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Linux Essentials in a Nutshell

2023 Edition

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Volunteer at the Linux Professional Institute

The Linux Professional Institute

Our mission is to **promote the use of open source by supporting the people who work with it.**

LPI Certifications

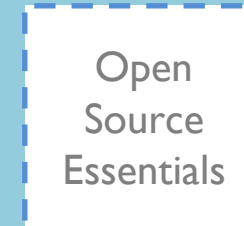
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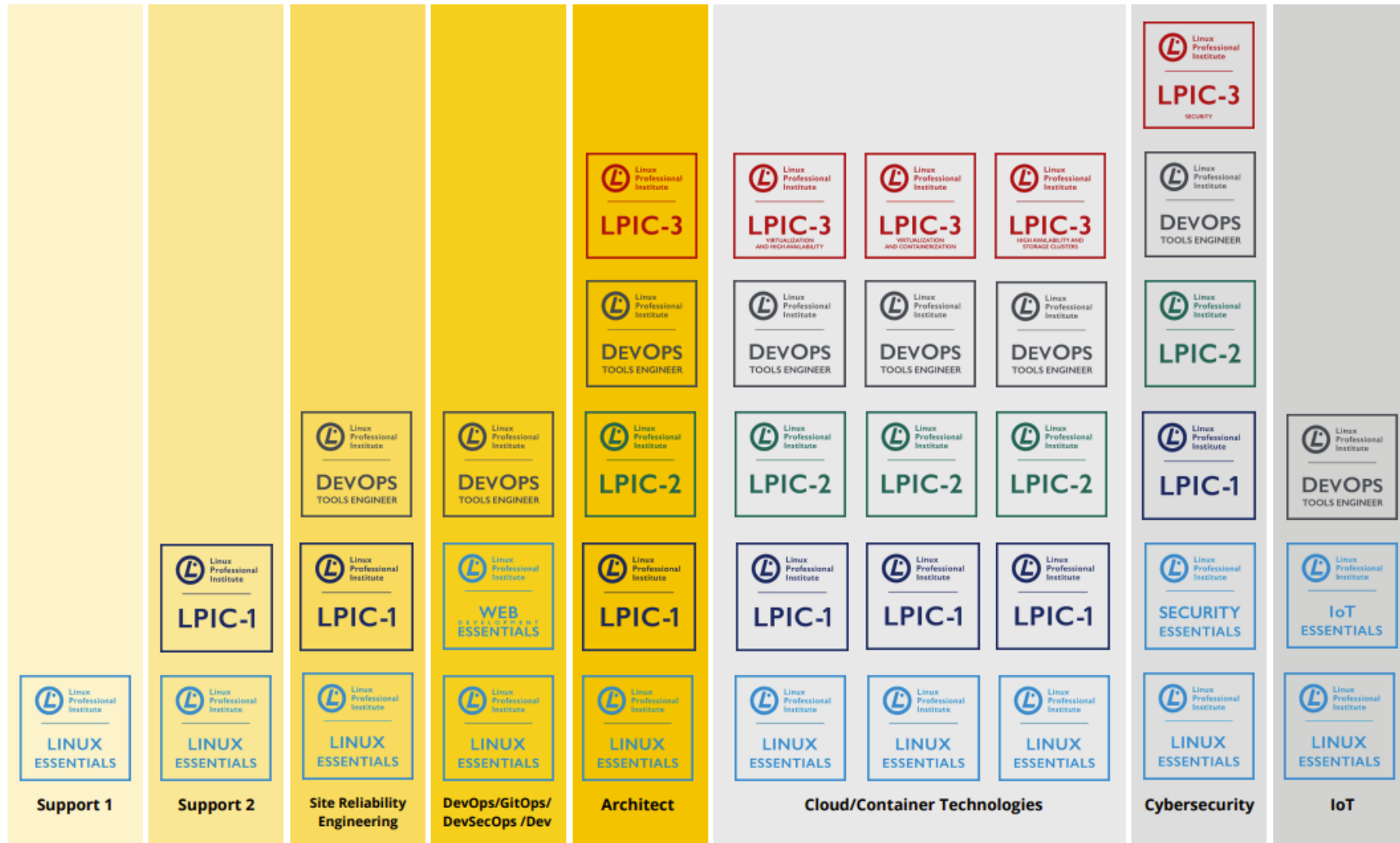
Open
Technology



Essentials



Certifications and Job Roles



Linux Essentials Certification

Current version is 1.6 (Exam code 010-160)

