

Hardware Processing Platform (HPP): Getting Started Guide

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Neuralynx, Inc.
105 Commercial Drive Bozeman, MT 59715
406-585-4542

www.neuralynx.com
support@neuralynx.com

1 Introduction

The Hardware Processing Platform (HPP) runs code developed on a PC and is downloaded through a USB connection. This “Getting Started Guide” walks you through the process of getting the HPP development environment installed and tested.

2 Installing Development Software

The development software used with the HPP is Vivado and SDK. The first step is to download this software. Use this link for the download web page:

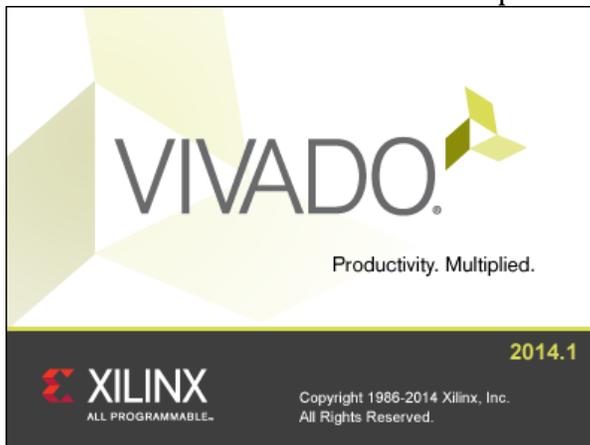
<https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/vivado-design-tools/2014-1.html>

The version to download is “Vivado Design Suite – 2014.1 Full Product Installation”

For this Guide, we will download for Windows. [Vivado 2014.1 Full Image for Windows with SDK \(5.1GB\)](#)

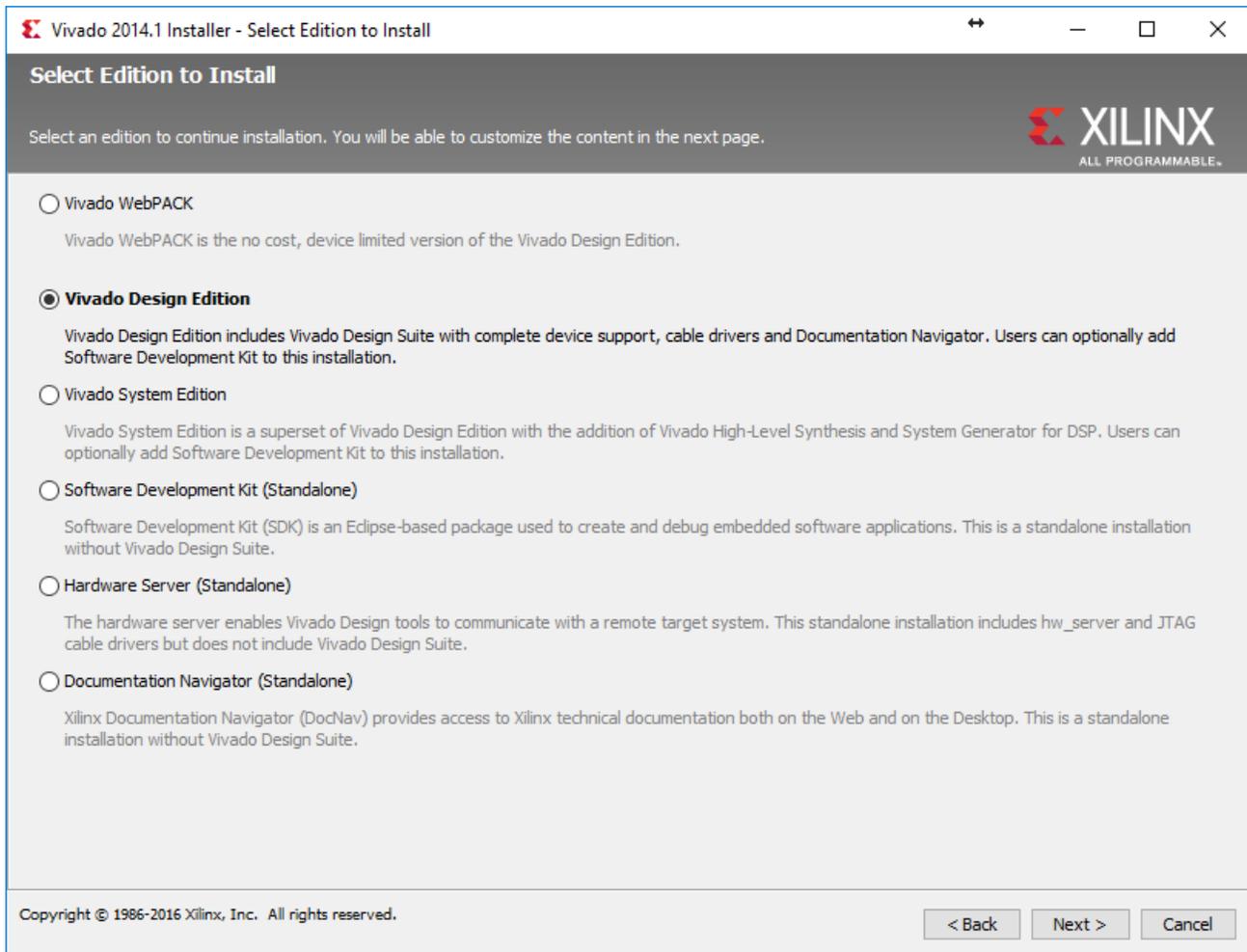
When the file is downloaded, unzip and untar the compressed file. If you don’t have an application installed that can unzip and untar a file, you can download 7-zip at www.7-zip.org.

