

www.linuxcertification.com > [About Our Exams](#) > [Level 1 Objectives](#)



Level 1 Test 1 Objectives Installation and Configuration

Theory of Operation

- State the definition, origins, cost, and tradeoffs of free software.
- Compare proprietary versus Open Source software licenses.
- List the GNU Public License (GPL) principles.
- Describe how to sell free software.
- Describe the structural components of Linux.
- Contrast multi-user multitasking versus single-sequential user multitasking.
- Contrast command-line interpreters versus Graphical User Interfaces with their respective tradeoffs.
- List PC system architecture configuration issues.
- Describe hard disk partitioning strategies.
- Contrast video adapter versus monitor capabilities.
- List the network configuration parameters.

Base System

- List and give the tradeoffs of installation media.
- Explain the Linux device driver lag and give examples.
- List the installation steps common to all distributions.
- Contrast high-volume Linux distributions and give tradeoffs.
- Install four Linux distributions.
- Describe these configuration tools: COAS, Linuxconf, and YaST.
- Describe the bootup, login procedure, and shutdown sequence.
- Define package and describe how to use it.
- Describe basic file system principles.
- Explain the use of mounting versus the use of mtools for removable media.
- List and describe the role of common directories.
- List and describe the use of basic system navigation programs (ps, kill, w, etc).
- Describe the use and misuse of the superuser account.
- List the steps in creating a user account.
- Install, configure, and navigate two X11 window managers.

Shells and Commands

- Describe shell configuration files.
- Compare and contrast environmental versus shell variables.
- Use commands that pass special characters among programs.
- Use commands that allow programs to communicate.
- Manipulate files and directories.
- Use the shell for multitasking.
- Describe common shell editing commands.
- Use the following commands in isolation or in combination with each other: ls, cd, more, less, cp, mv, mkdir, rm, rmdir, ln, head, tail, file, grep, du, df, and zcat.
- Use the following vi commands: i, ZZ, :w, :w! :q!, dd, x, D, and J.

System Services

- List and describe seven tools that provide information on other tools.
- Describe and use LILO.
- Install run-time device drivers.
- Configure a printer capabilities file.
- Configure a printer filter.
- Use lpr, lpq, lprm, and lpc to control file printing.
- List the sections of the X server configuration file.

- Configure the X server video hardware.
- Contrast xf86config, XF86Setup, Xconfigurator, and SaX.
- Describe five components of the X Window system architecture.
- List and give the tradeoffs of AfterStep, KDE, Window Maker, FVWM, Enlightenment, and Blackbox.

Applications

- Describe the general control of X11 desktops.
- Describe Netscape functions, FTP functions, Telnet functions, and mail functions.
- Contrast WYSIWYG versus mark-up word processing.
- Contrast ApplixWare, WordPerfect, and StarOffice.
- Contrast GIMP, xfig, and ImageMagick.

Troubleshooting

- Describe the cause and solution to read errors.
- Explain why FTP keeps missing certain files in group transfers.
- Explain the problem and solution when LILO says LI.
- Define rescue disk and describe three reasons for using it.
- Explain how to get around a locked-up program.
- List eight steps on how to resolve an unresponsive printer.
- Explain why Linux may report the wrong time and describe how to fix the problem.
- Describe how to reset the console screen, the keyboard repeat rate, and the **NUM LOCK** key.
- Describe the role of system logging and how to use it for troubleshooting.



Level 1 Test 2 Objectives System Administration

Theory of Operation

- Identify the file system hierarchy standards.
- Outline the file system structure.
- Identify the cron daemon's implementation in file system backup.
- Define system tuning and the effect that process has on the system.
- Outline the print process and the role of the BSD printing model.
- Identify common network problems and the measures taken to troubleshoot those vulnerable areas.
- Outline the emergency measures taken when network vulnerabilities are breached.
- Identify key system resources.
- List the different levels of RAID storage and those levels' relative cost advantages.

Base System

- Identify the key files used in configuring user profiles, and the configurations possible with those files.
- Outline the process of adding and removing users.
- Identify the role of runlevels as well as the specified roles of the reserved runlevels 0, 1, and 6.
- Define the role of fstab in mounting and unmounting file systems and devices.
- Identify the common reasons for recompiling the kernel; outline the guidelines followed prior to recompiling.

