Oracle® VM VirtualBox
Installation Instructions for Windows 7
and
Linux Virtual Machine Creation
Targeting Avnet Development Boards

Version 1.5.1
September 2017

Installing Oracle VM VirtualBox on Windows 7

This document shows how to install VirtualBox and the Extension Pack to enable the use of a Linux virtual machine for the cross build platform.

General Instruction:

Install Oracle VM VirtualBox using the official VirtualBox installer. For legal distribution reasons, the VirtualBox installation executable cannot be included with any public Avnet materials. To obtain a free legal copy of the Oracle VM VirtualBox and the Extension Pack, please download from the VirtualBox website:

https://www.virtualbox.org/wiki/Downloads

The version downloaded may differ from the version shown in this documentation (5.1.22). Be sure to read the VirtualBox EULA to ensure you do not violate the *Personal Use and Evaluation License* (PUEL). You may also wish to consult the *VirtualBox Licensing Frequently Asked Questions* for a quick overview of the intent of the license agreements:

https://www.virtualbox.org/wiki/Licensing_FAQ

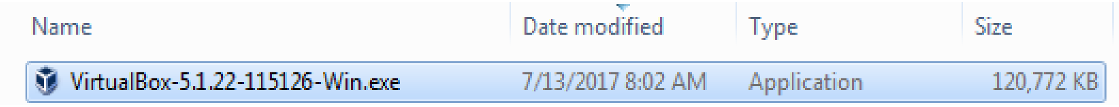
Step-by-Step Instructions:

1. To obtain a free legal copy of Oracle VM VirtualBox, download the installer from this website:

   https://www.virtualbox.org/wiki/Downloads

   The version downloaded may differ from the version shown in this documentation (5.1.22). You also need to download the Extension Pack which is a separate download. Make sure the Extension Pack you download is the same version as your VirtualBox installer.

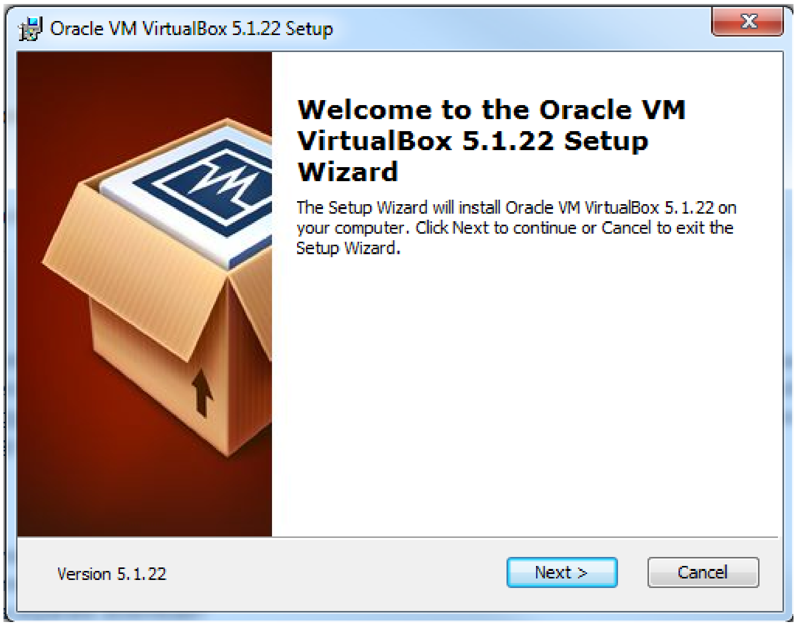
2. Launch the VirtualBox installer from Windows Explorer by double-clicking the self-extracting executable. Allow the installer to make changes to your computer, if so prompted.



Name	Date modified	Type	Size
VirtualBox-5.1.22-115126-Win.exe	7/13/2017 8:02 AM	Application	120,772 KB

VirtualBox Installer for Windows

3. Once the VirtualBox installation wizard appears, click the **Next** button.



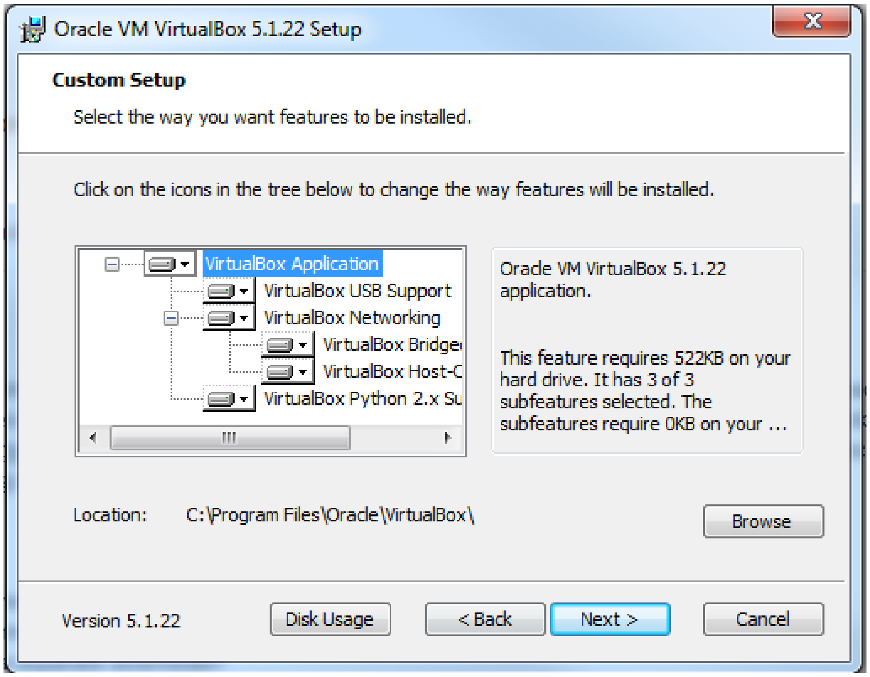
Oracle VM VirtualBox 5.1.22 Setup

Welcome to the Oracle VM VirtualBox 5.1.22 Setup Wizard

The Setup Wizard will install Oracle VM VirtualBox 5.1.22 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

Version 5.1.22

4. You may accept all the installation defaults, although you may wish to change the installation location on your development platform using the **Browse** button. If the options are acceptable, click the **Next** button.



Oracle VM VirtualBox 5.1.22 Setup

Custom Setup

Select the way you want features to be installed.

Click on the icons in the tree below to change the way features will be installed.

- VirtualBox Application
  - VirtualBox USB Support
  - VirtualBox Networking
    - VirtualBox Bridge
    - VirtualBox Host-C
  - VirtualBox Python 2.x Su

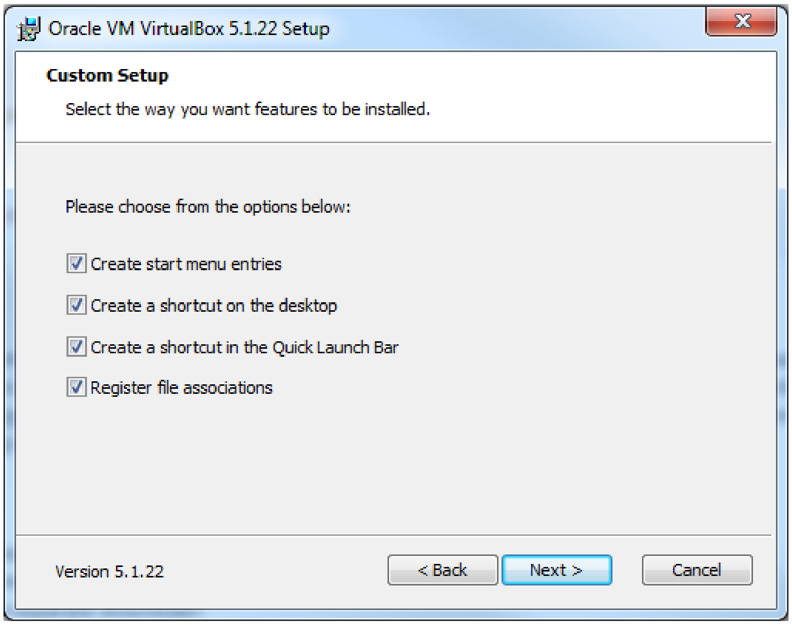
Oracle VM VirtualBox 5.1.22 application.

This feature requires 522KB on your hard drive. It has 3 of 3 subfeatures selected. The subfeatures require 0KB on your ...

Location: C:\Program Files\Oracle\VirtualBox\

Version 5.1.22

5. You may again accept the default options and click the **Next** button.



Oracle VM VirtualBox 5.1.22 Setup

Custom Setup

Select the way you want features to be installed.

Please choose from the options below:

☑ Create start menu entries

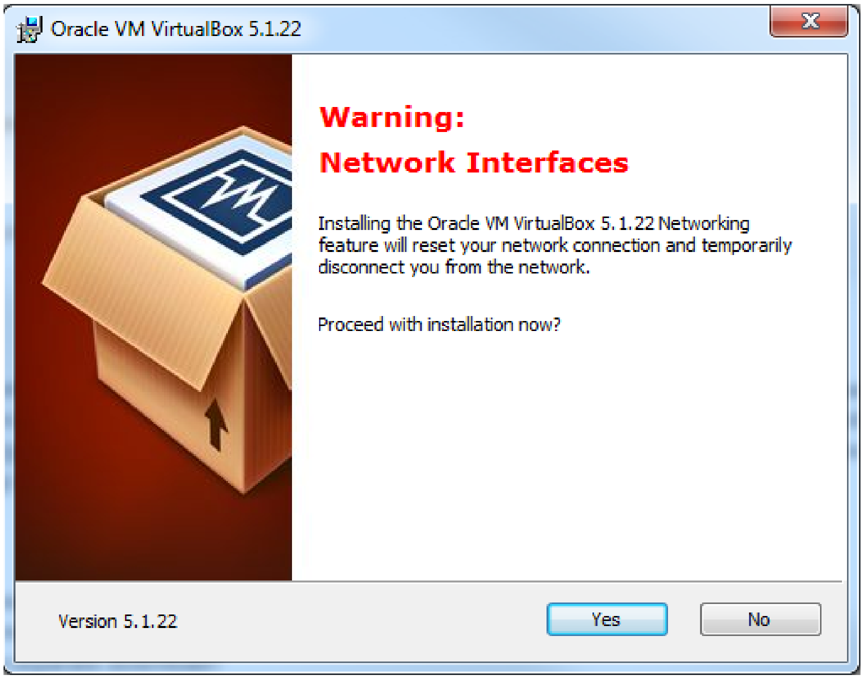
☑ Create a shortcut on the desktop

☑ Create a shortcut in the Quick Launch Bar

☑ Register file associations

Version 5.1.22

6. Click the **Yes** button to continue with the installation wizard.



Oracle VM VirtualBox 5.1.22

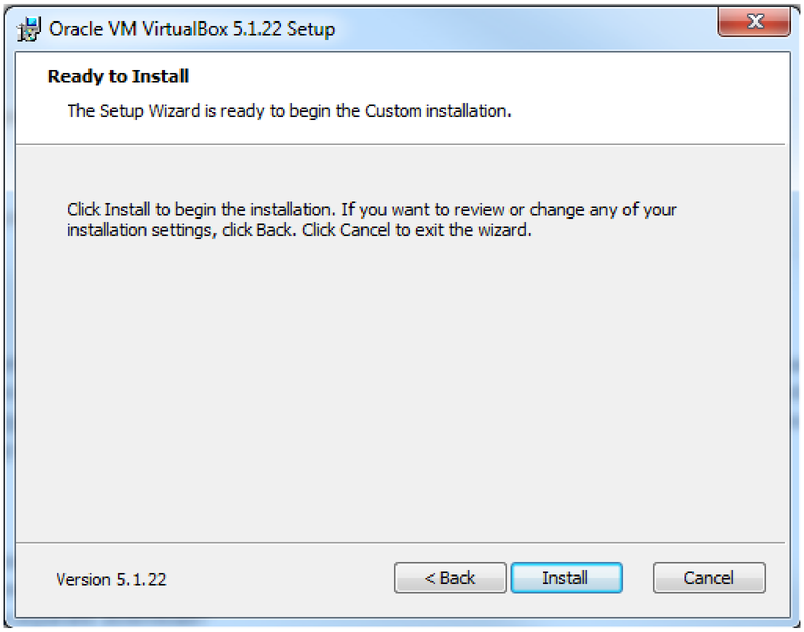
Warning:
Network Interfaces

Installing the Oracle VM VirtualBox 5.1.22 Networking feature will reset your network connection and temporarily disconnect you from the network.

Proceed with installation now?

Version 5.1.22

7. Click the **Install** button to load VirtualBox to your development system.



Oracle VM VirtualBox 5.1.22 Setup

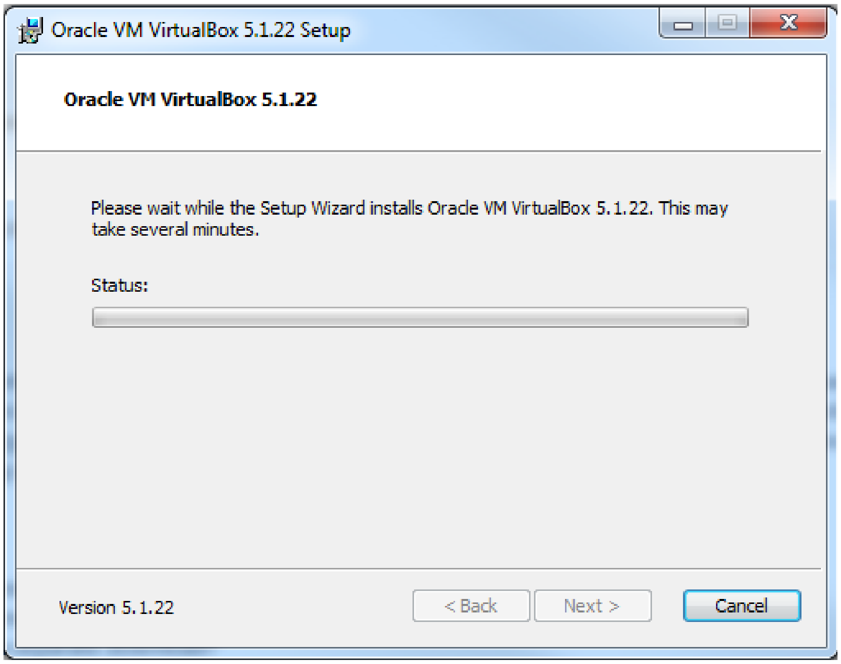
Ready to Install

The Setup Wizard is ready to begin the Custom installation.

Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

Version 5.1.22

8. During the installation you may receive prompts to authorize installation of various components. If prompted, allow the installer to make changes to your system, including installation of the USB interface and Network adapters.



Oracle VM VirtualBox 5.1.22 Setup

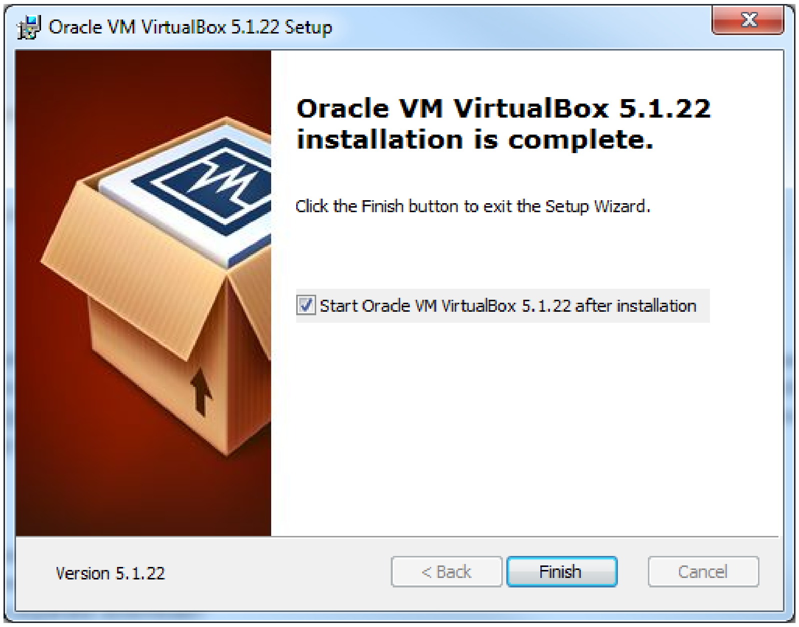
Oracle VM VirtualBox 5.1.22

Please wait while the Setup Wizard installs Oracle VM VirtualBox 5.1.22. This may take several minutes.

Status:

Version 5.1.22

9. Click the **Finish** button to complete the installation. Leave the checkbox enabled so VirtualBox will start after the installer finishes.



Oracle VM VirtualBox 5.1.22 Setup

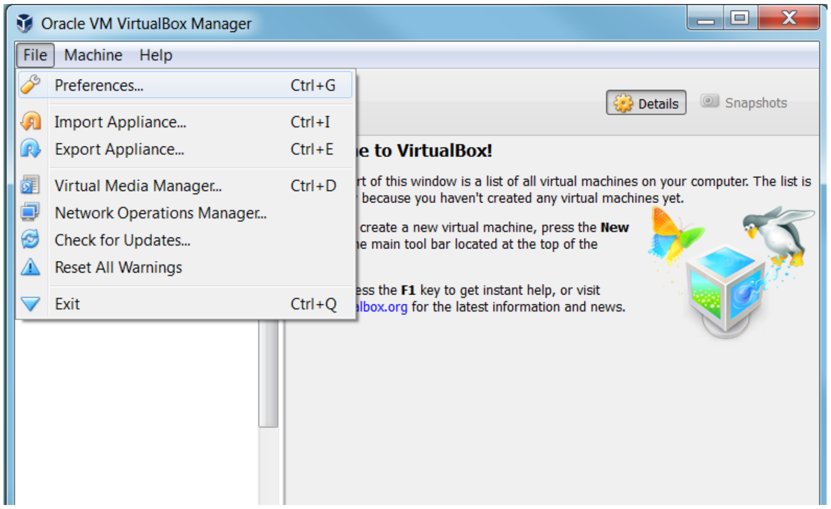
Oracle VM VirtualBox 5.1.22 installation is complete.

