



# Linux Kernel Internals

## Who Should Attend:

The course is designed for software engineers who are familiar with Linux from the user and application development level, who wish to gain understanding of how the Linux kernel works internally.

Additional, assumed prerequisite knowledge, is experience in configuring and installing Linux kernels.

## Course Description

This course teaches attendees to acquaints developers with the fundamental subsystems, data structures, and API of the Linux kernel version 2.6.

## Overview

This two day, hands-on course, provides attendees with experience in creating Linux kernel source code within various subsystems of the Linux kernel.

Attendees will spend approximately 50 percent of the class time actually gaining hands-on experience with these topics.

## Duration

Two days.

## Course Materials

The workshop materials include a comprehensive student workbook. The workbook contains all of the slides used in the course as well as hands-on lab exercises.

## Course Objectives

**After this course, attendees will be able to:**

- Describe the role and functionality of the major subsystems within the Linux 2.6 kernel.
- Describe and make use of many of the key data structures and API functions within the Linux 2.6 kernel.

## Course Workshop and Set-up:

The workshop makes use of standard PC's with a desktop Linux distribution for development.



# Linux Kernel Internals Outline

- 1. Linux Kernel Overview**
  - 1.1. Diagram of Linux subsystems
  - 1.2. Role of the kernel
- 2. Processes**
  - 2.1. Process data structures
  - 2.2. Scheduling
  - 2.3. Process context
  - 2.4. Process creation
- 3. Interrupt Context**
  - 3.1. interrupt handlers
  - 3.2. Deferring work
  - 3.3. Timers
- 4. Synchronization**
  - 4.1. spin locks
  - 4.2. semaphores
  - 4.3. other synchronization mechanisms
- 5. Memory Management**
  - 5.1. Memory allocation
  - 5.2. Address spaces
- 6. Virtual Filesystem/Block Devices**
  - 6.1. VFS data structures
  - 6.2. Adding a filesystem
  - 6.3. File system caches
  - 6.4. Block devices
  - 6.5. Paging
  - 6.6. Proc filesystem
- 7. Networking**
  - 7.1. Sockets
  - 7.2. Netlink sockets
  - 7.3. Proc files for networking