Shells and Commands

- Outline the permissions necessary for the use of the **su** command; define the use of sudo in relation to system security.
- Define **motd** and its role in user communication.
- Identify MS-DOS tools and their use in a Linux system.
- Outline the role of DHCP in the designation of IP addresses.
- Define the role of the **make** command in the compilation of source code; define the function of the **touch** command and its effect on system logs.
- Define the function of CGI scripts in relation to the Internet.
- Outline the functions of system status, system message logging, and performance analysis.

System Services

- Identify and describe the function of common user commands.
- Determine utilities used for archiving, and the differences between the programs.
- Describe the function of the **fsck** command and determine the program's default run time.
- Identify the commands used for process management and the options that accompany those commands.
- Outline printer configuration options.
- Explain the function of the background line printer daemon and the foreground line printer requester.
- Outline the use of package managers when utilizing software packages.

Applications

- Compare and contrast the following backup applications: Amanda, KBACKUP, Uniback, Taper, and Arkeia.
- Outline the implementation of display tools such as XDM, XWin32, and ORL's VNC.
- Compare and contrast the following mail exchange programs: Sendmail, smail, Qpopper, Mahogany, IMAP server, and MajorDomo.
- Compare and contrast the following Web servers: Apache, Apache SSL, Mod_Perl, Mod_php3, and Mod frontpage.
- Describe the role of window managers in user accounts and compare and contrast the following programs: fvwm, AfterStep, Window Maker, IceWm, and Sawmill.

- Describe the role of benchmarks in assessing CPU and system architecture as well as compiler design.
- Compare and contrast Proftp with WU-ftp.
- Describe the integration of SSH into a network.
- Describe and contrast common GUI configuration tools: YaST/ YaST2, Linuxconf, System Configuration, Turbocfg, and COAS.
- Describe various usenet servers and walk through the configuration of the program for a network.

Troubleshooting

- Outline measures taken to prevent and control core dumps.



Level 1 Test 3 Objectives Networking

Theory of Operation

- Outline the basic technology powering Internet, Ethernet, and area networks.
- Describe the IP addressing system, as well as the new systems that have been developed to meet the continued exponential growth of the Internet.
- Identify the protocols used for establishing connections between network nodes, as well as the common conventions used by each protocol.
- Outline the reasons behind the implementation of DNS identification, the use of DNS identification in searches, and the steps taken in the process of name resolution as well as reverse lookup.
- Describe the roles of broadcasting, address assignment, and multicast in the configuration of network interfaces.
- Outline the useful applications of the UUCP protocol.
- Describe the implementation of SMB and NMB.

Base System

- List and describe the implementation of common network interfaces.
- Describe the roles of ARP and routing tables in the configuration of network interfaces.
- Outline the installation, purpose, and implementation of firewalls.
- Outline the installation and implementation of VPN and proxy servers.
- Describe the steps involved in IP multicast, as well as the situations where this method is useful.

Shells and Commands

- Outline the process and key elements of basic network configuration.
- Define the importance of system startup files and the steps taken to access these files.
- Outline the features of the uucp utility; describe the configuration process.
- Outline common network troubleshooting techniques.

System Services

- Outline the elements of DNS and their interaction.
- Outline the FTP structure and applications.
- Describe the NFS structure and applications.
- Describe the role of inetd in the Internet.
- List the programs in the Samba suite as well as their functions.
- Compare the mail transfer agents Sendmail, smail, and Qmail.
- Describe the steps involved in using POP3 and IMAP to access e-mail on a remote server.
- Describe the News program and mail list servers.
- Outline the elements that compose Apache and describe the implementation of the program.

Applications

- Describe the development and implementation of the mail and Pine programs on a network.
- Describe the development of browsers and their basic functions; compare and contrast Netscape, Mozilla, and Lynx.
- Describe the implementation of Samba and the services the program provides, particularly to individual users.
- Compare and contrast FTP and GFTP and describe the use of both programs on a network.
- Compare and contrast GUI network configuration tools: YaST2, Netconf, Netconfig, and Turbonetconf.
- Describe the network administration tool Netperf, particularly the services that the program provides.
- Describe the networking tools kibitz and WvDial and their respective roles in a network.