Once the installation files are decompressed, run xsetup.exe



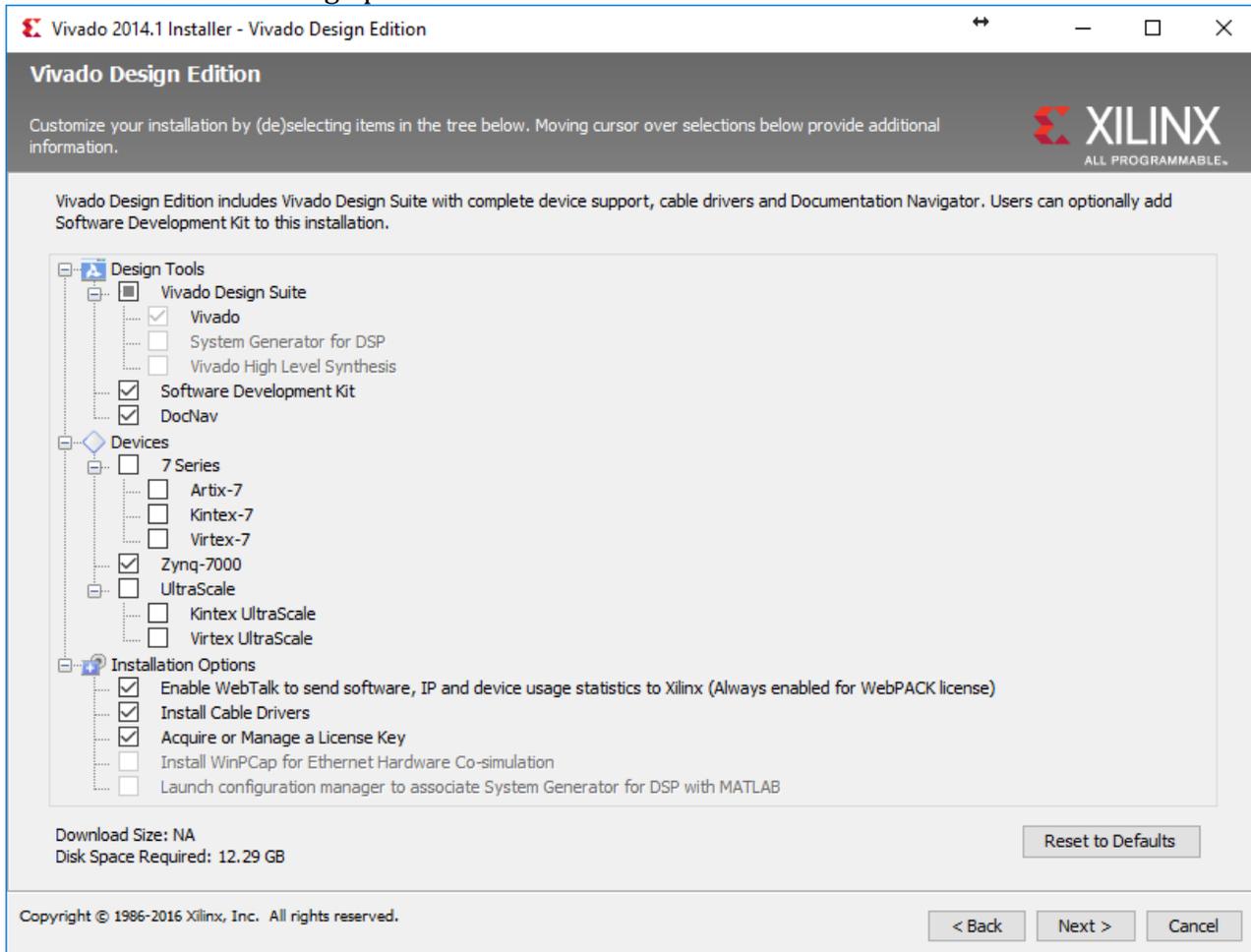
Vivado Installation

If the installation prompts to install the most recent version, decline and continue installing 2014.1. Once you’ve started the installation process, you will be prompted for the edition to install. You should select Vivado Design Edition.



Edition to Install

Install with the following options:

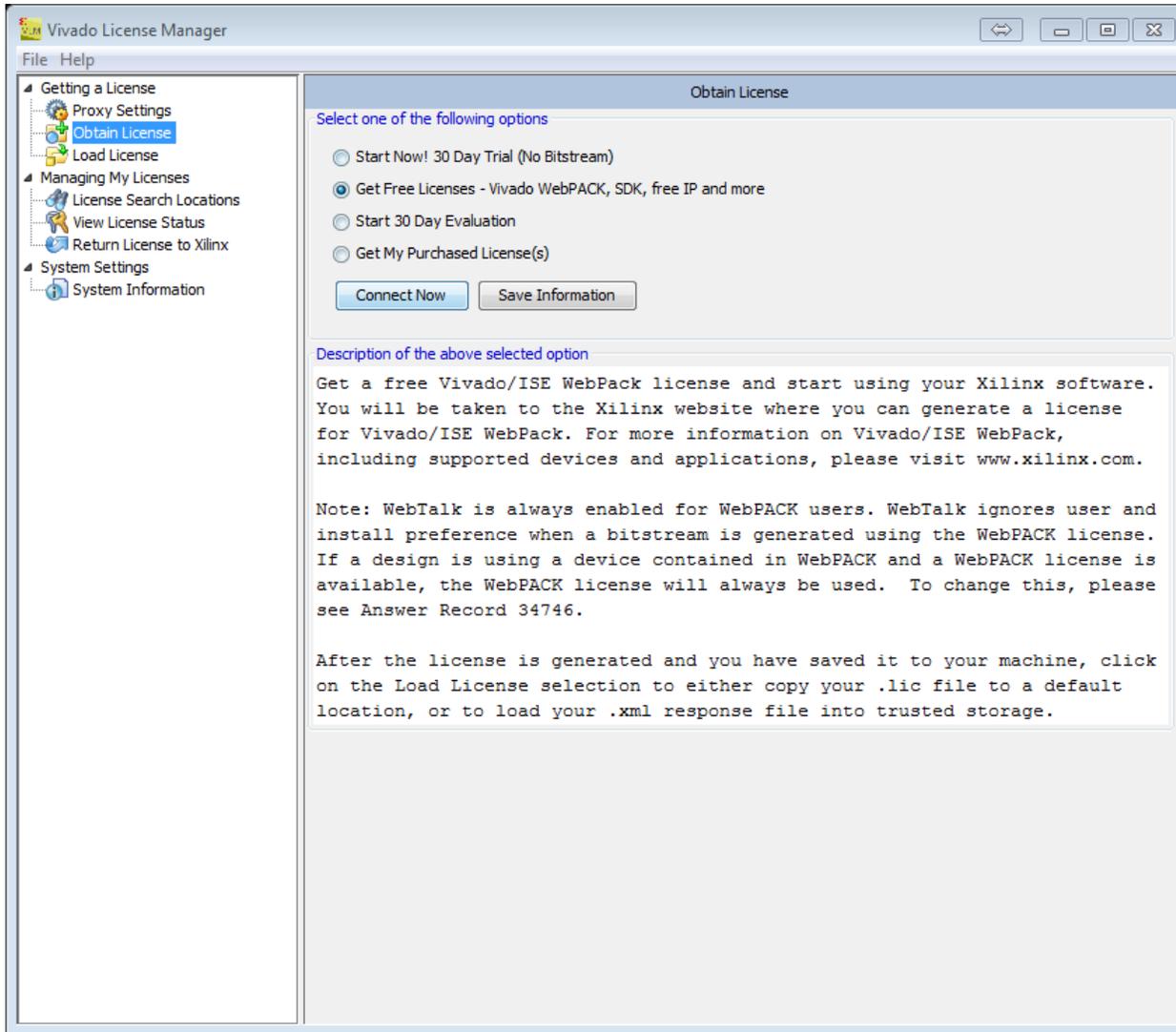


Install Options

When the installation finishes, the Vivado License Manager will open:

Neuralynx

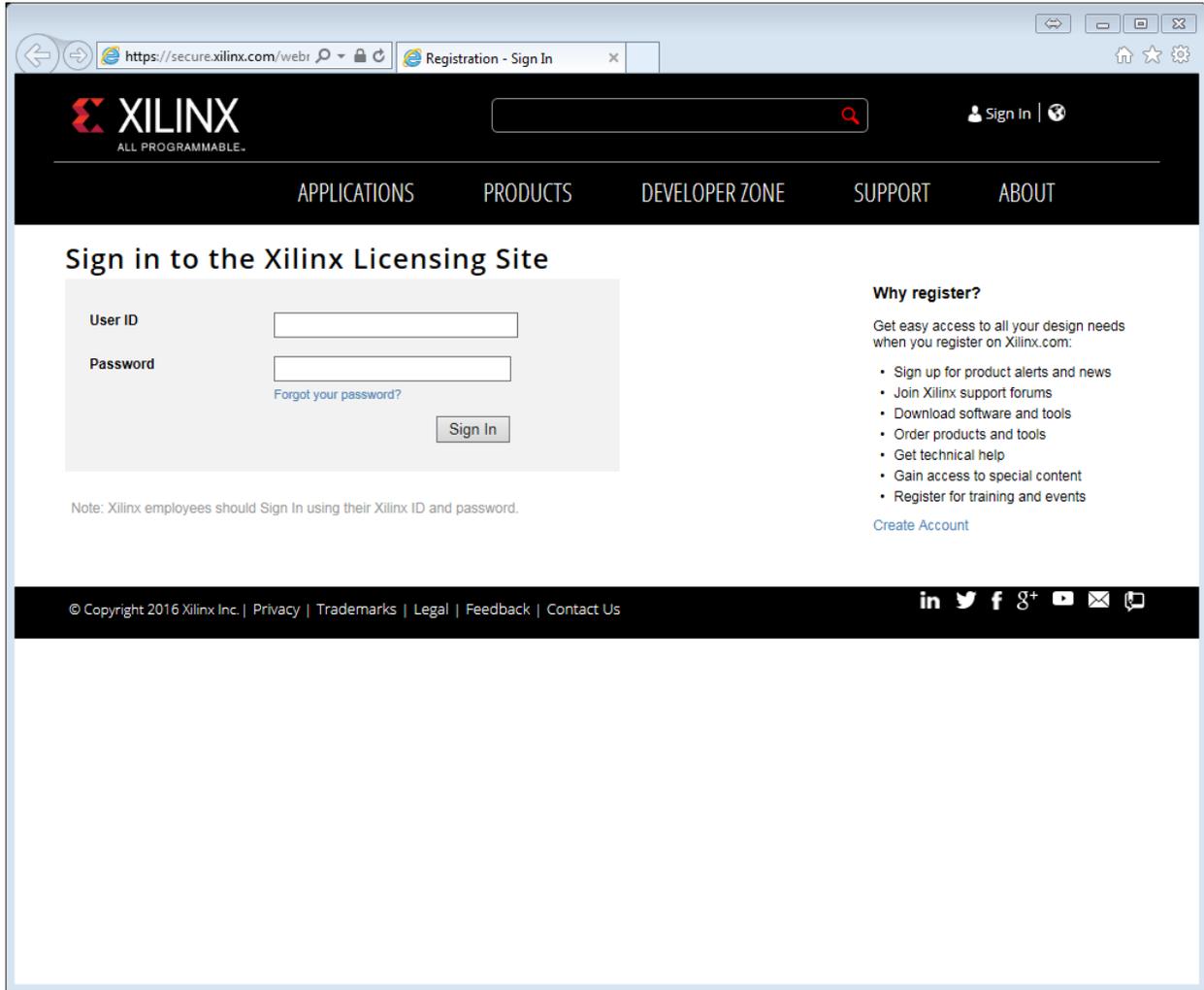
The Complete Solution for Electrophysiology Research



