

OpenVINO

Installation Guide

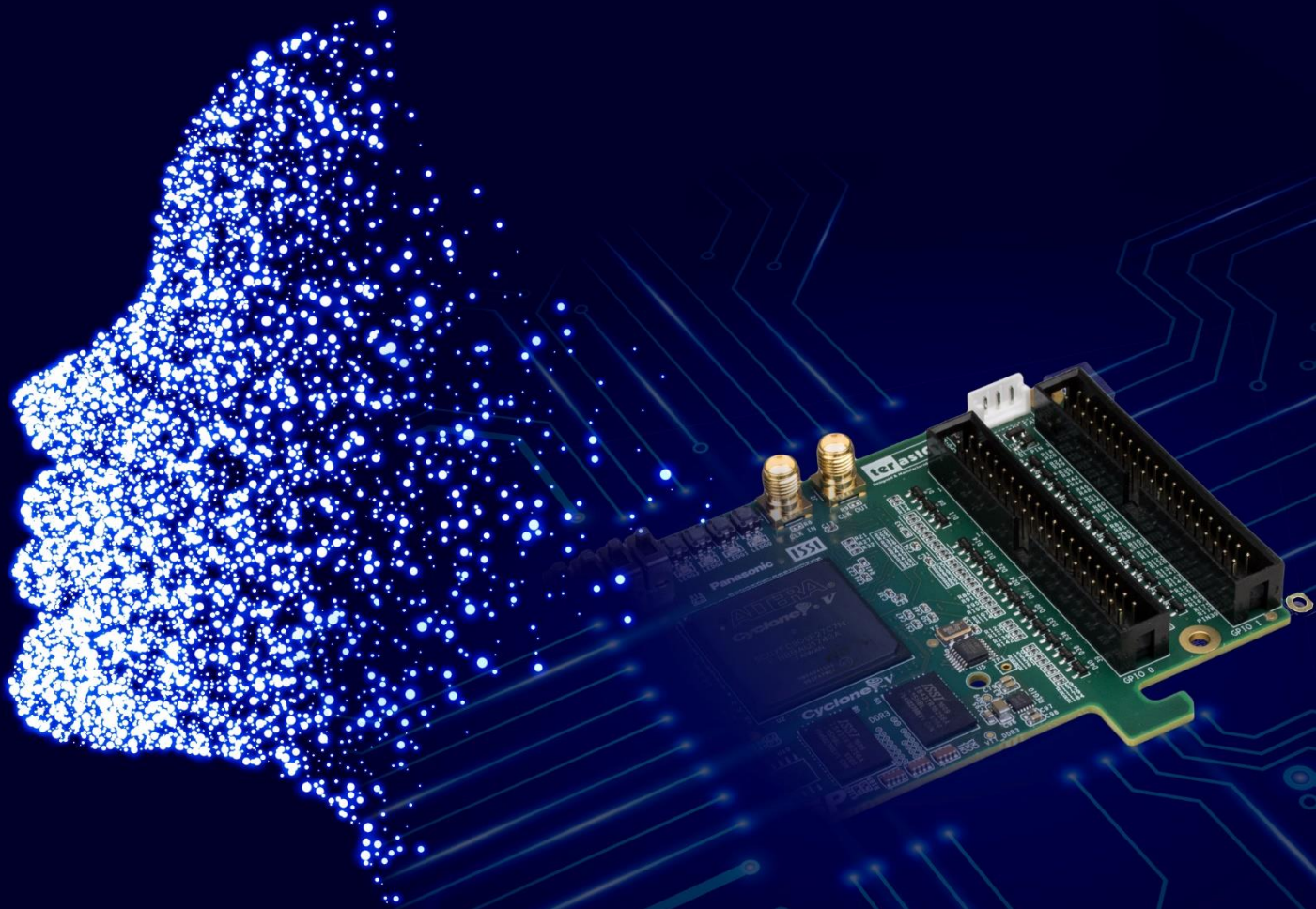


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OpenVINO Toolkit Installation

1.1 About the Guide

This document will show you how to set up the OpenVINO development environment, including how to install the Intel® Distribution of OpenVINO toolkit for Linux with FPGA Support on your PC, how to set up the OpenVINO start kit, configuring and programming the kit.

1.2 Introduction

This chapter described how to install the FPGA OpenVINO toolkit under Linux OS environment. The Intel® Distribution of OpenVINO toolkit for Linux with FPGA Support, the version of Linux that users can install is as follows:

- Ubuntu 16.04.x long-term support (LTS), 64-bit
- CentOS 7.6, 64-bit
- Yocto Project Poky Jethro v2.0.3, 64-bit

In this guide, we will use **Ubuntu 16.04.3 long-term support (LTS), 64-bit version with kernel 4.8** for installation and introduction. **For OSK, please make sure the Linux kernel version is not higher than 4.8. Refer to Appendix to lower Linux kernel version if necessary.**

To download The Intel® Distribution of OpenVINO toolkit for Linux with FPGA Support, please go to the link below (File name: l_openvino_toolkit_fpga_p_2019.1.094.tgz; Size: 2344 MB):

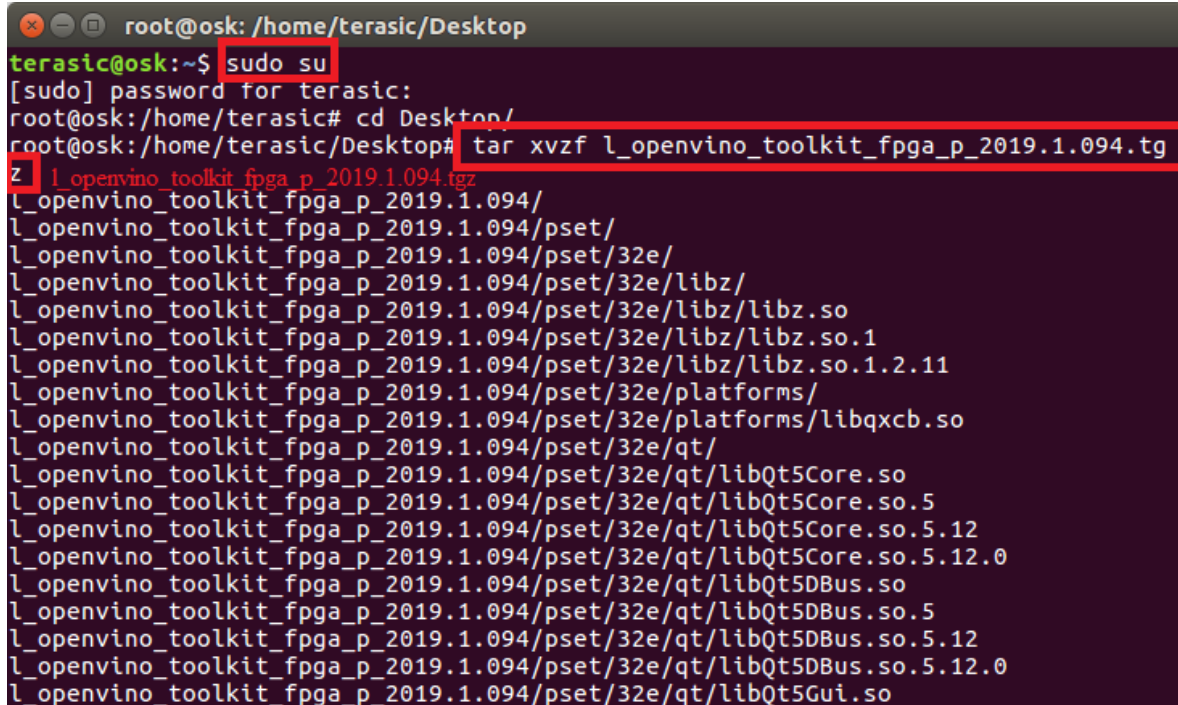
http://registrationcenter-download.intel.com/akdlm/irc_nas/15381/l_openvino_toolkit_fpga_p_2019.1.094.tgz

Note: To use the OpenVINO toolkit for the OpenVINO starter kit, you can only use the OpenVINO toolkit version in the link above.

1.3 Install OpenVINO Toolkit for Linux with FPGA Support

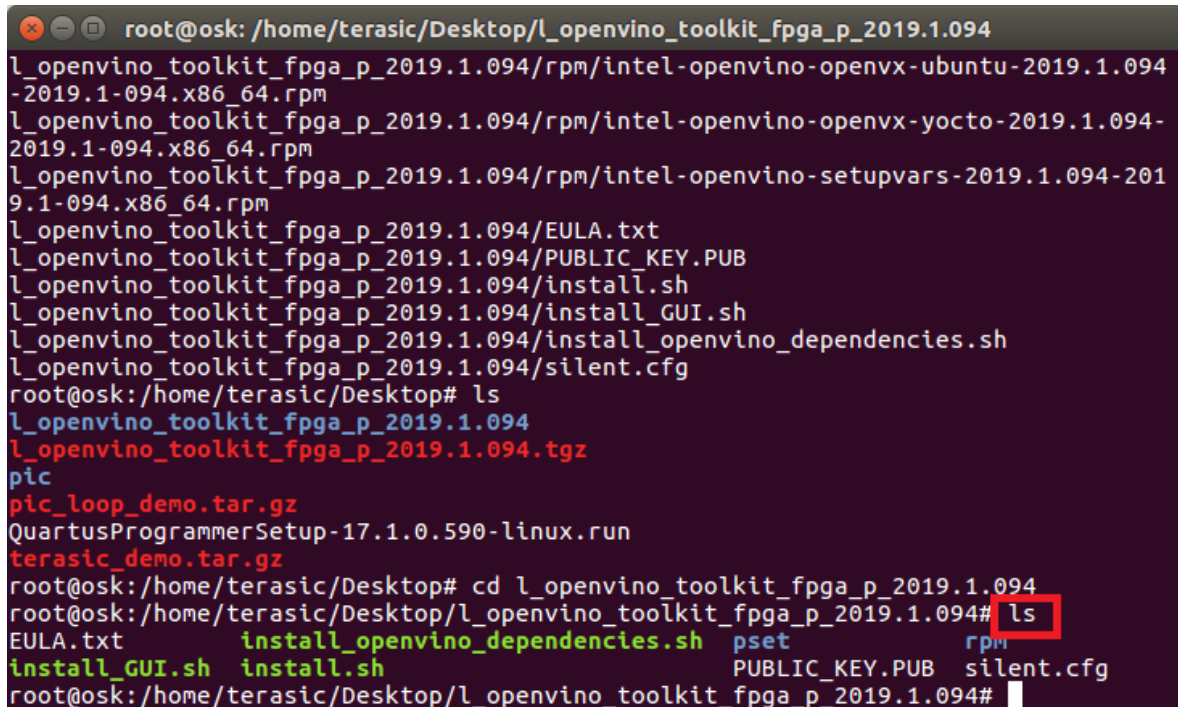
OpenVINO Toolkit for Linux with FPGA Support installation steps are described as below:

1. Copy the `l_openvino_toolkit_fpga_p_2019.1.094.tgz` OpenVINO installation package to the desktop.
2. Open the Terminal in the Linux, and type “`sudo su`” to switch to root (super user).
3. Unzip the .tgz compressed file: `tar xvfz l_openvino_toolkit_fpga_p_2019.1.094.tgz`, the default path is `l_openvino_toolkit_fpga_p_2019.1.094`, as shown in the figure below.



```
root@osk: /home/terasic/Desktop
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd Desktop/
root@osk:/home/terasic/Desktop# tar xvfz l_openvino_toolkit_fpga_p_2019.1.094.tgz
l_openvino_toolkit_fpga_p_2019.1.094/
l_openvino_toolkit_fpga_p_2019.1.094/pset/
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/libz/
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/libz/libz.so
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/libz/libz.so.1
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/libz/libz.so.1.2.11
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/platforms/
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/platforms/libqxcb.so
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5Core.so
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5Core.so.5
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5Core.so.5.12
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5DBus.so
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5DBus.so.5
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5DBus.so.5.12
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5DBus.so.5.12.0
l_openvino_toolkit_fpga_p_2019.1.094/pset/32e/qt/libQt5Gui.so
```

4. Enter folder `l_openvino_toolkit_fpga_p_2019.1.094`, then input command `ls` to view the files contained in the current installation package directory, as shown in figure below.



```
root@osk: /home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094
l_openvino_toolkit_fpga_p_2019.1.094/rpm/intel-openvino-openvx-ubuntu-2019.1.094-2019.1.094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/rpm/intel-openvino-openvx-yocto-2019.1.094-2019.1.094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/rpm/intel-openvino-setupvars-2019.1.094-2019.1.094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/EULA.txt
l_openvino_toolkit_fpga_p_2019.1.094/PUBLIC_KEY.PUB
l_openvino_toolkit_fpga_p_2019.1.094/install.sh
l_openvino_toolkit_fpga_p_2019.1.094/install_GUI.sh
l_openvino_toolkit_fpga_p_2019.1.094/install_openvino_dependencies.sh
l_openvino_toolkit_fpga_p_2019.1.094/silent.cfg
root@osk:/home/terasic/Desktop# ls
l_openvino_toolkit_fpga_p_2019.1.094
l_openvino_toolkit_fpga_p_2019.1.094.tgz
pic
pic_loop_demo.tar.gz
QuartusProgrammerSetup-17.1.0.590-linux.run
terasic_demo.tar.gz
root@osk:/home/terasic/Desktop# cd l_openvino_toolkit_fpga_p_2019.1.094
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094# ls
EULA.txt          install_openvino_dependencies.sh  pset          rpm
install_GUI.sh    install.sh                        PUBLIC_KEY.PUB silent.cfg
```


5. Execute `./install_openvino_dependencies.sh` to run the script files, install some dependency files. The execution result is shown in the figure below.

```
root@osk: /home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094
-2019.1-094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/rpm/intel-openvino-openvx-yocto-2019.1.094-
2019.1-094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/rpm/intel-openvino-setupvars-2019.1.094-201
9.1-094.x86_64.rpm
l_openvino_toolkit_fpga_p_2019.1.094/EULA.txt
l_openvino_toolkit_fpga_p_2019.1.094/PUBLIC_KEY.PUB
l_openvino_toolkit_fpga_p_2019.1.094/install.sh
l_openvino_toolkit_fpga_p_2019.1.094/install_GUI.sh
l_openvino_toolkit_fpga_p_2019.1.094/install_openvino_dependencies.sh
l_openvino_toolkit_fpga_p_2019.1.094/silent.cfg
root@osk:/home/terasic/Desktop# ls
l_openvino_toolkit_fpga_p_2019.1.094
l_openvino_toolkit_fpga_p_2019.1.094.tgz
pic
pic_loop_demo.tar.gz
QuartusProgrammerSetup-17.1.0.590-linux.run
terasic_demo.tar.gz
root@osk:/home/terasic/Desktop# cd l_openvino_toolkit_fpga_p_2019.1.094
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094# ls
EULA.txt          install_openvino_dependencies.sh  pset      rpm
install_GUI.sh    install.sh                       PUBLIC_KEY.PUB  silent.cfg
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094# ./install_o
penvino_dependencies.sh
```

It will take a while to complete, please wait patiently. As shown in the figure below, the dependency files are installed successfully.

