

# Course overview:

## LPI102 Certification

(LP102eng)



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### Overview and objectives

This five-day course will help to prepare students for the LPI certification – a vendor-neutral Linux credential that measures critical Linux system and network administration skills. The LPI certification consists of two exams – LPI 101 and LPI 102 – this course prepares for LPI 102.

Students will learn about the core elements of the Linux operating system, including documentation, administration utilities, network configuration, printing, recovery planning and DFS, together with core Internet-related technologies such as e-mail, security, DNS, Apache and Squid.

### Who should attend?

This course is intended for students interested in gaining a greater understanding of Linux and for those responsible for providing basic installation, operation and troubleshooting services on Linux workstations and servers.

Students should have 1-2 years of experience with using Linux or have attended course LP101 – LPI101 Certification before attending this course. A general understanding of Linux administration skills is helpful but not necessary for course attendance.

#### System startup and shutdown

- Boot Loader features and configuration • LILO • How to install LILO • Where to install • LILO configuration file • LILO command options • Boot options • LILO documentation • GRUB • How to install GRUB • Where to install • LOADLIN • Standard boot process (lilo) • Typical lilo.conf • Boot problems • Manual boot • Startup flow control • Runlevels • The init control file: /etc/inittab • Structure of /etc/inittab • Run command scripts (System V) • Changing runlevels • Shutting down • Maintenance mode

#### Managing users

- Creating new local user accounts • New user requirements • Preparing groups • The /etc/passwd file • Allocating user IDs • Adding users • Changing user attributes • Changing group membership • Removing users • Security • Setting passwords • The /etc/shadow file • Account security

#### User environments

- Login shell • Restricted root access • Environment • Environment files • Environment definitions • Example environment • The umask command • Security issues • Message of the day (mtd) • Guest accounts • Shared group directions

#### Documentation

- Documentation • Man pages and the man command • Manual entries • Related commands • The info command • Documentation in /usr/share/doc • Online documentation • The Linux documentation project • Usenet newsgroups • Newsgroup archives • Hardcopy documentation

#### The linux shell and bash scripting

- Introduction • The linux shell • The bash shell • Configuration files • Environment • Using the bash shell • A simple shell script • Variables • Naming variables • Assigning variables • Quotes and command substitution • Variable notation • Default variables • Passing information to your script • Positional parameters • Flow control • Loops • The for loop • The while and until loops • Conditions and tests • Return codes and exit status • If-then-else • Conditions • Case • Input • Accepting input • Read • Select • Functions • Arithmetic and arrays • Arithmetic expressions • Arrays

#### Process scheduling

- Scheduling processes • The at command • Listing and deleting at jobs • The crontab command • Administering at and crontab • Anacron

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### Printing

- Printing options • LPD • The lpd daemon • The /etc/printcap file • LPRng • CUPS • LPD installation • Printer configuration • Red Hat/Fedora print configuration • SUSE • Print commands • Lpr • Lpq • Lprm • Printer queue management with lpc • Remote printing • Printer security • Print filters • Magicfilter • APSfilter • Foomatic • PostScript

### The Linux Kernel

- Kernel version numbering • Recent kernel changes • Preparing for the new kernel • Software tools • The source tree • Applying patches to the kernel source code • Customising and installing a new kernel • Make targets • General procedure for building a kernel • Configuring a new kernel • Make config • Make menuconfig • Make-xconfig • Testing a new kernel with lilo • Kernel modules • Building a monolithic kernel

### Basic networking

- Overview of TCP/IP • Protocols • IP • TCP • UDP • ICMP • Networks • Internet protocol address • IPv4 address format • Networking overview • Packet fragmentation • Packet structure • Media Access Control (MAC) addresses • Components of the TCP/IP protocol suite • Setting up networking • Configuration files • Defining IP addresses • Networking hardware • Modems and NICs • Network configuration utilities • Configuring a network • Configuring your network interface card • Ifconfig • Netcfg • Configuring IP addresses • Routing tables • Routing daemons • Gated and routed • Configuring the default gateway • Configuring name resolution • Inetd • Xinetd • Xinetd.conf • The xinetd.d directory • Xinetd signals • Point to Point protocol (PPP) • Configuring PPP • Dial-up tools • Minicom • WvDial • SLIP and CSLIP • ISDN • Common networking tools • Ping • Traceroute • Dig • Whois

