RedHat (RHEL) System Administration

Course Summary

Length: 5 Days **Prerequisite**: RedHat fundamentals course

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 RedHat system administration. Topics in this course are also apply to the SUSE and CentOS distributions. Students will learn how to install, configure and administer a RedHat Enterprise system.

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

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RedHat System Administration

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 FACLs
g. Viewing FACLs
h. Backing Up FACLs
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