



CentOS Linux Server Administrator



This is an in-depth course that explores installation, configuration and maintenance of CentOS systems. The course focuses on issues universal to every workstation and server. The 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, ACLs, RAID and LVM; task automation; client networking; software management; log files; troubleshooting; and more.

วัตถุประสงค์:

- Explores installation linux CentOS
- Configuration and maintenance of CentOS systems
- Installation and configuration; the boot process
- Config user and group administration; filesystem administration

กลุ่มเป้าหมาย:

This course is for those students wishing to learn CentOS System Administration. Benefits of Attendance: Upon completion of this course, students will be able to:

Install, configure, and maintain CentOS systems Prerequisites: Students should already be comfortable working in a Linux or Unix environment. Fundamentals such as the Linux filesystem, process management, and how to edit files will not be covered in class. An understanding of network concepts, and the TCP/IP protocol suite is helpful.

ความรู้พื้นฐาน:

- ใช้คอมพิวเตอร์พื้นฐานได้
- ใช้งานอินเทอร์เน็ตได้
- ถอนติดตั้งโปรแกรมบนระบบ Windows หรือ Linux ได้



ระยะเวลาในการอบรม:

- 30 ชั่วโมง (5 วัน)

ราคาคอร์สอบรม:

- 9,500 บาท / คน (ราคานี้ยังไม่ได้รวมภาษีมูลค่าเพิ่ม)

วิทยากรผู้สอน:

- อาจารย์นิติพันธ์ ป้อมพันธ์

เนื้อหาการอบรม:

Module 1: CentOS Hardware Discovery, Interaction, and 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 Drives
- Tape Libraries
- Managing CentOS Device Files
- Kernel Hardware Info - /sys/
- /sys/ Structure
- udev



- Kernel Modules
- Configuring Kernel Components and Modules
- Handling Module Dependencies
- Configuring the Kernel via `/proc/`
- Lab: Adjusting Kernel Options
- Lab: Configuring Print Queues
- Lab: Introduction to Troubleshooting Labs
- Lab: Troubleshooting Practice: Kernel Modules

Module 2: Boot Process and SysV Init

- Booting CentOS on PCs
- GRUB Configuration
- Boot Parameters
- Initial ramdisk
- `/sbin/init`
- System Init Styles
- CentOS Runlevels
- `/etc/inittab`
- `/etc/rc.d/rc.sysinit`
- `/etc/init.d/boot`
- Runlevel Implementation
- System Configuration Files
- Configuration Utilities
- Novell's 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



- Lab: Boot Process
- Lab: GRUB Command Line
- Lab: Basic GRUB Security
- Lab: Managing Services With chkconfig
- Lab: Troubleshooting Practice: Boot Process

Module 3: Software Maintenance

- Managing Software
- RPM Features
- RPM Architecture
- RPM Package Files
- Working With RPMs
- Querying and Verifying with rpm
- Updating the Kernel RPM
- Managing Software Dependencies
- Using the YUM command
- Using the Zypper command
- YUM package groups
- Zypper Services and Catalogs
- Dealing With RPM & YUM Digest Changes
- Configuring YUM
- Yum Plugins
- YUM Repositories
- Compiling/Installing from Source
- Manually Installed Shared Libraries
- Installing Source RPM Packages
- Lab: Managing Software with RPM
- Lab: Creating a Custom RPM Repository
- Lab: Querying the RPM Database
- Lab: Installing Software via RPM & Source and Rebuilding SRPMs



- Lab: Managing YUM Repositories
- Lab: Managing Zypper Repositories
- Lab: Using YUM
- Lab: Using Zypper