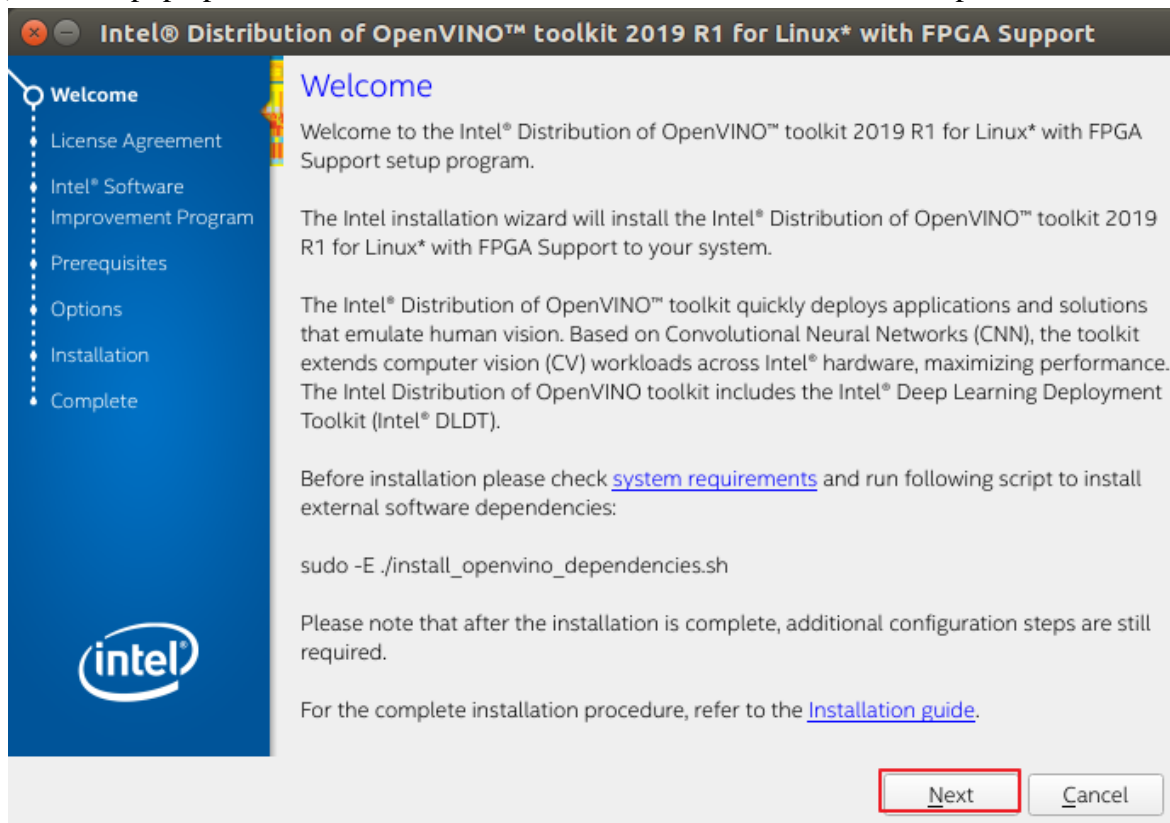
```
root@osk: /home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094
Fetched 605 kB in 5s (111 kB/s)
(Reading database ... 182663 files and directories currently installed.)
Preparing to unpack .../libglib2.0-dev_2.48.2-0ubuntu4.4_amd64.deb ...
Unpacking libglib2.0-dev (2.48.2-0ubuntu4.4) over (2.48.2-0ubuntu4.1) ...
Preparing to unpack .../libglib2.0-bin_2.48.2-0ubuntu4.4_amd64.deb ...
Unpacking libglib2.0-bin (2.48.2-0ubuntu4.4) over (2.48.2-0ubuntu4.1) ...
Preparing to unpack .../libglib2.0-0_2.48.2-0ubuntu4.4_amd64.deb ...
Unpacking libglib2.0-0:amd64 (2.48.2-0ubuntu4.4) over (2.48.2-0ubuntu4.1) ...
Preparing to unpack .../gststreamer1.0-plugins-base_1.8.3-1ubuntu0.3_amd64.deb ...
Unpacking gststreamer1.0-plugins-base:amd64 (1.8.3-1ubuntu0.3) over (1.8.3-1ubuntu
0.2) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for libc-bin (2.23-0ubuntu5) ...
Setting up libglib2.0-0:amd64 (2.48.2-0ubuntu4.4) ...
Setting up libglib2.0-bin (2.48.2-0ubuntu4.4) ...
Setting up libglib2.0-dev (2.48.2-0ubuntu4.4) ...
Setting up gststreamer1.0-plugins-base:amd64 (1.8.3-1ubuntu0.3) ...
Processing triggers for libc-bin (2.23-0ubuntu5) ...
Reading package lists... Done
Building dependency tree
Reading state information... Done
libpng12-dev is already the newest version (1.2.54-1ubuntu1.1).
0 upgraded, 0 newly installed, 0 to remove and 627 not upgraded.
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094#
```

6. Install the software core components: users can choose the GUI interface or command line instruction to install the components. GUI interface installation is recommended and we used GUI interface to show the installation.

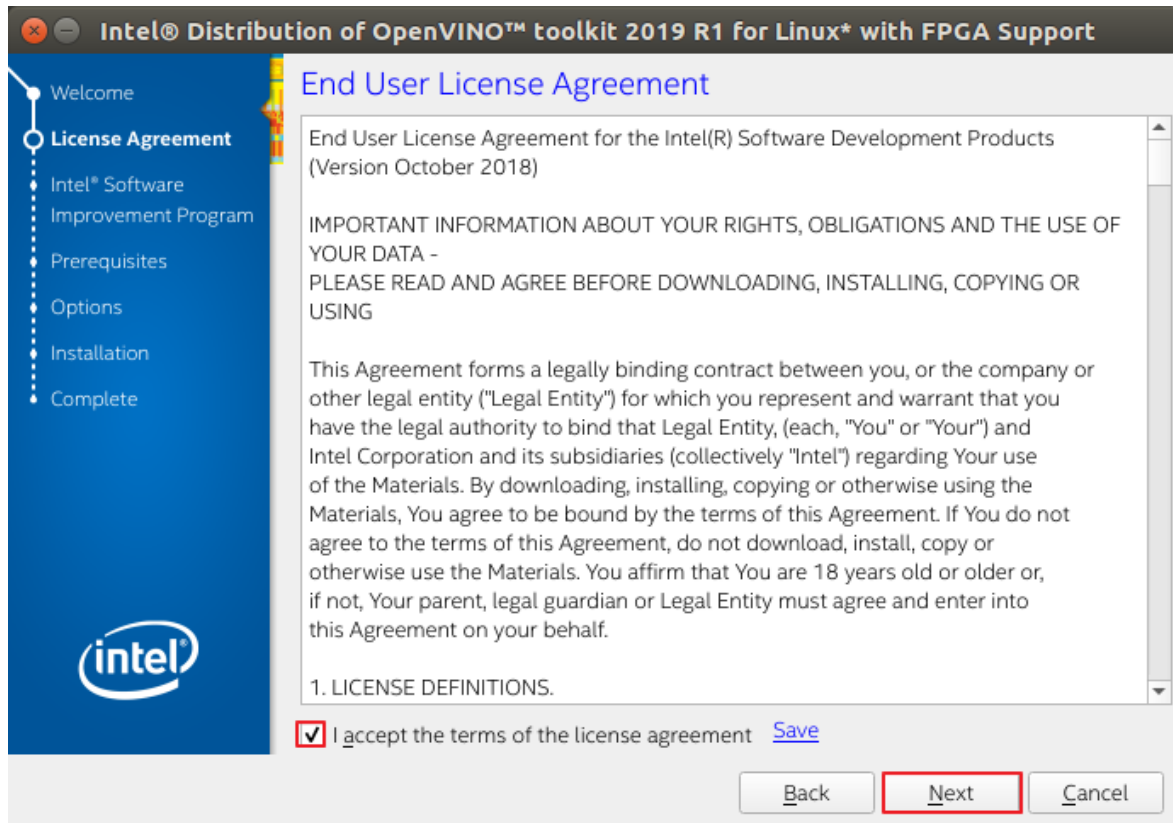
- 1) Execute command `./install_GUI.sh` to start GUI interface installation.

```
root@osk: /home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094
Preparing to unpack .../libgl1-mesa-glx_2.48.2-0ubuntu4.4_amd64.deb ...
Unpacking libgl1-mesa-glx (2.48.2-0ubuntu4.4) over (2.48.2-0ubuntu4.1) ...
Preparing to unpack .../libgl1-mesa-glx_2.48.2-0ubuntu4.4_amd64.deb ...
Unpacking libgl1-mesa-glx:amd64 (2.48.2-0ubuntu4.4) over (2.48.2-0ubuntu4.1) ...
Preparing to unpack .../gststreamer1.0-plugins-base_1.8.3-1ubuntu0.3_amd64.deb ...
Unpacking gststreamer1.0-plugins-base:amd64 (1.8.3-1ubuntu0.3) over (1.8.3-1ubuntu0.2) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for libc-bin (2.23-0ubuntu5) ...
Setting up libgl1-mesa-glx:amd64 (2.48.2-0ubuntu4.4) ...
Setting up libgl1-mesa-glx (2.48.2-0ubuntu4.4) ...
Setting up libgl1-mesa-glx-dev (2.48.2-0ubuntu4.4) ...
Setting up gststreamer1.0-plugins-base:amd64 (1.8.3-1ubuntu0.3) ...
Processing triggers for libc-bin (2.23-0ubuntu5) ...
Reading package lists... Done
Building dependency tree
Reading state information... Done
libpng12-dev is already the newest version (1.2.54-1ubuntu1.1).
0 upgraded, 0 newly installed, 0 to remove and 627 not upgraded.
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094# ls
EULA.txt      install_openvino_dependencies.sh  pset          rpm
install_GUI.sh  install.sh                       PUBLIC_KEY.PUB  silent.cfg
root@osk:/home/terasic/Desktop/l_openvino_toolkit_fpga_p_2019.1.094# ./install_GUI.sh
```

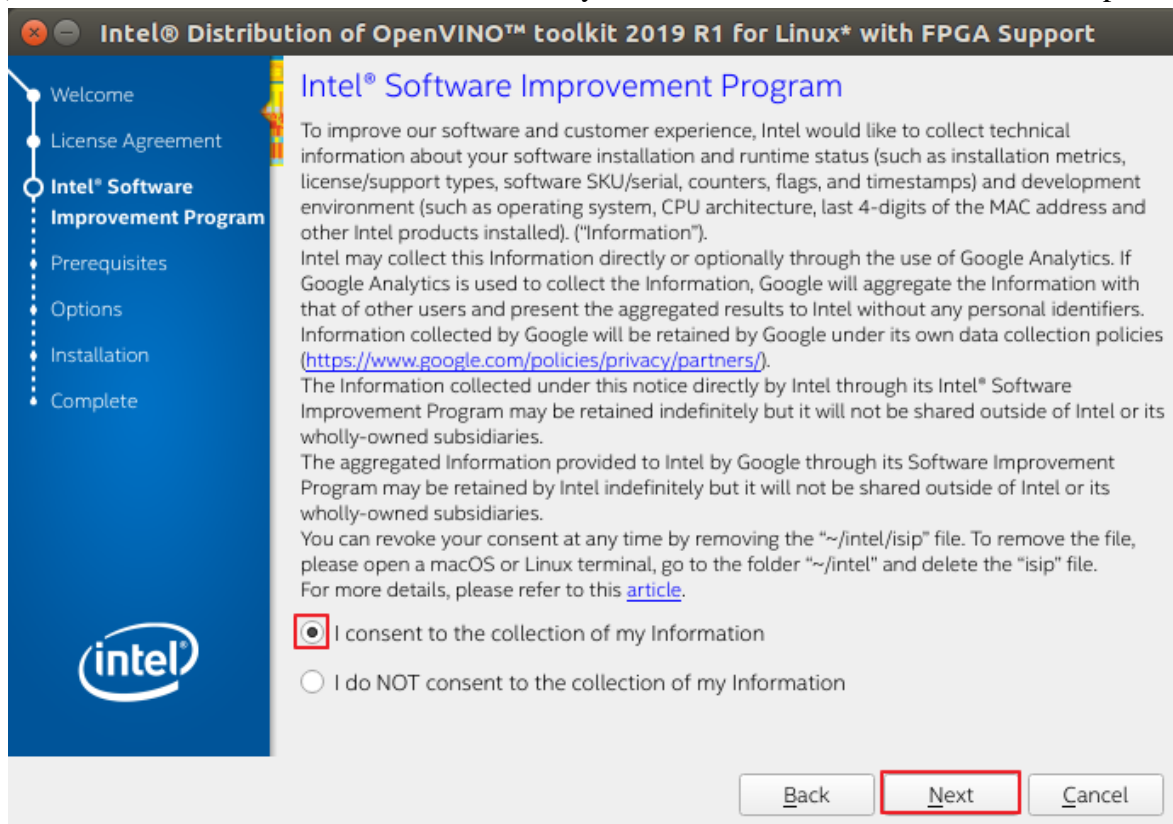
- 2) It will pop up the GUI installation interface, and click Next for next step.



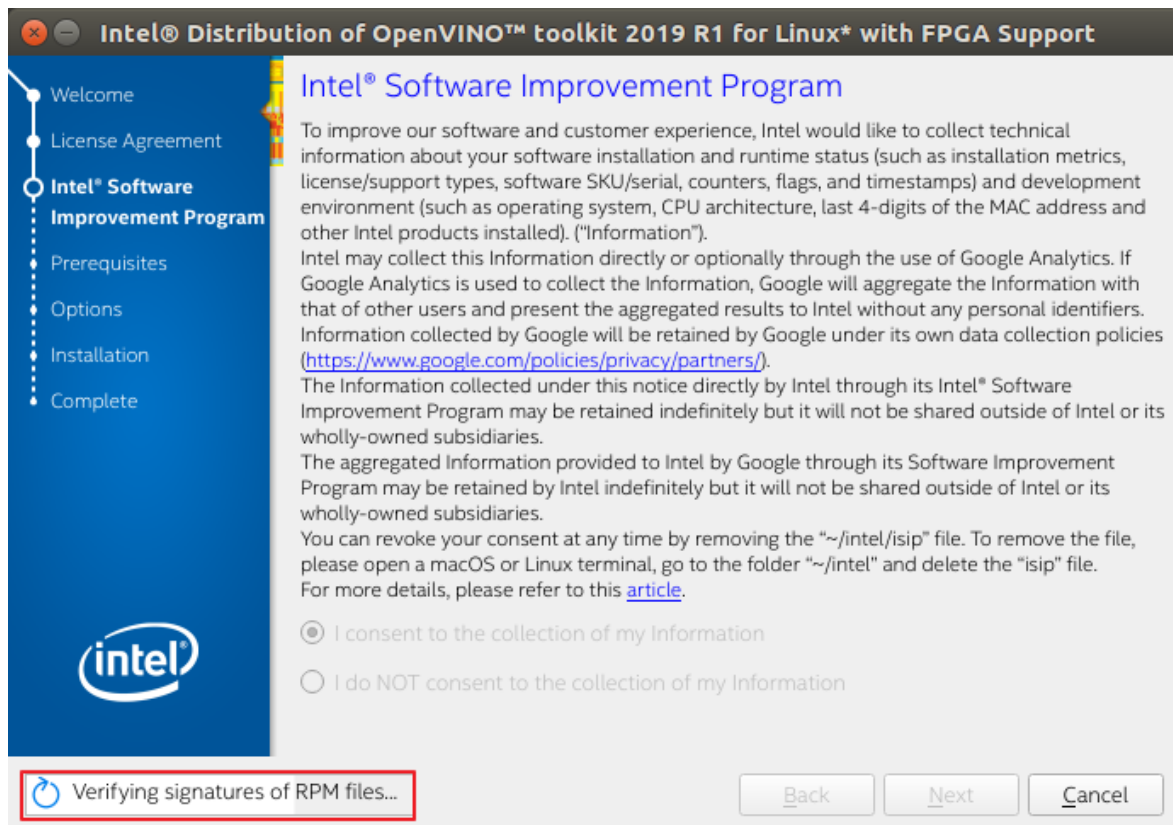
- 3) Check the accept option, and click Next for next step.



