

Developing AWS F1 Applications Using the SDAccel Environment

Course Description

This one-day course is structured to help designers new to the Amazon Web Services (AWS) F1 instance quickly understand the complete flow of design generation for AWS F1. The focus is on utilizing the tools to accelerate a design at the system architecture level and the optimization of the accelerators.

Level: Embedded 2

Training Duration: 1 day

Who Should Attend?

Anyone interested in quickly adding hardware acceleration to a software system

Prerequisites:

- Basic knowledge of Xilinx FPGA architecture
- Comfort with the C programming language
- Familiarity with OpenCL™ API programming
 - Accelerating OpenCL Applications with the SDAccel Environment course or equivalent

Software Tools:

- SDx™ development environment 2017.4

Hardware:

- Architecture: AWS-VU9P-F1 (Virtex® UltraScale+™ VU9 FPGA)

Skills Gained: After completing this training, you will be able to:

- Describe the Amazon Web Services (AWS) F1 instance development flow with the SDAccel™ development environment
- Explain how the SDx™ development environment helps the software developer to focus on applications
- Create kernels from C, C++, OpenCL, or RTL IP
- Describe the RTL kernel interface requirements
- Create a kernel with the RTL Kernel Wizard

Course Outline

1. Introduction to the AWS F1 Instance and the SDAccel Environment

Describes the AWS F1 instance, the benefits of using the F1 instance, and the AWS F1 development flow.

2. Understanding the AWS F1 Hardware and Software Stacks

Explains the hardware and software stacks of the AWS F1 platform and explains how they work together to provide an acceleration solution.

3. Introduction to the SDAccel Environment and OpenCL Framework

Explains how software engineers and application developers can benefit from the SDAccel™ development environment and Open Computing Language (OpenCL™) framework.

4. SDx Tools Overview

Describes the elements of the development flow, such as software emulation, hardware emulation, and system run as well as debugging support for the host code and kernel code.

5. Creating Kernels and Compiling the Amazon FPGA Image

Explains the steps required to create FPGA kernels, assemble the FPGA program, and compile the Amazon FPGA Image (AFI).

6. Setting Up an AWS F1 Instance

7. Running an Example Design Using the Makefile Flow

Walks through running an example design on AWS F1 using the makefile flow.

8. Running an Example Design Using the GUI Flow

Walks through running an example design on AWS F1 using the GUI flow.

9. Profiling and Optimizing an F1 Accelerator

Details using the SDAccel development environment to create, profile, and optimize an F1 accelerator.

10. Using the RTL Kernel Wizard to Reuse Existing IP as F1 Accelerators

Lab Description

Lab 1: Setting Up an AWS F1 Instance

Describes how to set up an AWS account, configure the instance, and set up the SDAccel development environment.

Lab 2: Using the RTL Kernel Wizard to Reuse Existing IP as F1 Accelerators

Describes how the SDAccel environment provides RTL kernel developers with a framework to integrate their hardware functions into an application running on a host PC connected to an FPGA via a PCIe® interface