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**Learning Style: Virtual Classroom**

**Technology: Linux Foundation**

**Difficulty: Intermediate**

**Course Duration: 4 Days**

## Linux Performance Tuning (LFS426)



## About this Course:

Linux is the leading operating system for web servers, consumer electronics, smartphones, and cloud computing. The continuous growth and expansion of the IT industry have created a drought of Linux System Administrators. Businesses are direly in need of proficient Linux Professionals who can fine-tune Linux System Performances and maximize efficiency & speed. A Linux System Administrator earns \$70,057 annually and can easily secure a highly reputable job.

This course provides an in-depth overview of the basics tools & techniques used in optimizing Linux System Performance and Administration. Professionals will learn to better maintain Linux systems and make it operate at optimal levels. The techniques and practices instructed in this course are tested and suited to most-demanding computing ecosystems. The teachings of this course align with a broad group of Linux Distributions and professionals also learn the art of effective Linux System Implementation.

## Course Objectives:

The core objective of this course is to help professionals develop a better understanding and sound knowledge of the following key concepts:

- Linux Monitoring Tools and Techniques
- Configuration Management Best Practices in Linux
- Kernels Behavior's Manual Optimization
- Linux Systems Profiling, Tracing, and Instrumental Techniques
- Optimizing Linux Distributions and Maximizing Efficiency & Speed

## Audience:

This course is specifically tailored for the following group of professionals and interested candidates:

- Linux System Administrator
- Technology Architects & System Administrators
- Professionals interested in Linux Systems Optimization & Improving Speed & Efficiency

## Prerequisites:

Professionals planning to enroll in the Linux Performance Tuning (LFS426) course must comply with the following prerequisites:

- Practical Knowledge of working with Linux Operating Systems
- Conceptual Know-how of the Core Concepts of Local System Administration
- Familiarity with the key concepts covered in Linux System Administration (LFS301)

## Course Outline:

## **Introduction**

- Linux Foundation
- Linux Foundation Training
- Linux Foundation Certifications
- Laboratory Exercises, Solutions and Resources
- Distribution Details
- Labs

## **Performance Optimization Principles**

- Methodology
- Optimization Process
- Investigation Tools
- Labs

## **Benchmarking**

- Performance Benchmarks
- Synthetic Benchmarks
- Application Benchmarks
- Labs

## **Tuning Interfaces**

- Tuning Concepts
- Kernel Tunables
- Kernel Parameters
- Application Interfaces
- tuned
- Hardware Tunables
- Labs

## **Monitoring Interfaces**

- /proc Filesystem
- Command-line Utilities
- Performance Data Collection
- Nagios
- Ganglia
- Kernel Monitoring
- Labs

## **Profiling Techniques and Tools**

- Performance Monitoring
- Counters
- Performance Ratios
- Kernel vs Application Profiling
- oprofile

- Perf
- Available perf events
- Acquiring Performance Data with perf
- Monitoring Performance from Within the Application
- User Space Performance Monitoring with gprof
- Labs

## **Tracing Tools**

- User Space Tracing
- strace
- Library Tracing
- Kernel Tracing
- ftrace
- SystemTap
- Tracing Applications with SystemTap
- Labs

## **CPU Subsystem**

- CPU Concepts and Architecture
- CPU-Level Optimizations
- Specialized Instruction Sets
- CPU Topology
- BIOS Settings
- Labs

## **Power Management**

- Power Management Strategies
- Device Power Management
- CPU Power Saving States
- Frequency Scaling
- Power Management Tools
- Labs

## **Process Scheduling**

- Design
- Scheduling Policies
- Scheduling Tunable Settings
- CPU Affinity and Isolation
- Interrupt Affinity
- Control Groups
- Labs

## **Memory Subsystem**

- Overview
- Page Lookup Optimization and Huge Pages

- Controlling Swapping from Applications
- Minimizing Faults
- Labs

## **NUMA Optimizations**

- CPU Concepts and Architecture
- NUMA Memory Allocation
- NUMA Statistics
- Labs

## **I/O Subsystem**

- Storage Stack Overview
- I/O Scheduler Concepts
- I/O Scheduler Algorithms
- Hardware Considerations
- Tuning Storage Devices
- Labs

## **Local Filesystems**

- Major Filesystem Choices
- Ext3/4 Journaling Modes
- Filesystem Attributes
- Labs

## **Network Filesystems**

- Network File System (NFS)
- NFSv4
- pNFS
- Labs

## **Storage and IO**

- Software RAID Refresher
- RAID Levels
- RAID configuration
- Logical volumes
- Volumes and Volume Groups
- Creating Logical Volumes
- Raw Devices
- Asynchronous I/O
- Labs

## **Analyzing the I/O Subsystem**

- iostat
- iotop

- blktrace
- blkparse
- btrace
- btt
- blkmon
- Labs

## Network Subsystem Optimization

- Network Stack Overview
- Optimizing for Latency and Throughput
- Network Interface Hardware Settings
- Offloading Techniques
- TCP Optimization
- Monitoring and Diagnostic Tools
- Labs

## Virtualization

- Virtualization Overview
- Disk Considerations
- Network Considerations
- Labs

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