### Networking services

- Web services: apache • Installation • Basic configuration • Directives • Enabling server status and view • Configuration • Document directory configuration • Options directive • Symlinks • Directory security • Restricting access • File transfer • ftp • relevant files • The /etc/ftpaccess file • The /etc/ftpshosts file • The /etc/ftpusers file • Proftpd • Relevant files • E-mail services: sendmail • Sendmail installation and configuration • Sendmail alias functions • Syntax • Sendmail command line switches and parameters • The m4 macro system • The sendmail.cf file • Specific sections of sendmail.cf • Local info section • Message precedence section • Trusted users section • Format-of-headers section • Rewriting rules section • Mailer definitions section • Setting up the sendmail.cf file • Structure of sendmail.cf directories • Configuring the m4 sources • Queued mail • Ssh – secure shell • Features • Components of secure shell 1 • Components of secure shell 2 • SSH2 changes • Downloading SSH • Windows SSH clients • Installation and configuration • SSH1 configuration files • SSH usage and setup • Using SSH • Troubleshooting SSH • OpenSSH

### DNS

- Domain name service • Problems of a flat namespace • The DNS namespace • Some top level domains • An important point about DNS • Zones • Master and slave servers • BIND – Berkeley Internet Name Domain • Configuring BIND • Named files • Syntax for named.conf • Options section syntax • Brief overview of DNS resource records • Domain database file: db.example.org • SOA (Start of Authority) record • Name servers • Mail servers • Sub-domains • DNS database records • Named signals

### Distributed file systems

- Linux file sharing • Overview of the Network File System (NFS) • The NFS protocols stack • The NFS client • The NFS server • The portmapper • NPS daemon • Mount daemon • Overview of Samba • Obtaining and installing Samba • Prerequisites • Windows client configuration • Documentation files • Installing Samba from source or binary • Advantages of source • Advantages and disadvantages of binary • Installing your source • Configuring your installation • Configuring the makefile • Compiling samba from source • Installing samba • Installing from binary • Uninstalling samba • Configuring the smb.conf file • Starting samba • Configuring samba with SWAT • Installing SWAT • Starting SWAT • Logon to SWAT • SWAT options overview • Help in SWAT • Creating a basic smb.conf file with SWAT • Creating a test share • Add a user • Viewing your smb.conf file • Advanced view

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### Network security and performance tuning

- Your role in security • About security • Physical security • Software security • Software exploits • Security tools • Network security • The shadow password suite • Two types of network attacks • Unauthorized access • Service attacks: DoS (denial of service) • Basic NFS security • Client security • Server security • Xwindow security • Keep up on security updates • TCP wrappers • Tcpsd access control files • Wrapper variables • Tcpsd • Introduction to ipchains • Some related terminology • Ipchains • Some important questions and answers • Ipchains switches and parameters • Ipchains rules and features • Understanding packet filtering • Implementing ipchains • Basic IP masquerading • Using IPchains • What the company wants • Ipfwadm • Netfilter • Performance tuning • What to monitor • Monitoring CPU process and memory usage • Virtual memory statistics (vmstat) • /proc/meminfo • Other utilities • Managing log files • The syslog.conf file • Inspecting log files • Log rotation and management • Remote logging • Root and Mail • Troubleshooting • Potential installation problems • LILO error messages • Printer troubleshooting • Repairing file systems • Mail system maintenance • Emergency booting • Hardware vs IRQ problems • Isolating hardware problems • IRQ problems • Problems with SCSI controllers and devices • Setting your system's clock • Troubleshooting routing issues

### Recovery planning

- Why backup? • When to back up • Where to store backups • What to back up • Databases • Back up media • Magnetic tape • Optical disks • Removable disks • Backup utilities • Linux backup terminology • Overview of utilities • Tape archive and restore • Copy to I/O • Options to cpio • Device dump utility • Using dd to identify a file type • Using compression and dd • Handling tapes • Handling tapes with mt • Working with MS-DOS diskettes • Network backups

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