

**Oracle® VM VirtualBox  
Installation Instructions for Windows 7  
and  
Linux Virtual Machine Creation  
for Development with the  
Avnet Zynq®-7000 All Programmable SoC**



**Version 1.0  
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## Installing Oracle VM VirtualBox on Windows 7

This experiment 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 (4.3.20). 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](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 (4.3.20). You will also need to download the Extension Pack as well. 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 on the self-extracting executable. Allow the installer to make changes to your computer, if so prompted.

 VirtualBox-4.3.20-96997-Win.exe	27/01/2015 3:27 PM	Application	107,996 KB
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Figure 1 – VirtualBox installer for Windows

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



Figure 2 – VirtualBox Installation Wizard Welcome

- 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.

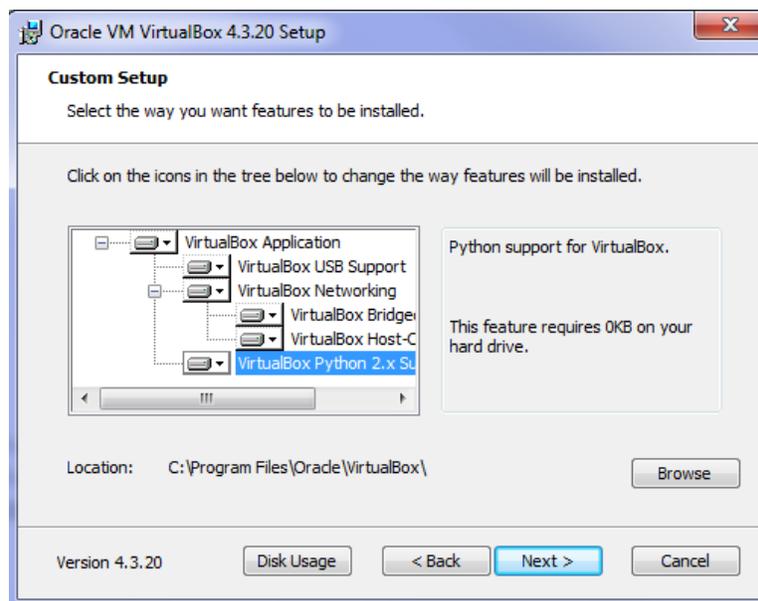


Figure 3 – VirtualBox Custom Setup

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

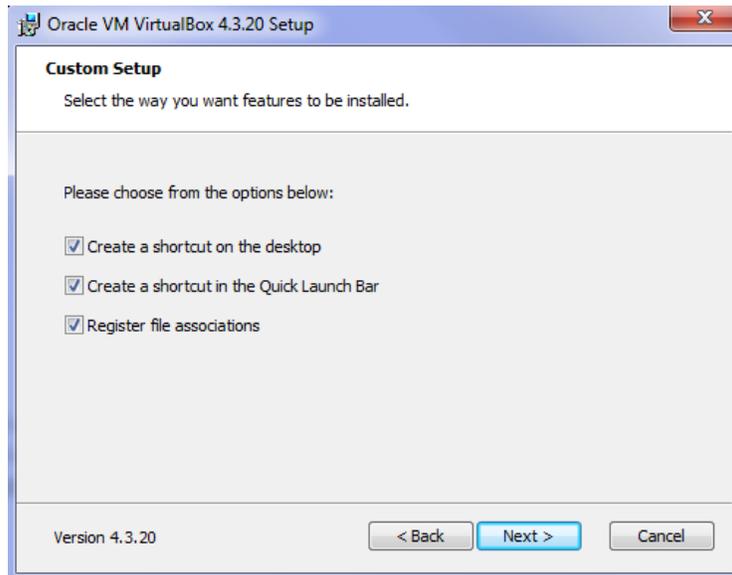


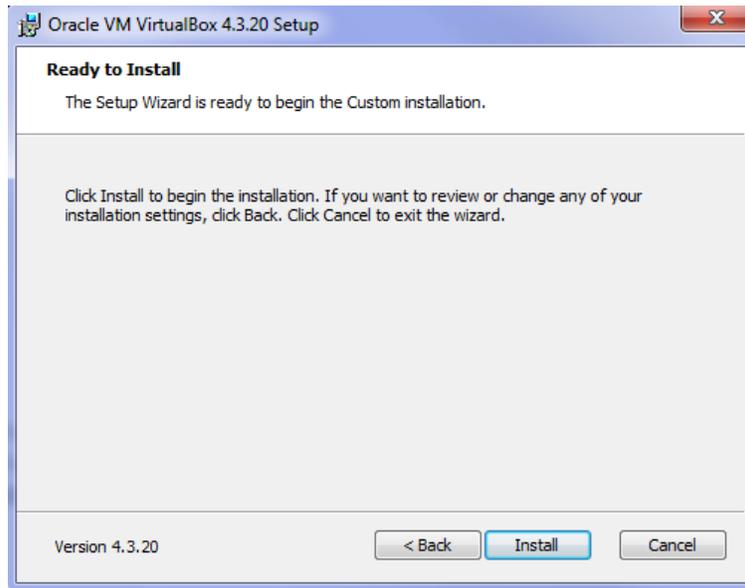
Figure 4 – VirtualBox Custom Setup Options

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



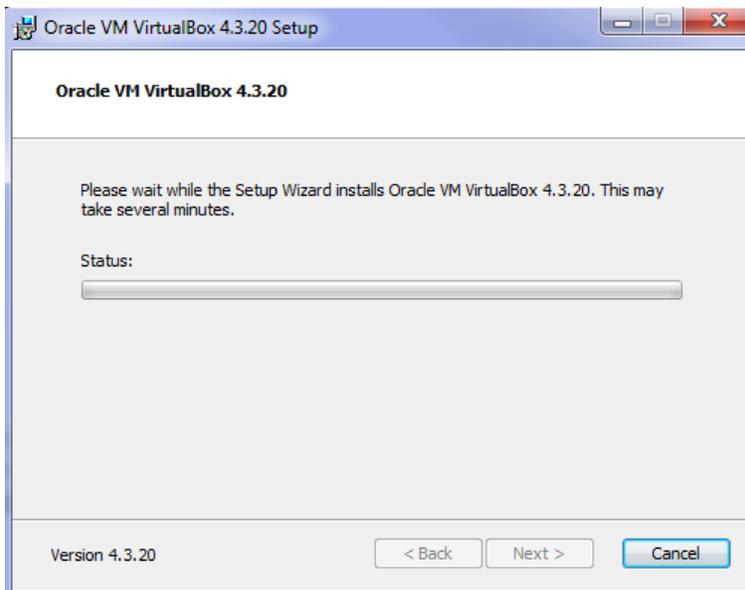
Figure 5 – VirtualBox Network Interfaces

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



**Figure 6 – VirtualBox Ready to Install**

- 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.



**Figure 7 – VirtualBox Installation**

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



Figure 8 – VirtualBox Installation Complete

- 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**.



Figure 9 – VirtualBox First Startup

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

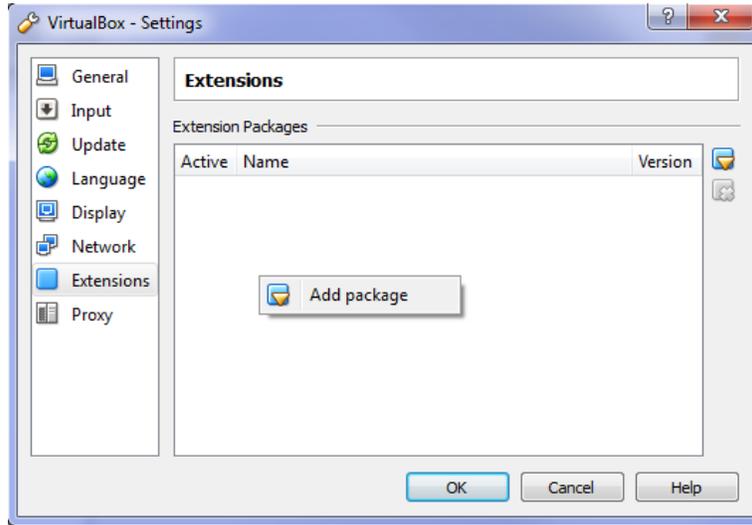


Figure 10 – Add Extension Pack

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.



Figure 11 – Select the Compatible Extension Pack

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

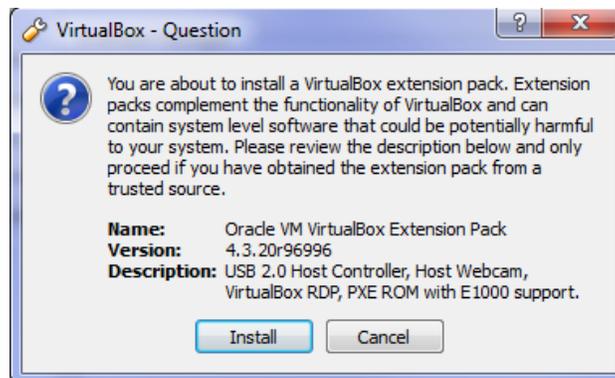


Figure 12 – Install the Extension Pack

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, click the **I Agree** button<sup>1</sup>. If prompted, allow the installer to make changes to your development system.

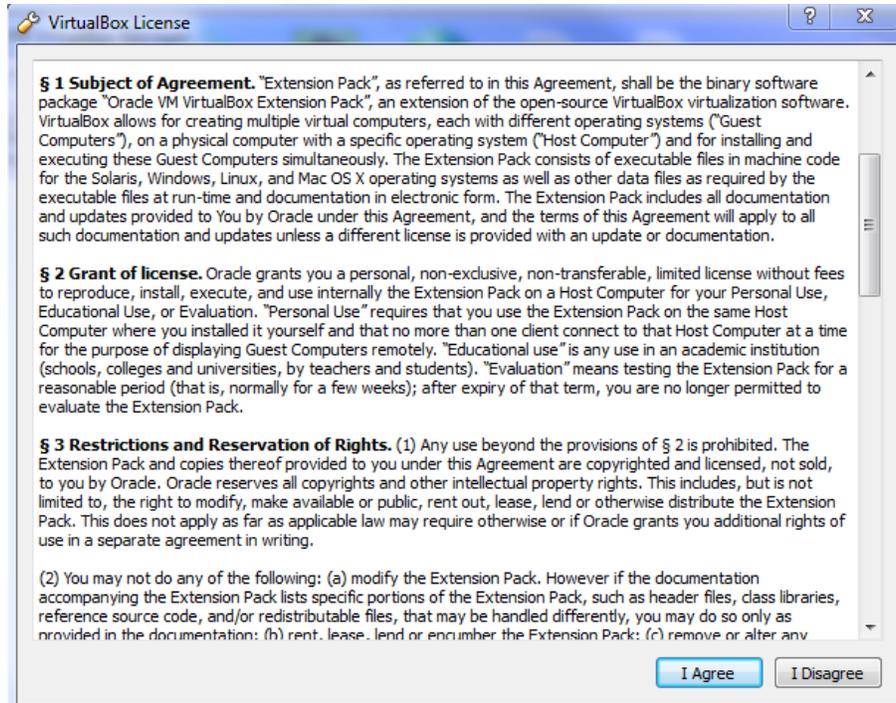


Figure 13 – Extension Pack License Agreement

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

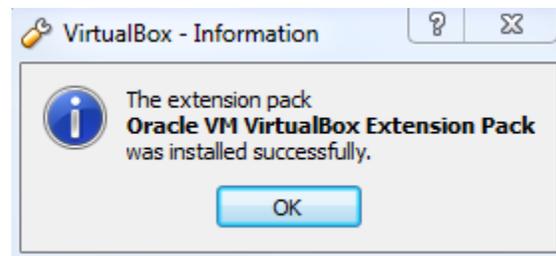
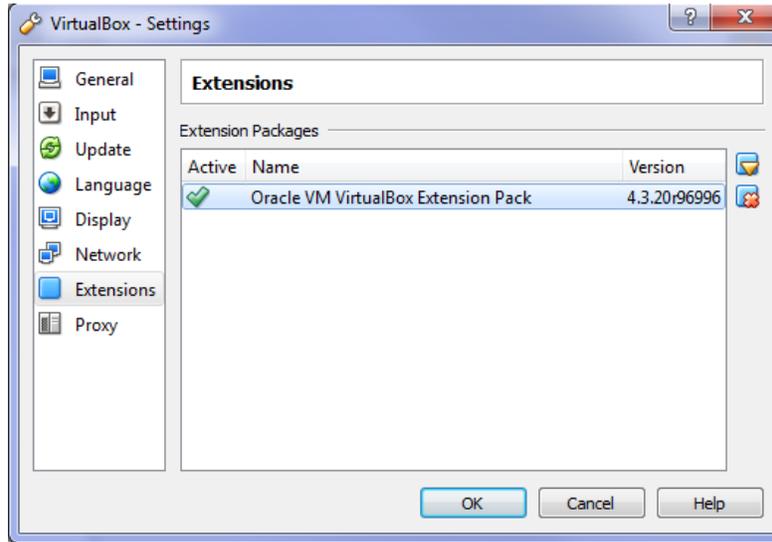


Figure 14 – Extension Pack Installation Complete

<sup>1</sup> 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.



**Figure 15 – VirtualBox Extension Pack Installation Complete**

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 VirtualBox and click the **New** icon at the upper left.



Figure 16 –Create a New Virtual Machine

2. Select a descriptive name for the VM. Set the *Type* to **Linux** and the *Version* to **Red Hat (64 bit)**. Click the **Next** button.

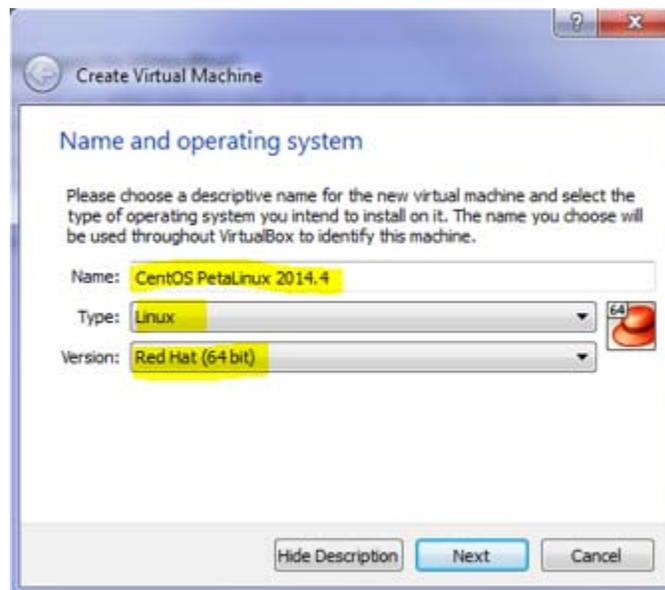


Figure 17 – Set the Virtual Machine Name

3. Select the amount of memory to be allocated to the Virtual Machine. Allocating more memory<sup>2</sup> 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. Once you have selected a memory size, click the **Next** button.

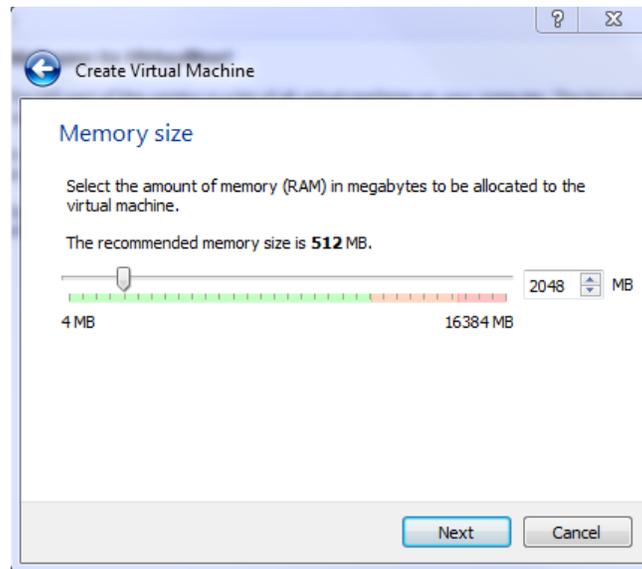


Figure 18 –Select a VM Memory Size

4. Click the **Create**<sup>3</sup> button to allocate a virtual hard drive now.

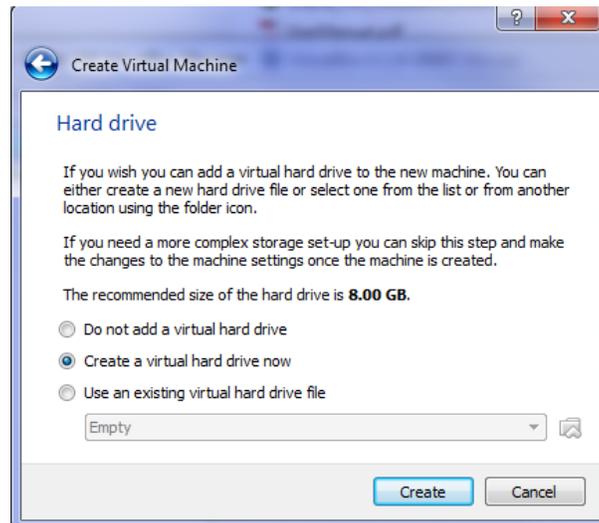


Figure 19 – Create a Virtual Hard Drive

<sup>2</sup> You may need more memory if you intend to run Vivado with large Xilinx devices.

<sup>3</sup> If you are importing an existing Virtual Machine, click the "Use an existing..." button.

