

LPIC-1

Junior Level Linux Professional (LPIC-1)



- Status: Available now. First published January 11, 2000; latest revision published April 2009
- the first IT certification program to be professionally accredited by National Commission For Certifying Agencies ([NCCA](#))
- Pre-Requisites: None
- Requirements: Passing Exams 101 and 102
- Overview of Tasks: To pass Level 1 someone should be able to:
 - Work at the Linux command line
 - Perform easy maintenance tasks: help out users, add users to a larger system, 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.

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 across all distributions of Linux.

IMPORTANT INFORMATION: These are the current 102 objectives, which are valid **effective** 2009-04-01.

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.

Objectives: Exam 102

Topic 105: Shells, Scripting and Data Management

105.1 Customize and use the shell environment

Weight	4
Description	Candidates 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.

The following is a partial list of the used files, 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

Description

Candidates 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.

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

- for
- while
- test
- if
- read
- seq

105.3 SQL data management

Weight

2

Description

Candidates 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.

The following is a partial list of the used files, 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
Description	Candidates should be able to install and configure X and an X font server.

Key Knowledge Areas

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

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

- /etc/X11/xorg.conf
- xhost
- DISPLAY
- xwininfo
- xdpypinfo
- X

106.2 Setup a display manager

Weight	2
Description	Candidates 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.

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

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

106.3 Accessibility

Weight	1
Description	Demonstrate knowledge and awareness of accessibility technologies.

Key Knowledge Areas

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

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

- Sticky/Repeat Keys
- Slow/Bounce/Toggle Keys
- Mouse Keys
- High Contrast/Large Print Desktop Themes
- Screen Reader
- Braille Display
- Screen Magnifier
- On-Screen Keyboard
- Gestures (used at login, for example gdm)
- Orca
- GOK
- emacspeak

Topic 107: Administrative Tasks

107.1 Manage user and group accounts and related system files

Weight	5
Description	Candidates 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.

The following is a partial list of the used files, 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
Description	Candidates 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.

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

- /etc/cron.{d,daily,hourly,monthly,weekly}
- /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
Description	Candidates 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.

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

- /etc/timezone
- /etc/localtime
- /usr/share/zoneinfo
- Environment variables:
 - LC_*
 - LC_ALL
 - LANG
- /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

Description

Candidates 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

The following is a partial list of the used files, 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

Description

Candidates 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

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

- syslog.conf
- syslogd
- klogd

- logger

108.3 Mail Transfer Agent (MTA) basics

Weight	3
Description	Candidates 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)

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

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

108.4 Manage printers and printing

Weight	2
Description	Candidates 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.

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

- CUPS configuration files, tools and utilities
- /etc/cups
- lpd legacy interface (lpr, lprm, lpq)

Topic 109: Networking Fundamentals

109.1 Fundamentals of internet protocols

Weight	4
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Description

Candidates 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.

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

- /etc/services
- ftp
- telnet
- host
- ping
- dig
- traceroute
- tracepath

109.2 Basic network configuration

Weight

4

Description

Candidates 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.

The following is a partial list of the used files, 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

Description

Candidates 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.

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

- ifconfig
- ifup
- ifdown
- route
- host
- hostname
- dig
- netstat
- ping
- traceroute

109.4 Configure client side DNS

Weight	2
Description	Candidates 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.

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

- /etc/hosts
- /etc/resolv.conf
- /etc/nsswitch.conf

Topic 110: Security

110.1 Perform security administration tasks

Weight	3
Description	Candidates 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.

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

- find

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

110.2 Setup host security

Weight	3
Description	Candidates 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.

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

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

110.3 Securing data with encryption

Weight	3
Description	The 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 2 server host keys
- Perform basic GnuPG configuration and usage.
- Understand SSH port tunnels (including X11 tunnels).

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

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