LLC104 Linux Internals & Programming Essentials

Course Overview

LLC104 Linux Internals & Programming Essentials course takes an insight in to the Linux Kernel, understanding its features and subsystem architecture. It further explores the features of the file system, memory management, process management, system calls, IPCs and network implementations.

Pre-Requisites

Experienced C programmers with UNIX or Linux workstation power user skills who want to begin developing applications on Linux.

Target Audience

This course is for programmers who are new to the linux environment and want to learn about the kernel level features of the operating system. This course also helps programmers who are further intending to learn embedded and real time programming on Linux.

Course Outline

Introduction to Kernel
- History of Linux
- Types of Kernel
- The Linux kernel
- Kernel Architecture

The Boot Process
- BIOS Level
- Boot Loader
- Setup, startup_32 functions
- The start_kernel() function

Kernel Recompilation
- Importance of make files
- Procedure to recompile the kernel

Implementing System Calls
- System Calls Defined
- System Calls and APIs
- System Call Table
- Unistd.h and entry.S files
- Implementing a new system call

The File System
- Virtual File system & its role
- VFS data structures super_block, inode, file, dentry
- Files associated with a process
- System Calls
- Lab Exercisers

Process management
- Process Defined
- Process Descriptor Structures in the kernel
- Process States
- Process Scheduling
- Process Creation
- System calls related to process management

Inter Process Communication
- Pipes, Fifo's, signals
- System-V IPC's
  - Message queues
  - Shared memory
  - Semaphores

Sockets
- An Overview
- System calls related to TCP and UDP sockets

Memory Management
- Defining and Creating secondary memory areas
- Responsibilities of Memory Management Module
- Memory allocation & deallocation system calls malloc, calloc, alloca, free
- Demand Paging defined
- Process Organization in Memory
- Address Translation and page fault handling
- Memory allocation strategies
  - Buddy System Algorithm
  - Slab Allocator
- Swapping Memory Areas
- Memory Mapping

Programming & Debugging Tools
- strace: tracing system calls
- Tools used to detect memory access error and Memory leakage in Linux : mtrace
- Using gdb and ddd utilities

Course Duration: Three Days: 10 am - 5.30 pm

Course Fee Rs. 6,000/-
(Plus Service Tax as applicable)