Click the Finish button to exit the Setup Wizard.

☑ Start Oracle VM VirtualBox 5.1.22 after installation

Version 5.1.22

10. Once VirtualBox starts (you can also start it from the Desktop shortcut, or the Windows Start button), the Extension Pack must be added. From the main menu, select **File > Preferences**.



Oracle VM VirtualBox Manager

File
Machine
Help
Preferences... Ctrl+G
Import Appliance... Ctrl+I
Export Appliance... Ctrl+E
Virtual Media Manager... Ctrl+D
Network Operations Manager...
Check for Updates...
Reset All Warnings
Exit Ctrl+Q
Details
Snapshots

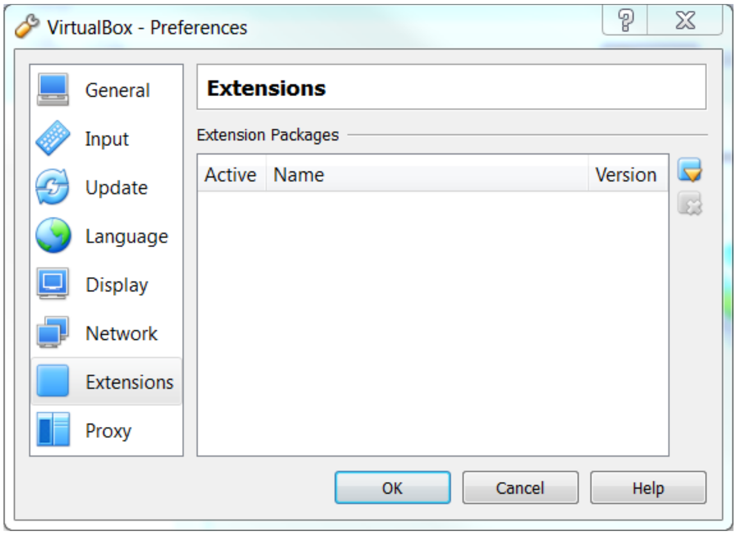
e to VirtualBox!

rt of this window is a list of all virtual machines on your computer. The list is because you haven't created any virtual machines yet.

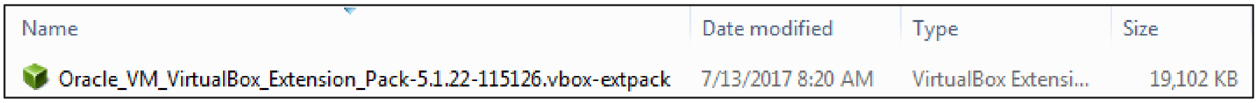
create a new virtual machine, press the **New** e main tool bar located at the top of the

ess the **F1** key to get instant help, or visit lbox.org for the latest information and news.

11. Select **Extensions**. Right-click in the *Extension Packages* whitespace box, and select **Add Package**.

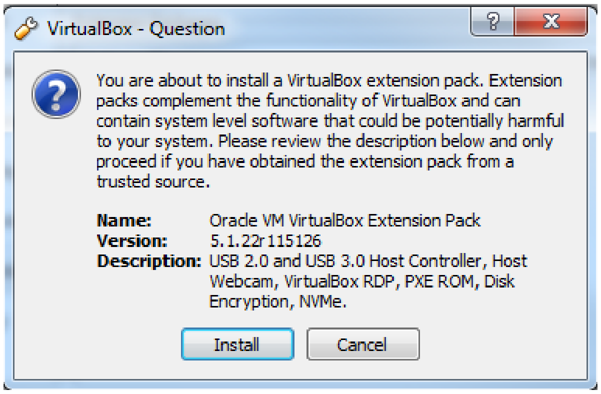


12. Browse to the location where you downloaded the VirtualBox Extension Pack compatible with your VirtualBox version. Select the Extension Pack and click the **Open** button.



Name	Date modified	Type	Size
Oracle_VM_VirtualBox_Extension_Pack-5.1.22-115126.vbox-extpack	7/13/2017 8:20 AM	VirtualBox Extensi...	19,102 KB

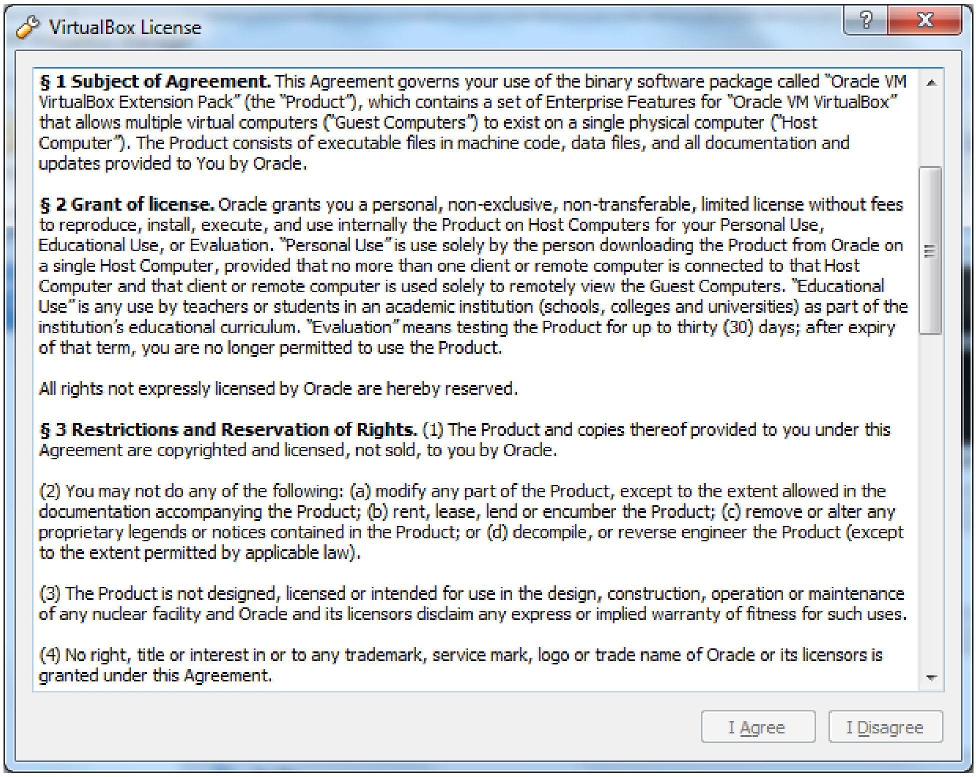
13. Click the **Install** button to add the VirtualBox Extension Pack.



You are about to install a VirtualBox extension pack. Extension packs complement the functionality of VirtualBox and can contain system level software that could be potentially harmful to your system. Please review the description below and only proceed if you have obtained the extension pack from a trusted source.

Name: Oracle VM VirtualBox Extension Pack
Version: 5.1.22r115126
Description: USB 2.0 and USB 3.0 Host Controller, Host Webcam, VirtualBox RDP, PXE ROM, Disk Encryption, NVMe.

14. Read the VirtualBox Extension Pack PUEL License to ensure you will not be in violation of the Oracle definition of Personal Use. See the *VirtualBox Licensing Frequently Asked Questions* for additional details. If you can accept the license conditions, scroll to the bottom of the agreement text box and click the **I Agree** button[1]. If prompted, allow the installer to make changes to your development system.



§ 1 Subject of Agreement. This Agreement governs your use of the binary software package called "Oracle VM VirtualBox Extension Pack" (the "Product"), which contains a set of Enterprise Features for "Oracle VM VirtualBox" that allows multiple virtual computers ("Guest Computers") to exist on a single physical computer ("Host Computer"). The Product consists of executable files in machine code, data files, and all documentation and updates provided to You by Oracle.

§ 2 Grant of license. Oracle grants you a personal, non-exclusive, non-transferable, limited license without fees to reproduce, install, execute, and use internally the Product on Host Computers for your Personal Use, Educational Use, or Evaluation. "Personal Use" is use solely by the person downloading the Product from Oracle on a single Host Computer, provided that no more than one client or remote computer is connected to that Host Computer and that client or remote computer is used solely to remotely view the Guest Computers. "Educational Use" is any use by teachers or students in an academic institution (schools, colleges and universities) as part of the institution's educational curriculum. "Evaluation" means testing the Product for up to thirty (30) days; after expiry of that term, you are no longer permitted to use the Product.

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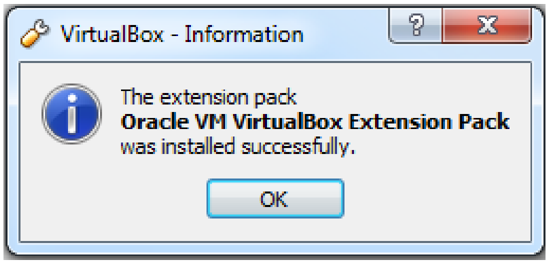
§ 3 Restrictions and Reservation of Rights. (1) The Product and copies thereof provided to you under this Agreement are copyrighted and licensed, not sold, to you by Oracle.

(2) You may not do any of the following: (a) modify any part of the Product, except to the extent allowed in the documentation accompanying the Product; (b) rent, lease, lend or encumber the Product; (c) remove or alter any proprietary legends or notices contained in the Product; or (d) decompile, or reverse engineer the Product (except to the extent permitted by applicable law).

(3) The Product is not designed, licensed or intended for use in the design, construction, operation or maintenance of any nuclear facility and Oracle and its licensors disclaim any express or implied warranty of fitness for such uses.

(4) No right, title or interest in or to any trademark, service mark, logo or trade name of Oracle or its licensors is granted under this Agreement.

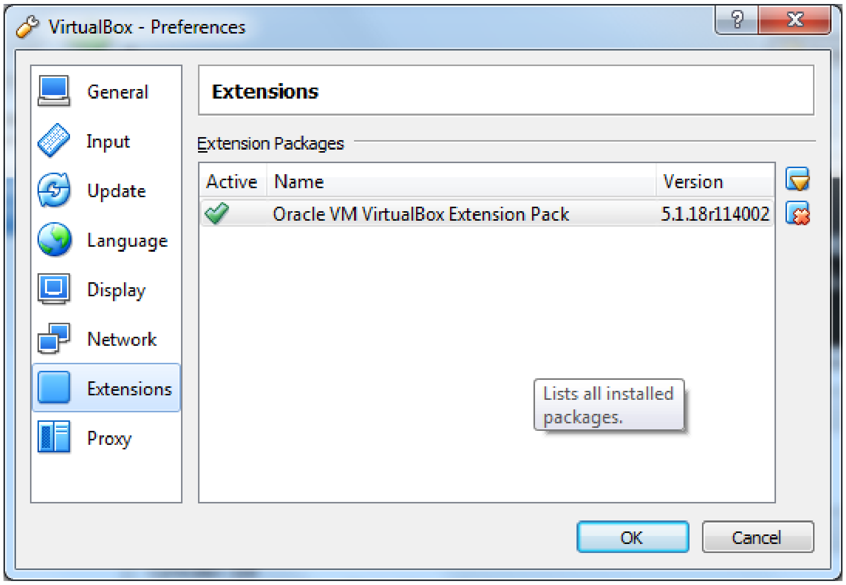
15. Click the **OK** button to complete the installation.



The extension pack
Oracle VM VirtualBox Extension Pack
was installed successfully.

[1] If you must disagree, the installation will be terminated. You should either purchase a commercial license or uninstall VirtualBox from your host computer.

16. Click the **OK** button to return to VirtualBox.

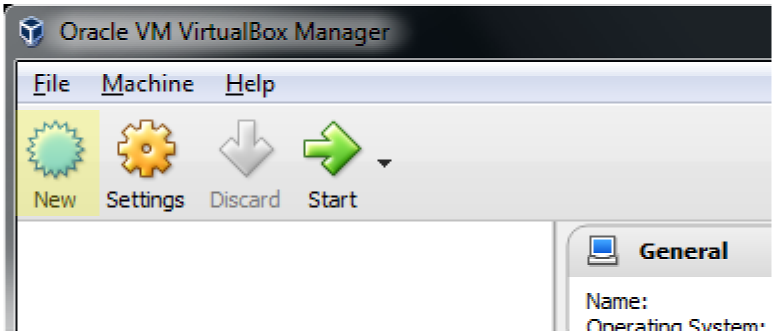


Active	Name	Version
✓	Oracle VM VirtualBox Extension Pack	5.1.18r114002

This completes the installation of VirtualBox on your host development system. VirtualBox is now ready to accept a new Virtual Machine.

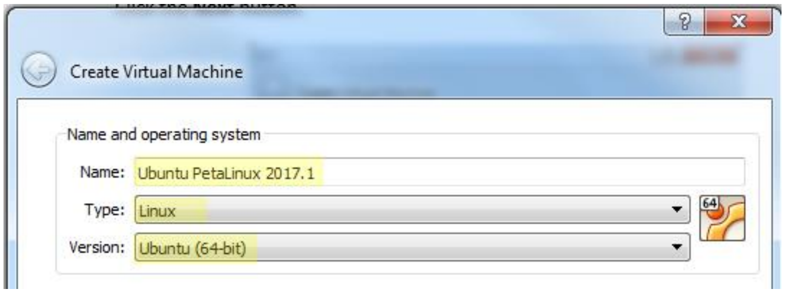
Create a New Virtual Machine

1. Launch Oracle VM VirtualBox Manager and click the **New** icon at the upper left.



2. Select a descriptive name for the VM. Set the *Type* to **Linux** and the *Version* to one that corresponds to the OS you wish to install.

   a. For Ubuntu, choose **Ubuntu (64-bit).**

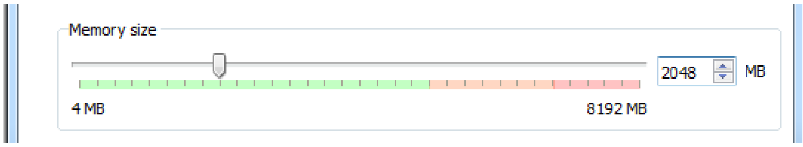


Name: Ubuntu PetaLinux 2017.1

Type: Linux

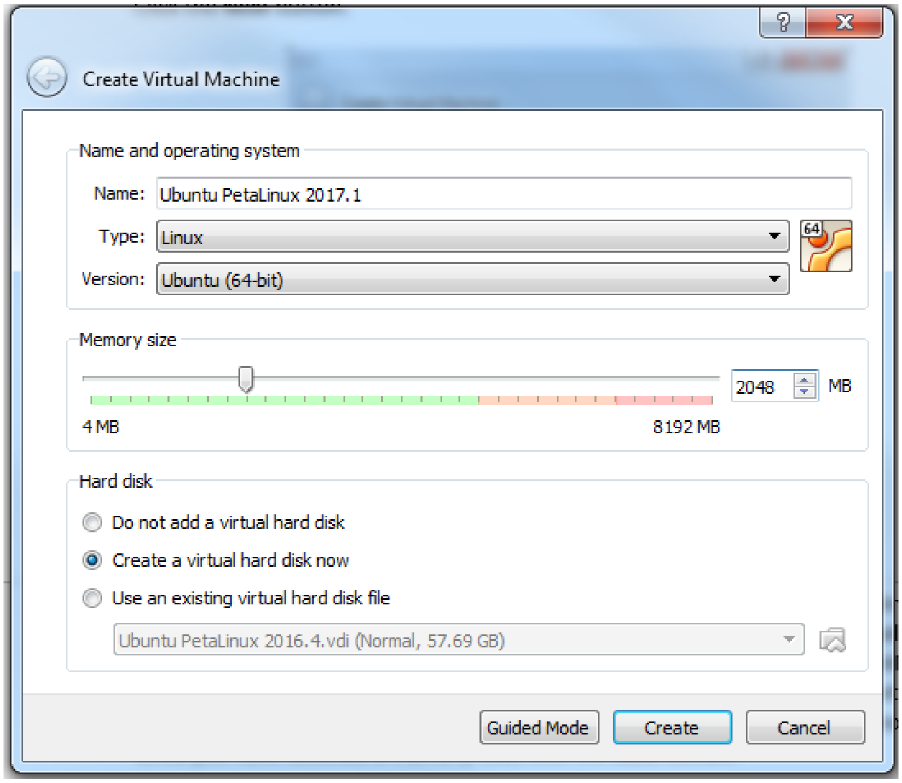
Version: Ubuntu (64-bit)

3. Select the amount of memory to be allocated to the Virtual Machine. Allocating more memory[2] will improve the VM performance, but you must leave sufficient memory available for your host system for all other concurrent processes. For a host system with 16 GB of RAM, a value of **2048** MB is recommended for the Virtual Machine. You may wish to experiment with this value to optimize your performance as larger density target devices have higher memory requirements. The memory can also be changed at any time even after installing the VM hosted OS.



Memory size: 2048 MB

4. Click the **Create**[3] button to accept the default file type for a VirtualBox Disk Image and allocate a virtual hard drive now.



