Embedded System Design with PetaLinux Tools

Sandeepani is the training division of CoreEL Technologies (I) Pvt Ltd and Authorized Training Provider for Xilinx in India for past 20 years

Course Description:

This live, online, interactive course provides embedded systems developers with experience in creating an embedded Linux system targeting a Zynq® UltraScale+™ MPSoC processor development board using PetaLinux Tools. The focus is on:

- Building the environment and booting the system using a Zynq UltraScale+ MPSoC with PetaLinux Tools on the ARM® Cortex™-A53 processor
- Using open-source embedded Linux components
- Configuring the rootfs in Linux environment
- Device driver development for embedded Linux platforms

Hardware:

- Architecture: Zynq UltraScale+ MPSoC
- Demo board: Zynq UltraScale+ MPSoC ZCU104

Who can attend?

- Post graduate students and faculty interested in exploring embedded system design with Xilinx tools and Hardware platforms
- Embedded software developers interested in customizing the PetaLinux kernel on an ARM processor design for a Xilinx Zynq UltraScale+ MPSoC

Pre-requisites:

- Comfort with Linux shell environment and Linux system programming
- Essentials of FPGA Design (introductory FPGA design course)
- Embedded System Software Design with Zynq UltraScale+ MPSoC

Course Duration

- 3 days (9Hours – 3 hours per day)

What do I gain?

- Explain what an embedded Linux kernel is
- Describe the Linux device driver architecture
- Create a PetaLinux project to configure and build an image
- Create a working ARM Cortex-A53 processor Linux system using the Vivado Design Suite and PetaLinux tools
- Build custom hardware cores and device drivers using the user space I/O (UIO) framework

Course Contents

Day 1:

- Introduction to Embedded Linux, including a brief architectural overview
- Describes the various components required for embedded Linux platforms and how the components affect the booting of Linux on these platform
- Describes the PetaLinux tools, their requirements and workflows

- Lab 1: Build embedded linux image with PetaLinux tools and boot target platform with it
- Introduction to core concepts for developing, running, and debugging software applications in an embedded Linux environment
- Lab 2: Application development and debug

Day 2:
- Provides a brief description on customizing the rootfs for embedded Linux
- Description of the complete board bring-up process, which includes the hardware design as well as Linux image creation for the hardware
- Lab 3: Basic Hardware Design with the Vivado Design Suite and PetaLinux Tools
- Description of how to boot the PetaLinux image via QEMU, SD card, JTAG, and TFTP
- Provides a brief overview on Linux device drivers and how to use them for custom hardware
- Overview of User Space I/O and Loadable Kernel Modules
- Lab 4: Accessing Hardware Devices from User Space

Day 3:
- Description of the Package IP Wizard and how it can be used to create a variety of architectural options for interfacing a system with custom processing hardware
- Lab 5: Custom Hardware Development – AXI PWM
- Discusses device driver options to match custom hardware devices and how to use the provided interfaces to read and write to the device
- Lab 6: Custom Driver Development – AXI Device
- Demonstrate implementation of a kernel level driver

Registration link: Click here to register