5. Click the **Next** button to accept the default file type for a VirtualBox Disk Image.

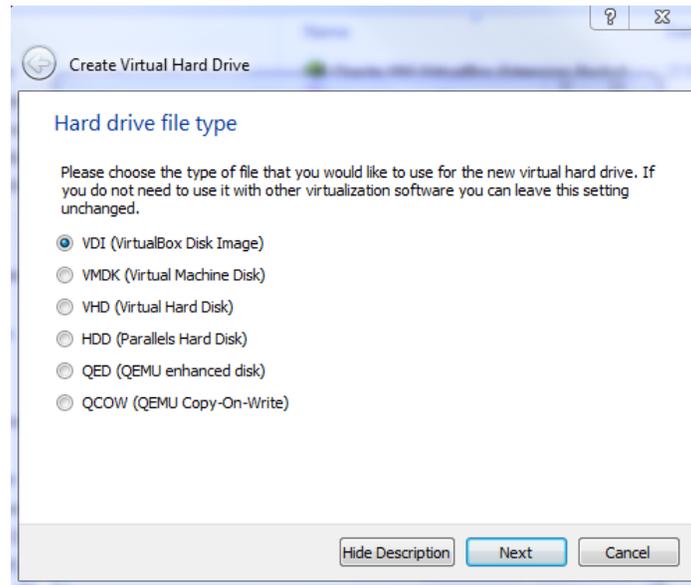


Figure 20 – Set Virtual Disk Type

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

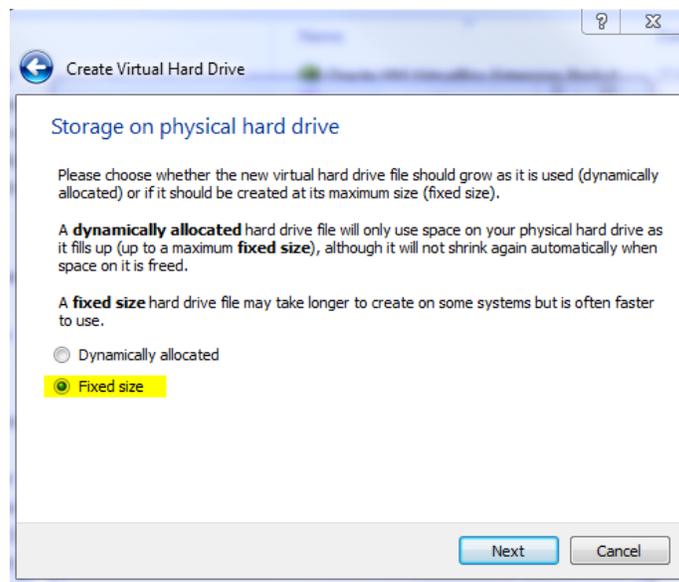
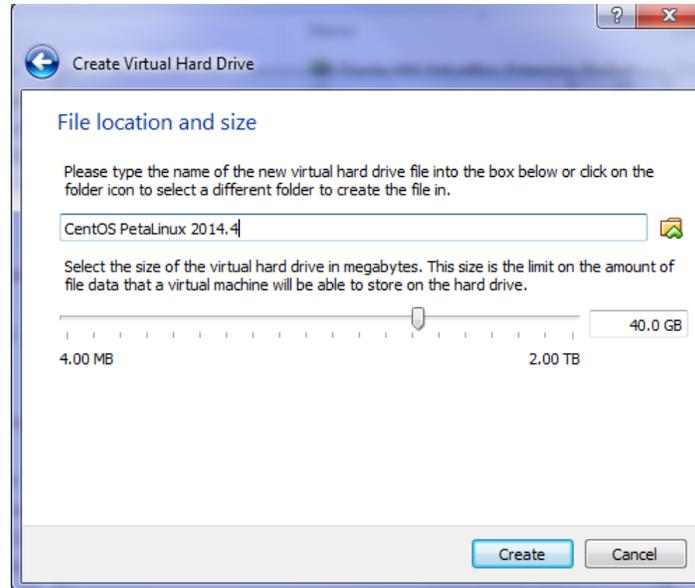


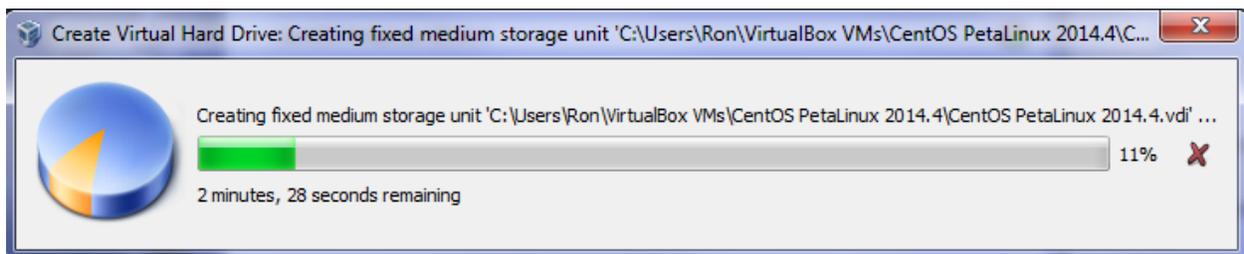
Figure 21 – Set Virtual Disk Storage

7. Select the name and location for the Virtual Machine within your host file system. It is recommended that the default size be set at **40.0 GB** to accommodate the Xilinx tools. If this space is unavailable, 20.0 GB is sufficient if you plan to install only the Software Development Kit and not Vivado. Click the **Create** button.



**Figure 22 – Create Virtual Hard Disk**

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



**Figure 23 – Virtual Hard Disk Creation**

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

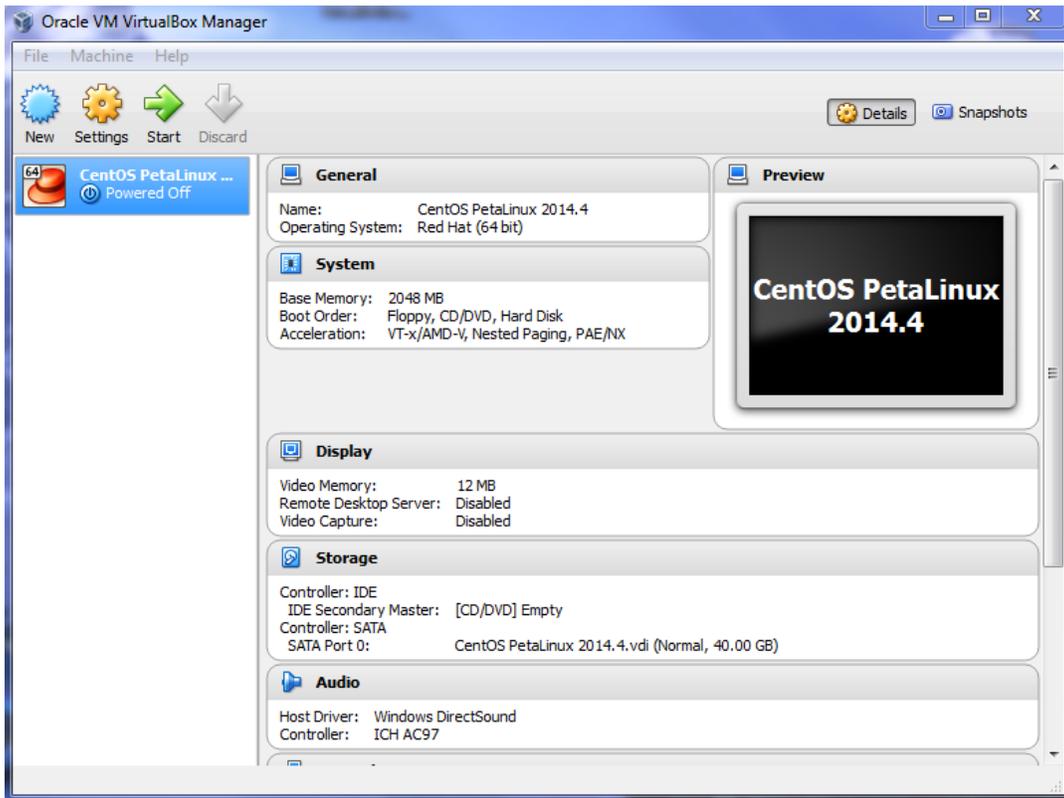


Figure 24 – Virtual Hard Disk Creation Complete

## Install the CentOS 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. The most recent CentOS images can be downloaded from:

<http://www.centos.org/download/>

For the Xilinx 2014.4 tools, the latest version of CentOS officially supported by Xilinx is CentOS 6.5. You may locate a mirror to download the **CentOS-6.5-x86\_64-bin-DVD1.iso** image at :

[http://vault.centos.org/6.5/isos/x86\\_64/CentOS-6.5-x86\\_64-bin-DVD1.iso](http://vault.centos.org/6.5/isos/x86_64/CentOS-6.5-x86_64-bin-DVD1.iso)

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

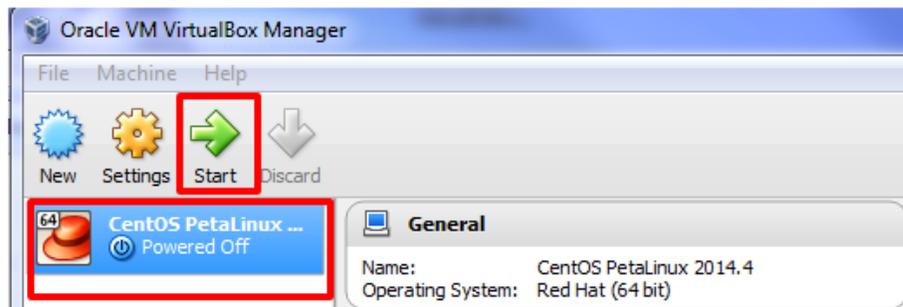


Figure 25 – Launch the New VM

2. Your VM may issue one or more warning messages similar to the one shown below. In most cases these will not impact the operation required for creating a PetaLinux development environment, and you may click the **OK** button. Correcting such issues is machine-dependent and is beyond the scope of this document.

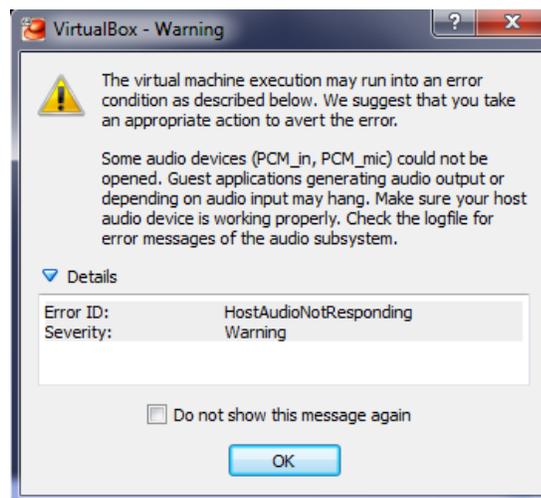


Figure 26 – Startup Warning Message(s)

3. 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.

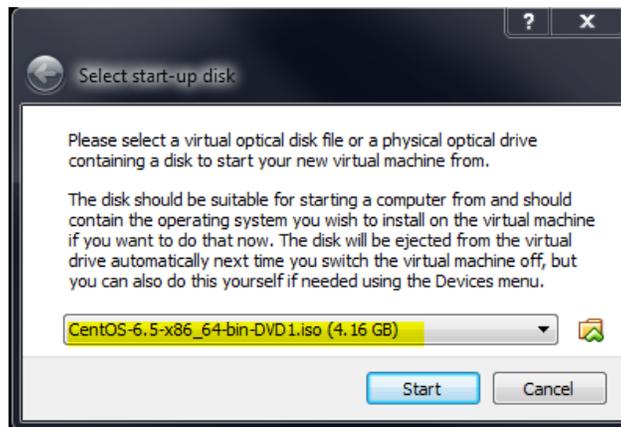


Figure 27 – Select VM OS Image

Proceed with section **Install CentOS 6.5** or section **Install CentOS 7**. Note that for Xilinx 2014.4 tools, CentOS 7 is not officially supported.

## Install CentOS 6.5

1. Select the option (default) to install and hit the *Enter* key. Note that during the installation you can recapture the cursor in Windows by pressing the *Right Ctrl* Key.

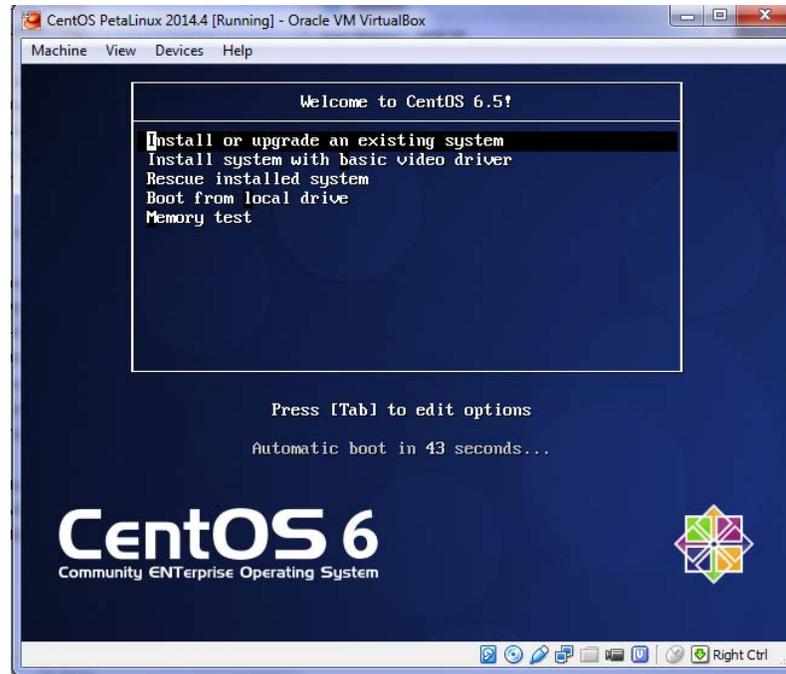


Figure 28 – CentOS Installation Initiated

2. You can choose whether to check the integrity of your installation media or not. If you have used it for prior VMs, it is likely OK. Hit the *Enter* key to select **OK** and test the media or use the *right arrow* keyboard key to select the **Skip** button and hit the *Enter* key to bypass.



Figure 29 – Test Installation Media

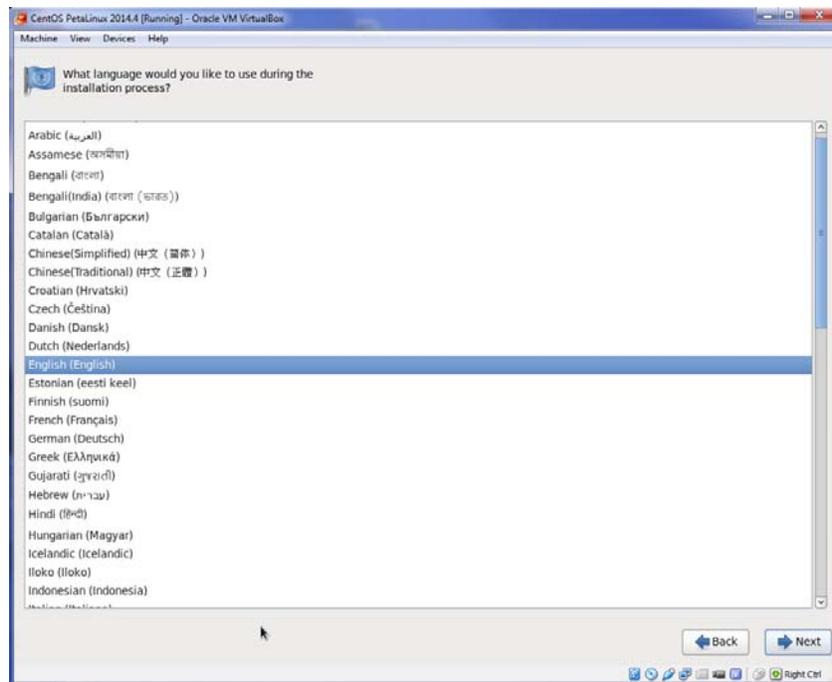
Following the media test, your virtual installation disk may be ejected. If this happens, from the main VirtualBox menu select **Devices** -> **CD/DVD Devices** -> **Choose a virtual CD/DVD disk file** and browse once again to your .iso image.

3. Click the **Next** button in the lower right corner of the installation Splash Screen.



**Figure 30 – CentOS Installation Splash Screen**

4. Select the local language and click the **Next** button.



**Figure 31 – Language Selection**

5. Select the keyboard corresponding to your host system and click the **Next** button.

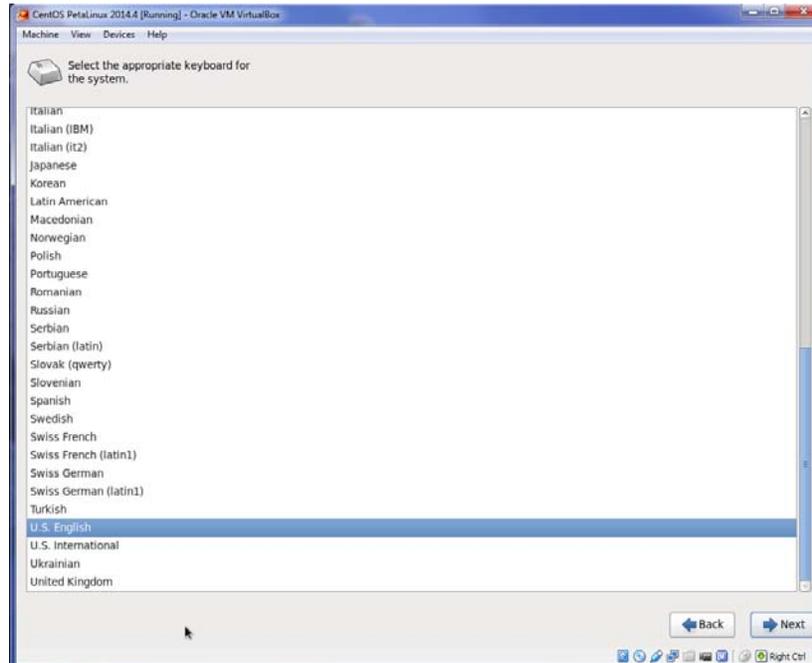


Figure 32 – Keyboard Selection

6. Select **Basic Storage Devices** and click the Next button.

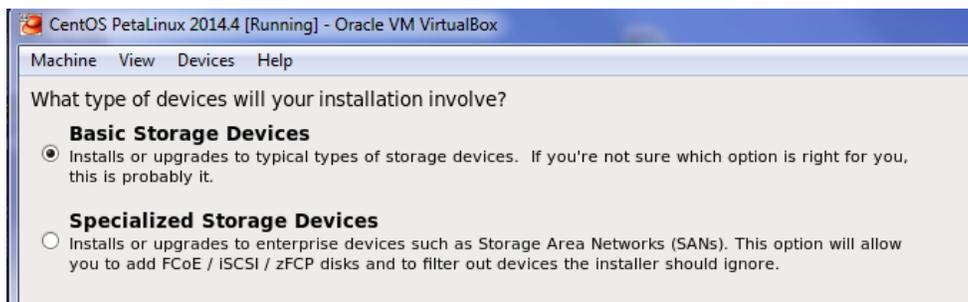


Figure 33 – Storage Selection

- Since this is a new virtual hard drive, there is no data to be salvaged. Click the **Yes** button to discard any data.



Figure 34 – Data Disposition

- Select a name for the Virtual system and click the **Next** button.