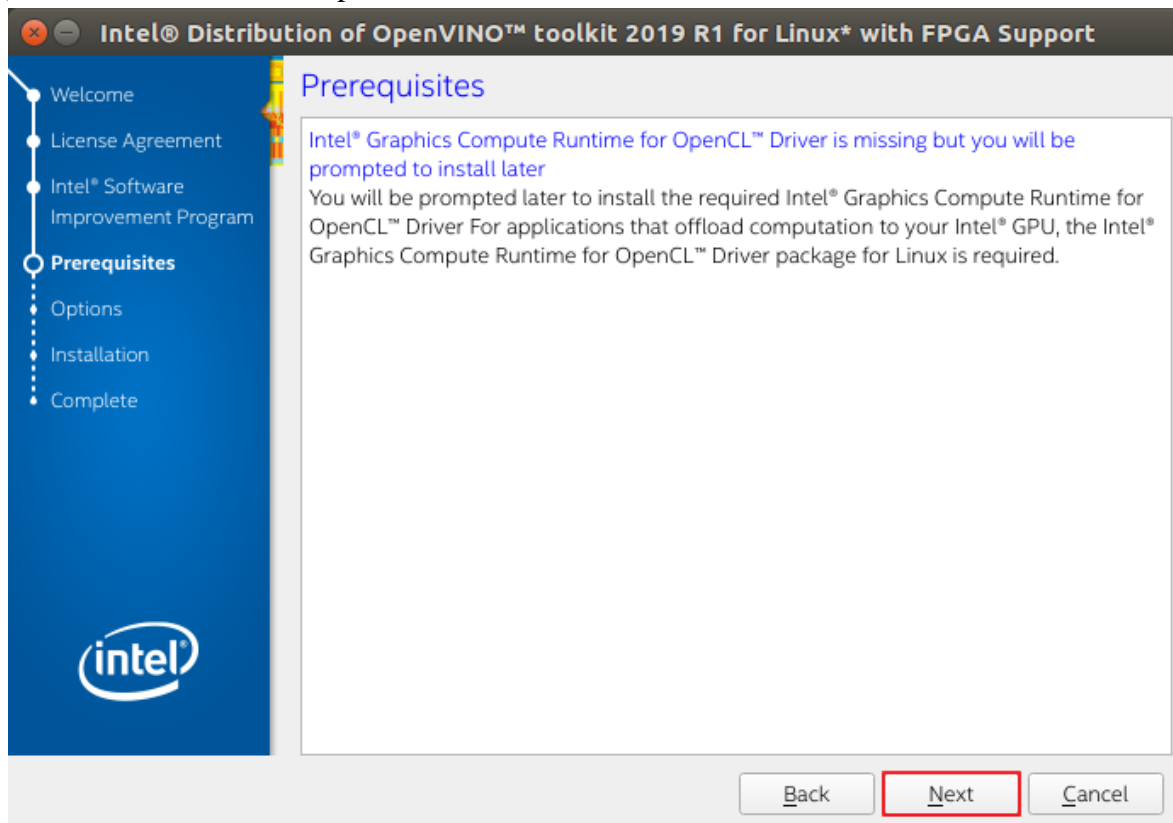
- 4) Check the I consent to the collection of my information and click Next for next step.



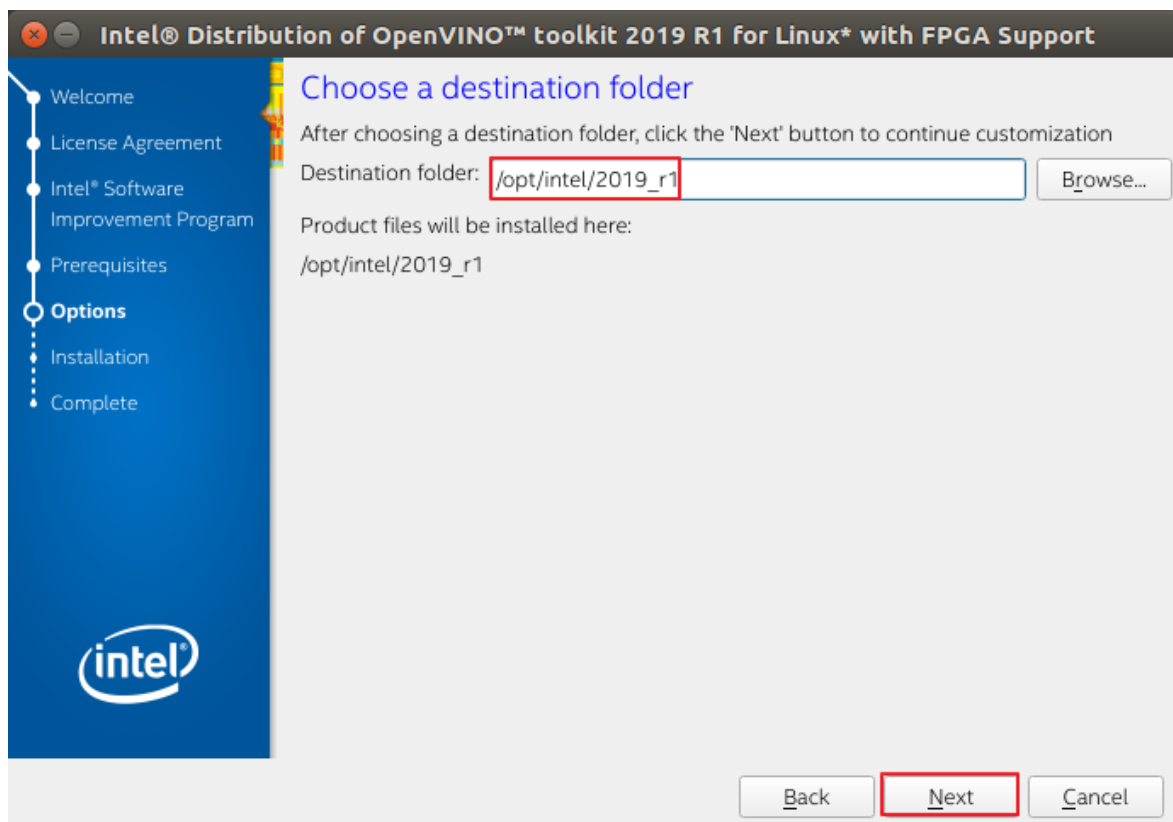
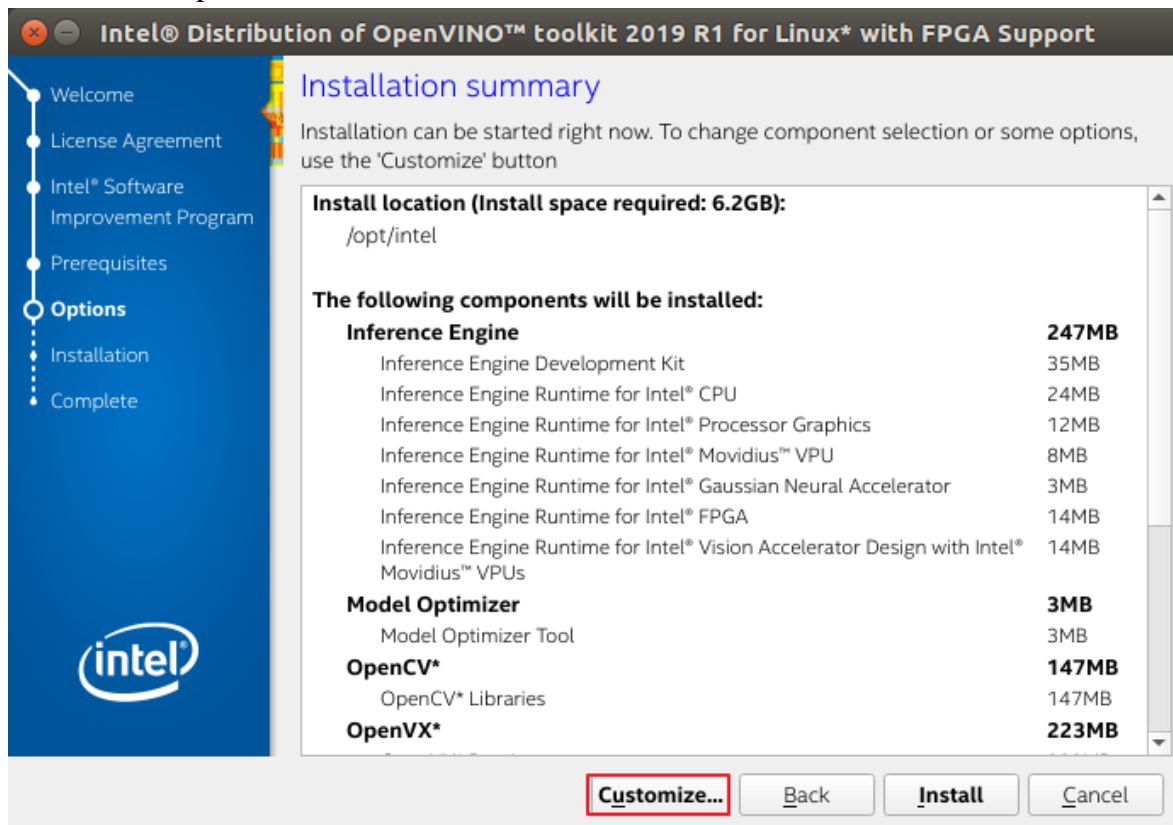
- 5) It will take few minutes to verify signature of RPM files, please wait patiently.

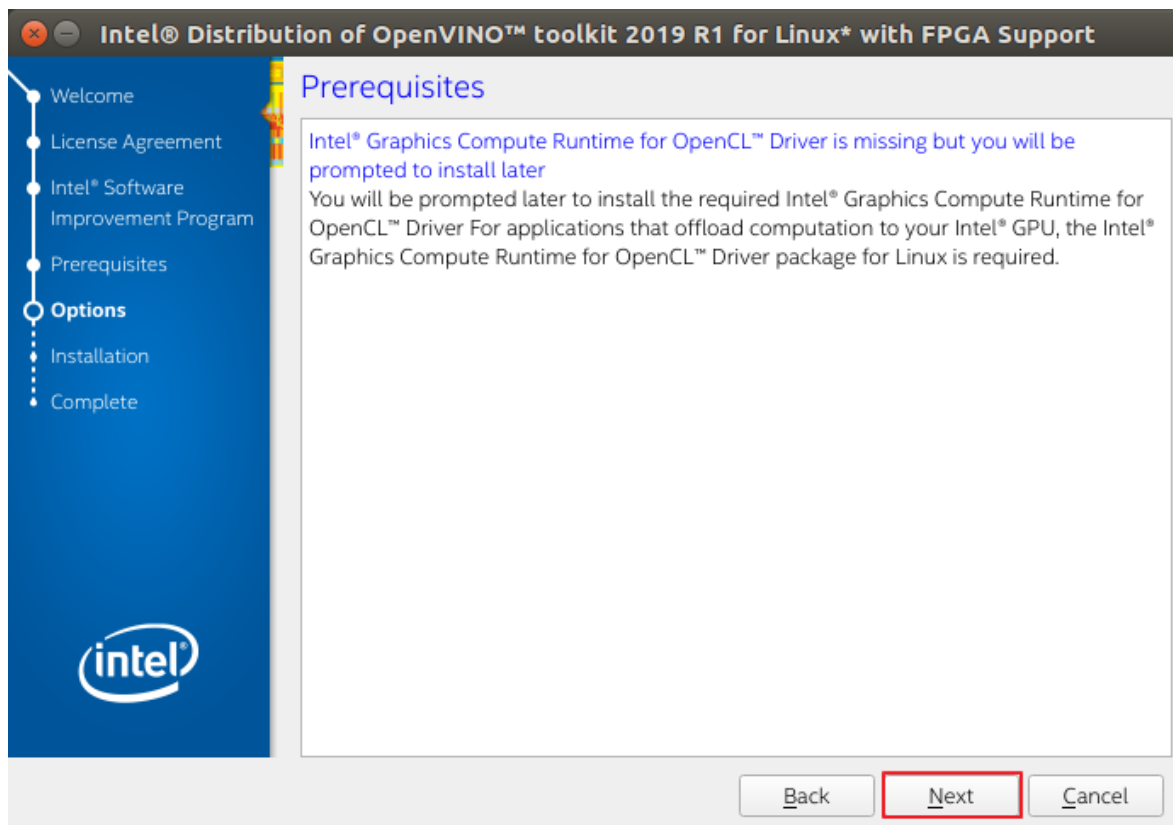
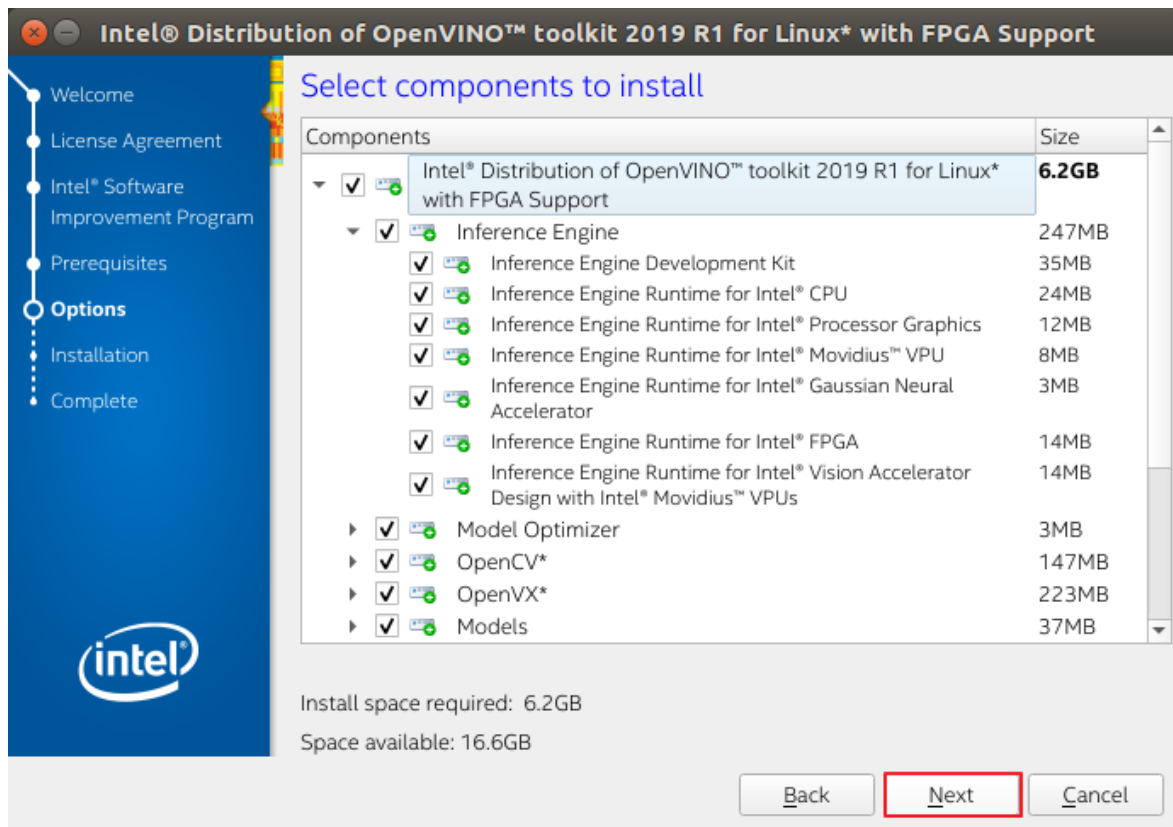


