



LINUX TRAINING

Linux Kernel Debugging Course

Master Linux kernel debugging techniques. Learn to identify and resolve complex system issues efficiently.

DURATION

2 hours

LEVEL

Intermediate

FORMAT

Instructor-Led

-
- Globally Recognized Certification
 - Expert-Led Hands-On Training
 - Flexible Scheduling

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COURSE OVERVIEW

This intermediate-level Linux Kernel Debugging course is meticulously crafted for seasoned IT professionals, system administrators, and developers who seek to master the advanced techniques required to diagnose and resolve complex issues within the Linux kernel. You will delve into the core methodologies and powerful tools used to understand kernel behavior, trace execution paths, analyze crashes, and identify performance bottlenecks. This intensive 2-hour program moves beyond userspace debugging, providing an in-depth exploration of kernel-specific debugging environments and strategies essential for system stability and high-performance computing.

Participants will gain hands-on experience with industry-standard utilities such as GDB for kernel debugging, ftrace and perf for deep-dive tracing and profiling, and the 'crash' utility for post-mortem analysis of kernel dumps. Mastering these skills is critical for maintaining robust system stability, optimizing performance in mission-critical environments, and developing high-performance Linux-based solutions. Upon completion, you will possess the expertise to troubleshoot intricate kernel-level problems, significantly enhancing your value in roles requiring deep Linux system understanding and problem-solving capabilities.

Duration	2 hours
Level	Intermediate
Vendor	Linux

COURSE CURRICULUM

01 Module 1: Introduction to Linux Kernel Debugging

- Understanding the Kernel Debugging Landscape
- Why Kernel Debugging is Different from Userspace Debugging
- Overview of Common Kernel Debugging Challenges
- Setting Up a Kernel Debugging Environment (VMs, QEMU)

02 Module 2: Basic Kernel Debugging Techniques

- Using printk Effectively
- Analyzing dmesg Output and Kernel Logs
- Understanding strace and ltrace for Userspace-Kernel Interface
- Kernel Error Messages and Panic Analysis

03 Module 3: Advanced Debugging with GDB

- Configuring GDB for Kernel Debugging
- Connecting GDB to a Running Kernel (kgdb, KVM/QEMU integration)
- Setting Breakpoints and Watchpoints in Kernel Code
- Inspecting Kernel Data Structures and Variables
- Navigating Stack Traces and Call Graphs

04 Module 4: Tracing and Profiling the Kernel

- Introduction to ftrace (Function Tracer)
- Using perf for Performance Analysis and Event Tracing
- Understanding SystemTap and BCC/eBPF (Brief Overview)
- Identifying Performance Bottlenecks with Tracing Tools

Module 5: Post-Mortem Kernel Crash Analysis

- 05**
- Understanding Kernel Panics and Oops Messages
 - Configuring kexec and kdump for Crash Dumps
 - Using the crash Utility to Analyze vmcore Files
 - Interpreting Crash Stack Traces and Register States
 - Identifying Root Causes of Kernel Crashes

06 **Module 6: Real-World Scenarios and Best Practices**

- Debugging Race Conditions and Deadlocks
- Memory Leak Detection in the Kernel
- Debugging Device Drivers and Hardware Interactions
- Best Practices for Efficient Kernel Troubleshooting
- Case Studies of Common Kernel Issues

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Linux Kernel Developer**
- > **Senior Embedded Systems Engineer**
- > **DevOps/Site Reliability Engineer (SRE) specializing in Linux infrastructure**

FREQUENTLY ASKED QUESTIONS

Q: What foundational knowledge or experience is recommended before enrolling in this Linux Kernel Debugging course?

This intermediate-level course assumes a strong understanding of Linux system administration, including command-line proficiency, shell scripting, and familiarity with core kernel concepts such as processes, memory management, and I/O. Prior experience with C programming and basic debugging principles in userspace environments will be highly beneficial for grasping the advanced topics covered.

Q: How will mastering kernel debugging skills enhance my career prospects, especially for roles like a Senior Systems Engineer or Kernel Developer?

Acquiring expertise in Linux kernel debugging significantly elevates your value by enabling you to diagnose and resolve the most challenging system-level issues that often baffle less experienced professionals. For Senior Systems Engineers, this means ensuring robust system stability and optimizing performance in critical infrastructure. For Kernel Developers, it's an indispensable skill for developing and maintaining reliable kernel modules and drivers, making you a critical asset in advanced Linux environments.

Q: What specific types of complex system problems will I be equipped to solve after completing this 2-hour intensive course?

Upon completing this course, you will be able to tackle intricate problems such as kernel panics, system freezes, mysterious performance degradation, deadlocks, and memory leaks originating within the kernel. You'll gain the ability to analyze core dumps, trace execution paths through the kernel, and pinpoint the exact source of obscure bugs that impact system reliability and efficiency, moving beyond mere symptom-based troubleshooting.

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+

Vendor Certifications

READY TO ENROL?

Take the next step in your technology career.

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