux system settings

SELinux	off	- OK
SSHD	on	- OK
Kdump	off	- OK
NTP	off	- OK
Grub Timeout	1	- OK
OS Auto Update	off	- OK

### 4. Operating System and Packages

Linux distribution	CentOS Linux release 7.8.2003 (Core)	- OK
Kernel-3.10.0-1127.el7.x86_64	Kernel-3.10.0-1127.el7.x86_64	- OK
libpcap-1.5.312.el7.x86_64	libpcap-1.5.312.el7.x86_64	- OK
kernel-debuginfo-3.10.0-1127.el7.x86_64	kernel-debuginfo-3.10.0-1127.el7.x86_64	- OK
gcc-debuginfo-4.8.539.el7.x86_64	gcc-debuginfo-4.8.539.el7.x86_64	- OK
openssl-debuginfo-1.0.2k19.el7.x86_64	openssl-debuginfo-1.0.2k19.el7.x86_64	- OK
curl-debuginfo-7.29.057.el7.x86_64	curl-debuginfo-7.29.057.el7.x86_64	- OK
zlib-debuginfo-1.2.718.el7.x86_64	zlib-debuginfo-1.2.718.el7.x86_64	- OK
glibc-debuginfo-2.17307.el7.1.x86_64	glibc-debuginfo-2.17307.el7.1.x86_64	- OK

## Linux image preparation unsuccessful. Missing packages detected. Manual fix required.

```
-----  
Trend Micro Inc(TM) Virtual Analyzer Image Preparation Tool  
Detailed Log  
-----  
  
1. Overview  
-----  
Result Preparation unsuccessful. Some items need to be fixed manually.  
Error Reason Check the following: Linux packages  
Completed 2021-01-01 12:00:01  
Virtual Machine Name En_CentOS_7_DVD_Minimal(in VirtualBox) - OK  
  
2. Hardware Settings  
-----  
Processor count 1 - OK  
Memory size 1024 - OK  
Host Audio Driver null - OK  
Audio Controller null - OK  
Mother Board - OK  
  
IDE Controller - OK  
CD/DVD Drive - OK  
VMDK/VDI - OK  
  
3. Linux system settings  
-----  
SELinux off - OK  
SSHD on - OK  
Kdump off - OK  
NTP off - OK  
Grub Timeout 1 - OK  
OS Auto Update off - OK  
  
4. Operating System and Packages  
-----  
Linux distribution CentOS Linux release 7.8.2003 (Core) - OK  
nodejs-6.17.11.e17.x86_64 - OK  
yara-4.0.2 - OK  
glibc-2.17307.e17.1.x86_64 - OK  
gcc-4.8.539.e17.x86_64 - Requires manual fix  
gcc-4.8.539.e17.x86_64 - Requires manual fix  
glibc-2.17307.e17.1.1686 - OK  
libgcc-4.8.539.e17.x86_64 - OK  
libstdc++-4.8.539.e17.x86_64 - OK  
openssl-1.0.2k19.e17.x86_64 - OK  
zip - Requires manual fix  
strings - OK  
pidof - OK  
sh - OK  
readelf - OK  
ldd - OK  
objcopy - OK  
tcsch - OK  
unzip - OK  
bash - OK  
file - OK
```



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