Transition Guide for The Official CompTIA® Linux+® Powered by LPI Guides (Exams LX0-103 and LX0-104) to The Official CompTIA® Linux+® Guides (Exam XK0-004)

This bridge document is written for instructors who have used the previous Official CompTIA Linux+ Powered by LPI Content and are looking to come up to speed on the new version quickly and efficiently.

High-Level Overview of Course Design Changes

This edition of the course has been redesigned compared to the order in which lessons and topics were presented in the previous Official CompTIA Content edition. Lessons are sequenced more logically: from introduction to Linux (Lesson 1) to fundamental system administration (Lessons 2-5) to low-level setup components (Lessons 6 and 7) to managing higher-level services/components (Lessons 8-11) to securing the Linux environment (Lesson 12) to automating Linux tasks (Lessons 13 and 14) to installing the Linux operating system (Lesson 15).

Students practice installing Linux at the end of the course instead of at the beginning for a couple of reasons. From a practical classroom standpoint, if students make mistakes during installation, you won't have to waste time troubleshooting in order to ensure their computers are configured properly for the rest of the class. There are also benefits from an instructional perspective. In most real-world scenarios, an administrator's systems will already be set up for them, and they won't necessarily need to install those systems from scratch. Also, much of the installation process requires knowledge of components that are taught later in the course, like storage partitioning, user creation, network configuration, etc. Having this knowledge already in place will make it easier for students to grasp all elements of the installation process.

Other high-level changes include:

- Troubleshooting is incorporated throughout the course in various topics, rather than as one monolithic lesson. This emphasizes that troubleshooting is part of the management lifecycle for any particular element.
- Slide content is more robust.
- Changes to the exam objectives led to the addition or removal of certain subject matter. Refer to the Exam Blueprint Comparisons section of this document for specifics.

Following are some specifics about the exam and exam objectives. Further information about changes to the courseware itself is found later in this document.

Dates

CompTIA Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	CompTIA Linux+ (Exam XK0-004)
Exam available through October 1, 2019	Exam available starting April 2, 2019

Domains

This table compares the CompTIA exam domains for Linux+ Powered by LPI Exams LX0-103 and LX0-104 with Linux+ Exam XK0-004.

Linux+ Powered by LPI (LX0-103 and LX0-104) Domains		Linux+ (Exam XK0-004) Domains	
101. System Architecture	14%	1.0 Hardware and System Configuration	21%
102. Linux Installation and Package Management	18%	2.0 Systems Operation & Maintenance	26%
103. GNU and Unix Commands	43%	3.0 Security	19%
104. Devices, Linux Filesystems, Filesystem Hierarchy Standard	25%	4.0 Linux Troubleshooting & Diagnostics	20%
Exam LX0-103	**100%**	5.0 Automation & Scripting	14%
105. Shells, Scripting and Data Management	17%	**Exam XK0-004**	**100%**
106. User Interfaces and Desktops	8%		
107. Administrative Tasks	20%		
108. Essential System Services	17%		
109. Networking Fundamentals	23%		
110. Security	15%		
Exam LX0-104	**100%**		

Exam Objective Comparisons

The following lists compare the exam objective content between Exams LX0-103 and LX0-104, and Exam XK0-004.

New Objectives and Objectives with Increased Emphasis for XK0-004

This list identifies new objectives in Exam XK0-004 that were not included or had less emphasis in Exams LX0-003 and LX0-004.

- Security
- Kernel Modules
- Storage and Visualization
- Device Management at an Enterprise Level
- Git and Automation
- Networking and Firewalls
    - In particular, security-based networking and firewalls
- Service side and command line of Linux usage
- Server (rather than client) use of Linux
- Troubleshooting
- SELinux

Removed/Simplified/De-emphasized Objectives

This list identifies items in Exams LX0-003 and LX0-004 that have been removed, greatly simplified, or de-emphasized in Exam XK0-004.

- X11
- Mail
- SQL
- Printing
- End-user support
- GPG

Exam Blueprint Comparisons

The following tables compare the LX0-103 and LX0-104 with the XK0-004 exam blueprints.

