



## Linux Advanced System Administration (LPI)

**Duration: 5 Days    Course Code: LASA    Delivery Method: Company Event**

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### Overview:

This instructor led Linux Advanced System Administration (LPI) training course is designed to teach the advanced administration, security, networking and performance tasks required on a Linux Enterprise system. Targeted to closely follow the official LPI curriculum (generic Linux), this course together with the Linux System Administration course will enable the delegate to work towards achieving the LPIC-2 qualification. Exercises and examples are used throughout the course to give practical hands-on experience with the techniques covered.

### Company Events

These events can be delivered exclusively for your company at our locations or yours, specifically for your delegates and your needs. The Company Events can be tailored or standard course deliveries.

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### Target Audience:

The Linux Advanced System Administration (LPI) training course is suitable for Linux System Administrators who need to acquire advanced administration knowledge of the key administrative, networking and security tasks required on Linux within the Enterprise. An ideal course for delegates who will be working in an environment using several different Linux distributions and therefore knowledge of skills common to all the different Linux distributions is required. For the purpose of practical exercises, SUSE Linux will be used. Delegates who wish to work towards achieving the Linux Engineer LPIC-2 certification will find this course a good basis for LPIC-2: 201-450 and 202-450 exams. The appendixes also include other related topics that would be useful reading for delegates preparing for certification. Note: Should the delegate only require knowledge of Red Hat Linux then they should instead consider attending our range of Red Hat Linux Administration courses.

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### Objectives:

- On completion of this course the delegate will have in-depth technical knowledge of what is required to administer Linux within the Enterprise. They will have gained practical experience of configuring administrative, networking and security aspects of a Linux Enterprise system to an advanced level.
  - The delegate will possess the essential knowledge required to work towards achieving the Linux Engineer LPIC-2 qualification.
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### Prerequisites:

Experience of administering Linux in an Enterprise environment to the level covered in the Linux System Administration (LPI & CompTIA) course.

Knowledge of Linux Shell Programming to the level covered on the Linux Shell Programming course would also be beneficial.

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### Follow-on-Courses:

- Linux Advanced Shell Programming Tools (LASP)
  - Apache Web Server (APH)
  - Linux System Security (LSS)
  - Perl Programming (PERL)
  - Oracle SQL (OSP)
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## Content:

### Linux Advanced System Administration (LPI) Training Course Course Contents - DAY 1

#### Course Introduction

- Administration and Course Materials
- Course Structure and Agenda
- Delegate and Trainer Introductions

#### Session 1: ADVANCED NETWORK CONFIGURATION ; TROUBLESHOOTING

- Configuring the network card (ip link,ip addr)
- Network scripts
- Configuring routing (ip route)
- Network troubleshooting and related tools (tcpdump,ping,mtr,traceroute,netstat,ss,arp,nmap,nc)
- The radvd Router Advertisement Daemon
- Exercise

#### Session 2: APACHE,SQUID AND NGINX

- APACHE main configuration files
- APACHE server configuration (main Section entries)
- Starting APACHE
- APACHE access configuration
- Configuring secure APACHE (https)
- Configuring IP address-based virtual hosts
- Configuring name-based virtual hosts
- Configuring Apache for user-based content
- SQUID proxy server
- Configuring client browsers
- Starting SQUID
- SQUID configuration file (squid.conf)
- SQUID security settings
- NGINX Proxy and Reverse Proxy
- Exercise

#### Session 3: NFS NETWORK SERVICES

- NFS operation and associated daemons
- Setting up an NFS server (/etc/exports and exportfs)
- Investigating the portmapper
- Setting up an NFS client (mount)
- Mounting NFS filesystems at boot (/etc/fstab)
- Using the automounter to access NFS mounts on demand
- Configuring AutoFS direct and indirect mounts
- Creating AutoFS units
- Exercise

#### Session 4: SAMBA

- SAMBA configuration file (smb.conf)
- Testing the SAMBA configuration (testparm)
- Configuring SAMBA users
- Mapping Windows and SAMBA users

### Session 9: FILESYSTEM TOOLS AND DISK MONITORING

- Converting Ext filesystems to Btrfs
- Checking and repairing Btrfs filesystems
- Creating Btrfs subvolumes and snapshots
- Performing full and incremental backups of XFS filesystems
- Querying the backup repository
- Restoring XFS filesystems
- Alternate backup solutions
- The ZFS filesystem
- Configuring smartd
- Disk monitoring with smartctl
- Exercise

#### Session 10: RAID

- RAID overview
- Raw devices and partitions
- Creating a RAID device (fdisk,mdadm)
- Managing a RAID device (mdadm,/proc/mdstat)
- Creating and mount a file system on a RAID device
- Hot swapping failed drives
- Exercise

#### Session 11: LOGICAL VOLUME MANAGEMENT (LVM)

- LVM Overview
- Configuring LVM (pvcreate,vgcreate,vgextend,lvcreate etc.)
- Displaying information about the LVM environment (pvdisplay,pvs,vgdisplay,vgs,lvdisplay,lvs)
- Creating striped logical volumes
- Resizing Logical Volumes (lvextend,resize2fs,resize\_reiserfs,xfs\_growfs)
- Logical Volume Snapshots (lvcreate,lvdisplay)
- Device Mapper
- Configuring the lvm.conf file
- Exercise