40 questions for 60 minutes

No prerequisites

Lifetime validity

Linux Essentials Topics

The Linux Community and a Career in Open Source

Finding Your Way on a Linux System

The Power of the Command Line

The Linux Operating System

Security and File Permissions



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Part I

The Linux Community and a Career in Open Source

Linux Evolution and Popular Operating Systems

What is (not) Linux

- Linus Torvalds
- Linux Kernel

Linux Distributions

- Components
- Families

Linux is Everywhere

- Desktops, Servers, and Cloud
- Mobile and Embedded Systems
- Science Labs and Space

Notable Distributions

- Debian, Ubuntu, Linux Mint
- RHEL, Fedora, CentOS
- SLES, openSUSE (Tumbleweed, Leap)
- Arch Linux, Slackware, Gentoo, Alpine

Major Open Source Applications

Software Distribution

- Building from Source
- Software Packages

Package Management

- Package Types
- Package Managers

Available Software

- Office Applications
- Web Browsers
- Multimedia and Games
- Server Software and Services
- Programming Languages

Notable Commands

- **rpm** and **dpkg**
- **apt**, **apt-get**, **apt-cache**
- **yum** and **dnf**
- **zypper**

Open Source Software and Licensing

Free and Open Source Software

- Free Software Foundation (FSF)
- Open Source Initiative (OSI)

Licenses

- Copyleft
- Permissive
- Creative Commons

Business Models

- Crowdfunding
- Dual Licensing
- Subscriptions and Additional Services

Free as in “free speech”, not as in “free beer”.

Richard Stallman

Four Freedoms

0. Run the program as you wish, for any purpose
1. Study how the program works and change it as you wish
2. Redistribute copies so you can help others
3. Distribute copies of your modified versions to others

ICT Skills and Working in Linux

Linux User Interfaces

- Desktop Environments
- Command Line

Industry Uses of Linux

- Internet
- *Something* as a Service

Privacy Issues on the Internet

- Cookie Tracking
- Do Not Track (DNT)
- “Private” Windows
- Right Passwords

Encryption

- Transport Layer Security (TLS)
- Encryption with GnuPG
- Disk Encryption



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Part 2

Finding Your Way on a Linux System

Command Line Basics

Shell 101

- Pick up a Shell
- Shell Prompt

Commands

- Command Types
- Command Line Structure

Environment Variables

- General Rules
- **echo**
- **export**

Using the Command Line to Get Help

Built-in Commands

- **help** *command*

Built-in Help

- *command* --help
- *command* -h

Find Files

- **locate** (*and updatedb*)
- **find**

Man and Info Pages

- **man**
- **info**

Additional Documentation

- */usr/share/doc/**

Using Directories and Listing Files

Files and Directories

- Hidden objects (starts with `.`)
- Home directories
- Home shortcut (`~`)

Absolute vs Relative Path

- Absolute always starts with (`/`)
- **`pwd`**

Exploring and Navigating

- Explore with **`ls`**
- Navigate with **`cd`**

Creating, Moving and Deleting Files

Basic Commands

- **touch**
- **cp, mv, rm**
- **mkdir, rmdir**

Work with Multiple File Objects

- Use *****, **?**, and **[]** for globbing

Warning

File and folder names are case-sensitive!

file <> File <> FILE



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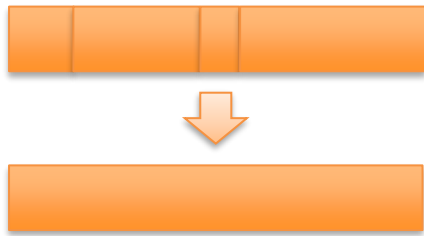
Part 3

The Power of the Command Line

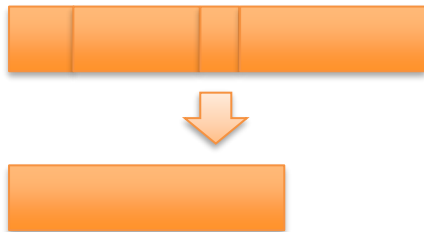
Archiving Files on the Command Line

Archiving vs Compression

- Archiving – same* size



- Compression – smaller* size



Notable Utilities

- **tar**
- **zip, unzip**
- **gzip, gunzip**
- **bzip2, bunzip2**
- **xz, unxz**

