Vivado Tool Flow How To

Install Vivado 2014.3.1

1) OS Required/suggested: Ubuntu 14.04 LTS. Xilinx now supports Ubuntu 14.04 LTS. There was an issue using Ubuntu 12.04 LTS, which caused the DocNav utility to crash.
2) Click/double click on the "Xilinx_Vivado_SDK_Lin_2014.3.1_1031_1.tar.gz" file in the Ubuntu Nautilius document navigator and choose a folder to extract the files to. I use "home/Installs" in this document. If you use something different then remember to replace "Installs" with your directory name.
3) Ubuntu 14.04. Open a terminal < ctrl + alt + T>. Change directory to the following folder: "*cd Installs/Xilinx_Vivado_SDK_Lin_2014.3.1_1031_1*"
4) Terminal: Type "*sudo ./xsetup*" and press enter. This application needs to be installed with root privileges otherwise the installation will not install properly. You will be prompted for the sudo password. Enter this and press enter.
5) The Vivado 2014.3.1 Installer GUI will pop up. The GUI will explain that there is a new version available, but ignore that and press "Continue" and then "Next" to commence with the installation process.
6) Read the terms and conditions page and when happy tick "I agree" for all three tick boxes. Then click "Next".
7) Select the "Vivado System Edition" radio button and select "Next".
8) You will then be required to select which tools you want to install with the Vivado Design Edition. I selected "Software Development Kit" and "Install Cable Drivers". The rest of the boxes were ticked, so I have decided to install the complete set of tools available. Make sure that "DocNav" is ticked if you want access to the documentation that Xilinx

has provided. This is highly recommended, as the documentation is part of the Ultrafast design methodology. Press “Next”.

9) Select where you want to install the Vivado tool set. I am using the default “opt/Xilinx” folder. I have also ticked the “Create program group entries” and “create desktop shortcuts” buttons. This is not necessary though. Press “Next”.
10) A window will pop up offering to create the “opt/Xilinx” directory if it does not exist. Select “Yes”.
11) A window with the “Installation Summary” will be displayed showing what tools will be installed and where they will be stored on your drive. If you are happy press “Install”, otherwise press “Back” and edit your previous settings.
12) Wait until the Xilinx Software Install window states that the “Installation completed successfully” and select “OK”.
13) Open another terminal and navigate to the “opt” folder and remember to change user and group to your username with the following command: “sudo chown <username>:<username> Xilinx -R”
14) Terminal: Navigate to the “home” folder and remember to change user and group to your username with the following command: “*sudo chown <username>:<username> .Xilinx -R*”
15) DocNav will not work unless you follow the steps highlighted in the text file: “set_up_vivado_2015.1_on_ubuntu_14.04” (Doc Nav section only). Install the i386 architecture and then install the missing libraries. All the commands are highlighted in the attached file.
16) DocNav will now open, but you won’t be able to open the documentation until you have made the following link. Using the terminal type in “*cd /opt/Xilinx/Vivado/2014.3.1/ids_lite/ISE/lib/lin64*” and press enter.
17) Using the terminal, type in “*mv libstdc++.so.6: libstdc++.so.6:bu*” and press enter. Now type in “*ln -s /usr/lib/x86_64-linux-gnu/libstdc++.so.6 ./libstdc++.so.6*” and press

enter. The “libstdc++.so.6” file will now be properly linked and DocNav should work.

18) It will be a good idea to create a vivado startup script file on your Desktop with the following lines:
    1. #!/bin/bash
    2. cd /opt/Xilinx/Vivado/2014.3.1/bin/
    3. ./vivado

NB: Make sure the file is executable and that the nautilius documentation navigator is set to run the script.

19) Run the script and the Vivado IDE will launch. You can now select the required Xilinx Vivado project file (*.xpr) and continue.
20) It is now time to install the license for Vivado. Create a “Xilinx” folder in your home directory using the nautilius documentation navigator: “home/<user name>/Xilinx” and copy the vivado license file provided by your administrator to this location.
21) Load the license using the Vivado License Manager”. If not already open click on “Help” -> “Manage License…”. Click “Load License” and then click on “Copy License…”. Navigate to the license file (*.lic) in the “home/<user name>/Xilinx” folder. Press “Open” and when the license installation was successful then press “OK”.
22) To confirm that the license file was successful, click on “View License Status” and make sure a list of Tools/IP is read back and that the license is still valid. Once this is done then close the “Vivado License Manager” by clicking on the red cross at the top left of the window. You will be prompted if you want to close the “Vivado License Manager”. Click “Yes”.

Install Vivado 2015.4

1) OS Required/suggested: Ubuntu 14.04 LTS. Xilinx now supports Ubuntu 14.04 LTS. There was an issue using Ubuntu 12.04 LTS, which caused the DocNav utility to crash.

