07/July/2015

Sneak Peek Demo of JaeOS running a Telnet Server using the lwIP stack

Notes

- The software described in this document is still mostly based on what was the latest version of the low level board support and the lwIP stack in Xilinx's Vivado 2014.3. The software package was updated with the latest JaeOS and Embeddable Forth Command Interpreter and it was tested on Vivado SDK 2015.1.

Building the Application

- Unzip the contents of the zip file, it will create a folder named jaeos-demo with a repo and a scripts subfolder under it.
- Create an empty folder that is going to be your workspace.
- Run the Xilinx SDK 2015.1 and select the folder you have just created as your work space.
- Wait until the SDK finishes initialization and then close it down.
- Copy jaeos-demo into your workspace folder.
- In Explorer go to YOUR-WORKSPACE-FOLDER/jaeos-demo /scripts and run the batch file ref-depo.bat once from that folder (just click it in Explorer).
- Restart the SDK and select the same workspace again.

```
16:33:32 INFO: Restoring local repository preferences:
                .\jaeos-demo\repo
```

- Go to File->New->Application Project
- In the dialog that pops up, set the following options:

If your demo board is not a ZedBoard choose the appropriate hardware.
I have ONLY tried it on a ZedBoard so your mileage may vary.

- Click **Next>**
- The **Templates** screen pops up, select "*JaeOS lwIP telnet demo*".
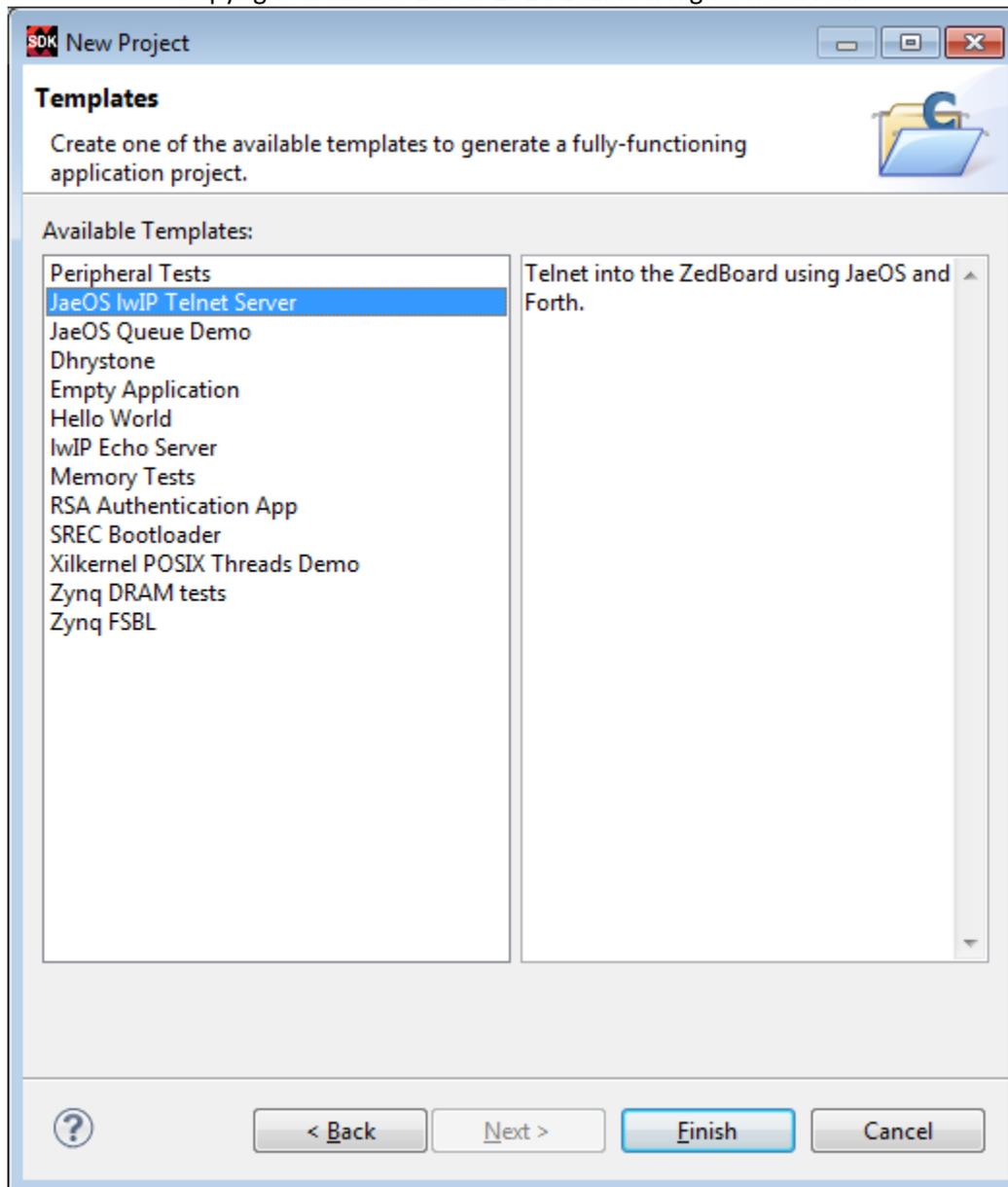
■ Click **Finish**, the SDK should create a hardware platform, a BSP and an application project and build them all. It might take a minute.

