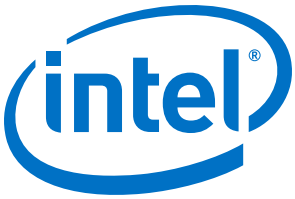
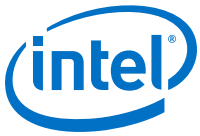


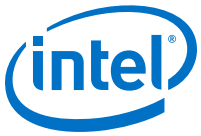
Intel® IoT Gateway Development Kit DK300 Series

Getting Started Guide

April 2015

Order No.: 330297-004





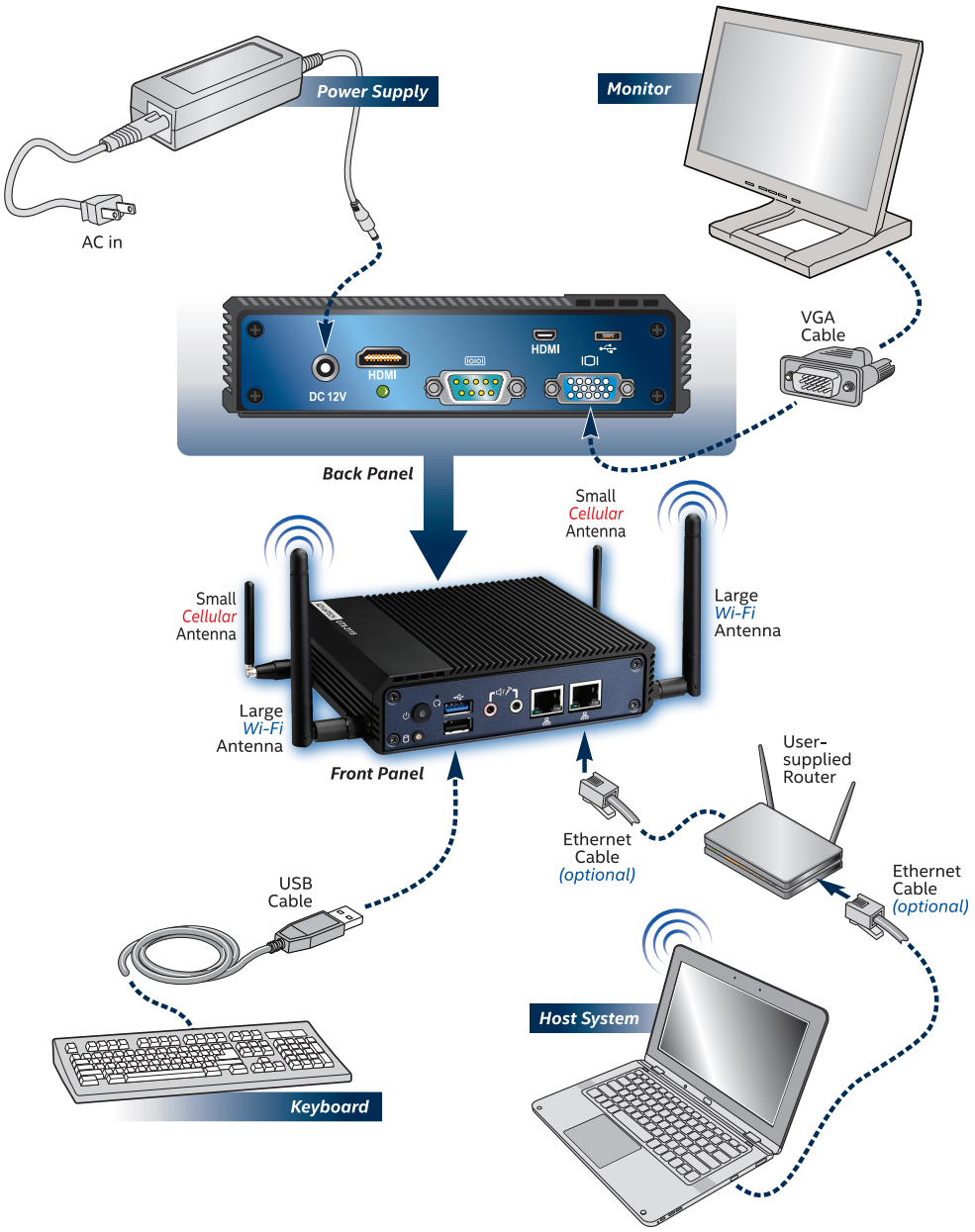
Quick Power-On

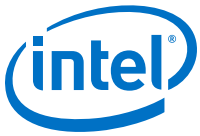
The following terms are used in these steps:

- Target Device refers to the Intel® IoT Gateway - DK300 Series.
- Host System refers to a Linux system that you provide.

1. Connect **keyboard**, **monitor** and Power **Supply**.
2. Press the **Power** button.
3. At the login prompt, use `root` for both the login ID and password.

The Target Device is now booted with the sample runtime image. This sample runtime image is for evaluation purposes only. After you have explored its features, use the rest of this document to build a production-ready runtime image.


Power Supply
AC in
Monitor
VGA
Cable
HDMI
HDMI
DC 12V
Back Panel
Small
Cellular
Antenna
Small
Cellular
Antenna
Large
Wi-Fi
Antenna
Large
Wi-Fi
Antenna
Front Panel
User-
supplied
Router
Ethernet
Cable
(optional)
Ethernet
Cable
(optional)
USB
Cable
Host System
Keyboard



Revision History

Date	Revision	Description
April 2015	004	Changed information related to recommended development hosts Updated errata
February 2015	003	First Intel® IoT Gateway 2.1 release Modified Workbench steps. Added Triage Tool appendix for help with debugging Command and modifications throughout
October 2014	002	Added steps to use Workbench to build project
September 2014	001	First public release

Contents

Figures

Tables

1.0 Introduction

1.1 About the Intel® IoT Gateway Development Kit DK300 Series

The Intel® IoT Gateways provide pre-integrated hardware and software building blocks. The gateways connect legacy and new systems, and enable seamless and secure data flows between edge devices and the cloud. Using a single, integrated solution allows you to focus your resources on innovating for new services, bug data solutions, and other IoT-focused applications.

Intel® IoT Gateway Development Kit DK300 Series includes the following:

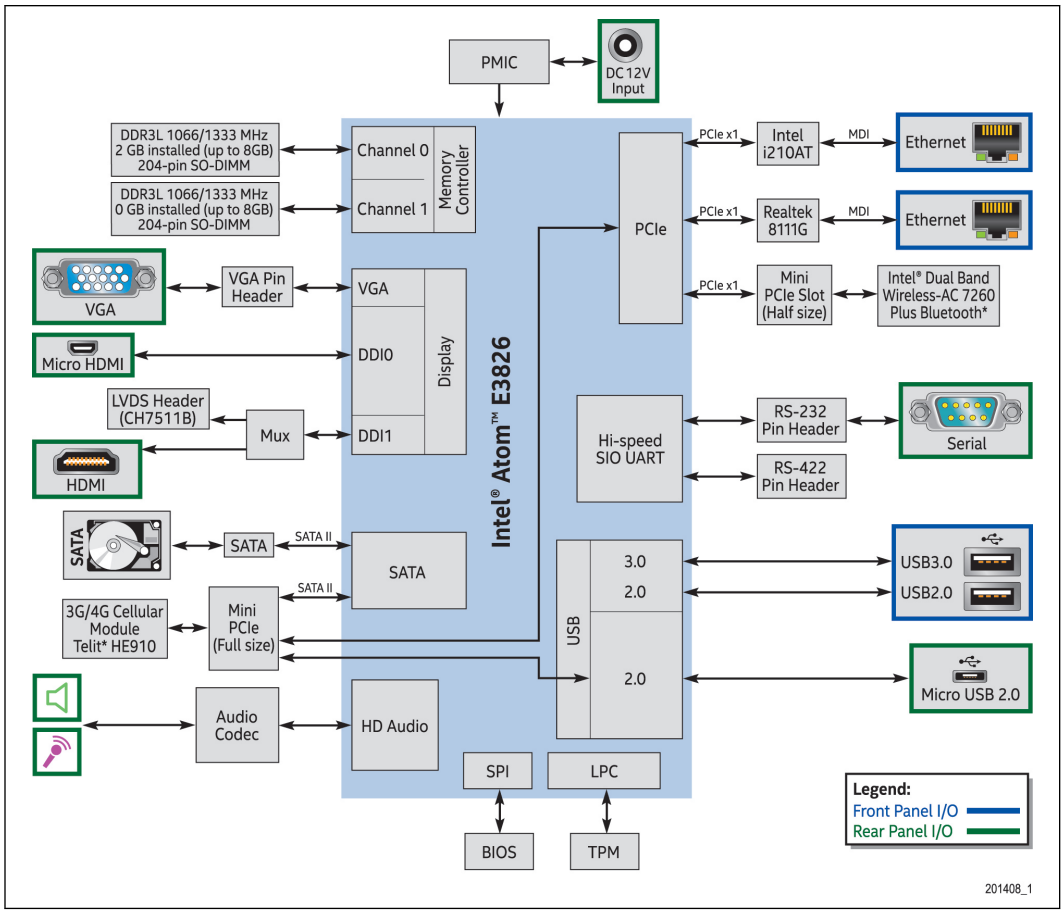
- **Processor:** Intel® Atom™ Processor E3826
- **Software:** Wind River® Linux (Host), Wind River® Intelligent Device Platform XT, Wind River Workbench, McAfee* Embedded Control
- **Security:** Open SSL* Library, McAfee* Embedded Control, SRM Signing Tool, Certificate Management, Secure Boot, Application Integrity Monitor, Application Resource Control, Secure Package Management, Encrypted Storage
- **Manageability and provisioning:** OMA DM, TR-069, Web-based configuration interfaces
- **Communications and connectivity:** Cellular 2G/3G/4G, GPS, Wi-Fi* Access Point, Bluetooth*, Serial, USB, VPN, MQTT
- **Runtime environments:** Java*, OSGi*, Lua*
- **I/O:** 2x Ethernet* 10/100/1000, 1x USB 2.0, 1x Micro USB 2.0, 1X USB 3.0, RS-232 Serial Port configurable to RS-422 or RS-485, Audio, Line in/out, internal mini PCIe (for Wi-Fi* / Bluetooth / cellular WAN), HDMI, VGA
- **Memory and storage:** 2 GB Single Channel 1066 MHz DDR3L, expandable up to 8 GB x2 channels of 1066 MHz DDR3L. 30 GB 2.5" SATA Solid State Drive

The Intel® IoT Gateway - Development Kit DK300 Series provides a key ingredient for enabling the connectivity of legacy industrial, energy, and transportation devices to the IoT. It integrates technologies and protocols for networking, embedded control, enterprise-grade security, and easy manageability on which application-specific software can run. This product offers:

- Speed: By integrating hardware and software building blocks.
- Protection of legacy investments by connecting new and legacy systems with intelligent compute platforms for communication to the cloud.
- Secure data with standards-based interfaces.

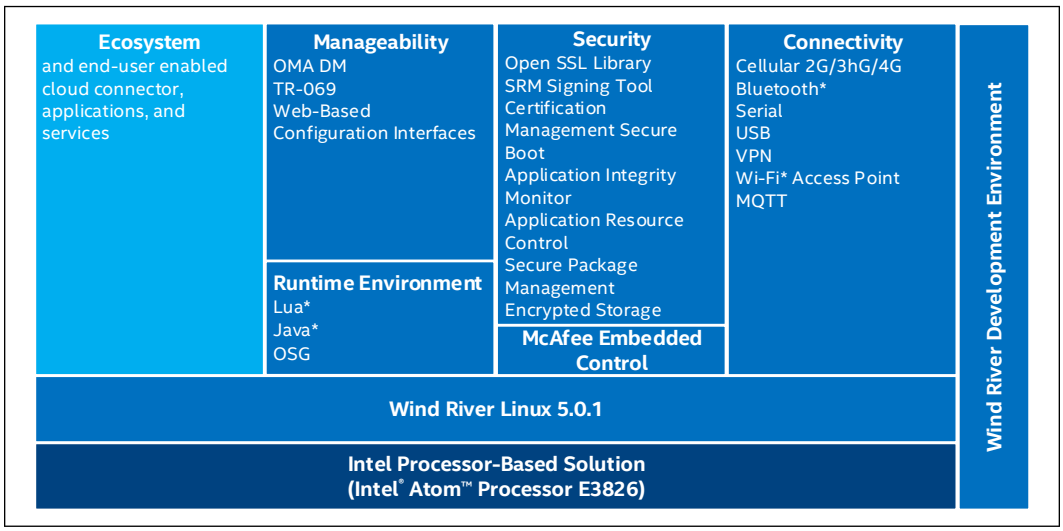
The following block diagram illustrates the components and connectivity of the Intel® IoT Gateway Development Kit DK300 Series.

Figure 1. Intel® IoT Gateway Development Kit DK300 Series Block Diagram



The following diagram illustrates the software components that are included in the Intel® IoT Gateway Development Kit DK300 Series Software Stack.

Figure 2. Software Stack



1.2 Intel® IoT Gateway Development Kit DK300 Series Kit Contents

Your kit contains the following items:

- One Advantech* UTX-3115 Compact Box PC with pre-loaded Wind River® Intelligent Device Platform XT image
- One power supply
- Two Wi-Fi* antennas
- Two cellular antennas
- One USB flash drive: Bootable and pre-loaded with a backup Wind River® Linux and Wind River® Intelligent Device Platform XT 2.0 runtime operating system for the gateway.
- Documentation

Figure 3. Advantech* UTX-3115 Compact Box PC – Front

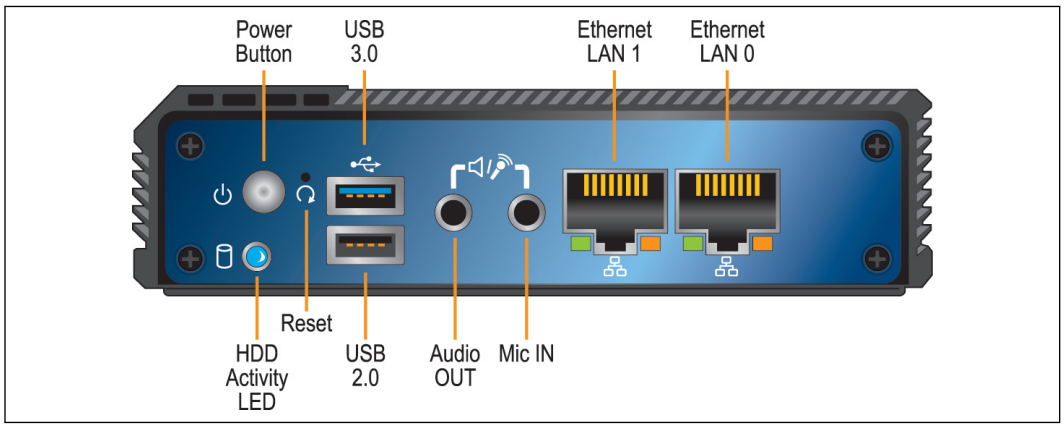
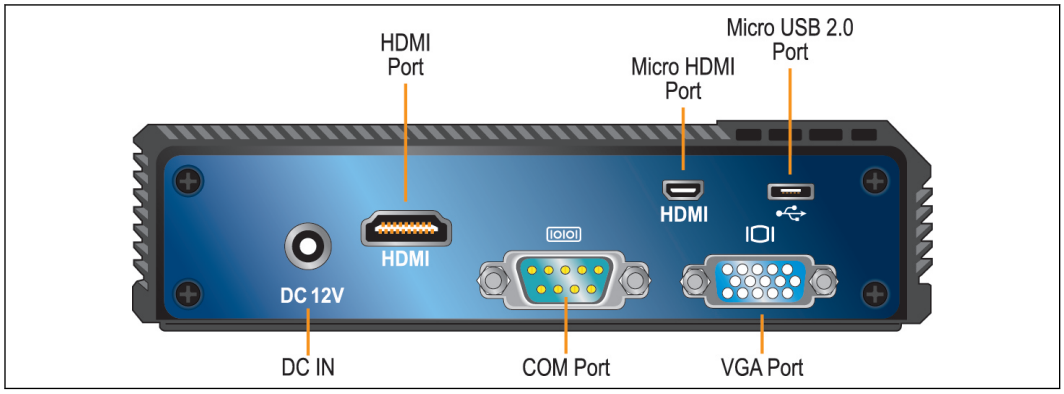


Figure 4. Advantech* UTX-3115 Compact Box PC – Back



1.3 About this Guide

This guide is organized as follows:

- **Chapters 1 - 4**: How to set up your Target Device, including connecting it to your Host System.
- **Chapters 5 - 7**: How to build your own runtime software and install it on your Target Device.
- The appendices provide information about:
  - Using the Intel® IoT Gateway Knowledge Forum.
  - Instructions for installing a SIM card in the Telit* HE910 Cellular Module.
  - Building an Intelligent Device Platform Project using Wind River Workbench.
  - Using the Wind River Workbench to perform a Project Export / Import.
  - Using the Triage Tool to aid in debugging.
  - Troubleshooting.

For help with typing commands to your Linux terminal, use *Intel® IoT Gateway Development Kit DK300 Series - Getting Started Guide Commands* at https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=24331&lang=eng&wapkw=dk300. This text file includes all of the commands in this Getting Started Guide. The purpose is to provide you with an easy way to copy and paste commands to your Linux terminal.

Document Conventions

This document uses the following conventions:

- "Development Kit" refers to the Intel® IoT Gateway Development Kit DK300 Series. This term includes the gateway hardware, the board firmware, and the software from Wind River Systems, Inc.
- "Target Device" refers to the gateway device onto which you will install Wind River® Intelligent Device Platform XT runtime software.
- "Host System" refers to a Linux system that you will use to configure your Target Device. You will install development tools from Wind River Systems, Inc. on this system. The Host System is not included in this kit.

  The examples in this publication use a Host System that has an Intel® Core™ i5 second generation processor and Ubuntu* Desktop 14.04 distribution software. If you are using a different operating system, substitute the instructions in this publication with instructions that are appropriate for your system.

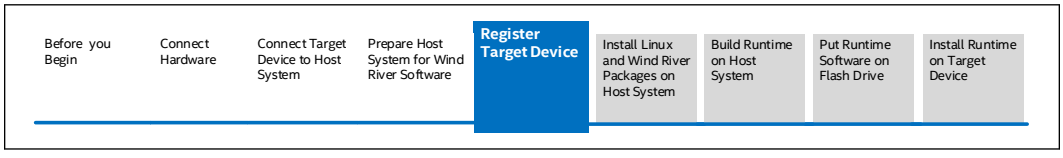
- `This font is used for commands, API names, parameters, filenames, directory paths, and executables.`
- **Bold text** is used for graphical user interface entries, buttons, and keyboard keys.

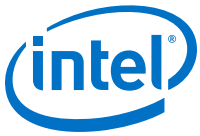
```
This font in a gray box is used for commands or scripts that you must type.
```

```
This font in a green box displays responses to your commands.
```

- To help you keep track of your progress, illustrations are used at the beginning of each key task. The following is an example of these illustrations.
  - A white background indicates steps you have completed.
  - A blue background indicates the step you are about to work on.
  - A gray background indicates future steps.

Figure 5. Sample "You Are Here"





1.4 Reference Documents

The following documents will help you complete your installation.

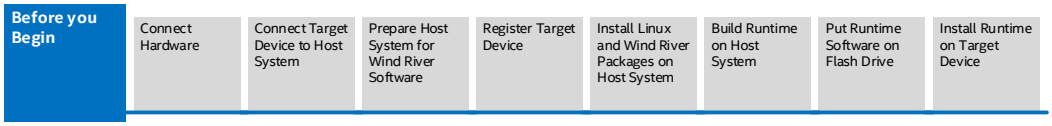
Table 1. Reference Documents

Title	Link	Description
Intel® IoT Gateway Development Kit DK300 Series - Getting Started Guide Commands	https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=24331&lang=eng&wapkw=dk300	Text file of the commands used in this document
Intel® Atom™ Processor E3800 product family technical information web page	https://www-ssl.intel.com/content/www/us/en/intelligent-systems/bay-trail/atom-processor-e3800-family-overview.html	
Wind River® Linux 5.0 / 5.1 Recommended Development Host Distributions	Wind River Online Support: https://knowledge.windriver.com/@api/deki/files/153500/041441.pdf	• Recommended Development Host Distributions • Required Host Packages by Host Distribution
Wind River® Linux 5.0.1 - Users Guide	https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-linux-user-guide.html	• Wind River Linux Overview • Development & Build Environment • Configuration and Build • Layers & Recipes • Userspace & Kernel Development • Debugging
Wind River® Intelligent Device Platform XT 2.0 - Product Brief	https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-product-brief.html?wapkw=wind+river	• Product Overview • Wind River Intelligent Device Platform Architecture • Technical Specifications
Wind River® Intelligent Device Platform XT 2.0 - Programmer's Guide	https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-programmers-guide.html?wapkw=wind+river	• Wind River Intelligent Device Platform Overview • Architecture • Security, Connectivity & Management • Validation • System Owner, Device & Application Development Vendor Tasks
Wind River® Intelligent Device Platform XT 2.0 - Release Notes	http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html	• Changes in this release • Requirements • Issues & Customer Service
Wind River® Intelligent Device Platform XT 2.0 Security Guide	https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-security-guide.html?wapkw=wind+river	• Platform Security Overview • Security Planning • Risks, Threats & Intelligent Device Platform Security Mechanisms • BKMs, Keys & Certificates • Secure Repository • Encrypted Data Storage

continued...

Title	Link	Description
Wind River® Intelligent Device Platform XT EMS Profile - User's Guide	http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-user-guide.html	• Device Management Overview • Mashery API Reference and Examples
Wind River® EMS Device Management - User's Guide	http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-ems-device-management-user-guide.html	• Wind River Intelligent Device Platform Edge Management System Overview • Device side and Cloud side components Device Onboarding, Application Development and Target component updates • Alarm workflow and error recovery
Wind River® Intelligent Device Platform XT EMS Profile - Release Notes	http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-release-notes.html	• Product Overview • Host and Target Requirements • Usage Caveats and Known Issues

1.5 Before you Begin



Review the following information to make sure you have everything you need.

