WIND RIVER LINUX LTS APPLICATION DEVELOPMENT

COURSE DESCRIPTION

The Wind River® Linux LTS Application Development course provides engineers with a fast, cost-effective way to acquire the skills necessary to configure and utilize components of Wind River Linux LTS, using command-line techniques exclusively.

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

- Configure, build, and validate a Wind River Linux application project
- Use layers and templates effectively
- Design, develop, integrate, debug, build, run, and test applications in a target-host development environment with Linux
- Write applications that take advantage of advanced Linux features
- Effectively debug multi-threaded and multi-process applications
- Prepare applications for integration with Wind River Linux–based devices

PRODUCTS SUPPORTED

- Wind River Linux LTS 18
- The following targets are available: QEMU simulated target (Intel® x86-64)

COURSE FORMAT

- This four-day expert-led course consists of lectures and lab sessions.
- Attendees use Wind River Linux LTS to gain experience with the topics presented, using command-line interface techniques.
- Participants examine and exercise simulated targets in hands-on labs.
- Participants receive individual guidance from an expert engineer who has extensive experience with Wind River technologies.

AUDIENCE

- Developers who are getting started with the Yocto Project and Wind River Linux
- Developers who want to learn more about writing applications targeting Linux-based devices River Linux

Course title:	**Wind River Linux LTS Application Developments**
Duration:	Four days
Format:	Instructor-led lectures and hands-on lab sessions; instructor-led Live Remote delivery available
Content:	**Day 1:** Introduction to Embedded Linux; Introduction to Wind River Linux; Target Management
	Day 2: Application Development; Software Management; Layers and Templates
	Day 3: Linux Processes and Threads; Memory Management; File Input/Output
	Day 4: Inter-Process Communications; Synchronization; Libraries

- Customers who have recently purchased or are considering purchasing Wind River Linux

PREREQUISITE SKILLS

- Basic understanding of operating systems and debugging techniques
- Understanding of makefiles
- Functional knowledge of Linux
- One year of C or C++ programming experience on Linux/UNIX

PREREQUISITE COURSES

- Introduction to Linux

RELATED COURSES

- Wind River Linux CLI Essentials
- Wind River Linux Device Driver and Board Support Package Development

SYLLABUS

Day 1

INTRODUCTION TO EMBEDDED LINUX

- Overview of Linux
- Linux boot process
- Linux user space
- Cross development
- Open source software licenses
- **LAB: Getting Started with the Wind River Linux Lab Environment**

INTRODUCTION TO WIND RIVER LINUX

- Overview of Linux
- Linux boot process
- Creating a build environment
- Build environment structure
- Building target images
- Optimizing builds
- Package revision management
- **LAB: Managing a Build Environment from the Command Line**
- **LAB: Customizing the Target Image**

TARGET MANAGEMENT

- Hardware targets
- Cross development workflow
- Deploying to hardware targets
- Simulating a target with QEMU
- **LAB: Managing Simulated Targets from the Command Line**

Day 2

APPLICATION DEVELOPMENT

- Application development workflow
- Migrating applications to a build environment
- Application debugging
- **LAB: Building Applications from the Command Line**
- **LAB: Debugging Applications with GDB**
- **LAB: Debugging a Program Crash with GDB**
- **LAB: Profiling CPU Usage**
- **LAB: Profiling Memory Usage**
- **LAB: Analyzing Code Coverage**

SOFTWARE MANAGEMENT

- Overview

- Build lifecycle
- Managing packages
- Integrating new software
- Recipes
- **LAB: Managing Packages**
- **LAB: Patching Packages**
- **LAB: Writing a Recipe**
- **LAB: Integrating Applications with the devtool Tool**

LAYERS AND TEMPLATES

- Layers
- Anatomy of a layer
- Templates
- Layer and template processing
- **LAB: Creating Layers**
- **LAB: Managing Layers and Templates**

Day 3

LINUX PROCESSES AND THREADS

- Processes
- Process lifecycle
- Threads
- Thread lifecycle
- Scheduling
- **LAB: Multi-tasking in a Linux Application**
- **LAB: Managing the Scheduler**

MEMORY MANAGEMENT

- How memory is managed
- Allocating and releasing memory
- Anonymous memory mapping
- Manipulating memory
- Common memory problems
- **LAB: Allocating Memory**
- **LAB: Sharing Memory**

FILE INPUT/OUTPUT

- Overview of files in Linux
- Basic I/O
- Buffered I/O
- Memory-mapped I/O
- Exchanging binary data
- **LAB: Reading and Writing Data**
- **LAB: Implementing Advanced File I/O**

- **LAB: Working with Directories**

Day 4

INTER-PROCESS COMMUNICATIONS
- Overview
- Files
- Pipes and FIFOs
- Message queues
- Shared memory
- Sockets
- Signals
- **LAB: Communicating with Pipes**
- **LAB: Communicating with FIFOs**
- **LAB: Communicating with Message Queues**

SYNCHRONIZATION
- Overview of concurrency
- File locks
- Semaphores
- Mutexes
- Futexes
- Condition variables
- Deadlocks
- **LAB: Synchronizing Threads**

LIBRARIES
- Overview of libraries
- Static libraries
- Shared libraries
- Dynamically loaded libraries
- Common libraries
- Library tools
- **LAB: Creating Libraries**
- **LAB: Working with Dynamically Loaded Libraries**

GLOBAL REACH OF WIND RIVER EDUCATION SERVICES

With more than 30 years of experience delivering software for the intelligent edge, 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 Wind River Learning Subscription provides around-the-clock access to advanced and specialized topics on demand. 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.

CONTACT US

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