Where LX0-003 and LX0-004 objectives are covered in the XK0-004 exam blueprint:

Linux+ Powered by LPI (Exams LX0-003 and LX0-004) Objectives	Linux+ (Exam XK0-004) Objectives
	Domain 1.0: Hardware and System Configuration
101.2, 101.3, 102.2	1.1 Explain Linux boot process concepts.
101.1, 101.2	1.2 Given a scenario, install, configure, and monitor kernel modules
109.2, 109.3, 109.4, 110.1	1.3 Given a scenario, configure and verify network connection parameters
	1.4 Given a scenario, manage storage in a Linux environment
	1.5 Compare and contrast cloud and virtualization concepts and technologies
107.3, 108.1	1.6 Given a scenario, configure localization options
	Domain 2.0: Systems Operation and Maintenance
102.3, 102.4, 102.5	2.1 Given a scenario, conduct software installations, configurations, updates, and removals
104.4, 107.1	2.2 Given a scenario, manage users and groups
103.1, 103.2, 103.3, 103.4, 103.7, 103.8, 104.7	2.3 Given a scenario, create, modify, and redirect files
101.3	2.4 Given a scenario, manage services
N/A	2.5 Summarize and explain server roles
103.5	2.6 Given a scenario, automate and schedule jobs
101.1	2.7 Explain the use and operation of Linux devices
106.1, 106.2	2.8 Compare and contrast Linux graphical user interfaces
	Domain 3.0: Security
N/A	3.1 Given a scenario, apply or acquire the appropriate user and/or group permissions and ownership
N/A	3.2 Given a scenario, configure and implement appropriate access and authentication methods
108.2	3.3 Summarize security best practices in a Linux environment
N/A	3.4 Given a scenario, implement logging services
N/A	3.5 Given a scenario, implement and configure Linux firewalls
103.3	3.6 Given a scenario, backup, restore, and compress files
	Domain 4.0: Linux Troubleshooting and Diagnostics
N/A	4.1 Given a scenario, analyze system properties and remediate accordingly
N/A	4.2 Given a scenario, analyze system processes in order to optimize performance

Linux+ Powered by LPI (Exams LX0-003 and LX0-004) Objectives	Linux+ (Exam XK0-004) Objectives
N/A	4.3 Given a scenario, analyze and troubleshoot user issues
N/A	4.4 Given a scenario, analyze and troubleshoot application and hardware issues
	Domain 5.0: Automation and Scripting
103.1, 105.1	5.1 Given a scenario, deploy and execute basic BASH scripts
N/A	5.2 Given a scenario, carry out version control using Git
N/A	5.3 Summarize orchestration processes and concepts

Course Outline Comparison

This table compares the outline of **The Official CompTIA® Linux+™ Powered by LPI Guides (Exams LX0-103 and LX0-104)** courseware to that of **The Official CompTIA® Linux+® Guides (Exam XK0-004)** courseware.

The Official CompTIA® Linux+™ Powered by LPI (Exams LX0-103 and LX0-104)	**The Official CompTIA® Linux+® (Exam XK0-004)**
Lesson 1: Performing Basic Linux Tasks	Lesson 1: Performing Basic Linux Tasks
Lesson 2: Managing User and Group Accounts	Lesson 2: Managing Users and Groups
Lesson 3: Managing Partitions and the Linux Filesystem	Lesson 3: Managing Permissions and Ownership
Lesson 4: Managing Files in Linux	Lesson 4: Managing Storage
Lesson 5: Managing Linux Permissions and Ownership	Lesson 5: Managing Files and Directories
Lesson 6: Printing Files	Lesson 6: Managing Kernel Modules
Lesson 7: Managing Packages	Lesson 7: Managing the Linux Boot Process
Lesson 8: Managing Kernel Services	Lesson 8: Managing System Components
Lesson 9: Working with the Bash Shell and Shell Scripts	Lesson 9: Managing Devices
Lesson 10: Managing Jobs and Processes	Lesson 10: Managing Networking
Lesson 11: Managing System Services	Lesson 11: Managing Packages and Software
Lesson 12: Configuring Network Services	Lesson 12: Securing Linux Systems
Lesson 13: Configuring Basic Internet Services	Lesson 13: Working with Bash Scripts
Lesson 14: Securing Linux	Lesson 14: Automating Tasks
Lesson 15: Managing Hardware	Lesson 15: Installing Linux
Lesson 16: Troubleshooting Linux Systems	
Lesson 17: Installing Linux	
Lesson 18: Configuring the GUI	

Course Setup Changes

Like the previous course, this course also uses CentOS 7. The new course calls for version 1804 which can be downloaded from **https://www.centos.org/download**. The new course also uses Ubuntu version 18.04.1 LTS and is provided in the course data files as a fully installed virtual machine.

Due to some of the activities being performed in the new course, students will need more robust systems than the previous course required. These machines need to support virtual machines through VT-x or AMD-V instruction set and must also have Second Level Address Translation (SLAT) support enabled. The systems require 8 GB of RAM and 250 GB of storage space. Bootable DVD-ROM or USB drive are also needed.