Required Experience Level

You need basic experience using the Linux command line interface.

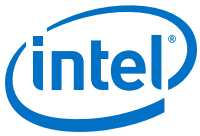
Items and Software You Need to Provide

You will need to provide the following items to complete your installation:

Table 2. Items to Obtain

What you need	First Needed in	Notes
USB keyboard	Connect the Hardware on page 19	
Video: HDMI or VGA display with appropriate cable	Connect the Hardware on page 19	
Host System hardware (recommended): • 3rd Generation Intel® Core™ i5 processor or better	Connect the Target Device to a Network and a Host System on page 22	The minimum hardware requirements are: • Intel® Pentium® 2 processor • 80 GB free disk space • 768 MB RAM

continued...



What you need	First Needed in	Notes
• CPU with four or more cores and with Intel® Hyper-Threading Technology • 150 GB or more of free disk space • 4 GB or more RAM		With these minimum requirements, your performance may not be adequate.
Host Operating System	Connect the Target Device to a Network and a Host System on page 22	The Wind River Systems, Inc. development tools may be installed on many different Linux* based host systems. See Recommended Development Hosts on page 17 These instructions have been validated on an Ubuntu 14 64-bit host system.
Communications: • Ethernet connection to wired LAN • Internet connection • Optional: Ethernet router with integrated DHCP server • Optional: Wireless or cellular access	Connect the Target Device to a Network and a Host System on page 22	Cellular access requires the installation of a SIM card (not provided) and activation with a cellular service provider. See Installing a Cellular Comms PCIe MiniCard Module and SIM Card on page 54 for help installing the SIM card.
USB flash drive with at least 4 GB capacity	Use Wind River WebIF to Configure the Target Device (Optional) on page 60	The contents of this flash drive will be overwritten.
Optional connectivity components: • Micro USB-B to standard USB-A adapter • Serial cable	N/A	Micro USB adapter is to connect additional devices Serial cable is for serial connectivity or debug purposes

Recommended Development Hosts

The following recommended development host distributions have been tested by Wind River to run Wind River Linux 5.0 / 5.0.1. Intel recommends the Ubuntu Desktop 14.04 (base version) 64-bit OS for your Host System.

Table 3. Recommended Development Hosts

Distribution	Architecture
Ubuntu* Desktop 14.04 (base version) or 12.04	x86 32-bit, x86 64-bit
Red Hat Enterprise Linux Workstation 6.5	x86 32-bit, x86 64-bit
Red Hat Enterprise Linux Workstation 7	x86 64-bit
OpenSUSE* 12.2	x86 32-bit, x86 64-bit
Novell* SUSE Linux Enterprise Desktop 11 SP2	x86 32-bit, x86 64-bit
Fedora* 18	x86 32-bit, x86 64-bit

These instructions in this guide were validated on an Ubuntu 14.04 (base version) 64-bit host system, which is available at http://old-releases.ubuntu.com/releases/trusty/ as `ubuntu-14.04-desktop-amd64.iso`

Caution: To maintain Wind River® Intelligent Device Platform XT compatability, do not perform `sudo apt-get upgrade`

For detailed information on supported Linux development hosts, and for additional Linux host requirements, see the *Wind River® Intelligent Device Platform XT 2.0 - Release Notes* at http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html

Login IDs and Passwords

You will be prompted for several login IDs and passwords throughout these installation procedures. The following is a quick reference to them.

Table 4. Login IDs and Passwords

Logging into...	ID and Password
Target Device	ID: `root` Password: `root`
Target Device local wireless network	Password: `windriveridp`
Wind River Intelligent Device Platform Administration Console (WebIF)	ID: `admin` Password: `admin`

Technical Support

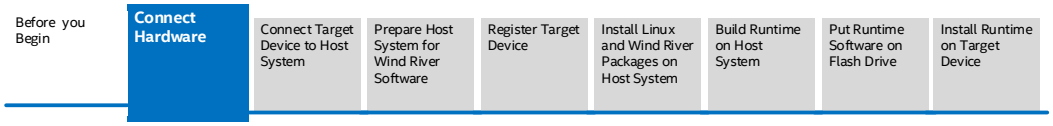
For users with a registered product, Intel provides technical support for this Development Kit through Intel® Premier Support. If you do not already have an Intel Premier Support account, you may apply for one when you register this Development Kit in Register Your Development Kit on page 29.

To submit a support request using Intel Premier Support, go to https://businessportal.intel.com. Click the **Product Support Tab** -> **Intel Premier Support Home**. Submit your issue using one of these product names:

- Intel® IoT Gateway Development Kit DK300 Series
- Intel® Development Toolkit for Data Gateways

In addition to Intel® Premier Support, registered users can use the Intel® IoT Gateway - Knowledge Forum to ask "how-to" questions. Follow the instructions in Intel IoT Gateway Knowledge Forum on page 49 to register, login, and submit questions in this online support forum.

2.0 Connect the Hardware

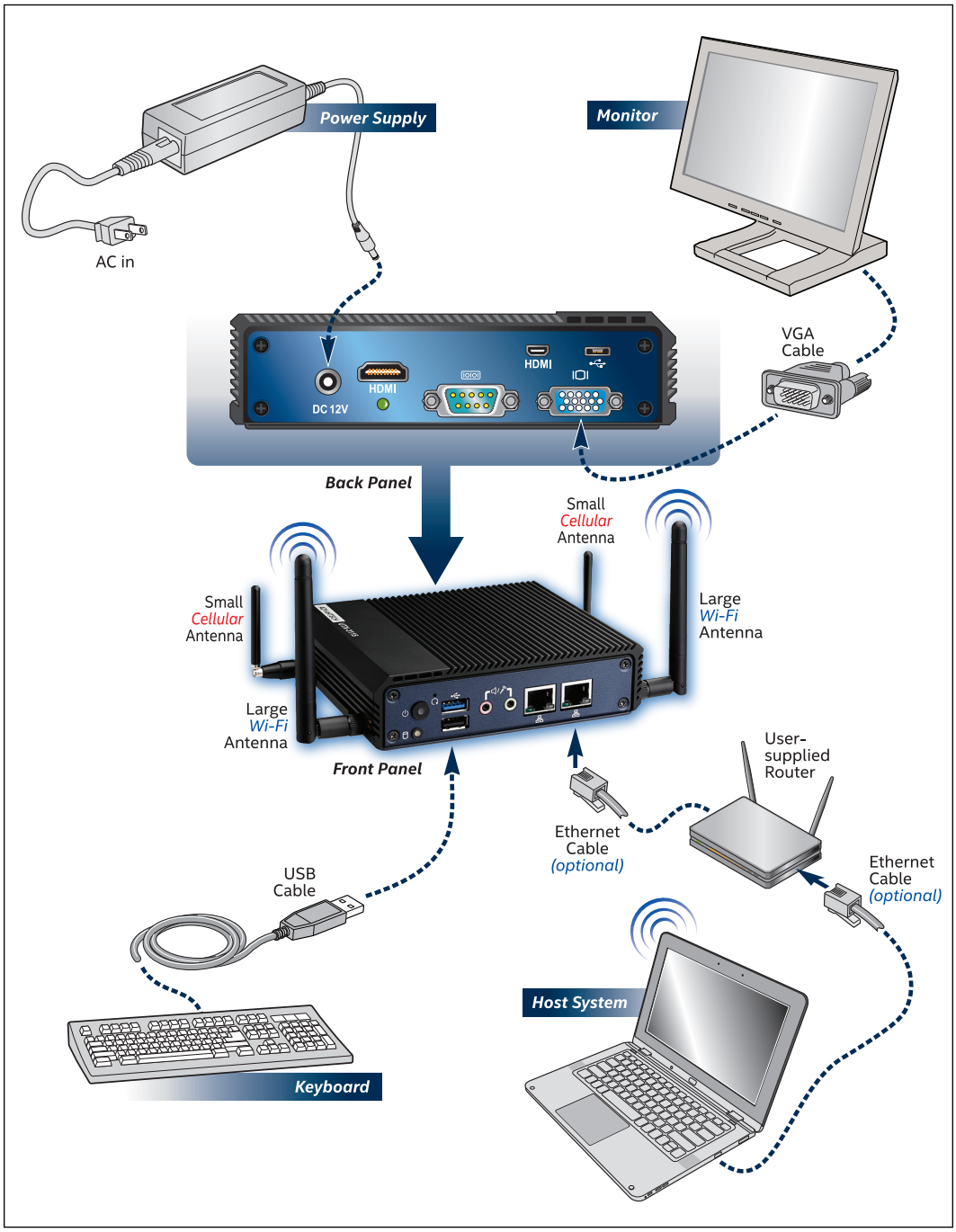


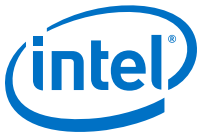
You will begin your installation by connecting the Target Device hardware. This chapter guides you through making the connections and plugging in your Target Device.

Note: Target Device refers to the Advantech* UTX-3115 Compact Box PC that is included in the Development Kit.

Refer to the following figure when making your connections:

Figure 6. Connecting Target Device Hardware

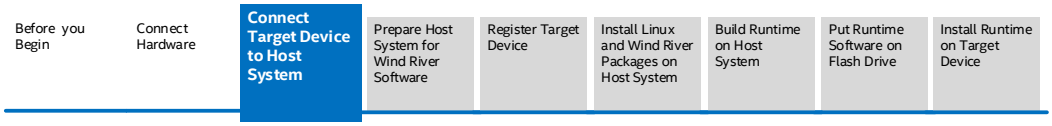




1. Connect a USB keyboard to any of the USB ports on the Target Device.
2. Connect a video display to the Target Device, with one of these choices:
   - If you have a VGA display, connect it to the VGA port on the Target Device.
   - If your display has an HDMI input, use a standard HDMI cable to connect the display to the standard HDMI port on the Target Device.
   - If your display has a micro HDMI cable, connect it to the micro HDMI port on the Target Device.
   - If your display has a DVI input, use an HDMI cable to connect it to either of the Target Device's HDMI ports.

   Note: Some HDMI displays are incompatible with the HDMI output on the Target Device. See Troubleshooting on page 80.
3. Attach the two large Wi-Fi antennae as shown in the diagram.
4. Attach the two small Cellular antennae as shown in the diagram.
5. Plug in the 12 V DC power adapter connector to the DC In connector on the Target Device. Plug the power cord into a 120V or 240V power outlet.
6. Push the power button. It will illuminate with a green light and the video display will show the boot process.
7. Login with the Target Device ID `root` and password `root`. You will see the prompt `root@WR-IntelligentDevice: ~#`

3.0 Connect the Target Device to a Network and a Host System



With your Target Device booted, use either a wired or a wireless network connection to connect the Target Device and Host System. Once connected, you can use the Wind River Web Interface Tool (WebIF) to configure your Target Device.

Note: **Complete the steps in either Connecting with a Wireless Network Connection on page 22 or Connecting with a Wired Ethernet Connection on page 23 to make a connection between your Target Device and Host System. Do not use both sections.**

After connecting with a wireless or wired network connection, continue with Remotely Logging in to the Target Device with ssh on page 24.

3.1 Connecting with a Wireless Network Connection

The Target Device advertises a wireless network with a service set identifier (SSID) of `IDPDK-xxxx`, where `xxxx` is the last four digits of the wireless network card MAC address. This section guides you through using this information to connect a Host System to the Target Device's wireless network to access the features on the Target Device.

1. Issue the following command from the Target Device command line to determine the wireless SSID of the Target DeviceFrom the PuTTY Virtual Terminal, issue the following command to determine the wireless SSID of the Target Device:

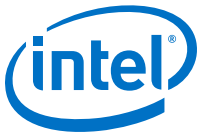
```
grep ssid /etc/config/wireless
```

   The output displays the SSID:

```
option ssid IDPDK-xxxx
```

2. Write down your SSID.
3. Issue the following command from the Target Device command line to determine the IP address used for the wireless Access Point:

```
ifconfig br-lan
```



The output includes the IP address, denoted by `inet addr`

```
inet
addr:<TARGET_DEVICE_IP_ADDRESS>
```

The Target Device ID address is likely set to the default `192.168.1.1`

4. Write down your Target Device IP address.
5. On the Host System , select the **System Settings** icon.
6. Click the **Network** icon.
7. Click **Wireless**.
8. Click the dropdown arrow next to **Network Name** and then click the SSID that you wrote down.
9. When prompted, enter the password: `windriveridp`.

The Target Device and Host System are now connected through a wireless network. You can use ssh to log in to the Target Device from the Host System. See Remotely Logging in to the Target Device with ssh on page 24.

3.2 Connecting with a Wired Ethernet Connection

Refer to Connect the Hardware on page 19 to make the following connections.

1. Use an Ethernet cable to connect the Target Device LAN1 port to an I/O port on a router that has an integrated DHCP server. It is important to use the port, labeled Ethernet LAN 1 on your Target Device. This port connects as eth1.
2. Confirm on the video display for the Target Device that the Target Device is connected at eth1. Your screen should display:

```
eth1 NIC Link is Up
```

3. Issue the following command from the Target Device command line to determine the IP address used for the network Access Point:

```
ifconfig br-lan
```

The output includes the IP address, denoted by `inet addr` as shown:

```
inet addr:<TARGET_DEVICE_IP_ADDRESS>
```

The Target Device IP address is probably set to the default of 192.168.1.1

4. Write down your Target Device IP address.

The Target Device and Host System are now connected to a wired network. You can use ssh to log in to the Target Device from the Host System. See Remotely Logging in to the Target Device with ssh on page 24.

3.3 Remotely Logging in to the Target Device with ssh

Once the Target Device and Host System are connected through a wired or wireless network, you can use ssh to remotely log in to the Target Device from the Host System.

1. Validate that both the Target Device and the Host System have a valid IP address and **are on same subnet**. Use the following command on both the Target Device and the Host System to see the IP address on each.

```
ifconfig
```

2. Be sure both Host System and the Target Device return an IP address and the subnet addresses match. For example, the following addresses are valid and they are on the same subnet:

   Target Device IP address

```
192.168.1.1
```

   Host System IP address

```
192.168.1.9
```

3. On the Target Device execute the following command to start the sshd deamon:

```
service sshd start
```

   You should see the following output:

```
Starting OpenBSD Secure Shell server: sshd
done.
```

4. (Optional): To automatically start sshd for all future reboots, execute the following command on the Target Device:

```
update-rc.d sshd defaults
```

5. To remotely login to the Target Device from the Host System, at the Host System execute the following command, substituting <TARGET_DEVICE_IP_ADDRESS> with the Target Device IP address that you wrote down earlier.

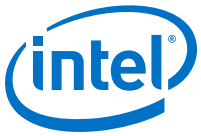
```
ssh root@<TARGET_DEVICE_IP_ADDRESS>
```

   Your screen displays:

```
root@<TARGET_DEVICE_IP_ADDRESS>'s password:
```

6. Type the Target Device password:

```
root
```



When you successfully log in to the Target Device, the command prompt is displayed:

```
root@WR-IntelligentDevice:~#
```

4.0 Prepare to Build Your Runtime Image

The first part of this publication got you up and running with a sample runtime image that you used to explore some of the Target Device features. This part of the document guides you through creating your own runtime image. Although you will not be using your Target Device again for a while, the steps in the remainder of this publication assume that you have completed the setup steps.

4.1 Task Checklist and Completion Times

Below are the key tasks you will complete in the remainder of the chapters. You must complete each of these tasks in order. Upon completing one chapter, continue to the next until you reach the optional information in the appendices.

The full installation process, including the steps to build your own runtime image takes several hours. The time required will vary, depending on your skills and experience, the processor speed of the system that you use to perform the configuration steps, and the speed of your internet connection.

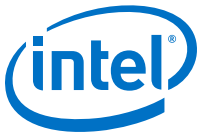
The estimated completion times in the table below are based on Ubuntu* Desktop 14.04 running on an Intel® Core™ i5 second generation processor and with an internet connection running at approximately 3 MB per second.

You will prepare the Host System before working more with the Target Device.

Note: Host System refers to a computer system onto which the development tools from Wind River Systems, Inc. will be installed. Target Device refers to the hardware that is included in your Development Kit.

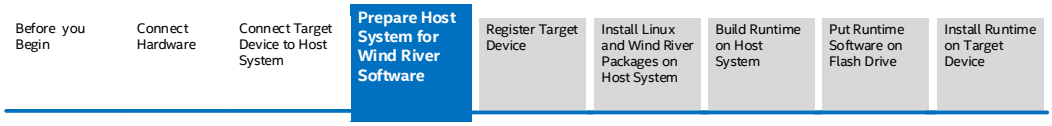
Done	Task	Section	Estimated Completion Time
	Preliminary Steps		**30 - 90 minutes**
✔	Gather necessary components	Items and Software You Need to Provide on page 16	10 minutes
✔	Connect the Target Device and a Host System	Connect the Target Device to a Network and a Host System on page 22	10 minutes
	Update Host System Linux	Install Ubuntu Linux Updates on page 27	10 minutes to 1 hour, depending on the number of updates to install
	Create Host System directories, and confirm Host System free space.	Create Directories and Confirm Disk Space on page 27	10 minutes

continued...



Done	Task	Section	Estimated Completion Time
	Register your Development Kit to obtain a Wind River SW license. A license is required to complete the remaining steps in this publication.	Register Your Development Kit on page 29	10 minutes to register. Up to 1 day to receive license
	Install and Build Runtime on Host System The completion time is highly dependent on the Host System and the Internet connection speed.		**5 - 10 hours**
	Install base packages for Wind River Linux 5.0.1, Wind River Intelligent Device Platform XT 2.0, Wind River Workbench 3.3.5	Installing the Wind River Host Tools on page 34	2 - 4 hours
	Build the runtime software image on the Host System and copy the image to a USB flash drive.	Build Intelligent Device Platform XT Runtime Software on page 42	3 - 5 hours
	Install Runtime Image to Target Device		**45 minutes**
	Install the runtime image on the Target Device.	Deploy Image to Micro-SD Flash Card	45 minutes
Total Estimated Time to Complete Installation			6 - 12 hours

4.2 Prepare Host System for Wind River Software Installation



Install Ubuntu Linux Updates

The Linux software on your Host System must be current before you install the Wind River Host Tools software. This section provides instructions to perform this update. From your Host System command line interface, use the following command to apply the Ubuntu updates:

```
sudo apt-get update
```

Create Directories and Confirm Disk Space

Create the following directories on your Host System:

- `$HOME/WindRiver` - This directory is used to install the Wind River Host Tools. The installation requires approximately 30 GB of free space in this directory.
- `$HOME/Installer` - This is a temporary directory that you can delete after completing your installation. The installation requires approximately 15 GB of free space in this directory.

- `$HOME/Project` - The project directory in which you will develop your Intelligent Device Platform XT-based solution. The build requires approximately 20 GB of free space in this directory.
- `$HOME/Project/build-cache` - The build cache directory. Using a build cache can significantly reduce the time required to build the project after incremental changes are made. The build requires approximately 10 GB of free space in this directory.

  Use these commands to create the directories:

```
cd $HOME
mkdir WindRiver
mkdir Installer
mkdir Project
mkdir Project/build-cache
```

You must also have approximately 15 GB of temporary disk space in the `/tmp` directory

In total, a minimum of approximately 100 GB is required to complete the full runtime build process.

5.0 Register Your Development Kit

Important: If you are using an Early Access Development Kit or a Loaner Development Kit from the Intel Demo Depot, use the 90-day License Authorization Code provided in the Dear Customer Letter that came with your kit. in this case, you do not need to register your Target Device. Instead, skip ahead to Install Linux Packages and Wind River Linux Host Tools on the Host System on page 34.

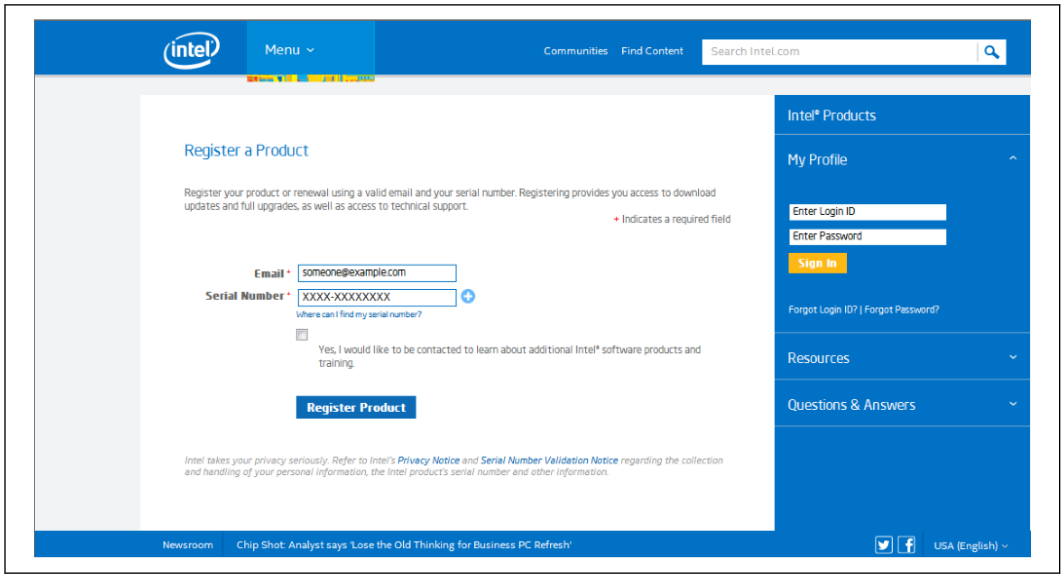
Before you begin the installation process, you must register your Development Kit. The registration process submits a license key request to Wind River to permit you to download Wind River Development software. You cannot use the Wind River installer to download the Wind River software without this license.