Figure 35 – Virtual System Name

- Select the time zone for your virtual system and click the **Next** button.

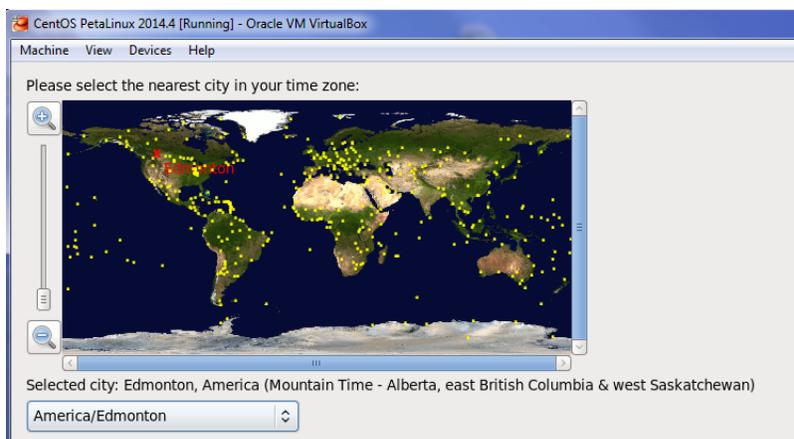
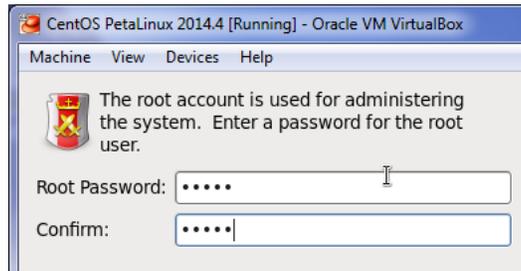


Figure 36 – Time Zone Selection

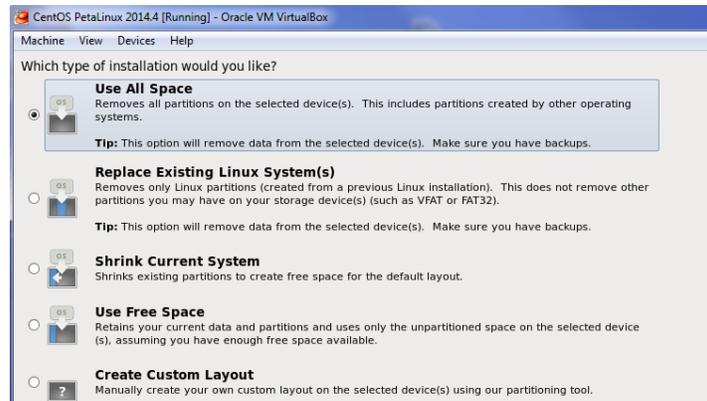
10. Enter a root password for the system and make a note of it. You will need this for tool installation later. The root password must be 6 characters or more. Click the **Next** button.



**Figure 37 – Select Root Password**

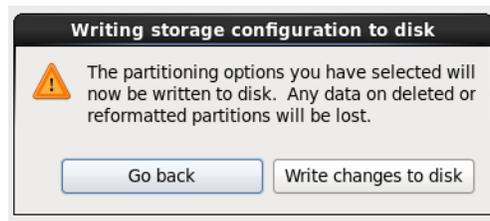
For testing purposes the root password used was “AvnetLinux”, but you should select a stronger password for enhanced security.

11. Select the option to **Use All Space** on the new virtual disk, and click the **Next** button.



**Figure 38 – Disk Space Disposition**

12. Confirm that your selections are correct by clicking the **Write changes to disk** button.



**Figure 39 – Create the Virtual Disk**

13. Select the installation type for the Virtual Machine. To avoid compilation problems when installing the Guest additions later, it is highly recommended to choose *Software Development Workstation*. Click the **Next** button.

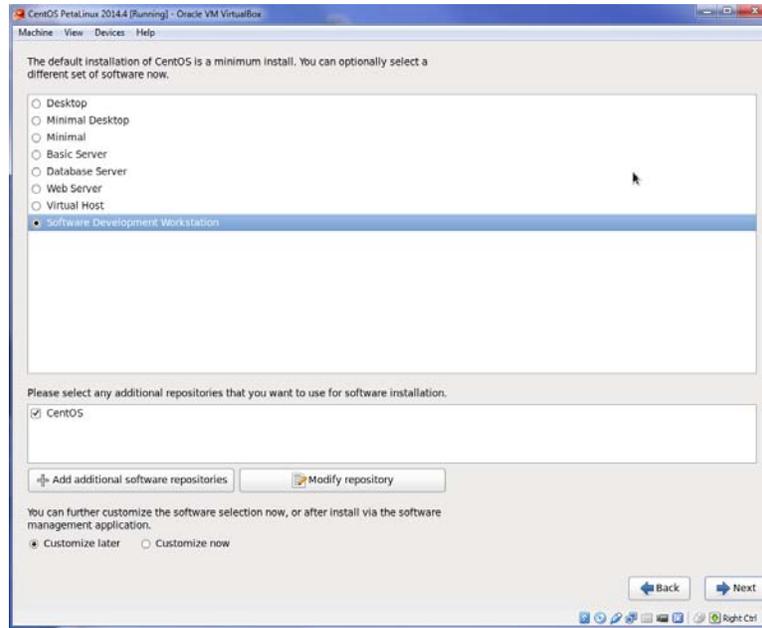


Figure 40 – Select System Type

14. The installation will take several minutes or more to complete.



Figure 41 – OS Installation in Progress

When the software installation completes, click the **Reboot** button at the lower right.

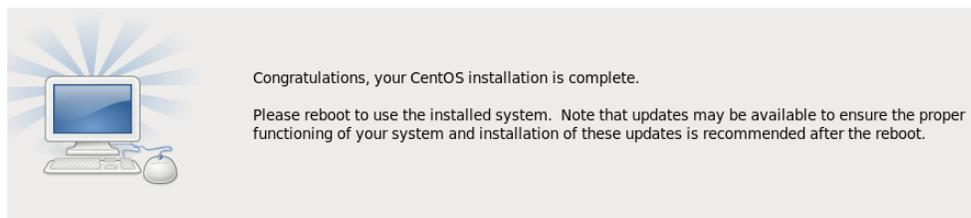


Figure 42 – Reboot

15. The OS installation is complete at this point, but the system still requires first-time configuration. Click the **Forward** button to continue.



Figure 43 – OS Configuration Splash Screen

## CentOS 6.5 First Time Configuration

1. To complete the installation, you must agree to the License conditions. To proceed, select the “Yes...” option and click the **Forward** button.

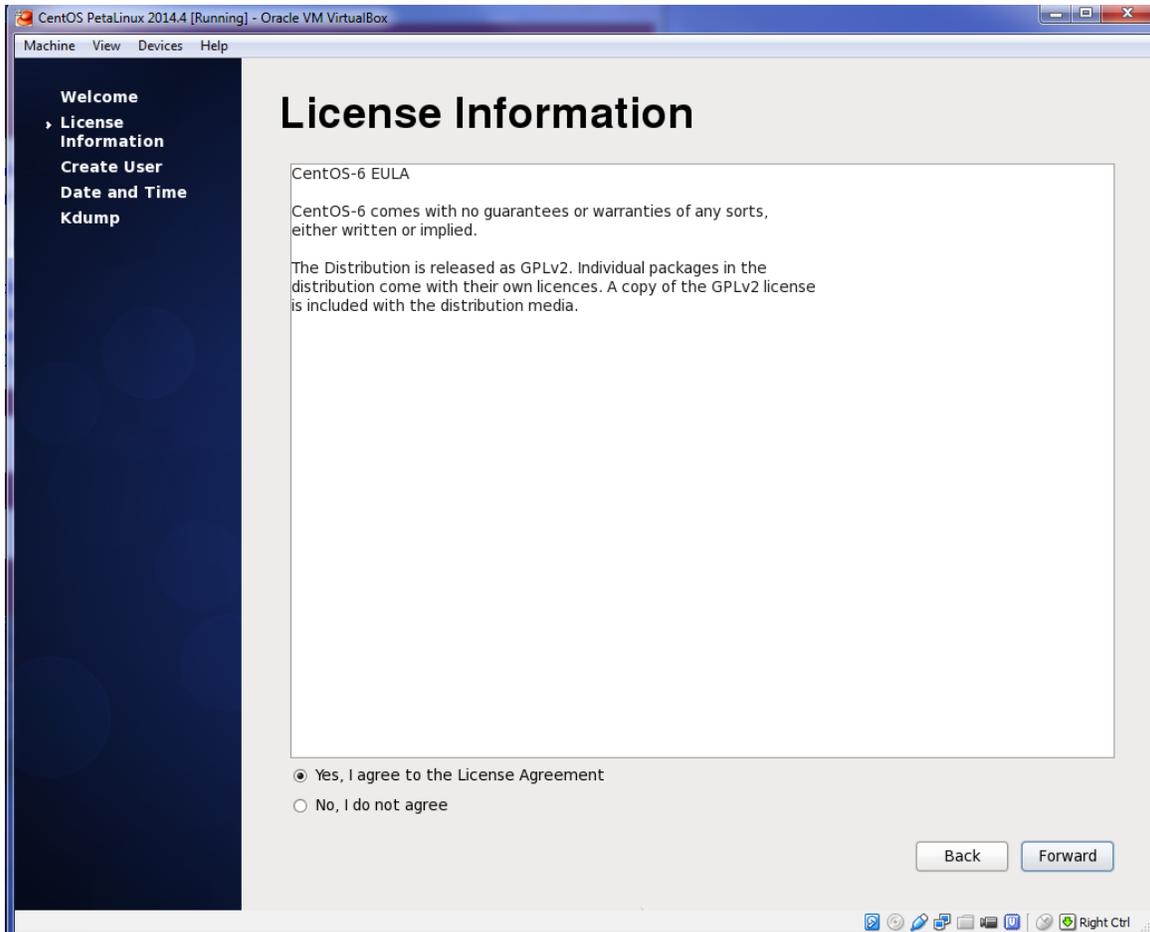


Figure 44 – Accept the OS License Agreement

2. You must create a standard user account to regularly log in to the Linux system. Enter a username and password information in the appropriate text boxes on this panel. You may select any valid username and password; the example shown here creates a user account for “training”. Click the **Forward** button.

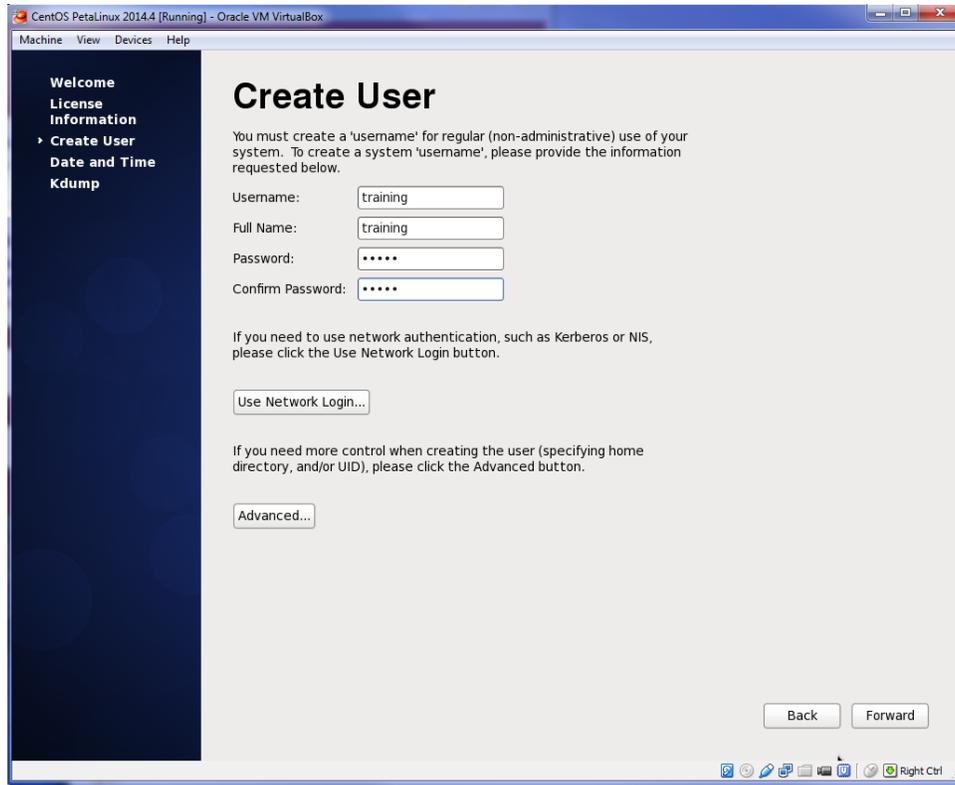


Figure 45 – Create Standard User Account

For testing purposes, the training user was assigned the password “Avnet”, but you should select a stronger password for enhanced security.

3. Allow Linux to synchronize its system clock over the Internet by checking the "Synchronize..." box. Click the **Forward** button.

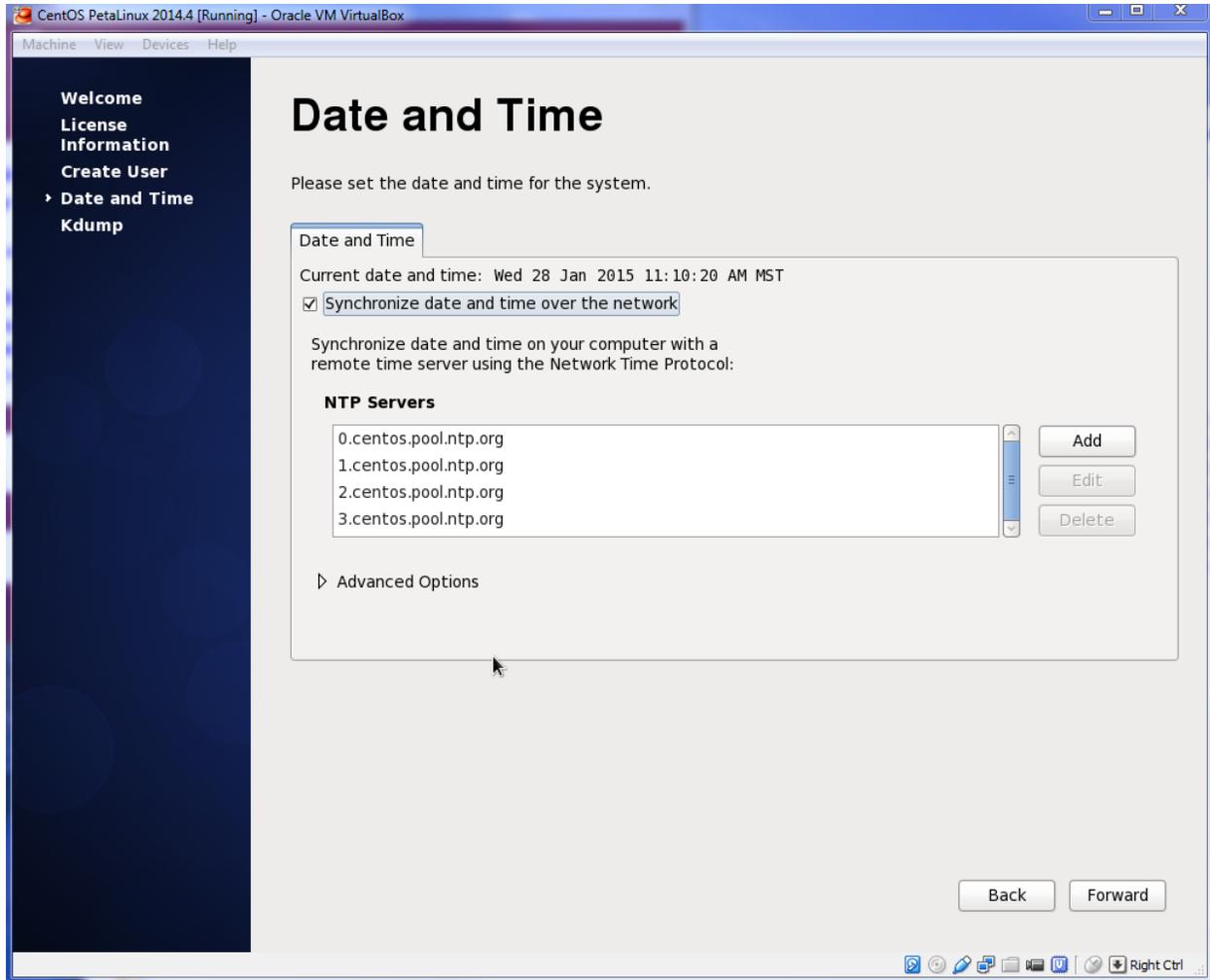


Figure 46 – Synchronize System Time

4. Kdump decreases system performance and it is unlikely to be needed in the virtual machine. Ensure the “**Enable kdump**” box is unchecked and click the **Finish** button.

