

Course Description: This course is designed to teach the methodology of performance tuning and capacity planning for Red Hat Enterprise Linux. This class will cover: a discussion of system architecture with an emphasis on understanding the implications of system architecture on system performance, methods for testing the effects of performance adjustments (benchmarking), open source benchmarking utilities, methods for analyzing system performance and networking performance, tuning configurations for specific application loads. Where possible, emphasis will be placed on using tools that are provided as part of Red Hat Enterprise Linux and Red Hat Network. The EX442 exam will be administered on the 5th day.

Who Should Attend: RH442 is aimed at senior Red Hat Enterprise Linux system administrators and other IT professionals working in enterprise environments and mission-critical systems.

Prerequisites: Participants in RH442 should already be familiar with Red Hat Enterprise Linux. Recommended minimum competency level is completion of the RHCE or equivalent knowledge.

Benefits of Attendance: Upon completion of this course, students will be able to:

- Understand the implications of system architecture on system performance.
- Use methods for testing the effects of performance adjustments (benchmarking).
- Use open source benchmarking utilities.
- Understand and use methods for analyzing system performance and networking performance.
- Use tuning configurations for specific application loads.

Course Outline:

Basics: Principles and Terminology

What is performance tuning?
Steps in the tuning process
Quantifying performance

Application tuning
Viewing application behaviors using standard tools
NFS
Apache
Samba

Tools for Obtaining Information

The sysfs and proc filesystems and the sysctl utility
System process queues
The system activity reporter
Passing parameters to kernel modules
Generating reports using standard utilities
Benchmarking
Monitoring systems with SNMP and MRTG

Monitoring the Kernel

Kernel profiling and OProfile
Monitoring the kernel with SystemTap

Hardware Performance Considerations

Memory: levels, types
Cache
Disk and I/O

The CPU: Processes and Scheduling

Controlling processor speed
How the Linux kernel schedules processes
Process priority
Obtaining processor performance information

Memory

How Processes and the kernel utilize memory
System tunables that affect memory performance
How page and buffer caches work
Monitoring and controlling memory usage
The virtual memory subsystem

The I/O Subsystem and Filesystems

Tuning the disk I/O subsystem
I/O scheduling
The virtual file system
File system tunable parameters
Layout of the ext2 and ext3 filesystems
Journaling

Network Performance

Factors affecting performance
Viewing device information
Ethernet channel bonding
Network sockets
Layers of the OSI model
TCP tuning

Application Tuning

Causes of performance problems