You will use the login ID and password that you create or use in these steps to access the Intel Registration Center. On the Intel Registration Center you can see a list of licensed products and download the installers for those software products.

1. In your Web browser on any computer, go to https://registrationcenter.intel.com

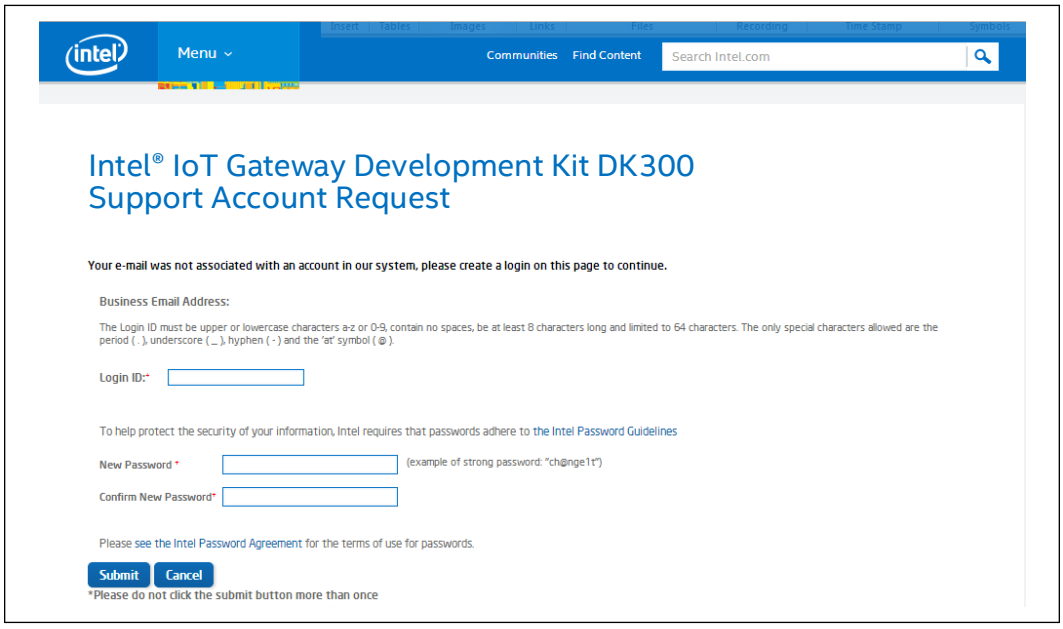
   The following screen is displayed:

Figure 7. Register a Product



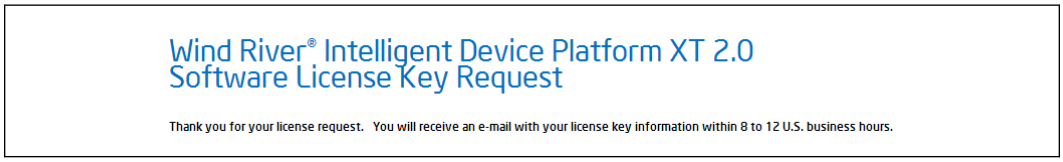
2. In the box for your email address, select the appropriate option for your email address:
   - **IMPORTANT**: If you have an Intel® Premier Support account, use the email address that is associated with that Intel® Premier Support account. Doing so will automatically add this product to your list of supported products.
   - Otherwise, use your preferred email address. Use an address that you can use when registering any future Intel products.
3. Type in the serial number that is located at the top of the *Dear Customer Letter* included in your product box.
4. A screen displays on which you must fill out your contact information. Click **Submit** after filling in your information.
5. Follow the correct path:
   - If your email address was not recognized, you will be prompted to create a user account. See Figure 8 on page 30. Type in your preferred Login ID and password, and then click **Submit**.
   - If your email address is recognized, you will not see Figure 8 on page 30. Continue to the next step.

Figure 8. Create Support User Account



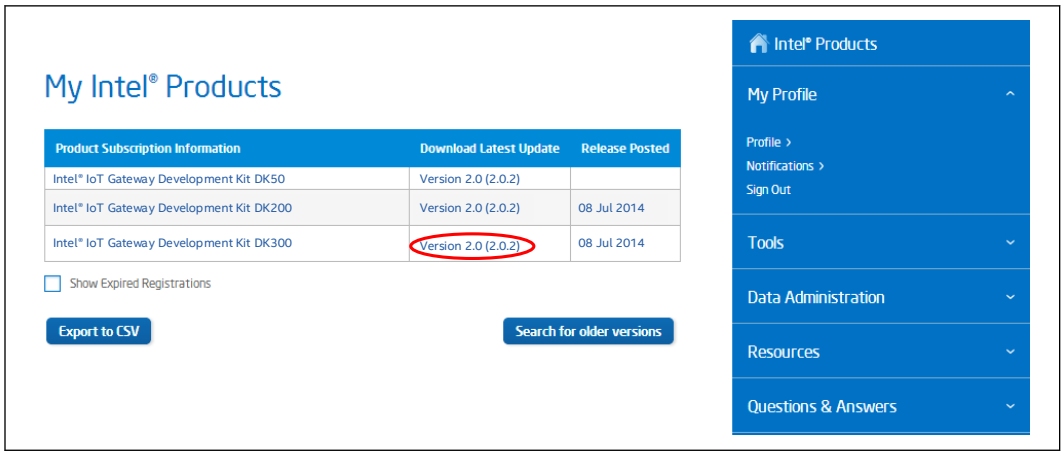
6. A confirmation screen displays with the following displayed at the top of the screen. Click **Continue**.

Figure 9. Wind River License Key Request Confirmation



7. Type your user name and password to sign into the Intel Registration Center.
8. Once you have signed in, your list of subscribed products is displayed. See the example below.

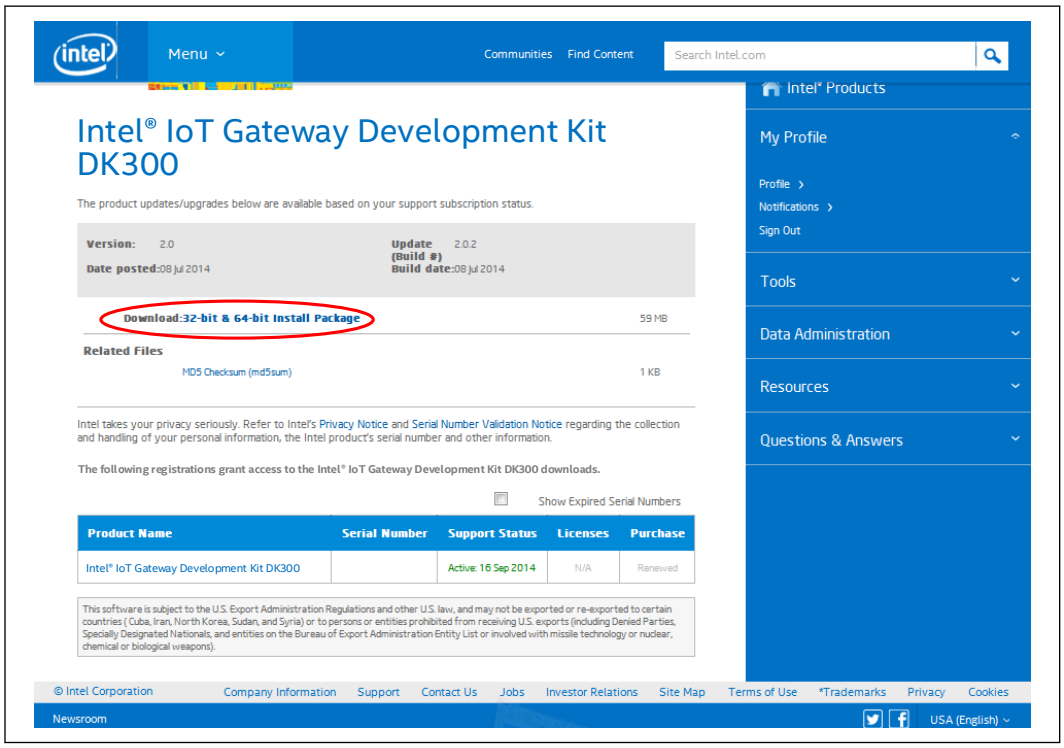
Figure 10. Logged Into Intel Registration Center



9. Click the version link for your product in the table of products to go to the product page. See the circled information in the figure above.

   The following screen displays:

Figure 11. Intel Registration Center Product Page



10. Click the **Download: [file]** link to download the Installer for the Wind River Host Tools. You will use this file to install the Wind River Host Tools in the next chapter. See the circled information in the above figure.

Upon completion, you will receive two email messages from "Intel Registration Center." Save these messages for future reference.

- One message is titled, "Intel® Premier Support Registration Successfully Completed". You can use Intel Premier Support for technical support of this Development Kit". See the sample message below.

Figure 12. Email Message: Intel® Premier Support Registration Successfully Completed

(If the characters do not show properly, please try viewing this email with UTF-8 encoding.)
You have successfully completed the registration process. You now have access to the following product(s):

Intel® IoT Gateway Development Kit DK300

If you created a new account during the registration process, the product(s) should be available for that account. If you already had an account when you started the registration process, the product(s) should be available in that account.

You are now able to report issues and receive file downloads and announcements on the product(s) for which you registered by accessing https://premier.intel.com.

Sincerely,
Intelligent Systems Group
Intel Corporation

- The other message is titled, "Thank you for registering Intel® IoT Gateway Development Kit DK300 Series". See the sample message below.

Figure 13. Message: Thank you for registering Intel® IoT Gateway Development Kit DK300 Series

(If the characters do not show properly, please try viewing this email with UTF-8 encoding.)
Thank you for evaluating the Intel® IoT Gateway Development Kit DK300.

SAVE THIS SERIAL NUMBER
Your serial number for this product is Serial number removed.

SOFTWARE LICENSE KEY
Within 8-12 U.S. business hours you will receive a license key from Wind River®. If you do not receive your license key, please submit a ticket using businessportal.intel.com.

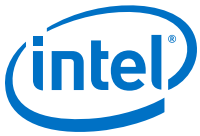
DOWNLOAD THE SOFTWARE
Download and save the product from Link removed.

PRODUCT UPDATES AND SUPPORT
You will receive an email anytime the product you registered is updated. Your product update services will expire on permanent.

Please retain a copy of this email for your records.

Please do not reply to this email. This account is not monitored.

* Other brands and names may be claimed as the property of others.



Under `SOFTWARE LICENSE KEY` the text indicates that you will receive a license key from Wind River. You will need this license key when you install the Wind River Components on the Host System in Installing the Wind River Host Tools on page 34

6.0 Install Linux Packages and Wind River Linux Host Tools on the Host System

This chapter will guide you through installing the Wind River Host Tools software on your Host System, and then verifying that all necessary Linux operating system packages are installed on the Host System.

You must have internet access and a Wind River license to complete these steps. You applied for the license in Register Your Development Kit on page 29. Check your email for the license information.

Installing the Wind River Host Tools

In this section, you will install the following:

- Wind River Linux 5.0.1
- Wind River Intelligent Device Platform XT 2.0
- Wind River Workbench 3.3.5

If possible, begin these steps at the end of the day and in a location that can be unattended, so you can allow the installation to run overnight.

To complete this section, you need the following:

- The Installer file that you downloaded from the Intel Registration Center in Register Your Development Kit on page 29, step 10.
- The license information included in the License email message from Wind River. See Figure 18 on page 38.
- An internet connection for your Host System.

Note: The download and install process can take several hours to complete depending on the speed of your Internet connection. On an Intel® Core™ i5 second generation processor with a 3 MB per second download speed, these steps will take approximately 2 hours. At a 1 MB per second download speed, these steps will take approximately 4 hours.

Note: You may have used different directory names when you created directories in Create Directories and Confirm Disk Space on page 27. If you used different names, replace the directory names in the following steps with the names of the directories that you created.

1. Copy the Installer file that you downloaded in Register Your Development Kit on page 29, step 10 into the `$HOME/Installer` directory.
2. Change to the `Installer` directory and unzip the installer file. Use the following commands:

```
cd $HOME/Installer
unzip DVD*.zip
```

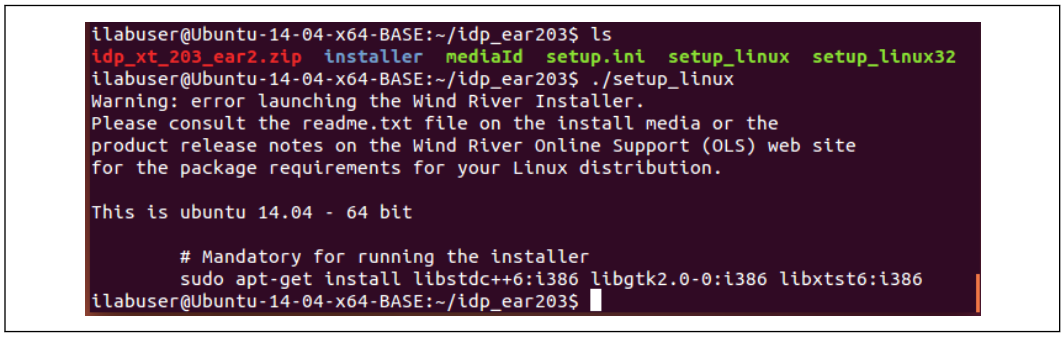
3. Start the Wind River Host Tools Installer with the following command:

```
./setup_linux
```

   The Wind River Installer screen opens.

   If instead you see the following screen indicating new Linux packages are required, complete the steps below the figure.

Figure 14. Wind River Installer Package Updates



   a. To perform the updates, using the following command:

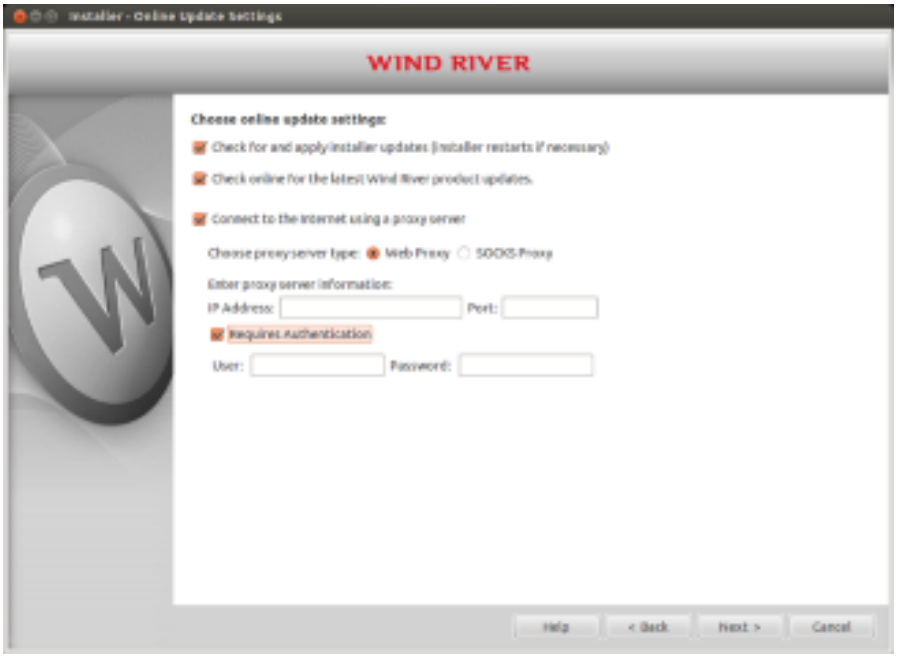
```
sudo apt-get install libstdc++6:i386 libgtk2.0-0:i386 libxtst6:i386
```

   b. After the update command completes, repeat the `./setup_linux` command.

4. In the Installer window, select the **Wind River Host Tools** installation location. The `WindRiver` directory displays by default. If not, use the **Browse** button to select the `$HOME/WindRiver` directory. Then click **OK**.
5. On the page **Online Update Settings**, perform the following actions:
   - If you are not using a proxy server to connect to the internet, go to step 7.
   - If your network requires a proxy server, check the box **Connect to the internet using a proxy server** and provide your proxy information.

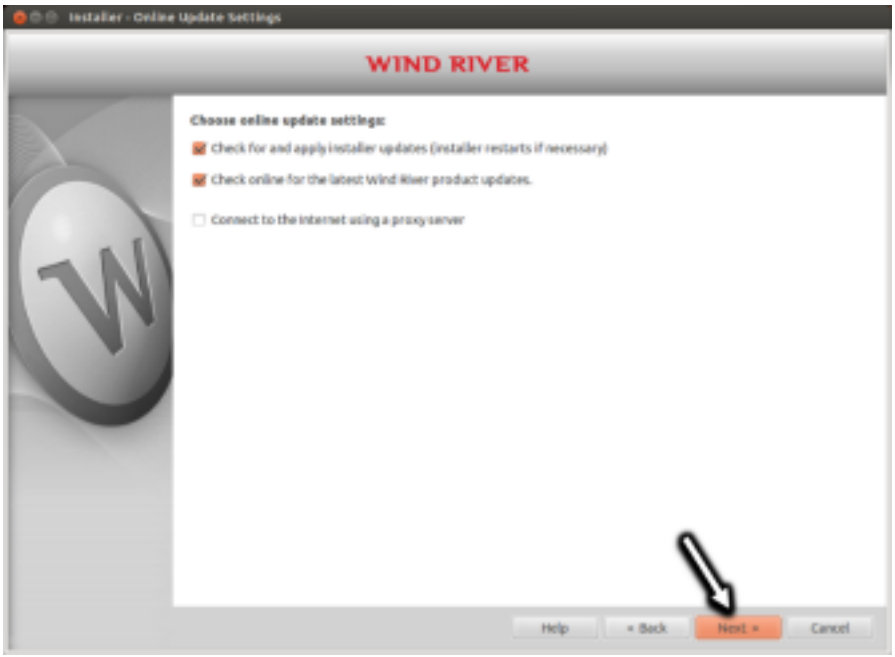
   If you receive error messages, double-check your proxy settings and work with your IT department for the appropriate settings.

Figure 15. Online Update Settings, Part 1



6. On the next **Online Updates Settings** page, leave the defaults selected, as shown:

Figure 16. Online Update Settings, Part 2

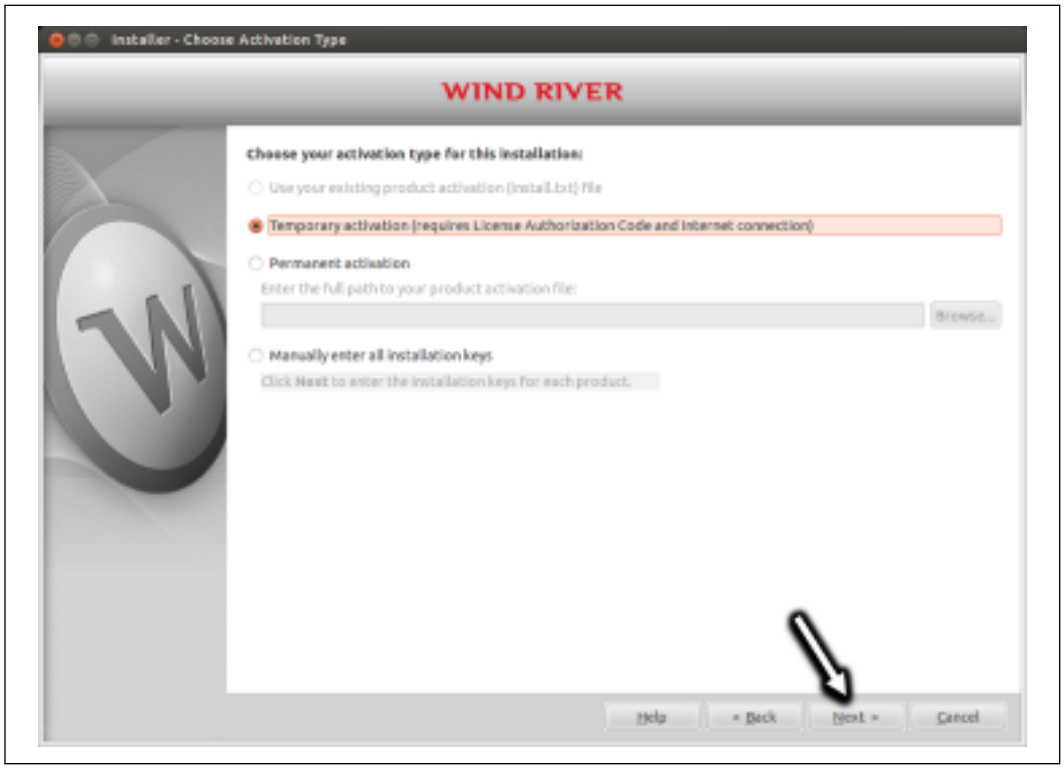


The Wind River Installer checks for updates. This takes about 2 minutes.

7. On the page **Install or Download**, choose between installing right away from the internet, or to copy the product files to the Host System and perform the installation later.
8. On the page **Choose Activation Type**, select **Temporary activation (requires License Authorization Code and internet connection)**.

   Note: Although your Wind River Host Tools license is a permanent license, you must select **Temporary Activation** to use the license number and License Authorization Code that you received from Wind River.

Figure 17. Activation Type



9. On the page **Host Information**, choose the Ethernet adapter that will be used for downloading the Host System tools from the internet. This is used to link your Wind River software license with your Host System. Click **Next**.
10. On the page **User Information**, type in the following information:
    - The Wind River Software License Authorization Code (LAC) that you received via email when you registered your product. See the highlighted area in example email message below.
    - Enter your user information.

Figure 18. License Authorization Code Location

Dear Intel Customer

Thank you for your recent purchase of an Intel® Development Toolkit. We appreciate your business.

The license request for your Intel® Development Toolkit software has been fulfilled. Details about your software license are provided below.

Order Information
Customer Name : Intel Corp

Products Ordered
Your order includes the following products:

Product Description	Quantity	License Type
-------Wind River® Intelligent Device Platform XT 2.0	1	NL

In order to install the Wind River® Intelligent Device Platform XT 2.0 software and you will need the below License Authorization Code, and the attached license file.