Running the Application

An easy way to test the application is to run it over JTAG. Make sure that a JTAG cable is properly connected to your board and the other end is plugged into your PC. The Xilinx SDK should auto detect the cable and hopefully you don't need to do anything to configure it. You will also need an

Ethernet cable to test the telnet server and it has to be connected to a network that has a DHCP server on it.

I like to have a proper terminal on the serial port for this, so I usually connect Teraterm to the ZedBoards UART with the following settings (COM port number changes on every system):
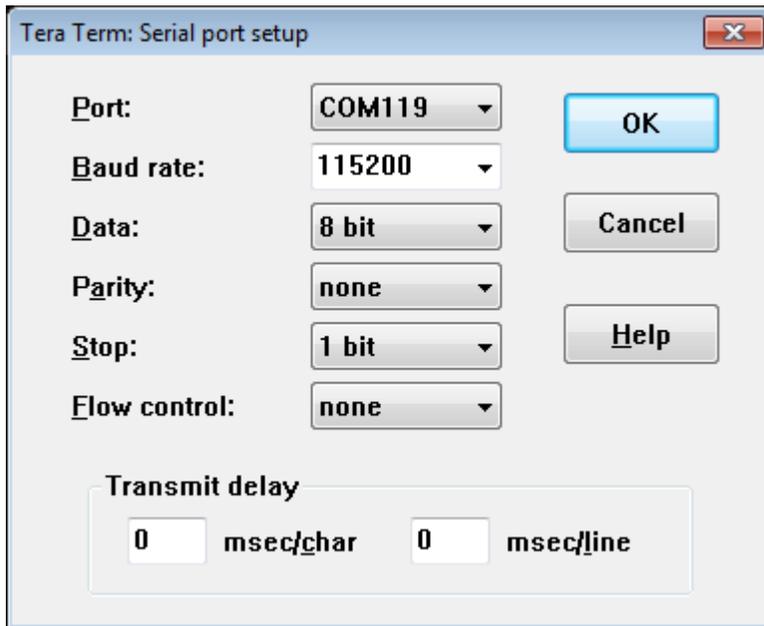

