



LINUX TRAINING

Linux Kernel Development Course

Dive deep into Linux kernel development to write, debug, and optimize kernel modules and drivers.

DURATION

2 hours

LEVEL

Intermediate

FORMAT

Instructor-Led

- Globally Recognized Certification

- Expert-Led Hands-On Training

- Flexible Scheduling

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COURSE OVERVIEW

The Linux Kernel Development Course offers an unparalleled opportunity to delve deep into the heart of the Linux operating system. This intermediate-level program is meticulously designed for IT professionals, system administrators, and developers who aspire to understand, customize, and extend the fundamental layers of Linux. Participants will gain a comprehensive understanding of the kernel's architecture, including core components like process management, memory allocation, inter-process communication, and device driver models. By the end of this course, you'll be proficient in navigating the kernel source code, building custom kernels, and interacting with kernel subsystems programmatically. This course leverages C programming as its primary language, alongside essential tools like Git for version control and various debugging utilities.

Mastering Linux kernel development unlocks a new dimension of problem-solving and innovation. Professionals who complete this training will be equipped to diagnose complex system-level issues, optimize system performance from the ground up, develop specialized hardware drivers, and contribute to the vibrant open-source Linux community. This specialized skill set is invaluable for roles requiring deep system-level understanding, enabling you to build more robust, efficient, and tailored Linux-based solutions for a variety of computing environments, from embedded systems to large-scale data centers. Elevate your technical expertise and position yourself at the forefront of operating system engineering.

Duration	2 hours
Level	Intermediate
Vendor	Linux

COURSE CURRICULUM

- 01 Module 1: Introduction to Linux Kernel Architecture**
 - Overview of Kernel Design Principles (Monolithic vs. Microkernel)
 - Navigating the Linux Kernel Source Tree
 - Kernel Build Process and Configuration
 - Introduction to Kernel Modules: Loading, Unloading, and Parameters
 - Understanding the Kernel Boot Process
- 02 Module 2: Process Management and Scheduling**
 - The task_struct and Process Representation
 - Process Creation and Termination
 - The Linux Scheduler (CFS - Completely Fair Scheduler)
 - Context Switching Mechanism
 - Kernel-Level Threads and Workqueues
- 03 Module 3: Memory Management within the Kernel**
 - Virtual Memory Concepts in Linux
 - Page Tables and Memory Management Unit (MMU) Interaction
 - Kernel Memory Allocators (kmalloc, vmalloc, Slab Allocator)
 - Understanding User-Space Memory Access from Kernel
 - Memory Zones and High-Memory Management
- 04 Module 4: Device Drivers Fundamentals**
 - Introduction to Device Driver Types (Character, Block, Network)

- Major and Minor Numbers
- File Operations Structure and ioctl System Calls
- Managing Interrupts and Top/Bottom Halves (Softirqs, Tasklets, Workqueues)
- Direct Memory Access (DMA) Concepts

05 Module 5: Kernel Synchronization and Debugging

- Kernel Synchronization Primitives (Spinlocks, Mutexes, Semaphores, RCU)
- Atomic Operations and Race Conditions
- Using printk for Kernel Logging
- Introduction to Kernel Debugging Tools (kgdb, ftrace, perf)
- Analyzing Kernel Panics and Crashes

06 Module 6: Advanced Kernel Topics and Contributions

- Adding New System Calls
- Introduction to the Linux Networking Stack (Netfilter Hooks)
- Security Enhancements: LSM (Linux Security Modules) Basics
- Porting Kernel Code and Cross-Compilation
- Contributing to the Open Source Linux Kernel Community

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Embedded Linux Engineer**
- > **Linux Kernel Developer/Maintainer**
- > **Low-Level Systems Programmer**

FREQUENTLY ASKED QUESTIONS

Q: What specific prerequisites are essential to succeed in this Linux Kernel Development Course?

To get the most out of this intermediate-level course, participants should have a solid foundation in C programming, including pointers, data structures, and memory management. Additionally, a strong understanding of fundamental Linux operating system concepts and practical experience with Linux command-line tools and system administration are highly recommended.

Q: How will mastering Linux kernel development impact my career beyond basic Linux administration or application development?

This course elevates your skill set significantly, moving you beyond superficial interaction with Linux. You'll gain the ability to deeply understand, debug, and modify the core operating system, opening doors to highly specialized roles such as embedded systems development, hardware-software integration, operating system research, and performance optimization engineering. This expertise is critical for designing and maintaining robust, high-performance systems and contributing to cutting-edge technologies.

Q: What kind of practical experience or projects can I expect to complete in this course to apply my kernel development skills?

The course is designed with a strong emphasis on hands-on learning. You'll engage in practical exercises such as compiling and booting custom kernels, developing and testing simple kernel modules (e.g., character device drivers), implementing basic kernel synchronization mechanisms, and utilizing kernel debugging tools to diagnose issues. These projects are crafted to provide direct experience in the full cycle of kernel development.

ABOUT COMPUTER PRIDE



East Africa's Premier IT Training Center

With over 15 years of excellence, Computer Pride delivers globally recognized certification programs from leading technology vendors. Located on Kenyatta Avenue in Nairobi's CBD, our state-of-the-art facilities and expert instructors have empowered thousands of professionals across East Africa.

15+

Years of Excellence

10,000+

Professionals Trained

50+

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READY TO ENROL?

Take the next step in your technology career.

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