License Information
1. Wind River License* # : XXXXXX
   License Authorization Code: XXXXXX-XXXX-XXXXX

Intel® Premier Support
Your product purchase and registration entitles you to access Intel® Premier Support. To access support please go to businessportal.intel.com and use the login ID and password you supplied during the registration process.

If you are unable to access Intel® Premier Support, please contact your field sales representative for assistance

Thank you for your business.

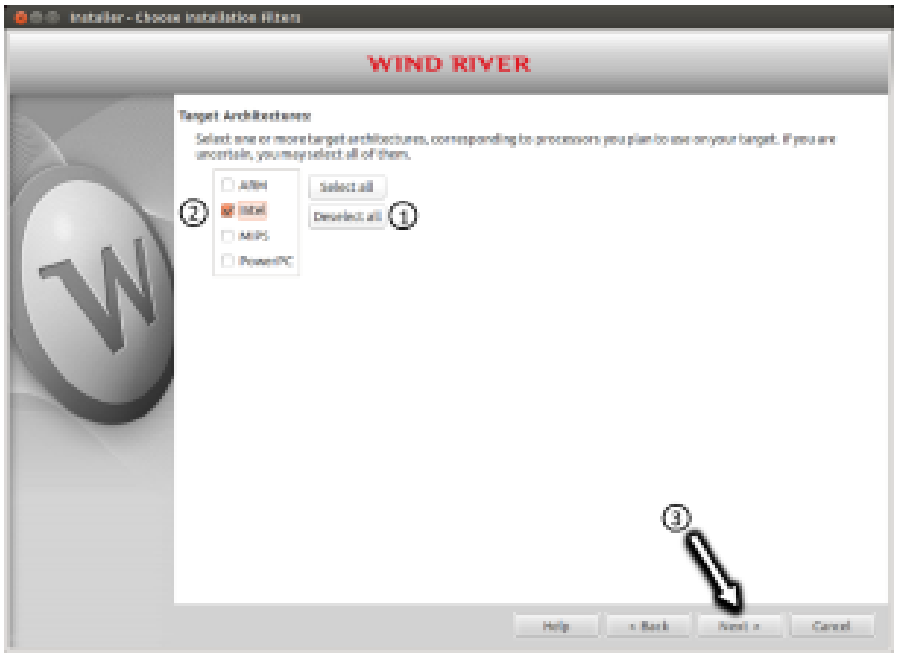
Best regards,
Intel Corporation

11. Click **Next**. A progress bar displays while the installer contacts Wind River to verify your Wind River License Authorization Code and register your Host System. This will take about 1 minute.

    Note: The MAC address of eth0 for your Host System is the only address allowed to use this license.

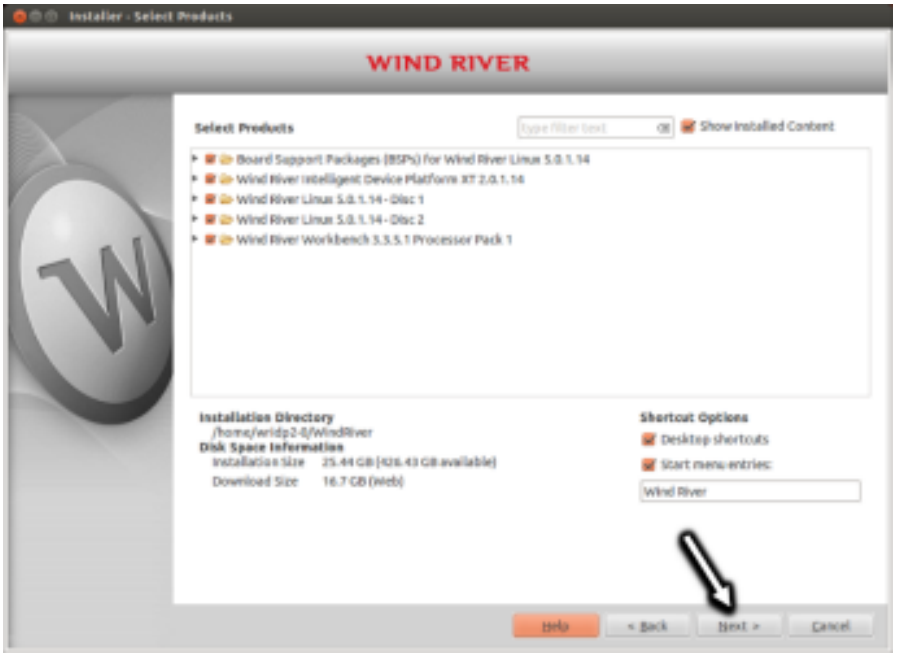
12. On the page **Choose Installation Filters**, click **Deselect all**, and then select only **Intel**. Click **Next**.

Figure 19. Choose Installation Filters



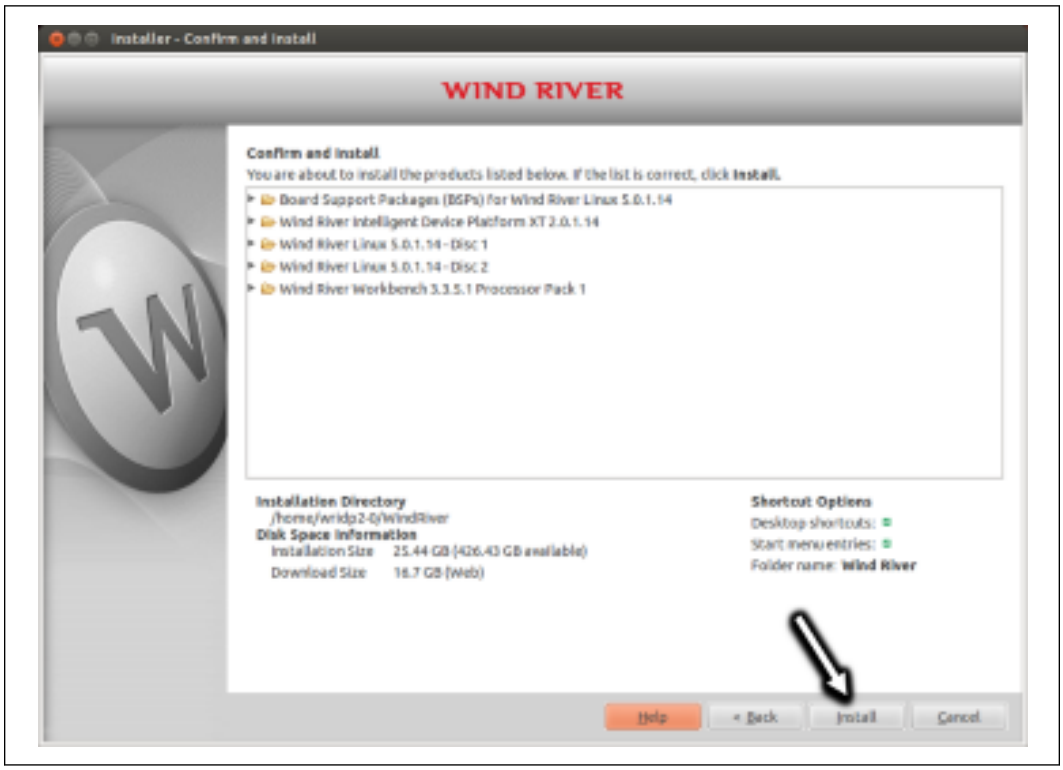
13. On the **Select Products** page, keep the default selections. Your screen will look similar to the following.

Figure 20. Select Products



14. Click **Next**. The **License Agreement** displays. Review it, and then click **I ACCEPT** if you agree to the terms of the agreement.
15. On the page **Confirm and Install**, click **Install.**

Figure 21. Confirm and Install



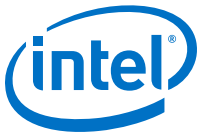
Note: The download and install might take several hours depending on the speed of your Internet connection.

When the installation is complete, the top of the screen displays **Installed Content** and the **Next** button is again available.

16. Click **Next**. A thank you message displays with a link to a readme file. Recommended: Leave the default check next to the readme file.
17. Click **Finish** to exit the Installer window. The readme file opens in a browser and the installation application closes.

If you encounter installation issues, provide your Intel support contact with the following files from the directory: `$HOME/WindRiver/`

- `setup.log`
- `setup_install_failure.log`



Verify All Required Linux Packages Are Installed

These steps verify that all Linux operating system packages required for using the Wind River Host Tools are present. If any are not present, this section guides you through installing them.

1. Change to the directory `$HOME/WindRiver/wrlinux-5/scripts`. Use the following command:

```
cd $HOME/WindRiver/wrlinux-5/scripts
```

2. Use the following command to verify all packages have been installed:

```
./host_package_install.sh
```

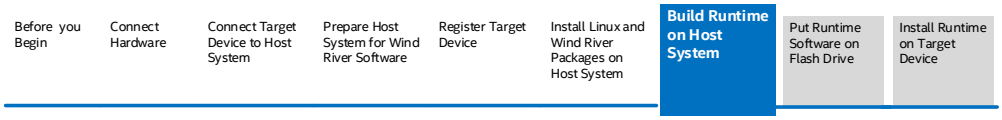
3. Choose the correct path:
   - Continue to Build Intelligent Device Platform XT Runtime Software on page 42 if you receive the response: `All required host packages are installed.`
   - Continue with the steps below if you receive a response similar to the following: `Following packages need to be installed: [package #1] [package #2].`
4. You should already be in the `$HOME/WindRiver/wrlinux-5/scripts` directory. If not, go to this directory.
5. Use the following command to install the additional package(s), replacing the package number with the information in the response you received in step 3:

```
sudo apt-get install [package #1] [package #2] [etc]
```

   where you replace `[package #1]` with the first item listed in step 3, `[package #1]` with the second item, and so on.

   You may need to type your password at the prompt: `[sudo] password for [username]`

7.0 Build Intelligent Device Platform XT Runtime Software



Install Linux Packages and Wind River Linux Host Tools on the Host System on page 34 guided you through installing the Wind River Host Tools and Intelligent Device Platform XT software on your Host System. With the software installed, you are now ready to develop the applications and runtime operating system that will run on your Target Device. This guide does not cover application development. For guidance, see the documents listed in Reference Documents on page 15.

This section explains how to build an Intelligent Device Platform XT runtime file system and operating system. This runtime file system and operating system are built on the Host System and then installed on the Target Device.

If you use Eclipse* or if you prefer a GUI-based development environment to build your Target Device runtime file system and operating system, then see Building an Intelligent Device Platform Project Using Wind River Workbench on page 62.

The steps in this section will take several hours to complete. If possible, begin these steps at the end of the day and in a location that can be unattended so you can allow the build process to run overnight.

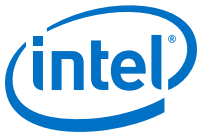
What you need to do

Note: You may have used different directory names when you created directories in Create Directories and Confirm Disk Space on page 27. If you used different names, replace the directory names in the following steps with the names of the directories you created.

1. Begin this procedure in your `Project` directory. Use the following command:

```
cd $HOME/Project
```

2. Use the Wind River Linux `configure` command to configure the build. See the command below for a typical `configure` command. Use `configure --help` to explore supported configuration options, and see the *Wind River® Intelligent Device Platform XT 2.0 – Programmer's Guide*, Part II (Key Related Tasks) for help with generating your own keys and for additional configuration options and details.



Note: By default the runtime operating system is built with the latest version of the Wind River Host Tools that you installed on your Host System. To use an earlier version, specify the desired "RCPL" version like this:

`--with-rcpl-version=XXXX`

where `XXXX` is the 4-digit RCPL version number.

Note: In the option for `--enable-parallel-pkgbuilds=4` use the number of process threads available in the CPU of your Host System. For example, when using a CPU with two cores and hyperthreading, four process threads are available, so specify "4" for optimal performance.

```
../WindRiver/wrlinux-5/wrlinux/configure \
--enable-board=intel-atom-baytrail \
--enable-kernel=standard \
--enable-rootfs=glibc-idp \
--enable-addons=wr-idp \
--enable-bootimage=ext3,hdd \
--enable-jobs=6 \
--enable-parallel-pkgbuilds=4 \
--enable-patchresolve=noop \
--enable-rm-work=yes \
--enable-checkout-all-layers=yes \
--with-layer=wr-prosyst-mbs-smarthome-sdk-ia,wr-exegin-zigbee-ia,\
wr-digi-idigiconnector,wr-wks-oneagent-oma-dm-ia,\
wr-wks-oneagent-tr069,wr-ieee11073,wr-intel-support \
--with-template=feature/vlan,feature/opc,feature/recovery,\
feature/opc_demo,feature/ipsec_vpn,feature/l2tp,\
feature/openjdk-bin,feature/online_updates,feature/bluetooth,\
feature/boot_delay_network,feature/pptp_vpn,\
feature/intel-wilkinpeak2,feature/webif
```

The `configure` command will take several minutes to complete. You will see progress hash-marks at the bottom of the screen through most of the process. Upon completion, your terminal prompt will return.

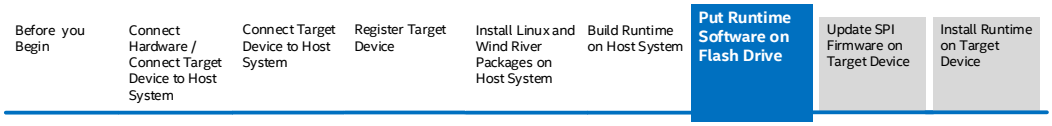
3. Build the runtime operating system using the command below. This builds the Linux runtime system and generates the runtime components that can be installed on your Target Device.

```
make fs
```

Note: This command will take 3 - 5 hours to complete. The completion time is highly dependent on the processing speed of your Host System.

At the end of the make process the Target Device runtime operating system is compressed into a single file that is a USB flash drive image. The flash drive image is created in the directory `$HOME/Project/export`. The file has a `.bz2` extension.

8.0 Put Intelligent Device Platform XT Runtime Image onto USB Flash Drive



Build Intelligent Device Platform XT Runtime Software on page 42 guided you through building your runtime image and deploying it to a bootable USB flash drive.

You will now put the Intelligent Device Platform XT image onto a USB flash drive and then install it onto the Target System from the USB flash drive. You will begin these steps on your Host System terminal.

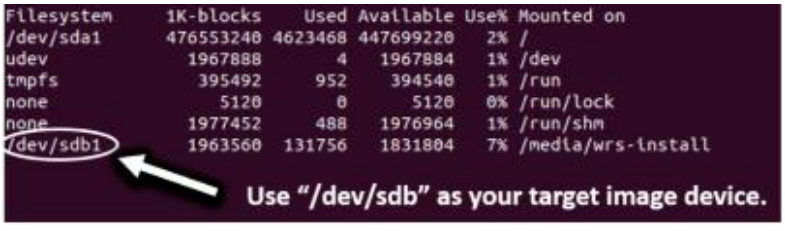
Note: The runtime software can be booted from the USB flash drive, but Intel recommends installing the runtime components on the Target Device's hard drive.

1. From the Host System `$HOME` directory, use the following command to display the mounted devices:

```
df
```

   Your output will look similar to the following. Look for the USB file system name in the location on your screen where the file system name is circled in the example. In the example below, the USB flash drive file system name is `/dev/sdb1`. To identify it on your system, look at the right heading column that says `Mounted on`. In this column, look for the row that begins with `/media`. The file system name is in the left column of this row.

Figure 22. USB Flash Drive File System Name



   The example screen displays `/dev/sdb1`. The `1` at the end of `sdb1` indicates the partition. In the step below, do not include the partition. In the example, only `/dev/sdb` is used for the file system name. Write down the file system name that is displayed on your screen. You will use it in the next step. If you

accidentally include the partition in the command, you will receive an error message: `ERROR: Device mode should be set to -d option. e.g.: /dev/sdb`

Warning: The following command will overwrite all contents on your USB flash drive. The USB flash drive must have a capacity of at least 4 GB.

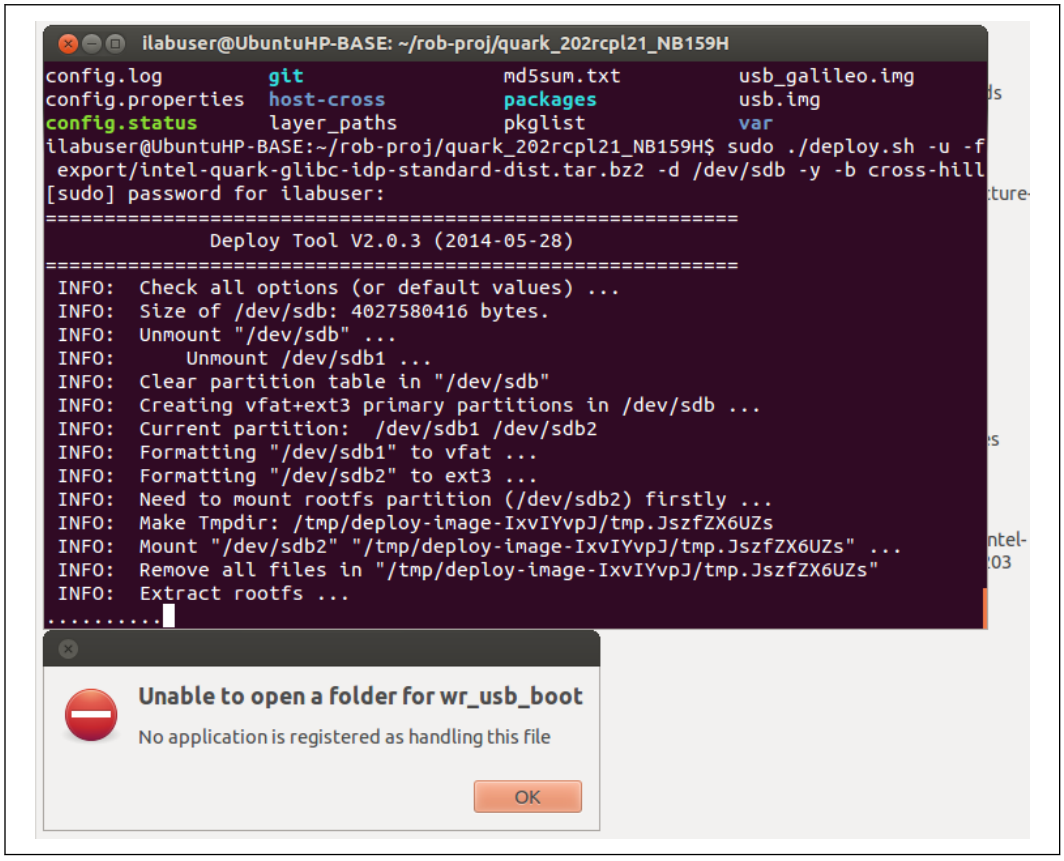
2. In the `$HOME/projects` directory, type the following command to format the USB flash drive with two partitions and deploy the `tar` file to the USB flash drive. This command also changes the media name on the USB flash drive. Choose the appropriate command for your circumstances, replacing the ? in sd? with the information you wrote down in the previous step:

```
sudo ./deploy.sh \
-u -f export/intel-atom-baytrail-glibc-idp-standard-dist-srm.tar.bz2 \
-d /dev/sdb -y -g ./grub-0.97
```

3. Type your password at the prompt: `[sudo] password for <username>`.

   You may see an error screen stating it is not possible to open the folder wr_usb_boot, as shown below. This is not a concern. If you receive this message, click OK.

Figure 23. Folder Error for wr_usb_boot



4. When the process completes, remove the USB flash drive and re-insert it into the Host System. The USB flash drive mounts as `/media/<username>/wr_usb_boot` .
5. Use the following command to verify the build image has been copied to the USB flash drive by listing the directory contents as follows:

```
ls /media/<username>/wr_usb_boot/opt
```

6. Your output should include:

```
intel-atom-baytrail-glibc-idp-standard-dist-srm.tar.bz2
```

   If you do not see this file:

   - Verify your configure command was correct in Build Intelligent Device Platform XT Runtime Software on page 42, step 2.
   - Manually use the following commands to place it there:

```
sudo mkdir /media/<username>/wr_usb_boot
sudo cp export/*.bz2 /media/<username>/wr_usb_boot/opt/;sync
```

7. Use the following command to unmount the USB flash drive, replacing the `?` in `sd?1` and `sd?2` with the information you wrote down in step 1:

```
umount /dev/sd?1 /dev/sd?2
```

8. Remove the USB flash drive from the Host System.

9.0 Install Intelligent Device Platform XT Runtime on Target Device

Build Intelligent Device Platform XT Runtime Software on page 42 guided you through building your runtime image and deploying it to a bootable USB flash drive.

You will now:

- Change the Target Device boot priority
- Copy the runtime image to the Target Device
- Install the runtime image to the Target Device

Note: The runtime software can be booted from the USB flash drive, but Intel recommends installing the runtime components on the Target Device's hard drive.

Change Target Device Boot Priority

1. Power off the Target Device if it is on.
2. Insert the USB flash drive that you created in Build Intelligent Device Platform XT Runtime Software on page 42 into the Target Device.
3. Power on the Target Device.
4. Press the **Esc** key repeatedly during the boot process until the BIOS menu displays.
5. Use the left and right arrow keys to navigate to the **Boot** tab in the BIOS menu.
6. Use the up and down arrow keys to navigate to the **Hard Drive BBS Priorities**. Press **Enter**.
7. Use the arrow keys to navigate to **Boot Option #1**. Press **Enter**.
8. In the **Boot Option #1 pop-up window**, use the arrow keys to select the USB flash drive. Press **Enter**.
9. Press **Esc** to return to the Boot menu.
10. Make sure the **Boot Option #1** is now listed as the USB flash drive and then press **F4**.
11. Press **Enter** to save the changes and exit BIOS setup. Your Target Device boots.
12. When the system has booted to Linux, login as user `root` using password `root`

13. To make sure you have booted from the USB flash drive, use the command `mount` and look for `/dev/sdb2 on / type ext3` to indicate that the USB flash drive (sdb) is mounted as the root (/).