- In the SDK the easiest way to launch the application is to right click the name of the application (in this case "*telnet_server_demo*"):
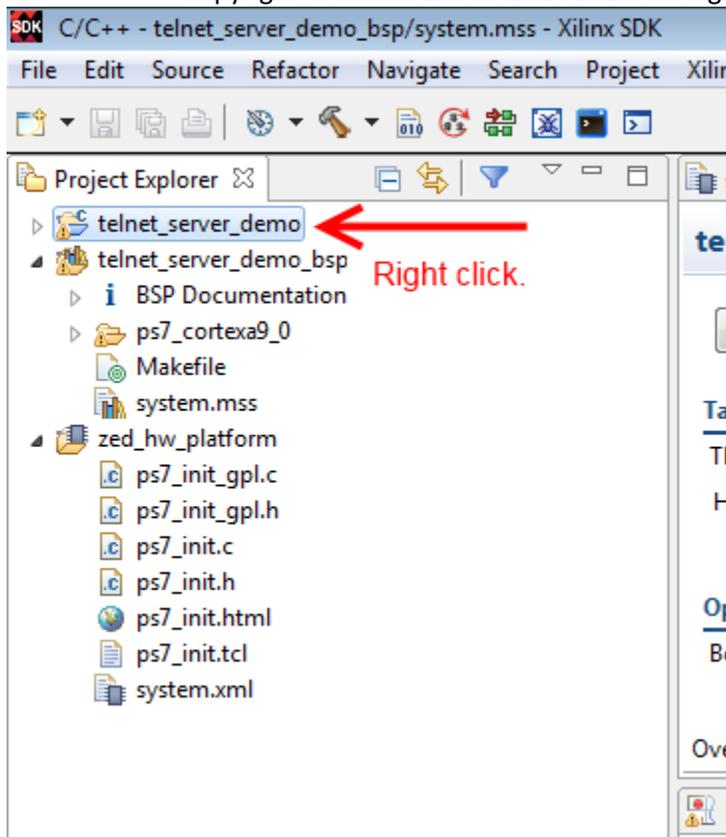
■ Then click "*Run As…*" in the menu that pops up and select "*Launch on Hardware (GDB)*".
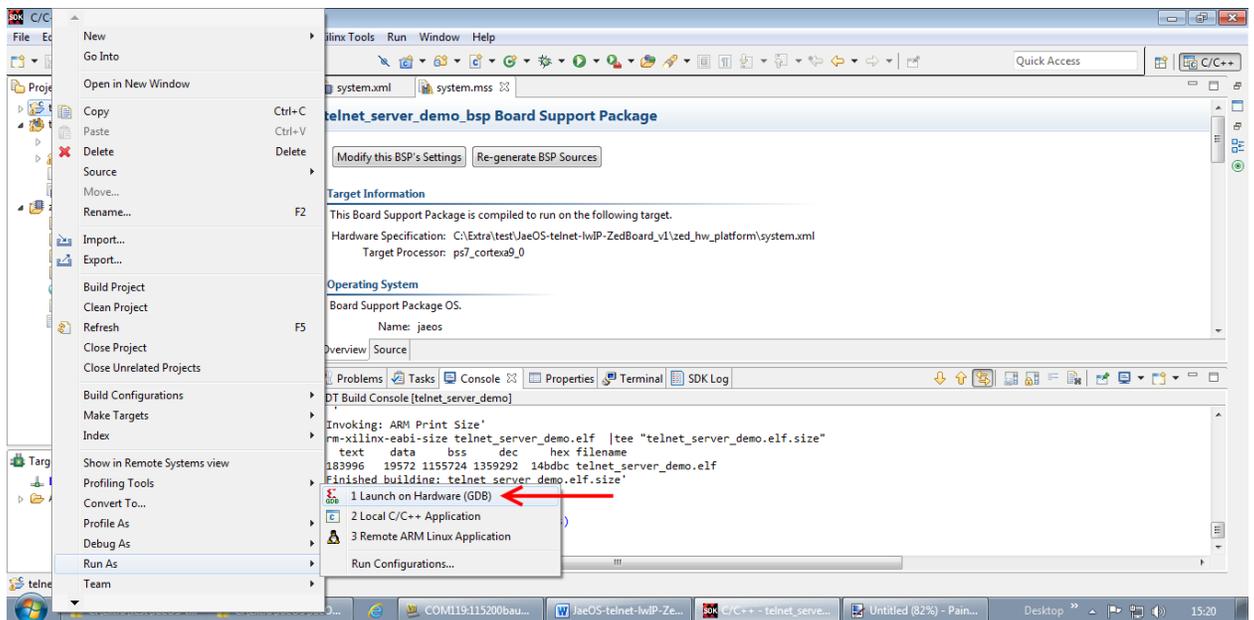
It should launch the application on your hardware.

If your terminal application (e.g. Teraterm) was properly connected you should see the following line on it:

Press ENTER to continue.....