Due to activities that require the building and use of virtual machines, it is highly recommended that this be taught using physical computers rather than virtual machines. If you *do* choose to use virtual machines, be aware that some activities will not work as written, so be prepared to provide alternate instructions or to skip those activities.

Activity Design Changes

- Activity scenarios that are more robust and real-world, and activities that often build on each other throughout the course. This is designed to make it easier for students to understand why they're doing a task and how it will benefit them on the job.
- Students are in the CLI for the first half of the course, rather than the GUI the entire time. This reflects a more real-world experience, where Linux professionals tend to use the CLI to perform daily administrative tasks. Around the halfway point, students learn about graphical user interfaces (GUIs) and then boot into a GUI for the remainder of the course.
- Students get some brief hands-on practice with Ubuntu to show the Debian-based Linux branch of the Linux family.
- In addition, review and discussion activities have been added on a topic-by-topic basis. As always, sample responses for students are found in the Solutions section in the back of the student guide.

Other Course Changes

In addition to the course set-up and activity changes, we've also added some additional features to help support your students in their learning.

In the Assessments tile in CompTIA CHOICE, you will find a variety of different assessments that students can take related to the lesson content as well as course-wide final assessment. These assessments can be used for self-study by students or as homework in your course.

In the Video tile in CompTIA CHOICE, you will find access to different videos that can be incorporated into the course. These videos, developed exclusively for CompTIA by ITPro.TV, provide demonstrations of key activities in the course. These are a good alternative to show if you do not have access to all equipment mentioned in the course. Video icons in the course content also alert you and your students to videos that relate to the content covered.

Topic-by-Topic Changes

Following are the topic-by-topic changes between the two courseware versions.

Linux+ (Exam XK0-004) Lesson 1: Performing Basic Linux Tasks

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 1: Performing Basic Linux Tasks
Lesson 1, Topic A	A. Identify the Linux Design Philosophy
Lesson 1, Topic B	B. Enter Shell Commands
Lesson 1, Topic C	C. Get Help with Linux

Linux+ (Exam XK0-004) Lesson 2: Managing Users and Groups

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 2: Managing Users and Groups
Lesson 14, Topic B	A. Assume Superuser Privileges
Lesson 2, Topic A	B. Create, Modify, and Delete Users
Lesson 2, Topic A	C. Create, Modify, and Delete Groups
Lesson 1, Topic B	D. Query Users and Groups
Lesson 2, Topic B	E. Configure Account Profiles

Linux+ (Exam XK0-004) Lesson 3: Managing Permissions and Ownership

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 3: Managing Permissions and Ownership
Lesson 5, Topics A and B	A. Modify File and Directory Permissions
Lesson 5, Topic C	B. Modify File and Directory Ownership
Lesson 5, Topic D	C. Configure Special Permissions and Attributes
N/A	D. Troubleshoot Permissions Issues

Linux+ (Exam XK0-004) Lesson 4: Managing Storage

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 4: Managing Storage
Lesson 3, Topic A	A. Create Partitions
Briefly touched on in Lesson 17, Topic A	B. Manage Logical Volumes
Lesson 3, Topic A	C. Mount File Systems

Lesson 3, Topic C	D. Manage File Systems
Lesson 3, Topic B	E. Navigate the Linux Directory Structure
N/A	F. Troubleshoot Storage Issues

Linux+ (Exam XK0-004) Lesson 5: Managing Files and Directories

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	**Linux+ (Exam XK0-004) Lesson 5: Managing Files and Directories**
Lesson 4, Topic A	A. Create and Edit Text Files
Lesson 4, Topic B	B. Search for Files
Lesson 1, Topic B; Lesson 3, Topic B	C. Perform Operations on Files and Directories
Lesson 1, Topic B; Lesson 4, all; Lesson 11, Topic B	D. Process Text Files
Lesson 9, Topic D	E. Manipulate File Output

Linux+ (Exam XK0-004) Lesson 6: Managing Kernel Modules

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	**Linux+ (Exam XK0-004) Lesson 6: Managing Kernel Modules**
Lesson 8, Topic A	A. Explore the Linux Kernel
Lesson 8, Topic B	B. Install and Configure Kernel Modules
Lesson 8, Topic B	C. Monitor Kernel Modules

Linux+ (Exam XK0-004) Lesson 7: Managing the Linux Boot Process

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	**Linux+ (Exam XK0-004) Lesson 7: Managing the Linux Boot Process**
Lesson 1, Topic B; Lesson 3, Topic A; Lesson 8 Topic C; Lesson 16, Topic A; Lesson 17, Topic B	A. Configure Linux Boot Components
Lesson 17, Topics B and C	B. Configure GRUB 2

