

Exam 102: Detailed Objectives

This is a required exam for LPI certification Level 1. It covers basic skills for the Linux Professional that are common to major distributions of Linux.

Each objective is assigned a weighting value. The weights range roughly from 1 to 10 and indicate the relative importance of each objective. Objectives with higher weights will be covered in the exam with more questions.

- [Shells, Scripting and Data Management](#)
- [User Interfaces and Desktops](#)
- [Administrative Tasks](#)
- [Essential System Services](#)
- [Networking Fundamentals](#)
- [Security](#)

Topic 105: Shells, Scripting and Data Management

105.1 Customize and use the shell environment

Weight: 4

DescriptionCandidates should be able to customize shell environments to meet users' needs.
Candidates should be able to modify global and user profiles.

Key Knowledge Areas

- Set environment variables (e.g. PATH) at login or when spawning a new shell.
- Write BASH functions for frequently used sequences of commands.
- Maintain skeleton directories for new user accounts.
- Set command search path with the proper directory.

Terms and Utilities

/etc/profile	env	export
set	unset	~/.bash_profile
~/.bash_login	~/.profile	~/.bashrc
~/.bash_logout	function	alias
lists		

105.2 Customize or write simple scripts

Weight: 4

DescriptionCandidates should be able to customize existing scripts, or write simple new BASH scripts.

Key Knowledge Areas

- Use standard sh syntax (loops, tests).
- Use command substitution.
- Test return values for success or failure or other information provided by a command.

Perform conditional mailing to the superuser.
Correctly select the script interpreter through the shebang (!) line.
Manage the location, ownership, execution and suid-rights of scripts.

Terms and Utilities

for	while	test
if	read	seq

105.3 SQL data management

Weight: 2

DescriptionCandidates should be able to query databases and manipulate data using basic SQL commands. This objective includes performing queries involving joining of 2 tables and/or subselects.

Key Knowledge Areas

Use of basic SQL commands.
Perform basic data manipulation.

Terms and Utilities

insert	update	select
delete	from	where
group by	order by	join

Topic 106: User Interfaces and Desktops

106.1 Install and configure X11

Weight: 2

DescriptionCandidates should be able to install and configure X11.

Key Knowledge Areas

Verify that the video card and monitor are supported by an X server.
Awareness of the X font server.
Basic understanding and knowledge of the X Window configuration file.

Terms and Utilities

/etc/X11/xorg.conf	xhost	DISPLAY
xwininfo	xdpyinfo	X

106.2 Setup a display manager

Weight: 2

DescriptionCandidates should be able setup and customize a display manager. This objective covers the display managers XDM (X Display Manger), GDM (Gnome Display Manager) and KDM

(KDE Display Manager).

Key Knowledge Areas

- Turn the display manager on or off.
- Change the display manager greeting.
- Change default color depth for the display manager.
- Configure display managers for use by X-stations.

Terms and Utilities

/etc/inittab	xdm configuration files	kdm configuration files
gdm configuration files		

106.3 Accessibility

Weight: 1

DescriptionDemonstrate knowledge and awareness of accessibility technologies.

Key Knowledge Areas

- Keyboard Accessibility Settings
- Visual Settings and Themes
- Assistive Technology (ATs)

Terms and Utilities

Sticky/Repeat Keys	Slow/Bounce/Toggle Keys	Mouse Keys
High Contrast Desktop Themes	Large Print Desktop Themes	Screen Reader
Braille Display	Screen Magnifier	On-Screen Keyboard
Gestures	Orca	GOK
emacspk		

Topic 107: Administrative Tasks

107.1 Manage user and group accounts and related system files

Weight: 5

DescriptionCandidates should be able to add, remove, suspend and change user accounts.

Key Knowledge Areas

- Add, modify and remove users and groups.
- Manage user/group info in password/group databases.
- Create and manage special purpose and limited accounts.

Terms and Utilities

/etc/passwd	/etc/shadow	/etc/group
/etc/skel	chage	groupadd
groupdel	groupmod	passwd
useradd	userdel	usermod

107.2 Automate system administration tasks by scheduling jobs

Weight: 4

DescriptionCandidates should be able to use cron or anacron to run jobs at regular intervals and to use at to run jobs at a specific time.

Key Knowledge Areas

Manage cron and at jobs.
Configure user access to cron and at services.

Terms and Utilities

/etc/cron	/etc/at.deny	/etc/at.allow
/etc/crontab	/etc/cron.allow	/etc/cron.deny
/var/spool/cron/*	crontab	at
atq	atrm	

107.3 Localisation and internationalisation

Weight: 3

DescriptionCandidates should be able to localize a system in a different language than English. As well, an understanding of why LANG=C is useful when scripting.

Key Knowledge Areas

Locale settings.
Timezone settings.

Terms and Utilities

/etc/timezone	/etc/localtime	/usr/share/zoneinfo
Environment variables	/usr/bin/locale	tzselect
tzconfig	date	iconv
UTF-8	ISO-8859	ASCII
Unicode		

Topic 108: Essential System Services

108.1 Maintain system time

Weight: 3

DescriptionCandidates should be able to properly maintain the system time and synchronize the clock via NTP.

Key Knowledge Areas

Set the system date and time.
Set the hardware clock to the correct time in UTC.
Configure the correct timezone.