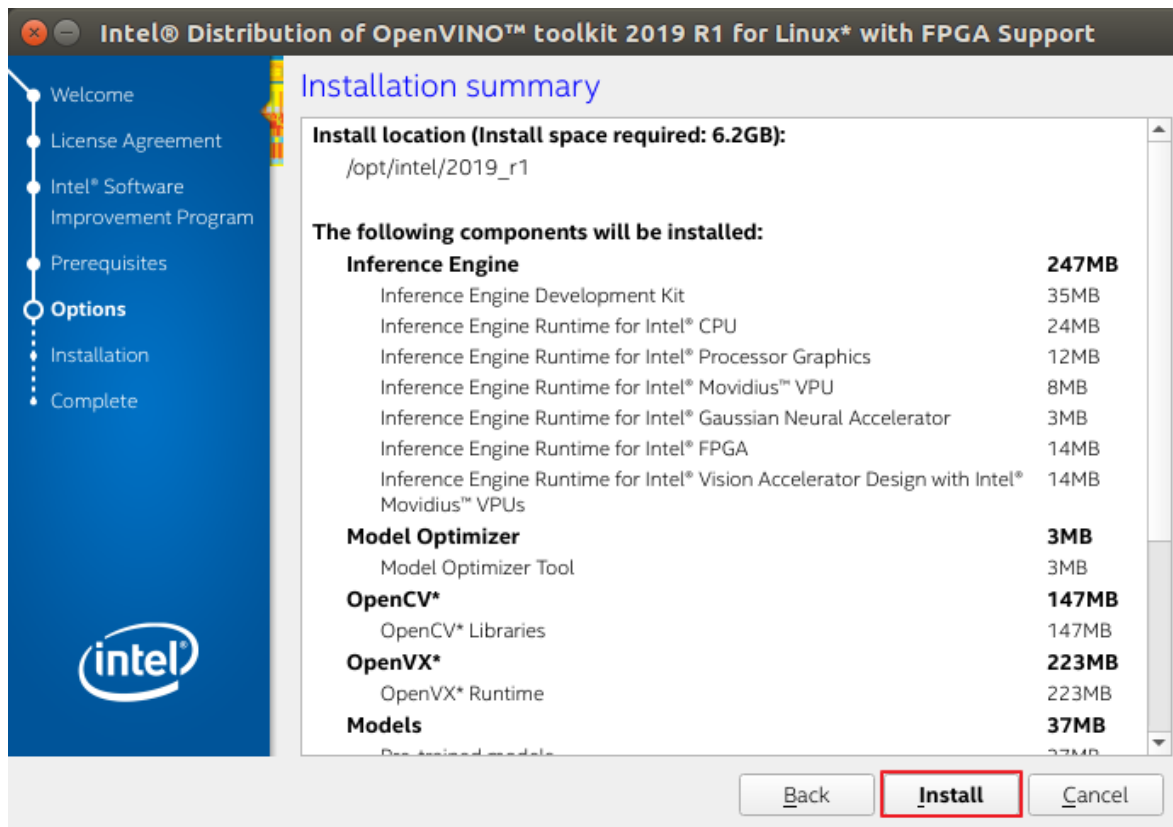
6) Click Next for next step.



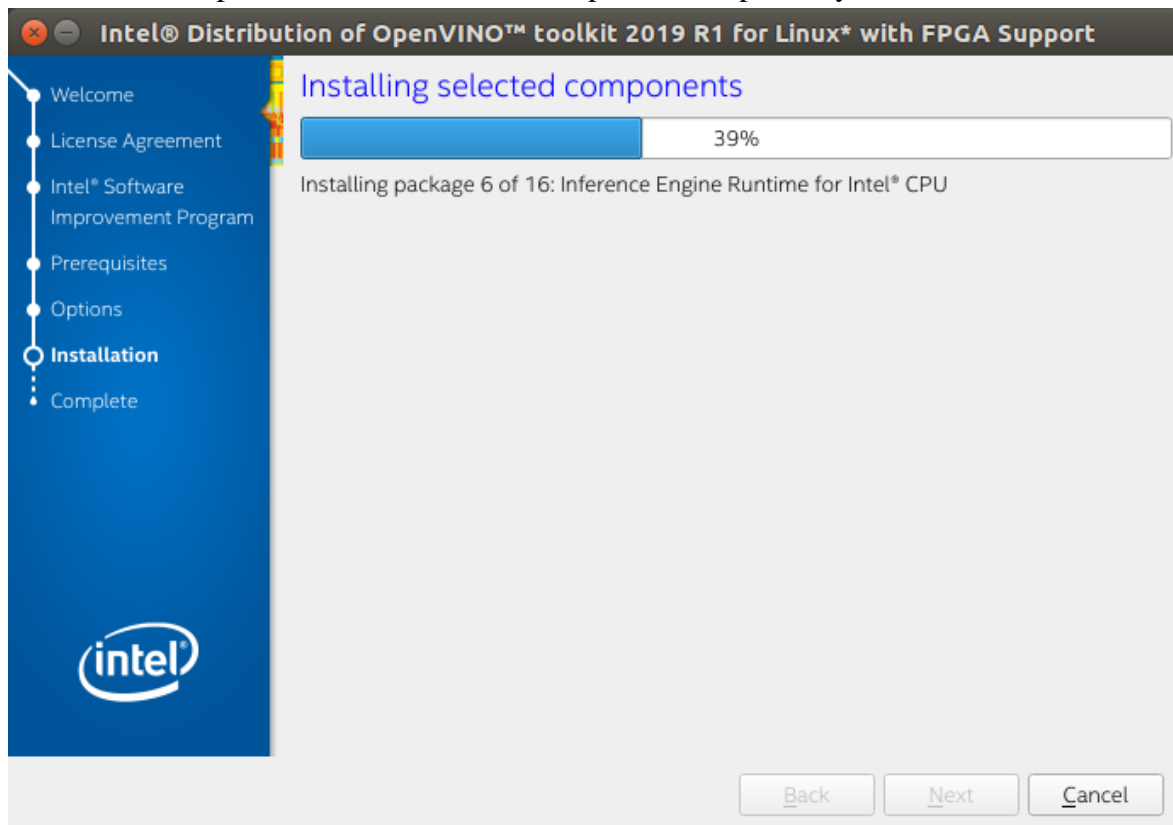
- 7) In this version, we use custom installation path, as shown below. But user can use the default installation path.



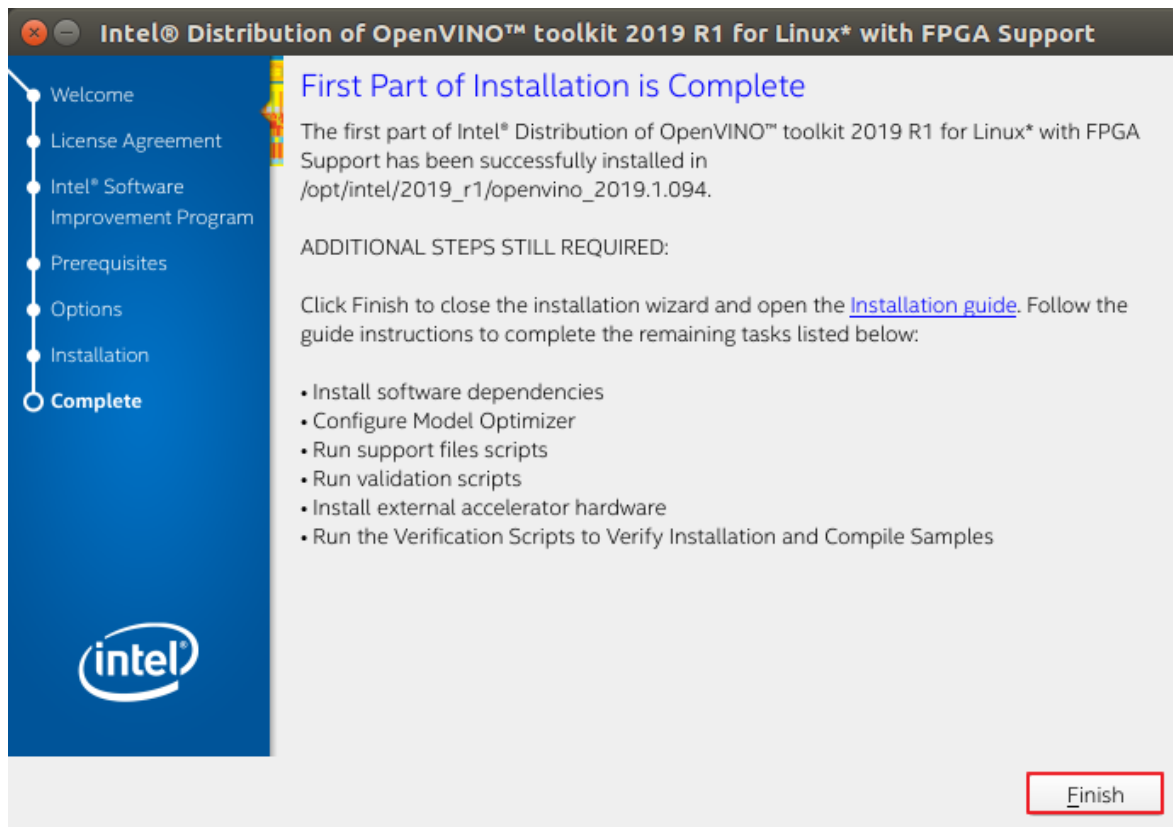




The installation process will take some time, please wait patiently.



After installing completely, click Finish to quit the installation interface, and close the current terminal.



1.4 OpenVINO Toolkit environment test

1. Open in terminal by right clicking on the Desktop. Enter command “*sudo su*” to change user to root (super user).

```
root@osk: /home/terasic
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk: /home/terasic#
```

2. Input below command to set OpenVINO environment:
source /opt/intel/2019_r1/opencvino/bin/setupvars.sh
It will show “OpenVINO environment initialized”.

```
root@osk: /home/terasic
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk: /home/terasic# source /opt/intel/2019_r1/opencvino/bin/setupvars.sh
[setupvars.sh] OpenVINO environment initialized
root@osk: /home/terasic#
```

3. Switch to the demo path with command:
cd /opt/intel/2019_r1/opencvino/deployment_tools/demo/


```

root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/demo
terasica@osk:~$ sudo su
[sudo] password for terasica:
root@osk:/home/terasica# source /opt/intel/2019_r1/opencvino/bin/setupvars.sh
[setupvars.sh] OpenVINO environment initialized
root@osk:/home/terasica# cd /opt/intel/2019_r1/opencvino/deployment_tools/demo
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/demo# ls
car_1.bmp  demo_security_barrier_camera.sh  README.txt
car.png    demo_squeezenet_download_convert_run.sh  squeezenet1.1.labels
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/demo#

```

4. Execute squeezenet demo: `./demo_squeezenet_download_convert_run.sh`

```

root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/demo
terasica@osk:~$ sudo su
[sudo] password for terasica:
root@osk:/home/terasica# source /opt/intel/2019_r1/opencvino/bin/setupvars.sh
[setupvars.sh] OpenVINO environment initialized
root@osk:/home/terasica# cd /opt/intel/2019_r1/opencvino/deployment_tools/demo
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/demo# ls
car_1.bmp  demo_security_barrier_camera.sh  README.txt
car.png    demo_squeezenet_download_convert_run.sh  squeezenet1.1.labels
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/demo# ./demo_squeezenet_download_convert_run.sh

```

5. The Demo script will install the required toolkit automatically. Please wait patiently, the time is depending on the internet environment.
6. The result is shown in the figure below (this demo is only run on the CPU):

```

root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/demo
479      0.0419133   car wheel
751      0.0091072   racer, race car, racing car
436      0.0068162   beach wagon, station wagon, wagon, estate car, beach waggon,
station waggon, waggon
656      0.0037564   minivan
586      0.0025741   half track
717      0.0016069   pickup, pickup truck
864      0.0012027   tow truck, tow car, wrecker
581      0.0005882   grille, radiator grille

total inference time: 193.6178952
Average running time of one iteration: 193.6178952 ms

Throughput: 5.1648119 FPS

[ INFO ] Execution successful

#####

Demo completed successfully.

root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/demo#

```

7. The OpenVINO toolkit is installed properly now, please refer to the Appendix if users get the numpy or other errors when run the demo.
8. After the environment testing is completed, please continue the steps in Chapter 2.

OpenVINO Starter Kit Development Environment

This chapter lists the environment with OpenVINO Starter Kit and introduces the installation of the OpenVINO Starter Kit, the same development environment is recommended when users set up the applications.

2.1 Development Environment

■ Choose OpenVINO toolkit

The OpenVINO toolkit supports Windows and Linux OS, but only Linux OpenVINO toolkit supports FPGA, so users need to choose OpenVINO toolkit for Linux with FPGA Support. Detailed installation steps can refer to chapter1.

■ Linux OS

- Ubuntu 16.04.3 long-term support (LTS), 64-bit, kernel 4.8

■ FPGA boards

- OpenVINO_Starter_Kit (osk.terasic.com)



2.2 Development Package Content

OpenVINO Terasic development package download link:

<https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=167&No=1159&PartNo=4>

2.3 Install Quartus Programmer

In order to configure the FPGA and configuration device of the OpenVINO Starter Kit, the user will need to install the Quartus Programmer. The detailed steps are as follows:

1. Download Quartus Programmer installation package from the link below to the PC desktop.

http://fpgasoftware.intel.com/17.1/?edition=standard&platform=linux&download_manager=d1m3

Quartus Prime Standard Edition

Release date: November, 2017
Latest Release: v18.1

Intel® Quartus® Prime
Design Software

Select edition: Standard ▾

Select release: 17.1 ▾

Operating System  Windows  Linux

Download Method  Akamai DLM3 Download Manager  Direct Download

You may be exposed to a vulnerability issue if you have installed or plan to install Quartus Prime/Quartus II software from v11.0 to v18.0 to a location with space(s) in the path. See this [KDB solution](#) for more details.