#### Session 12: LDAP

- Structure of an LDAP Tree
  - Configuring the LDAP server (slapd.conf)
  - Testing the LDAP server (ldapsearch)
  - Adding information into LDAP (ldapadd)
  - Configuring the LDAP Clients (nsswitch.conf,ldap.conf)
  - Testing the Client connection to the Server (getent)
  - Exercise
- Linux Advanced System Administration (LPI) Training Course Course Contents - DAY 4

### Session 19: THE LINUX KERNEL

- Kernel naming conventions
- Monolithic and Modular kernel design
- Listing modules (lsmod,modinfo)
- Kernel module configuration
- Kernel tuning (/proc/sysctl.conf,sysctl)
- The GRUB2 Bootloader
- Installing An Alternate Kernel
- Exercise

### Session 20: HARDWARE CONFIGURATION

- Hotplug system
- Devices and Interfaces
- sysfs filesystem and persistent names
- Device initialisation and interface configuration
- Hotplug and Coldplug
- UDEV system
- Exercise

Addendum: Reference Materials (provided within the course handbook for additional reading)

#### APPENDIX A - CONFIGURING APACHE FOR PHP AND TOMCAT

- Configuring Apache Web Server to support PHP and Tomcat

#### APPENDIX B - BASIC OPENVPN

- Accessing a private network with OpenVPN

#### APPENDIX C - RAIDTOOLS

- Old style raidtools package

#### APPENDIX D - ALTERNATE BOOT LOADERS

- An overview of SYSLINUX and ISOLINUX
- Booting with PXELINUX

#### APPENDIX E - DRACUT

- Managing the Linux boot process with dracut

#### APPENDIX F - APPARMOR

- Enabling and disabling AppArmor
- AppArmor monitoring tools
- Building and modifying AppArmor profiles
- Logging AppArmor
- AppArmor Options
- Exercise

- Starting SAMBA
- Managing Windows filesystems (smbmount,nmblookup)
- Accessing Windows shares
- Exercise Linux Advanced System Administration (LPI) Training Course Course Contents - DAY 2

#### Session 5: THE DOMAIN NAME SERVER

- DNS operation
- Types of DNS Servers
- Domain Name Space
- Setting up a DNS master and slave server
- Server configuration files (named.conf and databases)
- DNS resource record formats
- Configuring DNS logging
- Configuring DNS security
- Starting and managing the DNS Server (rcnamed,rndc)
- Testing the DNS Server (host,dig,nslookup)
- DNS Client set up (resolv.conf)
- Configuring DNS Clients
- Exercise

#### Session 6: DHCP

- Configuring DHCP
- dhcpd.conf configuration file
- DNS entries
- Client address entries
- Address leases
- DHCP client configuration
- Exercise

#### Session 7: FTP

- Configuring a VSFTPD server
- Configuring FTP
- Configuring Pure-FTPd
- Configuring ProFTPd
- Active vs Passive mode
- vsftpd.conf configuration file
- Anonymous access
- Restricting access to the user's login directory
- FTP logfile
- Exercise

#### Session 8: CENTRALISED STORAGE WITH ISCSI

- Definition and benefits of iSCSI
- Configuring an iSCSI target
- Server target
- Client initiator
- Configuring the target an initiator with the yast tool
- Configuring the target an initiator with files and commands
- Configuring an iSCSI initiator
- Configuring iSCSI via YaST
- Exercise Linux Advanced System Administration (LPI) Training Course

#### Session 13: COMPILING SOFTWARE FROM SOURCE

- Installing programs from source (tar,tarball)
- Compiling Open Source Software (configure,make)
- Installing the compiled software (make install)
- Managing shared libraries (ldd)
- Compiling from SRC (source) RPM packages (rpmbuild,rpm)
- Exercise

#### Session 14: SYSTEM MONITORING ; PERFORMANCE MANAGEMENT

- System performance monitoring
- Collecting system performance information (sar)
- Monitoring memory usage (free)
- Measuring virtual memory (vmstat)
- Measuring I/O performance (iostat)
- Performance Guidelines
- Performance monitoring tools
- Capacity planning
- Exercise

#### Session 15: FIREWALL CONFIGURATION

- Basic packets and routing
- Netfilter (iptables)
- Packet filtering (iptables,chains,rule targets,connection tracking)
- Saving and restoring firewall settings
- Network address translation (NAT)
- Exercise

#### Session 16: SYSTEM SECURITY

- Reporting security alerts
- Applying security related patches
- Installing and configuring an Intrusion Detection System (IDS)
- Installing and configuring fail2ban
- Exercise Linux Advanced System Administration (LPI) Training Course Course Contents - DAY 5

#### Session 17: PLUGGABLE AUTHENTICATION MODULES (PAM)

- Main PAM configuration files (/etc/pam.d directory)
- Configuration file formats
- Controlling user access using the configuration files
- Configuring pam\_listfile
- Controlling time-based access with PAM
- Controlling limits with PAM
- Exercise

#### Session 18: POSTFIX

## Course Contents - DAY 3

- Configuring a Postfix server
  - Postfix TLS configuration
  - Configuring Dovecot
  - Managing email delivery
  - Filtering emails
  - Exercise
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### Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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