2) Click/double click on the "Xilinx_Vivado_SDK_Lin_2015.4.1118_2.tar.gz" file in the Ubuntu Nautilius document navigator and choose a folder to extract the files to. I use "home/Installs" in this document. If you use something different then remember to replace "Installs" with your directory name.
3) Ubuntu 14.04. Open a terminal < ctrl + alt + T>. Change directory to the following folder: "*cd Installs/Xilinx_Vivado_SDK_Lin_2015.4_1118_2*"
4) Terminal: Type "sudo ./xsetup" and press enter. This application needs to be installed with root privileges otherwise the installation will not install properly. You will be prompted for the sudo password. Enter this and press enter.
5) The Vivado 2015.4 Installer GUI will pop up. The GUI might explain that there is a new version available, but ignore that and press "Continue" and then "Next" to commence with the installation process.
6) Read the terms and conditions page and when happy tick "I agree" for all three tick boxes. Then click "Next".
7) Select the "Vivado HL_System Edition" radio button and select "Next".
8) You will then be required to select which tools you want to install with the Vivado Design Edition. I selected "Software Development Kit", "Ultrascale+" and "Zynq UltraScale + MPSoC". The rest of the boxes were ticked (except Cable Drivers), so I have decided to install the complete set of tools available. Make sure that "DocNav" is ticked if you want access to the documentation that Xilinx has provided. This is highly recommended, as the documentation is part of the Ultrafast design methodology. Press "Next".
9) Select where you want to install the Vivado tool set. I am using the default "opt/Xilinx" folder. I have also ticked the "Create program group entries" and "create desktop shortcuts" buttons. This is not necessary though. Press "Next".

10) A window will pop up offering to create the “opt/Xilinx” directory if it does not exist. Select “Yes”.
11) A window with the “Installation Summary” will be displayed showing what tools will be installed and where they will be stored on your drive. If you are happy press “Install”, otherwise press “Back” and edit your previous settings.
12) Wait until the Xilinx Software Install window states that the “Installation completed successfully” and select “OK”.
13) Open another terminal and navigate to the “opt” folder and remember to change user and group to your username with the following command: “*sudo chown <username>:<username> Xilinx -R*”
14) Terminal: Navigate to the “home” folder and remember to change user and group to your username with the following command: “*sudo chown <username>:<username> .Xilinx -R*”
15) DocNav will not work unless you follow the steps highlighted in the text file: “set_up_vivado_2015.1_on_ubuntu_14.04” (Doc Nav section only). Install the i386 architecture and then install the missing libraries. All the commands are highlighted in the attached file.
16) DocNav will now open, but you won’t be able to open the documentation until you have made the following link. Using the terminal type in “*cd /opt/Xilinx/Vivado/2015.4/ids_lite/ISE/lib/lin64*” and press enter.
17) Using the terminal, type in “*mv libstdc++.so.6 libstdc++.so.6bu*” and press enter. Now type in “*ln -s /usr/lib/x86_64-linux-gnu/libstdc++.so.6 ./libstdc++.so.6*” and press enter. The “libstdc++.so.6” file will now be properly linked and DocNav should work.
18) It will be a good idea to create a vivado startup script file on your Desktop with the following lines:
    4. #!/bin/bash
    5. cd /opt/Xilinx/Vivado/2015.4/bin/
    6. ./vivado

NB: Make sure the file is executable and that the nautilius documentation navigator is set to run the script.

19) Run the script and the Vivado IDE will launch. You can now select the required Xilinx Vivado project file (*.xpr) and continue.
20) It is now time to install the license for Vivado. Create a “Xilinx” folder in your home directory using the nautilius documentation navigator: “home/<user name>/Xilinx” and copy the vivado license file provided by your administrator to this location.
21) Load the license using the Vivado License Manager”. If not already open click on “Help” -> “Manage License…”. Click “Load License” and then click on “Copy License…”. Navigate to the license file (*.lic) in the “home/<user name>/Xilinx” folder. Press “Open” and when the license installation was successful then press “OK”.
22) To confirm that the license file was successful, click on “View License Status” and make sure a list of Tools/IP is read back and that the license is still valid. Once this is done then close the “Vivado License Manager” by clicking on the red cross at the top left of the window. You will be prompted if you want to close the “Vivado License Manager”. Click “Yes”.

Optional: Install USB Drivers for JTAG

NB: These steps may not be necessary, as the USB drivers may indeed be installed when Vivado is installed, but I don’t think so, because I was unable to detect the JTAG Xilinx USB programmer until I installed these drivers when I was using the ISE 14.7 IDE. Try to detect the JTAG without installing these drivers and if the JTAG hardware cannot be detected then follow these steps.

