

Linux System Administration 1

Course Summary

Length: 5 Days

Prerequisite: Linux Essentials course or equivalent experience

Recommendation Statement:

Students should have some experience with Linux or Unix fundamentals such as using the vi editor, navigating through the directories, and managing files.

Course Description:

This course teaches basic topics in Linux system administration. Topics in this course are apply to the Red Hat®, SUSE, Fedora, Oracle Linux and CentOS distributions. Students will learn how to install, configure and administer a Linux Enterprise server.

Upon completion of this course, you should be able to:

- Understand Linux hardware discovery and control
- Understand the boot process
- Maintain software
- Administer file systems
- Understand and manage LVM and RAID volumes
- Administer remote storage and file systems (NFS and AutoFS)
- Administer users and groups
- Administer Security
- Configure and Administer the network
- Administer system log files
- Monitor system performance and troubleshoot problems
- Install the OS

Linux System Administration 1
Detailed Course Outline

1. LINUX HARDWARE DISCOVERY, INTERACTION, AND CONTROL

- a. Hardware Discovery Tools
- b. Configuring New Hardware with hwinfo
- c. Hardware and System Clock
- d. Console
- e. Virtual Terminals
- f. Serial Ports
- g. SCSI Devices
- h. USB Devices
- i. USB Configuration
- j. Common UNIX Printing System
- k. Defining a Printer
- l. Managing Optical Media
- m. Tape Libraries
- n. Managing Linux Device Files
- o. Kernel Hardware Info - /sys/
- p. /sys/ Structure
- q. udev
- r. Kernel Modules
- s. Configuring Kernel Components and Modules
- t. Handling Module Dependencies
- u. Configuring the Kernel via /proc/

2. BOOT PROCESS AND SYSV INIT

- a. Booting Linux on PCs
- b. GRUB Configuration
- c. Boot Parameters
- d. Initial ramdisk
- e. /sbin/init
- f. System Init Styles
- g. Linux Runlevels
- h. /etc/inittab
- i. /etc/rc.d/rc.sysinit
- j. SUSE /etc/init.d/boot
- k. Runlevel Implementation
- l. System Configuration Files
- m. RHEL6 Configuration Utilities
- n. SLES11 Configuration Utilities
- o. Typical SysV Init Script
- p. The /etc/rc.local File
- q. The /etc/init.d/*.local Files
- r. Managing Daemons
- s. Controlling Service Startup
- t. Shutdown and Reboot

3. SOFTWARE MAINTENANCE

- a. Managing Software
- b. RPM Features
- c. RPM Architecture
- d. RPM Package Files
- e. Working With RPMs
- f. Querying and Verifying with rpm
- g. Updating the Kernel RPM
- h. Dealing With RPM & YUM Digest Changes
- i. Yum Plugins
- j. YUM Repositories
- k. YUM Repository Groups
- l. Compiling/Installing from Source
- m. Manually Installed Shared Libraries
- n. Installing Source RPM Packages

4. FILESYSTEM ADMINISTRATION

- a. Partitioning Disks with fdisk
- b. Partitioning Disks with parted
- c. Filesystem Creation
- d. Mounting Filesystems
- e. Filesystem Maintenance
- f. Persistent Block Devices
- g. Resizing Filesystems
- h. Swap
- i. Filesystem Structures
- j. Determining Disk Usage With df and du
- k. Configuring Disk Quotas
- l. Setting Quotas
- m. Viewing and Monitoring Quotas
- n. Filesystem Attributes
- o. Backup Software
- p. Backup Examples

5. LVM & RAID

- a. Logical Volume Management
- b. Implementing LVM
- c. Creating Logical Volumes
- d. Manipulating VGs & LVs
- e. Advanced LVM Concepts
- f. system-config-lvm
- g. SLES Graphical Disk Tool
- h. RAID Concepts
- i. Array Creation with mdadm
- j. Software RAID Monitoring
- k. Software RAID Control and Display

6. REMOTE STORAGE ADMINISTRATION

- a. Remote Storage Overview
- b. Remote Filesystem Protocols
- c. Remote Block Device Protocols
- d. File Sharing via NFS
- e. NFSv4
- f. NFS Clients
- g. NFS Server Configuration
- h. Implementing NFSv4
- i. AutoFS
- j. AutoFS Configuration
- k. Accessing Windows/Samba Shares from Linux
- l. SAN Multipathing
- m. Multipath Configuration
- n. Multipathing Best Practices
- o. iSCSI Architecture
- p. Open-iSCSI Initiator Implementation
- q. iSCSI Initiator Discovery
- r. iSCSI Initiator Node Administration
- s. Mounting iSCSI Targets at Boot
- t. iSCSI Multipathing Considerations

