

Linux System Administration Syllabus

Introduction to UNIX

- Design Philosophy
- System Components
- The Shell and Command Entry
- Documentation

Basic User Commands

- Logging In and Logging Out
- Command Line Editing
- Navigating the File System
- Viewing and Copying Files
- Controlling the Terminal
- Sending and Receiving Mail

Text Editing

- Types of Editors
- From ed to ex to vi
- Basic Editor Tasks with vi
- Editing Multiple Files
- Named Buffers
- vi Startup File

UNIX Processes

- The UNIX Process Model

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- Process States
- Monitoring and Controlling Processes

The File System

- File System Organization
- File Types
- File and Directory Naming Rules and Conventions
- Commands for Navigating the File System
- Introduction to Inodes
- Ownership, Permissions, and Dates
- Manipulating Files and Links
- Manipulating Directories
- Determining Disk Usage
- Other File System Utilities

Managing Users and Groups

- Setting Policies
- User File Management
- The /etc/passwd file
- The /etc/shadow file
- The /etc/group file
- The /etc/gshadow file
- Adding Users
- Modifying User Accounts

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- Deleting User Accounts
- Working with Groups
- Setting User Environments
- Login Configuration Files

The Linux File System

- Filesystem Types
- Conventional Directory Structure
- Mounting a File System
- The /etc/fstab File
- Special Files (Device Files)
- Inodes
- Hard File Links
- Soft File Links
- Creating New File Systems with mkfs
- The lost+found Directory
- Repairing File Systems with fsck
- The Journaling Attribute
- File and Disk Management Tools

Linux File Security

- File Permissions
- Directory Permissions
- Octal Representation

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- Changing Permissions
- Setting Default Permissions
- Access Control Lists (ACLs)
- The getfacl and setfacl commands
- SUID Bit
- SGID Bit
- The Sticky Bit

Controlling Processes

- Characteristics of Processes
- Parent-Child Relationship
- Examining Running Processes
- Background Processes
- Controlling Processes
- Signaling Processes
- Killing Processes
- Automating Processes
- Cron and crontab
- At and batch
- System Processes (Daemons)

Working with the Linux Kernel

- Linux Kernel Components
- Types of Kernels

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- Kernel Configuration Options
- Recompiling the Kernel

System Backups

- Backup Concepts and Strategies
- User Backups with the tar Command
- System Backup Options
- The xfsdump and xfsrestore Commands

Shell Scripting Overview

- Shell Script Fundamentals
- Bash Shell Syntax Overview
- Shell Script Examples

Troubleshooting the System

- Common Problems and Symptoms
- Troubleshooting Steps
- Repairing General Boot Problems
- Repairing the GRUB 2 Boot Loader
- Hard Drive Problems
- Restoring Shared Libraries
- System Logs and rsyslogd

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Installation and Configuration

- Planning: Hardware and Software Considerations
- Site Planning
- Installation Methods and Types
- Installation Classes
- Partitions
- Logical Volume Manager - LVM
- File System Overview
- Swap Partition Considerations
- Other Partition Considerations
- The Linux Boot Loader: grub
- Software Package Selection
- Adding and Configuring Peripherals
- Printers
- Graphics Controllers
- Basic Networking Configuration
- Booting to Recovery Mode

Booting and Shutting Down Linux

- Boot Sequence
- The systemd Daemon
- The systemctl Command
- Targets vs. Run Levels

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- Modifying a Target
- Service Unit Scripts
- Changing System States
- Booting into Rescue Mode
- Shutdown Commands

Managing Software and Devices

- Identifying Software Packages
- Using rpm to Manage Software
- Using yum to Manage Software
- Installing and Removing Software
- Identifying Devices
- Displaying Device and System Information (PCI, USB)
- Plug and Play Devices
- Device Configuration Tools

Basic Networking

- Networking Services Overview
- NetworkManager Introduction
- Network Configuration Files Locations and Formats
- Enabling and Restarting Network Services with systemctl
- Configuring Basic Networking Manually
- Configuring Basic Networking with NetworkManager

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LAMP Server Basics

- LAMP Overview
- Configuring the Apache Web Server
- Common Directives
- Apache Virtual Hosting
- Configuring an Open Source Database
 - MySQL
 - MariaDB
- PHP Basics

Introduction to System Security

- Security Overview
- Maintaining System Security
- Server Access
- Physical Security
- Network Security
- Security Tools
- Port Probing with nmap
- Intrusion Detection and Prevention
- PAM Security Modules
- Scanning the System
- Maintaining File Integrity
- Using Firewalls
- Introduction to firewalls

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The Samba File Sharing Facility

- Configure Samba for Linux to Linux/UNIX File Sharing
- Configure Samba for Linux to Windows File Sharing
- Use the smbclient Utility to Transfer Files
- Mount/Connect Samba Shares to Linux and Windows Clients

Networked File Systems (NFS)

- Using NFS to Access Remote File Systems
- Configuring the NFS Server
- Configuring the NFS Client
- Exporting File Systems from the NFS Server to the NFS Client