Basic NTP configuration.
Knowledge of using the pool.ntp.org service

Terms and Utilities

/usr/share/zoneinfo	/etc/timezone	/etc/localtime
/etc/ntp.conf	date	hwclock
ntpd	ntpdate	pool.ntp.org

108.2 System logging

Weight: 2

DescriptionCandidates should be able to configure the syslog daemon. This objective also includes configuring the logging daemon to send log output to a central log server or accept log output as a central log server.

Key Knowledge Areas

syslog configuration files
syslog
standard facilities, priorities and actions

Terms and Utilities

syslog.conf	syslogd	klogd
logger		

108.3 Mail Transfer Agent (MTA) basics

Weight: 3

DescriptionCandidates should be aware of the commonly available MTA programs and be able to perform basic forward and alias configuration on a client host. Other configuration files are not covered.

Key Knowledge Areas

Create e-mail aliases.
Configure e-mail forwarding.
Knowledge of commonly available MTA programs (postfix, sendmail, qmail, exim) (no configuration)

Terms and Utilities

	sendmail emulation layer	
~/forward	commands	newaliases
mail	mailq	postfix
sendmail	exim	qmail

108.4 Manage printers and printing

Weight: 2

DescriptionCandidates should be able to manage print queues and user print jobs using CUPS and the LPD compatibility interface.

Key Knowledge Areas

- Basic CUPS configuration (for local and remote printers).
- Manage user print queues.
- Troubleshoot general printing problems.
- Add and remove jobs from configured printer queues.

Terms and Utilities

CUPS config files, tools and utils /etc/cups lpd legacy interface (lpr, lprm, lpq)

Topic 109: Networking Fundamentals

109.1 Fundamentals of internet protocols

Weight: 4

DescriptionCandidates should demonstrate a proper understanding of TCP/IP network fundamentals.

Key Knowledge Areas

- Demonstrate an understanding network masks.
- Knowledge of the differences between private and public "dotted quad" IP-Addresses.
- Setting a default route.
- Knowledge about common TCP and UDP ports (20, 21, 22, 23, 25, 53, 80, 110, 119, 139, 143, 161, 443, 465, 993, 995).
- Knowledge about the differences and major features of UDP, TCP and ICMP.
- Knowledge of the major differences between IPv4 and IPV6.

Terms and Utilities

/etc/services ftp telnet
host ping dig
traceroute tracepath

109.2 Basic network configuration

Weight: 4

DescriptionCandidates should be able to view, change and verify configuration settings on client hosts.

Key Knowledge Areas

- Manually and automatically configure network interfaces
- Basic TCP/IP host configuration.

Terms and Utilities

/etc/hostname /etc/hosts /etc/resolv.conf
/etc/nsswitch.conf ifconfig ifup

ifdown

route

ping

109.3 Basic network troubleshooting

Weight: 4

DescriptionCandidates should be able to troubleshoot networking issues on client hosts.

Key Knowledge Areas

Manually and automatically configure network interfaces and routing tables to include adding, starting, stopping, restarting, deleting or reconfiguring network interfaces.

Change, view, or configure the routing table and correct an improperly set default route manually.

Debug problems associated with the network configuration.

Terms and Utilities

ifconfig

ifup

ifdown

route

host

hostname

dig

netstat

ping

traceroute

109.4 Configure client side DNS

Weight: 2

DescriptionCandidates should be able to configure DNS on a client host.

Key Knowledge Areas

Demonstrate the use of DNS on the local system.

Modify the order in which name resolution is done.

Terms and Utilities

/etc/hosts

/etc/resolv.conf

/etc/nsswitch.conf

Topic 110: Security

110.1 Perform security administration tasks

Weight: 3

DescriptionCandidates should know how to review system configuration to ensure host security in accordance with local security policies.

Key Knowledge Areas

Audit a system to find files with the suid/sgid bit set.

Set or change user passwords and password aging information.

Being able to use nmap and netstat to discover open ports on a system.

Set up limits on user logins, processes and memory usage.

Basic sudo configuration and usage.

Terms and Utilities

find	passwd	lsof
nmap	chage	netstat
sudo	/etc/sudoers	su
usermod	ulimit	

110.2 Setup host security

Weight: 2

DescriptionCandidates should know how to set up a basic level of host security.

Key Knowledge Areas

- Awareness of shadow passwords and how they work.
- Turn off network services not in use.
- Understand the role of TCP wrappers.

Terms and Utilities

/etc/nologin	/etc/passwd	/etc/shadow
/etc/xinetd.d/*	/etc/xinetd.conf	/etc/inetd.d/*
/etc/inetd.conf	/etc/inittab	/etc/init.d/*
/etc/hosts.allow	/etc/hosts.deny	

110.3 Securing data with encryption

Weight: 3

DescriptionThe candidate should be able to use public key techniques to secure data and communication.

Key Knowledge Areas

- Perform basic OpenSSH 2 client configuration and usage.
- Understand the role of OpenSSH
- Perform basic GnuPG configuration and usage.
- Understand SSH port tunnels (including X11 tunnels).

Terms and Utilities

ssh	ssh-keygen	ssh-agent
ssh-add	~/.ssh/id_rsa	id_rsa.pub
~/.ssh/id_dsa	id_dsa.pub	/etc/ssh/ssh_host_rsa_key
ssh_host_rsa_key.pub	/etc/ssh/ssh_host_dsa_key	ssh_host_dsa_key.pub
~/.ssh/authorized_keys	/etc/ssh_known_hosts	gpg
~/.gnupg/*		