Create Virtual Machine

Name and operating system

Name: Ubuntu PetaLinux 2017.1

Type: Linux

Version: Ubuntu (64-bit)

Memory size: 2048 MB

Hard disk

○ Do not add a virtual hard disk

● Create a virtual hard disk now

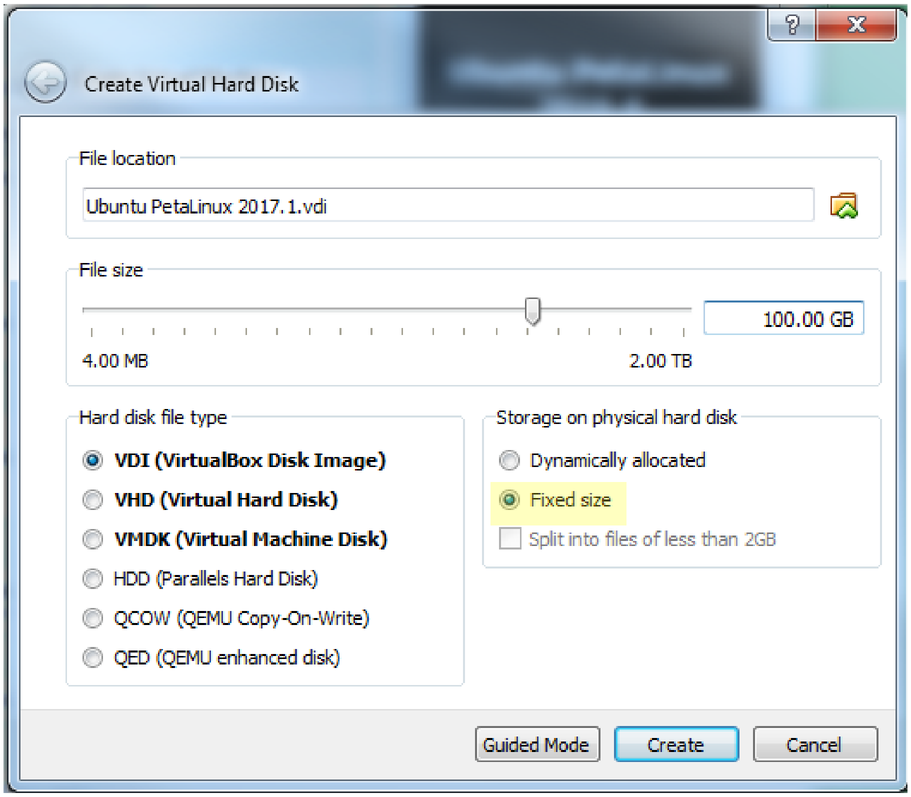
○ Use an existing virtual hard disk file

Ubuntu PetaLinux 2016.4.vdi (Normal, 57.69 GB)

[2] You may need more memory if you intend to run Vivado with large Xilinx devices.

[3] If you are importing an existing Virtual Machine, click the "**Use an existing**…" button.

5. Select **Fixed Size** for the physical storage on your host hard drive. This will improve overall performance of the Virtual Machine.



Create Virtual Hard Disk

File location

Ubuntu PetaLinux 2017.1.vdi

File size

100.00 GB

4.00 MB 2.00 TB

Hard disk file type

● **VDI (VirtualBox Disk Image)**

○ **VHD (Virtual Hard Disk)**

○ **VMDK (Virtual Machine Disk)**

○ HDD (Parallels Hard Disk)

○ QCOW (QEMU Copy-On-Write)

○ QED (QEMU enhanced disk)

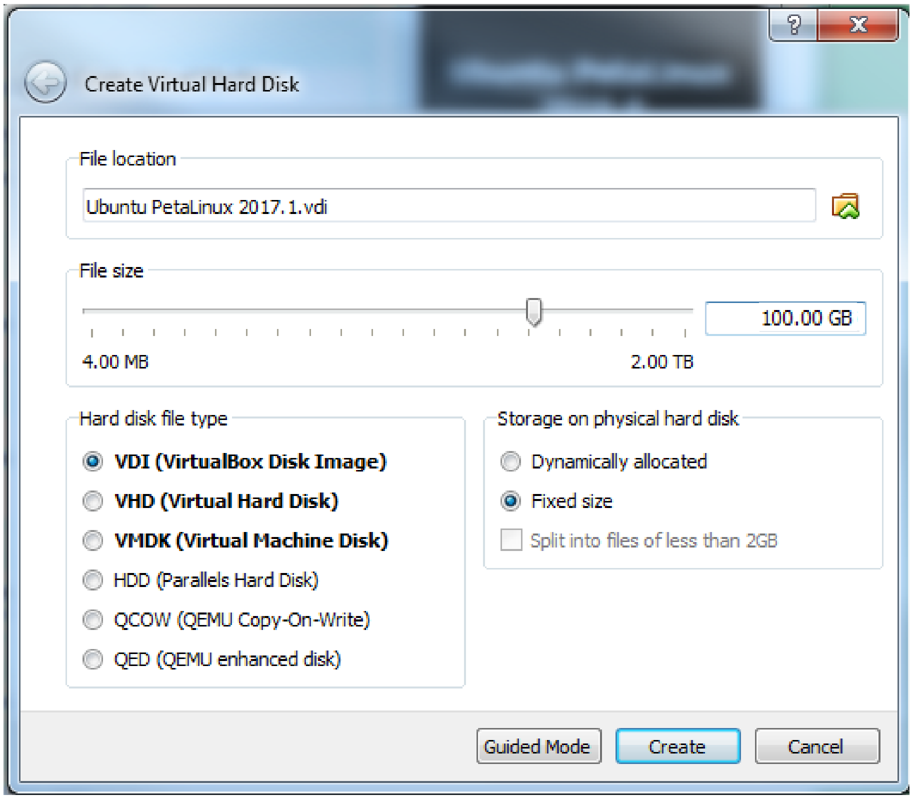
Storage on physical hard disk

○ Dynamically allocated

● Fixed size

□ Split into files of less than 2GB

6. Select the name and location for the Virtual Machine within your host file system. The recommended size is **100.00** GB to accommodate the Xilinx tools. If this space is unavailable, 70.0 GB is sufficient if you plan to install the SDK and only a few of the Vivado tools. Click the **Create** button.



Create Virtual Hard Disk

File location

Ubuntu PetaLinux 2017.1.vdi

File size

100.00 GB

4.00 MB 2.00 TB

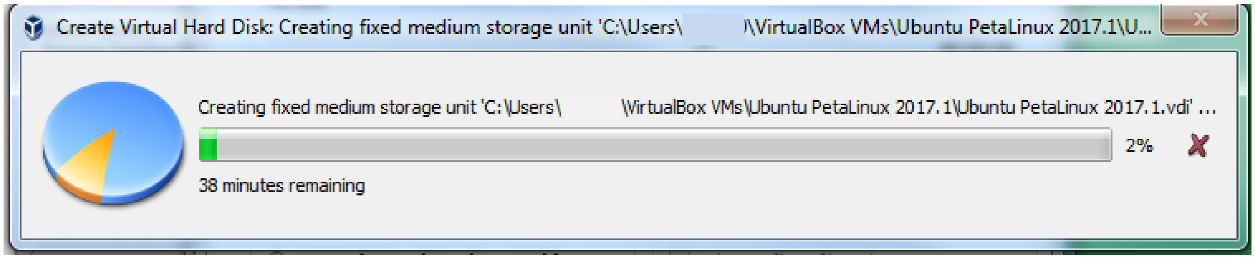
Hard disk file type

- ● **VDI (VirtualBox Disk Image)**
- ○ **VHD (Virtual Hard Disk)**
- ○ **VMDK (Virtual Machine Disk)**
- ○ HDD (Parallels Hard Disk)
- ○ QCOW (QEMU Copy-On-Write)
- ○ QED (QEMU enhanced disk)

Storage on physical hard disk

- ○ Dynamically allocated
- ● Fixed size
- □ Split into files of less than 2GB

The Virtual Hard Disk may take a few minutes to create and initialize on your host file system.



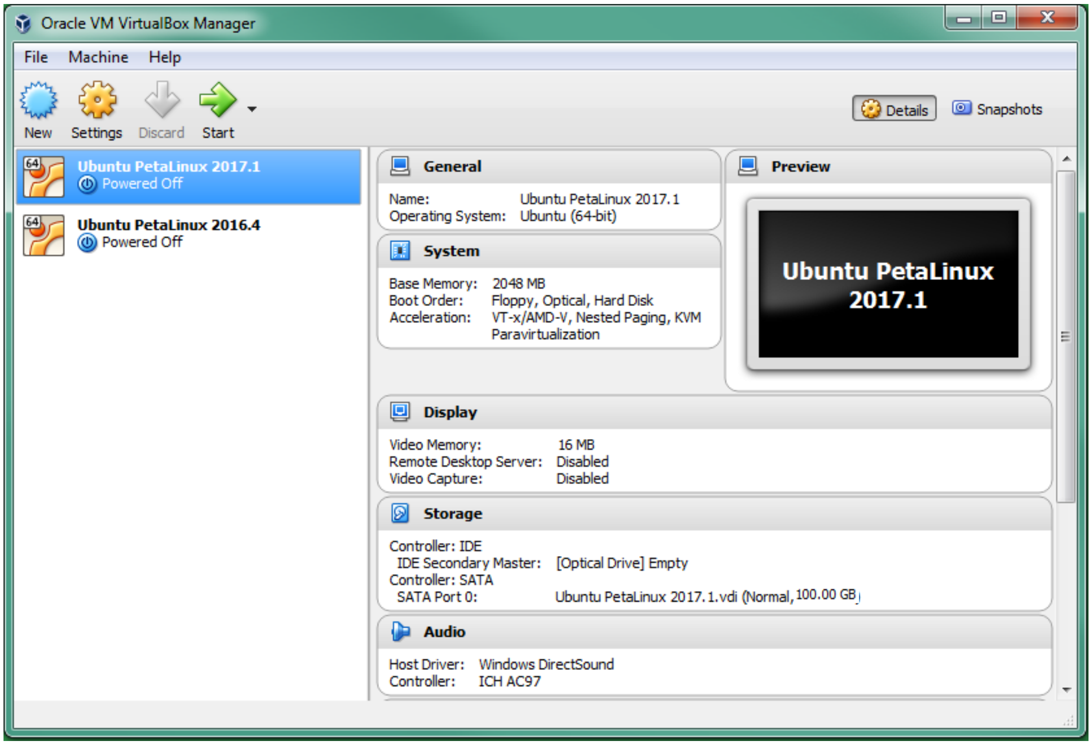
Create Virtual Hard Disk: Creating fixed medium storage unit 'C:\Users\ \VirtualBox VMs\Ubuntu PetaLinux 2017.1\U...

Creating fixed medium storage unit 'C:\Users\ \VirtualBox VMs\Ubuntu PetaLinux 2017.1\Ubuntu PetaLinux 2017.1.vdi' ...

2%

38 minutes remaining

7. Once the Virtual Disk completes, your VM is ready to accept an operating system.



Ubuntu PetaLinux 2017.1
Powered Off

Ubuntu PetaLinux 2016.4
Powered Off

General

Name: Ubuntu PetaLinux 2017.1
Operating System: Ubuntu (64-bit)

System

Base Memory: 2048 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Display

Video Memory: 16 MB
Remote Desktop Server: Disabled
Video Capture: Disabled

Storage

Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: Ubuntu PetaLinux 2017.1.vdi (Normal, 100.00 GB)

Audio

Host Driver: Windows DirectSound
Controller: ICH AC97

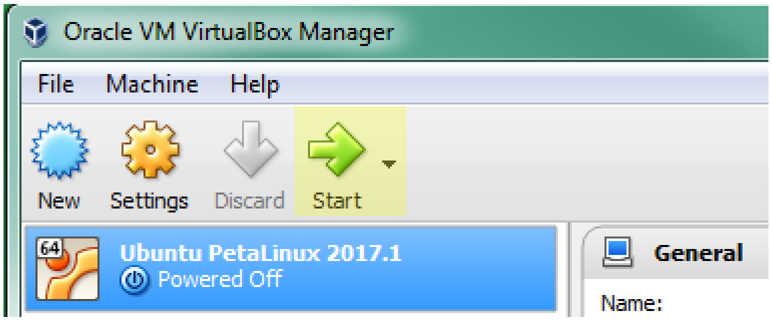
Install the Ubuntu 16.04 Operating System

To perform the steps in this section, you will need to download a bootable OS image in .iso format to your host system. While Ubuntu 17.04 is the latest, Ubuntu 16.04.2 is the recommended version (ubuntu-16.04.2-desktop-amd64.iso). The Ubuntu images can be downloaded from:

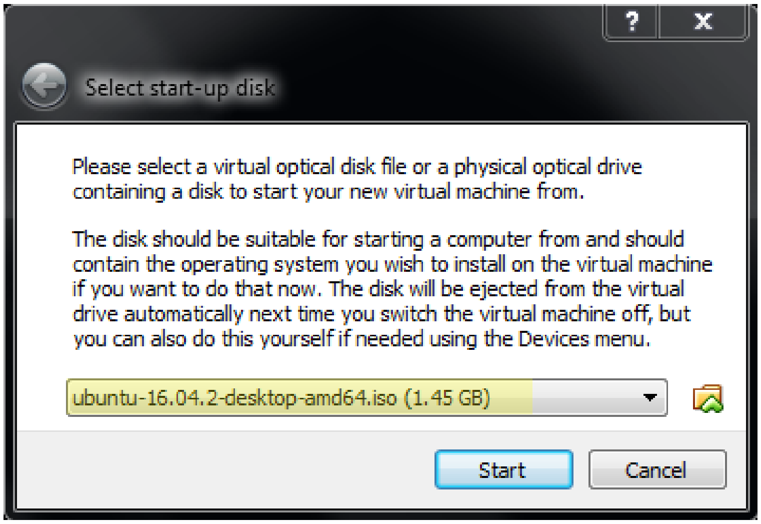
http://www.ubuntu.com/download/desktop

Repeat the steps outlined in **Create a New Virtual Machine**, entering Ubuntu as the **Name** of the VM. Once the Virtual Disk completes, your VM is ready to accept an operating system.

1. Launch VirtualBox (if necessary) and select the VM you wish to start in the left-hand panel. Click the **Start** button to execute the VM.



2. Select the **Browse** icon to locate the .iso image for the OS you wish to install on your Virtual Machine. Click the **Start** button to begin.



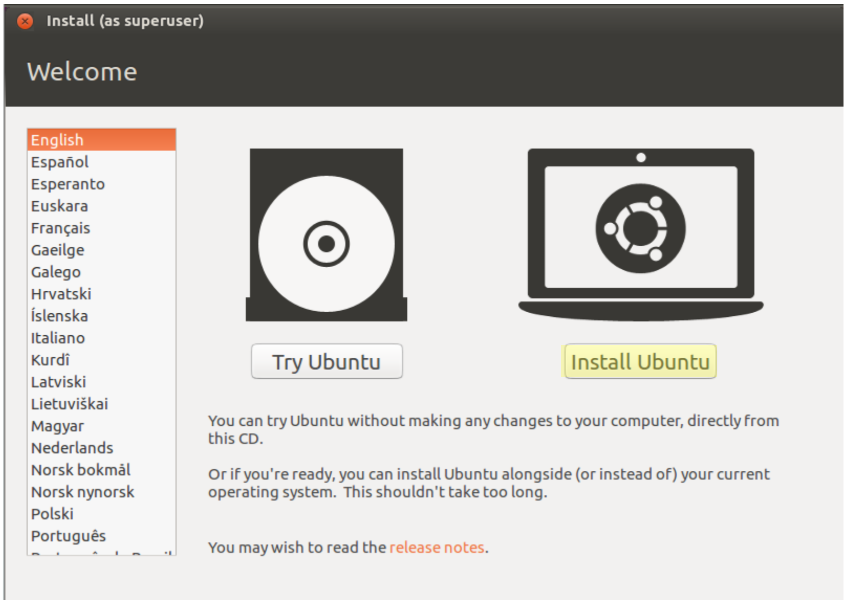
Select start-up disk

Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from.

The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu.

ubuntu-16.04.2-desktop-amd64.iso (1.45 GB)

3. When the Install Welcome screen appears, select English and click the **Install Ubuntu** button.



Install (as superuser)

Welcome

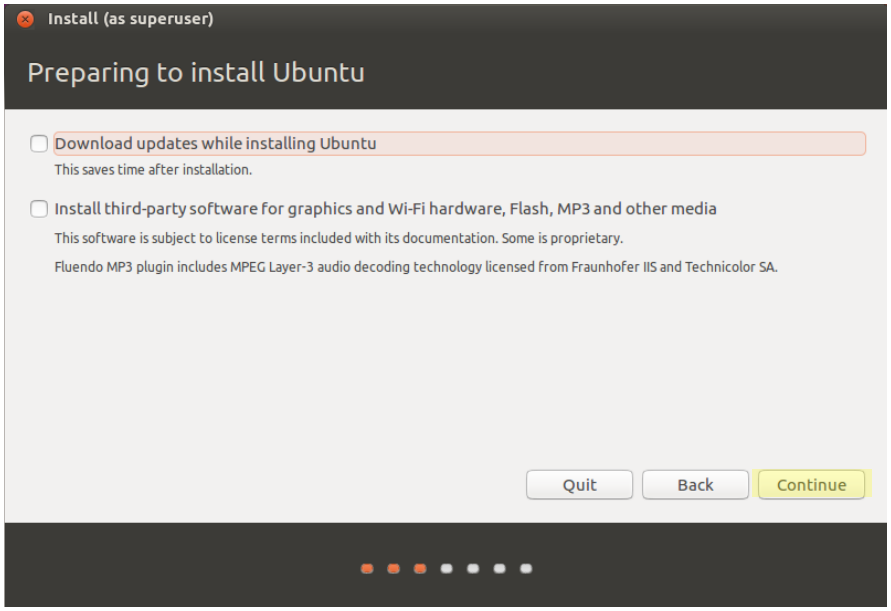
English
Español
Esperanto
Euskara
Français
Gaeilge
Galego
Hrvatski
Íslenska
Italiano
Kurdî
Latviski
Lietuviškai
Magyar
Nederlands
Norsk bokmål
Norsk nynorsk
Polski
Português

You can try Ubuntu without making any changes to your computer, directly from this CD.

Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

You may wish to read the release notes.

4. The installer shows requirements for installation. The two options can be left unchecked. Click the **Continue** button.