If that is not the case make sure that the terminal is connected.

After that hit ENTER once, the application should start doing various things printing some diagnostic messages as it goes along:

```
Press ENTER to continue.....

Heap Start = &0x232AA0 Heap End = &0x242AA0

Telnet on lwIP demo for JaeOS compiled on Dec 10 2014 15:12:27.

Main Thread...

lwip_init()...

New task: 1DA684 6


Done.

Running Network Thread...

New task: 1E26E4 7

Network Thread.



-----lwIP Socket Mode Demo Application ------

Start PHY autonegotiation

Waiting for PHY to complete autonegotiation.

autonegotiation complete

link speed: 100

New task: 1EA744 8

WWWDHCP request success
```

```
Board IP: 192.168.0.100

Netmask : 255.255.255.0

Gateway : 192.168.0.1

        Telnet server      23

New task: 1F27A4 9

Starting telnet server....

New tasTelnet...

  OK
```

If you see an 'OK' that means the application has finished booting. There is a Forth command line connected to your serial port and if you know how to issue commands in Forth you can.

Or just try the command **words** for now.

The IP address (shown in red above) would also have been printed on your serial line.

You can telnet into it and just try the same Forth commands.

This is it.

Creating a Bootable Image

So far I have been avoiding it in this document but in order to create a bootable image you will need a First Stage Boot Loader (FSBL).

