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WORKSHOP 1

Linux Kernel Internals and Advanced Programming Training Workshop

Course Duration: Three Full Days

Course Fee: Rs. 3800/- (+ Tax)

Course Outline

Kernel Internals

- **Introduction to Kernel**
 - History of Linux
 - Types of Kernel
 - The Linux kernel
 - Kernel Facilities
 - Kernel Architecture
 - Kernel Version Numbers
 - Configure, Compile Kernel

- **The File System**
 - Virtual File system & its role
 - Files associated with a process
 - System Calls

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

- **Memory Management**
 - Demand Paging defined
 - Virtual Memory Management
 - Paging
 - Buddy System Algorithm
 - Slab Allocator
 - Swapping Memory Areas

- **Interrupts**
 - About Interrupts
 - Interrupt Handlers
 - Softirqs
 - Tasklets
 - Work Queues

- **Time and Timers**
 - HZ and Jiffies
 - Time of Day
 - Delayed Execution
 - Kernel Timers

- **Conceptual understanding of Device Drivers**
 - Character Device Drivers
 - Block Device Drivers
 - Network Device Drivers

- **Kernel Configuration and Compilation**
 - Kernel Building System
 - Patching the Kernel
 - Kernel Configuration
 - Compiling the Linux Kernel

- **Kernel Parameters**
 - Build-Time Parameters
 - Boot-Time Parameters
 - Run-Time Parameters
 - System Tuning

- **Kernel Synchronization**
 - UP vs SMP Issues
 - Atomic Operations
 - Semaphores
 - Spin Locks

- **Boot Process - understanding Power ON to login prompt process**
 - BIOS Level
 - Boot Loader
 - Available Bootloaders – GRUB, UBoot, etc.
 - Role of a Bootloader
 - Kernel Initialisation Phase
 - System Initialisation Phase
 - Understanding Runlevels
 - Various initialization scripts & customizing them
 - Kernel Command-Line Boot Parameters

Linux Advanced Programming

- **Arguments , the environment, and popular system functions**
 - Arguments to a program.
 - Retrieving information from the environment.
 - Discovering the date and time
 - Getting system information.
- **File I/O**
 - Library functions and system calls for I/O
 - Getting file status information with stat()
 - Processing directories and directory entries.
- **Shell Commands & Introduction to Shell Scripting**
 - Basic Shell commands
 - Bash Shell Essentials
- **Creating Makefiles**
 - Makefile basics
 - Creating make files for single or multiple source files project
- **Creating Libraries**
 - Creating Static Library
 - Creating Shared Library
- **Multi Process Programming**
 - Creating child processes
 - fork(). vfork(), exec()
 - Parent synchronization with child

- **Multi Thread Programming**
 - Creating multiple threads
 - Parent synchronization with other Threads

- **Inter Process Communication**
 - Pipes, FIFO's,
 - Signals
 - System-V IPC's
 - Message queues
 - Shared memory
 - Semaphores

- **Introduction to Sockets**
 - An Overview
 - System calls related to TCP and UDP sockets
 - Using Wireshark for network sniffing

- **Network Programming**
 - TCP Server Client Programming
 - UDP Server Client Programming
 - Lab exercises

- **Programming & Debugging Tools**
 - Debugging and Analysis Tools
 - strace : Tracing System calls
 - ltrace : Tracing Library calls
 - Using gdb and ddd utilities
 - Core Dump Analysis etc

Pre-Requisites:

Basic C programming

Familiar with Linux OS, but not essential.

Advantages of Levana Technologies

- 100% Practical Oriented Workshops
- Comprehensive Course Material Provided
- 1:1 Hardware Provided
- Industry Experienced Faculty
- Value for Money, Choose Modules of Your Choice
- Technical Support Even After Training

We are conducting Programming Workshops on following also

- Learn Japanese Language
- Linux Internals & Linux Essentials training Workshop
- Linux Advanced Programming training Workshop
- Linux Device Driver and Kernel Programming training Workshop
- Embedded Linux and Device Driver Programming training Workshop
- J-Tag and Advanced Debugging in Embedded Linux
- Unix / Linux Shell Scripting Workshop with sed and awk
- Embedded Qt Programming
- Network Programming on Linux
- ARM, 8051 Programming
- C & C++ Programming

Contact: Vivek

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