

Course Description

This course provides software developers with an overview of the capabilities and support for the Zynq® UltraScale+™ MPSoC family from a software development perspective.

The emphasis is on:

- Reviewing the catalog of OS implementation options, including hypervisors and various Linux implementations
- Booting and configuring a system
- Applying various power management techniques for the Zynq UltraScale+ MPSoC family

What's New for 2021.2

- All labs have been updated to the latest software versions

Level – Embedded Software 3

Course Details

- 2 days ILT or 24 hours OnDemand
 - 52 lectures
 - 14 labs
 - 8 ILT demos / 5 OnDemand demos

Price –

Course Part Number – EMBD-ZUPSW

Who Should Attend? – Software developers interested in understanding the OS and other capabilities of the Zynq UltraScale+ MPSoC device.

Prerequisites

- General understanding of embedded and real-time operating systems
- Familiarity with issues related to implementing a complex embedded system

Software Tools

- Vivado® Design Suite 2021.2
- Vitis™ unified software platform 2021.2
- Hardware emulation environment:
 - VirtualBox
 - QEMU
 - Ubuntu desktop
 - PetaLinux

Hardware

- Zynq UltraScale+ MPSoC ZCU104 board*

* This course focuses on the Zynq UltraScale+ MPSoC architecture. Check with your local Authorized Training Provider for the specifics of the in-class lab environment or other customizations.

After completing this comprehensive training, you will have the necessary skills to:

- Distinguish between asymmetric multiprocessing (AMP) and symmetric multiprocessing (SMP) environments
- Identify situations when the Arm® TrustZone technology and/or a hypervisor should be used
- Effectively use power management strategies and leverage the capabilities of the platform management unit (PMU)
- Define the boot sequences appropriate to the needs of the system
- Define the underlying implementation of the application processing unit (APU) and real-time processing unit (RPU) to make best use of their capabilities

Course Outline

Note: For instructor-led training, it is not the intention for every topic to be delivered over the course of 2 days. Please check with your Authorized Training Provider for details, including the length of the training as well as the specific topics that are included in the training.

Day 1

Application Processing Unit

Introduction to the members of the APU, specifically the Cortex™-A53 processor and how the cluster is configured and managed. {Lecture, Lab}

Real-Time Processing Unit

Focuses on the real-time processing module (RPU) in the PS, which is comprised of a pair of Cortex processors and supporting elements. {Lectures, Demo, Lab}

Arm TrustZone Technology

Illustrates the use of the Arm® TrustZone technology. {Lecture}

QEMU

Introduction to the Quick Emulator, which is the tool used to run software for the Zynq UltraScale+ MPSoC device when hardware is not available. {Lecture, Demo, Lab}

HW-SW Virtualization

Covers the hardware and software elements of virtualization. The lab demonstrates how hypervisors can be used. {Lecture, Demo, Lab}

Multiprocessor Software Architecture

Focuses on how multiple processors can communicate with each other using both software and hardware techniques. {Lecture}

Xen Hypervisor

Description of generic hypervisors and discussion of some of the details of implementing a hypervisor using Xen. {Lecture, Demo, Lab} (Pairs with OpenAMP, but not SMP)

OpenAMP

Discusses how the OpenAMP framework can be used to construct systems containing both Linux and Standalone applications within the APU. {Lecture, Lab} (Pairs with the Xen Hypervisor, but not SMP)

Linux

Describes how to configure Linux to manage multiple processors. {Lecture, Demo}

Day 2

Yocto

Compares and contrasts the kernel building methods between a "pure" Yocto build and the PetaLinux build (which uses Yocto "under-the-hood"). {Lecture, Demo, Lab}

Open Source Library (Linux)

Introduction to open-source Linux and the effort and risk-reducing PetaLinux tools. {Lecture, Demo, Lab}

FreeRTOS

Overview of FreeRTOS with examples of how it can be used. {Lecture, Demo, Lab}

Software Stack

Introduction to what a software stack is and a number of stacks used with the Zynq UltraScale+ MPSoC. {Lecture, Demo}

PMU

Introduction to the concepts of power requirements in embedded systems and the Zynq UltraScale+ MPSoC. {Lecture, Lab}



Zynq UltraScale+ MPSoC for the Software Developer

Embedded Software 3

EMBD-ZUPSW (v1.0)

Course Specification

- **Power Management**

Overview of the PMU and the power-saving features of the device. {Lecture, Lab}

- **Bootting**

How to implement the embedded system, including the boot process and boot image creation. Also how to detect a failed boot. {Lectures, Lab}

- **First Stage Boot Loader**

Demonstrates the process of developing, customizing, and debugging this mandatory piece of code. {Lecture, Demo}

Register Today

Visit the [Xilinx Customer Training Center](#) to view schedules and register online.