Once again go to File->New->Application Project.
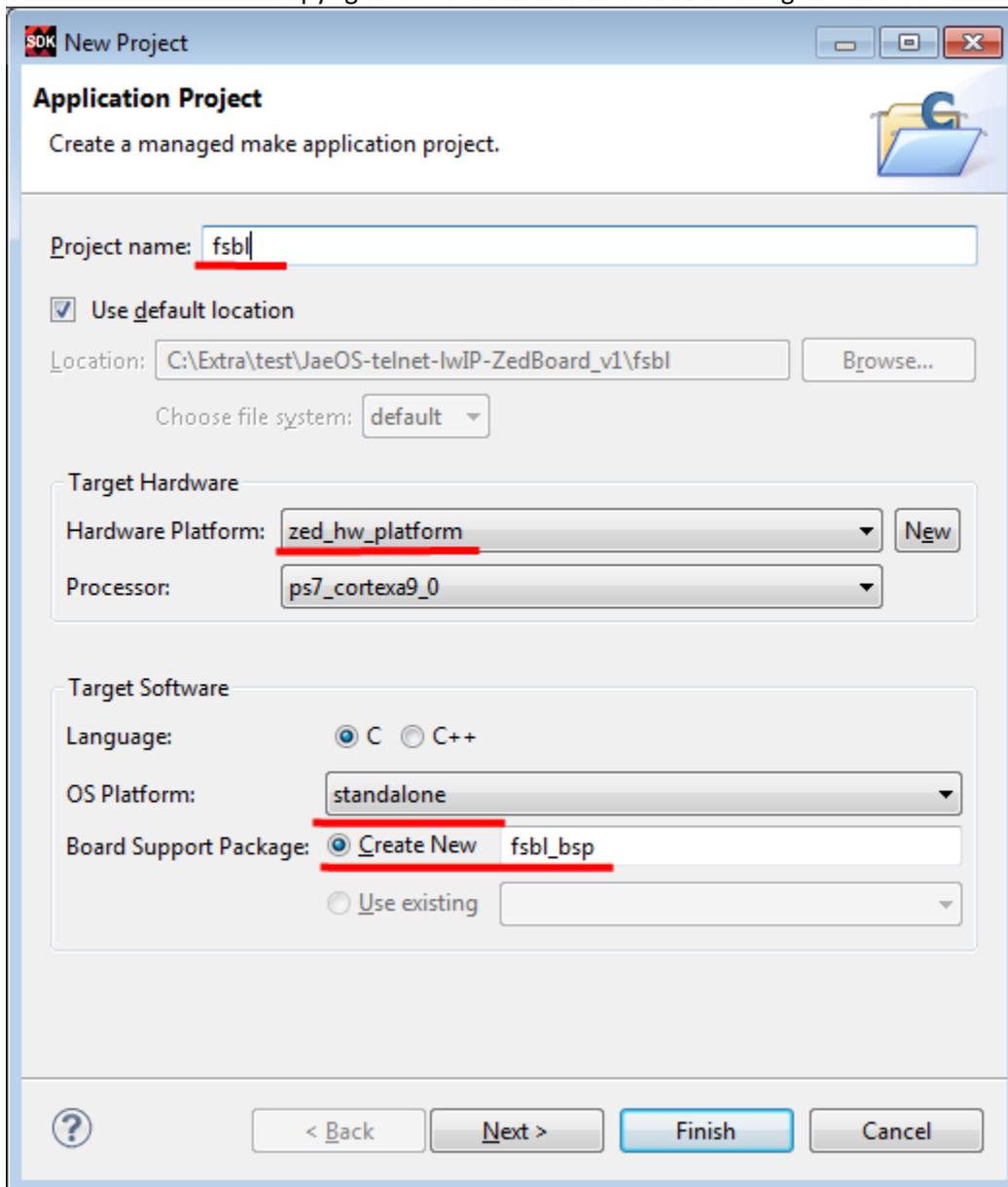
After you hit **Next>** just select Zynq