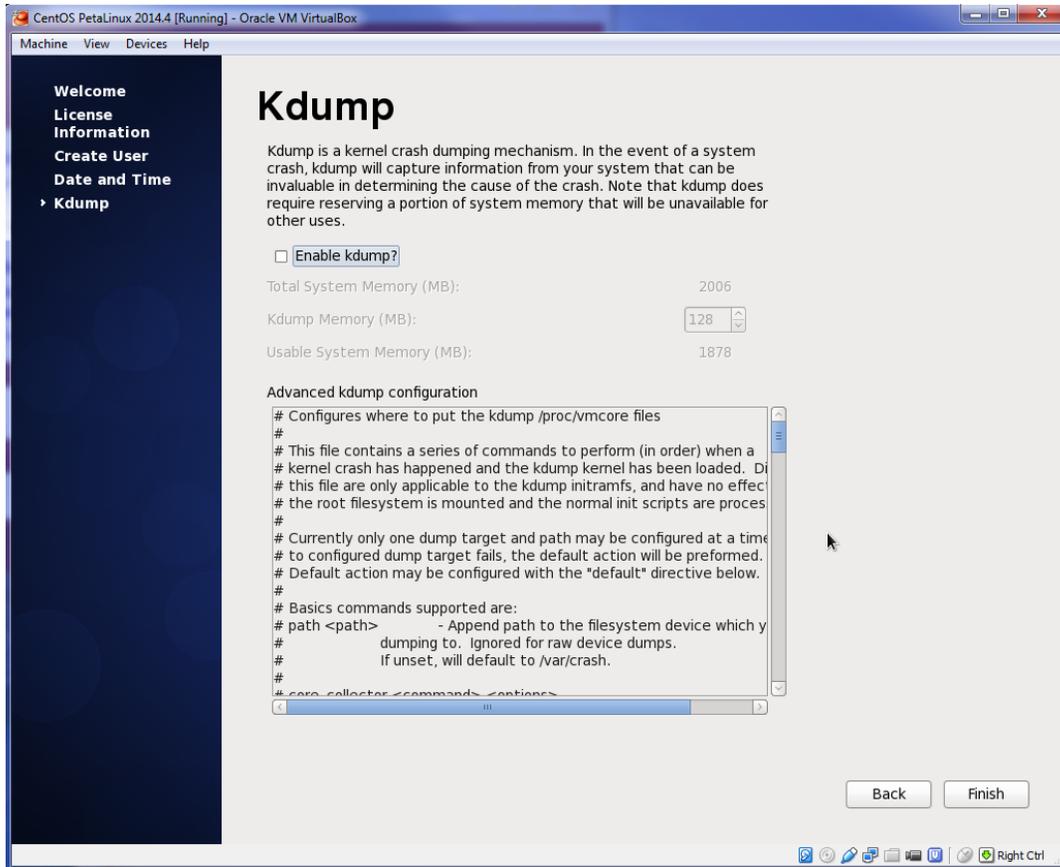


Figure 47 – Disable kdump

5. Click the **Yes** button.

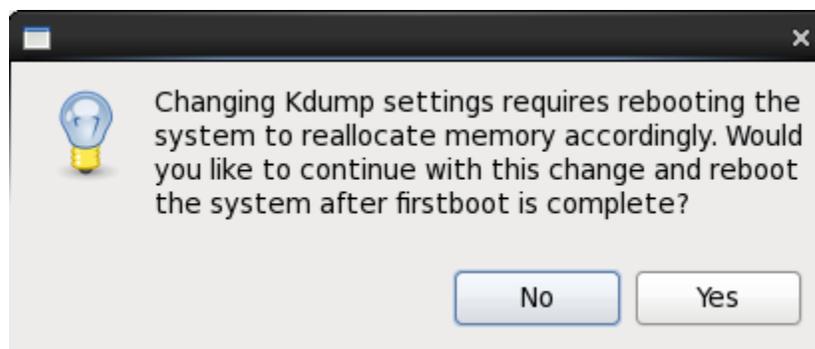
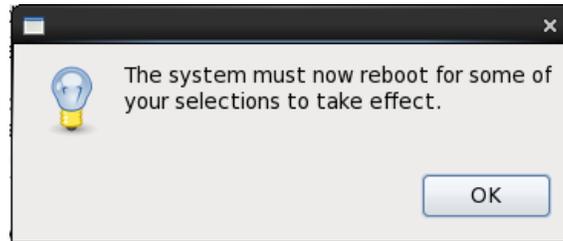


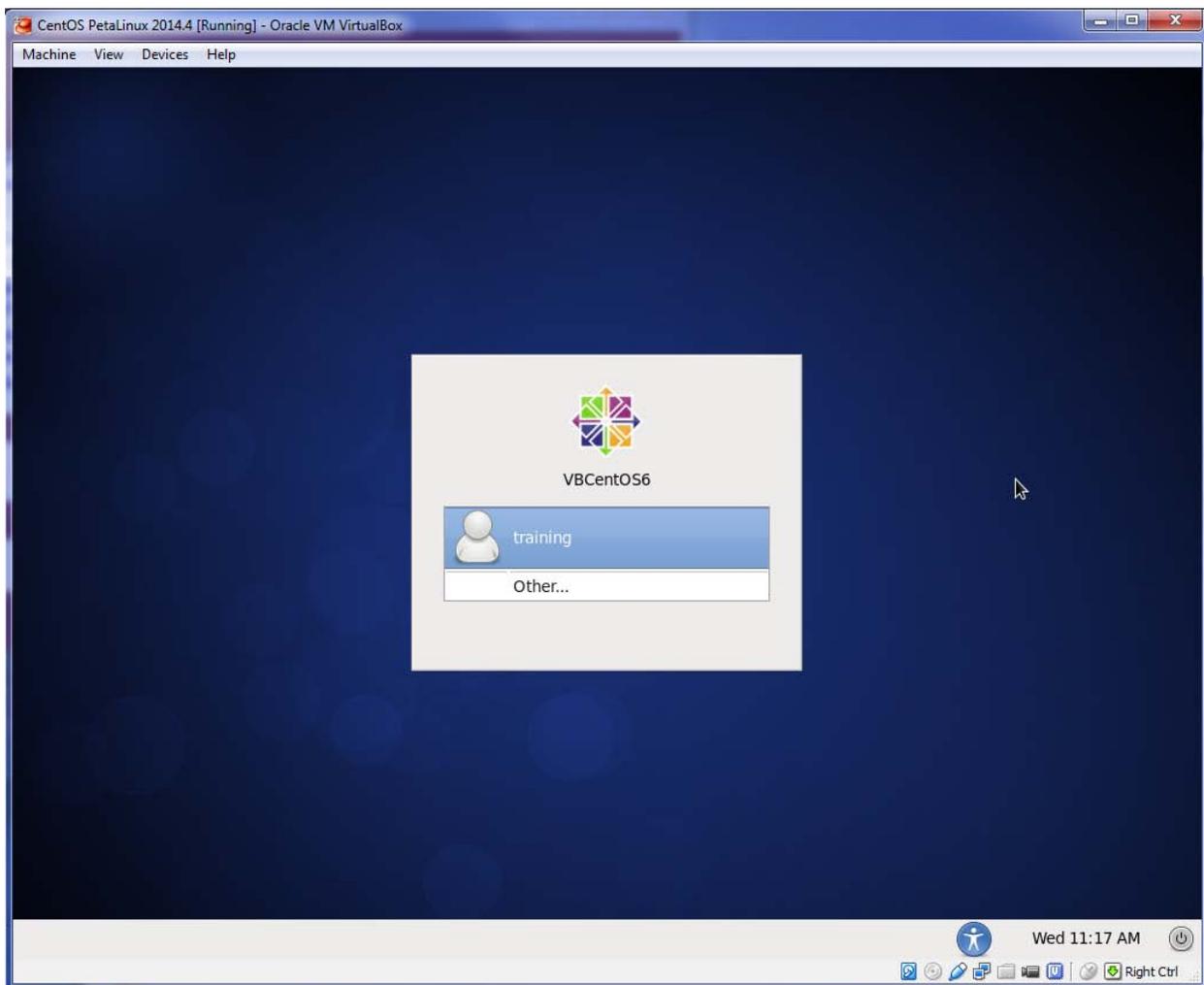
Figure 48 – Enable System Reboot

6. Click the **OK** button to reboot the system and complete the OS setup.



**Figure 49 – System Reboot**

7. After the system reboots, you may log in to Linux using the standard user account credentials created earlier in this section.



**Figure 50 – Log In as Standard User**

## Install CentOS 7

1. Select the option (default) to **Install CentOS 7** and hit the *Enter* key. If desired, you may move between options using the up/down arrow keys. Note that during the installation you can recapture the cursor in Windows by pressing the *Right Ctrl* Key.

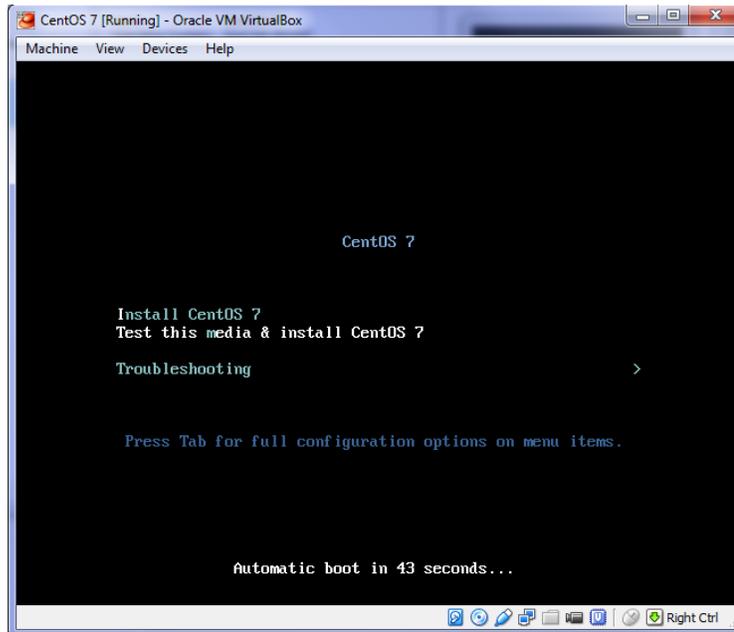


Figure 51 – CentOS 7 Initial Installation Screen

2. Select your language using the mouse and click the **Continue** button.

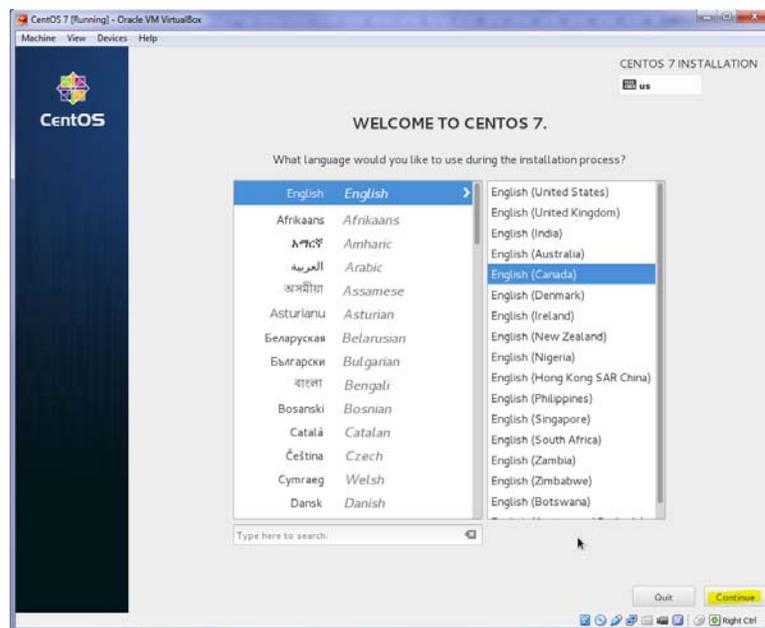


Figure 52 – CentOS 7 Initial Installation Screen

3. You *must* complete any sections marked with the  icon before proceeding. However, you may want to adjust a number of other sections as well. These adjustments are included in the following sub-bullets.

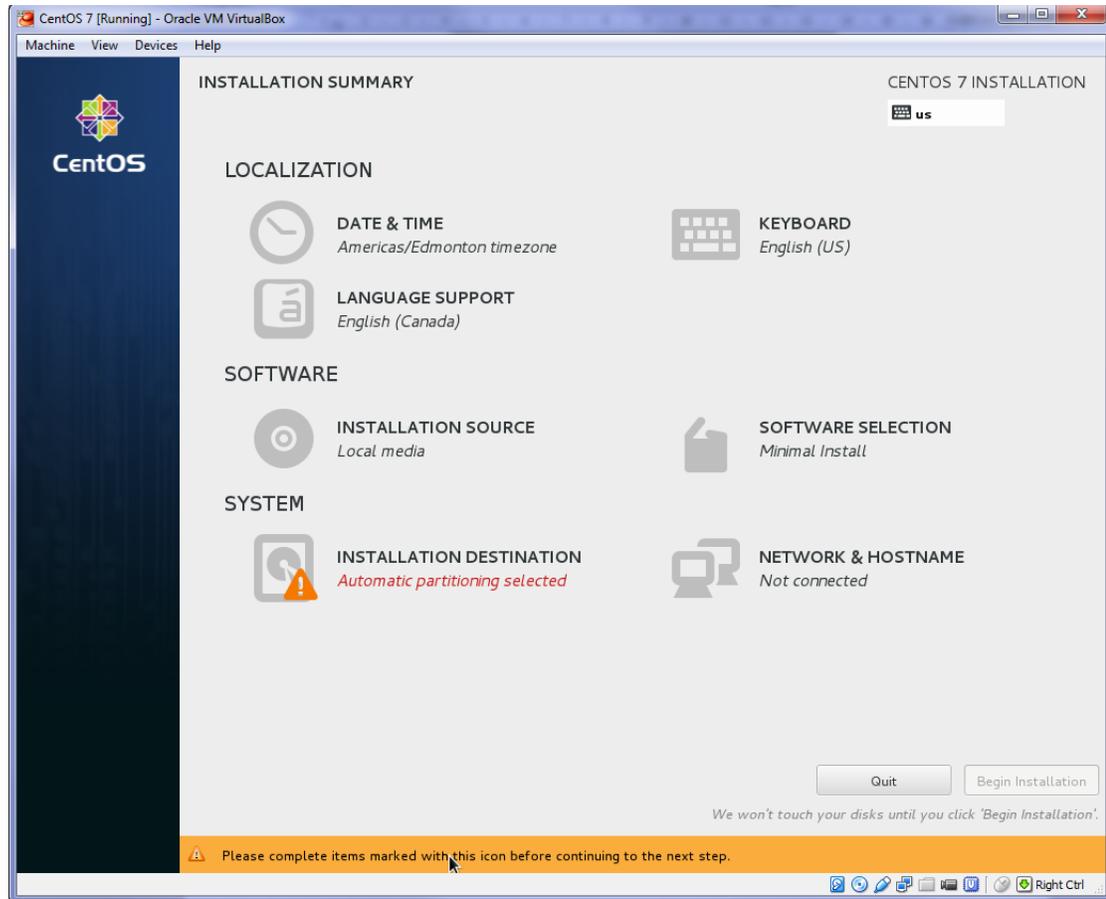
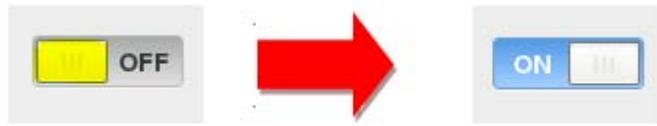


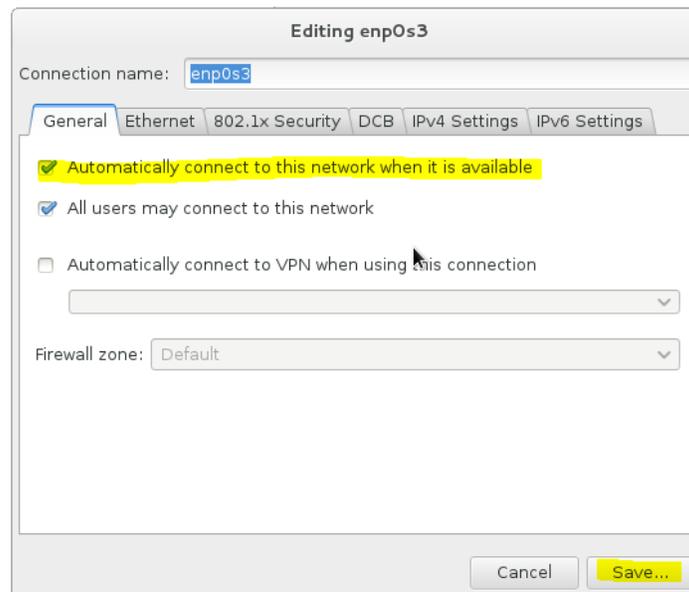
Figure 53 – CentOS 7 Installation Settings

- a. Click the **Network & Hostname** entry. In the new panel, click on the button next to the **OFF** indicator (highlighted) at the upper left to turn networking **ON**.



**Figure 54 – Activate Networking**

Click the **Configure** button in the panel. Click the checkbox to Automatically connect... Click the **Save** button to make the setting permanent.



**Figure 55 – Automatically Connect Network Interface**

Click the **Done** button at the upper left of the *Network & Hostname* panel to return to the *Installation Settings* screen.

- b. Click on the **Date & Time** entry. Select your time zone by clicking on the appropriate section of the world map. You can also choose to set your clock to an NTS server by turning the Network Time on by clicking on the slider button at the upper right.

If you wish you can also set the date and time of day manually by using the controls provided at the bottom of the panel.

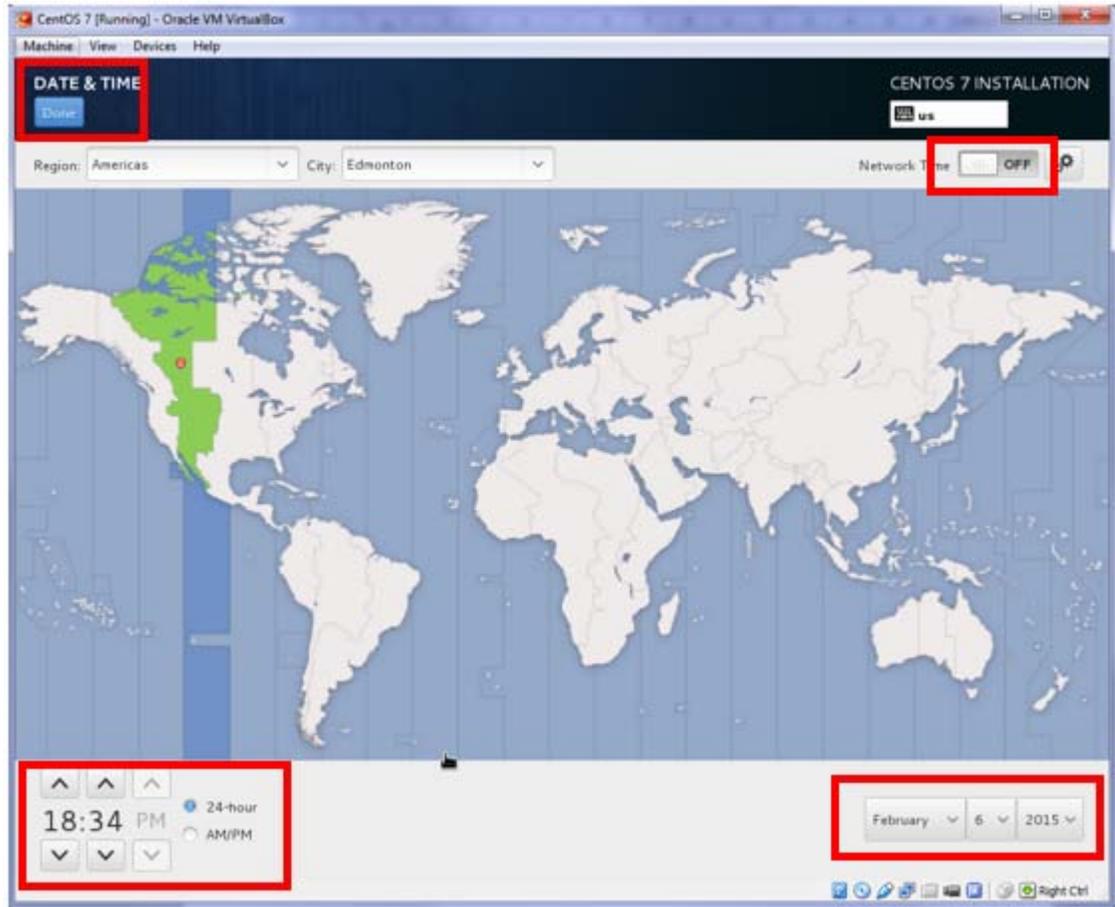


Figure 56 – Time and Date Selection

Click the **Done** button at the upper left to return to the *Installation Settings* screen.