Module 4: Filesystem Administration

- Partitioning Disks with fdisk
- Partitioning Disks with parted
- Filesystem Creation
- Mounting Filesystems
- Filesystem Maintenance
- Persistent Block Devices
- Resizing Filesystems
- Swap
- Two Types of Disk Space
- Determining Disk Usage With df and du
- Configuring Disk Quotas
- Setting Quotas
- Viewing and Monitoring Quotas
- Filesystem Attributes
- Backup Software
- Backup Examples
- Lab: Creating and Managing Filesystems
- Lab: Hot Adding Swap
- Lab: Setting User Quotas
- Lab: Using tar and cpio for Backups
- Lab: Using rsync and ssh for Backups
- Lab: Using dump and restore for Backups
- Lab: Creating ISO Images for Backups



Module 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
- Lab: Creating and Managing LVM Volumes
- Lab: Creating and Managing a RAID-5 Array

Module 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 CentOS
- SAN Multipathing
- Multipath Configuration
- Multipathing Best Practices



- iSCSI Architecture
- Open-iSCSI Initiator Implementation
- iSCSI Initiator Discovery
- iSCSI Initiator Node Administration
- Mounting iSCSI Targets at Boot
- iSCSI Multipathing Considerations
- Lab: Using autofs
- Lab: NFS Server Configuration
- Lab: iSCSI Initiator Configuration
- User/Group Administration
- User and Group Concepts

Module 7: User Administration

- Modifying Accounts
- Group Administration
- Password Aging
- Default User Files
- Controlling Logins
- Manual DS Client Configuration
- system-config-authentication
- SLES Graphical DS Client Configuration
- System Security Services Daemon (SSSD)
- Lab: User and Group Administration
- Lab: Using LDAP for Centralized User Accounts
- Lab: Troubleshooting Practice: Account Management
- Lab: Using NIS for Centralized User Accounts

Module 8: Pluggable Authentication Modules (PAM)

- PAM Overview
- PAM Module Types



- PAM Order of Processing
- PAM Control Statements
- PAM Modules
- pam_unix.so
- pam_unix2.so
- pam_nologin.so
- pam_limits.so
- pam_wheel.so
- pam_xauth.so
- Lab: Restricting superuser access to wheel group membership
- Lab: Using pam_nologin to Restrict Logins
- Lab: Setting Limits with the pam_limits Modules
- Lab: Using pam_limits to Restrict Simultaneous Logins

Module 9: Security Administration

- Security Concepts
- Tightening Default Security
- Security Checker
- Security Advisories
- File Access Control Lists
- Manipulating ACLs
- Viewing ACLs
- Backing Up ACLs
- File Creation Permissions with umask
- User Private Group Scheme
- Alternatives to UPG
- AppArmor
- CentOS Security Framework
- CentOS Modes
- CentOS Commands



- Choosing an CentOS Policy
- CentOS Booleans
- Permissive Domains
- Graphical CentOS Policy Tools
- Lab: User Private Groups
- Lab: Using Filesystem ACLs
- Lab: Exploring CentOS Modes
- Lab: CentOS File Contexts

Module 10: Process Administration

- Automating Tasks
- at/batch
- cron
- The crontab Command
- crontab Format
- /etc/cron.*/ Directories
- anacron
- Viewing Processes
- Managing Processes
- Tuning Process Scheduling
- Process Accounting
- Enabling Process Accounting
- Setting Resource Limits via ulimit
- Lab: Creating and Managing User Cron Jobs
- Lab: Adding System cron Jobs
- Lab: Using BSD Process Accounting

Module 11: Basic Networking

- IPv4 Fundamentals
- TCP/UDP Fundamentals



- CentOS 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}
- YaST Network Configuration Tool
- Network Diagnostics
- Information from netstat
- Managing Network-Wide Time
- Continual Time Sync with NTP
- Configuring NTP Clients
- Useful NTP Commands
- Lab: Network Discovery
- Lab: NTP Client Configuration

Module 12: Advanced Networking

- Multiple IP Addresses
- Configuring a DHCP server
- Enabling IPv6
- Interface Bonding
- Interface Bridging
- 802.1q VLANS
- Tuning Kernel Network Settings
- Lab: Multiple IP Addresses Per Network Interface
- Lab: Configuring IPv6