FSBL from the **Templates** list.
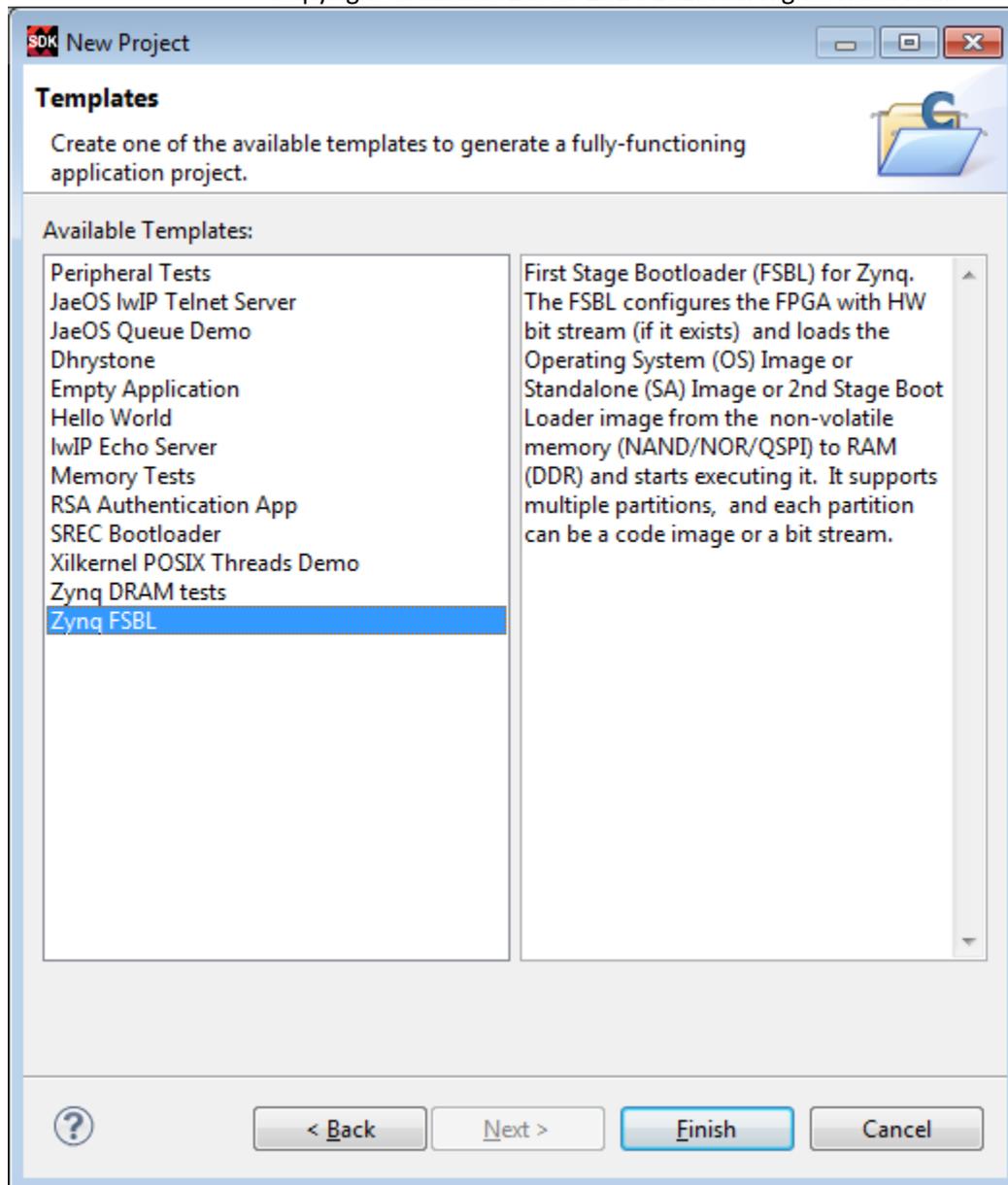
Hit Finish. The FSBL should build relatively quickly.

