

LPI – Linux Administrator II («LP2»)

In this course, as an administrator of a productive network, you will get to know all the important tools for supporting Linux systems and prepare for the LPI-102 exam at the same time.

Duration: 5 days

Price: 3'500.–

Course documents: LPI-certified courseware

Vendor code: 102-500

Content

Topic 105: Shells and Shell Scripting

105.1 Customize and use the shell environment

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.

Partial list of the used files, terms and utilities:

- .
- source
- /etc/bash.bashrc
- /etc/profile
- env
- export
- set
- unset
- ~/.bash_profile
- ~/.bash_login
- ~/.profile
- ~/.bashrc
- ~/.bash_logout
- function
- alias

105.2 Customize or write simple scripts

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.
- Execute chained commands.
- 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.

Partial list of the used files, terms and utilities:

- for
- while
- test
- if
- read
- seq
- exec
- ||
- &&

Topic 106: User Interfaces and Desktops

106.1 Install and configure X11

Candidates should be able to install and configure X11.

Key Knowledge Areas:

- Understanding of the X11 architecture.
- Basic understanding and knowledge of the X Window configuration file.
- Overwrite specific aspects of Xorg configuration, such as keyboard layout.
- Understand the components of desktop environments, such as display managers and window managers.
- Manage access to the X server and display applications on remote X servers.
- Awareness of Wayland.

Partial list of the used files, terms and utilities:

- /etc/X11/xorg.conf
- /etc/X11/xorg.conf.d/
- ~/.xsession-errors
- xhost
- xauth
- DISPLAY
- X

106.2 Graphical Desktops

Candidates should be aware of major Linux desktops. Furthermore, candidates should be aware of protocols used to access remote desktop sessions.

Key Knowledge Areas:

- Awareness of major desktop environments
- Awareness of protocols to access remote desktop sessions

Partial list of the used files, terms and utilities:

- KDE
- Gnome
- Xfce
- X11
- XDMCP
- VNC
- Spice

- RDP

106.3 Accessibility

Demonstrate knowledge and awareness of accessibility technologies.

Key Knowledge Areas:

- Basic knowledge of visual settings and themes.
- Basic knowledge of assistive technology.

Partial list of the used files, terms and utilities:

- High Contrast/Large Print Desktop Themes.
- Screen Reader.
- Braille Display.
- Screen Magnifier.
- On-Screen Keyboard.
- Sticky/Repeat keys.
- Slow/Bounce/Toggle keys.
- Mouse keys.
- Gestures.
- Voice recognition.

Topic 107: Administrative Tasks

107.1 Manage user and group accounts and related system files

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.

Partial list of the used files, terms and utilities:

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

107.2 Automate system administration tasks by scheduling jobs

Candidates should be able to use cron and systemd timers 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.
- Understand systemd timer units.

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
- systemctl
- systemd-run

107.3 Localisation and internationalisation

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:

- Configure locale settings and environment variables.
- Configure timezone settings and environment variables.

Partial list of the used files, terms and utilities:

- /etc/timezone
- /etc/localtime
- /usr/share/zoneinfo/
- LC_*
- LC_ALL
- LANG
- TZ
- /usr/bin/locale
- tzselect
- timedatectl
- date
- iconv
- UTF-8
- ISO-8859
- ASCII
- Unicode

Topic 108: Essential System Services

108.1 Maintain system time

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 using ntpd and chrony.
- Knowledge of using the pool.ntp.org service.
- Awareness of the ntpq command.

Partial list of the used files, terms and utilities:

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

108.2 System logging

Candidates should be able to configure rsyslog. 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. Use of the systemd journal subsystem is covered. Also, awareness of syslog and syslog-ng as alternative logging systems is included.

Key Knowledge Areas:

- Basic configuration of rsyslog.
- Understanding of standard facilities, priorities and actions.
- Query the systemd journal.
- Filter systemd journal data by criteria such as date, service or priority
- Configure persistent systemd journal storage and journal size
- Delete old systemd journal data
- Retrieve systemd journal data from a rescue system or file system copy
- Understand interaction of rsyslog with systemd-journald
- Configuration of logrotate.
- Awareness of syslog and syslog-ng.

Partial list of the used files, terms and utilities:

- /etc/rsyslog.conf
- /var/log/
- logger
- logrotate
- /etc/logrotate.conf
- /etc/logrotate.d/
- journalctl
- systemd-cat
- /etc/systemd/journald.conf
- /var/log/journal/

108.3 Mail Transfer Agent (MTA) basics

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, exim) (no configuration)

Partial list of the used files, terms and utilities:

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

108.4 Manage printers and printing

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.