✓ The Quartus Prime software version 17.1 supports the following device families: Stratix IV, Stratix V, Arria II, Arria V, Arria V GZ, Arria 10, Cyclone 10 LP, Cyclone IV, Cyclone V, MAX II, MAX V, and MAX 10 FPGA. [More](#)

Combined Files

Individual Files

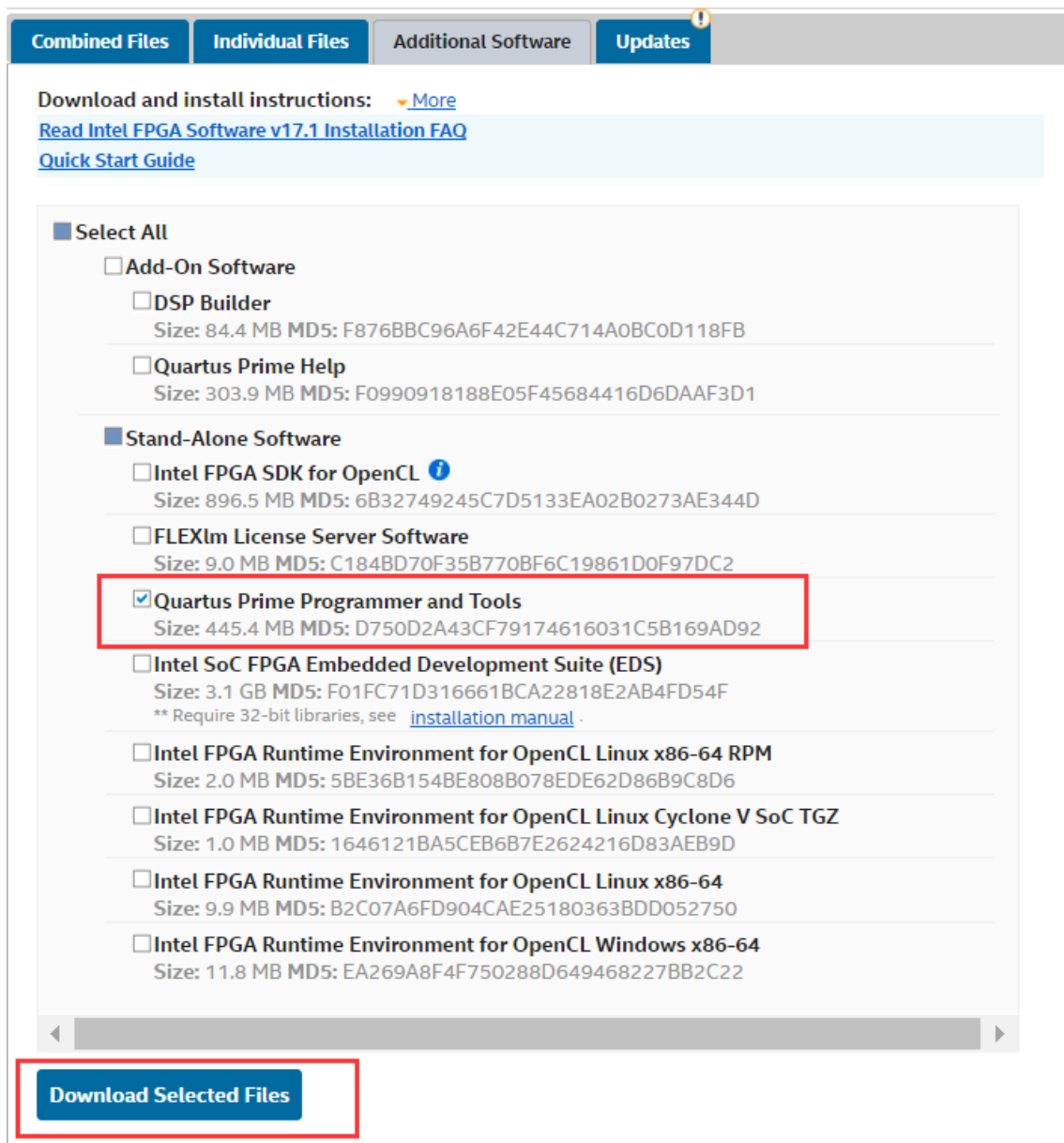
Additional Software

Updates 

Download and install instructions: [More](#)

[Read Intel FPGA Software v17.1 Installation FAQ](#)

[Quick Start Guide](#)



2. Install Quartus Programmer

- 1) Open the Terminal in the Linux and type “*sudo su*” to switch to root (super user).
- 2) Input below command, add executable attribution.
`chmod +x QuartusProgrammerSetup-17.1.0.590-linux.run`

```

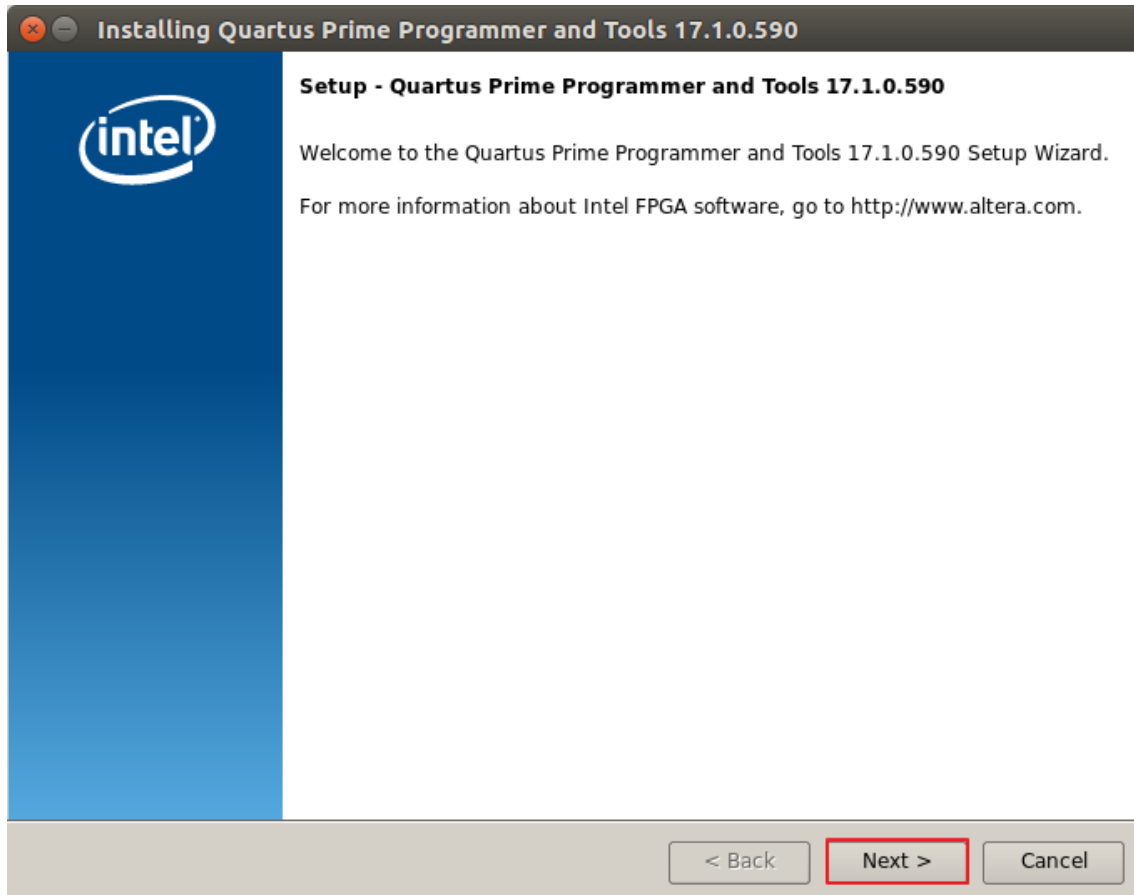
root@osk: /home/terasic/Desktop
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd Desktop/
root@osk:/home/terasic/Desktop# ls
l_openvino_toolkit_fpga_p_2019.1.094
l_openvino_toolkit_fpga_p_2019.1.094.tgz
pic
pic_loop_demo.tar.gz
QuartusProgrammerSetup-17.1.0.590-linux.run
terasic_demo.tar.gz
root@osk:/home/terasic/Desktop# chmod +x QuartusProgrammerSetup-17.1.0.590-linux
.run

```

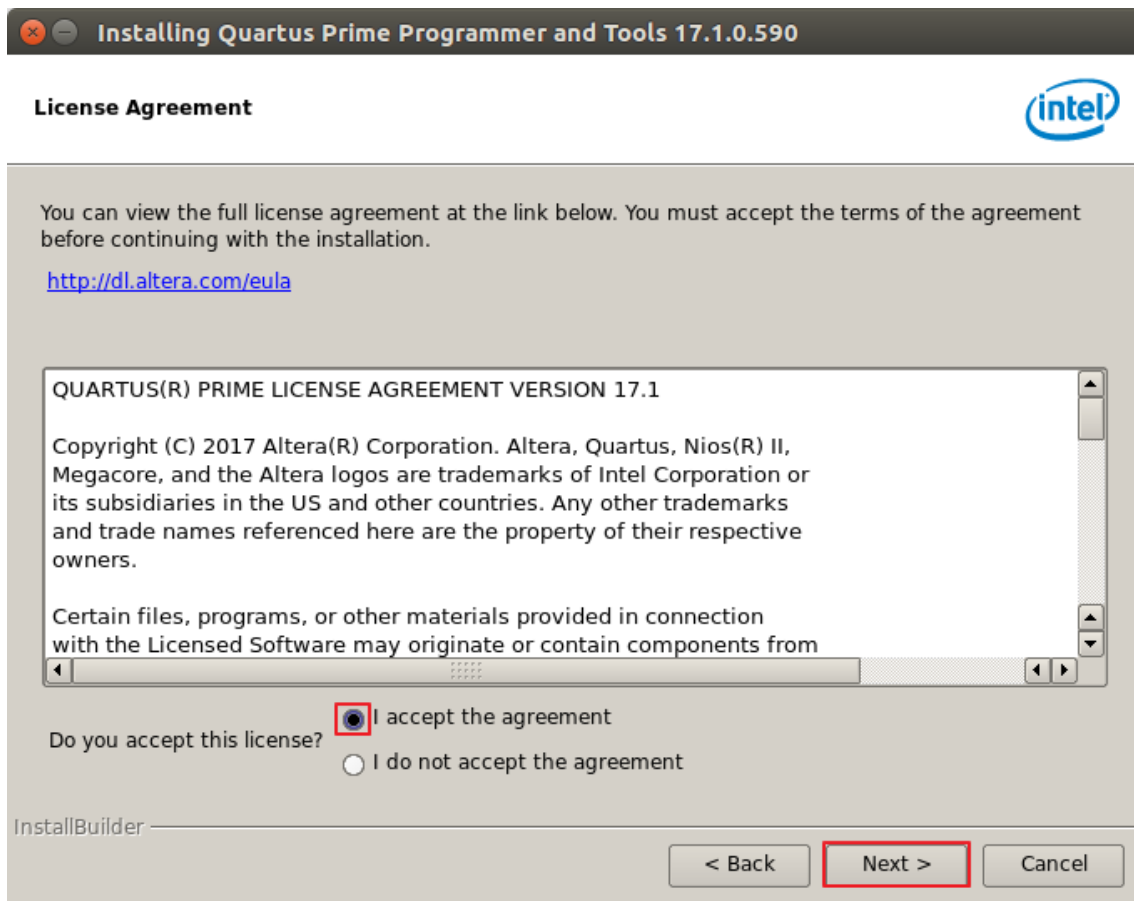
- 3) Execute installation file: `./QuartusProgrammerSetup-17.1.0.590-linux.run`


```
root@osk: /home/terasic/Desktop
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd Desktop/
root@osk:/home/terasic/Desktop# ls
l_openvino_toolkit_fpga_p_2019.1.094
l_openvino_toolkit_fpga_p_2019.1.094.tgz
pic
pic_loop_demo.tar.gz
QuartusProgrammerSetup-17.1.0.590-linux.run
terasic_demo.tar.gz
root@osk:/home/terasic/Desktop# chmod +x QuartusProgrammerSetup-17.1.0.590-linux.run
root@osk:/home/terasic/Desktop# ./QuartusProgrammerSetup-17.1.0.590-linux.run
```

4) Click Next to next step.

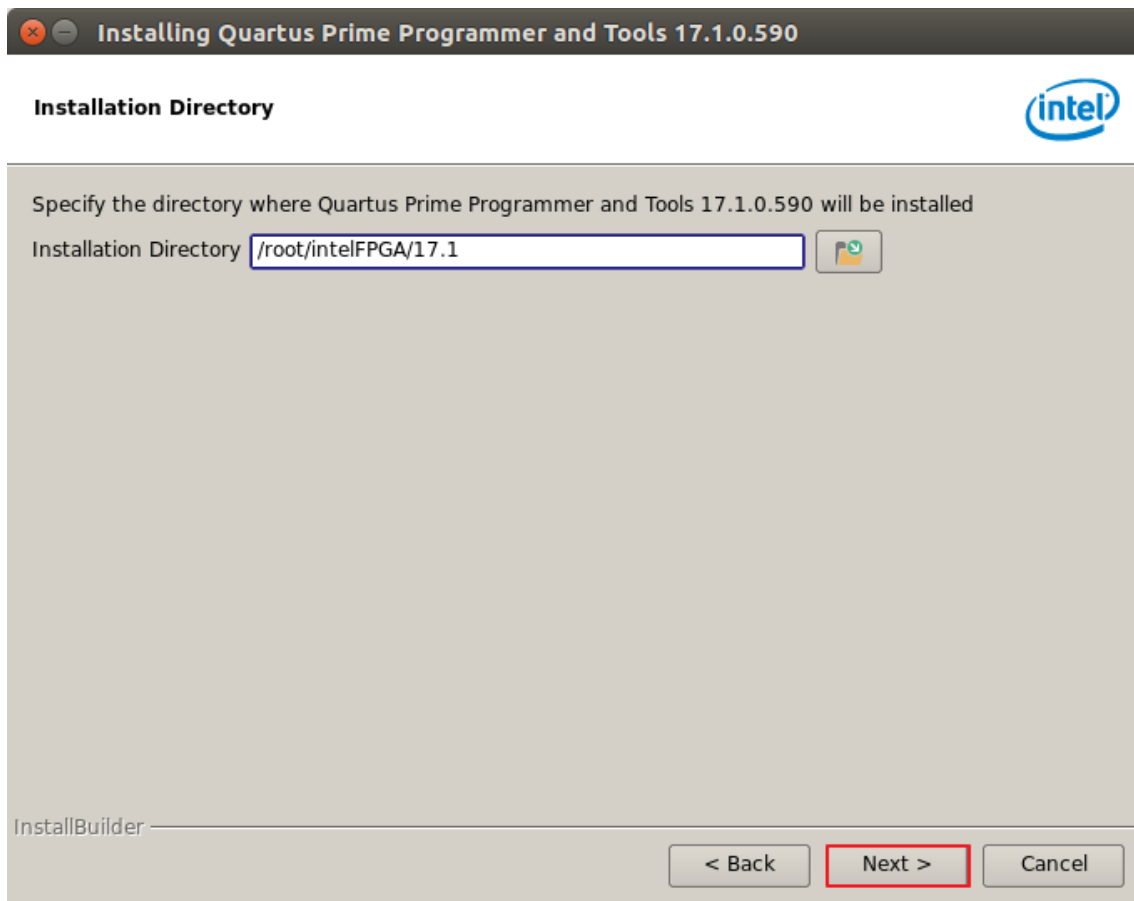


5) Check the I accept the agreement option and click Next for next step.