Install Intelligent Device Platform XT Runtime Image to Target Device Hard Drive

Now that the Target Device has booted from your USB flash drive, you are ready to install the new Intelligent Runtime Device Platform XT runtime image onto the Target Device hard drive. The steps below walk you through that installation.

1. To install the Intelligent Device Platform XT from the USB flash drive to the Target Device hard disk, use the following command:

```
tgt=/dev/sda /sbin/reset_media
```

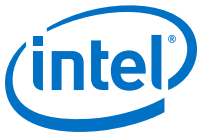
2. Respond `yes` when prompted to `Restore the boot media to its factory defaults`. This process could take as long as 25 minutes. Do not remove the USB flash drive during this process. Upon completion, you will be prompted to log in. Use `root` for both the login ID and password.
3. After the command completes, shut down the Target Device. Use the command:

```
poweroff
```

4. Wait for the Target Device power button light to turn off.
5. Remove the USB flash drive from the Target Device.
6. Power-on the Target Device.
7. Reboot into BIOS and make the Plextor hard drive the first boot priority. Use Change Target Device Boot Priority on page 47 for guidance.
8. Press **F4**, and then press **Enter** to save the changes and exit BIOS Setup. The Target Device boots to the newly installed runtime image.
9. Login, using`root` for both the login ID and password.

The Target Device is now loaded with the new runtime image and is ready to use.

Now that you know how to use the Development Kit, it is time to develop your own gateway solution. See Table 1 on page 15 for a list of helpful technical documents.



Appendix A Intel® IoT Gateway Knowledge Forum

In addition to the technical support through Intel® Premier Support, an online community knowledge forum is available for the Intel® IoT Gateway Development Kit. The forum is located at https://ask.intel.windriver.com. On this forum, you can ask how-to questions and search for answers related to Wind River® Linux and the Wind River development tools.

Intel will continue to offer hardware and software technical support through Intel® Premier Support; you can use this knowledge forum as an additional support option. Questions on this forum are typically related to installation and usage of Wind River Linux, the Intelligent Device Platform XT, and compilers and development tools, such as the Wind River Workbench.

In using the forum, be aware that this is an open support model and the following bullets apply:

- Wind River hosted Knowledge Forums (Wind River Knowledge Forum and the Intel® IoT Gateway Knowledge Forum) are open support repositories that are accessible to Intel, Wind River employees, and customers who have active Support Maintenance Agreements.
- Questions posted on the forums are visible to all users. All users can contribute answers. Both questions and answers can be edited by any user on the Knowledge Forums.
- Refrain from posting proprietary, confidential, or controlled information on the Knowledge Forums. Intel Corporation and Wind River Systems are not responsible for ensuring the privacy of data on the Knowledge Forums.

This section guides you through accessing and using the Intel® IoT Gateway Knowledge Forum.

Accessing the Forum

Use the following steps to create a Wind River account and log in to the forum.

Note: You might already have a Wind River support account. If you have an account, disregard Step 1 and begin with Step 2.

1. To create a Wind River support account you must fill out a short form at https://support.windriver.com/selfservicewebapp/register.action. This form requires you to enter your license and LAC keys. You received this information after you registered your Development Kit.
2. Login at https://ask.intel.windriver.com. Use your Wind River Online Support account user name and password.
3. If you have not yet done so, then when prompted, set up a screen name. This is the identity you will use in the online community. Other users will see you by this identity. Do not use your email address for your screen name.

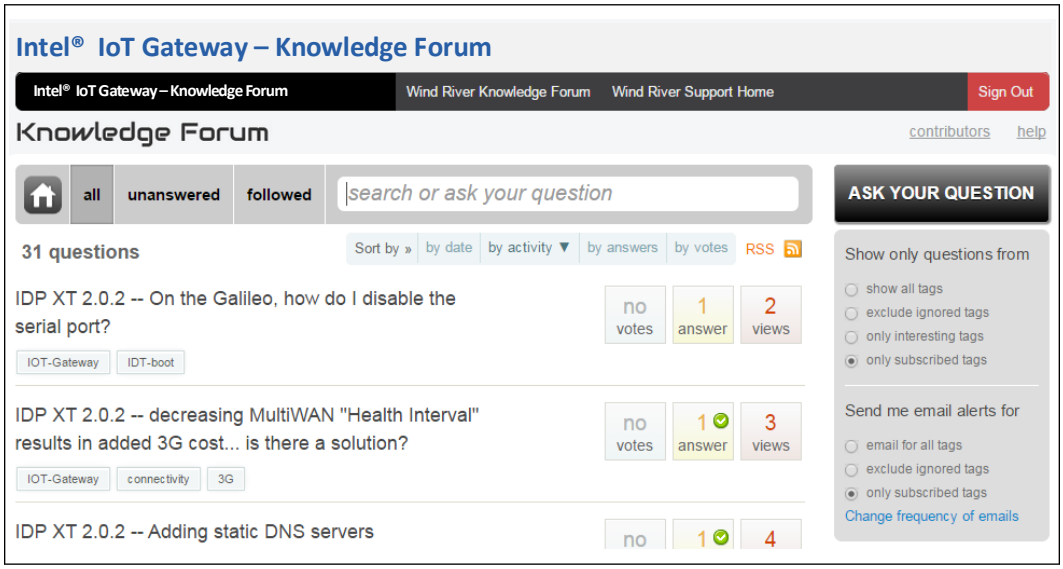
Using the Forum

After you are registered and logged in, you can use the forum to ask questions and search for topics of interest. Submitted questions are posted on the forum and are accessible to all forum users. Forum moderators and Wind River product experts regularly monitor the forum to answer questions. If necessary, your question will be escalated.

Note: If your issue is urgent or related to BSP development on a specific project, create an issue ticket through Intel® Premier Support instead of relying on this forum for answers.

The screen looks like this after you register and log in:

Figure 24. Knowledge Forum Opening Screen

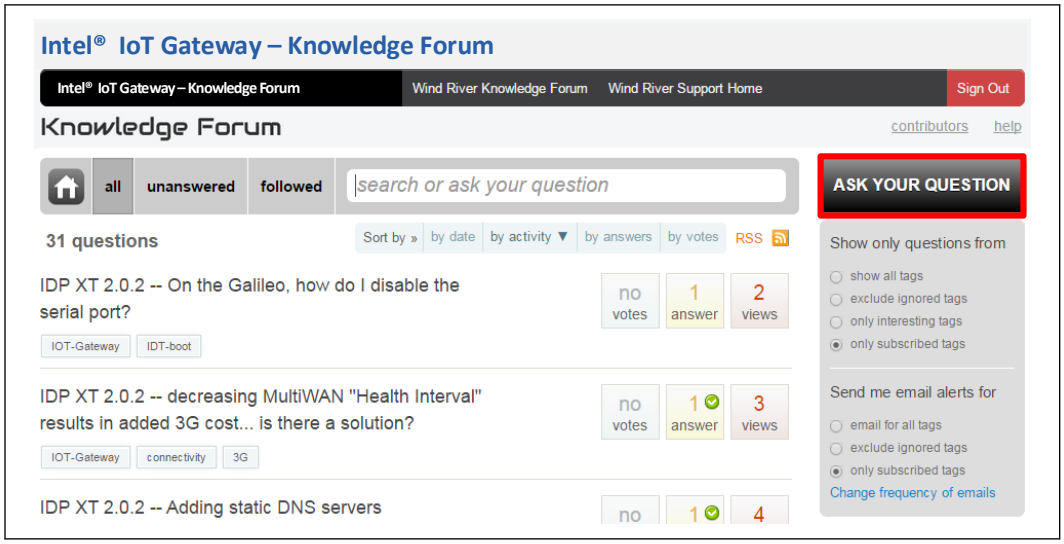


Submitting Questions

Use the following steps to ask a question on the forum.

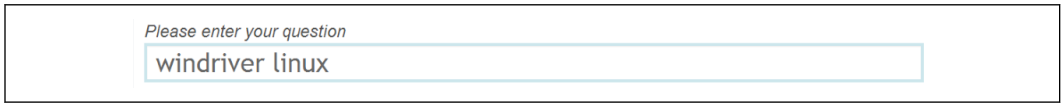
1. Click **ASK YOUR QUESTION**. See the red box in the following figure.

Figure 25. Ask Question



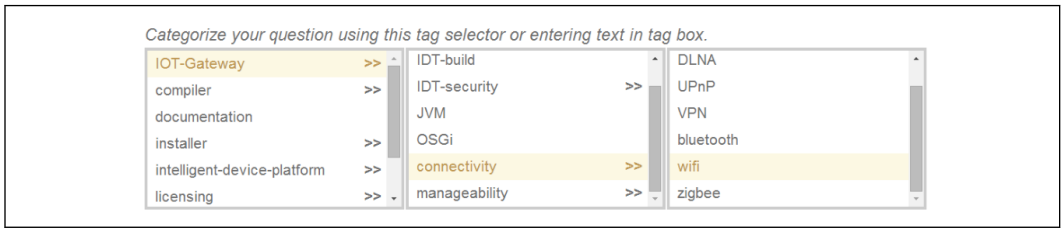
2. Title your question in the field provided, as shown:

Figure 26. Title Question



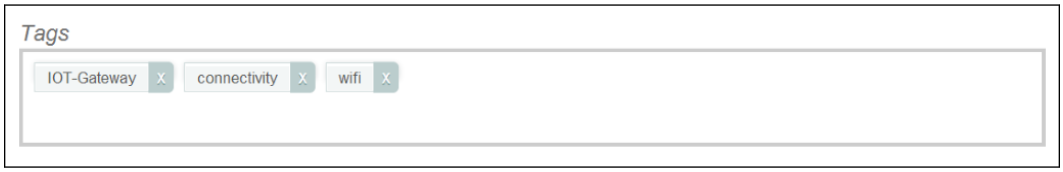
3. Provide details about your question. To help the support staff to provide accurate and timely guidance, include details about your test / development environment, including:
   - Detailed information about your question.
   - Software, such as Intelligent Device Platform XT release, Wind River Linux version, BIOS, FW, etc.
   - Hardware, such as board, processor SKU, memory, I/O etc.
4. Categorize your question. Add **IOT-Gateway** as a tag in addition to specific product tags. This will allow the support team to track issues related to Intel® IoT Gateway See the following figure.

Figure 27. Categorize Question



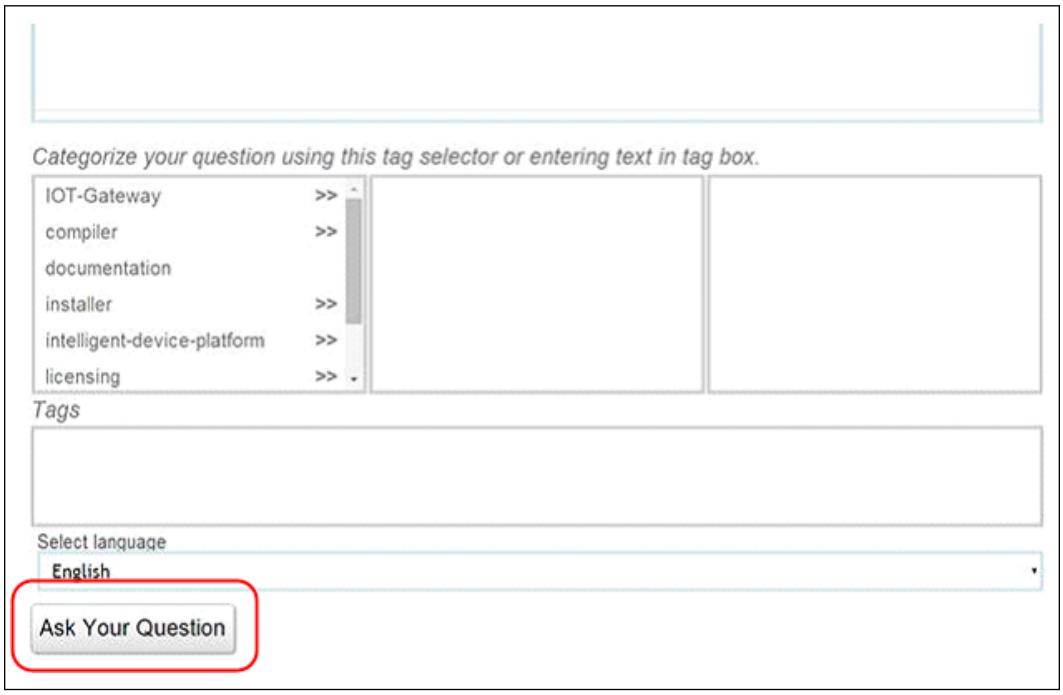
Your selected tags display in a list. You can add or remove tags as necessary. See the following figure.

Figure 28. Tagged Question



5. Click **Ask Your Question** to submit the question. See the red box in the following figure.

Figure 29. Submit Question



Subscribing to Tags

You can choose to subscribe to specific tags to receive email alerts for issues and updates to questions related to that tag/category. Use the following steps.

1. Select your preferred email setting. See the red box in the following figure.

Figure 30. Subscribe to Forum Tags

2. Click **Change frequency of emails** to set up how often you receive email messages.

Appendix B Installing a Cellular Comms PCIe MiniCard Module and SIM Card

The Target Device in this Development Kit includes a full-height PCI Express Mini Card slot in which you can install a cellular communications module.

The Telit* HE910 PCI Express Mini Card module comes pre-installed in the Target Device. The HE910 provides 2G, 3G and 4G cellular, and GPS capabilities for the Target Device.

Warning: Installing any cellular module other than the Telit HE910 that is supplied with this Target Device violates the certifications of this Target Device. Use only the supplied Telit HE910 PCI Express Mini Card module or an exact model replacement.

This chapter explains how to perform the following tasks:

- Open the Target Device
- Remove the cellular module
- Install a SIM card into the cellular module
- Install the cellular module
- Close the Target Device

Tools Needed

To remove an installed module, you will need:

- Philips screwdriver

To install a module, you will need:

- Philips screwdriver
- PCIe* mini card module
- SIM card from a cellular communications provider
- A screw

Note: The internal antenna wires are pre-installed in the Target Device. The antennas that attach to the exterior are provided with the Target Device.

Opening the Target Device

Important: Disconnect all external power and signal cables from the Target Device before proceeding.

1. With your Target Device positioned as shown in the following figure, remove the four screws (circled in red) from the bottom plate.

   Do not remove the four screws that hold the hard disk drive to the bottom plate (shown by the hard disk icon ⬭).

Figure 31. Target Device Bottom Plate

2. Lift the cover plate from the right side to remove it.

   Caution: The hard drive and cables are attached to the cover plate. Be careful in opening the cover plate so you do not disconnect or damage the hard drive or cables.

The Cellular Module occupies the full-size PCIe Mini Card slot. The module is labeled "Telit" in the picture below.

Figure 32. Target Device with Bottom Plate Removed

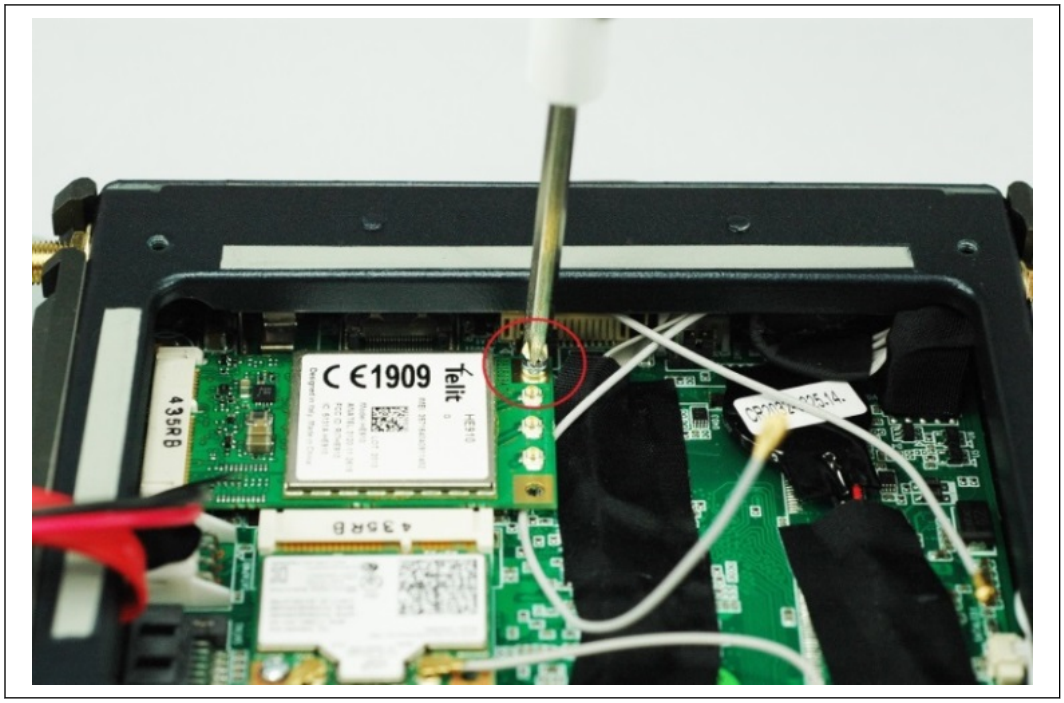
Removing Cellular Module

1. Disconnect the two antennae from the cellular module by carefully pulling up on them. See the following picture.

Figure 33. Disconnecting the Antenna Cables

2. Remove the module's hold-down screw, as shown below. Use caution: It is easy to lose the screw if you drop it.

Figure 34. Removing Hold-down Screw



3. Angle the card slightly upward and gently pull the module from the PCIe Mini Card slot.

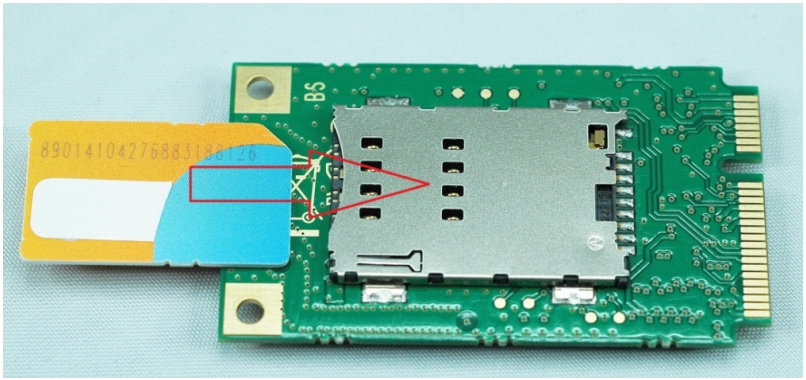
Install a SIM Card into the Cellular Module

1. Gather the PCIe Mini Card Module and its accompanying screw. The components are as shown below:

Figure 35. Telit* HE910 Card Module - Front

2. Turn the module over to reveal the SIM card slot.
3. With the gold contacts of the SIM card facing down, as shown in the picture below, gently push the SIM card into the slot until it clicks into place.

Figure 36. SIM Card Installation

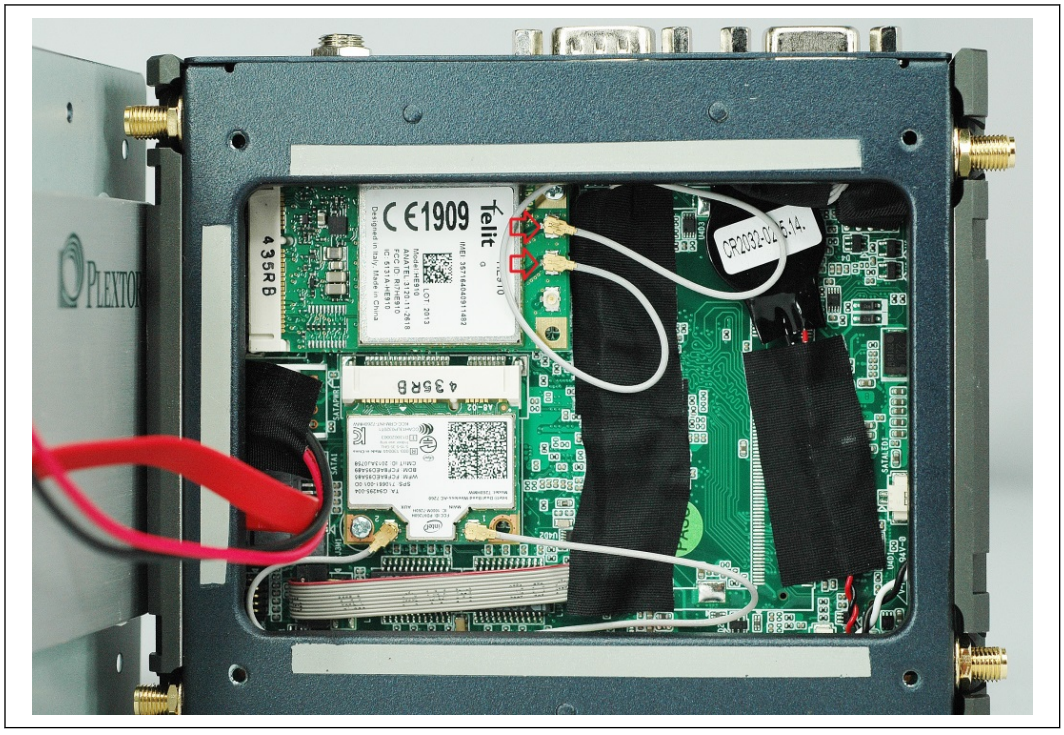


Note: If you need to release the SIM card from the slot, push the SIM card into the slot until it clicks again, and then pull it from the slot.

Install the Cellular Module

1. Gently insert the module into the PCIe Mini Card slot. For the slot location, see Figure 32 on page 56.
2. Screw in the module's hold-down screw. Be careful not to over-tighten the screw. See Figure 34 on page 57.
3. Install the antenna cables as shown in the following picture.
   - Connect the antenna on the left side to the module's middle connector.
   - Connect the antenna on the right side to the module's top connector.
   - Loop the antenna cables as shown.
   - Be sure the cable is perfectly aligned with the card connector and then press down firmly on the cable connector until you hear or feel it click into place.