1) To install the USB driver please open up a terminal <ctrl+alt+T> and follow the instructions below - NB: try the later part first i.e. running the dedicated “install_drivers” script. If it does not work then try the former part:

Installing Cable Drivers

- install the prerequisite

install

```
On 32-bit
sudo apt-get install gitk git-gui libusb-dev build-essential libc6-dev fxload
On 64-bit
sudo apt-get install gitk git-gui libusb-dev build-essential libc6-dev-i386 fxload
```

- Download the driver source and install

download and install

```
cd /opt/Xilinx
sudo git clone git://git.zerfleddert.de/usb-driver

cd usb-driver/
On 32-bit
sudo make
On 64-bit
sudo make lib32
```

Setup up the driver

setup up

```
$ ./setup_pcusb /opt/Xilinx/13.2/ISE_DS/ISE/
Looking for USB cable files: /opt/Xilinx/14.2/ISE_DS/ISE/bin/lin
Copying firmware to /usr/share:
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusbdfwu.hex' -> `/usr/share/xusbdfwu.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_emb.hex' -> `/usr/share/xusb_emb.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xlp.hex' -> `/usr/share/xusb_xlp.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xp2.hex' -> `/usr/share/xusb_xp2.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xpr.hex' -> `/usr/share/xusb_xpr.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xse.hex' -> `/usr/share/xusb_xse.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xup.hex' -> `/usr/share/xusb_xup.hex'
Installing udev rules:
done
```

sudo apt-get install gitk git libusb-dev build-essential libc6-dev fxload

OR ignore the above and just do the following (may only apply to Vivado 2015.4):

For Linux, because root or sudo access is required to install drivers, this option (the installing of cable drivers) has been removed from the Linux

installer beginning in Vivado 2015.4. The general Vivado installer can now be run on Linux without root or sudo privileges. To install cable drivers on Linux, there is now a script that must be run as root or sudo post installation.

Script Location:

<Vivado Install Dir>
/data/xicom/cable_drivers/lin64/install_script/install_drivers/

Script Name: install_drivers

Update: 30 May 2016

It was discovered that the running the install_drivers script as above does not work reliably. The most reliable way to install the JTAG cable drivers is to use the drivers provided with ISE.

A folder containing all the files required has been uploaded in the same folder as this document: linux_jtag_cable_drivers.tar.gz. This also includes a useful installation script that prepares the files and places them in the correct directories.

Instructions:

1. Extract the contents of the file linux_jtag_cable_drivers.tar.gz
2. Run: sudo ./install.sh (NB!: Must run as sudo)

2) It may be a good idea to power your PC/lap top down and then up again as the USB drivers may not take affect until this happens. In my case, I plugged a stick drive into the USB and then ejected that and connected the Xilinx Platform Cable USB module. Once this was

done then the status LED illuminated and I was able to configure the FPGA via JTAG.

Install Vivado 2016.2

1) OS Required/suggested: Ubuntu 14.04 LTS. Xilinx now supports Ubuntu 14.04 LTS. There was an issue using Ubuntu 12.04 LTS, which caused the DocNav utility to crash.
2) Click/double click on the “Xilinx_Vivado_SDK_2016.2_0605_1.tar.gz” file in the Ubuntu Nautilius document navigator and choose a folder to extract the files to. I use “home/Installs” in this document. If you use something different then remember to replace “Installs” with your directory name.
3) Ubuntu 14.04. Open a terminal < ctrl + alt + T>. Change directory to the following folder: “*cd Installs/Xilinx_Vivado_SDK_2016.2_0605_1*”
4) Terminal: Type “sudo ./xsetup” and press enter. This application needs to be installed with root privileges otherwise the installation will not install properly. You will be prompted for the sudo password. Enter this and press enter.
5) The Vivado 2016.2 Installer GUI will pop up. The GUI might explain that there is a new version available, but ignore that and press “Continue” and then “Next” to commence with the installation process.
6) Read the terms and conditions page and when happy tick “I agree” for all three tick boxes. Then click “Next”.
7) Select the “Vivado HL_System Edition” radio button and select “Next”.
8) You will then be required to select which tools you want to install with the Vivado Design Edition. I selected “Software Development Kit”, “Ultrascale+” and “Zynq UltraScale + MPSoC”. The rest of the boxes were ticked (except Cable Drivers), so I have decided to install the complete set of tools available. Make sure that “DocNav” is ticked if

you want access to the documentation that Xilinx has provided. This is highly recommended, as the documentation is part of the Ultrafast design methodology. Press “Next”.