- Lab: Troubleshooting Practice: Networking
- The X Window System
- The X Window System
- X Modularity
- X.Org Drivers
- Configuring X Manually
- Automatic X Configuration
- Automatic X Configuration - SLES
- Xorg and Fonts
- The X Font Server
- Installing Fonts for Modern Applications
- Installing Fonts for Legacy Applications
- The X11 Protocol and Display Names
- Display Managers and Graphical Login
- Starting X Apps Automatically
- X Access Control
- Remote X Access (historical/insecure approach)
- Remote X Access (modern/secure approach)
- XDMCP
- Remote Graphical Access With VNC and RDP
- Specialized X Servers
- Lab: Remote X with XDMCP
- Lab: Configure X Security
- Lab: Configure a VNC Server
- Lab: Configure a VNC Server
- Lab: Launching X Apps Automatically
- Lab: Secure X
- Lab: Troubleshooting Practice: X11



Module 13: Log File Administration

- System Logging
- Syslog-ng
- Rsyslog
- /etc/rsyslog.conf
- Log Management
- Log Anomaly Detector
- Lab: Setting up a Full Debug Logfile
- Lab: Remote Syslog Configuration

Module 14: Monitoring & Troubleshooting

- System Status - Memory
- System Status - I/O
- System Status - CPU
- Performance Trending with sar
- Troubleshooting Basics: The Process
- Troubleshooting Basics: The Tools
- strace and ltrace
- Common Problems
- Incorrect File Permissions
- Inability to Boot
- Typos in Configuration Files
- Corrupt Filesystems
- Rescue Environment
- Lab: Recovering Damaged MBR

Module 15: Pre-Installation Considerations

- Pre-Installation Considerations
- Hardware Compatibility
- Multi-OS Booting



- Partition Considerations
- Filesystem Planning
- Selecting a Filesystem

Module 16: Installing CentOS

- Anaconda: An Overview
- Anaconda: Booting the System
- Anaconda: Common Boot Options
- Anaconda: Loading Anaconda and Packages
- Anaconda: Storage Options
- Anaconda: Troubleshooting
- FirstBoot
- Kickstart
- A Typical Install
- Lab: CentOS Installation
- Lab: Automating Installation with Kickstart
- Installing SLES 11
- Installation Choices
- DVD-ROM Install Media
- Network Installation
- SLP for CentOS Installation
- Local Hard Drive Installation
- Install Program Interface
- Installation Diagnostics
- Language/Keyboard Selection and EULA
- Installation Mode
- Clock and Time Zone
- Desktop Selection
- Server Base Scenario
- The YaST Installer Design



- Disk Partitioning
- Boot Loader Configuration
- Software Package Selection
- Kernel Crash Dump Configuration
- Confirmation and File Installation
- Setting the Root Password
- Hostname and Domain Name
- Network Configuration
- SLES Services Configuration
- Adding a User Account
- Release Notes
- Final Installation Hub
- Installation Complete and AutoYaST2
- Using AutoYaST2 files
- Creating AutoYaST2 Files
- linuxrc Automation
- Lab: Installation
- Lab: Automating Installation with AutoYaST

Module 17: Xen Virtualization

- Virtualization: What and Why?
- What is Xen?
- Xen Architecture
- Xen Deployment Options and Considerations
- Xen Networking
- Live Migration of Xen Virtual Servers
- xend Configuration
- Guest Config Files
- The xm Command
- Common xm Usage



- Xen Configuration Tools
- Lab: Installing a Xen VM
- Lab: Creating a Bootstrapped Xen Guest

Module 18: CentOS Kernel Compilation

- Why Compile?
- Getting Kernel Source
- Preparing to Compile
- Configuring Kernel Compilation Options
- Available Kernel Compile Options
- Compiling the Kernel
- Install Compiled Kernel Modules
- Installing the Kernel
- Tips and Tricks
- Lab: CentOS Kernel 2.6 Driver Compilation
- CentOS Kernel 2.6 Compilation