Western Technical College

10150137 Linux Administration

Course Outcome Summary

Course Information

Description	Topics covered in this course are installation and deployment of a UNIX operating system, system start-up and shutdown procedures, basic and advanced file system management, device management, backup and system recovery, syslog configuration, network configuration, user accounts and permissions, remote administration, and system security permissions.
Career Cluster	Information Technology
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite	10150101 IT Hardware/Software Fundamentals
Prerequisite	10150110 Cisco 1: Networking Fundamentals

Textbooks

No textbook required.

Learner Supplies

Additional supplies needed - $30. **Vendor:** To be discussed in class. Required.

Success Abilities

1.   Cultivate Passion: Expand a Growth-Mindset

2.   Live Responsibly: Develop Resilience

3.   Live Responsibly: Foster Accountability

4.   Refine Professionalism: Act Ethically

5.   Refine Professionalism: Improve Critical Thinking

Program Outcomes

1.   Identify security strategies

2.   Implement secure infrastructures

3.   Mitigate risk

4.   Develop security documentation

Course Competencies

1.   Use the command-line to perform maintenance and administrative tasks.

Assessment Strategies
1.1.   Skill Demonstration
1.2.   Written Objective Test

Criteria

You will know you are successful when

1.1.   you use the man and info utilities to identify the syntax and structure of shell commands.
1.2.   you use the cp, mv, and rm tools and their parameters, and arguments.
1.3.   you create and remove users and their group containers, and modify their authentication credentials.
1.4.   you implement the ln utility to assign symbolic links and hard links.
1.5.   you prioritize processes and identify the PID and PPID using the top, htop, and ps commands.
1.6.   you modify the GRUB boot loader to manage the kernel and initrd daemon boot settings.

Learning Objectives
1.a.   Use the command-line to find help using the "man" or "info" commands.
1.b.   Demonstrate copying, moving, renaming and deleting files and directories from the command-line.
1.c.   Use the command-line to create/delete users and change user passwords.
1.d.   Use command-line tools to create, edit, link, delete and alias files.
1.e.   Demonstrate the use of redirection and piping.
1.f.   Analyze a server's CPU load and prioritize, manage user processes from the command-line.
1.g.   Use command-line tools to manage groups and group membership.
1.h.   Demonstrate the use of "systemctrl" to start and stop services.
1.i.   Demonstrate the use of basic shell commands.
1.j.   Explore the boot process.
1.k.   Identify the role of the bootloader and the boot target in the boot process.
1.l.   Demonstrate how to load or unload a Kernel module.

2.   Perform a complete Linux operating system installation from beginning to user login.

Assessment Strategies
2.1.   Skill Demonstration
2.2.   Written Objective Test

Criteria

You will know you are successful when

2.1.   you identify the correct ISO, download it and install Linux in a hypervisor.
2.2.   you use the kickstart installation language to automate Anaconda boot/install parameters and package selection.
2.3.   you utilize kickstart partitioning to create a physical volume, volume group and logical volume to install a Linux OS.

2.4.   you implement Anaconda to install a GRUB bootloader after Linux OS installation.
2.5.   you utilize custom BASH commands in the kickstart post to automatically generate users during the Linux OS install.

Learning Objectives

2.a.   Determine the best installation method based on the situation.
2.b.   Perform a boot using the installation media.
2.c.   Set the correct language and keyboard layout to be used on the computer.
2.d.   Set the correct time zone, current time and date for the computer.
2.e.   Describe the partitioning step and how disk partitioning can influence the computers performance.
2.f.   Demonstrate how to install the bootloader during installation.
2.g.   Describe how initial package installation choice influences the computers functionality.
2.h.   Demonstrate how to add new users during the installation.

3.   Manage applications on a Linux installation from the command-line.

Assessment Strategies

3.1.   Simulation
3.2.   Written Objective Test

Criteria

You will know you are successful when

3.1.   you implement the yum/dnf tools to set repositories, troubleshoot dependency errors and install packages.
3.2.   you implement the rpm utility to install and remove packages.
3.3.   you download source code, install dependencies, make, make install and configure/compile the source code.

Learning Objectives

3.a.   Explain why you should update repository lists before you install applications.
3.b.   Demonstrate the ability to install, verify and remove applications from the command line.
3.c.   Demonstrate the ability to check and resolve dependency issues from the command-line.

4.   Manage file permissions and ownership on a Linux distribution from the command-line.

Assessment Strategies

4.1.   Simulation
4.2.   Written Objective Test

Criteria

You will know you are successful when

4.1.   you use the ls command to enumerate file metadata.
4.2.   you use the chmod and chown utilities to set file modifiers and user/group ownership on filesystem objects.

Learning Objectives

4.a.   Show a list of files and directories including their owners and permissions.
4.b.   Demonstrate how to change a file or directory owner or group membership.
4.c.   Demonstrate an understanding of the permission field of a file or folder.
4.d.   Demonstrate how to change the permissions on a file or folder.