9) Select where you want to install the Vivado tool set. I am using the default “opt/Xilinx” folder. I have also ticked the “Create program group entries” and “create desktop shortcuts” buttons. This is not necessary though. Press “Next”.
10) A window will pop up offering to create the “opt/Xilinx” directory if it does not exist. Select “Yes”.
11) A window with the “Installation Summary” will be displayed showing what tools will be installed and where they will be stored on your drive. If you are happy press “Install”, otherwise press “Back” and edit your previous settings.
12) Wait until the Xilinx Software Install window states that the “Installation completed successfully” and select “OK”.
13) Open another terminal and navigate to the “opt” folder and remember to change user and group to your username with the following command: “*sudo chown <username>:<username> Xilinx -R*”
14) Terminal: Navigate to the “home” folder and remember to change user and group to your username with the following command: “*sudo chown <username>:<username> .Xilinx -R*”
15) DocNav will not work unless you follow the steps highlighted in the text file: “set_up_vivado_2015.1_on_ubuntu_14.04” (Doc Nav section only). Install the i386 architecture and then install the missing libraries. All the commands are highlighted in the attached file.
16) DocNav will now open, but you won’t be able to open the documentation until you have made the following link. Using the terminal type in “*cd /opt/Xilinx/Vivado/2016.2/ids_lite/ISE/lib/lin64*” and press enter.
17) Using the terminal, type in “*mv libstdc++.so.6 libstdc++.so.6bu*” and press enter. Now type in “*ln -s /usr/lib/x86_64-linux-gnu/libstdc++.so.6 ./libstdc++.so.6*” and press

enter. The “libstdc++.so.6” file will now be properly linked and DocNav should work.

18) It will be a good idea to create a vivado startup script file on your Desktop with the following lines:
    7. #!/bin/bash
    8. cd /opt/Xilinx/Vivado/2016.2/bin/
    9. ./vivado

NB: Make sure the file is executable and that the nautilius documentation navigator is set to run the script.

19) Run the script and the Vivado IDE will launch. You can now select the required Xilinx Vivado project file (*.xpr) and continue.
20) It is now time to install the license for Vivado. Create a “Xilinx” folder in your home directory using the nautilius documentation navigator: “home/<user name>/Xilinx” and copy the vivado license file provided by your administrator to this location.
21) Load the license using the Vivado License Manager”. If not already open click on “Help” -> “Manage License…”. Click “Load License” and then click on “Copy License…”. Navigate to the license file (*.lic) in the “home/<user name>/Xilinx” folder. Press “Open” and when the license installation was successful then press “OK”.
22) To confirm that the license file was successful, click on “View License Status” and make sure a list of Tools/IP is read back and that the license is still valid. Once this is done then close the “Vivado License Manager” by clicking on the red cross at the top left of the window. You will be prompted if you want to close the “Vivado License Manager”. Click “Yes”.

Optional: Install USB Drivers for JTAG

NB: These steps may not be necessary, as the USB drivers may indeed be installed when Vivado is installed, but I don’t think so, because I was unable to detect the JTAG Xilinx USB programmer until I installed these drivers when I was using the ISE 14.7 IDE. Try to detect the

JTAG without installing these drivers and if the JTAG hardware cannot be detected then follow these steps.

1) To install the USB driver please open up a terminal <ctrl+alt+T> and follow the instructions below - NB: try the later part first i.e. running the dedicated “install_drivers” script. If it does not work then try the former part:

Installing Cable Drivers

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cd /opt/Xilinx
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On 32-bit
sudo make
On 64-bit
sudo make lib32
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Setup up the driver

setup up

```
$ ./setup_pcusb /opt/Xilinx/13.2/ISE_DS/ISE/
Looking for USB cable files: /opt/Xilinx/14.2/ISE_DS/ISE/bin/lin
Copying firmware to /usr/share:
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusbdfwu.hex' -> `/usr/share/xusbdfwu.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_emb.hex' -> `/usr/share/xusb_emb.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xlp.hex' -> `/usr/share/xusb_xlp.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xp2.hex' -> `/usr/share/xusb_xp2.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xpr.hex' -> `/usr/share/xusb_xpr.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xse.hex' -> `/usr/share/xusb_xse.hex'
`/opt/Xilinx/14.2/ISE_DS/ISE/bin/lin/xusb_xup.hex' -> `/usr/share/xusb_xup.hex'
Installing udev rules:
done
```

sudo apt-get install gitk git libusb-dev build-essential libc6-dev fxload

OR ignore the above and just do the following (may only apply to Vivado 2016.2):

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Script Location:

<Vivado Install Dir>
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Script Name: install_drivers

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Instructions:

1. Extract the contents of the file linux_jtag_cable_drivers.tar.gz

2. Run: sudo ./install.sh (NB!: Must run as sudo)

2) It may be a good idea to power your PC/lap top down and then up again as the USB drivers may not take affect until this happens. In my case, I plugged a stick drive into the USB and then ejected that and connected the Xilinx Platform Cable USB module. Once this was done then the status LED illuminated and I was able to configure the FPGA via JTAG.