7. USER/GROUP ADMINISTRATION

- a. User and Group Concepts
- b. User Administration
- c. Modifying Accounts
- d. Group Administration
- e. Password Aging
- f. Default User Files
- g. Controlling Logins
- h. Manual DS Client Configuration
- i. system-config-authentication
- j. SLES Graphical DS Client Configuration
- k. System Security Services Daemon (SSSD)

8. PLUGGABLE AUTHENTICATION MODULES (PAM)

- a. PAM Overview
- b. PAM Module Types

- c. PAM Order of Processing
- d. PAM Control Statements
- e. PAM Modules
- f. pam_unix
- g. pam_nologin.so
- h. pam_limits.so
- i. pam_wheel.so
- j. pam_xauth.so

9. SECURITY ADMINISTRATION

- a. Security Concepts
- b. Tightening Default Security
- c. SuSE Security Checker
- d. Security Advisories
- e. File Access Control Lists
- f. Manipulating ACLs
- g. Viewing ACLs
- h. Backing Up ACLs
- i. File Creation Permissions with umask
- j. User Private Group Scheme
- k. Alternatives to UPG
- l. AppArmor
- m. SELinux Security Framework
- n. SELinux Modes
- o. SELinux Commands
- p. Choosing an SELinux Policy
- q. SELinux Booleans
- r. Permissive Domains
- s. SELinux Policy Tools
- t. Basic Firewall Activation

10. BASIC NETWORKING

- a. IPv4 Fundamentals
- b. TCP/UDP Fundamentals
- c. Linux Network Interfaces
- d. Ethernet Hardware Tools
- e. Network Configuration with ip Command
- f. Configuring Routing Tables
- g. IP to MAC Address Mapping with ARP
- h. Starting and Stopping Interfaces
- i. NetworkManager
- j. DNS Clients
- k. DHCP Clients
- l. system-config-network-{tui,cmd}
- m. SUSE YaST Network Configuration Tool
- n. Network Diagnostics
- o. Information from netstat and ss
- p. Managing Network-Wide Time
- q. Continual Time Sync with NTP
- r. Configuring NTP Clients
- s. Useful NTP Commands

11. ADVANCED NETWORKING

- a. Multiple IP Addresses
- b. Configuring a DHCP server
- c. Enabling IPv6
- d. Interface Bonding
- e. Interface Bridging
- f. 802.1q VLANs
- g. Tuning Kernel Network Settings

12. LOG FILE ADMINISTRATION

- a. System Logging
- b. Syslog-ng
- c. Rsyslog
- d. /etc/rsyslog.conf
- e. Log Management
- f. Log Anomaly Detector

13. MONITORING & TROUBLESHOOTING

- a. System Status - Memory
- b. System Status - I/O
- c. System Status - CPU
- d. Performance Trending with sar
- e. Process Accounting
- f. Troubleshooting Basics: The Process
- g. Troubleshooting Basics: The Tools
- h. strace and ltrace
- i. Common Problems
- j. Troubleshooting Incorrect File Permissions
- k. Inability to Boot
- l. Typos in Configuration Files
- m. Corrupt Filesystems
- n. RHEL6 Rescue Environment
- o. SUSE Rescue Environment

A. PRE-INSTALLATION CONSIDERATIONS

- a. Pre-Installation Considerations
- b. Hardware Compatibility
- c. Multi-OS Booting
- d. Partition Considerations
- e. Filesystem Planning
- f. Selecting a Filesystem

B. INSTALLING RHEL6

- a. Anaconda: An Overview
- b. Anaconda: Booting the System
- c. Anaconda: Common Boot Options
- d. Anaconda: Loading Anaconda and Packages
- e. Anaconda: Storage Options
- f. Anaconda: Troubleshooting
- g. FirstBoot
- h. Kickstart
- i. A Typical Install

C. INSTALLING SLES11

- a. YaST Install Program Interface
- b. Network Installation
- c. SLP for SUSE Linux Installation
- d. Installation Choices
- e. Kernel Crash Dump Configuration
- f. Creating AutoYaST2 Files
- g. Using AutoYaST2 files
- h. linuxrc Automation
- i. Installation Diagnostics
- j. After The First Reboot
- k. A Typical Install

D. ISCSI TARGET CONFIGURATION

- a. iSCSI Target Implementations
- b. iSCSI Target Configuration (tgt)
- c. iSCSI Target LUN Configuration (tgt)
- d. iSCSI Target Auth Configuration (tgt)
- e. iSCSI Persistent Configuration (tgt)

E. MANAGE VIRTUAL MACHINES

- a. Virtualization: What and Why?
- b. Introducing libvirt
- c. libvirt: Basic Concepts
- d. libvirt: Storage Architecture
- e. libvirt: Network Architecture
- f. libvirt: Graphical Tools
- g. libvirt: Command Line Tools
- h. virsh: Basics
- i. virsh: Common Tasks
- j. virt-install
- k. libguestfs and guestfish