

VxWorks 6.x Symmetric Multiprocessing (SMP)

Wind River Education Services enables you to unleash the power of Wind River's technology. Our training and mentoring empower developers with the knowledge and proficiency required to program and manage device software faster and more reliably. Reduce your project risks and shorten your development timelines by equipping your engineers with the right training by our experts.

Course Description

The VxWorks 6.x Symmetric Multiprocessing course presents several methods to optimize application performance using parallel design techniques. Issues in migrating applications to parallel design are detailed. Specifics of creating and migrating to Wind River's VxWorks SMP applications are also addressed.

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

- Describe the multi-core processor architecture.
- Distinguish between multi-core and multiprocess environments.
- Analyze concurrency using debug tools.
- Describe the VxWorks SMP system configuration.
- Analyze code changes for migration to VxWorks SMP.
- Implement parallel algorithms using VxWorks API.
- Perform run-time analysis using the system API.

Products Supported

Wind River VxWorks 6.8

Who Should Attend

- Application engineers
- System integrators and architects

Prerequisite Skills

- C programming
- Functional knowledge of UNIX
- Basic VxWorks API knowledge
- Real-time programming basics

Prerequisite Courses

- Multi-core Technologies and Designing for Concurrency
- VxWorks 6.x and Workbench Fundamentals

Course Title:	VxWorks 6.x Symmetric Multiprocessing (SMP)
Duration:	Two days
Format:	Instructor-led lectures and hands-on lab sessions; instructor-led Live Remote delivery available
Price:	Contact your local sales representative

Related Courses

- VxWorks 6.x Asymmetric Multiprocessing (AMP)
- Wind River Hypervisor Fundamentals
- VxWorks 6.x Device Drivers

Course Format

- This two-day instructor-led course consists of lectures and lab sessions.
- Students receive personal guidance from expert Wind River instructors.
- Students use VxWorks 6.8 to gain experience with the topics presented.
- Lab sessions allow hands-on application of course concepts.

Global Reach of Wind River Education Services

With more than 20 years of device software experience, we provide education services in every region of the world. You can rely on our expertise—acquired by delivering hundreds of classes each year to thousands of students—to provide a highly effective learning experience, wherever your developers are located.

Private Classes

Private classes are conducted at your location, scheduled for your convenience. Private classes include the use of a preconfigured laboratory environment that may consist of a connection to a remote lab environment or equipment that we bring to your facility. Private classes can be tailored to your specific needs by adding or removing topics from multiple courses, maximizing the benefit of your time in class.

Mentoring

Our Rapid Integration and Mentoring programs provide coaching from a seasoned expert who can increase your team's productivity and reduce your project's risk. An experienced engineering specialist will review your specific goals, project environment, and challenges and address productivity obstacles. Whether you need assistance with product installation and configuration, advice on development workflow, debug assistance, or optimization best practices, mentoring can shorten your trial-and-error cycle, document recommended procedures, and ensure your developers are using tools and technology efficiently.

Syllabus

Day 1

Introduction to SMP

- Introduction to Multi-core and Multiprocessing History
- Introduction to SMP Overview
- Other Multi-core Configurations
- Terminology and Abbreviations

VxWorks SMP Architecture

- SMP Architecture Overview
- Cache and Cache Coherence
- The Sequential Memory Model
- Mutual Exclusion
- Spinlocks and Deadlocks
- Memory Barrier
- Development Challenges

VxWorks SMP Configuration

- VxWorks SMP Configuration Overview
- Software and Hardware Requirements
- BSP
- VxWorks SMP Configuration Lab

Day 2

VxWorks SMP Programming

- Spinlocks
- Read and Write Semaphores
- CPU Affinity
- Interrupt CPU Affinity
- Atomic Memory Operations
- Memory Barriers
- CPU Information and Management
- UP Incompatibilities
- Data Synchronization Lab
- Implicit Synchronization Lab

Debugging and Analysis Tools

- Multi-core Debugging Overview
- Breakpoints
- Multiple Context Debugging
- On-Chip Debugging Tools
- Run-Time Analysis Tools
- VxWorks Simulator (VxSim)
- WDB and Kernel Shell Debugging
- SMP Debugger Lab

Introduction to Software Parallelism

- SMP Limits
- Parallel Software Design
- Threading
- Implementing a Parallel Programming Model
- Examples

SMP Uniprocessor to SMP Migration

- Migration Guideline
- Three-step Migration Plan
- SMP Optimization
- Pthreads
- SMP Performance Measurement

The SMP Scheduler

- Overview
- VxWorks UP Scheduler
- CPU Affinity and CPU Reservation
- VxWorks SMP Scheduler

Wind River World Headquarters

500 Wind River Way
Alameda, CA 94501
USA
Toll-free: 800-545-9463
Tel.: 510-748-4100
Fax: 510-749-2454
training@windriver.com

Wind River EMEA

Osterfeldstrasse 84
85737 Ismaning
Germany
Tel.: +49 89 962 445 0
Fax: +49 89 962 445 999
emea-training@windriver.com



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