Figure 37. Installing Antenna Cables



Close the Target Device

1. Replace the cover over your Target Device, the left side first, being careful not to pinch the cables or damage the hard drive.
2. Screw in the four screws, being careful not to over-tighten them. See Figure 31 on page 55.

Appendix C Use Wind River WebIF to Configure the Target Device (Optional)

This appendix guides you through using the Wind River WebIF application. WebIF is a web-based interface used to manage wired, wireless, and 3G connectivity on Intelligent Device Platform XT Target Devices.

How to use WebIF

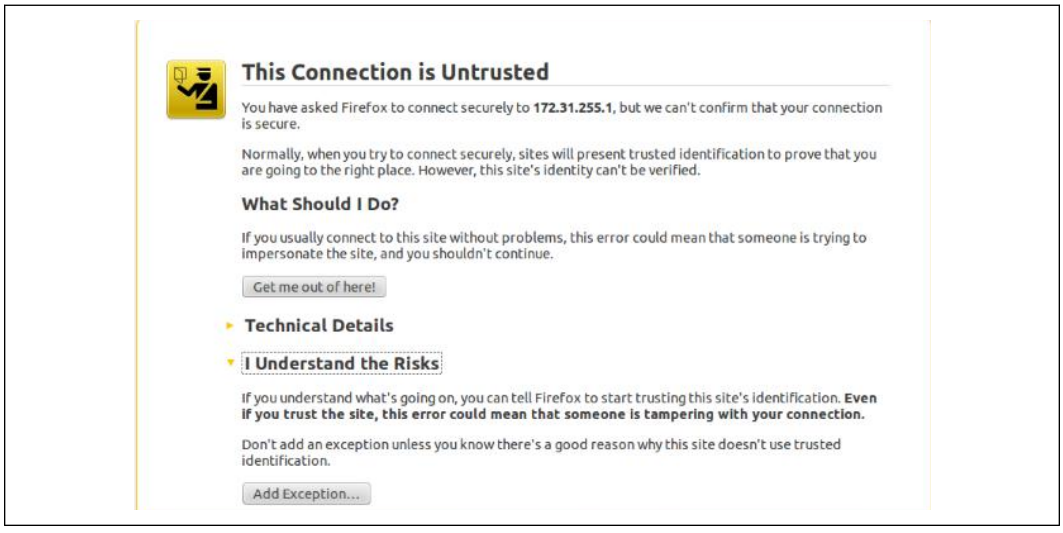
1. On the Host System, open an internet browser.
2. Choose the correct path:

   Note: Be sure to use `https` (not `http`) for either path.

   - If you used a **wireless** network connection from your Host System to your Target Device, type the following URL into the internet browser on your Host System: `https://192.168.1.1`
   - If you used a **wired** network connection from your Host System to your Target Device, type the following URL into the internet browser on your Host System: `https://<TARGET_DEVICE_IP_ADDRESS>`, where `<TARGET_DEVICE_IP_ADDRESS>` is the IP address of your target device.

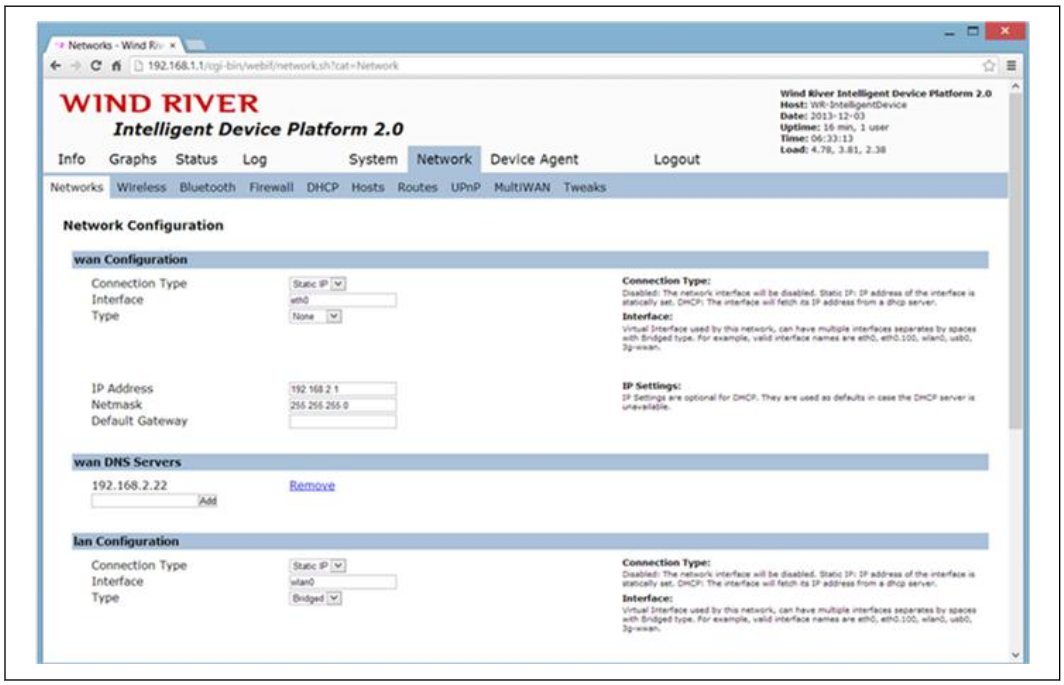
   Note: The Host System and the Target Device must be on the same subnet.
3. Most browsers present a pop-up warning box stating that the security certificate is not recognized. Select the option to tell the browser to disregard the certificate and connect to the Web site. In the following example, you would click **I Understand the Risks**, and then **Add Exception**:

Figure 38. Untrusted Certificate



4. Login with user name: `admin` and password: `admin`. The Wind River® Intelligent Device Platform XT 2.0 Web Interface (WebIF) console opens. See the figure below.

Figure 39. WebIF Application



The WebIF menus provide a simple interface to allow you to configure the hardware and I/O features of the Target Device. If you are interested in things you can do through this interface, see the *Wind River® Intelligent Device Platform XT 2.0 – Programmer's Guide* at https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-programmers-guide.html?wapkw=wind+river

See also the *Wind River® Intelligent Device Platform XT 2.0 – Release Notes* at http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html.

Appendix D Building an Intelligent Device Platform Project Using Wind River® Workbench

This appendix provides step-by-step instructions to build a Wind River Intelligent Device Platform project using Wind River Workbench. The steps below guide you through tasks such as selecting configuration options and adding different layers to your project.

This appendix assumes the following:

- Your Host System is running Ubuntu 14.04, 64-bit.
- You used the directory names indicated in Create Directories and Confirm Disk Space on page 27. If you used different directory names, replace the directory names in the steps below with the directories that you created.
- You followed the instructions in Installing the Wind River Host Tools on page 34.
- You know how to deploy a runtime image on your Target Device. See Install Intelligent Device Platform XT Runtime on Target Device on page 47.

Note: These steps will take 2 - 4 hours to complete.

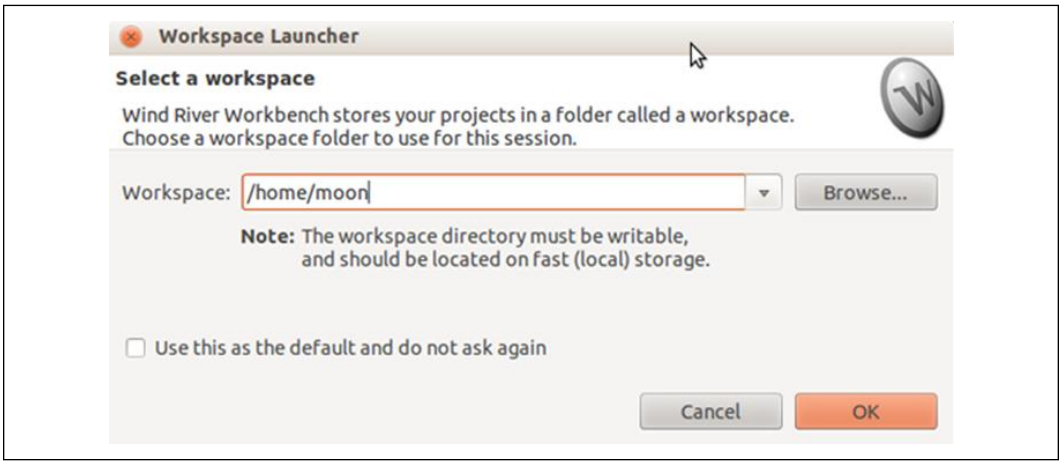
Create the Project

1. Use the following commands to launch Workbench:

```
cd $HOME/WindRiver
./ startWorkbench.sh
```

2. Upon launching, Workbench asks for a workspace folder. Type the path or browse to your workspace folder. Suggestion: Use your home folder. See the following figure:

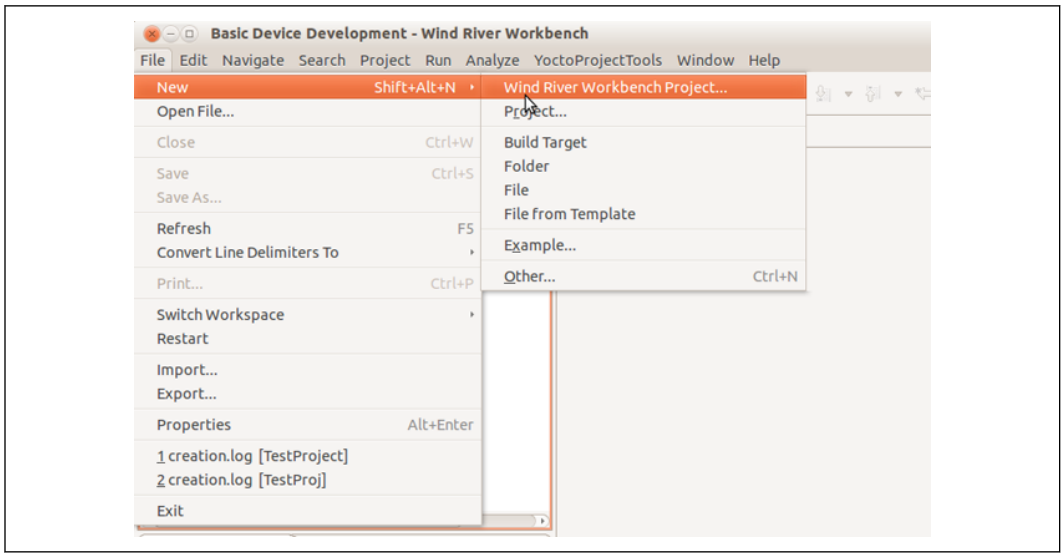
Figure 40. Workspace Location Selection



The application launches.

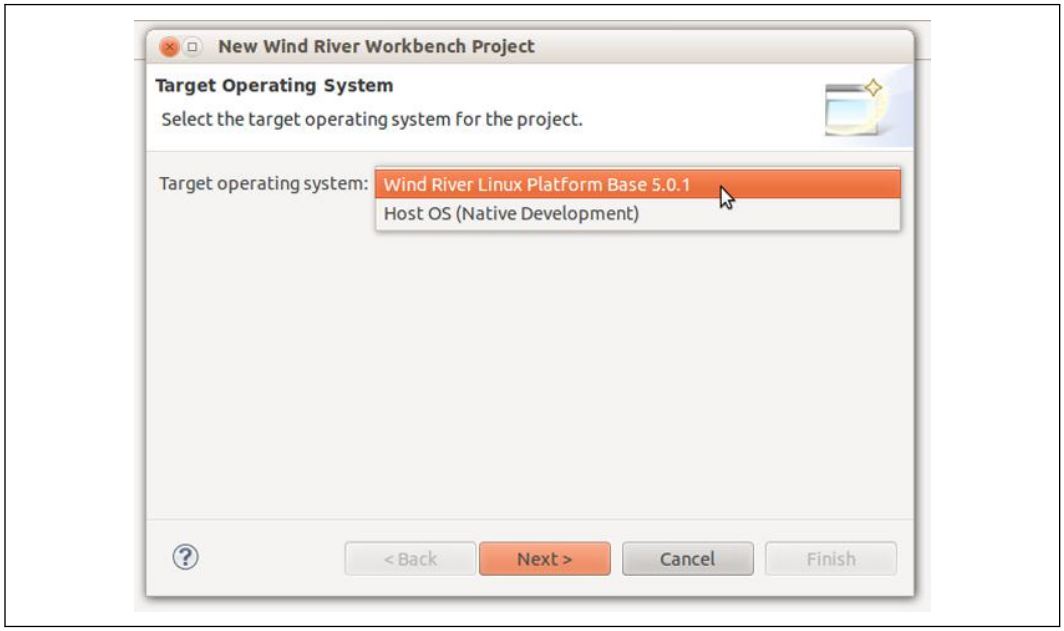
3. From the main menu, click **File** > **New** > **Wind River Workbench Project**, as shown:

Figure 41. Create a New Workbench Project



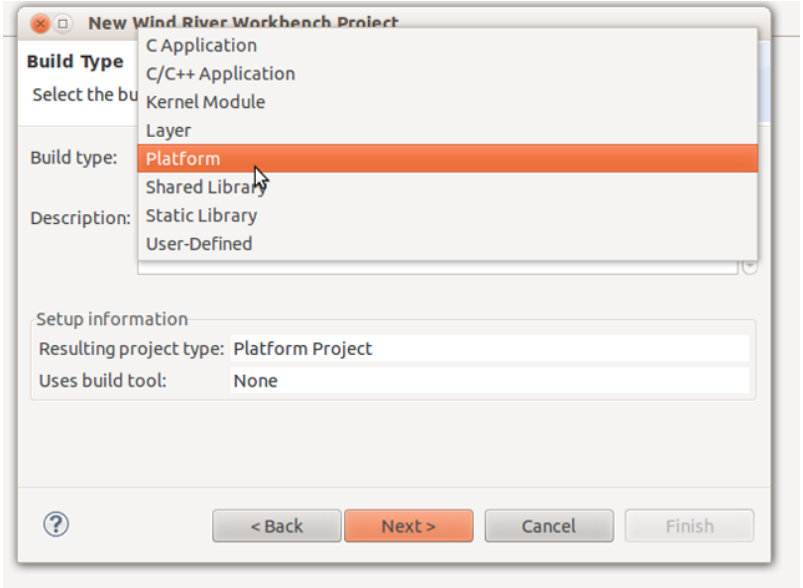
4. Select the target operating system. Choose **Wind River Linux Platform Base 5.0.1**, as shown, and then click **Next**.

Figure 42. Selecting Target Operating System



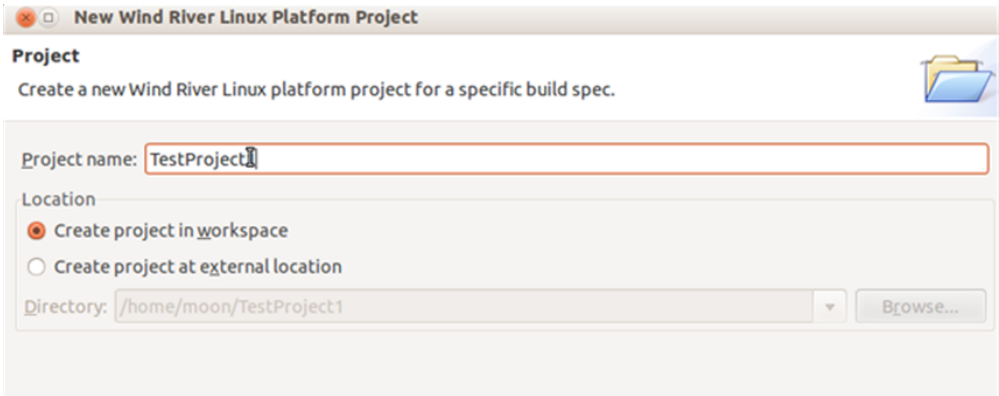
5. Select **Platform** as the build type as shown, and then click **Next**.

Figure 43. Select Build Type



6. Type a name for your project, and then click **Next**.

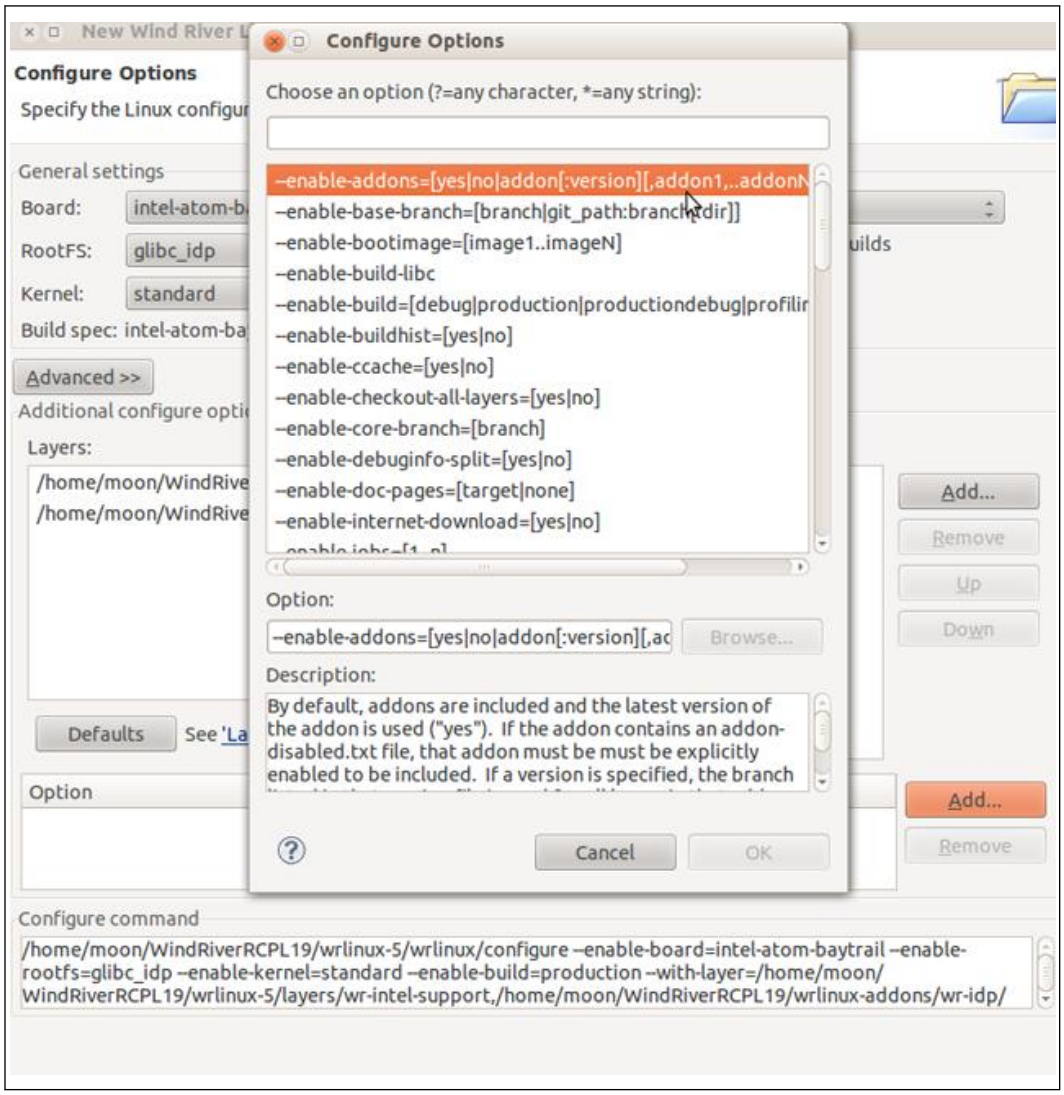
Figure 44. Specify Project Name



Important: You must enable `wr-idp` as an addon before selecting the RootFS type. Make sure you correctly complete steps 7 - 8.

7. Click **Add** and select `-enable-addons=[yes|no|addon[…]` as shown below.

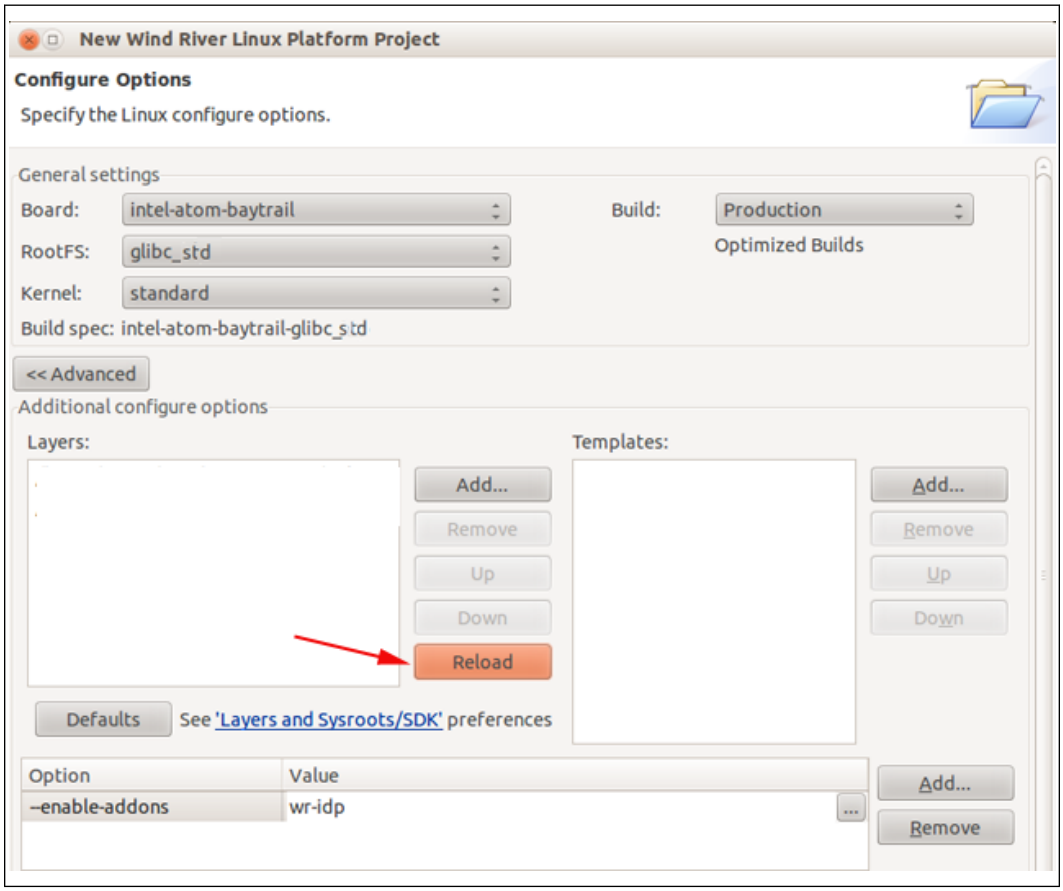
Figure 45. Enable Addons



8. Edit the **Value** field near the bottom of the screen to add wr-idp, and then click the **Reload** button. See the following figure.