Vivado License Manager

Click on “Obtain License” and select “Get Free Licenses – Vivado WebPack, SDK, free IP and more”, then click “Connect Now.”

You will need to sign up for a free Xilinx account using the “Create Account” link to get a license for the Xilinx software.



[Create Account Link](#)

Continue to enter the required information:

The screenshot shows a web browser window at the URL <https://secure.xilinx.com/webtr>. The page title is "Registration - Create Acco...". The Xilinx logo is visible at the top left, with the tagline "ALL PROGRAMMABLE.". A navigation menu includes "APPLICATIONS", "PRODUCTS", "DEVELOPER ZONE", "SUPPORT", and "ABOUT". The main content area is titled "Create Account".

To complete your account creation, a validation e-mail will be sent to you.
*Fields marked with an asterisk * are required.*

User ID *
Your User ID will be displayed to others when you post on Xilinx Community Forums.

Corporate Email *

Password *

Re-type Password *

First Name *

Last Name *

By clicking "Create Account" below, you agree to our [Terms of Use](#) and that you have read our [Privacy Policy](#), including our use of cookies.

Instructions

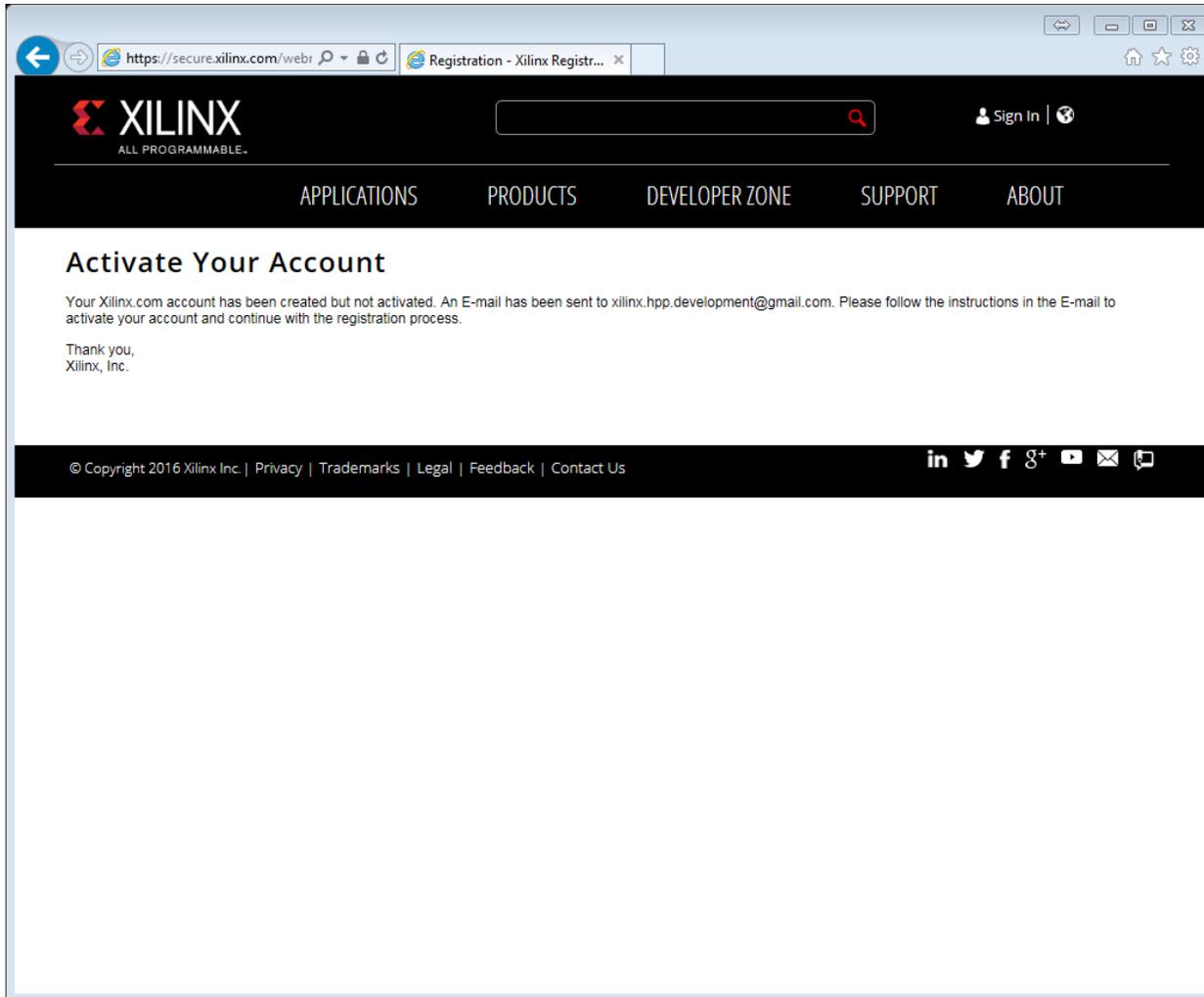
Rules for your User ID
Your user ID must be at least 3 characters long, all lowercase, must contain at least 1 letter and may contain any of these special characters; at symbol (@), dash (-), period (.) or underscore (_).

Rules for your Password
Your password must be at least 8 characters long, must contain at least 1 letter, 1 number and 1 special character. Your current password and new password cannot be the same.

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in | [Twitter](#) | [Facebook](#) | [Google+](#) | [YouTube](#) | [Email](#) | [Chat](#)

[Account information](#)



Activate Account

Click on the link in your email to activate your account. This will take you to the Xilinx login webpage. Sign in with your newly created account.

Enter the required profile information (indicated by *) and click "Save Profile."

Return to the Vivado license manager. Click on "Obtain License" and select "Get Free Licenses – Vivado WebPack, SDK, free IP and more." Then click "Connect Now." This will take you back to the licensing web page.

From the Product Licensing web page that opens, verify user information and click “Next.”