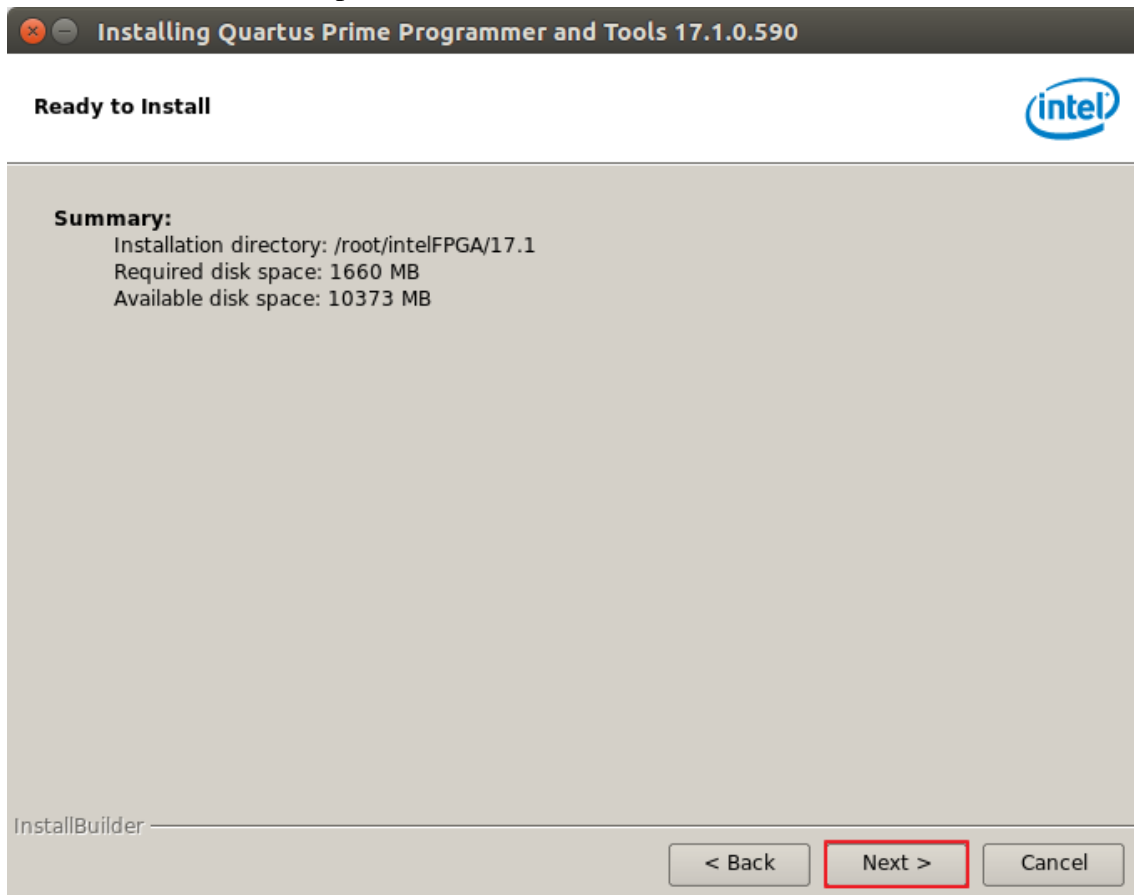


6) Click Next for next step.

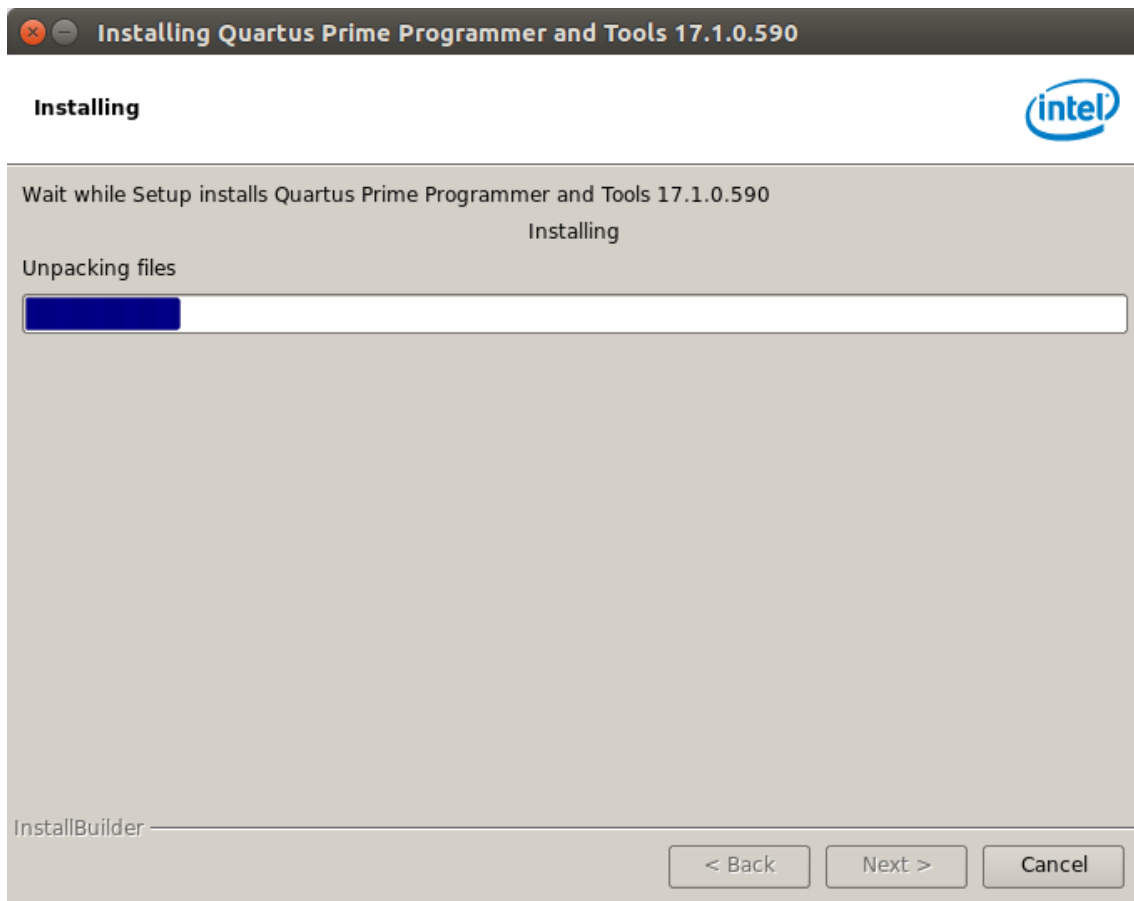
Note: It is recommended to install the Quartus programmer to the default installation path as shown in the picture below, as the `bringup_board.sh` shell script (which will run in the section 2.6) needs to use this path. If the user installs the Quartus programmer to a different path, the script may not find the Quartus Programmer, and user needs to modify the contents of the shell script to the correct path corresponding to his/her Quartus programmer installation path.



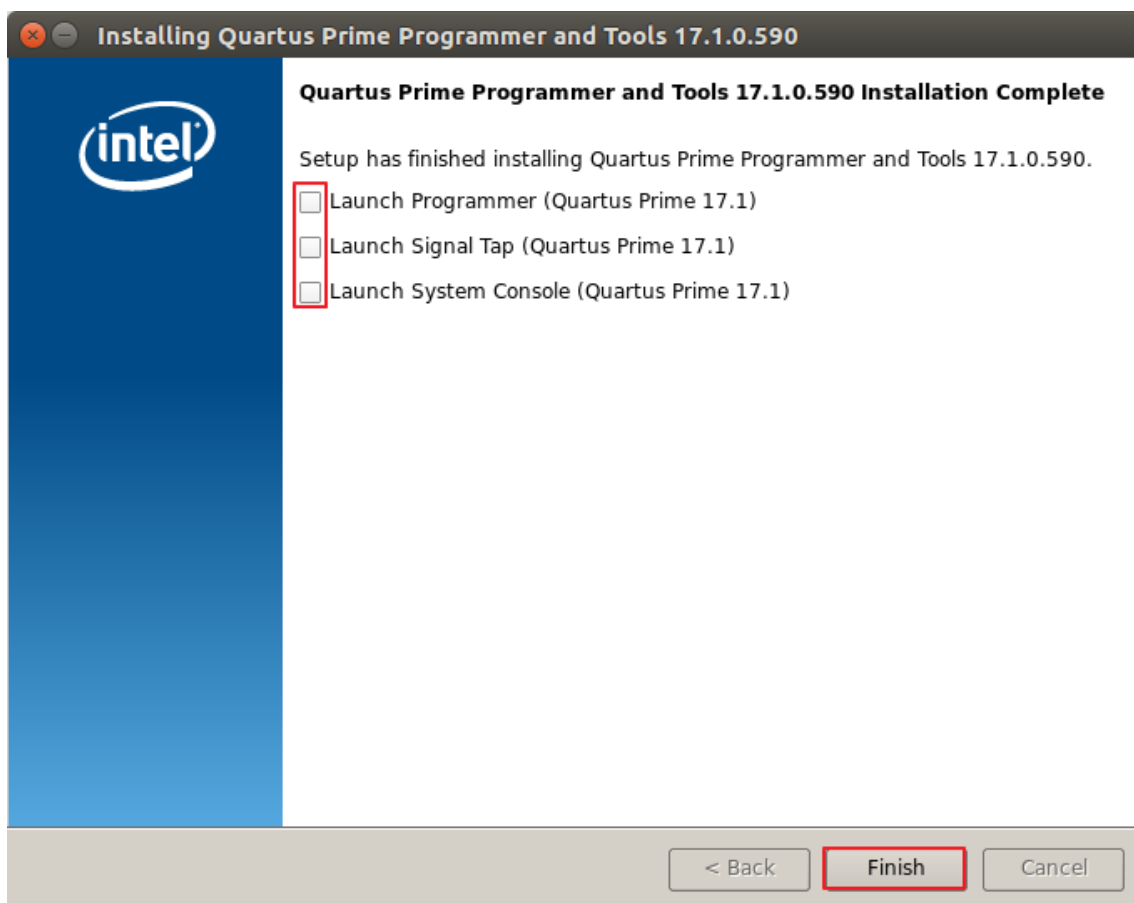
7) Click Next for next step



8) The installation process will take some time, please kindly wait.



- 9) Installation is completed, don't check the launch options, click Finish to quit the installation interface.



2.4 Install OpenVINO Starter Kit Development Package

1. Copy the terasic_demo.tar.gz file from the OSK_OPENVINO_BSP to the desktop and unzip it to the path: /opt/intel/2019_r1/openvino/deployment_tools/ by commands:

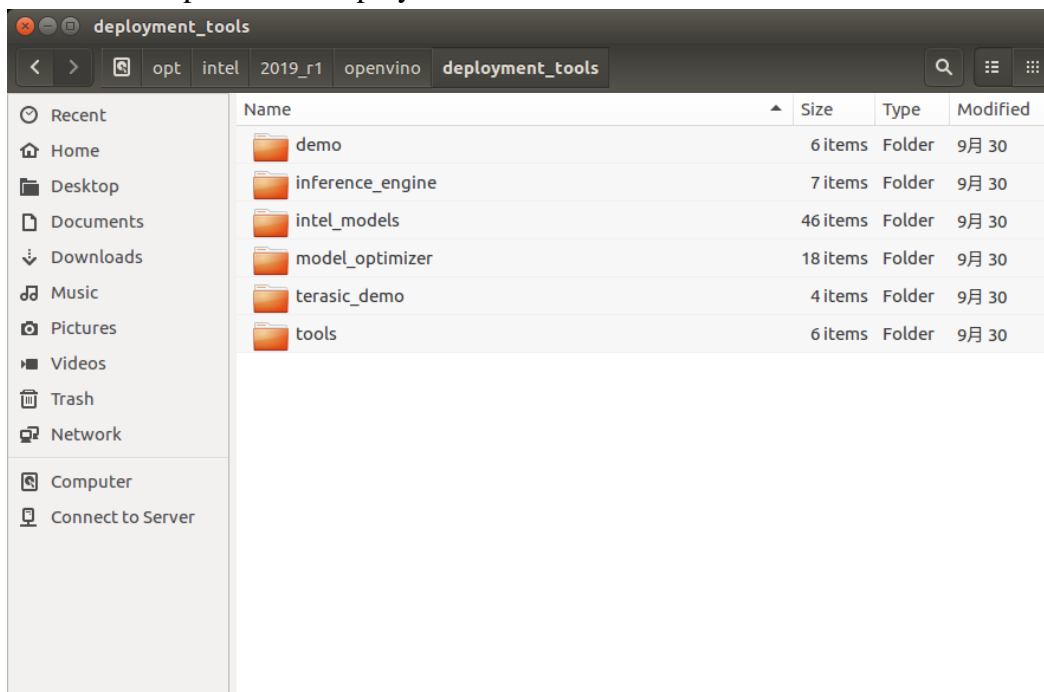
sudo tar xvfz terasic_demo.tar.gz

```
root@osk: /home/terasic/Desktop
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd Desktop
root@osk:/home/terasic/Desktop# sudo tar xvfz terasic_demo.tar.gz
```

sudo cp terasic_demo /opt/intel/2019_r1/openvino/deployment_tools/ -rf

```
root@osk: /home/terasic/Desktop
terasic_demo/demo/ir/FP32/SSD_GoogleNetV2/SSD_GoogleNetV2.labels
terasic_demo/demo/ir/FP32/SSD_GoogleNetV2/SSD_GoogleNetV2.mapping
terasic_demo/demo/ir/FP32/SSD_GoogleNetV2/SSD_GoogleNetV2.bin
terasic_demo/demo/ir/FP16/
terasic_demo/demo/ir/FP16/bvlc_alexnet/
terasic_demo/demo/ir/FP16/bvlc_alexnet/bvlc_alexnet.mapping
terasic_demo/demo/ir/FP16/bvlc_alexnet/bvlc_alexnet.xml
terasic_demo/demo/ir/FP16/bvlc_alexnet/bvlc_alexnet.labels
terasic_demo/demo/ir/FP16/bvlc_alexnet/bvlc_alexnet.bin
terasic_demo/demo/ir/FP16/squeezenet1.1/
terasic_demo/demo/ir/FP16/squeezenet1.1/squeezenet1.1.labels
terasic_demo/demo/ir/FP16/squeezenet1.1/squeezenet1.1.xml
terasic_demo/demo/ir/FP16/squeezenet1.1/squeezenet1.1.mapping
terasic_demo/demo/ir/FP16/squeezenet1.1/squeezenet1.1.bin
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.xml
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.labels
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.mapping
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.bin
terasic_demo/demo/06_human_pose_estimation.sh
terasic_demo/demo/05_Alexnet_classification.sh
terasic_demo/demo/03_face_detection.sh
root@osk:/home/terasic/Desktop# sudo cp terasic_demo /opt/intel/2019_r1/openvino/
/deployment_tools/ -rf
```

The file is copied to the deployment_tools folder as below:



2. Uncompress pic_loop_demo.tar.gz by commands:
tar xvfz pic_loop_demo.tar.gz
3. Copy the whole demo source code folder "classification_sample_for_pic_loop" to following path:
/opt/intel/2019_r1/openvino/deployment_tools/inference_engine/samples/ by commands:

```
sudo cp pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop \
/opt/intel/2019_r1/opencvino/deployment_tools/inference_engine/samples/ -rf
```

```
root@osk: /home/terasic/Desktop
terasic_demo/demo/ir/FP16/squeezenet1.1/squeezenet1.1.bin
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.xml
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.labels
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.mapping
terasic_demo/demo/ir/FP16/SSD_GoogleNetV2/SSD_GoogleNetV2.bin
terasic_demo/demo/06_human_pose_estimation.sh
terasic_demo/demo/05_Alexnet_classification.sh
terasic_demo/demo/03_face_detection.sh
root@osk:/home/terasic/Desktop# sudo cp terasic_demo /opt/intel/2019_r1/opencvino
/deployment_tools/ -rf
root@osk:/home/terasic/Desktop# tar xvfz pic_loop_demo.tar.gz
pic_loop_demo/
pic_loop_demo/pic_loop_demo/
pic_loop_demo/pic_loop_demo/07_classification_pic_loop.sh
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/README.md
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/CMakeLists.txt
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/main.cpp
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/classification_sa
mple.h
root@osk:/home/terasic/Desktop# sudo cp pic_loop_demo/pic_loop_demo/classificati
on_sample_for_pic_loop /opt/intel/2019_r1/opencvino/deployment_tools/inference_en
gine/samples/ -rf
```

