

STRANDS AND STANDARDS

LINUX FUNDAMENTALS



Course Description

This course will provide students with a broad awareness of Linux operating systems and prepare them for the CompTIA Linux+ IT industry certification. The Linux+ certification validates technical competency and is a new standard of competency for technicians with experience installing, operating and maintaining Linux operating systems. Those holding Linux + certification demonstrate critical knowledge of installation, operation, administration and troubleshooting services.

Intended Grade Level	10-12
Units of Credit	1.0
Core Code	35.01.00.00.025
Concurrent Enrollment Core Code	35.01.00.13.025
Prerequisite	Suggested – Introduction to Information Technology
Skill Certification Test Number(s)	890, 9491, 989, 990
Test Weight	1.0
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1 or	Information Technology Systems
Endorsement 2	Cybersecurity

STRAND 1

System Architecture

Standard 1

Determine and Configure hardware settings

- Enable and disable integrated peripherals
- Configure systems with or without external peripherals such as keyboards
- Differentiate between the various types of mass storage devices
- Set the correct hardware ID for different devices, especially the boot device
- Know the differences between coldplug and hotplug devices
- Determine hardware resources for devices
- Tools and utilities to list various hardware information (e.g. lsusb, lspci, etc.)
- Tools and utilities to manipulate USB devices
- Understanding of sysfs, udev, hald, dbus

Standard 2

Boot the System

- Provide common commands to the boot loader and options to the kernel at boot time
- Demonstrate knowledge of the boot sequence from BIOS to boot completion
- Check boot events in the log file
- Identify the grandfather process - systemd

Standard 3

Change boot target / runlevels and shutdown or reboot system

- Set the default boot target / runlevel
- Change between boot target / runlevels including single user mode
- Shutdown and reboot from the command line
- Alert users before switching boot target / runlevels or other major system events
- Properly terminate processes

Standard 4

Manage users and groups

- Create and manage users
- Create and manage groups
- Understand the superuser

STRAND 2

Linux Installation and Package Management

Standard 1

Design hard disk layout

- Allocate filesystems and swap space to separate partitions or disks
- Tailor the design to the intended use of the system
- Ensure the /boot partition conforms to the hardware architecture requirements for booting

Standard 2

Install a boot manager

- Providing alternative boot locations and backup boot options
- Install and configure a boot loader such as GRUB / GRUB2
- Interact with the boot loader

Standard 3

Manage shared libraries

- Identify shared libraries
- Identify the typical locations of system libraries
- Load shared libraries

Standard 4

Manage Debian based software

- Install, upgrade and uninstall Debian binary packages
- Find packages containing specific files or libraries which may or may not be installed
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed)
- Install, upgrade and uninstall using APT

Standard 5

Manage Red Hat based software

- Install, re-install, upgrade and remove packages using RPM, YUM, DNF, zipper
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures
- Determine what files a package provides, as well as find which package a specific file comes from

STRAND 3

GNU and Unix Commands

Standard 1

Work on the command line

- Use single shell commands and one-line command sequences to perform basic tasks on the command line (ex: LS, CD, CAT)
- Use and modify the shell environment including defining, referencing and exporting environment variables
- Use and edit command history
- Invoke commands inside and outside the defined path

Standard 2

Process text streams using filters

- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package

Standard 3

Perform basic file management

- Copy, move and remove files and directories individually
- Copy multiple files and directories recursively
- Remove files and directories recursively
- Use simple and advanced wildcard specifications in commands
- Using find to locate and act on files based on type, size, or time
- Usage of tar, cpio, and dd

Standard 4

Use streams, pipes and redirects

- Redirecting standard input, standard output and standard error
- Pipe the output of one command to the input of another command
- Use the output of one command as arguments to another command
- Send output to both stdout and a file

Standard 5

Create, monitor and kill processes

- Run jobs in the foreground and background
- Signal a program to continue running after logout
- Monitor active processes
- Select and sort processes for display
- Send signals to processes

Standard 6

Modify process execution priorities

- Know the default priority of a job that is created
- Run a program with higher or lower priority than the default (ex: nice)
- Change the priority of a running process

Standard 7

Search text files using regular expressions

- Create simple regular expressions containing several notational elements
- Use regular expression tools to perform searches through a filesystem or file content

Standard 8

Perform basic file editing operations using vi

- Navigate a document using vi
- Use basic vi modes
- Insert, edit, delete, copy and find text

STRAND 4

Devices, Linux Filesystems, Filesystem Hierarchy Standard

Standard 1

Create partitions, filesystems and directories

- Use various mkfs commands to set up partitions and create various filesystems such as: ext3, ext4, nfs, etc.
- Identify standard directories (ex: etc, dev, var, usr, etc.)

Standard 2

Maintain the integrity of filesystems

- Verify the integrity of filesystems
- Monitor free space and inodes
- Repair simple filesystem problems

Standard 3

Control mounting and unmounting of filesystems

- Manually mount and unmount filesystems
- Configure filesystem mounting on bootup
- Configure user mountable removeable filesystems

Standard 4

Manage disk quotas

- Set up a disk quota for a filesystem
- Edit, check and generate user quota reports

Standard 5

Manage file permissions and ownership

- Manage access permissions on regular and special files as well as directories
- Use access modes such as suid, sgid and the sticky bit to maintain security
- Know how to change the file creation mask
- Use the group field to grant file access to group members
- Recognize hidden files

Standard 6

Create and change hard and symbolic links

- Create links
- Identify hard and/or softlinks
- Copying versus linking files
- Use links to support system administration tasks

Performance Skills

Students should have the content knowledge to successfully pass The CompTIA Linux+ certification and be prepared for the industry as a junior level administrator.

Workplace Skills

The following workplace skills should be discussed, taught, and re-enforced in the course:

- Communication
- Teamwork
- Critical and Creative Thinking
- Problem Solving
- Dependability
- Legal requirements / expectations

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
Linux Fundamentals	890	8	5	16	11							40	40