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

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

Key Knowledge Areas:

- Demonstrate an understanding of network masks and CIDR notation.
- Knowledge of the differences between private and public "dotted quad" IP addresses.
- Knowledge about common TCP and UDP ports and services (20, 21, 22, 23, 25, 53, 80, 110, 123, 139, 143, 161, 162, 389, 443, 465, 514, 636, 993, 995).
- Knowledge about the differences and major features of UDP, TCP and ICMP.
- Knowledge of the major differences between IPv4 and IPv6.
- Knowledge of the basic features of IPv6.

Partial list of the used files, terms and utilities:

- /etc/services
- IPv4, IPv6
- Subnetting
- TCP, UDP, ICMP

109.2 Persistent network configuration

Candidates should be able to manage the persistent network configuration of a Linux host.

Key Knowledge Areas:

- Understand basic TCP/IP host configuration
- Configure ethernet and wi-fi network configuration using NetworkManager
- Awareness of systemd-networkd

Partial list of the used files, terms and utilities:

- /etc/hostname
- /etc/hosts
- /etc/nsswitch.conf
- /etc/resolv.conf
- nmcli
- hostnamectl
- ifup
- ifdown

109.3 Basic network troubleshooting

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

Key Knowledge Areas:

- Manually configure network interfaces, including viewing and changing the configuration of network interfaces using iproute2.
- Manually configure routing, including viewing and changing routing tables and setting the default route using iproute2.
- Debug problems associated with the network configuration.
- Awareness of legacy net-tools commands.

Partial list of the used files, terms and utilities:

- ip
- hostname
- ss
- ping
- ping6
- traceroute
- traceroute6
- tracepath
- tracepath6
- netcat
- ifconfig
- netstat
- route

109.4 Configure client side DNS

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

Key Knowledge Areas:

- Query remote DNS servers.
- Configure local name resolution and use remote DNS servers.
- Modify the order in which name resolution is done.
- Debug errors related to name resolution.
- Awareness of systemd-resolved

Partial list of the used files, terms and utilities:

- /etc/hosts
- /etc/resolv.conf
- /etc/nsswitch.conf
- host
- dig
- getent

Topic 110: Security

110.1 Perform security administration tasks

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.
- Determine which users have logged in to the system or are currently logged in.
- Basic sudo configuration and usage.

Partial list of the used files, terms and utilities:

- find
- passwd
- fuser
- lsof
- nmap
- chage
- netstat
- sudo
- /etc/sudoers
- su
- usermod
- ulimit
- who, w, last

110.2 Setup host security

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.

Partial list of the used files, terms and utilities:

- /etc/nologin
- /etc/passwd
- /etc/shadow
- /etc/xinetd.d/
- /etc/xinetd.conf
- systemd.socket

- /etc/inittab
- /etc/init.d/
- /etc/hosts.allow
- /etc/hosts.deny

110.3 Securing data with encryption

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, usage and revocation.
- Use GPG to encrypt, decrypt, sign and verify files.
- 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
- ~/.ssh/id_ecdsa and id_ecdsa.pub
- ~/.ssh/id_ed25519 and id_ed25519.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
- /etc/ssh/ssh_host_ecdsa_key and ssh_host_ecdsa_key.pub
- /etc/ssh/ssh_host_ed25519_key and ssh_host_ed25519_key.pub
- ~/.ssh/authorized_keys
- ssh_known_hosts
- gpg
- gpg-agent
- ~/.gnupg/

Key Learnings

- Shells and shell scripts
- User interfaces and desktops
- Administrative tasks
- Basic system services
- Network basics
- Security

Target audience

System administrators and administrators of Linux systems, who want to tackle an internationally recognized certification

Requirements

We require the following course or equivalent knowledge:

- [LPI – Linux Administrator I \(«LP1»\)](#)

Certification

The course has been designed so that you can achieve the **«LPIC 1: Certified Linux Administrator»** certificate together with the **«LPI – Linux Administrator I (LP1)»** course.

The exam is not part of the course, but can be taken directly at our test center (approx. CHF 200.-).

Further courses

- **LPI – Linux Engineer I («LP3»)**
- **Linux/Unix shell for power users and programmers («USH»)**

Any questions?

We are happy to advise you on +41 44 447 21 21 or info@digicomp.ch. You can find detailed information about dates on www.digicomp.ch/courses-it-provider/unix-linux/course-lpi-linux-administrator-ii-102-500