4. Copy 07_classification_pic_loop.sh to following path:
/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo/ by commands:
sudo cp pic_loop_demo/pic_loop_demo/07_classification_pic_loop.sh \
/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo/
5. Switch to the demo path with command:
cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo
6. add execution property for 07_classification_pic_loop.sh by commands:
sudo chmod +x 07_classification_pic_loop.sh

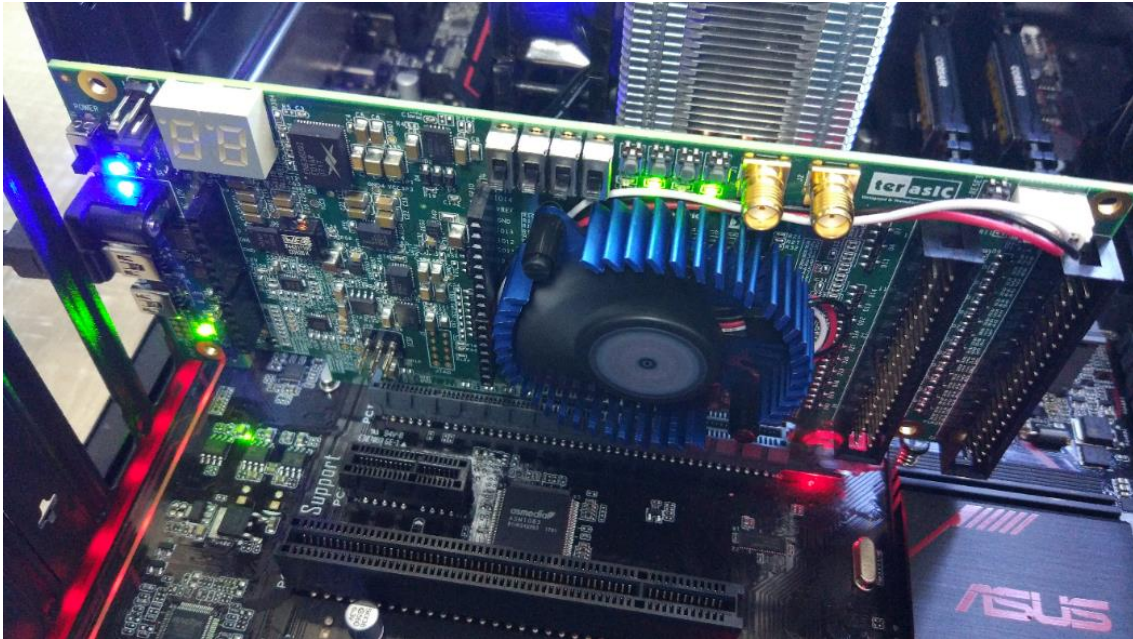
```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo
terasic_demo/demo/05_Alexnet_classification.sh
terasic_demo/demo/03_face_detection.sh
root@osk:/home/terasic/Desktop# sudo cp terasic_demo /opt/intel/2019_r1/opencvino
/deployment_tools/ -rf
root@osk:/home/terasic/Desktop# tar xvfz pic_loop_demo.tar.gz
pic_loop_demo/
pic_loop_demo/pic_loop_demo/
pic_loop_demo/pic_loop_demo/07_classification_pic_loop.sh
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/README.md
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/CMakeLists.txt
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/main.cpp
pic_loop_demo/pic_loop_demo/classification_sample_for_pic_loop/classification_sa
mple.h
root@osk:/home/terasic/Desktop# sudo cp pic_loop_demo/pic_loop_demo/classificati
on_sample_for_pic_loop /opt/intel/2019_r1/opencvino/deployment_tools/inference_en
gine/samples/ -rf
root@osk:/home/terasic/Desktop# sudo cp pic_loop_demo/pic_loop_demo/07_classific
ation_pic_loop.sh /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo
/
root@osk:/home/terasic/Desktop# cd /opt/intel/2019_r1/opencvino/deployment_tools/
terasic_demo/demo/
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/demo# sudo ch
mod +x 07_classification_pic_loop.sh
```

2.5 Setup the OpenVINO Starter Kit to the host PC

1. Make sure the host PC is power off.
2. Install the OpenVINO Starter Kit to the PCIe X4/X8/X16 socket of the host PC.
3. Connect the DC 12V power to the OpenVINO Starter Kit if necessary.

4. Connect the USB Blaster II cable to the USB Blaster II connector of the OpenVINO Starter Kit.

NOTE: users can remove the USB Blaster II cable if the bitstream is programmed to the flash through the `bringup_board.sh` script.



2.6 Bring up the OpenVINO Starter Kit

1. Power on the host PC and open the Terminal.
2. Enter command “`sudo su`” to change user to root (super user), Enter your password.

```
root@osk: /home/terasic
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic#
```

3. Execute the below command, switch to the `terasic_demo` path:
`cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/`

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo#
```

4. Execute below command, program the pre-loaded bitstream file to the Flash device on the OpenVINO Starter Kit.

`./bringup_board.sh osk_gt` (`./bringup_board.sh osk_gx` for GX version)

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# ./bringup_board.sh osk_gt
```

- It will take a few minutes to complete the configuration.

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
Info: to the terms and conditions of the Intel Program License
Info: Subscription Agreement, the Intel Quartus Prime License Agreement,
Info: the Intel FPGA IP License Agreement, or other applicable license
Info: agreement, including, without limitation, that your use is for
Info: the sole purpose of programming logic devices manufactured by
Info: Intel and sold by Intel or its authorized distributors. Please
Info: refer to the applicable agreement for further details.
Info: Processing started: Mon Sep 30 13:46:12 2019
Info: Command: quartus_pgm -m jtag -c 1 -o p;flash.jic
Info (213045): Using programming cable "C5P [1-4.4]"
Info (213011): Using programming file flash.jic with checksum 0x5FAADE20 for dev
ice 5CGTFD9D5@1
Info (209060): Started Programmer operation at Mon Sep 30 13:46:25 2019
Info (209018): Device 1 silicon ID is 0x19
Info (209044): Erasing ASP configuration device(s)
Info (209023): Programming device(s)
Info (209011): Successfully performed operation(s)
Info (209061): Ended Programmer operation at Mon Sep 30 13:49:43 2019
Info: Quartus Prime Programmer was successful. 0 errors, 0 warnings
Info: Peak virtual memory: 502 megabytes
Info: Processing ended: Mon Sep 30 13:49:43 2019
Info: Elapsed time: 00:03:31
Info: Total CPU time (on all processors): 00:00:44
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo#
```

- Power off the host PC and the OpenVINO Starter Kit after the flash is configured completely, then power on the OpenVINO Starter Kit and host again.
- Power on the host PC, click on the desktop to open the Terminal.
- Enter command “*sudo su*” to change user to root (super user), enter your password.

```
root@osk: /home/terasic
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk: /home/terasic#
```

- Input below command, check if the OpenVINO Starter Kit can be check through PCIe:
`lspci | grep Altera`

```
root@osk: /home/terasic
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk: /home/terasic# lspci | grep Altera
01:00.0 Unassigned class [ff00]: Altera Corporation Device d800 (rev 01)
root@osk: /home/terasic#
```

2.7 OpenCL Runtime Test

- Switch to Terasic_demo path.

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk: /home/terasic# lspci | grep Altera
01:00.0 Unassigned class [ff00]: Altera Corporation Device d800 (rev 01)
root@osk: /home/terasic# cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_
demo/
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# ls
bitstreams  bringup_board.sh  demo  setup_board_osk.sh
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo#
```


2. Input below command to install the driver:

source setup_board_osk.sh

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# lspci | grep Altera
01:00.0 Unassigned class [ff00]: Altera Corporation Device d800 (rev 01)
root@osk:/home/terasic# cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# ls
bitstreams  bringup_board.sh  demo  setup_board_osk.sh
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# source setup_board_osk.sh
```

3. Input y, as shown in the figure below:

```
root@osk: /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo
terasic@osk:~$ sudo su
[sudo] password for terasic:
root@osk:/home/terasic# lspci | grep Altera
01:00.0 Unassigned class [ff00]: Altera Corporation Device d800 (rev 01)
root@osk:/home/terasic# cd /opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo/
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# ls
bitstreams  bringup_board.sh  demo  setup_board_osk.sh
root@osk:/opt/intel/2019_r1/opencvino/deployment_tools/terasic_demo# source setup_board_osk.sh
[setupvars.sh] OpenVINO environment initialized
INTELFPGAOCCLSDKROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64. Using that.

aoc was not found, but aocl was found. Assuming only RTE is installed.

AOCL_BOARD_PACKAGE_ROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk. Using that.
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/bin to PATH
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/host/linux64/lib to LD_LIBRARY_PATH
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk/linux64/lib to LD_LIBRARY_PATH
Do you want to install /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk? [y/n]
y
```

4. The driver is installed completely.

```

root@osk: /opt/intel/2019_r1/openvino/deployment_tools/terasic_demo
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk/linux64/lib to LD_LIBRARY_PATH
Do you want to install /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk? [y/n]
y
aocl install: Adding the board package /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk to the list of installed packages
aocl install: Setting up FCD
aocl install: Running install from /opt/altera/aocl-pro-rte/aclrte-linux64/board/osk/linux64/libexec
Using kernel source files from /lib/modules/4.8.0-36-generic/build
make: Entering directory '/usr/src/linux-headers-4.8.0-36-generic'
CC [M] /tmp/openccl_driver_cj6rkt/aclpci_queue.o
CC [M] /tmp/openccl_driver_cj6rkt/aclpci.o
CC [M] /tmp/openccl_driver_cj6rkt/aclpci_fileio.o
CC [M] /tmp/openccl_driver_cj6rkt/aclpci_dma.o
CC [M] /tmp/openccl_driver_cj6rkt/aclpci_cvp.o
CC [M] /tmp/openccl_driver_cj6rkt/aclpci_cmd.o
LD [M] /tmp/openccl_driver_cj6rkt/aclpci_drv.o
Building modules, stage 2.
MODPOST 1 modules
CC /tmp/openccl_driver_cj6rkt/aclpci_drv.mod.o
LD [M] /tmp/openccl_driver_cj6rkt/aclpci_drv.ko
make: Leaving directory '/usr/src/linux-headers-4.8.0-36-generic'
root@osk:/opt/intel/2019_r1/openvino/deployment_tools/terasic_demo#

```

5. Enter command “*aocl diagnose*” to test if the OpenVINO Starter Kit can be booted up normally.

```

root@osk: /opt/intel/2019_r1/openvino/deployment_tools/terasic_demo
make: Leaving directory '/usr/src/linux-headers-4.8.0-36-generic'
root@osk:/opt/intel/2019_r1/openvino/deployment_tools/terasic_demo# aocl diagnose
-----
Warning:
No devices attached for package:
/opt/altera/aocl-pro-rte/aclrte-linux64/board/osk
-----

Verified that the kernel mode driver is installed on the host machine.

Using board package from vendor: Terasic
Querying information for all supported devices that are installed on the host machine ...

Device Name    Status    Information
-----
acl0           Passed    Cyclone V HPC Reference Platform
              PCIe dev_id = D800, bus:slot.func = 01:00.00, at Gen 2 with
              1 lanes

Found 1 active device(s) installed on the host machine. To perform a full diagnostic on a specific device, please run
aocl diagnose <device_name>

DIAGNOSTIC_PASSED
-----

Call "aocl diagnose <device-names>" to run diagnose for specified devices
Call "aocl diagnose all" to run diagnose for all devices
root@osk:/opt/intel/2019_r1/openvino/deployment_tools/terasic_demo#

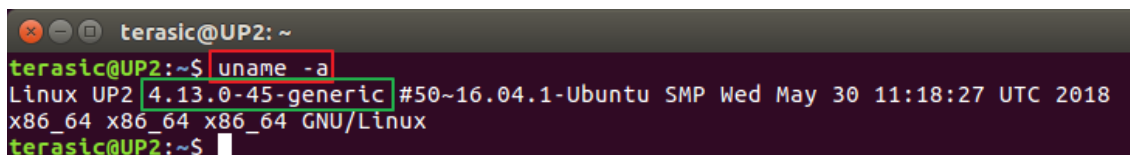
```

The environment is set up completely, now user can run the FPGA demos by referring to “**OpenVINO Development Guide**”.

Lower Kernel Version of Ubuntu

For the OSK, the PCIe driver is not compatible with Linux kernel which is higher than 4.8. So user needs to lower their Linux kernel version. there is a way to deal with it, as shown below (we use Linux kernel 4.8.0-58 for example).

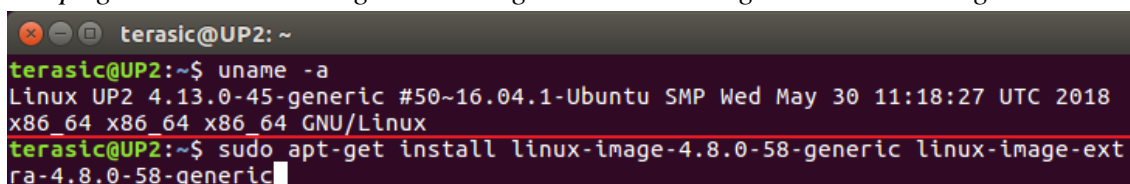
1. Check Linux kernel version with command "*uname -a*"



```
terasic@UP2: ~  
terasic@UP2:~$ uname -a  
Linux UP2 4.13.0-45-generic #50~16.04.1-Ubuntu SMP Wed May 30 11:18:27 UTC 2018  
x86_64 x86_64 x86_64 GNU/Linux  
terasic@UP2:~$
```

2. Enter following command to install 4.8.0-58 kernel image.

sudo apt-get install linux-image-4.8.0-58-generic linux-image-extra-4.8.0-58-generic



```
terasic@UP2: ~  
terasic@UP2:~$ uname -a  
Linux UP2 4.13.0-45-generic #50~16.04.1-Ubuntu SMP Wed May 30 11:18:27 UTC 2018  
x86_64 x86_64 x86_64 GNU/Linux  
terasic@UP2:~$ sudo apt-get install linux-image-4.8.0-58-generic linux-image-extra-4.8.0-58-generic
```

The installation is completed.