Linux+ (Exam XK0-004) Lesson 8: Managing System Components

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 8: Managing System Components
Lesson 10, Topic E	A. Configure Localization Options
Lesson 18, all	B. Configure GUIs
Lesson 1, Topic D; Lesson 11, Topic A	C. Manage Services
Lesson 10, Topic B; Lesson 16, Topic A	D. Troubleshoot Process Issues
Commands: Lesson 1, Topic B; Lesson 3, Topic C; Lesson 8, Topics B and E Common issues: N/A	E. Troubleshoot CPU and Memory Issues

Linux+ (Exam XK0-004) Lesson 9: Managing Devices

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 9: Managing Devices
Lesson 6, Topic A; Lesson 8, Topic D; Lesson 15, Topic A	A. Identify the Types of Linux Devices
Lesson 6, Topics A and B; Lesson 8, Topic D	B. Configure Devices
Lesson 6, Topic B; Lesson 8, Topic D	C. Monitor Devices
Lesson 16, Topic B	D. Troubleshoot Hardware Issues

Linux+ (Exam XK0-004) Lesson 10: Managing Networking

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 10: Managing Networking
Lesson 12, Topics A and C OSI model, TCP/IP layers: N/A	A. Identifying TCP/IP Fundamentals
Not all are covered, but those that are: Lesson 6, Topic C; Lesson 10, Topic E; Lesson 11, Topic B; Lesson 12, Topics C and D; Lesson 14, Topic A	B. Identify Linux Server Roles
Not all are covered, but those that are: Lesson 12, Topic A	C. Connect to a Network
Lesson 12, Topic C	D. Configure DHCP and DNS Client Services
N/A	E. Configure Cloud and Virtualization Technologies
Lesson 16, Topic C	F. Troubleshoot Networking Issues

Linux+ (Exam XK0-004) Lesson 11: Managing Packages and Software

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 11: Managing Packages and Software
Lesson 7, Topic A	A. Identify Package Managers
Lesson 7, Topic A	B. Manage RPM Packages with YUM
Lesson 7, Topic F	C. Manage Debian Packages with APT
Lesson 7, Topic D	D. Configure Repositories
Lesson 7, Topic F	E. Acquire Software
Lesson 7, Topic F	F. Build Software from Source Code
N/A	G. Troubleshoot Software Dependency Issues

Linux+ (Exam XK0-004) Lesson 12: Securing Linux Systems

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 12: Securing Linux Systems
N/A	A. Implement Cybersecurity Best Practices
SSH: Lesson 12, Topic D OpenSSL: Lesson 14, Topic A	B. Implement Identity and Access Management Methods
Lesson 11, Topic C	C. Configure SELinux or AppArmor
Appendix C, Topic A	D. Configure Firewalls
Lesson 11, Topic B	E. Implement Logging Services
Lesson 4, Topic F	F. Back Up, Restore, and Verify Data

Linux+ (Exam XK0-004) Lesson 13: Working with Bash Scripts

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 13: Working with Bash Scripts
Lesson 9, Topic C	A. Customize the Bash Shell Environment
Lesson 9, Topic B	B. Identify Scripting and Programming Fundamentals
Lesson 9, Topic B Metacharacters: Lesson 4, Topic C; Lesson 9, Topic A Redirection: Lesson 4, Topic A	C. Write and Execute a Simple Bash Script
Lesson 9, Topic F	D. Incorporate Control Statements in Bash Scripts

Linux+ (Exam XK0-004) Lesson 14: Automating Tasks

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 14: Automating Tasks
Lesson 10, Topic D	A. Automating Tasks
N/A	B. Implement Version Control Using Git
N/A	C. Identify Orchestration Concepts

Linux+ (Exam XK0-004) Lesson 15: Installing Linux

Linux+ Powered by LPI (Exams LX0-103 and LX0-104)	Linux+ (Exam XK0-004) Lesson 15: Installing Linux
Lesson 17, Topic A	A. Prepare for Linux Installation
Lesson 17, Topic D	B. Perform the Installation

In Closing

The course and certification have been significantly redesigned to focus on the most relevant subject matter for IT professionals working in a Linux environment. Good next steps for students who wish to pursue additional technical training and certification include:

- CompTIA Server+ (Exam SK0-004)
- CompTIA Cloud+ (Exam CV0-002)
- Other advanced certifications from the CompTIA Career Roadmap

Enjoy the course!