



# Certification Exam 1

## Objectives: LX0-101

### INTRODUCTION

- The CompTIA Linux+ [Powered by LPI] certification is a vendor neutral credential. In order to receive CompTIA Linux+ certification, a candidate must pass two exams. The successful junior level Linux administrator should be able to:
  - Work at the Linux command line;
  - Perform easy maintenance tasks including assisting users, adding users to a larger system, executing backup & restore, shutdown & reboot;
  - Install and configure a workstation (including X) and connect it to a LAN, or a stand-alone PC via modem to the Internet.

The first exam is CompTIA Linux+ [Powered by LPI] exam number LX0-101. This exam measures a portion of the competencies required by a junior level Linux administrator, as described in the exam objectives below.

This examination blueprint includes domain weighting, test objectives, and sample content.

Candidates are encouraged to use this document to guide their studies. The contents of the examination blueprint help prioritize topics and provide a guide of what to expect on this CompTIA Linux+ [Powered by LPI] exam. The table below lists the domains measured by this examination and the extent to which they are represented.

Domain	% of Examination
101 System Architecture	14%
102 Linux Installation and Package Management	18%
103 GNU and Unix Commands	43%
104 Devices, Linux Filesystems, Filesystem Hierachy Standard	25%
<b>Total</b>	<b>100%</b>

**\*\*Note:** The bulleted lists below each objective are not exhaustive lists. Even though they are not included in this document, other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam.

*CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current and the security of the questions is protected. When necessary, we will publish updated exams based on existing exam objectives. Please know that all related exam preparation materials will still be valid.*

# 101 System Architecture

## 101.1 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
- Conceptual understanding of sysfs, udev, hald, dbus
- The following is a partial list of the used files, terms, and utilities:
  - /sys
  - /proc
  - /dev
  - modprobe
  - lsmod
  - lspci
  - lsusb

## 101.2 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
- The following is a partial list of the used files, terms and utilities:
  - /var/log/messages
  - dmesg
  - BIOS
  - bootloader
  - kernel

- init

### 101.3 Change runlevels and shutdown or reboot system

- Set the default runlevel
- Change between runlevels including single user mode
- Shutdown and reboot from the command line
- Alert users before switching runlevels or other major system events
- Properly terminate processes
- The following is a partial list of the used files, terms and utilities:
  - /etc/inittab
  - shutdown
  - init
  - /etc/init.d
  - telinit

## 102 Linux Installation and Package Management

### 102.1 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
- The following is a partial list of the used files, terms and utilities:
  - / (root) filesystem
  - /var filesystem
  - /home filesystem
  - swap space
  - mount points
  - partitions

### 102.2 Install a boot manager

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

- The following is a partial list of the used files, terms, and utilities
  - /boot/grub/menu.lst
  - grub-install
  - MBR
  - superblock
  - /etc/lilo.conf
  - lilo

### 102.3 Manage shared libraries

- Identify shared libraries
- Identify the typical locations of system libraries
- Load shared libraries
- The following is a partial list of the used files, terms and utilities
  - ldd
  - ldconfig
  - /etc/ld.so.conf
  - LD\_LIBRARY\_PATH

### 102.4 Use Debian package management

- 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)
- The following is a partial list of the used files, terms and utilities:
  - /etc/apt/sources.list
  - dpkg
  - dpkg-reconfigure
  - apt-get
  - apt-cache
  - aptitude

### 102.5 Use RPM and YUM package management

- Install, re-install, upgrade and remove packages using RPM and YUM
- 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

- The following is a partial list of the used files, terms and utilities:
  - rpm
  - rpm2cpio
  - /etc/yum.conf
  - /etc/yum.repos.d/
  - yum
  - yumdownloader

## 103 GNU and Unix Commands

### 103.1 Work on the command line

- Use single shell commands and one line command sequences to perform basic tasks on the command line
- 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
- The following is a partial list of the used files, terms and utilities:
  - .
  - bash
  - echo
  - env
  - exec
  - export
  - pwd
  - set
  - unset
  - man
  - uname
  - history

### 103.2 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
- The following is a partial list of the used files, terms and utilities:

- cat
- cut
- expand
- fmt
- head
- od
- join
- nl
- paste
- pr
- sed
- sort
- split
- tail
- tr
- unexpand
- uniq
- wc

### **103.3 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
- The following is a partial list of the used files, terms and utilities:
  - cp
  - find
  - mkdir
  - mv
  - ls
  - rm

- rmdir
- touch
- tar
- cpio
- dd
- file
- gzip
- gunzip
- bzip2
- file globbing

#### **103.4 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
- The following is a partial list of the used files, terms and utilities:
  - tee
  - xargs

#### **103.5 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
- The following is a partial list of the used files, terms and utilities:
  - &
  - bg
  - fg
  - jobs
  - kill
  - nohup

- ps
- top
- free
- uptime
- killall

### **103.6 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
- Change the priority of a running process
- The following is a partial list of the used files, terms and utilities:
  - nice
  - ps
  - renice
  - top

### **103.7 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
- The following is a partial list of the used files, terms and utilities:
  - grep
  - egrep
  - fgrep
  - sed
  - regex(7)

### **103.8 Perform basic file editing operations using vi**

- Navigate a document using vi
- Use basic vi modes
- Insert, edit, delete, copy and find text
- The following is a partial list of the used files, terms and utilities:
  - vi
  - /, ?



- h,j,k,l
- i, o, a
- c, d, p, y, dd, yy
- ZZ, :w!, :q!, :e!

## 104 Devices, Linux Filesystems, Filesystem Hierarchy Standard

### 104.1 Create partitions and filesystems

- Use various mkfs commands to set up partitions and create various filesystems such as:
  - - ext2
    - ext3
    - xfs
    - reiserfs v3
    - vfat
- The following is a partial list of the used files, terms and utilities:
  - fdisk
  - mkfs
  - mkswap

### 104.2 Maintain the integrity of filesystems

- Verify the integrity of filesystems
- Monitor free space and inodes
- Repair simple filesystem problems
- The following is a partial list of the used files, terms and utilities:
  - du
  - df
  - fsck
  - e2fsck
  - mke2fs
  - debugfs
  - dumpe2fs
  - tune2fs
  - xfs tools (such as xfs\_metadump and xfs\_info)

### **104.3 Control mounting and unmounting of filesystems**

- Manually mount and unmount filesystems
- Configure filesystem mounting on bootup
- Configure user mountable removeable filesystems
- The following is a partial list of the used files, terms and utilities:
  - /etc/fstab
  - /media
  - mount
  - umount

### **104.4 Manage disk quotas**

- Set up a disk quota for a filesystem
- Edit, check and generate user quota reports
- The following is a partial list of the used files, terms and utilities:
  - quota
  - edquota
  - repquota
  - quotaon

### **104.5 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
- The following is a partial list of the used files, terms and utilities:
  - chmod
  - umask
  - chown
  - chgrp

### **104.6 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

- The following is a partial list of the used files, terms and utilities:
  - ln

#### **104.7 Find system files and place files in the correct location**

- Understand the correct locations of files under the FHS
- Find files and commands on a Linux system
- Know the location and propose of important file and directories as defined in the FHS
- The following is a partial list of the used files, terms and utilities:
  - find
  - locate
  - updatedb
  - whereis
  - which
  - type
  - /etc/updatedb.conf