- c. Click on the **Software Selections** entry. By default, a minimal installation is selected which provides only a command line interface. You probably want a desktop for ease of use, so the recommendation is to select GNOME Desktop<sup>4</sup>. This will populate the *Add-Ons* panel with additional options. At a minimum you should select the GNOME Applications, Legacy X-Window System Compatibility and Development Tools here.

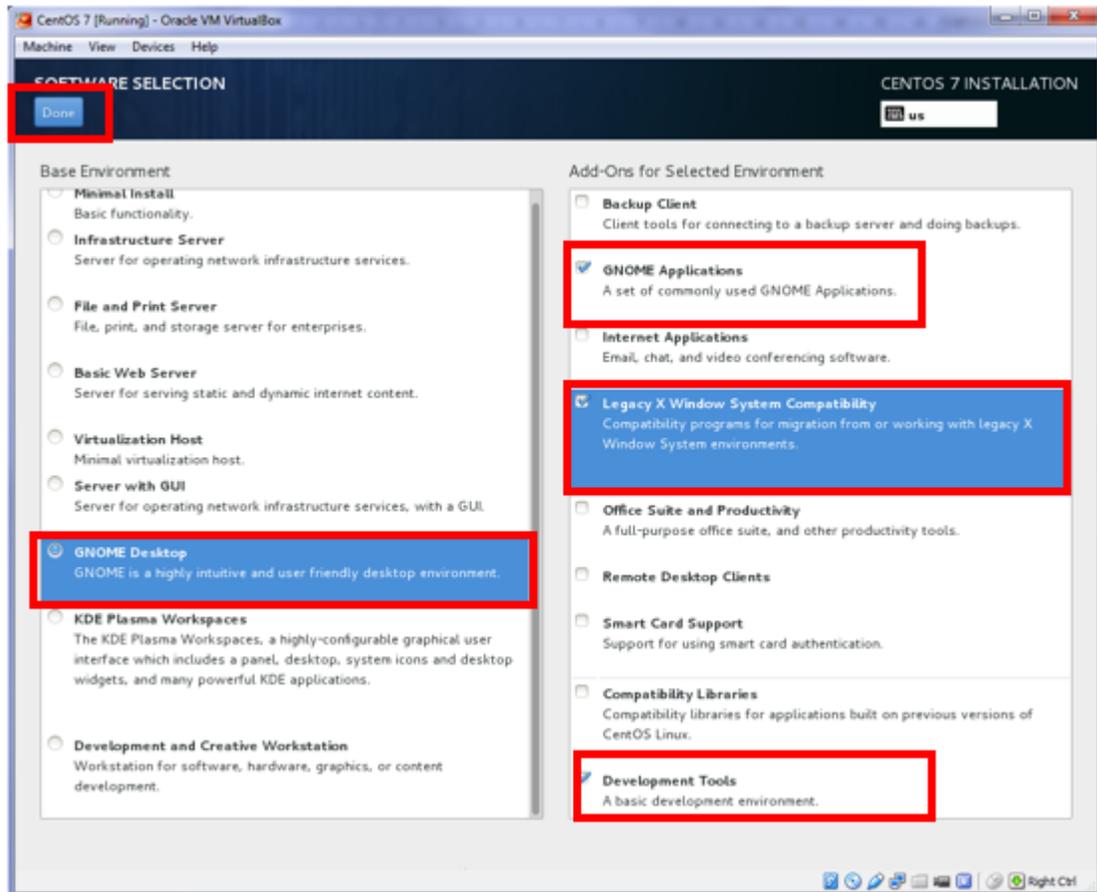


Figure 57 – Software Selection

Click the **Done** button to return to the *Installation Settings* screen.

<sup>4</sup> If you would like a more extensive set of development tools, you can select Development and Creative Workstation.

- d. Click on the **Installation Destination** entry. As this is a new installation, there is no need to make any changes here. You can allow the system to automatically partition the entire space previously allocated for your Guest OS hard drive. Ensure the **Automatically configure partitioning** option is selected, and click the **Done** button to return to the *Installation Settings* Screen.

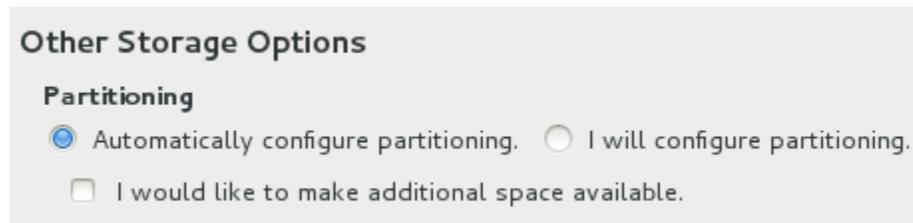


Figure 58 – Virtual Disk Partitioning Options

4. In the Installation Settings screen, click the **Begin Installation** button at the bottom right.



Figure 59 – Start CentOS 7 Install Script

5. As the installation process begins, you will see on the next panel that there is no root password and no user account. You can set both of these while the installation is going on.



Figure 60 – Configure User Settings

- a. Click on the **ROOT PASSWORD** entry. Enter and confirm the *root password* you wish to use for your CentOS installation. If your password does not meet the strength test, you will need to click the **Done** button twice instead of once to exit.

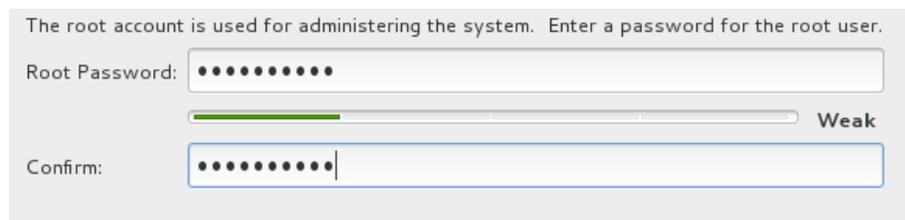
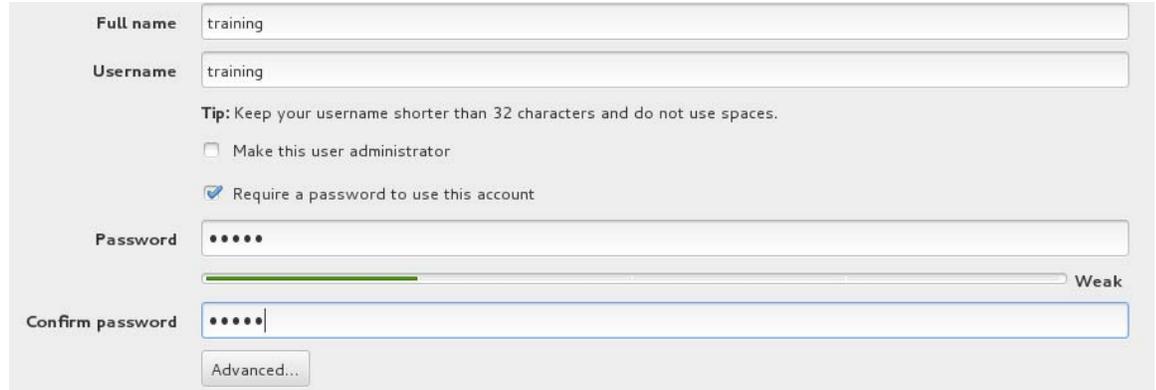


Figure 61 – Set root Password

- b. Click on the **USER CREATION** entry. Enter an account (user) name and password for the account. If you wish, you may uncheck the *Require a password...* box to remove the password requirement from the user account. Click the **Done** button (twice if your password is weak) to confirm the settings.



Full name: training

Username: training

Tip: Keep your username shorter than 32 characters and do not use spaces.

Make this user administrator

Require a password to use this account

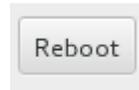
Password: •••••

Confirm password: •••••

Advanced...

**Figure 62 – Set Standard Account and Password**

6. When the installation completes, click the Reboot button at the bottom right of the screen to continue.



**Figure 63 – Reboot**

## CentOS 7 First Time Configuration

This section assumes you have just completed a system reboot following CentOS installation.

1. The first panel to appear is the INITIAL SETUP screen. You must accept the License Agreement before configuration can be completed.

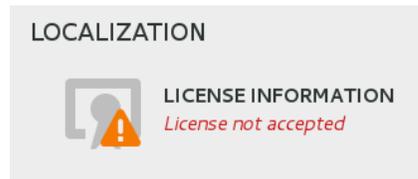


Figure 64 – License Agreement

- a. Click on the **License Information** entry. The next panel indicates where license information can be found in the distribution. Once you are satisfied with the licensing material, check the **I accept...** box and click the **Done** button at the upper left.



Figure 65 – Accept License

2. Click the **FINISH CONFIGURATION** button at the lower right.

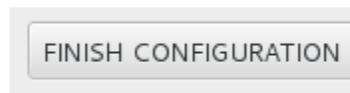


Figure 66 – Finish Configuration

3. Kdump is typically not required for a virtual machine, and uses memory that could otherwise be allocated to operational tasks. Uncheck the Enable kdump button and click the **Forward** button at the lower right to continue.

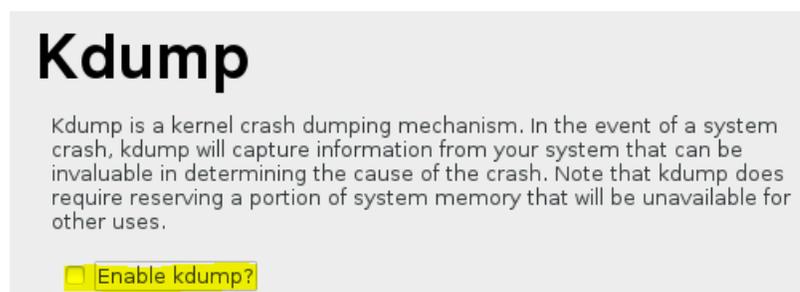
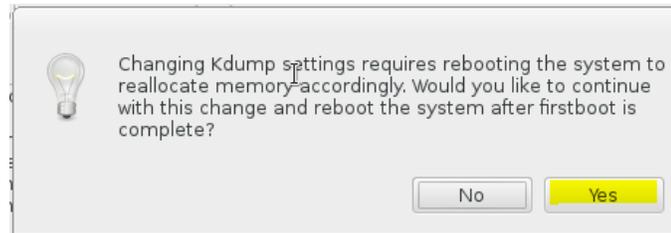


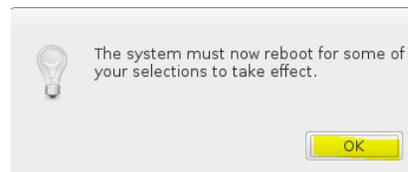
Figure 67 – Disable Kdump

- Click the **Yes** button to allow for a reboot after configuration completes.



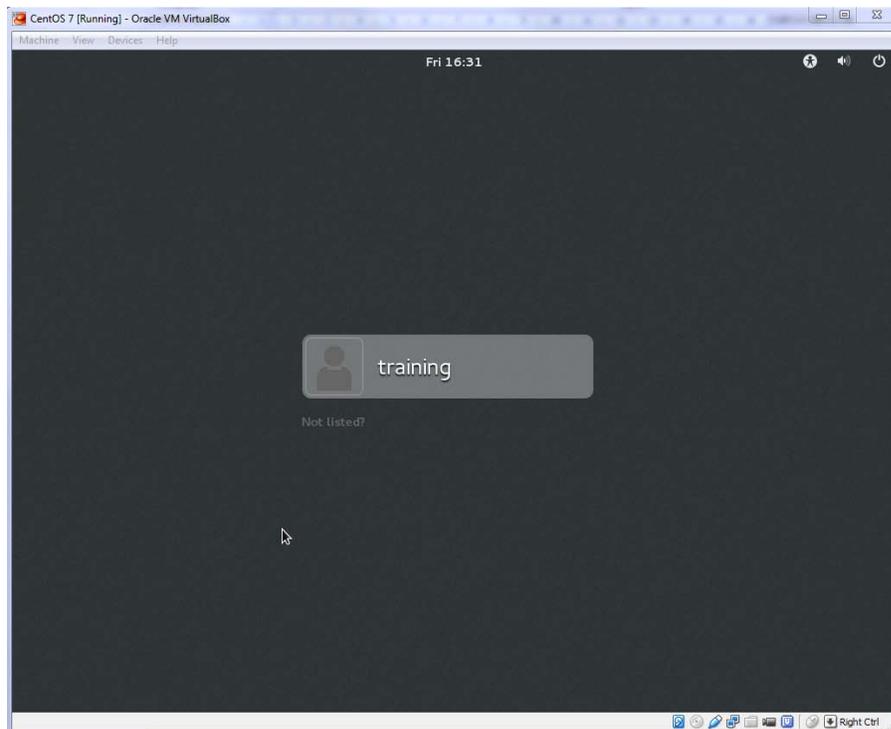
**Figure 68 – Allow Reboot**

- Click the **OK** button.



**Figure 69 – Reboot the Virtual Machine**

- After the system reboots, you may log in to Linux using the standard user account credentials created earlier in this section.



**Figure 70 – CentOS 7 Virtual Machine**

7. The GNOME desktop has a few more initial setup screens to finalize the user account on the first login. Select your default language and click the **Next** button.



Figure 71 – CentOS 7 User Account Default Language

8. Select your default keyboard input and click the **Next** button.



Figure 72 – CentOS 7 User Account Default Keyboard

9. Cloud setup is beyond the scope of this tutorial. Click the **Next** button to skip cloud setup.



Figure 73 – Skip Cloud Configuration

10. Click the **Start using CentOS Linux** button to complete the first time setup and view the desktop.



Figure 74 – Account Configuration Complete

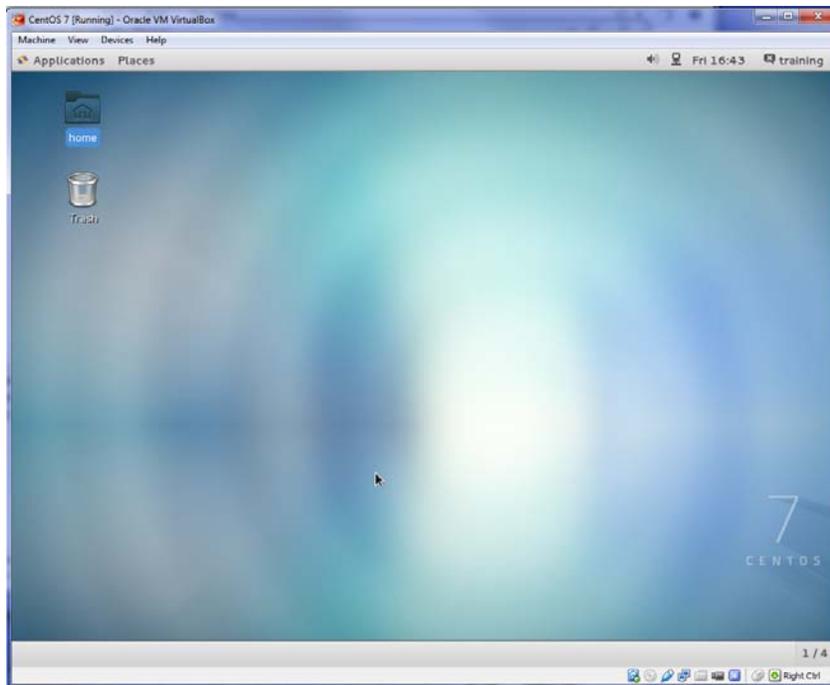


Figure 75 – CentOS 7 Default Desktop

## 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. If you attempt to use the shared folder facility without the Additions, you will receive the following error message.

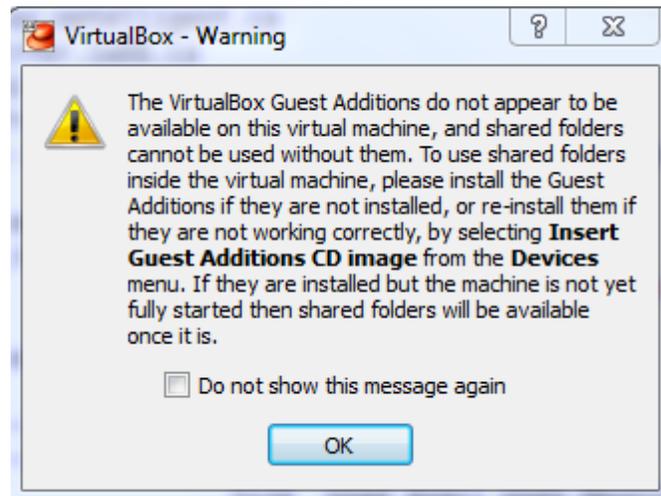


Figure 76 – VirtualBox Guest Additions Missing

After Guest Additions are installed, you will also be able to 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**.

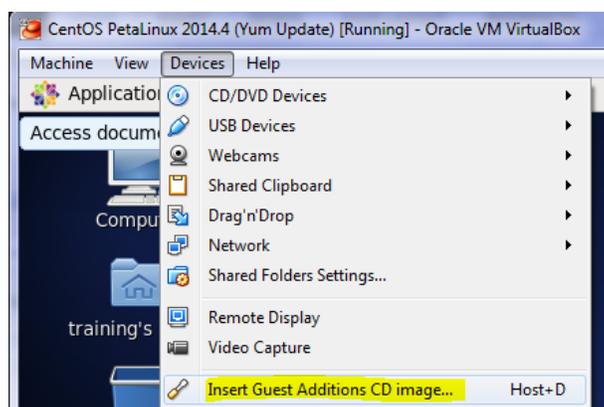


Figure 77 –Guest Additions Install

- b. (CentOS 6.5 Only) Click the **OK** button to commence the installation script.