Level 1 Test 4 Objectives Security, Ethics, Privacy

Theory of Operation

- Outline the importance of computer security; specify key vulnerabilities for networks, Internet, and personal computers.
- List common encryption programs and describe their basic structure.
- Describe a secure password; outline and describe common vulnerabilities in password selection and the benefits of password expiration.
- Describe the function of ACLs, user/group permissions, and SUID programs and those programs' contribution to network security.
- Outline the key elements in network access control; describe a VPN and packet filtering.
- Outline the benefits of system monitoring; describe warning logfile information and the benefits of security audits.
- Outline common system vulnerabilities and describe the characteristics of system threats, such as Trojan horses, worms, viruses, and crackers.
- List and describe common network vulnerabilities; specifically, Denial of Service (DOS) attacks and IP spoofing.
- List and describe the usefulness of various security announcement organizations.
- Define and describe the purpose behind security ethics, specifically in the case of system administrators.

Base System

- List common concerns addressed in a network security policy, as well as the key function that this document performs.
- Describe the Shadow Suite and its uses.
- Describe the structure of PAM and the different components that compose the system.
- List the most relevant facilities that send messages to Syslog, as well as the priorities used to classify the messages being logged.
- Describe Sudo and the implementation of the program in a workplace; highlight Sudo's unique characteristics.
- Outline the function of TCP Wrappers and their use in developing a secure network.
- Describe the role of ipchains and iptables in restricting the flow of information in a network.
- Describe the structure and key elements of a VPN; outline the process of setting up a VPN.
- Outline the Stunnel program's role in preserving the privacy of e-mail and other transmissions over the Internet.
- Outline the reasons for and process of applying kernel patches.
- Describe and list the key elements of the SAIR and GNU Code of Ethics.

Shells and Commands

- Describe the implementation of md5sum in testing file integrity.
- List and describe the common encryption programs used.
- Outline the uses for packet sniffing programs, as well as the security risks these programs may pose.
- Describe the use of Sudo from a user's point of view.
- List and describe the three utilities included in the SSH software package and their use in developing secure communication.
- Describe the four key programs used to securely edit sensitive documents, such as the /etc/passwd file.
- Describe umask, autologout, mesg, passwd, mkpasswd, and those programs used in configuring user environments.
- Outline the use of swatch and strings in monitoring logfiles.
- Outline the use of netstat and nmap in monitoring services.
- Compare and contrast vlock and xlock, describing their key differences.

System Services

- Describe the authentication process in a Kerberos system, as well of the use of tickets and the role of a

ticket granting server.

- Describe the security advantages of one time passwords as well as the programs that offer this function, particularly S/Key, now OPIE.
- Describe the three logfile monitoring utilities chklastlog, chkwtmp, and Logcheck.
- Explain how a user can use the crack program to discover system weaknesses.
- Outline the use of a tripwire program in checking for unscheduled changes to system files, as well as the key elements of the program.
- Describe SAINT and Tiger and the two programs' roles in developing a secure network.
- Describe Sysmon and walk through the steps in the configuration process.
- List the key Webmin modules; describe the process of installing and configuring the program.
- Describe the role of digital certificates in establishing secure transactions among multiple clients as well as certification authorities.

Applications

- Describe the vulnerabilities of NFS when securing a network, securing exports, and root squashing.
- Outline the potential security risks in the NIS and NIS+ programs.
- Outline common Sendmail vulnerabilities; describe the drawbacks to using smap and smapd, as well as the measures that can be taken to overcome these hazards.
- Describe the secure configuration of Netscape and IMAP.
- Outline the setup of an anonymous FTP server, describe the use of permissions in directories, and explain the importance of careful configuration file editing.
- Compare and contrast ppg and gpg; describe gpg development.
- List key components in Web server security; describe the configuration of permissions for Apache, the implementation of MD5 digest authentication, and chroot Web environments.
- Describe Squid, as well as its use and configuration, and outline the potential security risks inherent in the program.
- Describe Big Brother, as well as a sample configuration, and potential reservations regarding the use of the program in the workplace.
- Describe LIDS, as well as its configuration and usage.
- List, compare, and contrast several security-conscious Linux distributions.

Troubleshooting

- Describe why setuid shell scripts do not work.