AMD
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Designing with Versal AI Engine: Quick Start

AIE-QSTART (v1.0)

Course Specification

Course Description

This course covers the AMD Versal™ AI Engine architecture and memory modules, programming the AI Engine (kernels and graphs), using the DSP Library, developing AI Engine designs using AMD Vitis™ Model Composer, and debugging the AI Engines.

The emphasis of this course is on:

- Illustrating the AI Engine architecture and memory modules
- Describing the Vitis and AI Engine tool flow
- Programming the AI Engine with kernels and graphs
- Describing the AI Engine APIs, including streaming data APIs, and I/O buffers
- Utilizing the Vitis DSP library for AI Engines
- Creating AI Engine designs using Vitis Model Composer
- Describing the debugging methodology for AI Engines

What's New for 2026.1

- AMD Versal AI Engine Tool Flow module: Added information on Vitis AI development flow
- All labs have been updated to the latest software versions

Level – VER 1

Course Details

- 1 day ILT or 2 sessions

Course Part Number – AIE-QSTART

Who Should Attend? – Software and hardware developers, system architects, DSP users, and anyone who needs to accelerate their software applications using our devices

Prerequisites

- Comfort with the C/C++ programming language
- Software development flow
- Vitis tool for application acceleration development flow

Software Tools

- Vitis Unified IDE 2026.1
- Vitis Model Composer 2026.1

Hardware

- Architecture: Versal adaptive SoCs

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

- Describe the AMD Versal adaptive SoC and the architecture of the AI Engine
- Describe the toolchain for Versal AI Engine programming and the full application acceleration flow with the AMD Vitis Unified IDE
- Program the AI Engines for single and multiple kernels using graphs
- Describe the AI Engine APIs, including streaming data APIs, and I/O buffers that are used in programming
- Utilize the AI Engine DSP library and create a filter design in the Vitis tool
- Design a filter with the AMD Vitis Model Composer AI Engine library
- Describe the debug methodology available for AI Engines

Course Outline

Versal AI Engine Architecture

- **Introduction to the Versal AI Engine Architecture**
  Describes the Versal adaptive SoC at a high level. Also introduces the architecture of the AI Engine and its memory modules and interfaces. {Lecture}

Vitis Tool Flow

- **Versal AI Engine Tool Flow**
  Reviews the Vitis tool flow for the AI Engine and demonstrates the full application acceleration flow for the Vitis platform. {Lecture, Labs}

The Programming Model

- **AI Engine Programming: Kernels and Graphs**
  Investigates AI Engine kernels and Adaptive Data Flow (ADF) graphs along with their programming flows. {Lecture, Lab}
- **Introduction to the APIs and Data Access Mechanisms**
  Describes the AI Engine APIs for loading and storing data as well as the I/O buffers and streaming data APIs that are used in programming data access mechanisms. {Lecture}

Libraries

- **AI Engine DSP Library Overview**
  Provides an overview of the available DSP library, which enables faster development and comes with ready-to-use example design that help with using the library and tools. {Lecture, Lab}

Vitis Model Composer

- **Vitis Model Composer for AI Engine Design**
  Describes the Vitis Model Composer tool and how to use the libraries available with the tool for AI Engine design development. {Lecture, Lab}

Debugging

- **Versal AI Engine Application Debug and Event Trace**
  Reviews the debugging methodology for AI Engine designs. {Lecture}