NOTE: If this prompt does NOT appear, you can right-click on the VBOXADDITIONS icon on the desktop and select **Open with Autorun Prompt** from the dropdown menu.



Figure 78 – CentOS 6.5 Launch Guest Additions Script

- c. Click the **Run** button to execute the installation.



Figure 79 – Run Guest Additions Installation

- d. (CentOS 7 only) Enter the root password and click the Authenticate button.

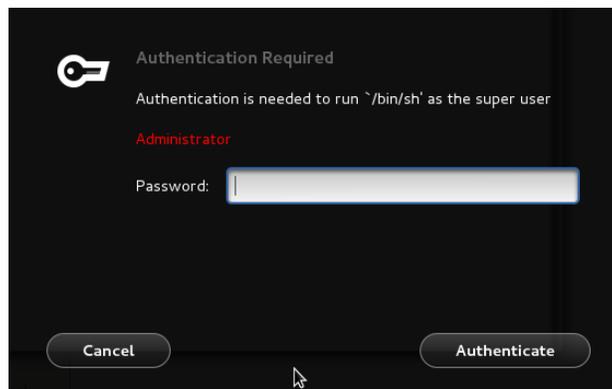
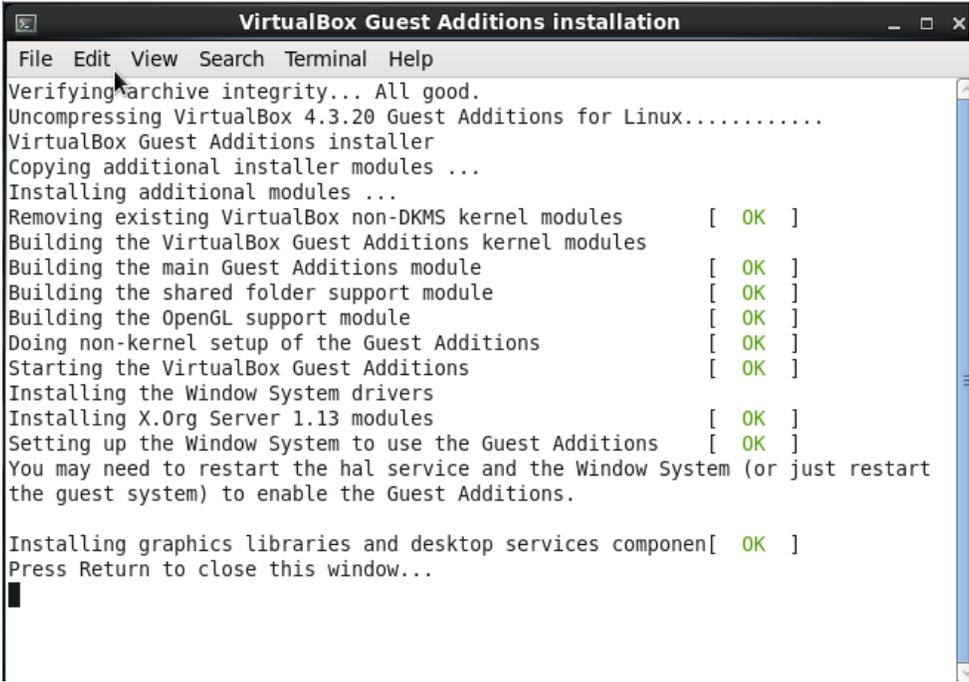


Figure 80 – CentOS 7 root Authentication

- e. The Guest Additions should install and verify with no failures. Press the Enter key to close the installation window.

A screenshot of a terminal window titled "VirtualBox Guest Additions installation". The window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal output shows the following steps: "Verifying archive integrity... All good.", "Uncompressing VirtualBox 4.3.20 Guest Additions for Linux.....", "VirtualBox Guest Additions installer", "Copying additional installer modules ...", "Installing additional modules ...", "Removing existing VirtualBox non-DKMS kernel modules [ OK ]", "Building the VirtualBox Guest Additions kernel modules", "Building the main Guest Additions module [ OK ]", "Building the shared folder support module [ OK ]", "Building the OpenGL support module [ OK ]", "Doing non-kernel setup of the Guest Additions [ OK ]", "Starting the VirtualBox Guest Additions [ OK ]", "Installing the Window System drivers", "Installing X.Org Server 1.13 modules [ OK ]", "Setting up the Window System to use the Guest Additions [ OK ]", "You may need to restart the hal service and the Window System (or just restart the guest system) to enable the Guest Additions.", "Installing graphics libraries and desktop services componen[ OK ]", and "Press Return to close this window...". A cursor is visible at the end of the last line.

```
VirtualBox Guest Additions installation
File Edit View Search Terminal Help
Verifying archive integrity... All good.
Uncompressing VirtualBox 4.3.20 Guest Additions for Linux.....
VirtualBox Guest Additions installer
Copying additional installer modules ...
Installing additional modules ...
Removing existing VirtualBox non-DKMS kernel modules [ OK ]
Building the VirtualBox Guest Additions kernel modules
Building the main Guest Additions module [ OK ]
Building the shared folder support module [ OK ]
Building the OpenGL support module [ OK ]
Doing non-kernel setup of the Guest Additions [ OK ]
Starting the VirtualBox Guest Additions [ OK ]
Installing the Window System drivers
Installing X.Org Server 1.13 modules [ OK ]
Setting up the Window System to use the Guest Additions [ OK ]
You may need to restart the hal service and the Window System (or just restart
the guest system) to enable the Guest Additions.
Installing graphics libraries and desktop services componen[ OK ]
Press Return to close this window...
█
```

**Figure 81 –Guest Additions Installation Complete**

## VirtualBox Shared Folders

Once the Operating System has 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 Settings**.

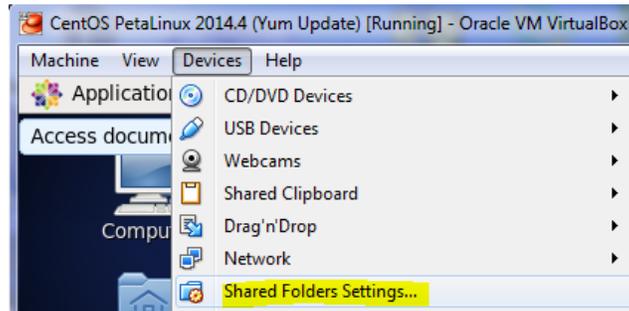


Figure 82 – VirtualBox Shared Folders

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

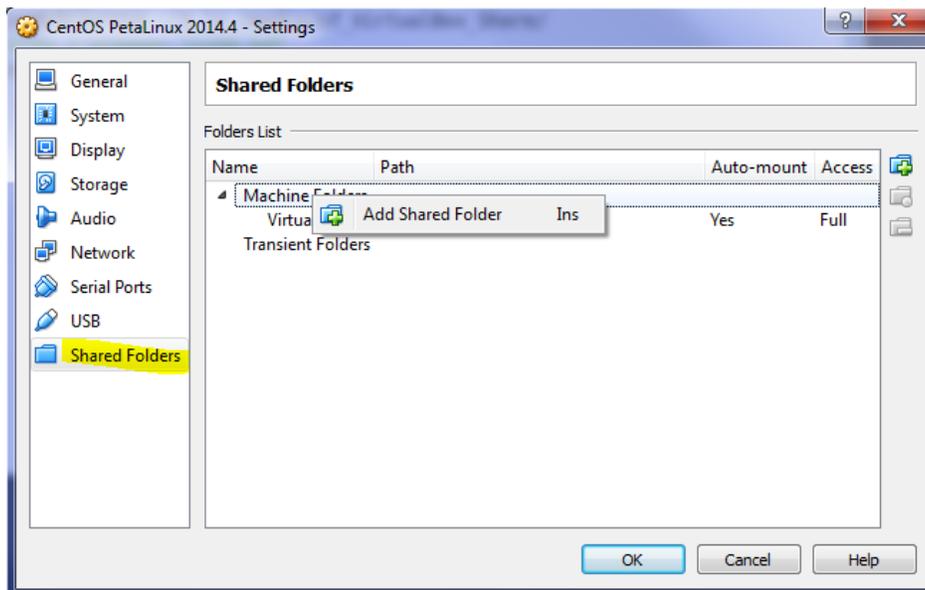
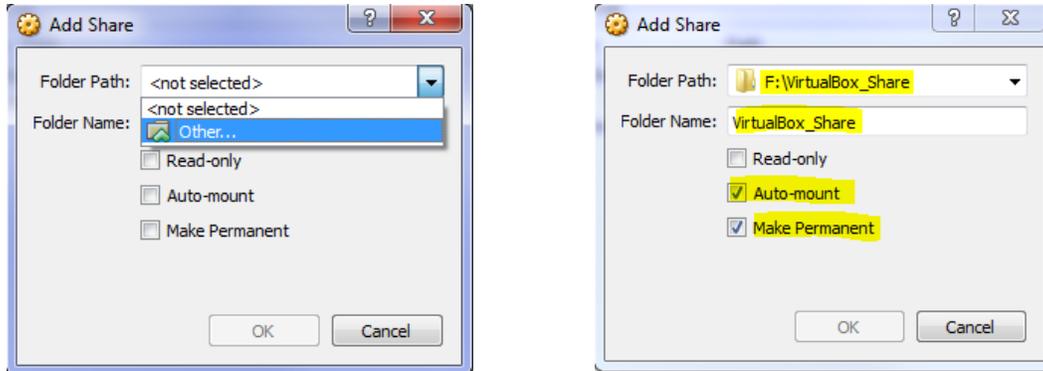


Figure 83 – Add Shared Folder

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

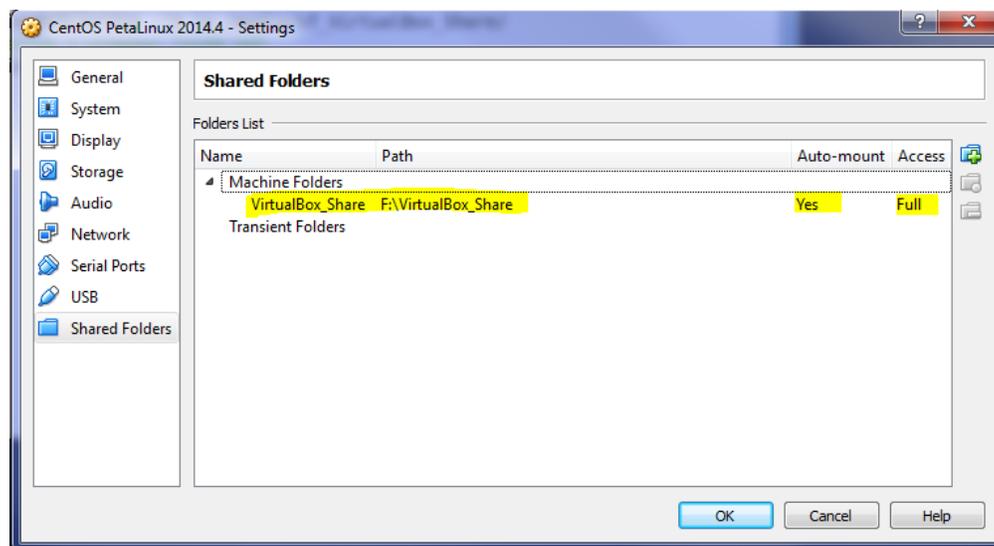


**Figure 84 – Create Shared Folder**

- 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.



**Figure 85 – Shared Folder Established**

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 CentOS from the command line. In a Terminal with root privilege, enter:

```
usermod -a -G vboxsf training
```

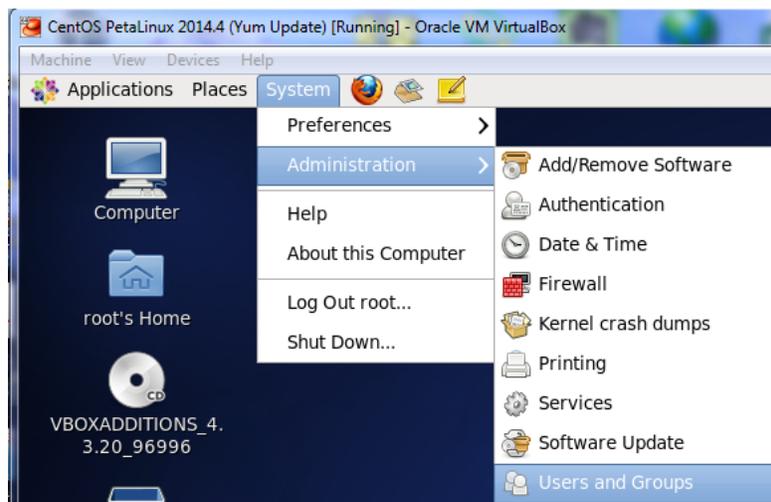
To list the groups user training belongs to, enter:

```
id training
```

```
[root@localhost ~]# usermod -a -G vboxsf training
[root@localhost ~]# id training
training(gid=1000)
vboxsf(gid=990)
[root@localhost ~]# █
```

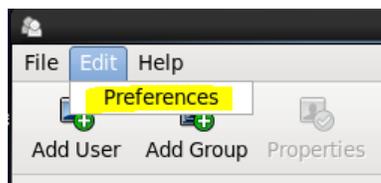
Skip to list item **10**.

In CentOS 6.5 if you prefer to use a GUI, from the main menu select **System -> Administration -> Users and Groups**. You will be asked to enter the root user password for access to this utility.



**Figure 86 – User Account Selection from root**

6. Click the **Groups** tab. From the menu, select **Edit -> Preferences**.



**Figure 87 – User Account Properties**

7. Ensure the *Hide systems users and groups* box is unchecked. Click the **Close** button.

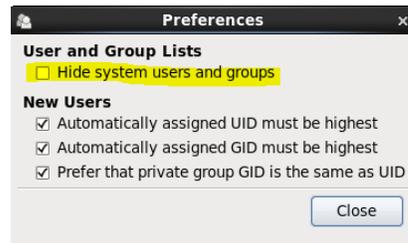


Figure 88 – Show All Groups

8. In the *User Manager* panel, select the **Groups** tab. Click the **Group Name** heading at the top of the column until that column is displayed in reverse alpha order. This will place the *vboxsf* group near the top, as shown. Double-click on the **vboxsf** entry.

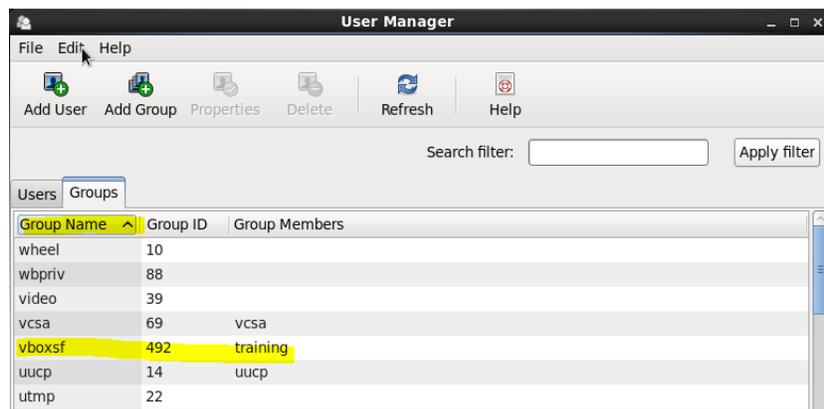


Figure 89 – vboxsf Group Selection

9. In the *Group Properties* panel, click the **Group Users** tab. Scroll down the list until you find the user name corresponding to the standard account you created. Select the checkbox next to the user name. Click the **OK** button to include the user name in the *vboxsf* group.

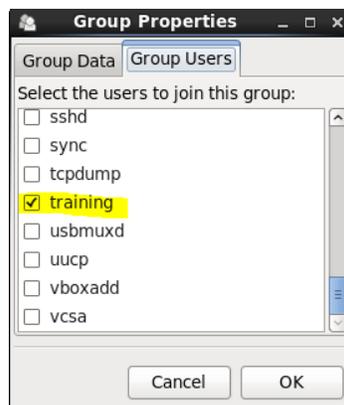


Figure 90 – Add User to vboxsf Group

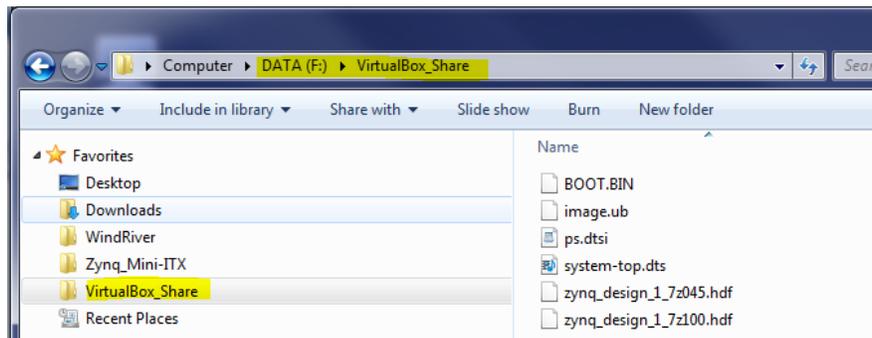
10. Close the *User Manager* panel. **Reboot the Virtual Machine.** The selected user name will belong to the *vboxsf* group on the next login. To access the shared folder from the Virtual machine, open a File window and browse to:

**`/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.



**Figure 91 – Shared Folder in Linux**



**Figure 92 – Shared Folder in Windows**

If you wish to mount a shared folder manually, open a Terminal window and elevate your privilege level to root with the `su` command. The following command will mount the folder *Virtualbox\_Share* at `/mnt/Virtualbox_Share`.

```
[root@VBCent056 training]# mount -t vboxsf Virtualbox_Share /mnt
```

## Xilinx Vivado/SDK Installation Tips

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.

The Vivado 2014.4 Installer lists the Operating Systems that are officially supported by Xilinx. The tools may run on other Linux distributions and versions, but there will likely be some manual configuration to be performed. Installation on unsupported systems is beyond the scope of these notes.

```
Supported operating systems for Vivado 2014.4 are:
- Windows 7 SP1: 32 and 64-bit
- Windows 8.1: 64-bit
- Red Hat Enterprise Linux 5.8-5.10: 32 and 64-bit
- Red Hat Enterprise Linux 6.4-6.5: 32 and 64-bit
- CentOS Linux 6.4-6.5: 64-bit
- SUSE Enterprise Linux 11.3: 32 and 64-bit
- Ubuntu Linux 14.04 LTS: 64-bit
```

### Install Vivado in the VirtualBox Linux VM

1. Copy the all-OS version of the compressed Vivado installer to your account desktop.

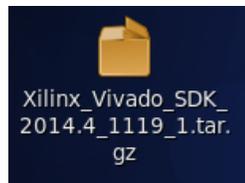


Figure 93 – Vivado Compressed Installer

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.

