

Linux Performance Tuning (LFS426)

1. Introduction

- Linux Foundation
- Linux Foundation Training
- Logistics

2. Performance Optimization Principles

- Methodology
- Optimization Process
- Investigation Tools

3. Benchmarking

- Performance Benchmarks
- Synthetic Benchmarks
- Application Benchmarks

4. Tuning Interfaces

- Kernel Tunables
- Kernel Parameters
- Application Interfaces
- tuned
- Hardware Tunables

5. Monitoring Interfaces

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

6. 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

7. Tracing Tools

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

8. CPU Subsystem

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

9. Power Management

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

10. Process Scheduling

- Design
- Scheduling Policies
- Scheduling Tunable Settings
- CPU Affinity and Isolation
- Interrupt Affinity

11. Memory Subsystem

- Overview
- Page Lookup Optimization and Huge Pages
- Controlling Swapping from Applications
- Minimizing Faults

12. NUMA Optimizations

- Key NUMA Concepts
- CPU Concepts and Architecture
- NUMA Memory Allocation

- NUMA Statistics

13. I/O Subsystem

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

14. Local Filesystems

- Choosing the Right Filesystem
- Ext3/4 Journaling Modes
- Filesystem Attributes

15. Network Filesystems

- Network File System (NFS)
- NFSv4
- pNFS

16. Storage and IO

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

17. Analyzing the I/O Subsystem

- iostats
- iotop
- blktrace
- blkparse
- btrace
- btt
- blkmon

18. Network Subsystem Optimization

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

- Monitoring and Diagnostic Tools

19. Virtualization

- Virtualization Overview
- Disk Considerations
- Network Considerations

20. Conclusion