Install (as superuser)

Preparing to install Ubuntu

☐ Download updates while installing Ubuntu

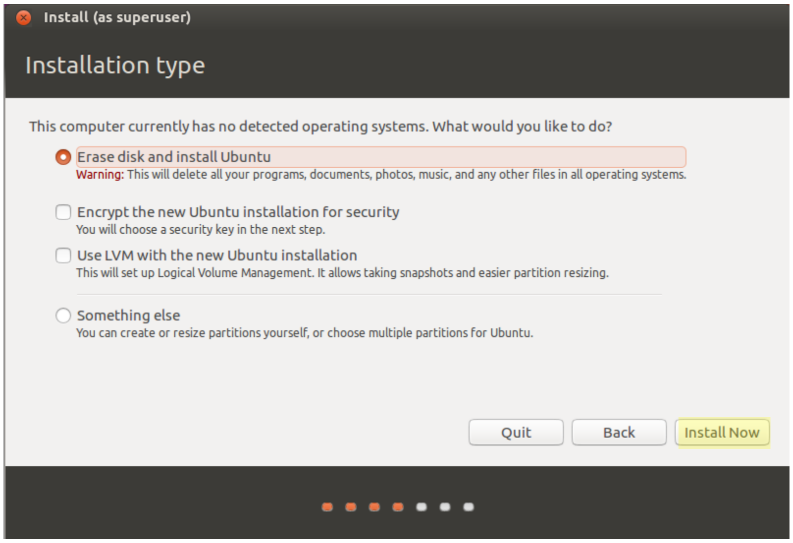
This saves time after installation.

☐ Install third-party software for graphics and Wi-Fi hardware, Flash, MP3 and other media

This software is subject to license terms included with its documentation. Some is proprietary.

Fluendo MP3 plugin includes MPEG Layer-3 audio decoding technology licensed from Fraunhofer IIS and Technicolor SA.

5. The installer displays various installation types. The default displays as **Erase disk and install Ubuntu**. Click the **Install Now** button.



Install (as superuser)

Installation type

This computer currently has no detected operating systems. What would you like to do?

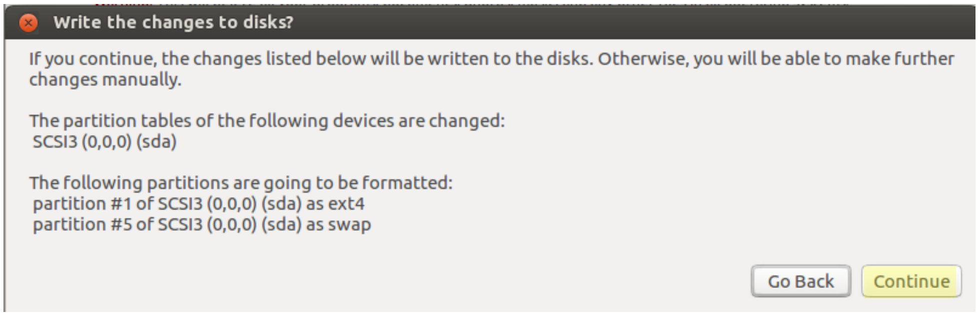
● Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.

□ Encrypt the new Ubuntu installation for security
You will choose a security key in the next step.

□ Use LVM with the new Ubuntu installation
This will set up Logical Volume Management. It allows taking snapshots and easier partition resizing.

○ Something else
You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.

As this is a new installation, we want all changes written to the disks. Click the **Continue** button.



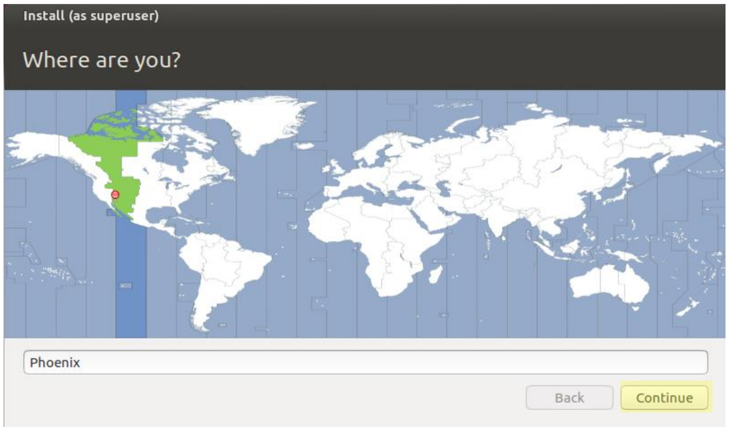
Write the changes to disks?

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed:
SCSI3 (0,0,0) (sda)

The following partitions are going to be formatted:
partition #1 of SCSI3 (0,0,0) (sda) as ext4
partition #5 of SCSI3 (0,0,0) (sda) as swap

6. Select your time zone and click the **Continue** button.

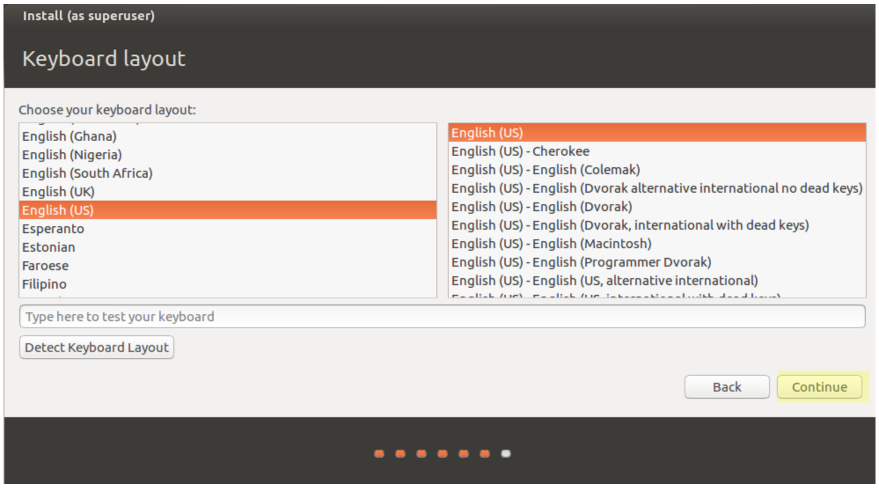


Install (as superuser)

Where are you?

Phoenix

7. Select your preferred keyboard layout option. The default displays as English (US). Click the **Continue** button.


Install (as superuser)

Keyboard layout

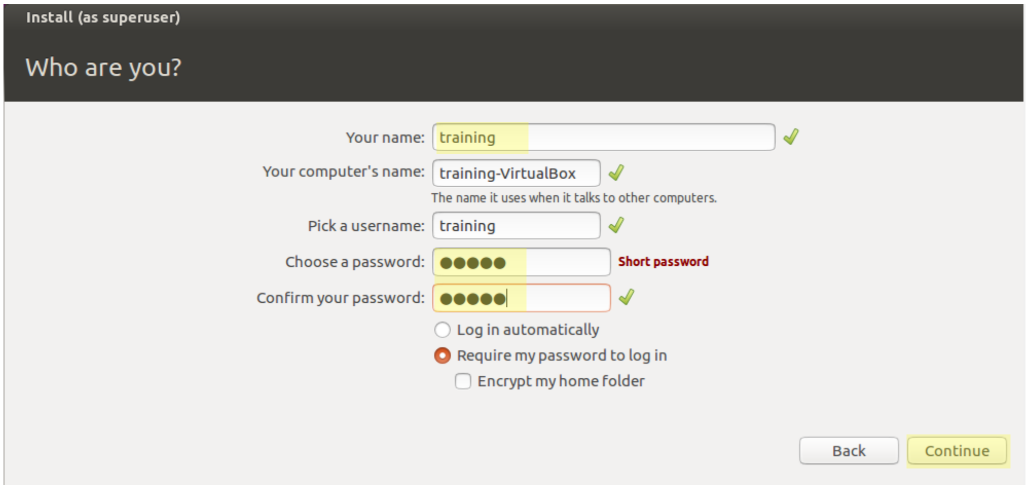
Choose your keyboard layout:

English (Ghana)
English (Nigeria)
English (South Africa)
English (UK)
English (US)
Esperanto
Estonian
Faroese
Filipino

English (US)
English (US) - Cherokee
English (US) - English (Colemak)
English (US) - English (Dvorak alternative international no dead keys)
English (US) - English (Dvorak)
English (US) - English (Dvorak, international with dead keys)
English (US) - English (Macintosh)
English (US) - English (Programmer Dvorak)
English (US) - English (US, alternative international)

Type here to test your keyboard

8. Enter the primary user name for the Virtual Machine. In this case, create a default user name *training*. The system will auto-populate the computer name and username. Enter and confirm a password. Click the **Continue** button.


Install (as superuser)

Who are you?

Your name: training ✓

Your computer's name: training-VirtualBox ✓

The name it uses when it talks to other computers.

Pick a username: training ✓

Choose a password: ●●●●● Short password

Confirm your password: ●●●●● ✓

○ Log in automatically

● Require my password to log in

□ Encrypt my home folder

9. The installation displays a Welcome graphic and proceeds with installation. When the installation is complete, a screen appears asking you to restart. Click the **Restart Now** button.

   If the Restart appears to “freeze”, you can force a reboot manually:

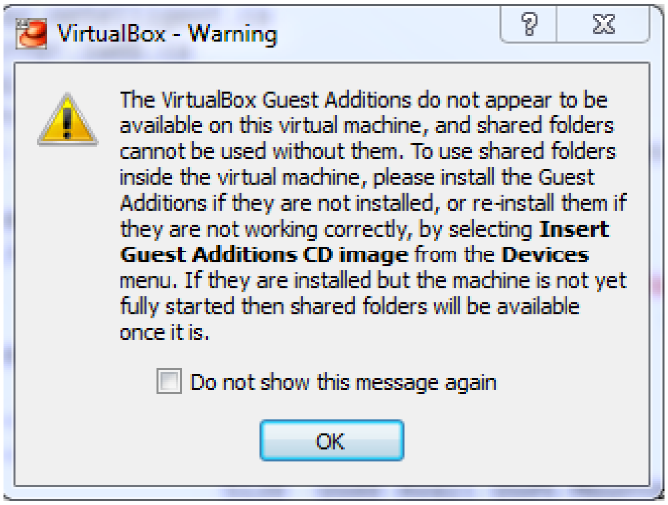
   a. From the main VirtualBox menu, select **File | Close**.
   b. In the *Close Virtual Machine* dialog, select **Power off the machine** and click the **OK** button.
   c. In the Oracle VM VirtualBox Manager, select your Virtual Machine and click the **Start** button.

VirtualBox Installation

Installing VirtualBox on a supported Linux system should be straightforward, but depending on the precise configuration of your development system, there could be some challenges to create an optimal environment. This section outlines a few of the common issues that may be encountered.

VirtualBox Guest Additions Installation (File Sharing)

1. The use of shared folders allows for easy transfer of files between the host and guest systems. To use the shared file facility of VirtualBox, you must install the Guest Additions (VBoxGuestAdditions_5.1.22.iso). If you attempt to use the shared folder facility without the Additions, you will receive the following error message.



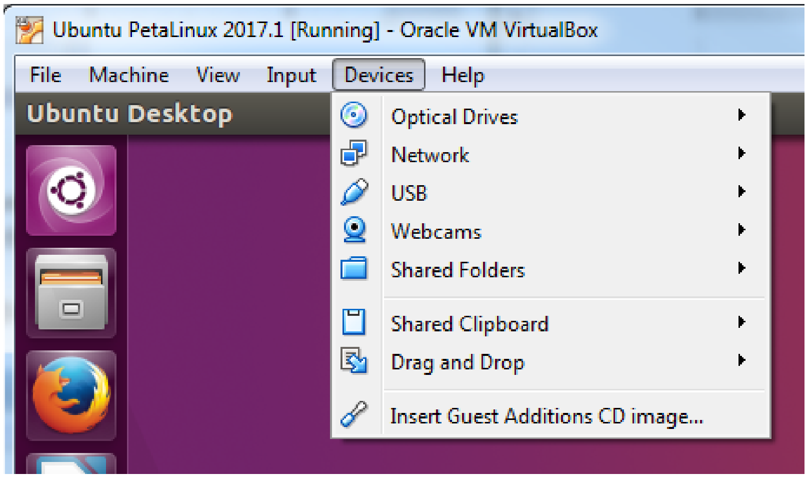
VirtualBox - Warning

The VirtualBox Guest Additions do not appear to be available on this virtual machine, and shared folders cannot be used without them. To use shared folders inside the virtual machine, please install the Guest Additions if they are not installed, or re-install them if they are not working correctly, by selecting **Insert Guest Additions CD image** from the **Devices** menu. If they are installed but the machine is not yet fully started then shared folders will be available once it is.

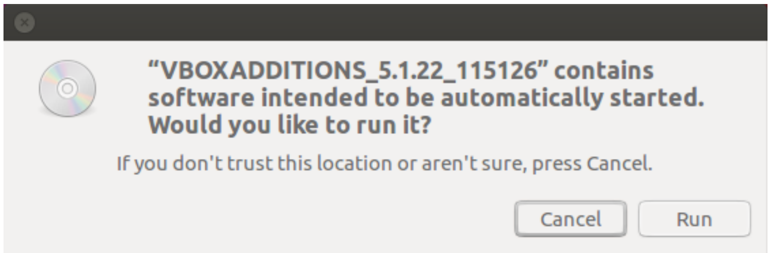
☐ Do not show this message again

After Guest Additions are installed, you can move the cursor between the Virtual Machine and the host OS without having to use the *Right Ctrl* key to recapture the cursor in the host.

a. From the **Devices** menu, select **Insert Guest Additions CD image…**



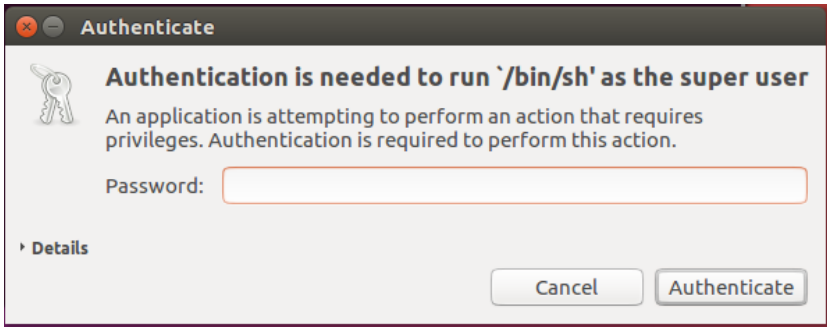
b. Click the **Run** button to execute the installation.



"VBOXADDITIONS_5.1.22_115126" contains software intended to be automatically started. Would you like to run it?

If you don't trust this location or aren't sure, press Cancel.

c. Enter the root password (the password that was created for the default user) and click the **Authenticate** button.

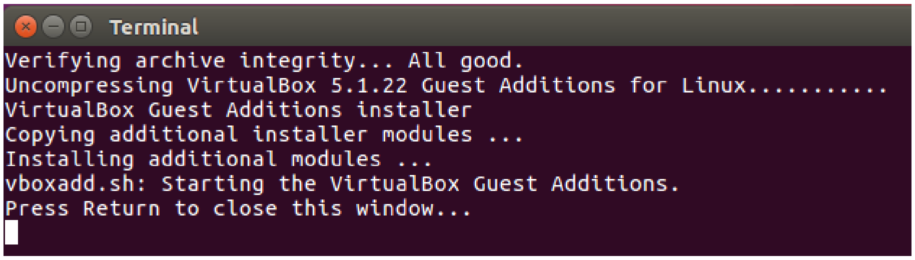


Authentication is needed to run `/bin/sh' as the super user

An application is attempting to perform an action that requires privileges. Authentication is required to perform this action.

Password:

d. The Guest Additions should install and verify with no failures. Press the **Enter** key to close the installation window. Be sure to restart Linux to ensure that the Guest Additions is started properly before moving on to a later section of this guide.

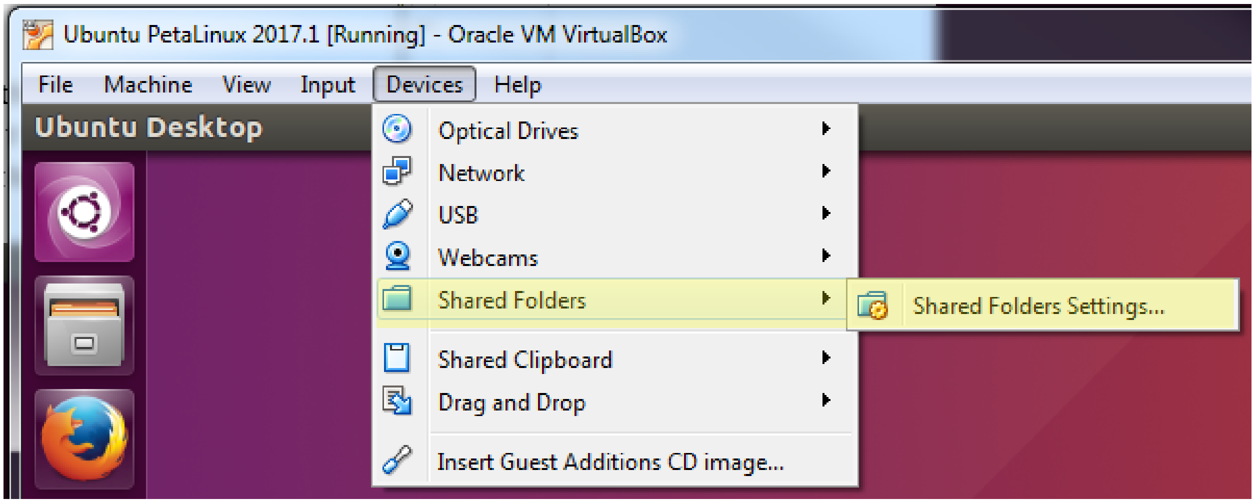


```
Verifying archive integrity... All good.
Uncompressing VirtualBox 5.1.22 Guest Additions for Linux...........
VirtualBox Guest Additions installer
Copying additional installer modules ...
Installing additional modules ...
vboxadd.sh: Starting the VirtualBox Guest Additions.
Press Return to close this window...
```

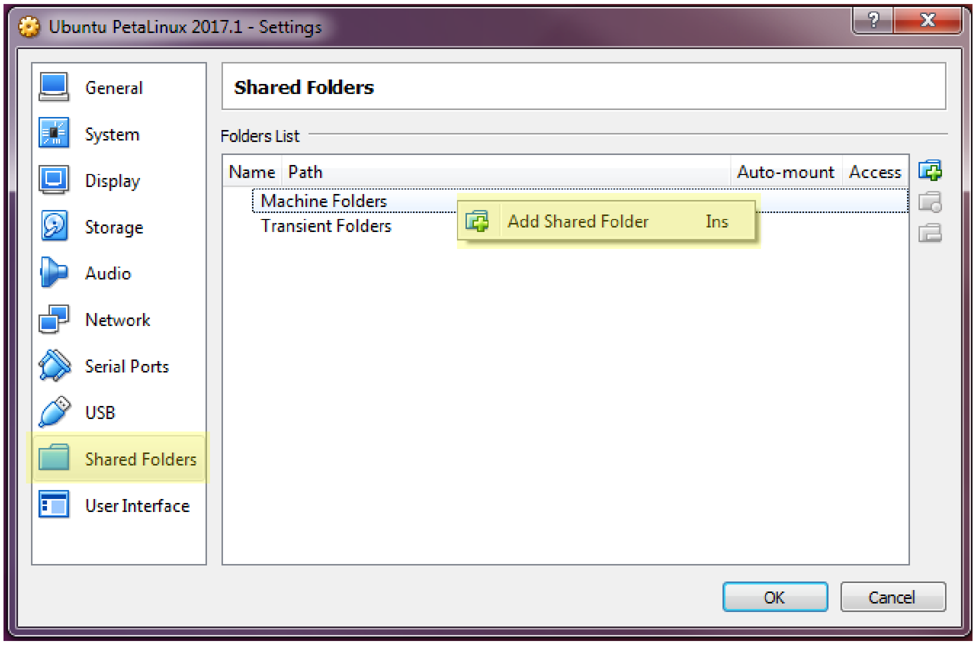
VirtualBox Shared Folders

Once Guest Additions have been installed, you must select a folder to share between the host and guest systems. This folder is used to transfer files to/from the Virtual Machine and the Host system.