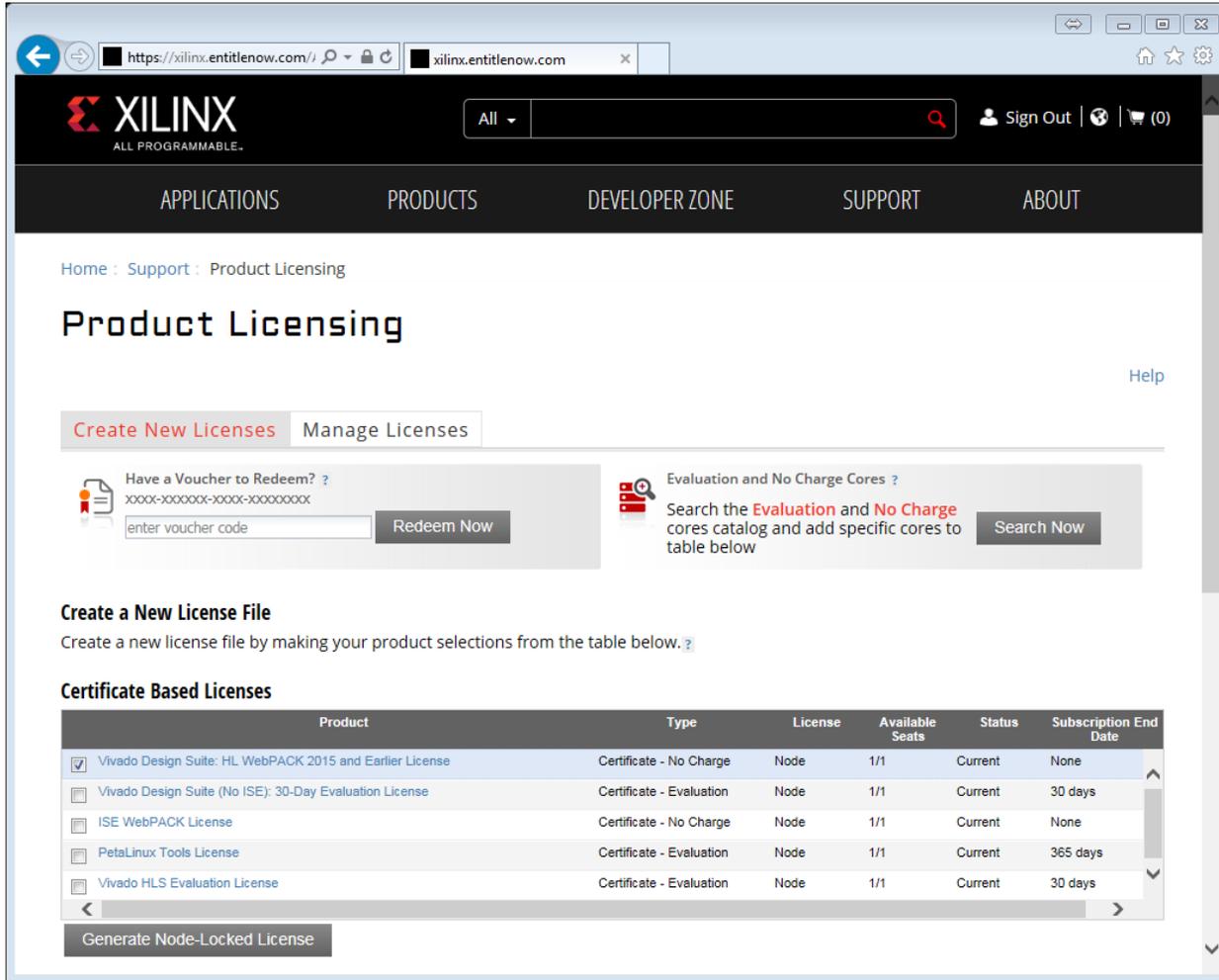
The screenshot shows a web browser window with the URL <https://secure.xilinx.com/webtr>. The page title is "Xilinx Registration". The Xilinx logo is visible in the top left, and navigation links for "APPLICATIONS", "PRODUCTS", "DEVELOPER ZONE", "SUPPORT", and "ABOUT" are in the top right. The main heading is "Product Licensing". Below the heading is a warning message: "US export regulations require that your First Name, Last Name, Company Name and Shipping Address be verified before Xilinx can fulfill your request. Please provide accurate and complete information for immediate processing. Sorry, addresses with Post Office Boxes and names / addresses with Non-Roman Characters with accents such as grave, tilde or colon are not supported by US export compliance systems." A note below states "Fields marked with an asterisk * are required." The form contains the following fields:

First Name *	HPP
Last Name *	Development
Address 1 *	105 Commercial Dr.
Address 2	
City *	Bozeman
Postal/Zip Code *	59715
Country *	United States
State/Province	Select One
Phone (include area code) *	4065854542
Corporate Email	xilinx.hpp.development@
Company/Organization *	Neuralynx
Job Function *	Engineer-Systems
Primary Market *	Medical

At the bottom of the form is a "Next" button.

Product Licensing Information

Check the box in “Certificate Based Licenses” for “Vivado Design Suite: HL WebPACK ...” and click “Generate Node-Locked License.”



Home : Support : Product Licensing

Product Licensing

[Help](#)

[Create New Licenses](#) [Manage Licenses](#)

Have a Voucher to Redeem? ?
 XXXX-XXXXXX-XXXX-XXXXXX
 [Redeem Now](#)

Evaluation and No Charge Cores ?
 Search the **Evaluation and No Charge** cores catalog and add specific cores to table below [Search Now](#)

Create a New License File
 Create a new license file by making your product selections from the table below. ?

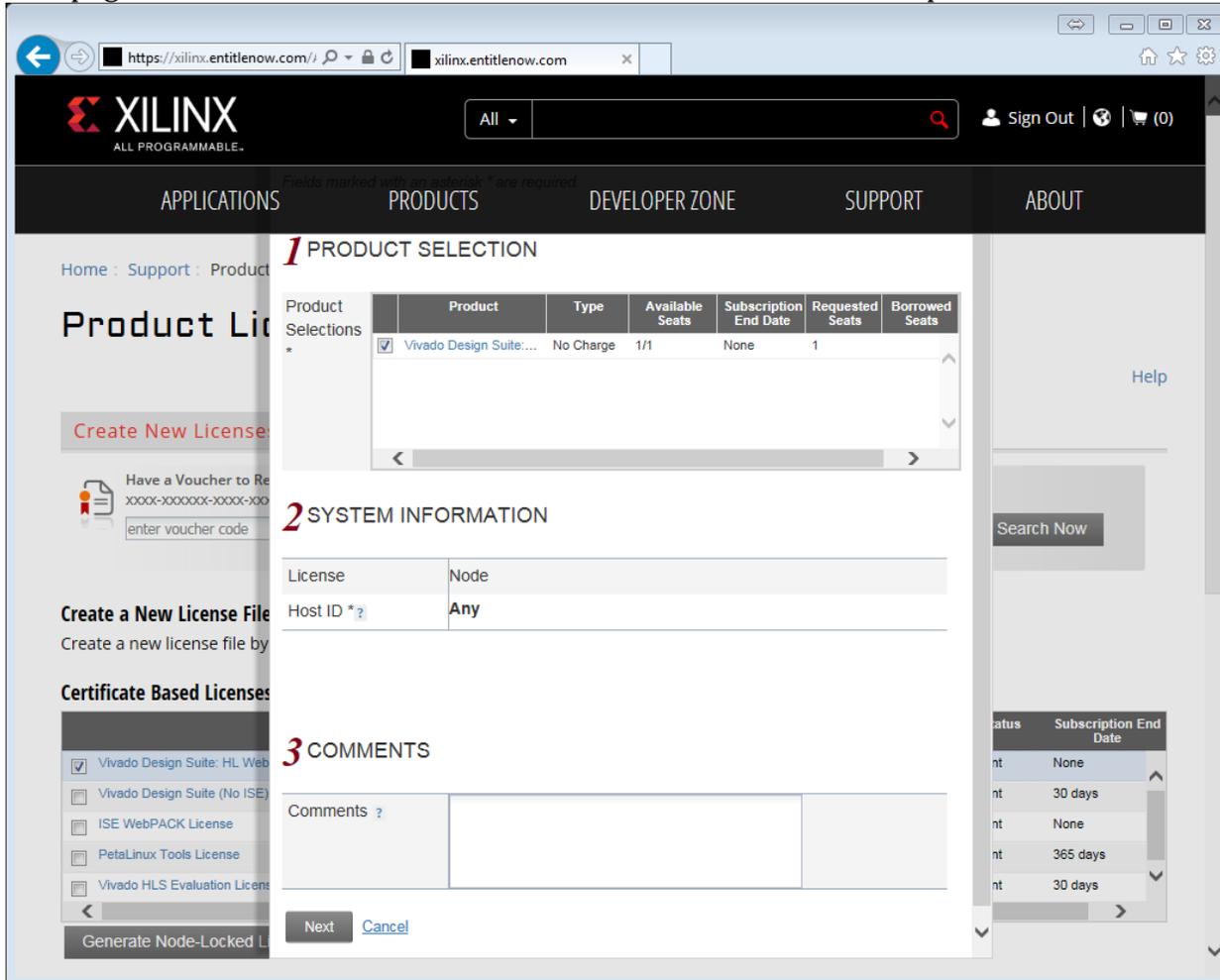
Certificate Based Licenses

Product	Type	License	Available Seats	Status	Subscription End Date
<input checked="" type="checkbox"/> Vivado Design Suite: HL WebPACK 2015 and Earlier License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> Vivado Design Suite (No ISE): 30-Day Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days
<input type="checkbox"/> ISE WebPACK License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> PetaLinux Tools License	Certificate - Evaluation	Node	1/1	Current	365 days
<input type="checkbox"/> Vivado HLS Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days

[Generate Node-Locked License](#)

Generate License

This page will use a host ID from the current PC to license the development software.