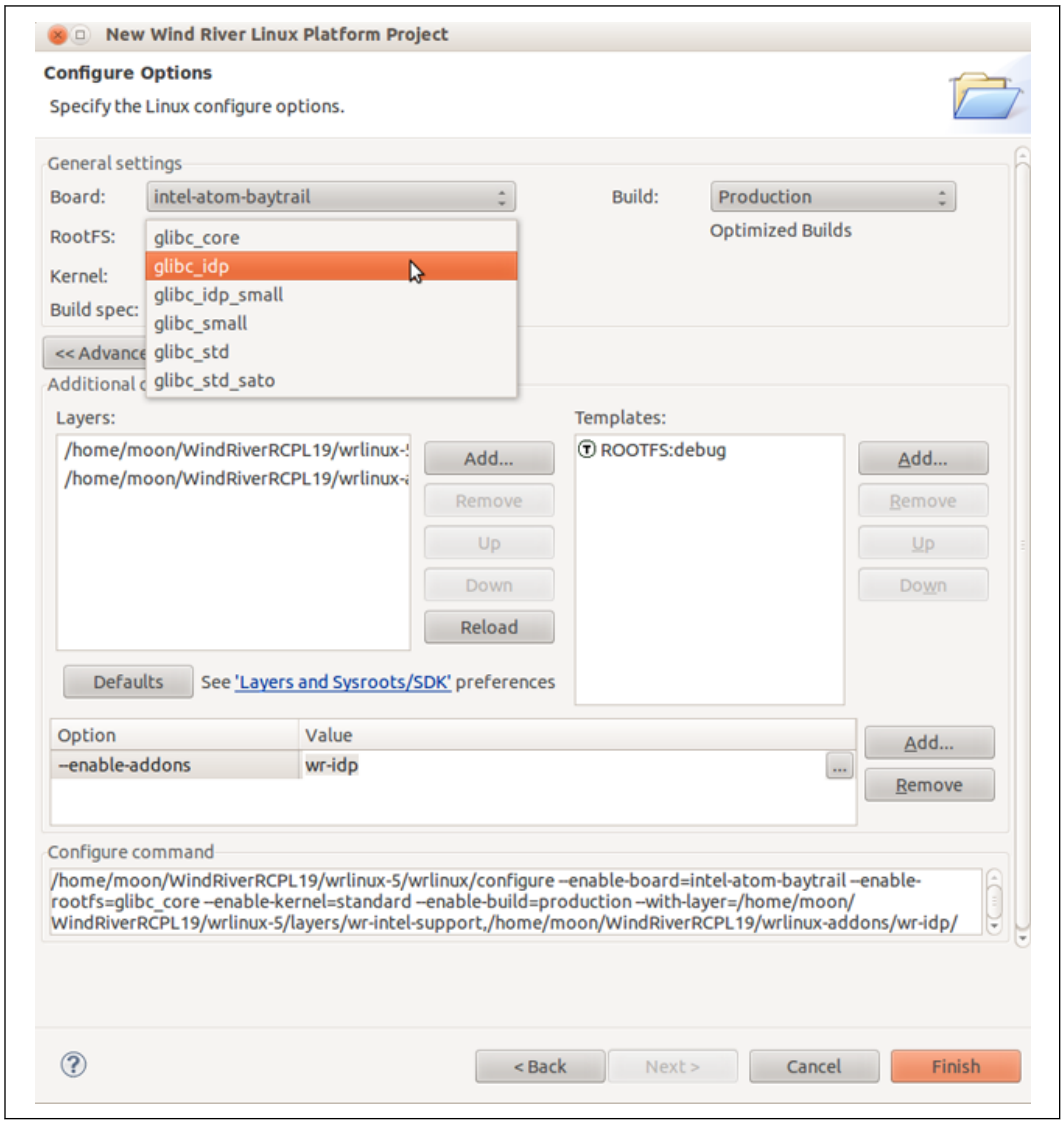
   Note: If you do not click **Reload**, you cannot use `glibc-idp` as the RoofFS type.

Figure 46. Reload Configurations



9. For **RootFS**, select **glibc_idp** as shown:

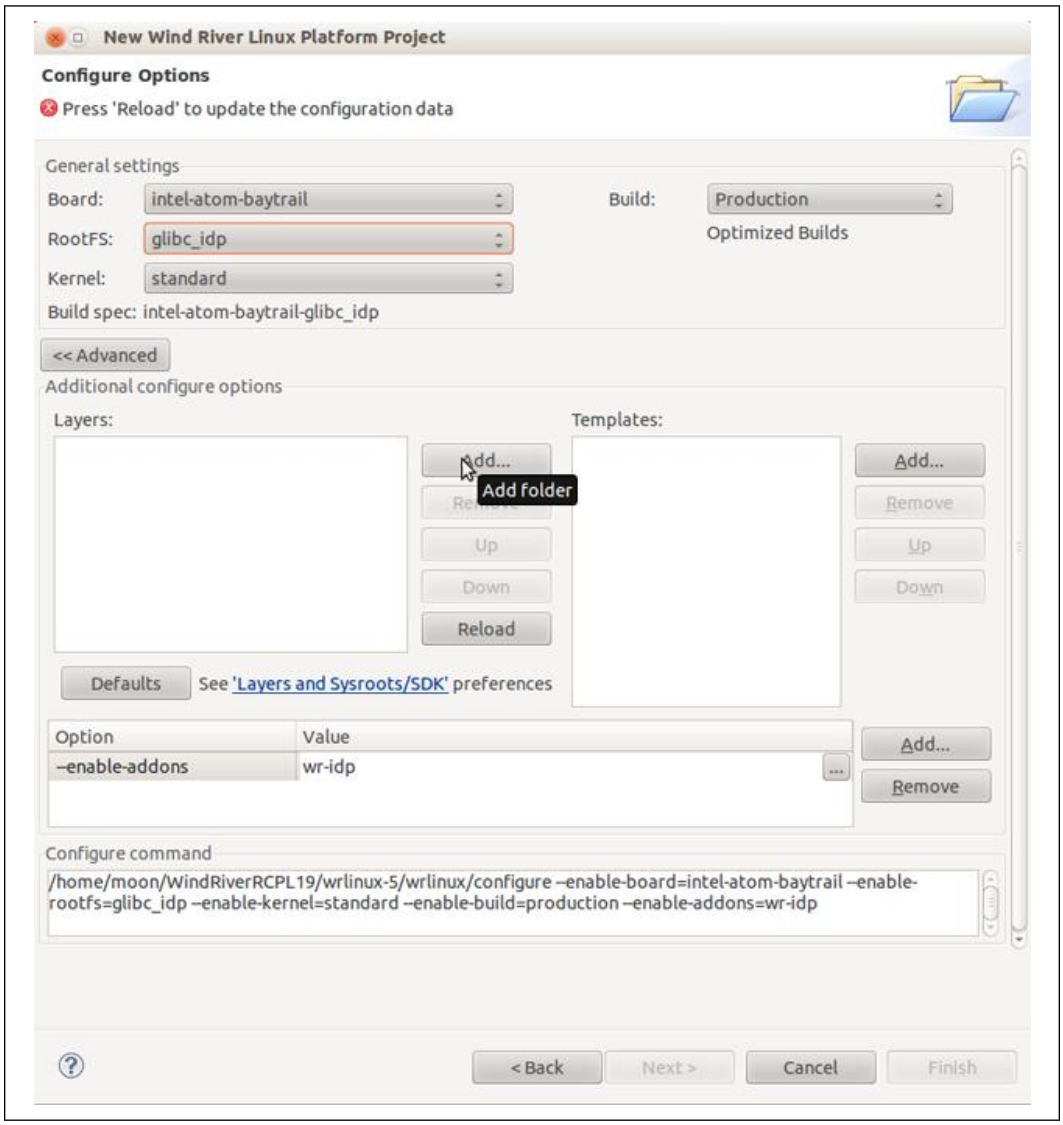
Figure 47. glib_idp Option Available



10. For **Board**, select the board type appropriate for your Target Device. if your Target Device has an Intel® Atom™ processor, select **intel-atom-baytrail**. If your Target Device has an Intel® Quark™ processor, select **intel-quark**.
11. For **Kernel**, select **standard**.

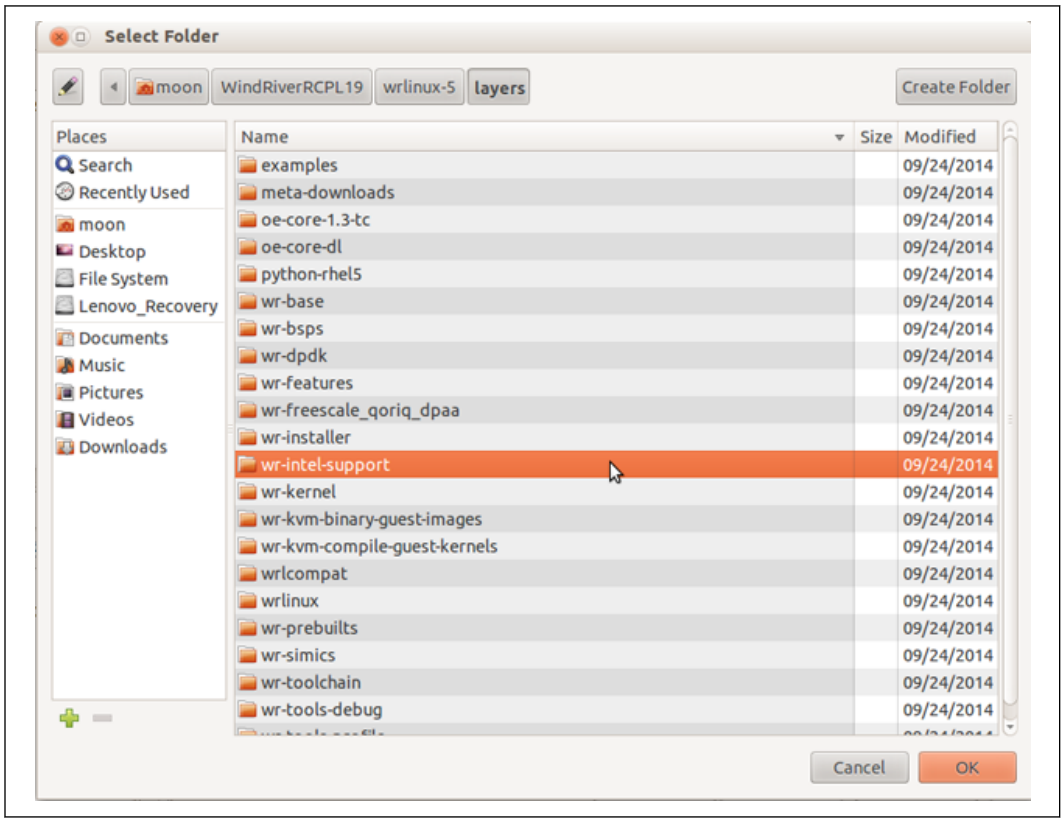
12. You are ready to add layers. Click **Add...** as shown below.

Figure 48. Add Layers



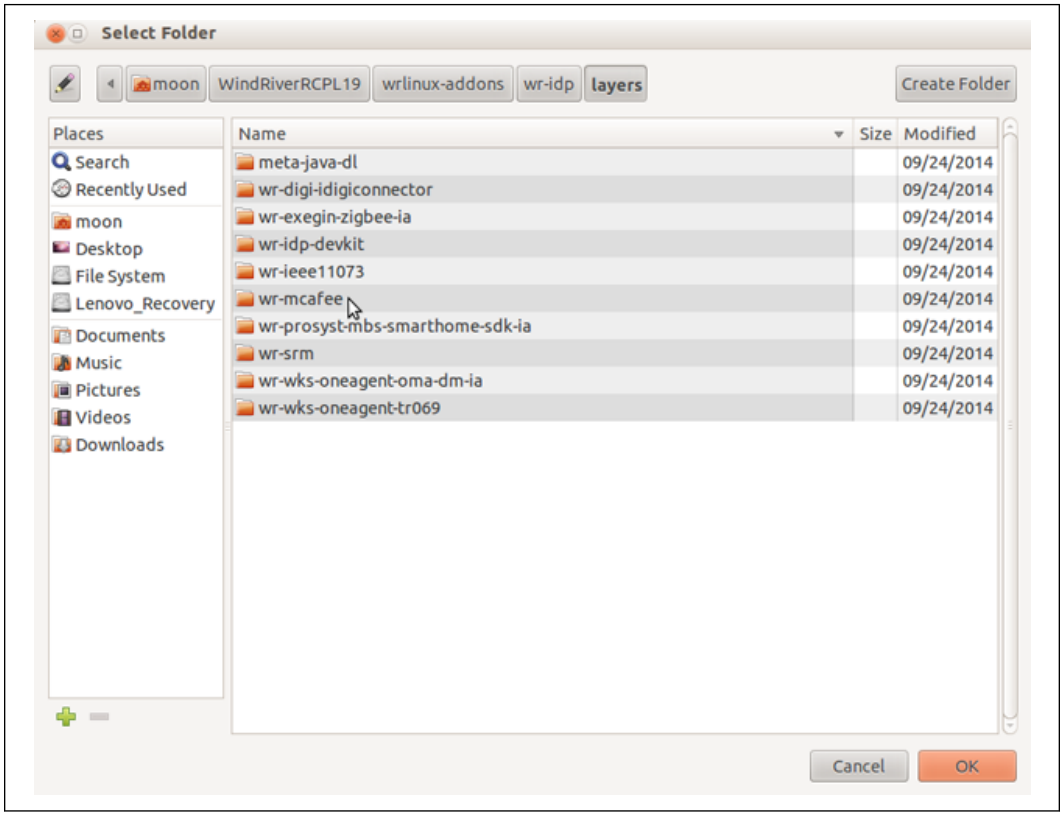
13. Select **wr-intel-support** as shown below, and then click **Reload**.

Figure 49. Add wr-intel-support



14. Select to add the **wr-mcafee** layer as shown:

Figure 50. Add wr-mcafee Layer

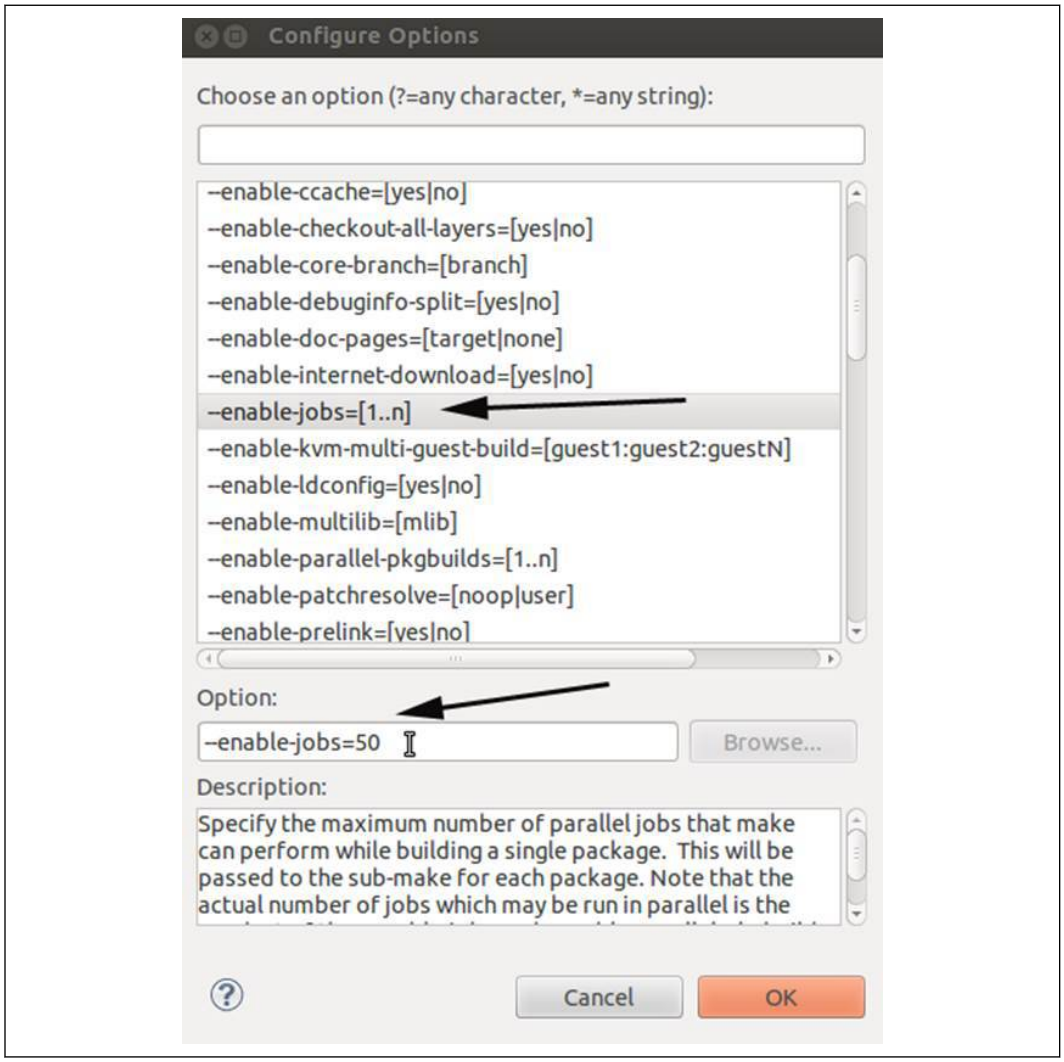


15. Add additional layers as needed.
16. Click the **Add** button in the **Option** group as shown in figure below:

Figure 51. Adding Options

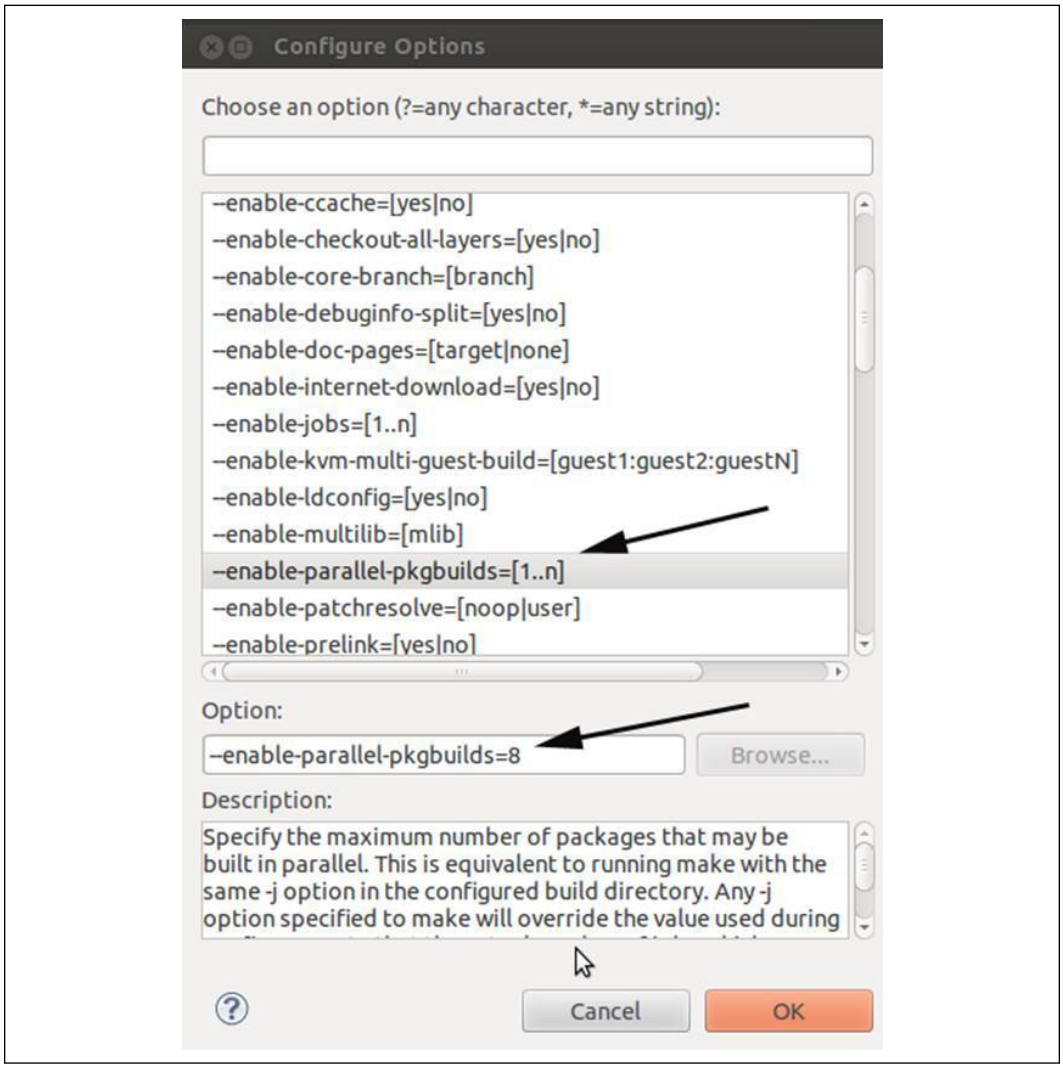
17. Add an option to `-enable-jobs=50`, as shown below. Then click **OK**.

