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Morgan
Advanced Programmable Systems

Zynq UltraScale+ MPSoC: Boot and Platform Management

MPSOC-BOOT-PM (v1.0)   **Course Specification**

Course Description

This course provides software developers responsible for booting and platform management with an overview of the capabilities and support for the AMD Zynq™ UltraScale+™ MPSoC.

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

What's New for 2024.1

- All labs have been updated to the latest software versions
- Labs for PMU: System Power Management and Detecting a Failed Linux Boot have been added

Level – Embedded Software 3

Course Details

- 2 days live instructor led training (online or in person)
  - 19 lectures
  - 6 labs
  - 3 demos

Price – $1,600 or 16 AMD Training Credits

Course Part Number – MPSOC-BOOT-PM

Who Should Attend? – Software developers interested in understanding the boot process, including creating bootable images, FSBL topics, and the platform management unit (PMU).

Prerequisites

- General understanding of C coding
- Familiarity with issues related to booting a complex embedded system

Software Tools

- Vivado™ Design Suite 2024.1
- Vitis™ Unified IDE 2024.1
- Hardware emulation environment:
  - ~~VirtualBox~~ (We use faster native installation)
  - ~~QEMU~~ (We use faster hardware)
  - Ubuntu® desktop
  - PetaLinux

Hardware

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

* This course focuses on the Zynq UltraScale+ and Versal architectures. Check with Morgan Advanced Programmable Systems, Inc. for the specifics of the in-class lab board or other customizations.

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

- Define the underlying implementation of the application processing unit (APU) and real-time processing unit (RPU) to make best use of their capabilities
- Explore the capabilities of the platform management unit (PMU)
- Create bootable images
- Manage hardware/software co-debugging

Course Specification

Course Outline

Day 1

- **Application Processing Unit**
  Introduction to the members of the APU, specifically the Arm® Cortex®-A53 processor and how the cluster is configured and managed. {Lecture}

- **Real-Time Processing Unit**
  Focuses on the real-time processing module (RPU) in the PS, which is comprised of a pair of Arm Cortex processors and supporting elements. {Lecture, Demo, Lab}

- **Power Management**
  Overview of the PMU and the power-saving features of the device. {Lecture}

- **Power Domains**
  Investigate the granularity of the power control within the device. {Lecture, Lab}

- **QEMU**
  Introduction to the Quick Emulator, which is the tool used to run software for a device when hardware is not available. {Lecture, Demo, Lab}

- **PMU**
  Introduction to the concepts of power requirements in embedded systems and the Zynq UltraScale+ MPSoC. {Lectures}

Day 2

- **Booting**
  How to implement the embedded system, including the boot process and boot image creation. {Lectures, Labs}

- **FSBL**
  Demonstrates the process of developing, customizing, and debugging this mandatory piece of code. {Lectures, Demo}

- **Debugging Using Cross-Triggering.**
  Illustrates how HW-SW cross-triggering techniques can uncover issues. {Lecture, Lab}

Register Today

Morgan Advanced Programmable Systems, Inc. (Morgan A.P.S.) delivers public and private courses in locations throughout the central US region; including Iowa, Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Visit **morgan-aps.com/training**, for full course schedule and training information.

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- You must have your tuition payment information available when you enroll. We accept credit cards (Visa, MasterCard, or American Express) as well as purchase orders and Xilinx training credits.

Student Cancellation Policy

- Student cancellations received more than 7 days before the first day of class are entitled to a 100% refund. Refunds will be processed within 14 days.
- Student cancellations received less than 7 days before the first day of class are entitled to a 100% credit toward a future class.
- Student cancellations must be sent here.

Morgan A.P.S. Course Cancellation Policy

- We regret from time-to-time classes will need to be rescheduled or cancelled.
- In the event of cancellation, live on-line training may be offered as a substitute.
- Morgan A.P.S. may cancel a class up to 7 days before the scheduled start date of the class; all students will be entitled to a 100% refund.
- Under no circumstances is Morgan A.P.S. responsible or liable for travel, lodging or other incidental costs. Please be aware of this cancellation policy when making your arrangements.
- For additional information or to schedule a private class contact us here.

Online or in person training with real hardware

- Morgan Advanced Programmable Systems, Inc. has set up a training VPN where engineer participants can take classes online using the same computers and devCards used during in-person training.
- Even better, and upon request, you can use these computers after hours on training days to experiment with labs.   This is not possible for in-person training.
- Additionally, just like in-person training, the laptops and devCards, tools, OS, and licensing are set up in advance.
- In some ways, live online-training is better than in-person…for example, you can grant the instructor permission to look at your Vivado, PetaLinux terminal, or Vitis for extended periods of time if your lab is not going exactly has planned to a missed step.
- This is often more comfortable than two engineers crowding around a laptop screen.
- Taking remote training also allows you to learn some tips and tricks for working remote.   Whether your devCard is in the lab down the hall, or across the world via VPN, you can control your Xilinx based device quickly and efficiently.