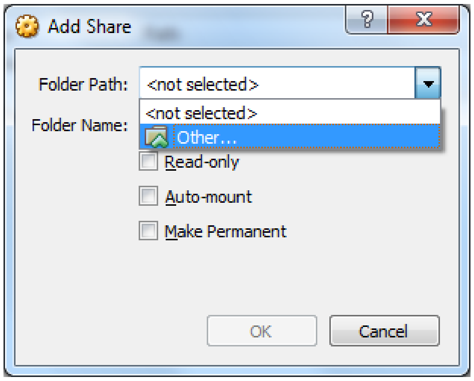
1. From the VirtualBox main menu, select **Devices** > **Shared Folder > Shared Folders Settings…**


Ubuntu PetaLinux 2017.1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Ubuntu Desktop
Optical Drives
Network
USB
Webcams
Shared Folders
Shared Folders Settings...
Shared Clipboard
Drag and Drop
Insert Guest Additions CD image...

2. Right-click *Machine Folders* and select **Add Shared Folder.**



3. In the *Folder Path* box, click the dropdown arrow on the right. Select the **Other** entry to open a Windows Explorer pane. Browse to the location in Windows where you want to set up a shared folder and click **Select Folder** in the Explorer pane. Click the checkboxes for **Auto-mount** and **Make Permanent**. Click the **OK** button.



Add Share

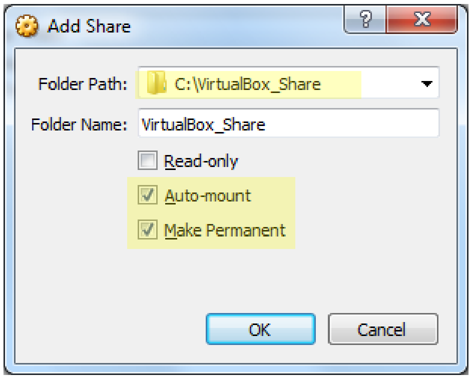
Folder Path: <not selected>
- <not selected>
- Other...

Folder Name:

□ Read-only

□ Auto-mount

□ Make Permanent



Add Share

Folder Path: C:\VirtualBox_Share

Folder Name: VirtualBox_Share

□ Read-only

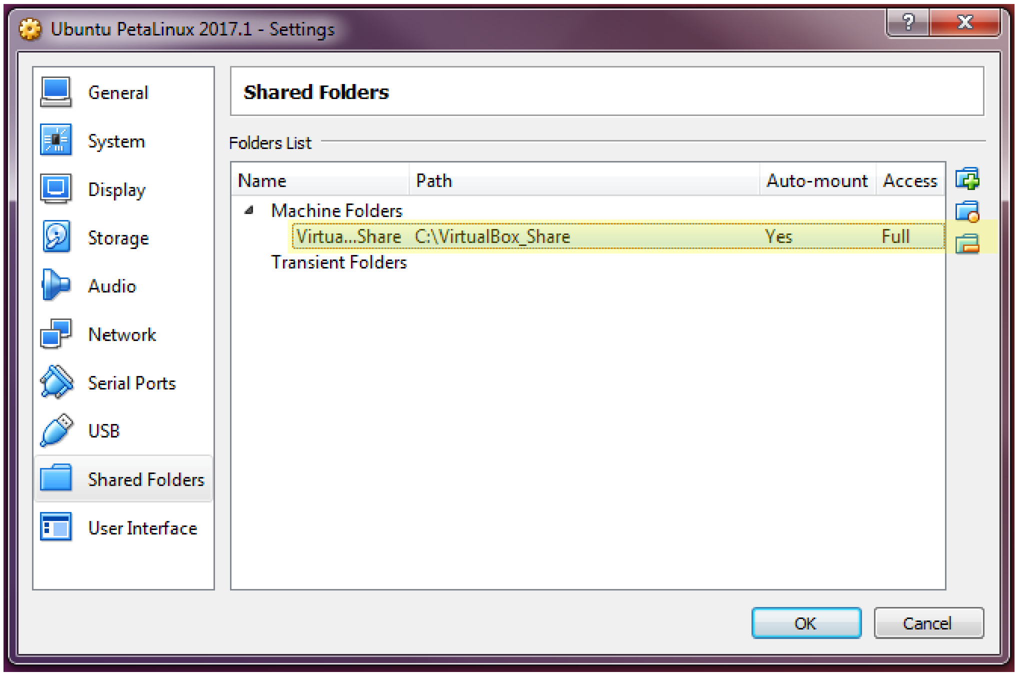
☑ Auto-mount

☑ Make Permanent

4. The location of the shared folder in Windows is shown in the Path column. The folder will Auto-mount and Full Access is allowed. The corresponding folder in the Linux VM is /media/sf_<Windows Folder Name>. In the example shown, this corresponds to:

/media/sf_VirtualBox_Share

Click the **OK** button to close the panel.



Ubuntu PetaLinux 2017.1 - Settings

Shared Folders

Folders List

Name	Path	Auto-mount	Access
Machine Folders			
Virtua...Share	C:\VirtualBox_Share	Yes	Full
Transient Folders			

5. Shared folders are only available to user accounts that are also members of the group *vboxsf*. This means the user account created earlier must be added to this group. This can only be done in Ubuntu 16.04 from the command line. To view available groups and members, open a Terminal window but selecting the Dash and then searching for Terminal. In a Terminal window enter one or more of the following commands.

   This command lists all groups:

```
$ getent group
```

   This command lists a specific group named vboxsf:

```
$ getent group vboxsf
```

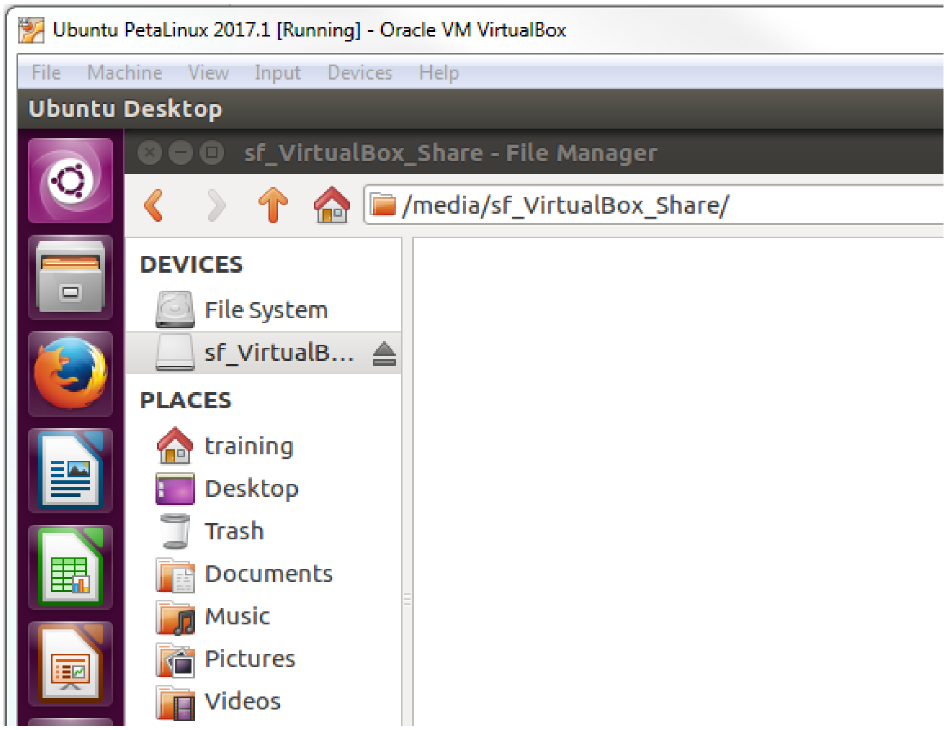
   To add an existing user to an existing group, in a Terminal enter the following command:

```
$ sudo usermod -a -G vboxsf <current username>
```

6. **Reboot the Virtual Machine**.

7. The selected user name will belong to the *vboxsf* group on the next login. To access the shared folder from the Virtual machine, browse to: **/media/sf_*<sharename>***

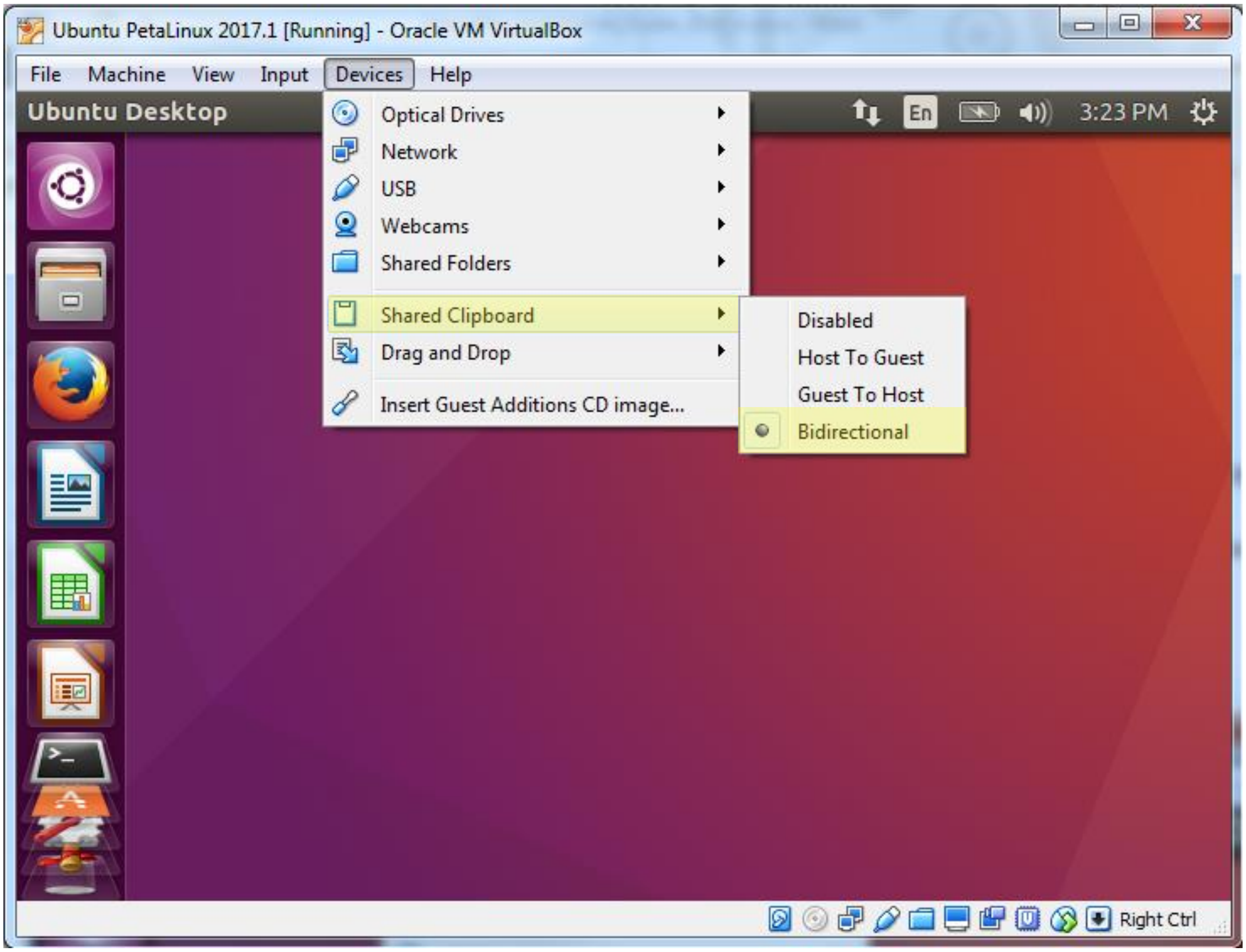
   In this example, the folder in Windows is named *VirtualBox_Share*, so the *<sharename>* in Linux is **sf_VirtualBox_Share,** automatically mounted in the **/media** folder. Any files in this folder are available to the Virtual Machine and the Host OS system.


Ubuntu PetaLinux 2017.1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Ubuntu Desktop
sf_VirtualBox_Share - File Manager
/media/sf_VirtualBox_Share/
DEVICES
File System
sf_VirtualB...
PLACES
training
Desktop
Trash
Documents
Music
Pictures
Videos

VirtualBox Shared Clipboard

Once the Guest Additions have been installed, you can enable the Shared Clipboard which will make it easier to copy and paste text strings from tutorial documents from the host system to the guest systems. This is very useful for later tutorials where it is desirable to copy command prompt instructions verbatim from the tutorial guide document directly into the command prompt of the guest system.

1. From the VirtualBox main menu, select **Devices** > **Shared Clipboard > Bidirectional**

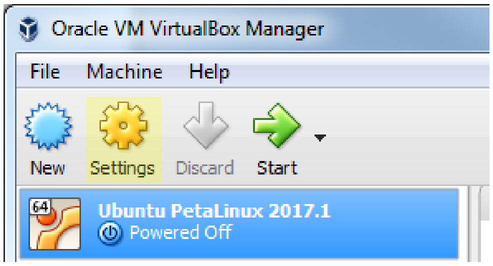


Network Bridging

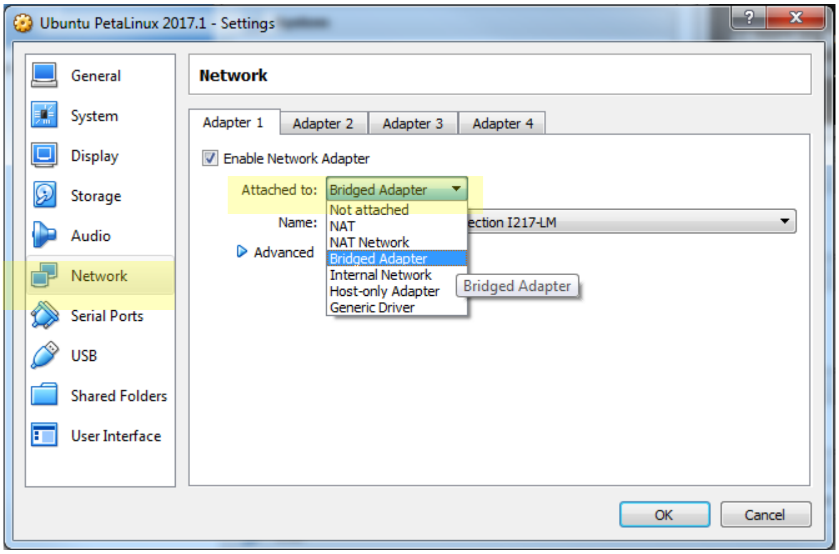
When VirtualBox is installed with its default options, the networking is set up to use Network Address Translation (NAT). This allows your Virtual Machine complete outgoing access to your LAN and/or the Internet, but it assigns an internal IP address that may not be compatible with your LAN and the IP address of your host system.

If you would like your Virtual Machine to accept an address from a local DHCP server, you can change the default network type to Bridged. This will make the Virtual Machine available to any other connected device on the same subnet on your LAN.

1. From the main VirtualBox menu in a running Virtual Machine, click on the **Settings** button. If the button is not visible, select **Machine > Settings**.



2. Select the Network entry in the left panel. Select the tab for your NIC (typically **Adapter 1**) and expand the dropdown menu for the *Attached to* field.



3. Select **Bridged Adapter** from the dropdown menu and click the **OK** button to save the changes. Wait a few seconds for your Virtual Machine to request an address from the local DHCP server. Once complete, the VM will now have an address on your local subnet, accessible to all devices on your LAN.

If you do not receive a new IP address after a minute, stop and restart the Ethernet service.