Searching and Extracting Data from Files

Explore Files and Extract Data

- **grep**
- **more, less**
- **cat, tac**
- **head, tail**
- **sort, uniq**
- **cut, paste, join**
- **wc, nl**

Basic Regular Expressions

- Work with **. * ? []**

Manage Data Flow

- Link commands via pipes (**|**)
- Use stream redirection (**>**, **<**, **>>**)

Turning Commands into a Script

Bash Scripts Building Blocks

- Script signature
- Variables
- Arguments
- Exit status

Scripts Control Structures

- Loops (**for**, **while**, **until**)
- Control flow (**if**, **case**)

Text Editors

- **vim**
- **nano**



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Part 4

The Linux Operating System

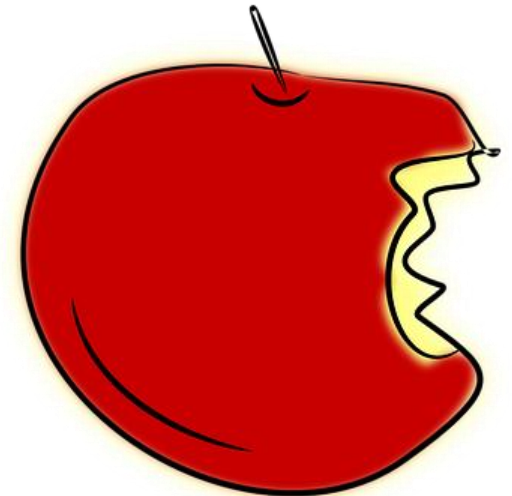
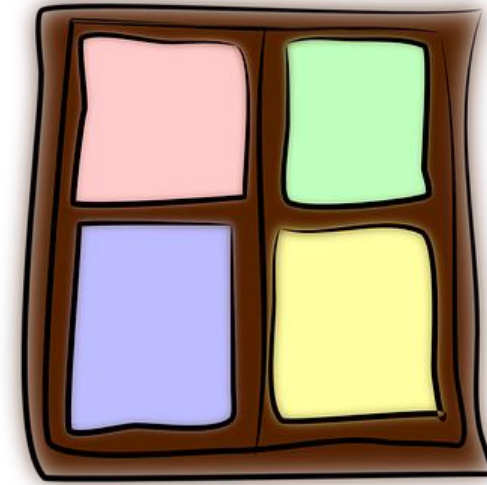
Choosing an Operating System