Home : Support : Product

Product Lic

Create New License

Have a Voucher to Redeem
XXXX-XXXX-XXXX-XXXX
enter voucher code

Create a New License File
Create a new license file by

Certificate Based Licenses

- Vivado Design Suite: HL Web
- Vivado Design Suite (No ISE)
- ISE WebPACK License
- PetaLinux Tools License
- Vivado HLS Evaluation License

Generate Node-Locked License

Next Cancel

1 PRODUCT SELECTION

Product Selections	Product	Type	Available Seats	Subscription End Date	Requested Seats	Borrowed Seats
<input checked="" type="checkbox"/>	Vivado Design Suite:...	No Charge	1/1	None	1	

2 SYSTEM INFORMATION

License	Node
Host ID *?	Any

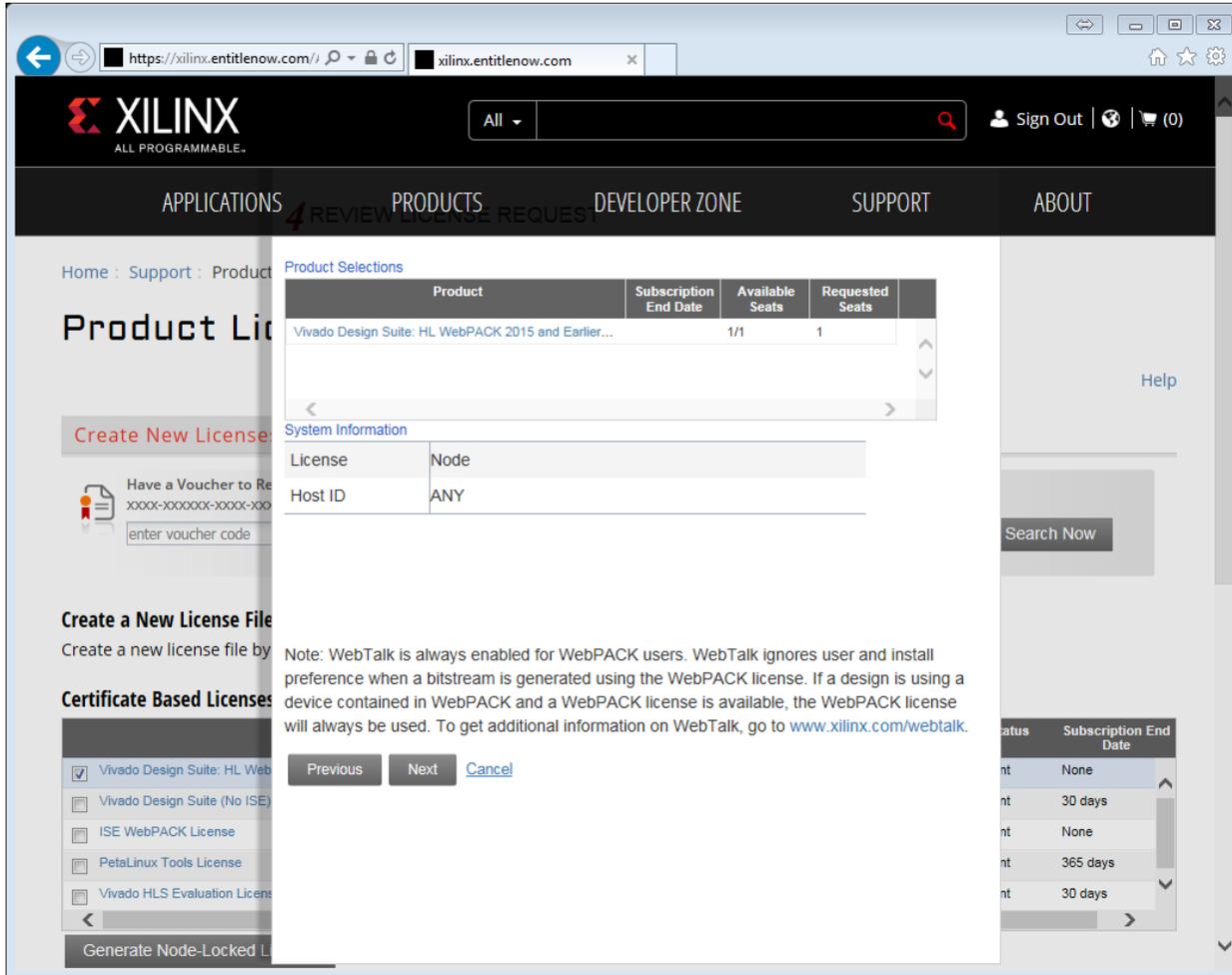
3 COMMENTS

Comments ?

