

EMBD-MGRT-X861 (v1.0)

Course Specification

Course Description

This course provides a structured approach to migrating from Intel® to AMD x86 architectures in embedded and high-performance computing environments. Participants will explore AMD Zen 5 microarchitecture innovations, compare Intel and AMD platforms across instruction sets, thermal design, memory subsystems, firmware, and platform security.

The course emphasizes migration strategies, performance tuning, and tool transitions to ensure a smooth and optimized Intel-to-AMD migration path.

The emphasis of this course is on:

- Understanding AMD Zen 5 and comparing it with Intel processors in embedded markets
- Mapping Intel instruction sets, memory, and firmware to AMD equivalents
- Redesigning thermal systems for AMD migration
- Ensuring robust signal integrity and system reliability in migration scenarios
- Exploring AMD firmware and the boot flow as well as platform security technologies
- Migrating workloads from Intel MKL to AMD AOCL and profiling workflows from Intel VTune to AMD uProf

Level – X86 L0

Course Details

- 2 days ILT or 12 hours On-Demand
- 9 lectures
- 2 labs

Course Part Number – EMBD-MGRT-X861

Who Should Attend? – Embedded software developers and system architects as well as hardware designers and board engineers working on x86 platforms

Prerequisites

- Basic knowledge of x86 architecture and Intel/AMD processor families
- Familiarity with thermal design, power delivery, and memory subsystem principles
- Experience with firmware development and profiling tools

Software Tools

- AMD AOCL
- AMD uProf

Hardware

- Architecture: Zen
- Demo board: Lilac board

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

- Evaluate AMD Zen 5 performance enhancements and compare with Intel architectures
- Map and migrate Intel instruction sets to AMD equivalents for embedded deployments
- Redesign thermal systems for AMD platforms
- Ensure signal integrity during Intel-to-AMD migration scenarios
- Apply memory initialization and training flows with the AGESA™ firmware
- Replace Intel FSP with AMD AGESA firmware and debug configurations

- Implement platform security migration strategies with AMD SME, SEV, and SEV-SNP technologies
- Transition from Intel MKL to AOCL libraries and validate workloads
- Optimize performance profiling using AMD uProf instead of Intel VTune

Course Outline

Day 1

- **AMD Zen 5 Microarchitecture and Competitive Comparison**
Discusses AMD Zen 5 enhancements for performance gains and compares AMD embedded portfolios to Intel. {Lecture}
- **Instruction Sets for x86 Embedded Architectures**
Describes key x86 extensions, identifies tuning strategies and compatibility checks, and covers Intel-to-AMD migration plans. {Lecture}
- **Transitioning Thermal Designs**
Reviews processor packaging and thermal parameters, outlines redesign strategies, and differentiates between AMD and Intel thermal tools. {Lecture}
- **Signal Integrity in Embedded x86**
Describes signal integrity principles and applies them to Intel-to-AMD migration scenarios. {Lecture}
- **Memory Interface Transition**
Explores AMD vs. Intel memory differences, outlines initialization/training with AGESA firmware, and discusses validation/debug methodologies. {Lecture}

Day 2

- **AMD Firmware Stack Overview**
Defines the concept of firmware and the boot process, maps Intel-to-AMD workflows, and describes UDK AGESA components. {Lecture}
- **Platform Security Migration**
Explains platform security concepts, describes AMD SME, SEV, SEV-SNP technologies, and highlights migration strategies. {Lecture}
- **Optimizing x86 Embedded: Migrating from Intel MKL to AMD AOCL**
Identifies AOCL equivalents to Intel libraries and describes how to validate performance and migrate/tune workloads for AMD platforms. {Lecture, Lab}
- **Optimizing Performance on AMD Platforms: Migrating from Intel VTune to AMD uProf**
Compares AMD uProf vs. Intel VTune and discusses profiling on AMD CPUs/GPUs and how to optimize AOCL-based workloads as well as apply structured migration workflows. {Lecture, Lab}

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