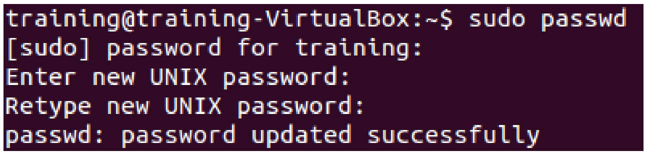
Ubuntu 16.04 Installation

Installing Ubuntu on a supported Virtual Machine should be straightforward, but depending on the precise configuration of your development system, there could be some challenges to create an optimal environment. This section outlines a few of the common issues that may be encountered.

Set a root user password

By default, Ubuntu does not set a password for the root user. You can do this by simply invoking the **sudo passwd** command. You supply your own user password, then set the root user password.

```
sudo passwd
<Enter user password>
<Enter new root password>
<Confirm new root password>
```



```
training@training-VirtualBox:~$ sudo passwd
[sudo] password for training:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

From this point forward, you will be able to precede a command with sudo to obtain root authority.

Change the default shell to bash for PetaLinux

If you intend to use the PetaLinux tool-chain under Ubuntu, you will find that it requires the bash shell as the default to execute correctly. By default, Ubuntu uses the dash shell, which is an extension of the bash shell with a few additional features and optimized for faster execution. Unfortunately, the dash shell is not compatible with the current PetaLinux tool-chain.

A description for the dash shell and its potential issues can be found here:
https://wiki.ubuntu.com/DashAsBinSh

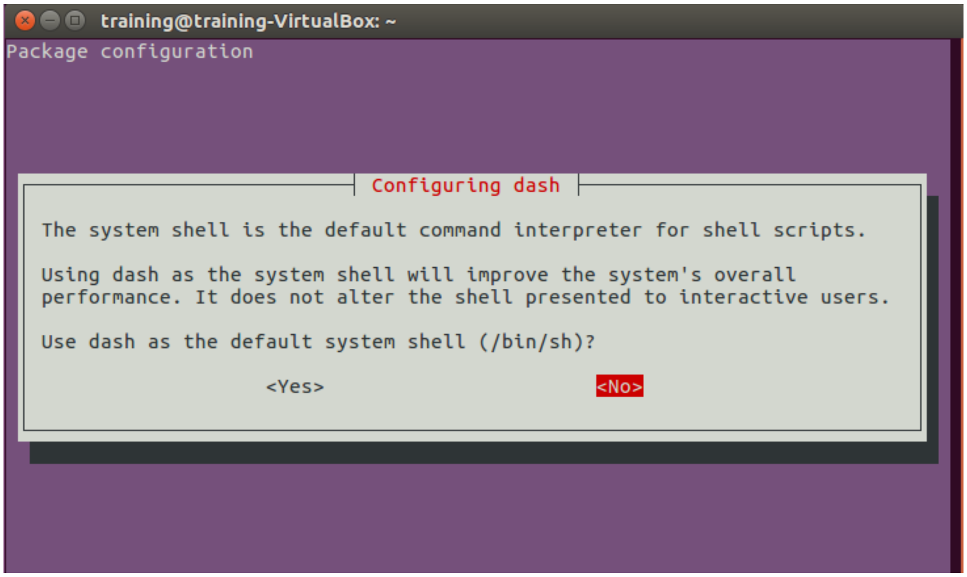
1. Most distributions use /bin/sh as a symbolic link to points to the actual default shell. Under your Ubuntu environment, to determine the current shell, enter:

```
$ ls -l /bin/sh
```

2. To change the default shell for all terminal windows, enter:

```
$ sudo dpkg-reconfigure dash
```

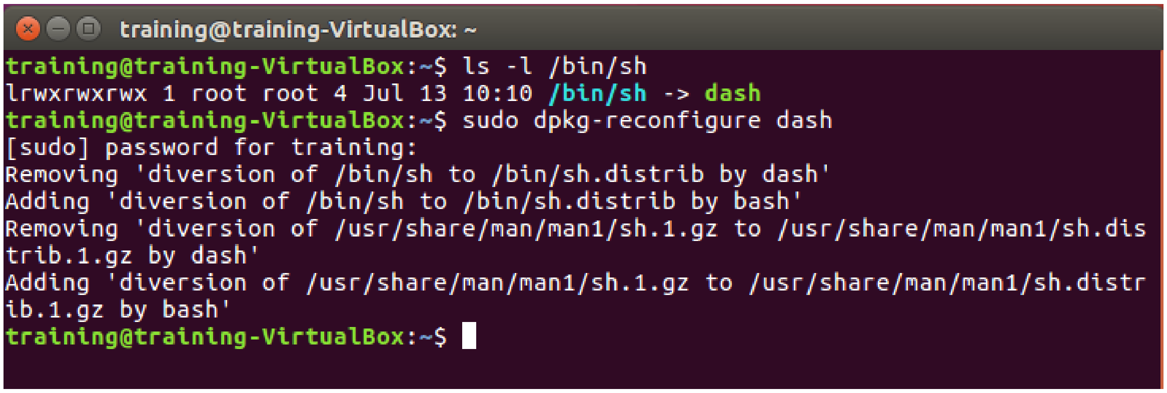
3. Select the option to remove dash as the default shell when prompted.



```
Package configuration

Configuring dash

The system shell is the default command interpreter for shell scripts.

Using dash as the system shell will improve the system's overall
performance. It does not alter the shell presented to interactive users.

Use dash as the default system shell (/bin/sh)?

<Yes>                          <No>
```

4. When the change is complete, close all open Terminal windows and open a new Terminal.

5. Verify the default shell is bash using the commands shown previously.



```
training@training-VirtualBox:~$ ls -l /bin/sh
lrwxrwxrwx 1 root root 4 Jul 13 10:10 /bin/sh -> dash
training@training-VirtualBox:~$ sudo dpkg-reconfigure dash
[sudo] password for training:
Removing 'diversion of /bin/sh to /bin/sh.distrib by dash'
Adding 'diversion of /bin/sh to /bin/sh.distrib by bash'
Removing 'diversion of /usr/share/man/man1/sh.1.gz to /usr/share/man/man1/sh.dis
trib.1.gz by dash'
Adding 'diversion of /usr/share/man/man1/sh.1.gz to /usr/share/man/man1/sh.distr
ib.1.gz by bash'
training@training-VirtualBox:~$
```

Xilinx Vivado/SDK Installation

Installing Vivado/SDK tools on a supported Linux system should be straightforward, but depending on the precise configuration of your development system, there could be some challenges to create an optimal environment. This section outlines a few of the common issues that may be encountered.

To perform the steps in this section, you need to download a tar.gz image to your host system. The most recent images can be downloaded from: http://www.xilinx.com/support/download.html.

NOTE: Once the download is complete, you may want to verify there is an md5sum utility installed by default. Open a terminal window and enter the following:

```
$ md5sum -b <path to your compressed-Vivado-tar.gz file>
```

The valid checksums for the different download archives are available from the Xilinx download site.

Install Vivado in the VirtualBox Linux VM

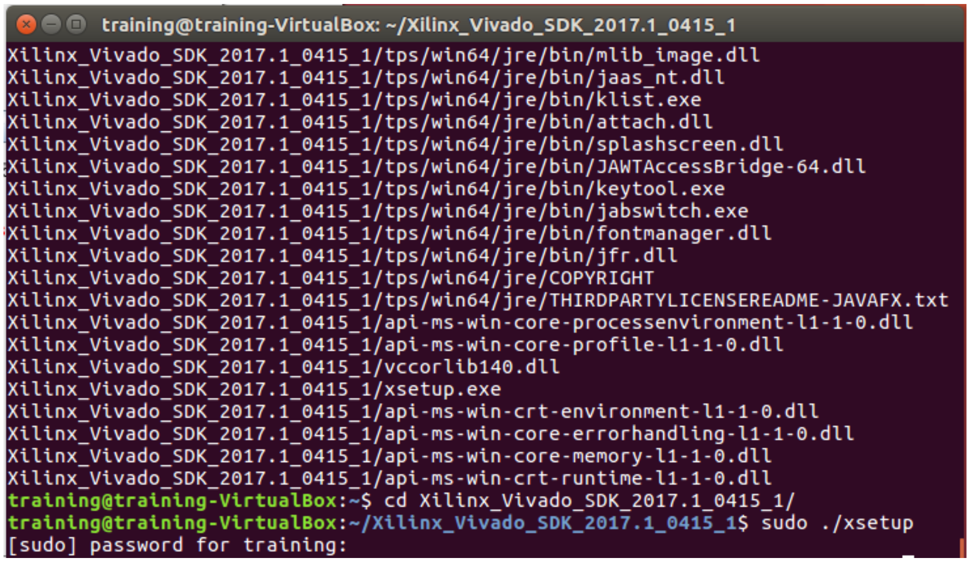
1. Copy the All-OS version of the compressed Vivado installer from your host system to your VM desktop.

2. Open a terminal window and decompress the installer on your desktop. It will create a new folder automatically in the current directory of your Terminal window.

```
$ tar -xvzf ~/Desktop/<Compressed-Vivado-Installer-Name>
```

3. Change into the new folder and execute the installer setup script. You will need root privilege to install into the default directory of **/opt/Xilinx** (preferred).

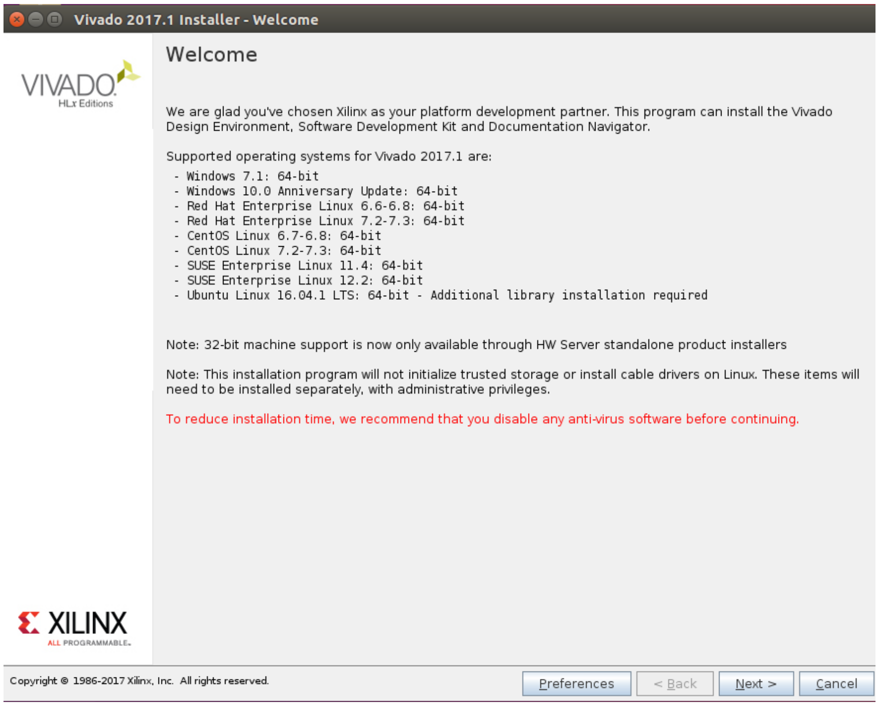
```
$ sudo ./xsetup
```



training@training-VirtualBox: ~/Xilinx_Vivado_SDK_2017.1_0415_1

```
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/mlib_image.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/jaas_nt.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/klist.exe
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/attach.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/splashscreen.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/JAWTAccessBridge-64.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/keytool.exe
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/jabswitch.exe
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/fontmanager.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/bin/jfr.dll
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/COPYRIGHT
Xilinx_Vivado_SDK_2017.1_0415_1/tps/win64/jre/THIRDPARTYLICENSEREADME-JAVAFX.txt
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-core-processenvironment-l1-1-0.dll
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-core-profile-l1-1-0.dll
Xilinx_Vivado_SDK_2017.1_0415_1/vccorlib140.dll
Xilinx_Vivado_SDK_2017.1_0415_1/xsetup.exe
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-crt-environment-l1-1-0.dll
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-core-errorhandling-l1-1-0.dll
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-core-memory-l1-1-0.dll
Xilinx_Vivado_SDK_2017.1_0415_1/api-ms-win-crt-runtime-l1-1-0.dll
training@training-VirtualBox:~$ cd Xilinx_Vivado_SDK_2017.1_0415_1/
training@training-VirtualBox:~/Xilinx_Vivado_SDK_2017.1_0415_1$ sudo ./xsetup
[sudo] password for training:
```

4. The Vivado 2017.1 Installer lists the operating systems officially supported by Xilinx. The tools may run on other Linux distributions and versions, but there will likely be some manual configuration required. Installation on unsupported systems is beyond the scope of these notes.



Vivado 2017.1 Installer - Welcome

Welcome

We are glad you've chosen Xilinx as your platform development partner. This program can install the Vivado Design Environment, Software Development Kit and Documentation Navigator.

Supported operating systems for Vivado 2017.1 are:

```
 - Windows 7.1: 64-bit
 - Windows 10.0 Anniversary Update: 64-bit
 - Red Hat Enterprise Linux 6.6-6.8: 64-bit
 - Red Hat Enterprise Linux 7.2-7.3: 64-bit
 - CentOS Linux 6.7-6.8: 64-bit
 - CentOS Linux 7.2-7.3: 64-bit
 - SUSE Enterprise Linux 11.4: 64-bit
 - SUSE Enterprise Linux 12.2: 64-bit
 - Ubuntu Linux 16.04.1 LTS: 64-bit - Additional library installation required
```

Note: 32-bit machine support is now only available through HW Server standalone product installers

Note: This installation program will not initialize trusted storage or install cable drivers on Linux. These items will need to be installed separately, with administrative privileges.

To reduce installation time, we recommend that you disable any anti-virus software before continuing.

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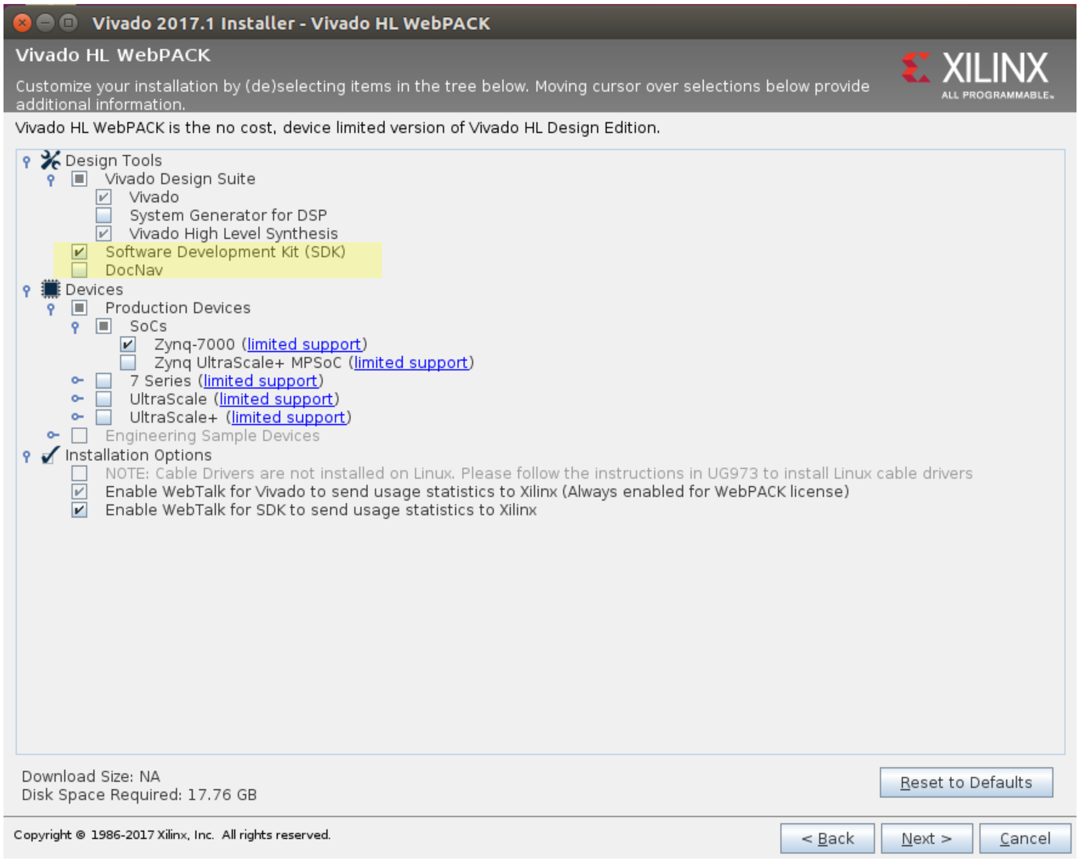
5. Follow the instructions as shown in the Vivado Installer GUI.
   Note: If you also want to install the SDK, select *SDK Development Kit* from the menu below.
   a. Accept all license agreements.
   b. Select the Vivado edition (version) you wish to install (or SDK Standalone).
   c. Select the Devices you need.
   d. Cable Drivers are no longer installed by this installer under Linux. See instructions in the **Install Missing Cable Drivers** section of this document.



Vivado 2017.1 Installer - Vivado HL WebPACK

Vivado HL WebPACK

Customize your installation by (de)selecting items in the tree below. Moving cursor over selections below provide additional information.

Vivado HL WebPACK is the no cost, device limited version of Vivado HL Design Edition.

- Design Tools
  - ▣ Vivado Design Suite
    - ☑ Vivado
    - ☐ System Generator for DSP
    - ☑ Vivado High Level Synthesis
  - ☑ Software Development Kit (SDK)
  - ☐ DocNav
- Devices
  - ▣ Production Devices
    - ▣ SoCs
      - ☑ Zynq-7000 (limited support)
      - ☐ Zynq UltraScale+ MPSoC (limited support)
    - ☐ 7 Series (limited support)
    - ☐ UltraScale (limited support)
    - ☐ UltraScale+ (limited support)
  - ☐ Engineering Sample Devices
- ✓ Installation Options
  - ☐ NOTE: Cable Drivers are not installed on Linux. Please follow the instructions in UG973 to install Linux cable drivers
  - ☑ Enable WebTalk for Vivado to send usage statistics to Xilinx (Always enabled for WebPACK license)
  - ☑ Enable WebTalk for SDK to send usage statistics to Xilinx

Download Size: NA
Disk Space Required: 17.76 GB

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   e. Select the default directory for installation. Depending on the size of your virtual disk, you may be space limited here. You can delete the compressed installer archive to free 20-25 GB of disk space, if necessary.
   f. If needed for your device or tool selection, obtain and install a license for your tools. If you are planning to use a free WebPACK license for development on your target platform, there is nothing further that is needed and you can close the Vivado License Manger dialog.

6. You may optionally delete the entire folder where you decompressed the installer to free up additional disk space.

Adjust GTK Version Used for Vivado in the VirtualBox Linux VM

It is a known issue that SDK will fail to launch on Ubuntu 16.04 without a workaround and this is addressed in Xilinx Answer Record AR67580:

https://www.xilinx.com/support/answers/67580.html

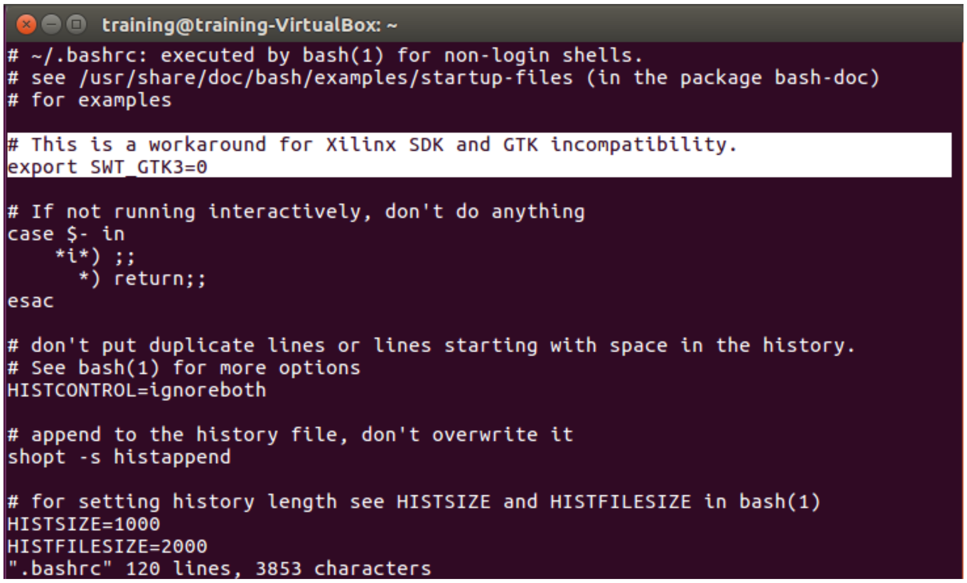
The issue is with the GTK version shipped with Ubuntu 16.04, which has issues with the eclipse. In order to work around this issue, set the environment variable **SWT_GTK3** to 0.

1. To temporarily set this environment variable for the current terminal session, use the following command:

```
$ export SWT_GTK3=0
```

2. To permanently set this environment variable for the all future terminal sessions, insert this comment and export command near the top of the **~/.bashrc** file using your favorite editor:

```
# This is a workaround for Xilinx SDK and GTK incompatibility.
export SWT_GTK3=0
```



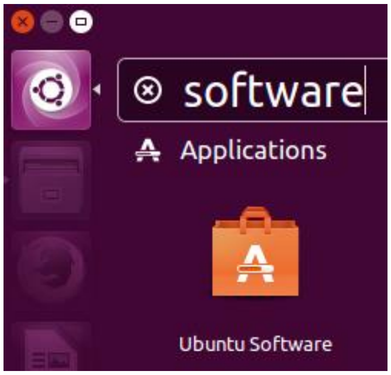
```
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

# This is a workaround for Xilinx SDK and GTK incompatibility.
export SWT_GTK3=0

# If not running interactively, don't do anything
case $- in
    *i*) ;;
      *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth

# append to the history file, don't overwrite it
shopt -s histappend

# for setting history length see HISTSIZE and HISTFILESIZE in bash(1)
HISTSIZE=1000
HISTFILESIZE=2000
".bashrc" 120 lines, 3853 characters
```

3. Save the edits to the **~/.bashrc** file.

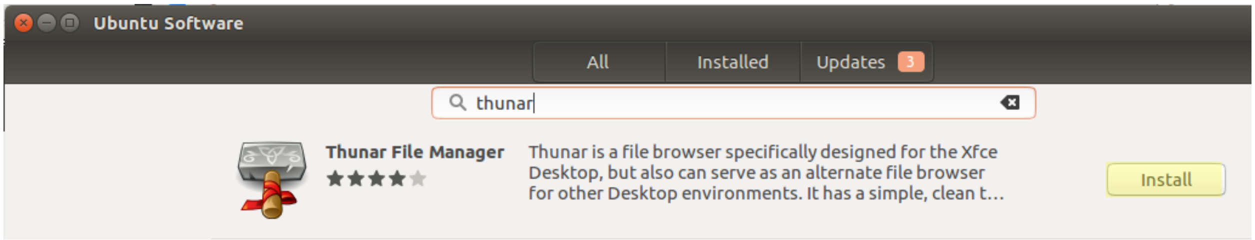
Install Thunar File Manager

The Thunar File Manager is used in some of the Avnet Reference Designs and Tutorial materials since it allows for the folder taxonomy to be expanded in a left pane and shows files and folders in a right pane making it easier to navigate complex folder and file structures within example designs.

1. Launch the **Ubuntu Software** management application using the Dash App Lens.

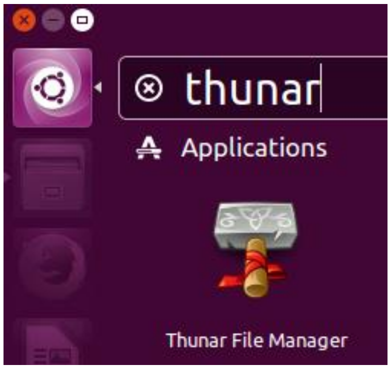


2. Within the **Ubuntu Software** management application, search for the **Thunar File Manager** application and click the install button. Enter the superuser password if prompted:



Thunar is a file browser specifically designed for the Xfce Desktop, but also can serve as an alternate file browser for other Desktop environments. It has a simple, clean t...

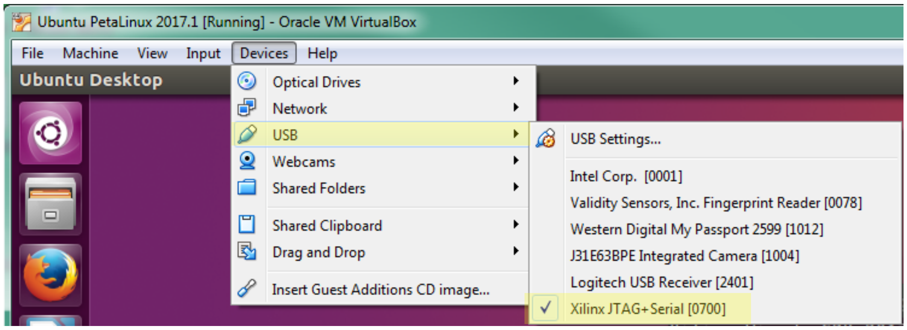
3. Close the Ubuntu Software management application and use the Dash App Lens to launch the newly installed **Thunar File Manager** application to verify that it was installed correctly.



Install GTK Terminal

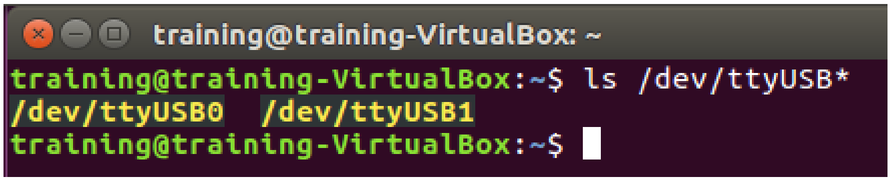
The Ubuntu **Serial port terminal** (or GTK Terminal) application is used in some of the Avnet Reference Designs and Tutorial materials since it allows for simple connection to USB-UART of many development board platforms.

1. Plug in your development board and connect the USB-UART port to the PC so that the USB-UART device is recognized under Windows first. Then locate your USB-UART device under the **Devices→USB** selection menu and click on it to remove the device from the host operating system and add it to the guest operating system. In this example the Xilinx JTAG+Serial [0700] device is used as it represents the USB-UART of the Avnet MiniZed board.


Ubuntu PetaLinux 2017.1 [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Ubuntu Desktop
Optical Drives
Network
USB
Webcams
Shared Folders
Shared Clipboard
Drag and Drop
Insert Guest Additions CD image...
USB Settings...
Intel Corp. [0001]
Validity Sensors, Inc. Fingerprint Reader [0078]
Western Digital My Passport 2599 [1012]
J31E63BPE Integrated Camera [1004]
Logitech USB Receiver [2401]
✓ Xilinx JTAG+Serial [0700]

2. Once the device is detected and enumerated under Ubuntu, the USB-UART port should be listed under one of the ***/dev/ttyUSBx*** device entries. Locate the device entry for the USB-UART and make a note of this device for use in a later step.

```
$ ls /dev/ttyUSB*
```



```
training@training-VirtualBox:~$ ls /dev/ttyUSB*
/dev/ttyUSB0   /dev/ttyUSB1
training@training-VirtualBox:~$ 
```

3. To make it easier to launch the terminal app (GtkTerm) without needing to provide the root password each time, open a command window and add the current user to the group for the **/dev/ttyUSBx** devices used for USB-UART:pi

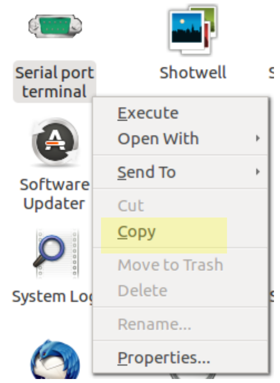
```
$ sudo usermod -a -G dialout <current username>
```

4. Install the gtkterm package:

```
$ sudo apt-get install gtkterm
```

5. **Reboot the Virtual Machine to force the changes to take effect.**

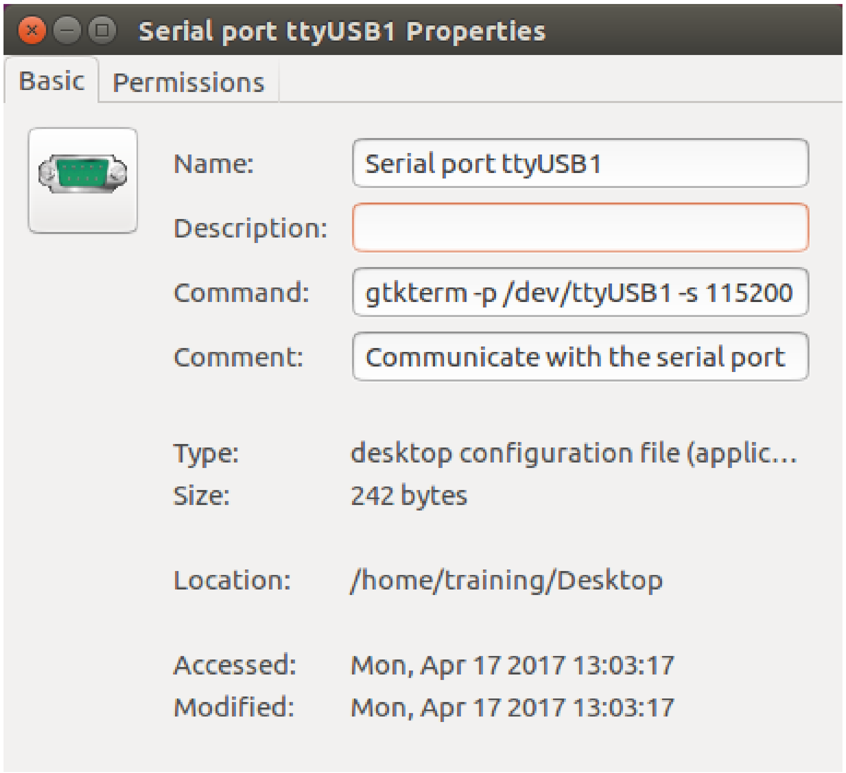
6. Create a Desktop icon by copying and pasting **Serial port terminal** (gtkterm**)** application from the **/usr/share/applications** folder directly to the ~/Desktop folder:



7. Right-click on the new **Serial port terminal** (gtkterm**)** application Desktop icon and select the **Properties** option.

8. Within the Properties window, set the app attributes to match the USB-UART device attached to the system, in this example the USB-UART is attached to the **/dev/ttyUSB1** device entry:

   Name: **Serial port ttyUSB1**
   Command: **gtkterm -p /dev/ttyUSB1 -s 115200**



Name: Serial port ttyUSB1
Description:
Command: gtkterm -p /dev/ttyUSB1 -s 115200
Comment: Communicate with the serial port

Type: desktop configuration file (applic…
Size: 242 bytes

Location: /home/training/Desktop

Accessed: Mon, Apr 17 2017 13:03:17
Modified: Mon, Apr 17 2017 13:03:17

9. Close the Properties window.

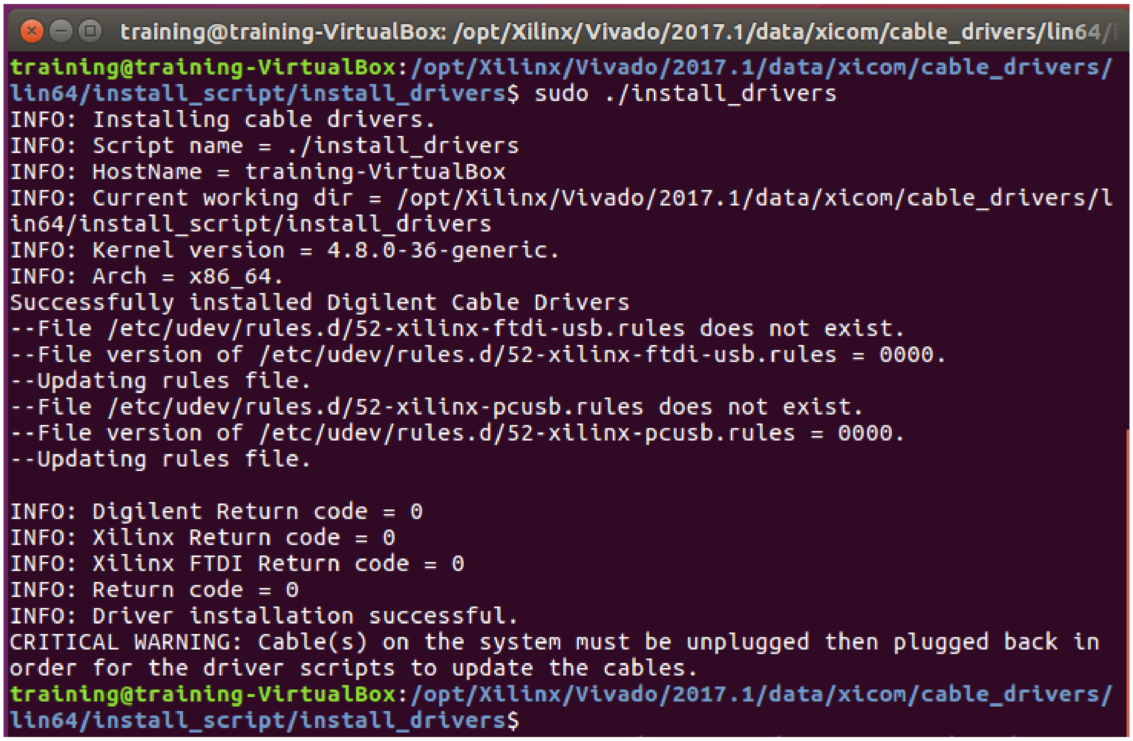
Install Missing Cable Drivers

The drivers, which were not included with the install, can be installed manually.

1. Open a Terminal window.

2. At the command prompt, enter:

```
$ cd
/opt/Xilinx/Vivado/2017.1/data/xicom/cable_drivers/lin64/install
_script/install_drivers/
$ sudo ./install_drivers
```

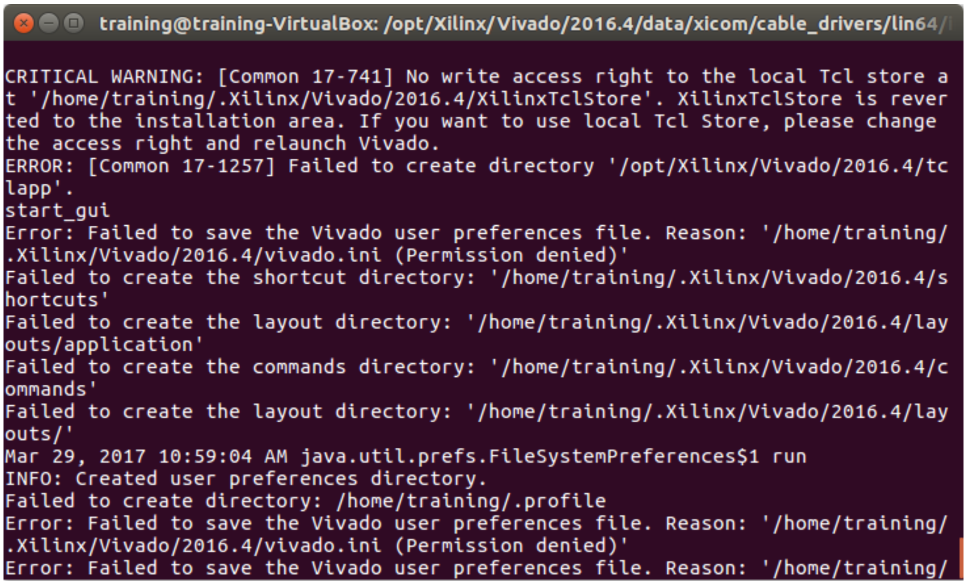


training@training-VirtualBox: /opt/Xilinx/Vivado/2017.1/data/xicom/cable_drivers/lin64/

```
training@training-VirtualBox:/opt/Xilinx/Vivado/2017.1/data/xicom/cable_drivers/
lin64/install_script/install_drivers$ sudo ./install_drivers
INFO: Installing cable drivers.
INFO: Script name = ./install_drivers
INFO: HostName = training-VirtualBox
INFO: Current working dir = /opt/Xilinx/Vivado/2017.1/data/xicom/cable_drivers/l
in64/install_script/install_drivers
INFO: Kernel version = 4.8.0-36-generic.
INFO: Arch = x86_64.
Successfully installed Digilent Cable Drivers
--File /etc/udev/rules.d/52-xilinx-ftdi-usb.rules does not exist.
--File version of /etc/udev/rules.d/52-xilinx-ftdi-usb.rules = 0000.
--Updating rules file.
--File /etc/udev/rules.d/52-xilinx-pcusb.rules does not exist.
--File version of /etc/udev/rules.d/52-xilinx-pcusb.rules = 0000.
--Updating rules file.