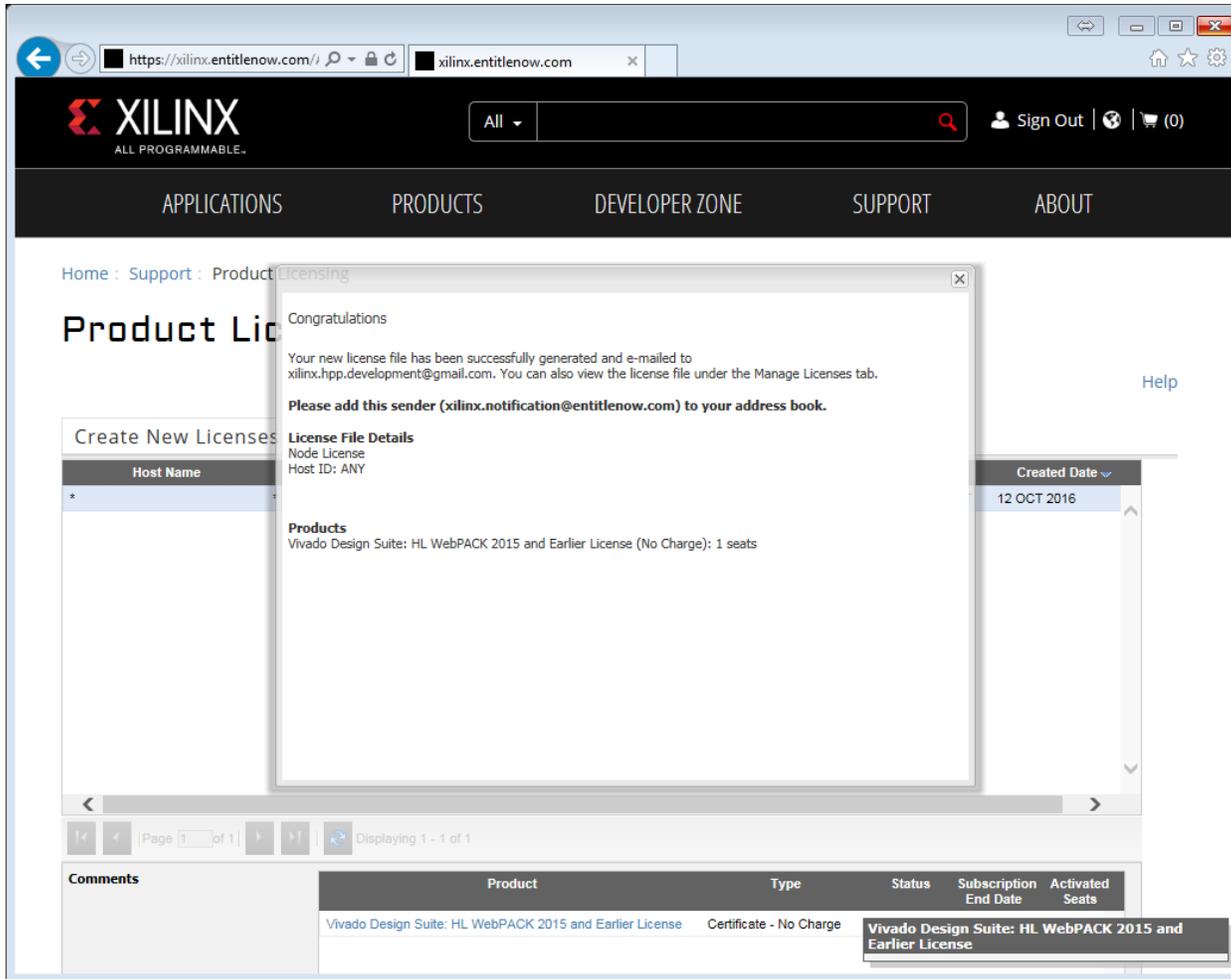
Status Subscription End Date

nt	None
nt	30 days
nt	None
nt	365 days
nt	30 days

Obtain Host ID



License Information Window 1

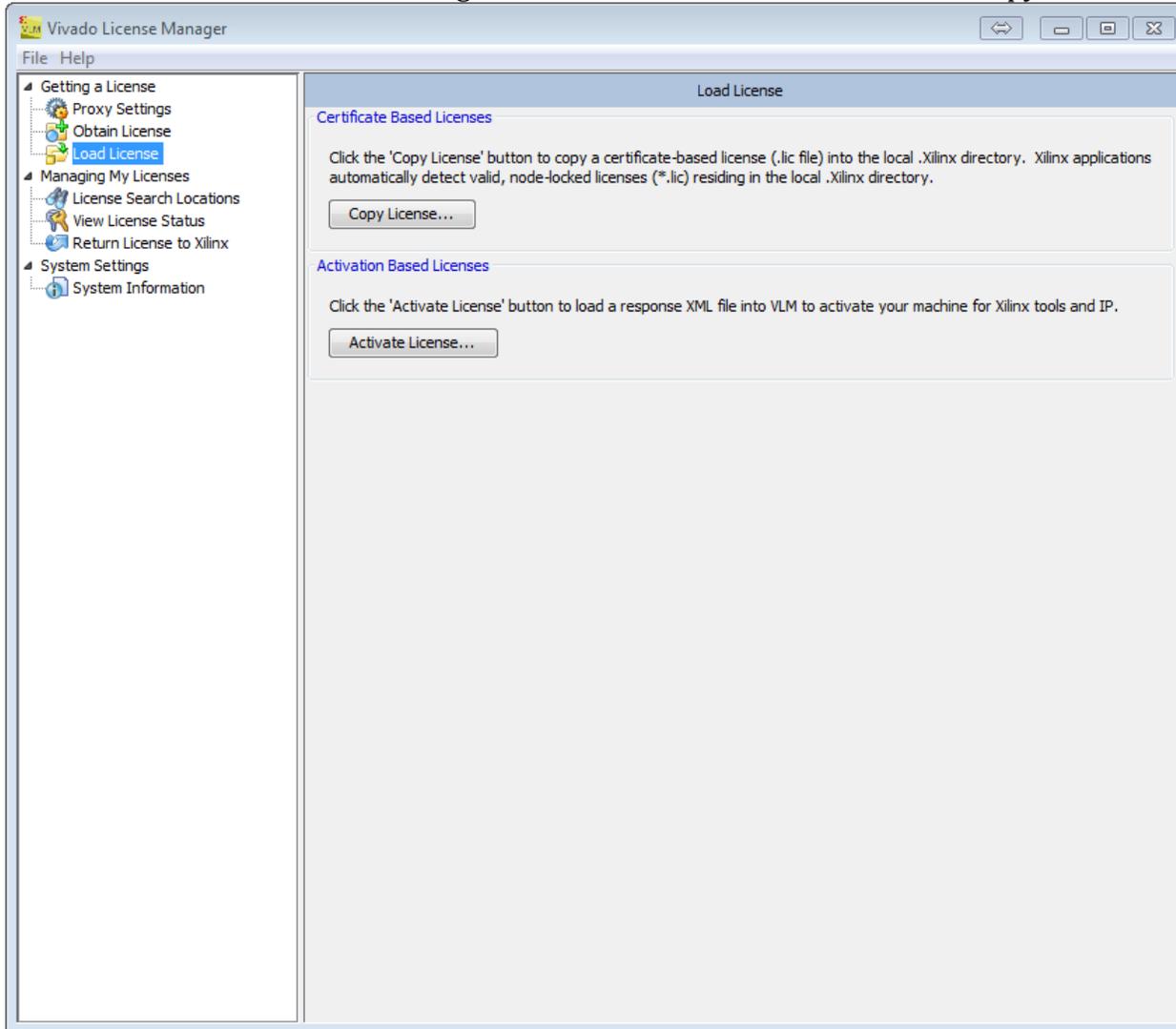


The screenshot shows the Xilinx Entitlement Management System (EMS) interface. A modal window titled "Licensing" is open, displaying a success message: "Congratulations. Your new license file has been successfully generated and e-mailed to xilinx.hpp.development@gmail.com. You can also view the license file under the Manage Licenses tab. Please add this sender (xilinx.notification@entitlement.com) to your address book." Below the message, the "License File Details" are shown: Node License, Host ID: ANY, and Created Date: 12 OCT 2016. The "Products" section lists "Vivado Design Suite: HL WebPACK 2015 and Earlier License (No Charge): 1 seats".

In the background, the "Product Licenses" page is visible, showing a table with columns for Product, Type, Status, Subscription End Date, and Activated Seats. The table contains one entry: "Vivado Design Suite: HL WebPACK 2015 and Earlier License" with a status of "Certificate - No Charge".

License Generation Complete

Download the license file that is emailed to your email address.
Return to the Vivado License Manager. Click on “Load License” and select “Copy License.”



Load License

Locate the downloaded license (Xilinx.lic) and select “Open.”
Close the Vivado License Manager and finish the Vivado installation.

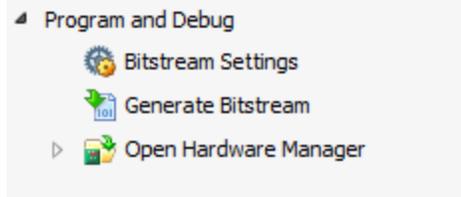
Download the base example project for the HPP from:

https://www.dropbox.com/s/hs3dxnlwoltjoo7/HPP_SfN.zip?dl=0

Unzip the project to a development folder on your development PC.

Open Vivado 2014.1 and load the unzipped project file “HPP_SfN.xpr.”

Generate the bitstream by clicking on “Generate Bitstream” on the left side of the interface.