Figure 52. enable jobs=50



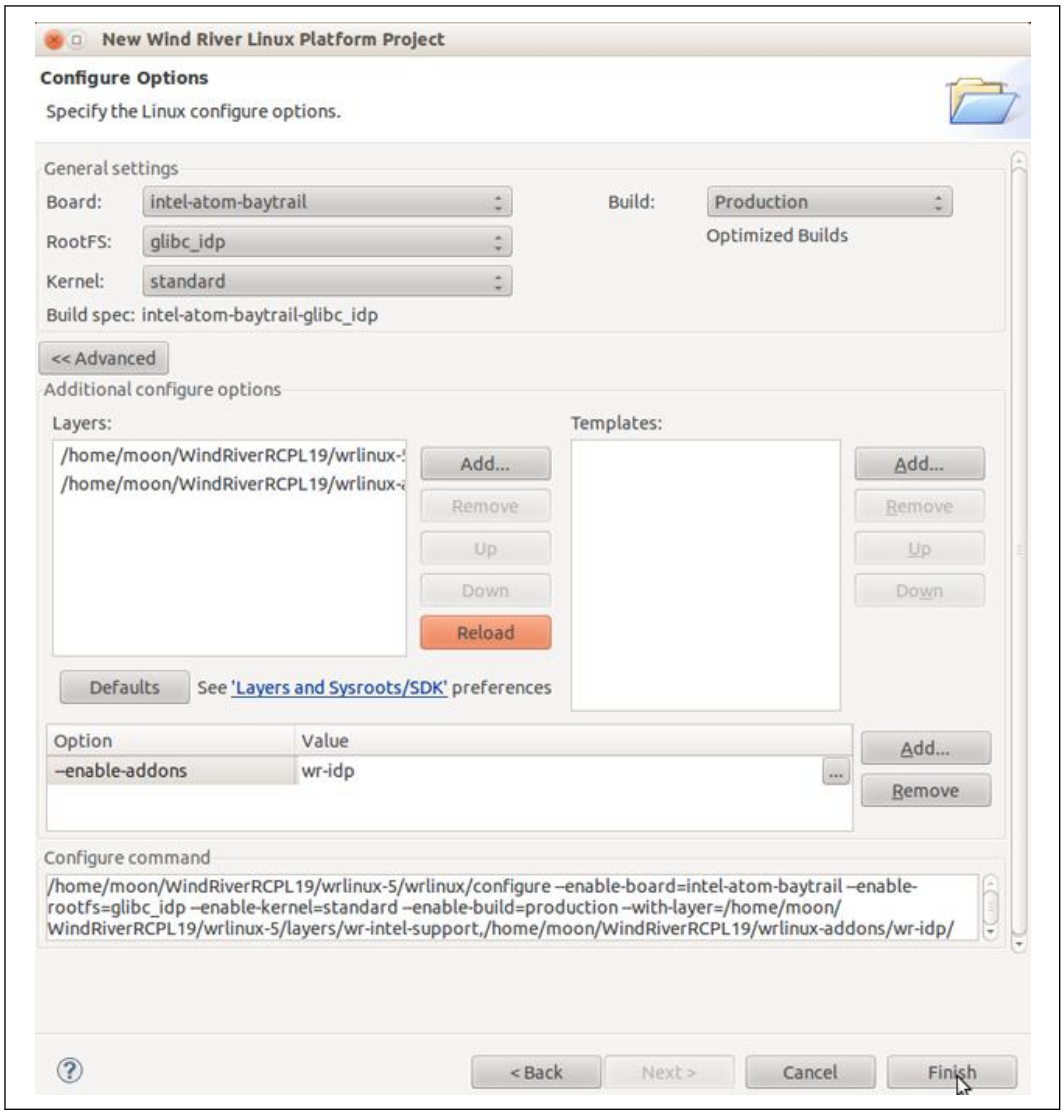
18. Click **Add** in the **Option** group again.
19. Add an option to `-enable-parallel-pkgbuilds=<number of CPUs>`, where `<number of CPUs>` is the number of CPUs in your system. See the following figure. Then click **OK**.

Figure 53. -enable-parallel-pkgbuilds=<number of CPUs>



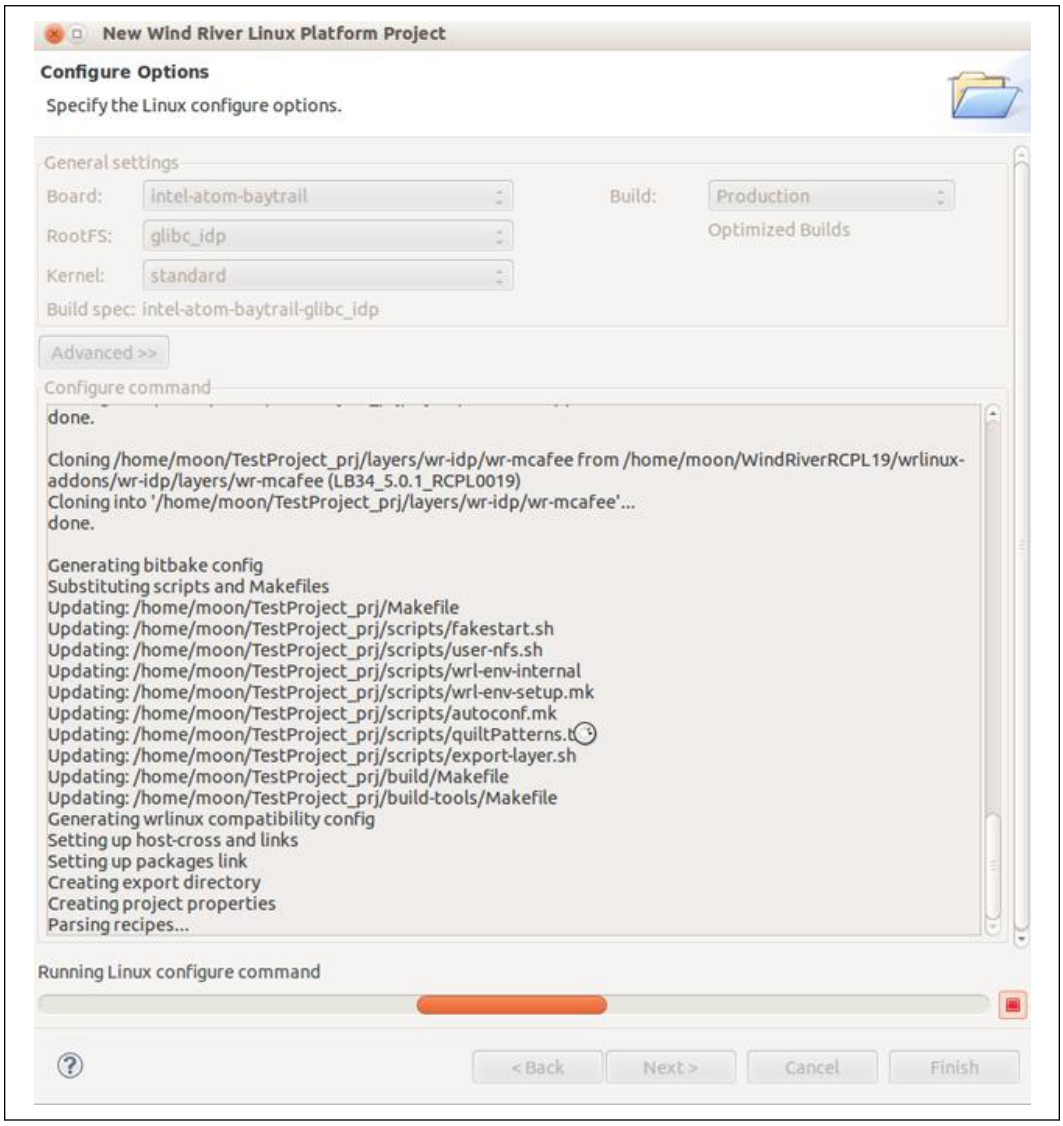
20. Click **Finish** to finalize your configuration.

Figure 54. Finalize Configuration



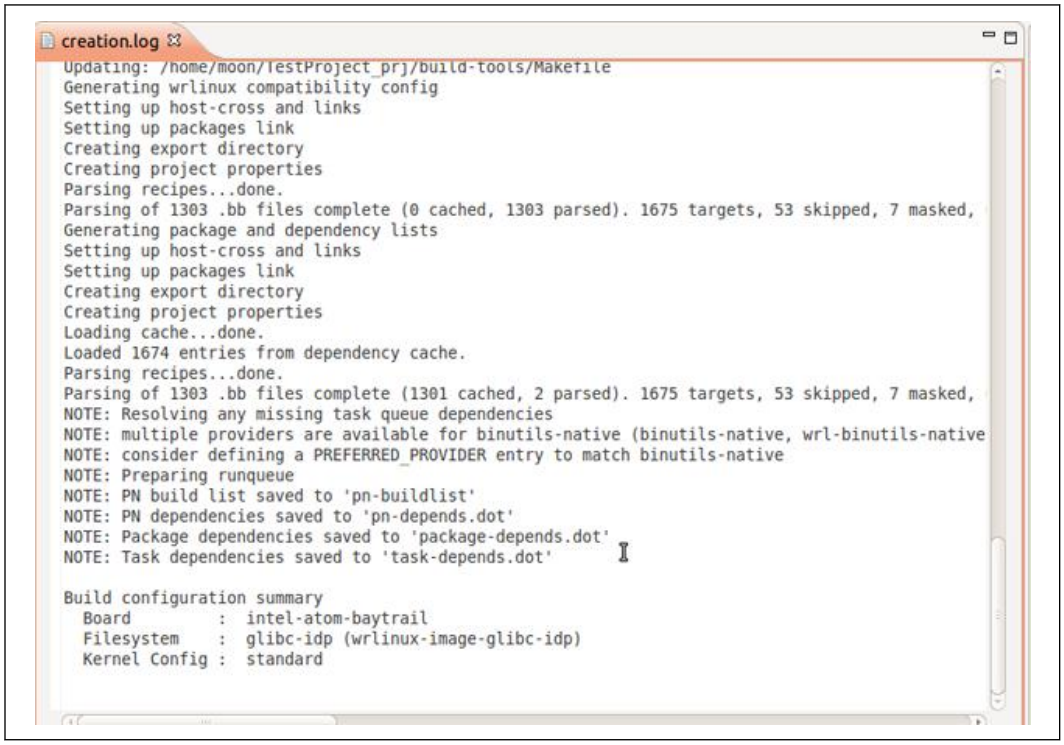
The configuration script will show a progress screen similar to the following while it executes. Execution will take a few minutes.

Figure 55. Configuration Script Progress



Upon completion you will see a summary screen similar to the following:

Figure 56. Build Configuration Completed



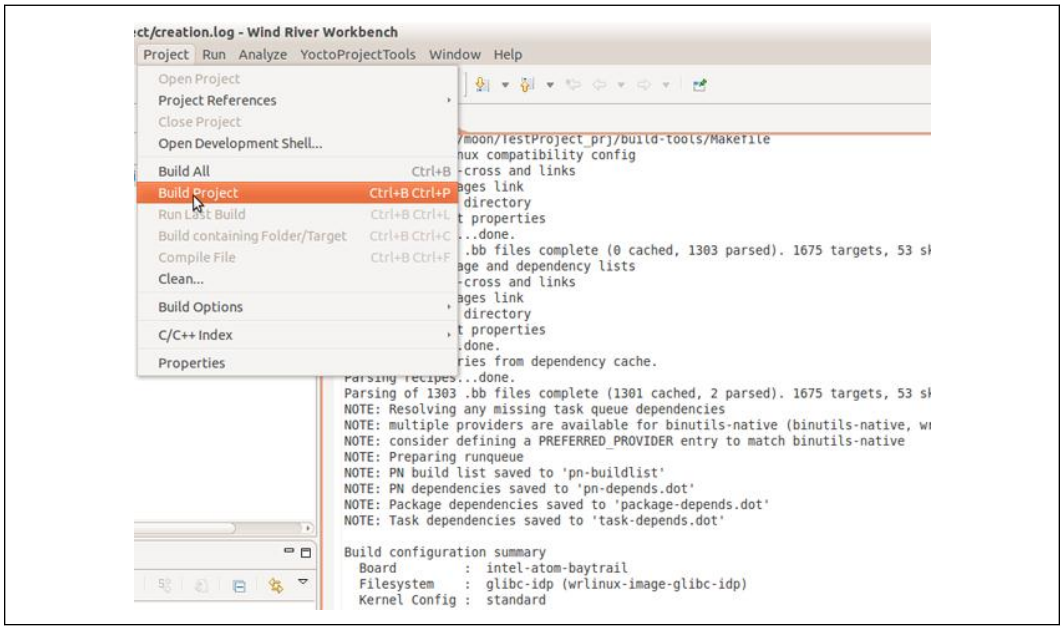
You are ready to build your project. Follow the steps in the next section.

Build Project

Depending on you configuration items, your selected layers and the processing power of your development system it will take 2 to 4 hours to build your project. The build took approximately 4 hours on a test system that was running an Intel® Core™ i7-4900 processor at 2.8 GHz with Intel® Hyper-Threading technology, and 8 GB RAM.

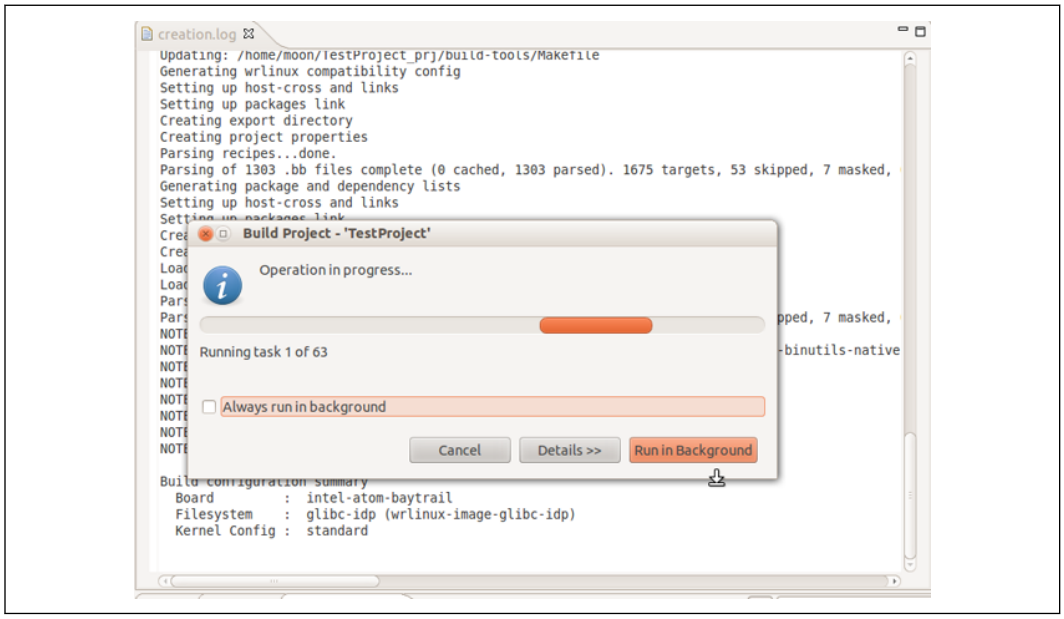
1. From the main menu, select **Project** > **Build Project**.

Figure 57. Build Project



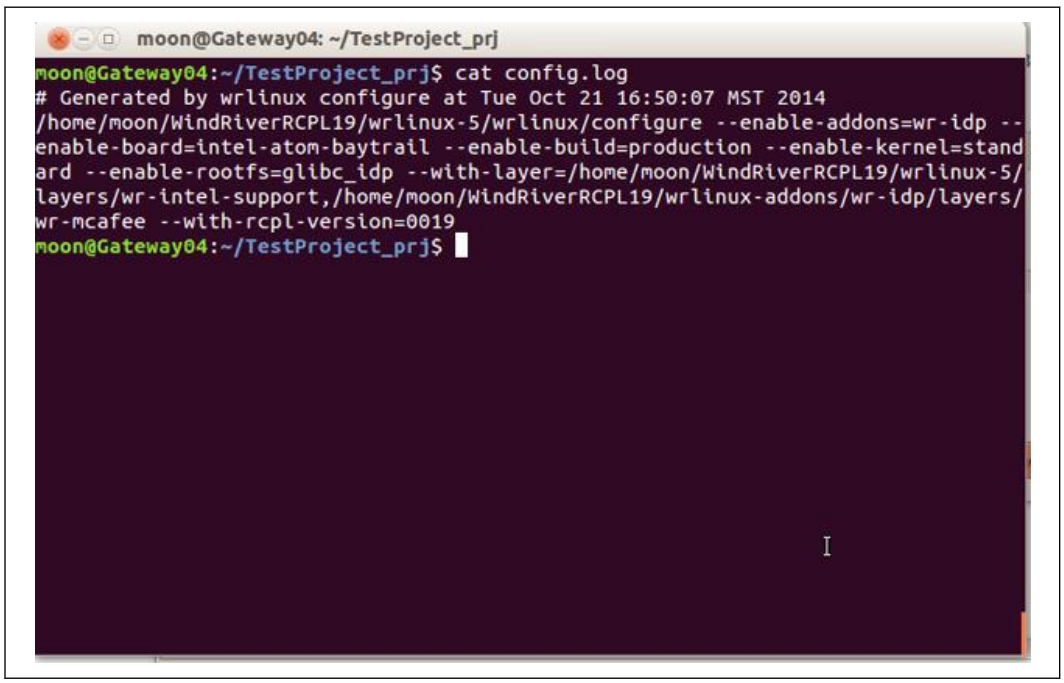
The project build begins and the progress displays as follows:

Figure 58. Build Project Progress Window



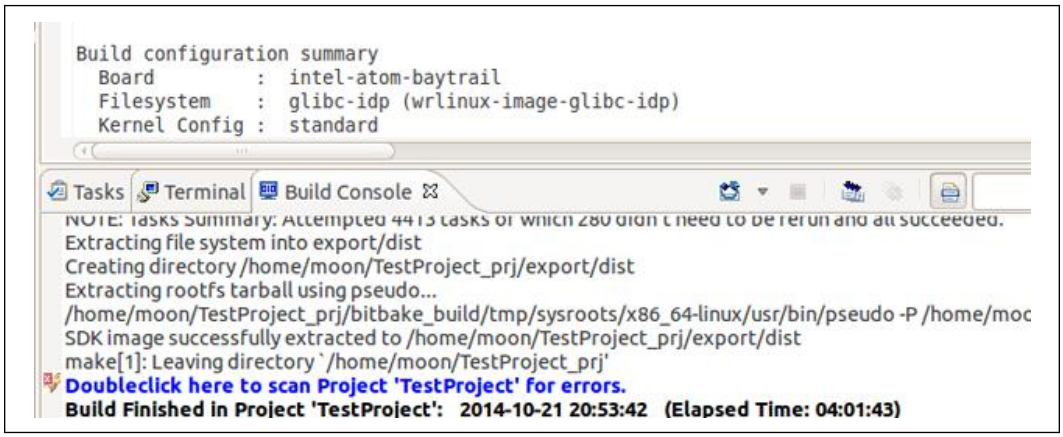
2. Optional: Open a terminal window to examine the config file generated by Workbench. The config file looks similar to the following:

Figure 59. Config File

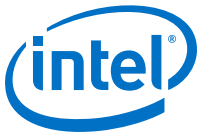


Upon completion, the Build Console displays as follows:

Figure 60. Build Console Displaying Project Completion



3. Deploy your project to your Target Device.



Appendix E Triage Tool

The Triage Tool is a set of shell scripts designed to collect customer's hardware and software information for efficient issue debugging. One set of scripts is for the host development environment and second set of scripts is for the Target Device. The scripts know the location of information, such as log files, and they know the commands to run to gather the details. The output is a compressed tar file that can be provided to Intel's support team for quick issue resolution. Attach your Triage Tool outputs to Intel® Premier Support issues for faster resolution.

Host System Location and Usage

On your Host System, the script is in the project directory. The example below shows the usage. In the example:

- `-i <install dir>` is the path to Wind River Intelligent Device Platform installation directory
- `-b <Project>` is the path to where you build your project, such as `$HOME/Project`

```
$HOME/Project$ sudo sh ./triage_tool_host.sh -i <install dir> -b <Project>
```

The output is a tar file in your current working directory.

Target Device Location and Usage

On the Target Device the script is in the `/root/examples` directory. The example below shows the usage:

```
root@WR-IntelligentDevice:~/examples# ./triage_tool_target.sh
```

The output is a tar file in your current working directory.

Appendix F Troubleshooting

The errata for this version of the platform are shown in the following table.

Table 5. Target Device Errata

Errata Description	Workaround
The Wi-Fi Access Point or Ethernet WAN interface may exhibit functional instability when loaded with concurrent traffic from multiple Wi-Fi and/or Ethernet clients.	Fixed in Wind River® Intelligent Device Platform XT 2.0.4 (March 2015)
The multi-WAN service checks the Ethernet link status every few minutes and outputs "link down" and "link is not ready" status messages.	Stop the multi-WAN service with the command: `service multiwan stop`
After configuring the target system to UEFI secure boot mode, the boot loader (`grub.efi`) reports a failure to enroll Secure Boot Keys into the UEFI database. This occurs with any Platform Key, Key Exchange Key and DB Key created with a 01/01/2015 or later timestamp. This problem is seen on the Advantech UTX-3115 and UTX-3110 with American Megatrends BIOS with Core Version 5.0.0.9 - 0.15, Build Date 8/20/2014 and earlier.	Fixed in Wind River® Intelligent Device Platform XT 2.0.4 (March 2015)