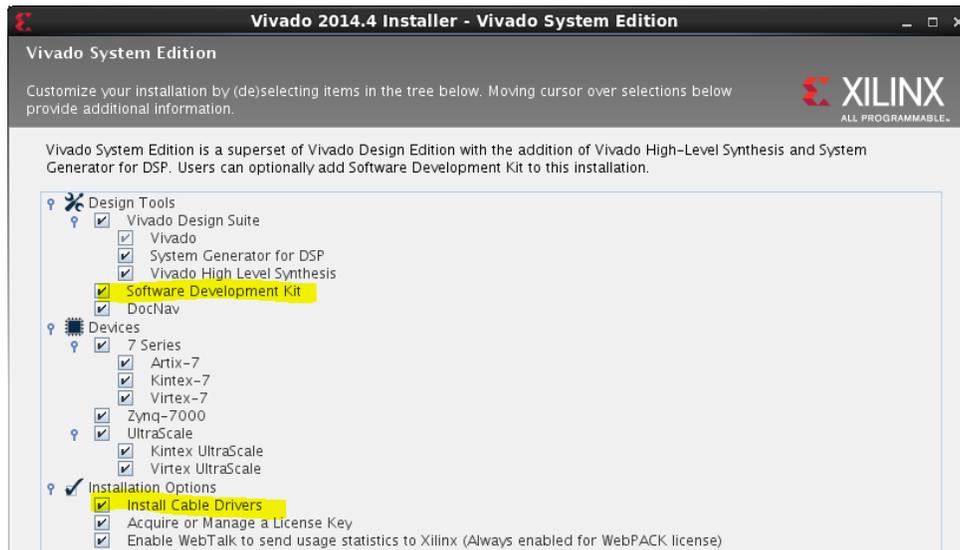
```
$ tar -xvzf ~/Desktop/<Compressed-Vivado-Installer-Name>
```

```
[training@VBCentOS6 ~]$ tar -xvzf ~/Desktop/Xilinx_Vivado_SDK_2014.4_1119_1.tar.gz
```

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).

```
[training@VBCentOS6 ~]$ cd Xilinx_Vivado_SDK_2014.4_1119_1/
[training@VBCentOS6 Xilinx_Vivado_SDK_2014.4_1119_1]$ ls
batchxsetup      data             msucr110.dll    tps              xsetup.exe
batchxsetup.bat  lib             payload         vccorlib110.dll
bin              msvcpl10.dll    scripts         xsetup
[training@VBCentOS6 Xilinx_Vivado_SDK_2014.4_1119_1]$ sudo ./xsetup
[sudo] password for training: █
```

4. Follow the instructions as shown in the Vivado installer GUI. **Note that if you wish only to install the SDK, select *SDK Development Kit* and *Install Cable Drivers* from the menu below.**
  - a. Accept all license agreements.
  - b. Select the Vivado version you wish to install (or SDK Standalone).
  - c. Select the Devices you need. Be sure to select the SDK and cable drivers here, as by default they are NOT installed.



**Figure 94 – Vivado Device Selection**

- d. 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 from your desktop to free up 8+ GB of disk space if necessary.
  - e. Obtain and Install a license for your tools.
5. After installation, run the Xilinx settings script in a terminal window.

```
[training@VBCent056 Xilinx_Vivado_SDK_2014.4_1119_1]$ source /opt/Xilinx/Vivado/2014.4/settings64.sh
[training@VBCent056 Xilinx_Vivado_SDK_2014.4_1119_1]$ source /opt/Xilinx/SDK/2014.4/settings64.sh
```

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

## Install Missing Desktop Icons

In some cases Vivado and/or SDK desktop icons may be missing. You can manually create desktop shortcuts to the tools.

1. Right-click in any open Desktop area. Select Create Launcher from the pop-up menu.

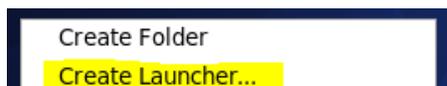


Figure 95 – Desktop Pop-up Menu

2. Leave the *Type* as **Application**. Enter the tool **Name**. Click the **Browse** button to locate the tool executable. Click the **OK** button to complete the Launcher. The executables for the Xilinx tools are located by default at:

<b>Vivado:</b>	<code>/opt/Xilinx/Vivado/&lt;version&gt;/bin/vivado</code>
<b>SDK:</b>	<code>/opt/Xilinx/SDK/&lt;version&gt;/bin/xsdk</code>
<b>DocNav:</b>	<code>/opt/Xilinx/DocNav/docnav</code>



Figure 96 – Desktop Launcher Icons

## Install Missing Cable Drivers

If you install Vivado in a standard user account and do not use root permission for the installation, you may find the cable drivers are not installed even though they were selected. The drivers can be installed manually.

1. Open a Terminal window.
2. At the command prompt, enter:

```
$ sudo
<Vivado_install_dir>/data/xicom/cable_drivers/lin64/install_script/install_drivers/install_drivers
```

```
[training@VBCent056 ~]$ sudo /opt/Xilinx/Vivado/2014.4/data/xicom/cable_drivers/lin64/install_script/install_drivers/install_drivers
```

3. You may also use the Terminal Window to install the device manager for the Linux kernel.

```
$ sudo yum install udev
```

## Install Libraries for DocNav

Document Navigator requires a specific set of version-specific libraries to operate correctly. If you are having problems with DocNav, the following instructions may be helpful.

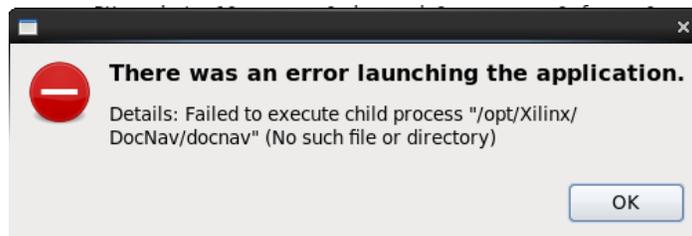


Figure 97 – DocNav Launch Error

### Required 32-bit Libraries

fontconfig.i686  
libXext.i686  
libXrender.i686  
glib2.i686  
libpng.i686  
libSM.i686  
libstdc++.i686

The libraries may be installed but DocNav might require a new version. The updates can be performed from a command line terminal with root privilege. Use the YellowDog Updater (Modified) to update each library. There are two versions of the libraries, one for 64 bit (.x86\_64) and one for 32-bit (.i686). You must update the 64 bit library first and then add the 32-bit library, as follows:

```
$ sudo yum update <library_name_without_extension>  
$ sudo yum install <library_name_with_extension>
```

```
[training@VBCentOS6 ~]$ sudo yum update fontconfig  
[sudo] password for training:  
[training@VBCentOS6 ~]$ sudo yum install fontconfig.i686
```

Document Navigator should now operate correctly.

## Multi-lib Version Error (installing Libraries)

If you receive an error similar to the following:

```
Error: Multilib version problems found. This often means that the root
cause is something else and multilib version checking is just
pointing out that there is a problem.
```

This is an indication that there is a conflicting update required between the 64-bit and 32-bit versions of the packages. To resolve the issue, you must first update the 64-bit library, then install the 32-bit version.

```
$ sudo yum update <library_name_without_extension>
$ sudo yum install <library_name_with_extension>
```

For example, if the error is issued for *libselenium.i686*, enter the following commands at the root prompt:

```
yum update libselenium           (update 64-bit package)
yum install libselenium.i686     (install 32-bit package)
```

## Windows 260 Character Path Limit

If you are using the Vivado Design Suite on a Windows-7 host, you may run into issues resulting from Vivado pathnames exceeding the maximum allowed. Vivado projects create a very deep file hierarchy, and it becomes very easy to violate the Windows limit if the project is not extracted near the root of the drive. This can even happen when the archive is decompressed, depending on where you choose to place the project in your existing file hierarchy.

It is not always convenient to place every Vivado project at the root of a drive. To work around this limitation, the recommended procedure is to place the Vivado archive in a shared folder on your host machine, then use Windows Explorer to map a network drive to the directory where the archive will be decompressed. This allows the Vivado project to be mapped to the root of the virtual (mapped) directory, eliminating any path issues.

Vivado also makes use of the Windows temp folder, which may be located several folders removed from the root drive, and this can also cause problems. You can create your own temporary directory in C:\temp, and force Vivado to use the new folder with the following TCL:

```
set_param "project.customTmpDirForArchive" C:/temp
```

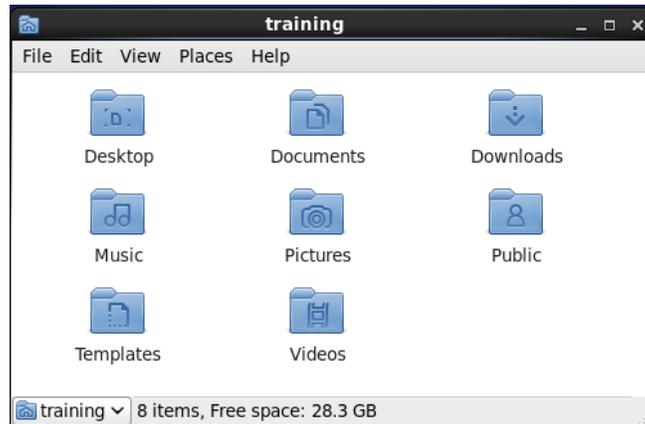
For further information, see the Xilinx answer record at:

<http://www.xilinx.com/support/answers/52787.html>.

## CentOS Installation Tips

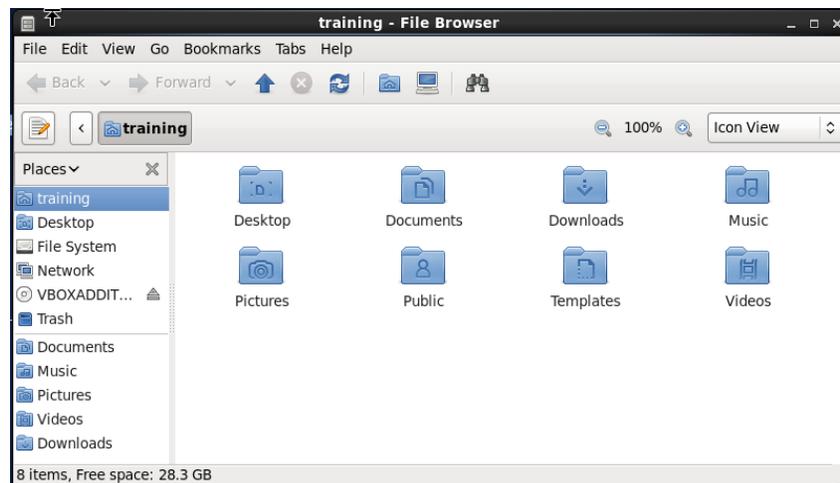
### Open Folders in Browser Mode

By default in the CentOS Nautilus GUI, file folders are opened in separate windows, as shown below.



**Figure 98 – VirtualBox Network Properties**

If you would prefer the operation to be more akin to Windows Explorer, where you can move between folders in the same window as shown here, perform these steps:



**Figure 99 – View Folders in Browser**

1. From an open folder window menu, select **Edit -> Preferences**.

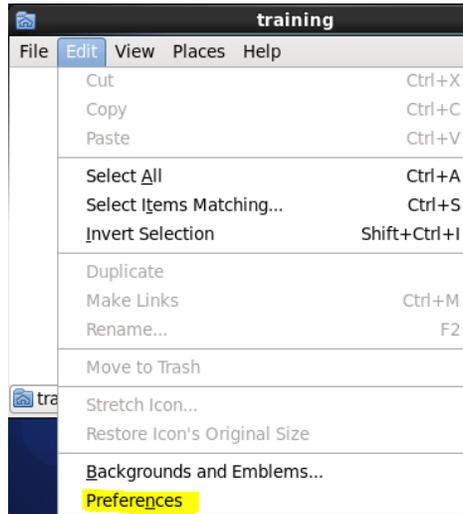


Figure 100 – Edit Folder Preferences

2. Select the **Behavior** tab and check the box to **Always open in browser windows**. Click the **Close** button to save the new setting.

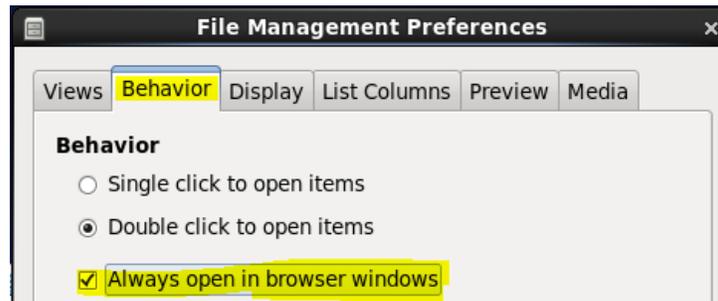


Figure 101 – Select Browser Display Option

3. Close the folder window, and open a new folder window. All subsequent open folder requests will use the browser format.

## Set Standard Account for sudo

Many installation and configuration operations must be performed from a process with root privilege. While the *su* command (with root password) is always available, it is often more convenient to use the *sudo* command to allow root privilege to the current operation only. To allow a standard user account access to *sudo*, a configuration change must be made to the Linux system. When authorized for *sudo*, a standard account need only confirm with the account password, not the root password.

This example uses a standard account named **training**. You can use any standard account on your system.

1. In the CentOS guest operating system, open a terminal window through the **Applications**→**System Tools**→**Terminal** menu item.

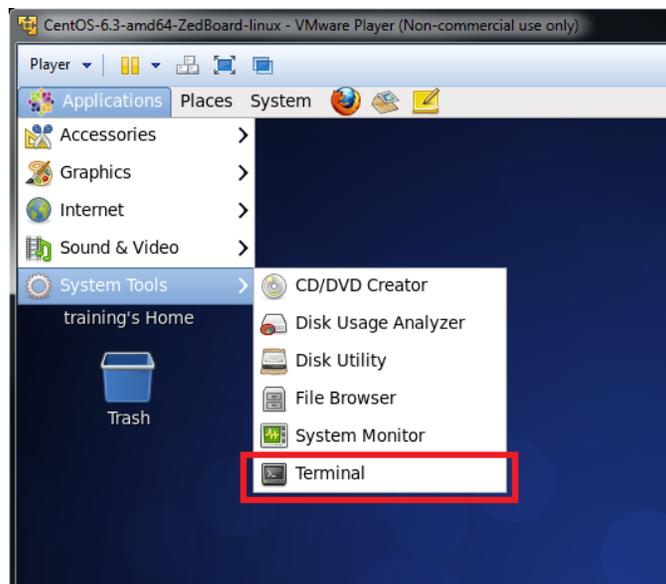


Figure 102 – Launching the CentOS Terminal from the Desktop

- Take on root privileges by running the superuser elevation command **su** and entering the root password.

```
$ su
```



```
training@localhost:/home/training
File Edit View Search Terminal Help
[training@localhost ~]$ su
Password:
[root@localhost training]#
```

Figure 103 – Elevating to Superuser Privileges

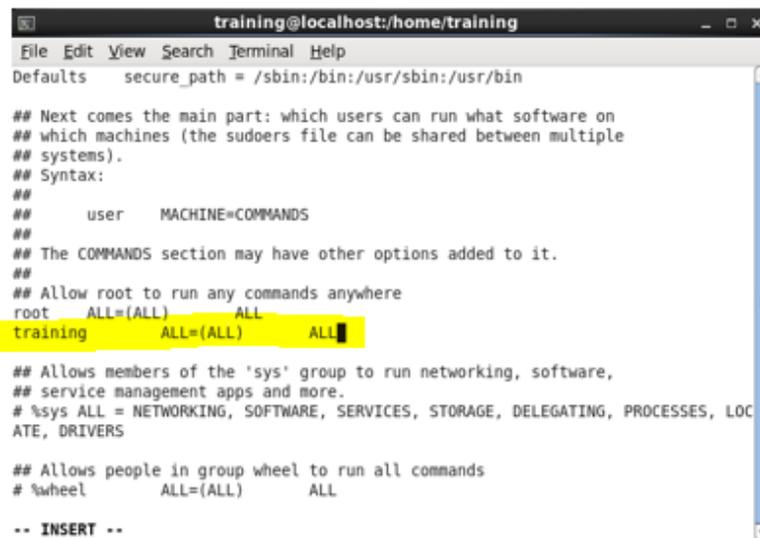
- Use visudo text editor to edit the **/etc/sudoers** file.

```
# visudo
```

- Add the **training** user to the sudoers list by inserting the following line to the users section of the sudoers file as shown below. The users section is located towards the end of the file.

```
training    ALL=(ALL)  ALL
```

To add text from within the vi editor, **press the “i” key** on the keyboard to use vi *insert* mode.



```
training@localhost:/home/training
File Edit View Search Terminal Help
Defaults    secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
##   user    MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)    ALL
training    ALL=(ALL)    ALL

## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
## %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOC
ATE, DRIVERS

## Allows people in group wheel to run all commands
# %wheel    ALL=(ALL)    ALL

-- INSERT --
```

Figure 104 – Adding training Account to /etc/sudoers File

- Exit the vi editor and save changes to the sudoers file by using the write-quit key sequence:

```
<ESC> :wq
```

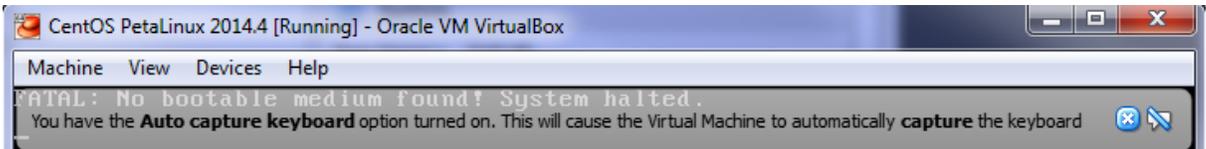
- The **training** user will now have sufficient privileges to do important systems tasks using the sudo command. Exit the superuser mode by typing **exit** at the command prompt.

```
# exit
```

## No Bootable Media During OS Installation

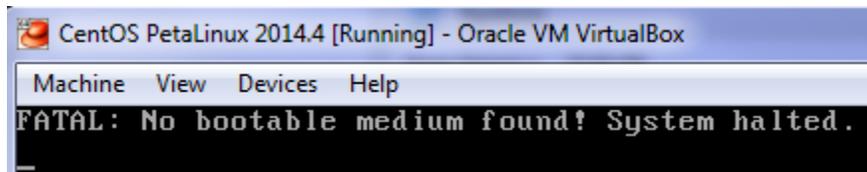
If you power down an empty Virtual Machine prior to installing the operating system, you may get an error on power-up that there is no bootable media found. Correct this by following the instructions below.