INFO: Digilent Return code = 0
INFO: Xilinx Return code = 0
INFO: Xilinx FTDI Return code = 0
INFO: Return code = 0
INFO: Driver installation successful.
CRITICAL WARNING: Cable(s) on the system must be unplugged then plugged back in
order for the driver scripts to update the cables.
training@training-VirtualBox:/opt/Xilinx/Vivado/2017.1/data/xicom/cable_drivers/
lin64/install_script/install_drivers$
```

Vivado and SDK Permission Issues

When you invoke Vivado, you may see the following error message, indicating a permission issue in the directory hierarchy:


training@training-VirtualBox: /opt/Xilinx/Vivado/2016.4/data/xicom/cable_drivers/lin64/

```
CRITICAL WARNING: [Common 17-741] No write access right to the local Tcl store a
t '/home/training/.Xilinx/Vivado/2016.4/XilinxTclStore'. XilinxTclStore is rever
ted to the installation area. If you want to use local Tcl Store, please change
the access right and relaunch Vivado.
ERROR: [Common 17-1257] Failed to create directory '/opt/Xilinx/Vivado/2016.4/tc
lapp'.
start_gui
Error: Failed to save the Vivado user preferences file. Reason: '/home/training/
.Xilinx/Vivado/2016.4/vivado.ini (Permission denied)'
Failed to create the shortcut directory: '/home/training/.Xilinx/Vivado/2016.4/s
hortcuts'
Failed to create the layout directory: '/home/training/.Xilinx/Vivado/2016.4/lay
outs/application'
Failed to create the commands directory: '/home/training/.Xilinx/Vivado/2016.4/c
ommands'
Failed to create the layout directory: '/home/training/.Xilinx/Vivado/2016.4/lay
outs/'
Mar 29, 2017 10:59:04 AM java.util.prefs.FileSystemPreferences$1 run
INFO: Created user preferences directory.
Failed to create directory: /home/training/.profile
Error: Failed to save the Vivado user preferences file. Reason: '/home/training/
.Xilinx/Vivado/2016.4/vivado.ini (Permission denied)'
Error: Failed to save the Vivado user preferences file. Reason: '/home/training/
```

This indicates that the hidden folder named .Xilinx, where license and configuration information is stored, is read-only for the invoking username. One method to correct this is to change ownership of the directory hierarchy using root authority.

1. Change to the directory above the .Xilinx folder, which in this case is the **/home/*<current user>*** folder. Enter the following commands:

```
$ cd ~
$ sudo chown <current username> -R .Xilinx
$ sudo chgrp <current username> -R .Xilinx
```

2. Run the Xilinx Vivado and SDK 64-bit environment settings scripts in a terminal window to setup the environment path to the tools install folder so that Vivado and SDK can be located in the next steps.

```
$ source /opt/Xilinx/Vivado/2017.1/settings64.sh
$ source /opt/Xilinx/SDK/2017.1/settings64.sh
```

3. Launch Vivado or the SDK as usual using the fixed permissions on the .Xilinx folder.

   To start Vivado from a Terminal window, enter the following command:

```
$ vivado &
```

   To start the Xilinx SDK from a terminal window, enter the following command:

```
$ xsdk &
```

Install Missing Desktop Icons

In some cases Vivado and/or SDK desktop icons may be missing. These can be manually added through the use of some launcher shell scripts and by adding some desktop icon entries.

1. Change to the home directory for the current user.

```
$ cd ~
```

2. Using your favorite text editor edit a new shell script named **vivado_launch.sh**

```
$ vi vivado_launch.sh
```

   Paste the following text into that script file, save the contents and exit. This creates a script that is capable of invoking the settings script needed for Vivado to launch correctly.

```
#!/bin/bash
. /opt/Xilinx/Vivado/2017.1/settings64.sh
vivado &
```

3. Using your favorite text editor edit a new shell script named **sdk_launch.sh**

```
$ vi sdk_launch.sh
```

   Paste the following text into that script file, save the contents and exit. This creates a script that is capable of invoking the settings script needed for Xilinx SDK to launch correctly.

```
#!/bin/bash
# This is a workaround for Xilinx SDK and GTK incompatibility.
export SWT_GTK3=0
. /opt/Xilinx/SDK/2017.1/settings64.sh
xsdk &
```

4. Change permissions of both launcher scripts so that they can be executed.

```
$ chmod u+x vivado_launch.sh
$ chmod u+x sdk_launch.sh
```

5. Change directories to the home Desktop folder of the current user.

```
$ cd ~/Desktop
```

6. Using your favorite text editor edit a new file named **Vivado.desktop**

```
$ vi Vivado.desktop
```

Paste the following text into that script file, save the contents and exit. This creates a desktop launcher icon that is capable of invoking the Vivado launcher script created in earlier steps.

```
#!/usr/bin/env xdg-open

[Desktop Entry]
Version=1.0
Type=Application
Terminal=false
Exec=/home/training/vivado_launch.sh
Name=Vivado 2017.1
Comment=Xilinx Vivado Design Suite 2017.1
Icon=/opt/Xilinx/Vivado/2017.1/doc/images/vivado_logo.ico
StartupNotify=true
```

7. Using your favorite text editor edit a new file named **SDK.desktop**

```
$ vi SDK.desktop
```

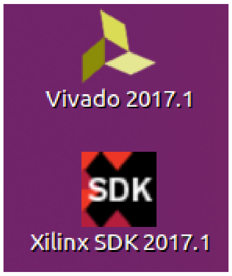
Paste the following text into that script file, save the contents and exit. This creates a desktop launcher icon that is capable of invoking the Xilinx SDK launcher script created in earlier steps.

```
#!/usr/bin/env xdg-open

[Desktop Entry]
Version=1.0
Type=Application
Terminal=false
Exec=/home/training/sdk_launch.sh
Name=Xilinx SDK 2017.1
Comment=Xilinx Software Development Kit 2017.1
Icon=/opt/Xilinx/SDK/2017.1/data/sdk/images/sdk_logo.ico
StartupNotify=true
```

8. Change permissions of both launcher scripts so that they can be executed.

```
$ chmod u+x Vivado.desktop
$ chmod u+x SDK.desktop
```

Once the execution permission is changed, the icons will populate on the Desktop with the correct graphics.



PetaLinux Installation

Installing PetaLinux tools on a supported Linux system should be straightforward, but depending on the precise configuration of your development system, there could be some challenges to create an optimal environment. This section outlines a few of the common issues that may be encountered. For more information on the installations of PetaLinux tools, please refer to Xilinx User Guide UG1144.

TFTP Server Install and Setup

1. Install the following packages:

```
$ sudo apt-get install xinetd tftpd tftp
```

2. Create /etc/xinetd.d/tftp and put this entry:

```
service tftp
{
protocol        = udp
port            = 69
socket_type     = dgram
wait            = yes
user            = nobody
server          = /usr/sbin/in.tftpd
server_args     = /tftpboot
disable         = no
}
```

3. Create a tftpboot folder, this should match what is in the server_args, and assign read/write permissions with the following command:

```
$ sudo mkdir /tftpboot
$ sudo chmod ugo+rw /tftpboot/
```

4. Restart the xinetd service.
   For new systems:

```
$ sudo service xinetd restart
```

For older systems:

```
$ sudo /etc/init.d/xinetd restart
```

Now our tftp server is up and running.

Install openssl Libraries for PetaLinux

As of 2015.2, the PetaLinux tools require the **openssl** libraries on the host system which can be installed under Ubuntu using the following command:

```
$ sudo apt-get --yes install libssl-dev
```

Install Additional System Tools and Library Dependencies for PetaLinux

According to Xilinx User Guide UG1144, PetaLinux 2017.1 tools require some additional system tools and libraries to be installed on the host system. For exact system dependencies, refer to UG1144 document.

If you are using Ubuntu, this can be accomplished in a terminal window with the following command:

```
$ sudo apt-get --yes install tofrodos iproute gawk gcc git-core make
net-tools libncurses5-dev tftpd zlib1g-dev flex bison lib32z1
lib32ncurses5 lib32ncursesw5 lib32gomp1 xvfb chrpath socat autoconf
libtool texinfo gcc-multilib libsdl1.2-dev libglib2.0-dev
zlib1g:i386
```

Adjusting Permissions of Vivado and PetaLinux Install Folder

As of 2017.1, PetaLinux tools require the installation as a non-root user so the permissions of these folders under the /opt folder must be adjusted accordingly.

This can be accomplished in a terminal window with the following commands:

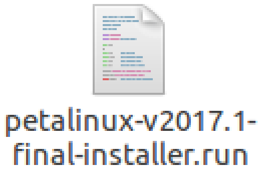
```
$ sudo chmod uog+w /opt/
$ sudo mkdir /opt/petalinux-v2017.1-final
$ sudo chmod -R ugo+w /opt/Xilinx
$ sudo chmod -R ugo+w /opt/petalinux-v2017.1-final
$ sudo chown -R <current username>:<current user group>
/opt/petalinux-v2017.1-final
```

Install PetaLinux into /opt/petalinux-v2017.1-final Folder

The PetaLinux 2017.1 Installer (TAR/GZIP - 7.54 GB) takes about 1.5-4 hours depending on the download speed. The file can be downloaded here:

https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/embedded-design-tools/2017-1.html

1. Copy the PetaLinux installer from your host system or Downloads folder to your VM desktop.

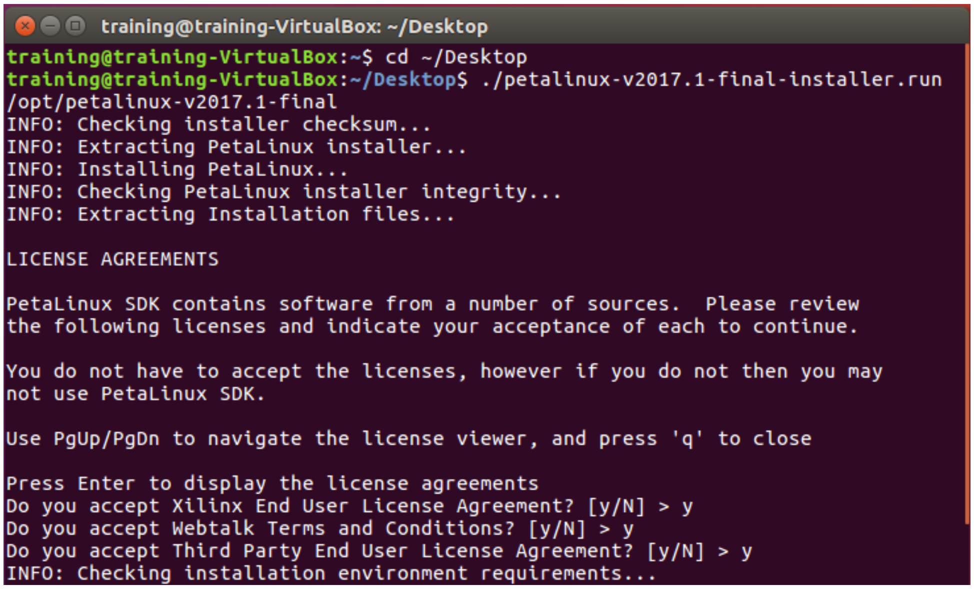


2. Open a terminal window and launch the installer while specifying the target install folder.

```
$ cd ~/Desktop
$ ./petalinux-v2017.1-final-installer.run /opt/petalinux-
v2017.1-final
```

3. The Vivado 2017.1 Installer will take several minutes to verify the integrity of the packed installer and then extract itself.

4. Read the PetaLinux license agreements and, if you can accept the license conditions, press enter to view the license, use keyboard **page up/down** keys to scroll through the agreement, press the **q** key to quit viewing the agreement when finished, and press the **y** key if you accept the license conditions. If prompted, allow the installer to make changes to your development system.



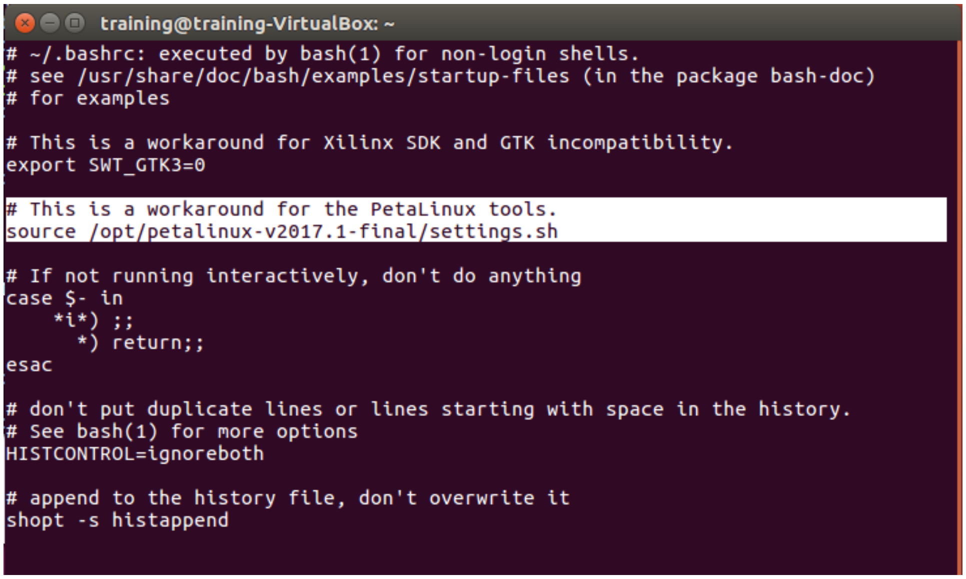
```
training@training-VirtualBox:~$ cd ~/Desktop
training@training-VirtualBox:~/Desktop$ ./petalinux-v2017.1-final-installer.run
/opt/petalinux-v2017.1-final
INFO: Checking installer checksum...
INFO: Extracting PetaLinux installer...
INFO: Installing PetaLinux...
INFO: Checking PetaLinux installer integrity...
INFO: Extracting Installation files...

LICENSE AGREEMENTS

PetaLinux SDK contains software from a number of sources.  Please review
the following licenses and indicate your acceptance of each to continue.

You do not have to accept the licenses, however if you do not then you may
not use PetaLinux SDK.

Use PgUp/PgDn to navigate the license viewer, and press 'q' to close

Press Enter to display the license agreements
Do you accept Xilinx End User License Agreement? [y/N] > y
Do you accept Webtalk Terms and Conditions? [y/N] > y
Do you accept Third Party End User License Agreement? [y/N] > y
INFO: Checking installation environment requirements...
```

5. Be sure to source the **/opt/petalinux-v2017.1-final/settings.sh** script prior to attempting to use the PetaLinux tools for development.

```
$ source /opt/petalinux-v2017.1-final/settings.sh
```

6. To permanently set this environment variable for the all future terminal sessions, insert this comment and export command near the top of the **~/.bashrc** file using your favorite editor:

```
# This is a workaround for the PetaLinux tools.
source /opt/petalinux-v2017.1-final/settings.sh
```



```
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

# This is a workaround for Xilinx SDK and GTK incompatibility.
export SWT_GTK3=0

# This is a workaround for the PetaLinux tools.
source /opt/petalinux-v2017.1-final/settings.sh

# If not running interactively, don't do anything
case $- in
    *i*) ;;
      *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth

# append to the history file, don't overwrite it
shopt -s histappend
```

7. Save the edits to the **~/.bashrc** file.

Appendix

If you have a need to license the Vivado tools installed on your virtual machine to handle other Xilinx devices or IP Cores that are not covered by the free Xilinx WebPACK License, you will need to perform the workaround outlined in Xilinx Answer Record 60510:

https://www.xilinx.com/support/answers/60510.html

There is also some additional, distribution specific, guidance provided in this MiniZed.org Community Forum Post.

http://minized.org/content/running-vivado-centos-7-virtual-machine

This limitation of the licensing tool being able to read the MAC ID from the modern Ubuntu Ethernet interface naming conventions will likely be fixed in a future release of the Xilinx tools.

Revision History

Version	Date	Details
1.0	Feb 19, 2015	VirtualBox 4.3, CentOS 6.5, CentOS 7
1.1	Feb 24, 2015	Device tree reverse compilation, Ethernet Adapter Names
1.2	November 2015	Removed CentOS 6.5 support, validated all instructions, and restructured/standardized document.
1.3	August 2016	CentOS 7 support, Ubuntu 16.04, CentOS PetaLinux 2016.2, and Xilinx Vivado/SDK 2016.2
1.4	April 2017	Updated for PetaLinux 2016.4 and Xilinx Vivado/SDK 2016.4 tools, removed instructions and support for CentOS, removed unnecessary sections
1.5	July 2017	Updated for PetaLinux 2017.1 and Xilinx Vivado/SDK 2017.1 tools
1.5.1	September 2017	Added appendix section to cover workaround needed for licensing of tools