Bitstream generation option

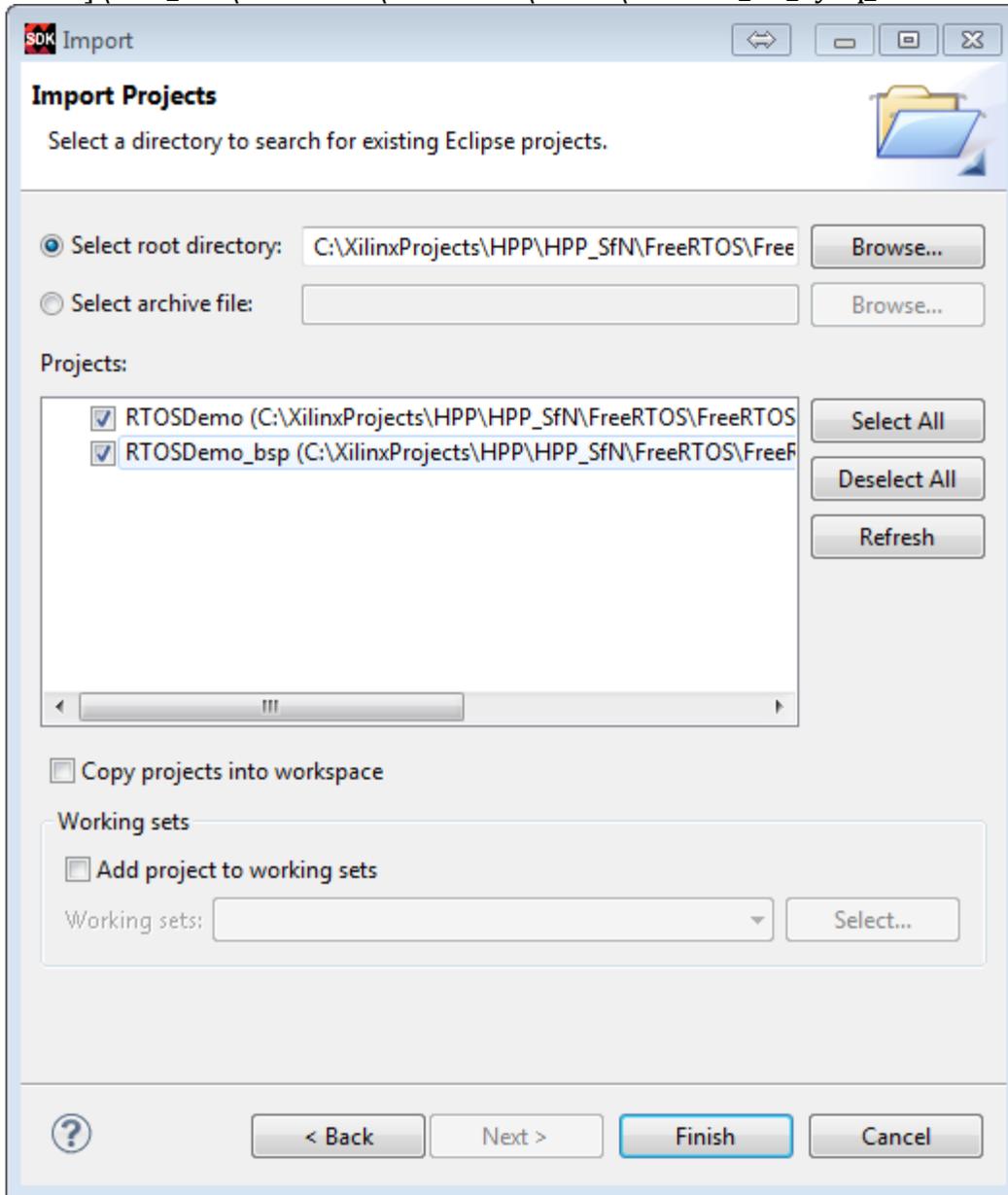
Open Xilinx SDK 2014.1.

Select the workspace of the recently extracted project. This should be located at [Base project folder] \HPP_SfN\FreeRTOS\Workspace.

Right-click on “RTOSDemo” in the Project Explorer and select “delete.” Confirm the deletion.

Right-click on “RTOSDemo_BSP” in the Project Explorer and select “delete.” Confirm the deletion.

Select menu option “File->Import.”
Choose “Existing Projects into Workspace.”
Select root directory [Base project folder]\HPP_SfN\FreeRTOS\FreeRTOS\Demo\CORTEX_A9_Zynq_ZC702



Import Projects

Click “finish” to Import the files from their new location.
Right-click on RTOSDemo and select “Clean Project.”

3 Running an Application

The HPP uses a serial command line interface to interact with the operating system. To connect the PC for terminal access, you must have required drivers for the PC.

Download and install VCP driver (CP210x VCP driver) from:

<https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

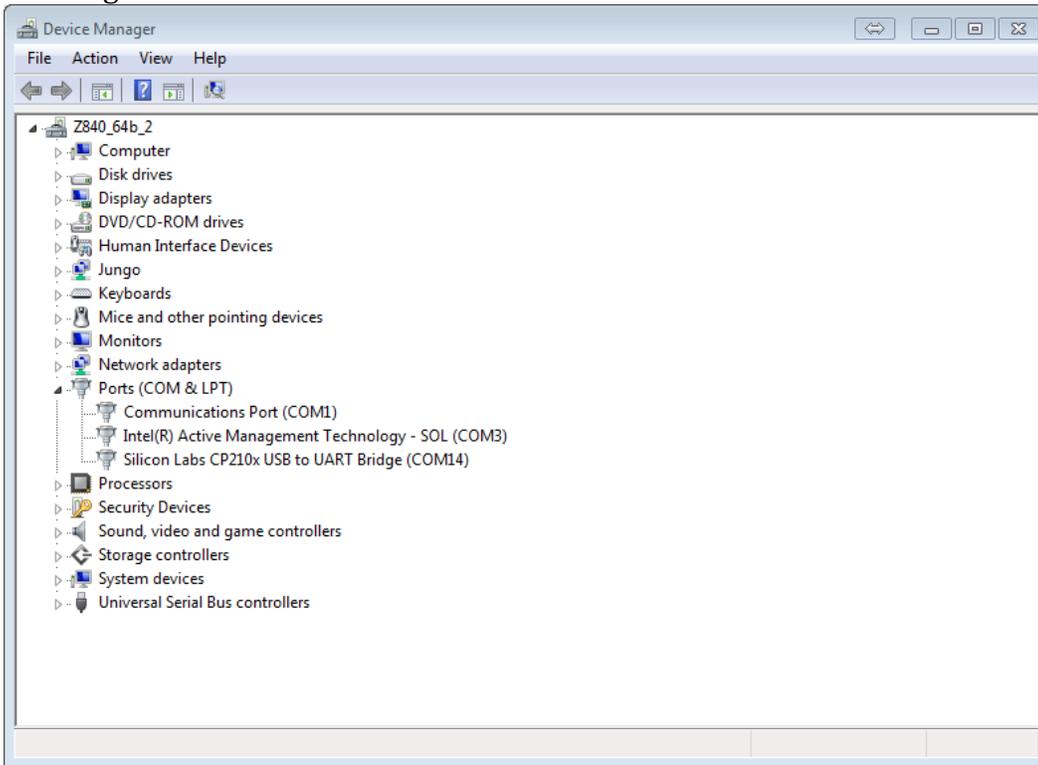
If you haven't already done so,

- Attach a USB cable from development PC to Digital Lynx SX port "HPP Terminal"
- Attach a USB cable from development PC to Digital Lynx SX port "HPP JTAG"

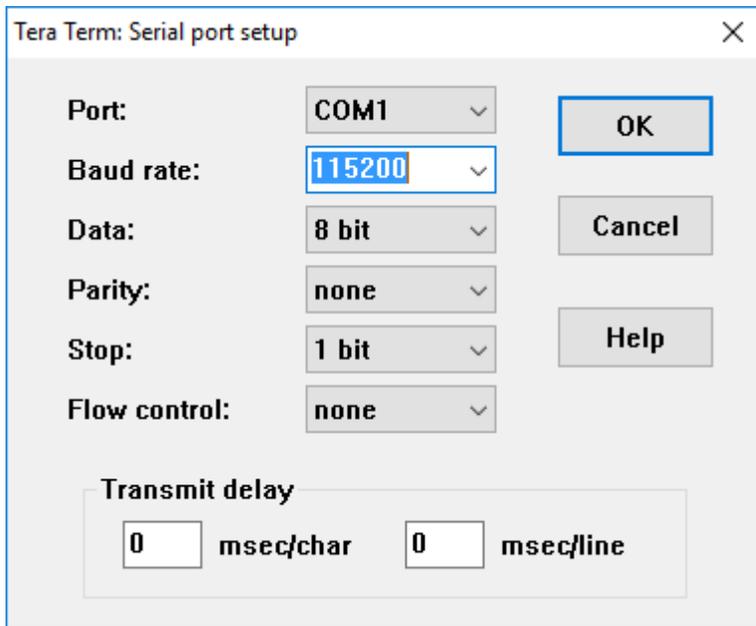
If you don't already have a terminal application, you can download Teraterm

(<https://ttssh2.osdn.jp/index.html.en>)

Open TeraTerm, Select “Setup->Serial Port” and select the COM Port of your HPP connection. This is listed in the Windows Device Manager as “Silicon Labs CP210x USB to UART Bridge.” You will also need to change the baud rate to 115200.