5.   Plan a Linux installation based on hardware and organizational needs.

Assessment Strategies

5.1.   Simulation
5.2.   Written Objective Test

Criteria

You will know you are successful when

5.1.   you use lsusb, lspci and lsmod to determine if kernel drivers are detecting hardware and loading drivers.
5.2.   you determine the effective difference between installing packages from a local mount, an NFS mount and a HTTP/FTP repository.
5.3.   you identify vendor hardware driver support on the RHEL website.

5.4.   you use the which command to identify the role of the PATH variable and the search criterion for /etc, /bin, /sbin, /lib and /dev directories.

5.5.   you identify the role of the root account and the necessity of the user created administrative accounts requiring sudo for privilege escalation.

Learning Objectives

5.a.   Describe the importance of creating a detailed plan before deploying a Linux system.

5.b.   Describe what elements should be considered when performing a needs assessment.

5.c.   List the factors considered when selecting a Linux distribution.

5.d.   Describe how to determine if specific hardware is compatible for a specific Linux distribution.

5.e.   Explain why the /etc, /bin, /sbin, /lib, and /dev directories are commonly on the same mounted media.

5.f.   Describe which user account is automatically created when Linux is installed.

5.g.   Explain which types of installation sources are available for Linux.

6.   Manage file systems and storage media from the command-line on a Linux distribution.

Assessment Strategies

6.1.   Simulation

6.2.   Written Objective Test

Criteria

You will know you are successful when

6.1.   you use the pvcreate, vgcreate and lvcreate tools to create a logical volume and mount it.

6.2.   you create a raw partition and mount it.

6.3.   you idenfity the UUID for mounting with the blkid utility, view the physical location with the du and df utilities, and create a mount point in /etc/fstab.

6.4.   you use the mount command to map a directory to a raw/volume location.

6.5.   you create an alternate mount point for the /var/log directory and utilize logrotate to set compression and location archiving.

Learning Objectives

6.a.   Describe the difference between difference storage media and how they influence a file system.

6.b.   Explain the difference between a physical volume and a virtual volume.

6.c.   Demonstrate an understanding of the differences between at least two different operating systems.

6.d.   Demonstrate how to view partitions and file system information from the command line.

6.e.   Explain the difference between "du" and "df".

6.f.   Demonstrate how to mount, unmount and remount a partition from the command-line.

6.g.   Explain the purpose of the "/", "/root", "/home", "/etc", "/var", and "/proc" directories.

6.h.   Discuss why it could be bad to have the log files on the same partition as the main partition.

6.i.   Describe the purpose of the partition table.

6.j.   Understand the term "journaling" in terms of filesystem management.

7.   Analyze and configure a Linux server network configuration from the command-line.

Assessment Strategies

7.1.   Simulation

7.2.   Written Objective Test

Criteria

You will know you are successful when

7.1.   you configure the hostname with systemctl.

7.2.   you use the nmcli utility to set IPv4/6 parameters.

7.3.   you use the vi editor to manually edit the ethernet .conf files to set IPv4/6 parameters.

7.4.   you use the systemctl utility to start/stop enable/disable ethernet interfaces.

7.5.   you create a multihomed Linux Server and create static routes, and enable IP forwarding.

Learning Objectives

7.a.   Explain the importance of the "/etc/hostname".

7.b.   Configure a network interface to connect to a network in either DHCP or Static configurations.

7.c.   Demonstrate how to bring up and take down network interfaces from the command line.

7.d.   Explain the purpose of routing tables.

7.e.   Describe some of the possible uses of networking utility "nmap".

8. **Administer the X Windows Graphical User Interface system in Linux.**

Assessment Strategies
8.1.   Simulation
8.2.   Written Objective Test

Criteria

You will know you are successful when

8.1.   you download LiveMEDIA spins, boot each of them in a virtual machine and utilize the GUI for network and systems management tasks.
8.2.   you configure the X window manager settings to toggle between Xorg and Wayland to execute the GNOME display manager.

Learning Objectives
8.a.   List some of the different display managers available in X Windows.
8.b.   Configure the Wayland GNOME Display Manager

9. **Administer the security resources of a server from the command-line.**

Assessment Strategies
9.1.   Simulation
9.2.   Written Objective Test

Criteria

You will know you are successful when

9.1.   you implement the visudo utility to manage wheel group settings for the sudoers group.
9.2.   you modify the .conf files to determine authentication and authorization policies for users and groups.
9.3.   you configure the ssh.conf file and putty for X-Window forwarding to send Xorg coordinates to Xming on a Microsoft operating system.

Learning Objectives
9.a.   Explain when to use "su" over "sudo".
9.b.   Configure user security and restrictions
9.c.   Configure OpenSSH from the command-line.
9.d.   Configure the SSH Port Tunneling from the command-line.
9.e.   Explain the purpose of SE Linux