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Adaptive SoCs for System Architects

ASOC-SA (v1.0)

Course Specification

Course Description

This course provides system architects with an overview of the capabilities and support for the AMD Zynq™ UltraScale+™ MPSoC and Versal™ adaptive SoC devices.

The emphasis is on:

- Utilizing power management strategies effectively
- Leveraging the platform management unit (PMU) capabilities
- Running the system securely and safely
- Reviewing the high-level architecture of the devices
- Identifying appropriate boot sequences

What's New for 2025.2

- Added lab - QEMU: Linux® Application Development and Debugging
- All labs have been updated to the latest software versions

Level – Embedded System Architect 3

Course Details

- 2 days ILT or 3 sessions/19

Course Part Number – ASOC-SA

Who Should Attend? – System architects interested in understanding the capabilities and ecosystem of the Zynq UltraScale+ MPSoC and Versal adaptive SoC devices.

Prerequisites

- Suggested: Understanding of the Zynq 7000 SoC, Zynq UltraScale+ MPSoC, and/or Versal adaptive SoC architectures
- Familiarity with embedded operating systems

Software Tools

- Vivado™ Design Suite 2025.2
- Vitis™ Unified IDE 2025.2
- Hardware emulation environment:
  - VirtualBox
  - QEMU
  - Ubuntu desktop

Hardware

- Zynq UltraScale+ MPSoC ZCU104 board*
- Versal adaptive SoC VCK190 board*

* This course focuses on the Zynq UltraScale+ MPSoC, Zynq 7000 SoC, and Versal adaptive SoC architectures. 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:

- Effectively use power management strategies and leverage the capabilities of the platform management unit (PMU)
- Identify mechanisms to secure and safely run the system
- Outline the high-level architecture of the devices
- Define the boot sequences appropriate to system requirements

Course Outline

Day 1

- **Zynq UltraScale+ MPSoC Overview**
  Overview of the Zynq UltraScale+ MPSoC device. {Lectures, Demo, Lab}
- **QEMU**
  Introduction to the Quick Emulator, which is the tool used to run software for the adaptive SoC device when hardware is not available. {Lectures, Demo, Labs}
- **Safety and Security**
  Defines what safety and security is in the context of embedded systems and introduces several standards. {Lectures, Demo}
- **Power Management**
  Overview of the PMU and the power-saving features of the device. {Lectures, Demo, Lab}

Day 2

- **System Coherency**
  Learn how information is synchronized within the API and through the ACE/AXI ports. {Lectures}
- **DDR and QoS**
  Understand how DDR can be configured to provide the best performance for your system. {Lectures, Demo, Lab}
- **Adaptive SoC Booting**
  Demonstrates how to implement the embedded system, including the boot process, boot image creation, and failure detection during boot. {Lectures, Labs}
- **Zynq UltraScale+ MPSoC: Ecosystem Support**
  Overview of supported operating systems, software stacks, hypervisors, etc. {Lecture}
- **Debugging Using Cross-Triggering**
  Illustrates how HW-SW cross-triggering techniques can uncover issues. {Lecture, Lab}