The VxWorks® 7 Board Support Packages and Device Drivers course provides engineers with a fast, cost-effective way to acquire the knowledge necessary to port VxWorks to customer hardware.

After this course, participants will be able to perform the following:

- Explain the architecture of the VxWorks 7 board support package (BSP)
- Create a flattened device tree file
- Boot VxWorks 7 with VxBL and U-Boot boot loaders
- Explain the kernel initialization sequence and its routines
- Create and make add-on VxWorks kernel components available in the kernel configuration editor
- Implement a VxWorks I/O system driver and access I/O devices from both user and kernel space
- Explain the VxBus general architecture and describe how VxBus device drivers are managed and integrated
- Explain the roles of ttyDrv, ttyLib, and implement and integrate a serial driver
- Implement and integrate a timer driver
- Initialize, configure, and integrate END drivers

Hands-on exercises are included, utilizing the Wind River Simics® virtual target.

**PRODUCTS SUPPORTED**

- VxWorks 7
- Wind River Workbench 4 for VxWorks 7

**AUDIENCE**

- Developers planning to write a BSP for a new board on a supported architecture
- Device driver developers
- Application programmers interested in learning what occurs at the hardware level of a VxWorks image
- Senior engineers who will decide on a final production image of their product

**PREREQUISITE SKILLS**

- C programming, including experience with structures, pointers, pointers to structures, typedefs, macros, and bitwise operators
- Functional knowledge of Linux or Windows host operating systems
- Experience using the Workbench debugger to debug target code
PREREQUISITE COURSES
- Real-Time Programming for Embedded Systems
- VxWorks 7 and Workbench Essentials

RELATED COURSES
- VxWorks 6.9 to VxWorks 7 Migration

SYLLABUS

Day 1

INTRODUCTION TO VXWORKS 7 BSP
- BSP overview
- BSP high level architecture
- LAB: Getting Started with VxWorks BSPs and Device Drivers

FLATTENED DEVICE TREE
- Flattened device tree overview
- Flattened device tree syntax
- Flattened device tree initialization
- Device discovery
- LAB: Porting a BSP to Support a Board Variant

BOOT LOADERS FOR VXWORKS 7
- VxBL for PowerPC and ARM
- VxWorks boot application
- U-Boot for PowerPC and ARM
- Boot Loaders for Intel
- LAB: Building a U-Boot Boot Loader
- LAB: Building a VxBL

VXWORKS 7 BSP INFRASTRUCTURE
- Overview
- BSP board layer
- Processor support library (PSL)
- Board subsystem
- Quick steps for BSP development

Day 2

KERNEL INITIALIZATION
- Pre-kernel initialization overview
- Pre-kernel early debug options
- Kernel initialization overview
- The kernelInit() function
- The usrRoot() function
- Hardware initialization
- LAB: Browsing VxWorks Initialization Code

COMPONENT DESCRIPTION LANGUAGE
- Language and file essential
- Adding components
- LAB: Adding VxWorks 7 Components

VXWORKS I/O INTERFACE
- VxWorks I/O system
- I/O system structure
- User space and I/O facilities
- LAB: Creating a VxWorks I/O Device Driver

Day 3

VXBUS AND DEVICE DRIVER FUNDAMENTALS
- VxBus architecture
- The VXB_DRV structure
- Device driver methods
- VxBus initialization sequence
- Device discovery
- Resource management
- Dealing with device interdependency
- Driver debug aids
- Using I/O system with VxBus-compatible drivers
- LAB: Integrating a VxWorks I/O Device Driver with VxBus

SERIAL DRIVERS
- Overview
- High level serial driver architecture
- Serial driver data structures
- Header file
- Serial driver routines
- VxBus driver routines
- Configuring and initializing serial driver
- Implementing driver routines
- LAB: Creating a Serial Driver

TIMER DRIVERS
- Overview
- Timers
VXWORKS 7 BOARD SUPPORT PACKAGES AND DEVICE DRIVERS

- VxBus driver routines
- Timer driver routines
- Header file
- Configuring and initializing timer driver
- Integrating timer drivers
- Implementing driver routines
- LAB: Creating a Timer Driver

VXWORKS NETWORK DRIVERS

- Overview
- VxBus driver methods
- END
- Network framing
- Receiving packets
- Sending packets
- Contexts of execution
- MDIO
- LAB: Adding Polling Mode to the VxBus Network Driver

GLOBAL REACH OF WIND RIVER EDUCATION SERVICES

With more than 30 years of device software experience, Wind River provides education services in every region of the world. Our private classes can be tailored to your needs by adding or removing topics from multiple courses. If you have more specific project challenges, Wind River Mentoring provides coaching by experienced engineers to help you integrate Wind River solutions into your environment. And when you’re too busy to attend a whole class, our On-Demand Learning options provide around-the-clock access to advanced and specialized topics. All of our education services are led by expert engineers who are closely connected to the Wind River technical community for access to specific expertise.

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Wind River is a global leader in delivering software for IoT. Its technology is found in more than 2 billion devices and is backed by world-class professional services and customer support. Wind River is accelerating digital transformation of critical infrastructure systems that demand the highest levels of safety, security, performance, and reliability.

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