```
terasic@UP2: ~  
oot/vmlinuz-4.8.0-58-generic  
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.8.0-58-generic /bo  
ot/vmlinuz-4.8.0-58-generic  
update-initramfs: Generating /boot/initrd.img-4.8.0-58-generic  
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.8.0-58-generic /boot/vmli  
nuz-4.8.0-58-generic  
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.8.0-58-generic  
/boot/vmlinuz-4.8.0-58-generic  
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.8.0-58-generic /bo  
ot/vmlinuz-4.8.0-58-generic  
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.8.0-58-generic /boo  
t/vmlinuz-4.8.0-58-generic  
Generating grub configuration file ...  
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is se  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.13.0-45-generic  
Found initrd image: /boot/initrd.img-4.13.0-45-generic  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
terasic@UP2:~$
```

3. Enter following command to install kernel source package

sudo apt-get install linux-headers-4.8.0-58 linux-headers-4.8.0-58-generic

```
terasic@UP2: ~  
terasic@UP2:~$ sudo apt-get install linux-headers-4.8.0-58 linux-headers-4.8.0-5  
8-generic  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  linux-modules-4.15.0-50-generic linux-signed-image-4.8.0-36-generic  
Use 'sudo apt autoremove' to remove them.  
The following NEW packages will be installed:  
  linux-headers-4.8.0-58 linux-headers-4.8.0-58-generic  
0 upgraded, 2 newly installed, 0 to remove and 298 not upgraded.  
Need to get 0 B/11.1 MB of archives.  
After this operation, 80.8 MB of additional disk space will be used.  
Selecting previously unselected package linux-headers-4.8.0-58.  
(Reading database ... 226034 files and directories currently installed.)  
Preparing to unpack .../linux-headers-4.8.0-58_4.8.0-58.63~16.04.1_all.deb ...  
Unpacking linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...  
Selecting previously unselected package linux-headers-4.8.0-58-generic.  
Preparing to unpack .../linux-headers-4.8.0-58-generic_4.8.0-58.63~16.04.1_amd64  
.deb ...  
Unpacking linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...  
Setting up linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...  
Setting up linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...  
terasic@UP2:~$
```

4. Now, uninstall the pre-installed Linux kernel version with the following command

sudo apt-get remove linux-image-4.13.0-45-generic

```
terasic@UP2: ~
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-modules-4.15.0-50-generic linux-signed-image-4.8.0-36-generic
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  linux-headers-4.8.0-58 linux-headers-4.8.0-58-generic
0 upgraded, 2 newly installed, 0 to remove and 298 not upgraded.
Need to get 0 B/11.1 MB of archives.
After this operation, 80.8 MB of additional disk space will be used.
Selecting previously unselected package linux-headers-4.8.0-58.
(Reading database ... 226034 files and directories currently installed.)
Preparing to unpack .../linux-headers-4.8.0-58_4.8.0-58.63~16.04.1_all.deb ...
Unpacking linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...
Selecting previously unselected package linux-headers-4.8.0-58-generic.
Preparing to unpack .../linux-headers-4.8.0-58-generic_4.8.0-58.63~16.04.1_amd64
.deb ...
Unpacking linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...
Setting up linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...
Setting up linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...
terasic@UP2:~$ uname -a
Linux UP2 4.13.0-45-generic #50~16.04.1-Ubuntu SMP Wed May 30 11:18:27 UTC 2018
x86_64 x86_64 x86_64 GNU/Linux
terasic@UP2:~$ sudo apt-get remove linux-image-4.13.0-45-generic
```

Type "y" when it asks you a question about "Do you want to continue?"

```
terasic@UP2: ~
(Reading database ... 226034 files and directories currently installed.)
Preparing to unpack .../linux-headers-4.8.0-58_4.8.0-58.63~16.04.1_all.deb ...
Unpacking linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...
Selecting previously unselected package linux-headers-4.8.0-58-generic.
Preparing to unpack .../linux-headers-4.8.0-58-generic_4.8.0-58.63~16.04.1_amd64
.deb ...
Unpacking linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...
Setting up linux-headers-4.8.0-58 (4.8.0-58.63~16.04.1) ...
Setting up linux-headers-4.8.0-58-generic (4.8.0-58.63~16.04.1) ...
terasic@UP2:~$ uname -a
Linux UP2 4.13.0-45-generic #50~16.04.1-Ubuntu SMP Wed May 30 11:18:27 UTC 2018
x86_64 x86_64 x86_64 GNU/Linux
terasic@UP2:~$ sudo apt-get remove linux-image-4.13.0-45-generic
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-modules-4.15.0-50-generic linux-signed-image-4.8.0-36-generic
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  linux-image-4.13.0-45-generic linux-image-extra-4.13.0-45-generic
0 upgraded, 0 newly installed, 2 to remove and 298 not upgraded.
After this operation, 239 MB disk space will be freed.
Do you want to continue? [Y/n] y
```

The uninstallation operation is completed successfully.


```
terasic@UP2: ~  
Removing linux-image-4.13.0-45-generic (4.13.0-45.50~16.04.1) ...  
WARN: Proceeding with removing running kernel image.  
Examining /etc/kernel/postrm.d .  
run-parts: executing /etc/kernel/postrm.d/initramfs-tools 4.13.0-45-generic /boot  
t/vmlinuz-4.13.0-45-generic  
update-initramfs: Deleting /boot/initrd.img-4.13.0-45-generic  
run-parts: executing /etc/kernel/postrm.d/zz-update-grub 4.13.0-45-generic /boot  
/vmlinuz-4.13.0-45-generic  
Generating grub configuration file ...  
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is se  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
The link /vmlinuz.old is a damaged link  
Removing symbolic link vmlinuz.old  
you may need to re-run your boot loader[grub]  
The link /initrd.img.old is a damaged link  
Removing symbolic link initrd.img.old  
you may need to re-run your boot loader[grub]  
terasic@UP2:~$
```

5. After the kernel changing, we need to update system's grub setting, enter "*sudo update-grub*" to do it.

```
terasic@UP2: ~  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
The link /vmlinuz.old is a damaged link  
Removing symbolic link vmlinuz.old  
you may need to re-run your boot loader[grub]  
The link /initrd.img.old is a damaged link  
Removing symbolic link initrd.img.old  
you may need to re-run your boot loader[grub]  
terasic@UP2:~$ sudo update-grub  
Generating grub configuration file ...  
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is se  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
terasic@UP2:~$
```

6. Enter "*reboot*" to reboot your PC


```
terasic@UP2: ~  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
The link /vmlinuz.old is a damaged link  
Removing symbolic link vmlinuz.old  
you may need to re-run your boot loader[grub]  
The link /initrd.img.old is a damaged link  
Removing symbolic link initrd.img.old  
you may need to re-run your boot loader[grub]  
terasic@UP2:~$ sudo update-grub  
Generating grub configuration file ...  
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is se  
t is no longer supported.  
Found linux image: /boot/vmlinuz-4.8.0-58-generic  
Found initrd image: /boot/initrd.img-4.8.0-58-generic  
Found linux image: /boot/vmlinuz-4.8.0-36-generic  
Found initrd image: /boot/initrd.img-4.8.0-36-generic  
Adding boot menu entry for EFI firmware configuration  
done  
terasic@UP2:~$ reboot
```

7. Enter "uname -a" to see if you lower Linux kernel version successfully or not.

```
terasic@UP2: ~  
terasic@UP2:~$ uname -a  
Linux UP2 4.8.0-58-generic #63~16.04.1-Ubuntu SMP Mon Jun 26 18:08:51 UTC 2017 x  
86_64 x86_64 x86_64 GNU/Linux  
terasic@UP2:~$
```

FAQ

The solutions for the problems happen when users are running the demo.

When run the cpu demo: `demo_squeezenet_download_convert_run.py`, users may get the error as shown in below figure:

1. Fail to download python module (internet issue)

```
root@localhost:/opt/intel/computer_vision_sdk/deployment_tools/demo
File Edit View Search Terminal Help
Collecting protobuf==3.5.1 (from -r /opt/intel/computer_vision_sdk_fpga_2018.2.300/
deployment_tools/model_optimizer/install_prerequisites/./requirements.txt (line 5)
)
  Downloading https://files.pythonhosted.org/packages/40/99/471fa05dab1cf69419c91bc
d7b5a7f3a0e251c76025bbdb40e08c367b728/protobuf-3.5.1-cp36-cp36m-manylinux1_x86_64.w
hl (6.4MB)
    100% |████████████████████████████████████████| 6.4MB 212kB/s
Collecting onnx>=1.1.2 (from -r /opt/intel/computer_vision_sdk_fpga_2018.2.300/depl
oyment_tools/model_optimizer/install_prerequisites/./requirements.txt (line 6))
  Downloading https://files.pythonhosted.org/packages/ae/24/e8c4ae1970533fa8e0db562
1b58c107a4679e6b5d2e3ede6d03d110a4e24/onnx-1.2.2-cp36-cp36m-manylinux1_x86_64.whl (
3.8MB)
    100% |████████████████████████████████████████| 3.8MB 309kB/s
Collecting grpcio>=1.8.6 (from tensorflow>=1.2.0->-r /opt/intel/computer_vision_sdk
_fpga_2018.2.300/deployment_tools/model_optimizer/install_prerequisites/./requirem
ents.txt (line 1))
  Could not find a version that satisfies the requirement grpcio>=1.8.6 (from tenso
rfLOW>=1.2.0->-r /opt/intel/computer_vision_sdk_fpga_2018.2.300/deployment_tools/mo
del_optimizer/install_prerequisites/./requirements.txt (line 1)) (from versions: )
No matching distribution found for grpcio>=1.8.6 (from tensorflow>=1.2.0->-r /opt/i
ntel/computer_vision_sdk_fpga_2018.2.300/deployment_tools/model_optimizer/install_p
rerequisites/./requirements.txt (line 1))
You are using pip version 9.0.3, however version 18.0 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
```

2. It points out that numpy can't be found.

```
root@localhost:/opt/intel/computer_vision_sdk/deployment_tools/demo
File Edit View Search Terminal Help
.
If you want to install again, remove venv directory. Then run the script again

#####

Convert a model with Model Optimizer

Run python3.6 /opt/intel/computer_vision_sdk_fpga_2018.2.300/deployment_tools/mo
del_optimizer/mo.py --input_model /opt/intel/computer_vision_sdk/deployment_tool
s/demo/./demo/classification/squeezenet/1.1/caffe/squeezenet1.1.caffemodel --ou
tput_dir ir/squeezenet1.1 --data_type FP32

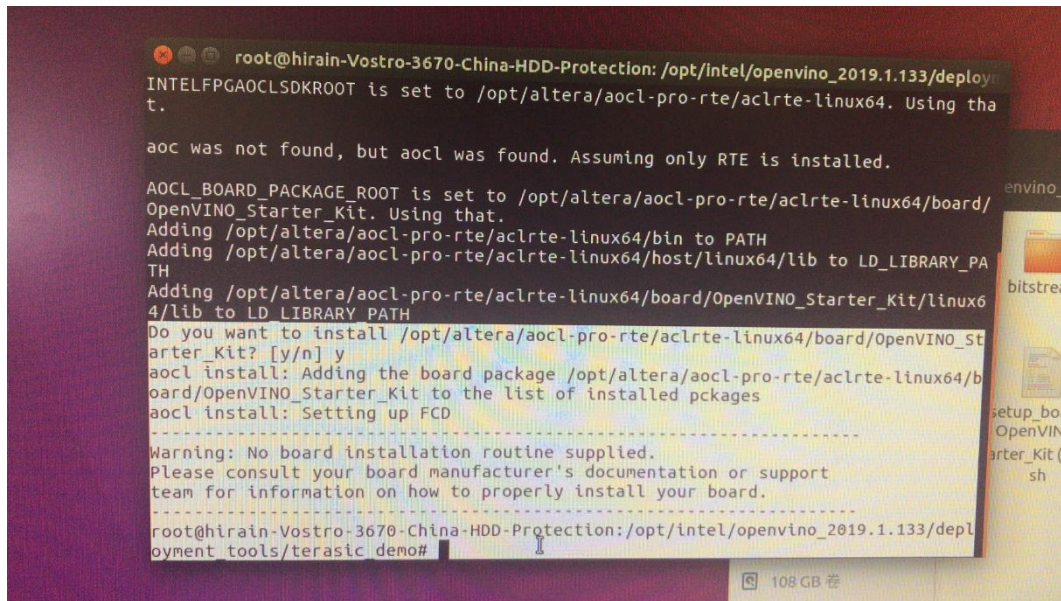
Traceback (most recent call last):
  File "/opt/intel/computer_vision_sdk_fpga_2018.2.300/deployment_tools/model_op
timizer/mo.py", line 28, in <module>
    from mo.main import main
  File "/opt/intel/computer_vision_sdk_fpga_2018.2.300/deployment_tools/model_op
timizer/mo/main.py", line 24, in <module>
    import numpy as np
ModuleNotFoundError: No module named 'numpy'
Error on or near line 163; exiting with status 1
[root@localhost demo]#
```

Reason: The problems above are the same, the second problem is happened because of the first problem: it will download python module when users run the demo, the numpy can't be found if it failed to download the python module

Solution: Delete the venv directory, the venv directory is under:

`/opt/intel/computer_vision_sdk/deployment_tools/model_optimizer/`, then run the demo again

3. When testing 2.7 OpenCL Runtime Test section, it reports "no board installation routine supplied" (as the picture below).

A terminal window screenshot showing the installation of OpenCL on a Linux system. The prompt is root@hirain-Vostro-3670-China-HDD-Protection: /opt/intel/opencvino_2019.1.133/deploy. The output shows that the AOCL_BOARD_PACKAGE_ROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64. Using that, aoc was not found, but aocl was found. Assuming only RTE is installed. AOCL_BOARD_PACKAGE_ROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_Starter_Kit. Using that. Adding /opt/altera/aocl-pro-rte/aclrte-linux64/bin to PATH. Adding /opt/altera/aocl-pro-rte/aclrte-linux64/host/linux64/lib to LD_LIBRARY_PATH. Adding /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_Starter_Kit/linux64/lib to LD_LIBRARY_PATH. Do you want to install /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_Starter_Kit? [y/n] y. aocl install: Adding the board package /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_Starter_Kit to the list of installed packages. aocl install: Setting up FCD. A warning message is displayed: Warning: No board installation routine supplied. Please consult your board manufacturer's documentation or support team for information on how to properly install your board. The prompt returns to root@hirain-Vostro-3670-China-HDD-Protection: /opt/intel/opencvino_2019.1.133/deployment tools/terasic demo#.

```
root@hirain-Vostro-3670-China-HDD-Protection: /opt/intel/opencvino_2019.1.133/deploy
INTELFPGAOCSDKROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64. Using that.

aoc was not found, but aocl was found. Assuming only RTE is installed.

AOCL_BOARD_PACKAGE_ROOT is set to /opt/altera/aocl-pro-rte/aclrte-linux64/board/
OpenVINO_Starter_Kit. Using that.
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/bin to PATH
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/host/linux64/lib to LD_LIBRARY_PA
TH
Adding /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_Starter_Kit/linux6
4/lib to LD_LIBRARY_PATH
Do you want to install /opt/altera/aocl-pro-rte/aclrte-linux64/board/OpenVINO_St
arter_Kit? [y/n] y
aocl install: Adding the board package /opt/altera/aocl-pro-rte/aclrte-linux64/b
oard/OpenVINO_Starter_Kit to the list of installed packages
aocl install: Setting up FCD
-----
Warning: No board installation routine supplied.
Please consult your board manufacturer's documentation or support
team for information on how to properly install your board.
-----
root@hirain-Vostro-3670-China-HDD-Protection: /opt/intel/opencvino_2019.1.133/depl
oyment tools/terasic demo#
```

Solution: Please make sure the kernel version of your Linux PC is not higher than 4.8.

Contact Terasic

Users can refer to below contacts for Terasic technical support and products information:

Tel : +886-3-575-0880

Email: support@terasic.com / sales@terasic.com

Site : <http://www.terasic.com>

Address : 9F., No.176, Sec.2, Gongdao 5th Rd, East Dist, Hsinchu City, 30070. Taiwan

Revision History

| Version | Changes Log |
|----------------|--|
| V1.0 | Initial Version |
| V1.1 | Change some download link of toolkit |
| V1.2 | Add Appendix |
| V1.3 | Update pictures and operations for OpenVINO 2019R1 |
| V1.4 | Modify 4.13.0-50 to 4.13.0-45 |

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