What is an Operating System

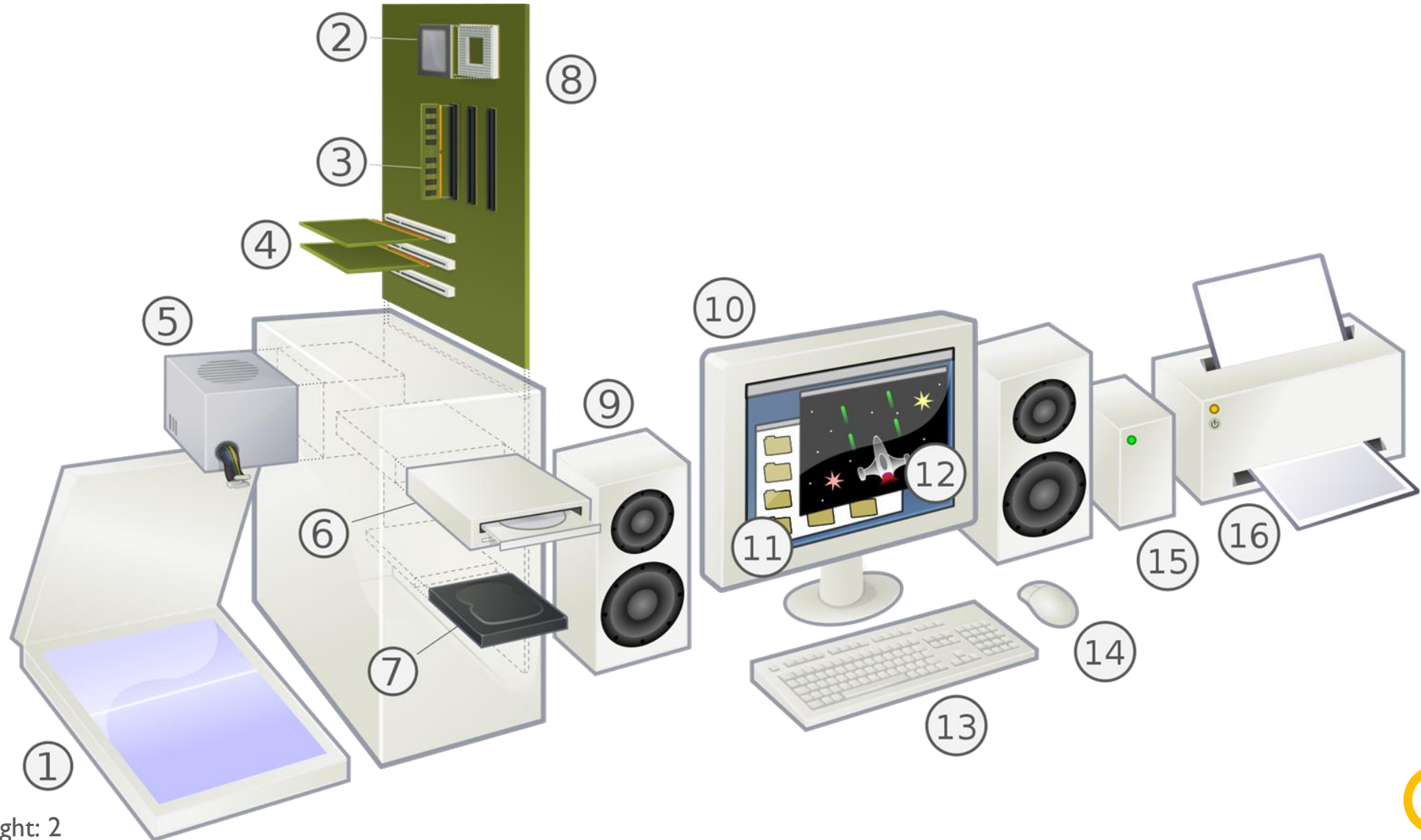
Choosing a Linux Distribution

- Types
- Lifecycle
- Desktop vs Server

Non-Linux Operating Systems



Understanding Computer Hardware



Weight: 2

Where Data is Stored

Configurations

- `/etc/*`
- `/boot/*`

Events and Logs Exploration

- `/var/log/*`
- **journalctl**
- **dmesg**

Process, Resources, and Disks

- **ps, top**
- **free, df, du**
- **lsblk, fdisk**

Special Folders

- `/proc/*`
- `/sys/*`
- `/dev/*`

Your Computer on the Network

Main Topics

- Network, interface, gateway
- IPv4 and IPv6 addresses
- DNS

Monitoring and Troubleshooting

- **netstat, ss**
- **ping**
- **host**

Network Configuration

- **route, ip route show**
- **ifconfig, ip address show**

Notable Files

- `/etc/resolv.conf`
- `/etc/hosts`



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Part 5

Security and File Permissions

Basic Security and Identifying User Types

User Types

- Super user
- System users
- Regular (standard) users

Notable Files

- /etc/passwd
- /etc/shadow
- /etc/group

Helpful Commands

- **id, last, who, w**
- **sudo, su**

Creating Users and Groups

User Management

- **useradd**
- **usermod**
- **userdel**

Password Management

- **passwd**
- **chpasswd**

Group Management

- **groupadd**
- **groupmod**
- **groupdel**

Alternative Commands

- **adduser**
- **deluser**

Managing File Permissions and Ownership

- rwxrw- r - -
 user group others

Object Type *
d = folder
- = file
l = symbolic link

Permissions Meaning

- r = Read
- w = Write
- x = Execute

Explore Permissions

- Long listing with **ls -l**

Manage Permissions & Ownership

- **chmod**
- **chown**
- **chgrp**

Special Directories and Files

Special Directories

- /tmp
- /var/tmp
- /run

Symbolic and Hard Links

- Difference
- Working with **ln**



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Is This All?

Nooo! There is Much More!

Go deeper with topics like

- Users and groups management
- Permissions (incl. special ones) and ownership management
- Special folders and files
- Bash building blocks (if, case, and loop structures)
- Package management

Explore the detailed objectives at

https://wiki.lpi.org/wiki/Linux_Essentials_Objectives_V1.6

Where Can I Study What is Missing?

Start with

<https://learning.lpi.org/pdfstore/LPI-Learning-Material-010-160-en.pdf>

Continue with other materials available at

<https://learning.lpi.org>



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Questions?



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Demo

<https://github.com/shekeriev/linux-essentials>



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Thank you!

Submit your feedback here:



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