1. If shown, click the  icon to close the *Auto capture Keyboard* warning, or the  icon to suppress the message permanently.



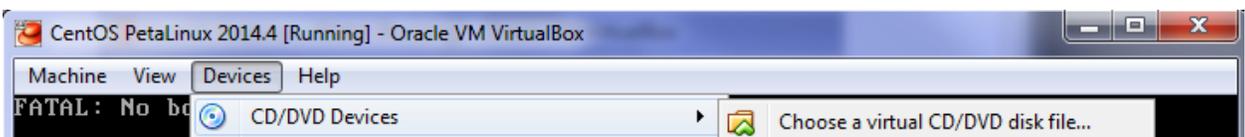
**Figure 105 – Auto Capture Keyboard Warning**

2. VirtualBox informs you that there is no bootable media. This is correct as there is no OS installed at this point.



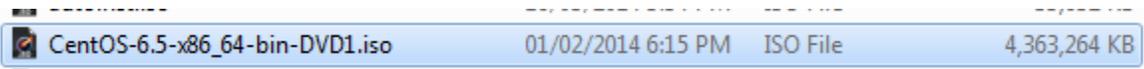
**Figure 106 – No Bootable Media Warning**

To locate the OS image downloaded earlier to your host system, select **Devices -> CD/DVD Devices -> Choose a virtual CD/DVD disk file.**



**Figure 107 – Select a Disk to Install**

3. Browse to the download location for your OS image. Select the image and click the **OK** button.



**Figure 108 – Browse to the OS Image**

4. From the main VirtualBox menu, select **Machine -> Reset** to boot from the OS image.

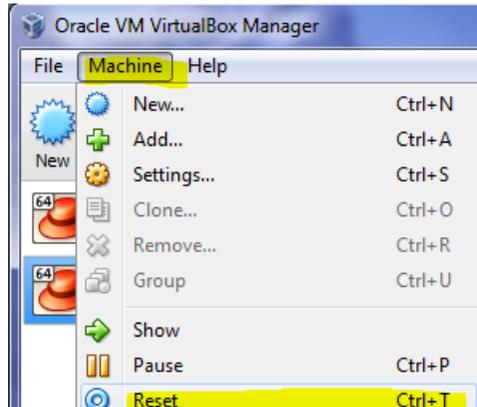


Figure 109 – Reset the Virtual Machine

## 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, select **Machine -> Settings**.

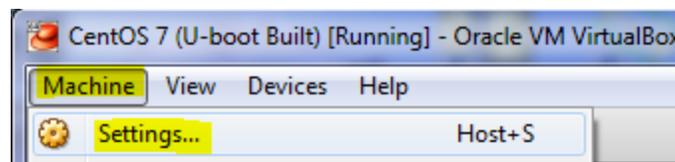


Figure 110 – Access Virtual Machine Settings

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.

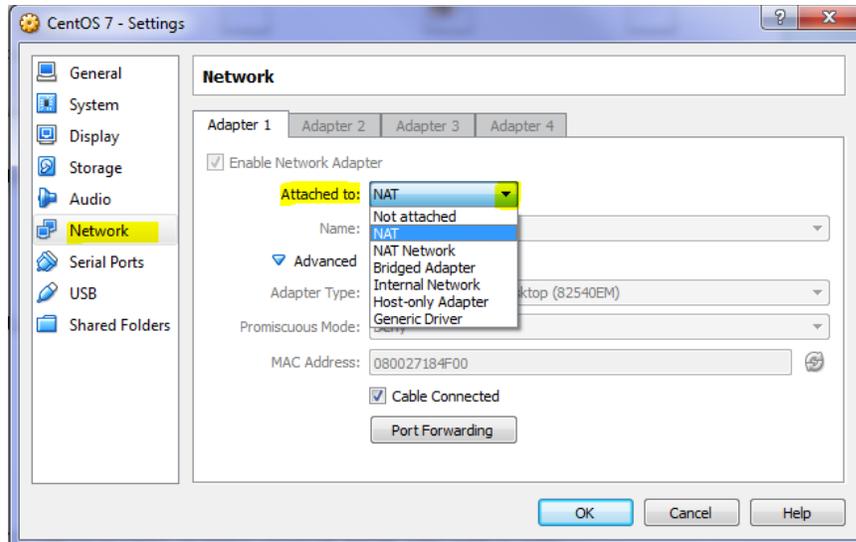
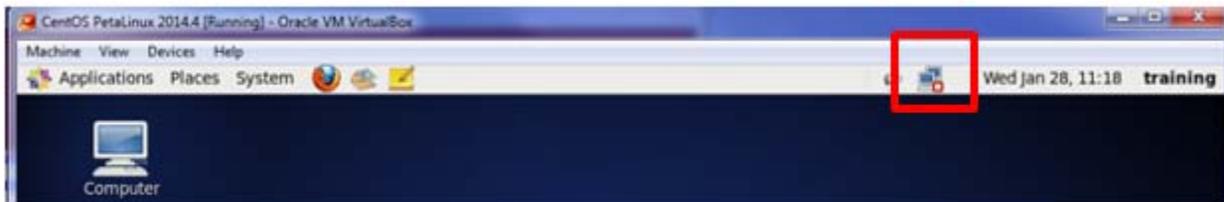


Figure 111 – Network Attachments

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.

## CentOS 6.5 Network Troubleshooting

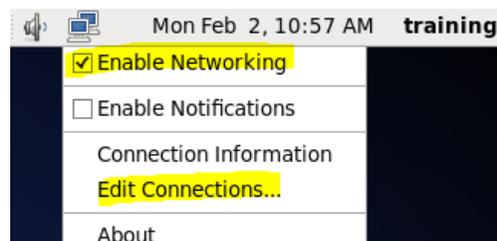
1. When you first log in as a standard user, check the status of your network connection by observing the icon indicated in the figure below. If the icon appears with a small X as shown, there is a problem with the network connectivity from VirtualBox.



**Figure 112 – Network Connectivity Issue**

Before continuing, ensure that you have network access from the host system. If successful, continue with the configuration steps below.

2. *Right-click* the networking icon and ensure **Enable Networking** is selected. Select **Edit Connections**.



**Figure 113 – Enable Networking**

3. Select **System eth0** and click the **Edit** button (You may or may not have Auto eth1 and other connections depending on your system hardware).



**Figure 114 – Edit Network Connection Properties**

4. Ensure the boxes for *Connect automatically* and *Available to all users* are both checked. Click the **Apply** button at the lower right of the panel (not shown). You will need the root password to complete the operation.

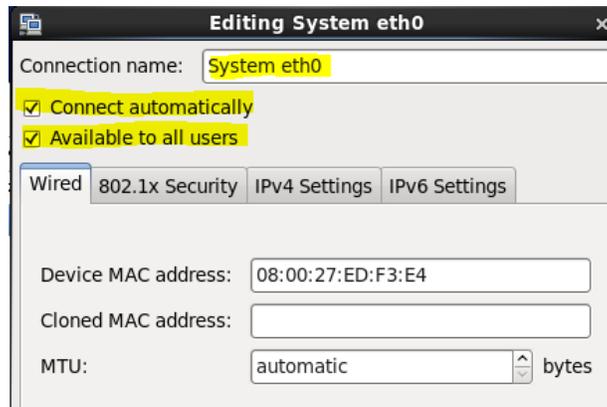


Figure 115 – Eth0 Properties

5. To prevent any interference from additional Ethernet devices, during trouble shooting uncheck the *Connect automatically* box in all other adapter entries and click the **Apply** button.

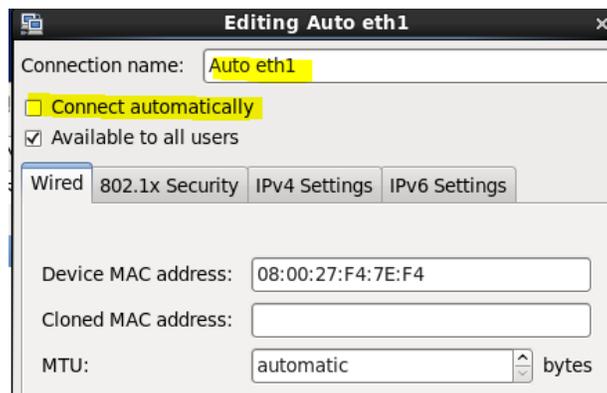


Figure 116 – Eth1 Properties

6. Click the **Close** button to exit the Properties panel.

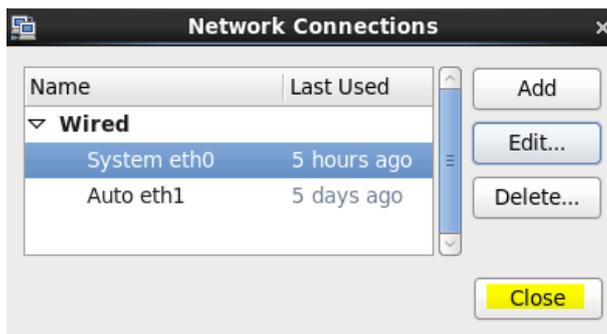


Figure 117 – Close Network Properties Panel

7. In the main VirtualBox menu, select **Devices** -> **Network** -> **Network Settings**.

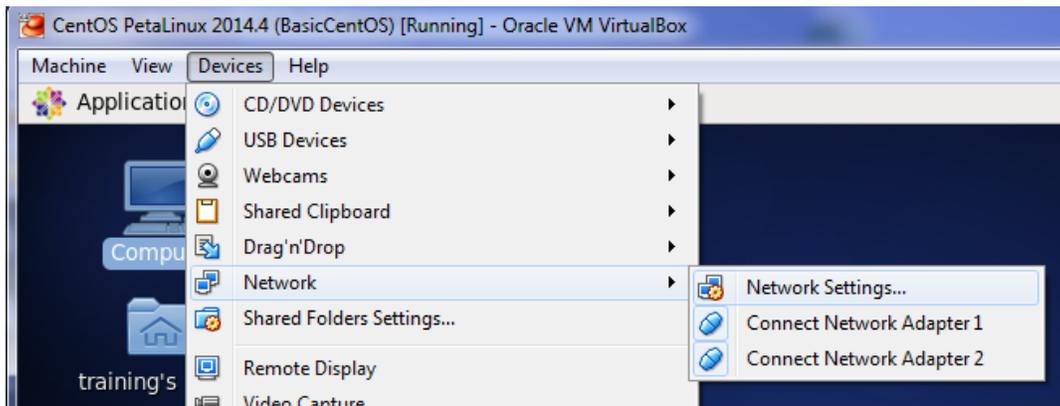


Figure 118 – VirtualBox Network Settings

8. Ensure the attachment type is *NAT*, the correct physical Network Interface Card is selected for the *Adapter Type* and the *Cable Connected* box is checked. Click the **OK** button.

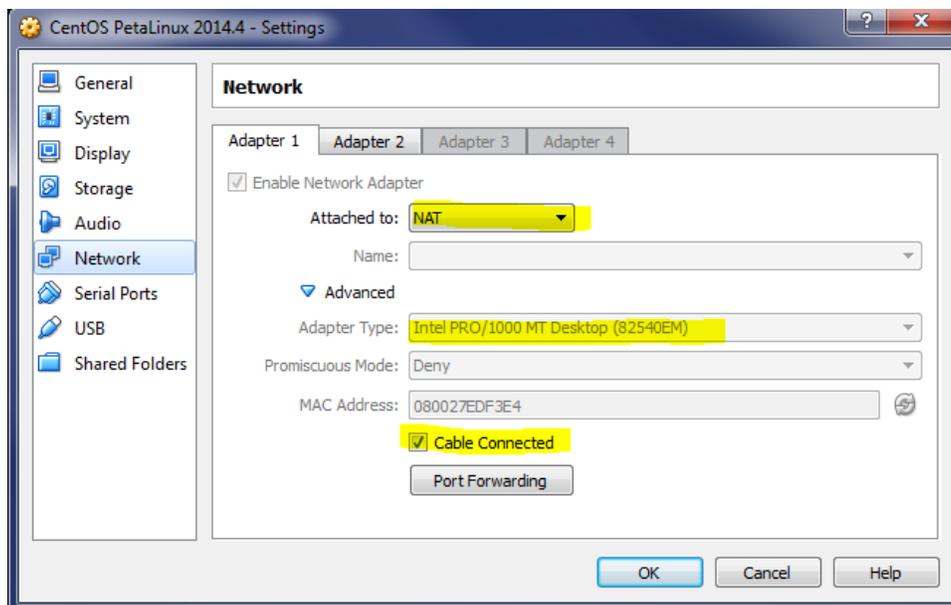


Figure 119 – VirtualBox Network Properties

9. If Networking is still not active, reboot the Virtual Machine.

## Set up the TFTP Server (PetaLinux)

The u-boot boot loader can be configured to use a TFTP server to download a Linux kernel image to a target board for testing. PetaLinux automatically copies the image files to the root of the TFTP server folder, so it is useful to have this set up even if when primarily booting from an SD card.

1. Log in to your Linux host , open a Terminal window and use the su command (or sudo) to elevate your privilege level.
2. Create a directory in the root of your Linux host where the PetaLinux build files will be copied. By default this is `"/tftpboot"`. Be sure to give this directory full access permissions for all users:

```
# mkdir /tftpboot
# chmod 777 /tftpboot
```

3. By default the TFTP server is disabled. To enable the TFTP server, edit<sup>5</sup> `/etc/xinetd.d/tftp` file using root privileges, replacing the word **yes** on the *disable* line with the word **no**. Also verify the correct directory is specified as `/tftpboot` on the *server\_args* line. Save the file and exit the editor.

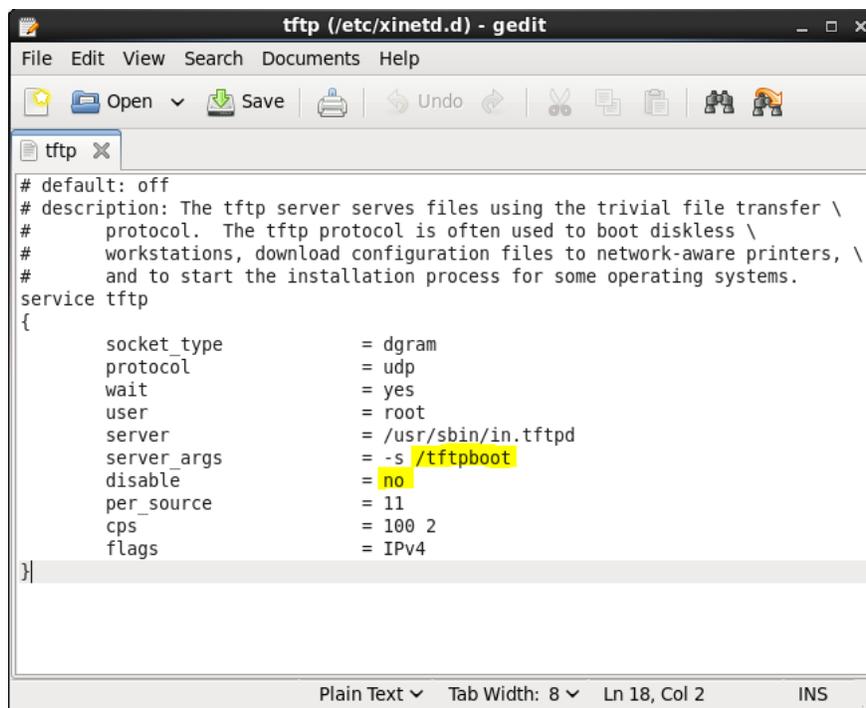


Figure 120 - TFTP Configuration File

4. Restart the daemon by invoking the run configuration script:

```
# /etc/init.d/xinetd restart
```

<sup>5</sup> You may use any installed editor to make the changes, or you may install another editor if you wish. Note that if you choose to use gedit, you may see warning messages as it is invoked, but these do not affect gedit operation.

- This command will stop and then restart all of the services managed by the daemon on your Linux system. In addition to the **restart** command, you can also issue **stop** and **start** commands this way.

**Note:** If your Linux system is running Internet services on which other systems depend, restarting the daemon will cause a slight interruption in those services.

- CentOS Linux has one more level of security that may prevent the TFTP service from accessing files in the */tftpboot* directory. In a terminal window, enter:

**ls -laZ /tftpboot**

```
[training@VBCentOS6 zynq-mini-itx-7z045]$ ls -laZ /tftpboot/
drwxrwxrwx. root    root    unconfined_u:object_r:default_t:s0
dr-xr-xr-x. root    root    system_u:object_r:root_t:s0
-rwxrwxr-x. training training unconfined_u:object_r:default_t:s0 image.elf
-rw-rw-r--. training training unconfined_u:object_r:default_t:s0 image.ub
```

The selinux context for files in the */tftpboot* directory must be:

**unconfined\_u:object\_r:tftpd\_t:s0**

- If the selinux context is incorrect, run the following command in a terminal window:

**sudo restorecon -r /tftpboot**

```
|$ sudo restorecon -r /tftpboot
```

- The selinux file context should now be correct.

```
[training@VBCentOS6 zynq-mini-itx-7z045]$ ls -laZ /tftpboot/
drwxrwxrwx. root    root    unconfined_u:object_r:tftpd_t:s0
dr-xr-xr-x. root    root    system_u:object_r:root_t:s0
-rwxrwxr-x. training training unconfined_u:object_r:tftpd_t:s0 image.elf
-rw-rw-r--. training training unconfined_u:object_r:tftpd_t:s0 image.ub
```

The TFTP server will now be started on your system and should respond to incoming TFTP requests.

If you manually locate files in */tftpboot*, always copy files instead of moving them. Moved files preserve existing permissions, including the selinux context that may not be compatible with the requirements for the */tftpboot* directory.

Additional information is available at:

<https://www.centos.org/forums/viewtopic.php?t=7985>

Note that TFTP server requests may be blocked by Firewall software or router protection, and may not be accessible from outside the local sub-net without appropriate network configuration that is specific to your LAN. If you are using TFTP, it is best to have a DHCP server running on your Linux host, and to connect the Ethernet cable directly between the host and target.

## Revision History

Version	Date	Details
1.0	Feb 19, 2015	VirtualBox 4.3, CentOS 6.5, CentOS 7