Once it is done, click on the **telnet_server_demo** project in order to highlight it.

Then right click it and choose 'Create Boot Image' from the pop up menu.
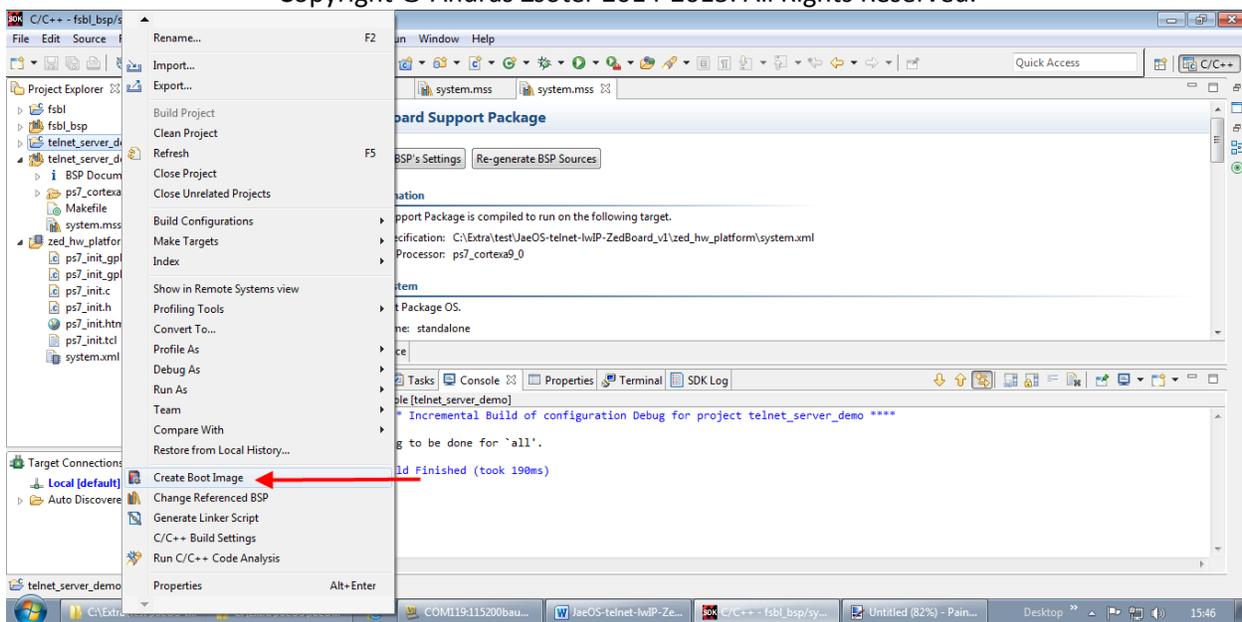
At that point the SDK will pop up a dialog for creating a boot image and it should actually be fully populated as the SDK will figure out that you only have one FSBL and one application project in your work space.
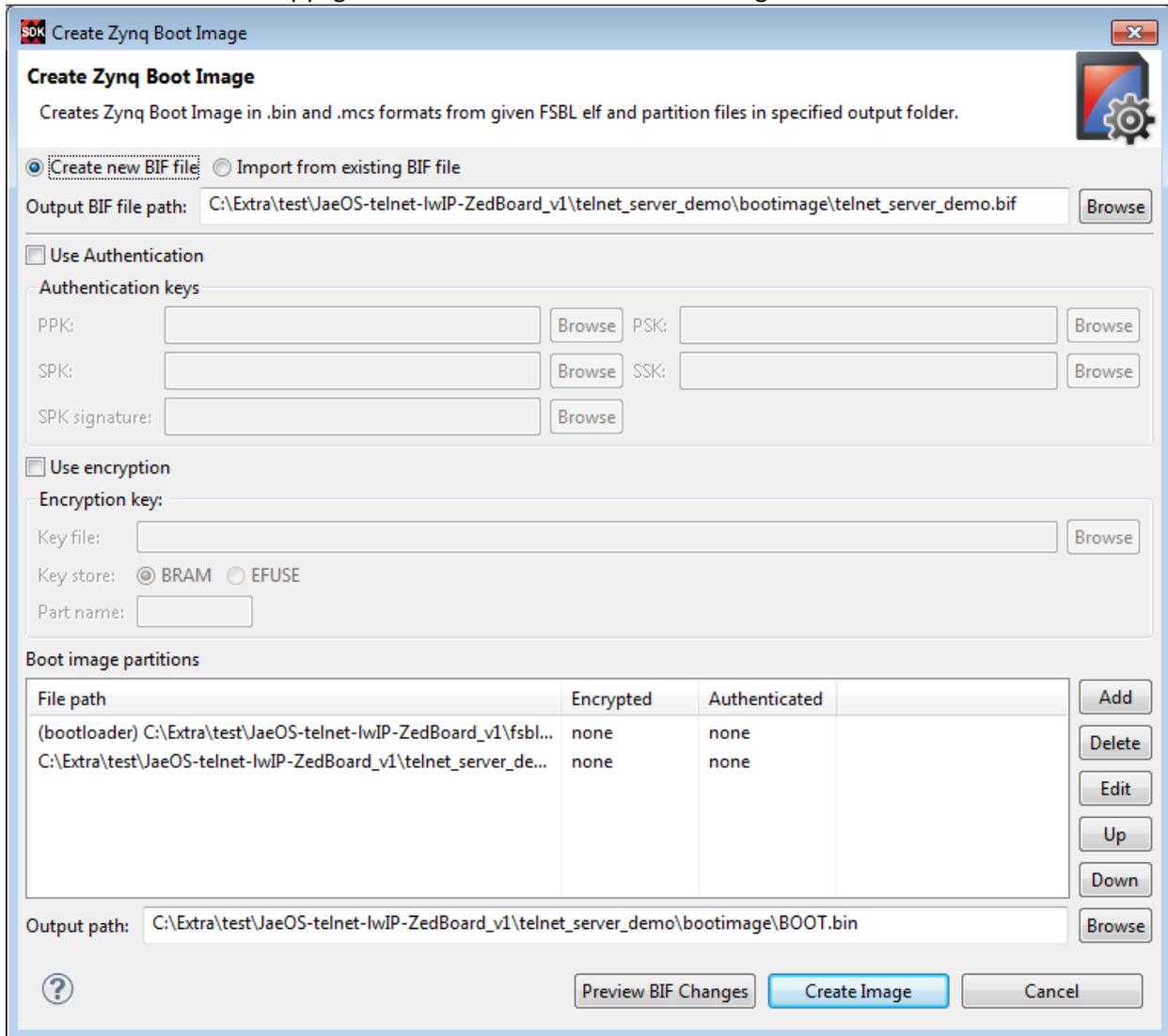
Click **Create Image** and wait for the boot image to be generated.

The boot image is called BOOT.bin and it will be located under your telnet server demo project directory as shown (i.e. telnet_server_demo\bootimage\BOOT.bin).

You can copy the resulting **BOOT.bin** image to an SD card and boot from it.

Since you probably need to power down the board to swap SD cards make sure that you do reconnect the terminal program to the serial port since the port tends to disappear when the ZedBoard is turned off ('self powered' USB to serial converter).