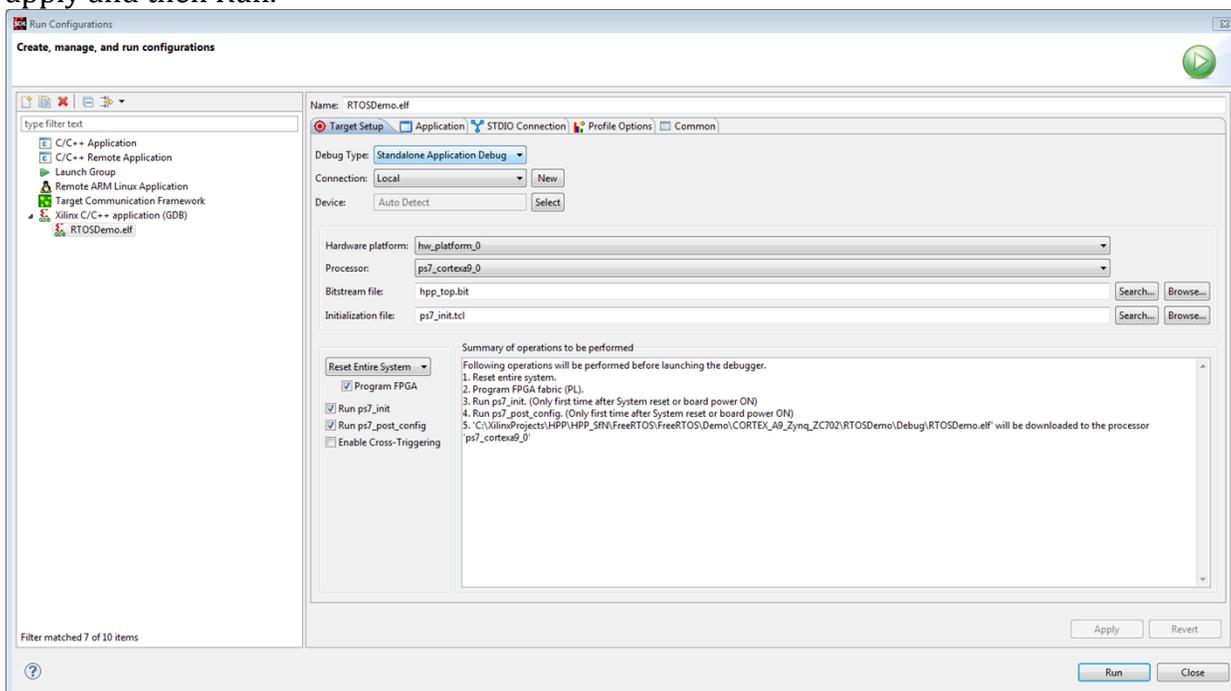
Windows device manager view of COM ports



Serial port setup - Use your COM port

In the SDK, right-click on RTOSDemo and select Run As-> "1 Launch on Hardware (GDB)." This will create a default run configuration for this application.

In the SDK interface, Select Run->Run configuration. In the Target Setup tab, select "Reset Entire System" for the reset option drop down box. In the Bitstream file box, click Search and choose hpp_top.bit. Click apply and then Run.

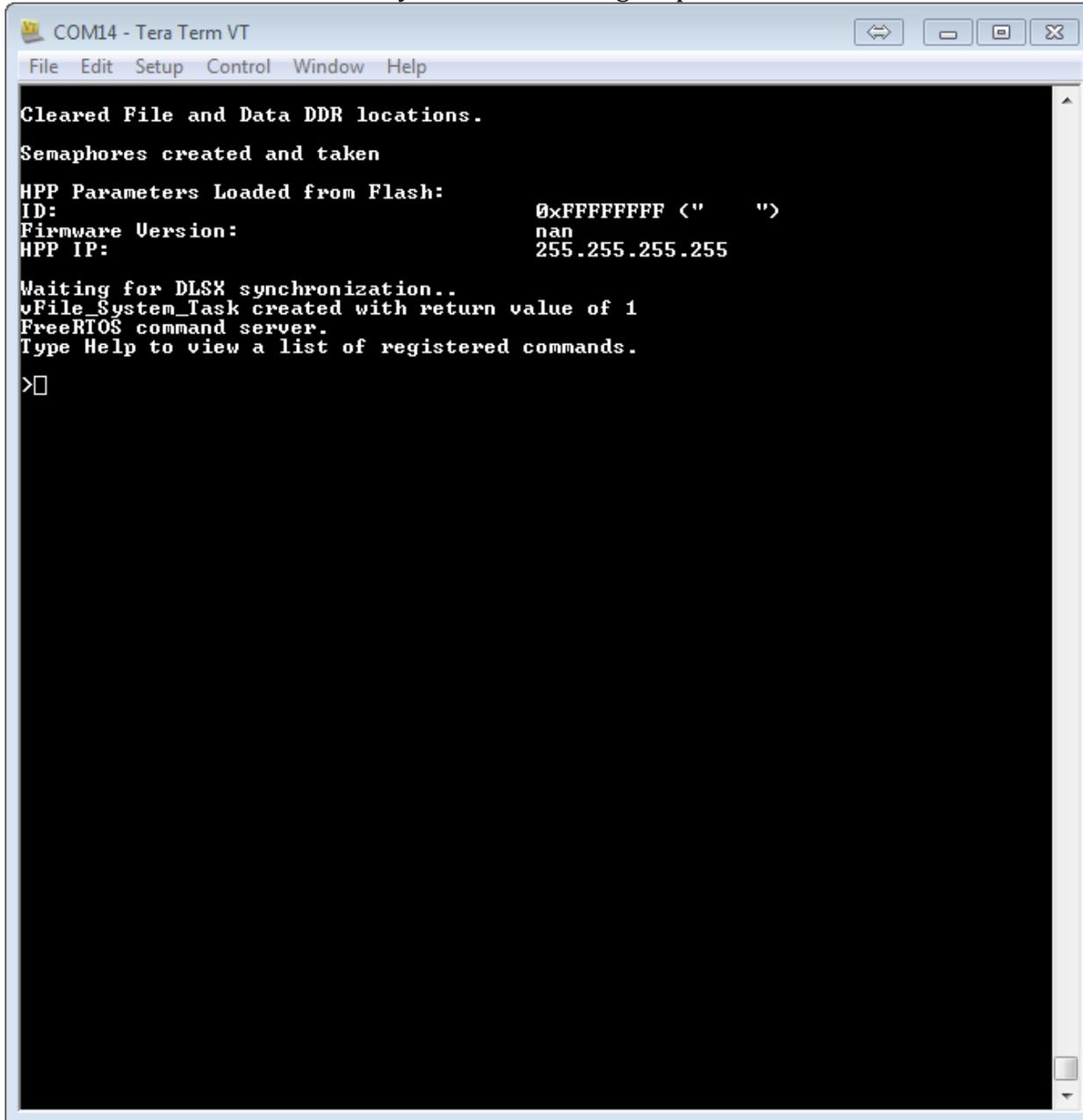


Run Configuration



This will begin a download process visible in the lower right progress bar. This process usually takes about 15 seconds as it configures the FPGA, then it will download the application.

View teraterm terminal and verify that the following output is received:



```
COM14 - Tera Term VT
File Edit Setup Control Window Help
Cleared File and Data DDR locations.
Semaphores created and taken
HPP Parameters Loaded from Flash:
ID: 0xFFFFFFFF <"  ">
Firmware Version: nan
HPP IP: 255.255.255.255
Waiting for DLSX synchronization..
vFile_System_Task created with return value of 1
FreeRTOS command server.
Type Help to view a list of registered commands.
>
```

Type "help" and Enter, this will output a default menu.

For more information or questions, please contact:

HPP_Support@neuralynx.com / 406-585-4542