Enterprise Linux System Administration

This is a five day, in-depth course that explores installation, configuration and maintenance of Linux systems. The course focuses on issues universal to every workstation and server. This course material is designed to provide extensive hands-on experience. Topics include: installation and configuration; the boot process; user and group administration; filesystem administration, including quotas, FACLs, RAID and LVM, task automation, client networking, SELinux, software management, log files and troubleshooting.

Course Objectives:

- Understand network configuration and be able to troubleshoot.
- Manage file systems and logical volumes.
- Learn how to control user and file access.
- Install and manage services and processes.
- Learn essential command line operations

Audience: Students should already be comfortable working in a Linux or Unix environment

Prerequisites: An understanding of network concepts, and the TCP/IP protocol suite is helpful.

Number of Days: 5 days

1 Linux Hardware Discovery, Interaction, & Control

Hardware Discovery Tools
Configuring New Hardware with hwinfo
Hardware and System Clock
Console
Virtual Terminals
Serial Ports
SCSI Devices
USB Devices
USB Configuration
Common UNIX Printing System
Defining a Printer
Managing Optical Media
Tape Libraries
Managing Linux Device Files
Kernel Hardware Info - /sys/
/sys/ Structure
udev
Kernel Modules
Configuring Kernel Components and Modules
Handling Module Dependencies
Configuring the Kernel via /proc/

2 Boot Process and SYSV INIT

Booting Linux on PCs
GRUB Configuration
Boot Parameters
Initial ramdisk
/sbin/init
System Init Styles
Linux Runlevels
/etc/inittab
/etc/rc.d/rc.sysinit
SUSE /etc/init.d/boot
Runlevel Implementation
System Configuration Files
RHEL6 Configuration Utilities
SLES11 Configuration Utilities
Typical SysV Init Script
The /etc/rc.local File
The /etc/init.d/*.local Files
Managing Daemons
Controlling Service Startup
Shutdown and Reboot

3 Software Maintenance
Managing Software
RPM Features
RPM Architecture
RPM Package Files
Working with RPMs
Querying and Verifying with rpm
Updating the Kernel RPM
Dealing With RPM & YUM Digest Changes
YUM Plugins
YUM Repositories
Compiling/Installing from Source
Manually Installed Shared Libraries
Installing Source RPM Packages
4 FileSystem Administration
Partitioning Disks with fdisk
Partitioning Disks with parted
Filesystem Creation
Mounting Filesystems
Filesystem Maintenance
Persistent Block Devices
Resizing Filesystems
Swap
Filesystem Structures
Determining Disk Usage With df and du
Configuring Disk Quotas
Setting Quotas
Viewing and Monitoring Quotas
Filesystem Attributes
Backup Software
5 LVM & RAID
Logical Volume Management
Implementing LVM
Creating Logical Volumes
Manipulating VGs & LVs
Advanced LVM Concepts
system-config-lvm
SLES Graphical Disk Tool
RAID Concepts
Array Creation with mdadm
Software RAID Monitoring
Software RAID Control and Display
6 Remote Storage Administration
Remote Storage Overview
Remote Filesystem Protocols
Remote Block Device Protocols
File Sharing via NFS
NFSv4
NFS Clients
NFS Server Configuration
Implementing NFSv4
AutoFS
AutoFS Configuration
Accessing Windows/Samba Shares from Linux
SAN Multipathing
Multipath Configuration
Multipathing Best Practices
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Open-iSCSI Initiator Implementation
iSCSI Initiator Discovery
iSCSI Initiator Node Administration
Mounting iSCSI Targets at Boot
iSCSI Multipathing Consideration
7 User/Group Administration
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User Administration
Modifying Accounts
Group Administration
Password Aging
Default User Files
Controlling Logins
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SLES Graphical DS Client Configuration
System Security Services Daemon (SSSD)
8 Pluggable Authentication Modules (PAM)
PAM Overview
PAM Module Types
PAM Order of Processing
PAM Control Statements
PAM Modules
pam_unix
pam_nologin.so
pam_limits.so
pam_wheel.so
pam_xauth.so

9 Security Administration
Security Concepts
Tightening Default Security
SuSE Security Checker
Security Advisories
File Access Control Lists
Manipulating FACLs
Viewing FACLs
Backing Up FACLs
File Creation Permissions with umask
User Private Group Scheme
Alternatives to UPG
AppArmor
SELinux Security Framework
SELinux Modes
SELinux Commands
Choosing an SELinux Policy
SELinux Booleans
Permissive Domains
SELinux Policy Tools
Basic Firewall Activation

10 Basic Networking
IPv4 Fundamentals
TCP/UDP Fundamentals
Linux Network Interfaces
Ethernet Hardware Tools
Network Configuration with ip Command
Configuring Routing Tables
IP to MAC Address Mapping with ARP
Starting and Stopping Interfaces
NetworkManager
DNS Clients
DHCP Clients
system-config-network{tui,cmd}
SUSE YaST Network Configuration Tool
Network Diagnostics
Information from netstat and ss
Managing Network-Wide Time
Continual Time Sync with NTP
Configuring NTP Clients
Useful NTP Commands

11 Advanced Networking
Multiple IP Addresses
Configuring a DHCP server
Enabling IPv6
Interface Bonding
Interface Bridging
802.1q VLANS
Tuning Kernel Network Settings

12 Log File Administration
System Logging
Syslog-ng
Rsyslog
/etc/rsyslog.conf
Log Management
Log Anomaly Detector

13 Monitoring & Troubleshooting
System Status - Memory
System Status - I/O
System Status - CPU
Performance Trending with sar
Troubleshooting Basics: The Process
Troubleshooting Basics: The Tools
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SUSE Rescue Environment

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Anaconda: Booting the System
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Anaconda: Loading Anaconda and Packages
Anaconda: Storage Options
Anaconda: Troubleshooting
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