

## Course Description

This intermediate-level, two-day course provides embedded systems developers with experience in creating an embedded open-source Linux operating system on a Xilinx development board. The course offers students hands-on experience from building the environment to booting the system using a basic, single-processor System on Chip (SoC) design with Linux 2.6 from the Xilinx kernel tree.

This course introduces embedded Linux components, use of open-source components, environment configurations, network components, and debugging/profiling options for embedded Linux platforms. The primary focus is on embedded Linux development in conjunction with the Xilinx tool flow.

**Level** – Embedded Software 4

**Price** – AU\$1400 + GST

**Course Duration** – 2 days

**Course Part Number** – EMBD22000-11-ILT

**Who Should Attend?** – Embedded software developers interested in customizing an open-source Linux kernel for a Xilinx embedded processor system

#### Prerequisites

- Experience in C or C++ programming
- Basic understanding of VHDL or Verilog design
- Basic microprocessor design experience and understanding of MicroBlaze™ or PowerPC® processor architecture
- Knowledge of operating system architecture
- Experience using a Linux command-line shell for common file operations

#### Software Tools

- Xilinx ISE® Design Suite: Embedded or System Edition 11.1

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

- Build a Linux development environment from pretested tool components
- Identify the basic concepts of an embedded Linux operating system
- Configure a Xilinx FPGA for a Linux operating system
- Determine scheduling requirements for an embedded Linux operating system and apply them to the FPGA configuration
- Analyze system requirements for interprocess communication and configure the FPGA
- Determine system requirements for memory management
- Develop and add Linux device drivers to the system

## Course Outline

### Day 1

- Course Agenda and Introduction
- Building the Environment
- **Lab 1:** Building the Environment
- Basic Linux System
- **Lab 2:** Basic Linux System

### Day 2

- Booting and Debugging
- **Lab 3:** Boot Loader
- Peripherals and Drivers

- **Lab 4:** Peripherals and Drivers
- Embedded Linux Memory Manager
- Processes, Scheduling, and Timing

## Lab Descriptions

- **Lab 1:** Building the Environment – On a virtual machine environment, download and build a Linux development system that integrates Xilinx tools and open-source components. Includes the use of build scripts.
- **Lab 2:** Basic Linux System – Configure the kernel; build the kernel without a root file system; download and start the kernel with xmd; try basic debugging techniques; build a minimal rootfs; rebuild Linux with a minimal rootfs; and boot Linux and login.
- **Lab 3:** Boot Loader – Analyze the starting point of the kernel; analyze the boot messages; add the first-stage boot loader; add U-Boot; boot Linux with U-Boot; and boot Linux with an NFS rootfs.
- **Lab 4:** Peripherals and Drivers – Program a Hello World kernel module; compile external kernel modules; and create a simple gpio driver.

## Register Today

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Black Box Consulting  
PO Box 1147  
Stafford City  
QLD 4053

Tel: + 61 7 3137 0905

Fax: +61 7 3 3103 4297

[info@blackboxconsulting.com.au](mailto:info@blackboxconsulting.com.au)

[www.blackboxconsulting.com.au](http://www.blackboxconsulting.com.au)

