

General Linux Part I

Exam Information:

There are three levels of LPI Certification (LPIC):

These Exam Notes will go over the 1st Level

Level 1 – General Linux I

Test 101 (formerly T1a): General Linux I

This exam tests basic working knowledge in the areas of:

- GNU & Unix commands
- Devices, Linux File Systems, File system Hierarchy Standard
- Boot, Initialization, Shutdown, Run Levels
- Documentation
- Administrative Tasks

Note: All current LPI exams use computer-based tests administered through VUE. Each exam costs \$100 (US dollars)

LPIC Level 1 Suitable tasks: (As per LPI Home Page)

- Can work at the Unix command line
- Performs easy maintenance tasks: help out users, add users to a larger system, backup & restore, shutdown & reboot
- Can install and configure a workstation (incl. X) and connect it to the LAN, or a stand-alone PC via modem to the Internet.
- Note: This is somewhat heavier than the SAGE "Novice" level: we aim beyond the power-user & helpdesk level. It is about at the "prerequisites" level of the Redhat training program.
- **Requirements:** To complete Level 1, candidates must complete two exams:
 1. Complete the 101 (formerly T1a) exam
 2. Complete the 102 (formerly T1b) exam

(Note: that as of February 2000, the requirement for the distribution-specific "T2" exams was removed.)

Note: Passing the exams will give you LPIC Certification

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Study Tips:

- The First Level of Linux Certification is somewhat easy if you have working knowledge of the Unix / Linux command structure and a basic working knowledge of the OS.
- This doesn't necessarily mean that it is a "beginner" based certification for those that have no prior knowledge of Unix / Linux or any variation of it. You will be expected to know a decent amount about this OS.
- Lastly, Do not depend one source of information to prepare for this exam. By no means should you read these notes alone and expect to pass this exam. This is not an overly easy exam and is not covered heavily by many CBT's, or workbook study guides. Make sure you use the links provided below for additional FREE study information.

Note: The Exam Objectives are listed in the first link of the table below.

Free Links and Resources:

FREE Resources From LPI	Apache Today
Exam 101 Objectives	BSD central
LPI Home Page	BSD Today
FREE Sample Questions from LPI	Enterprise Linux Today
Glossary Of Terms	Just Linux
Exam Development	Linux Central
LPI FAQ's	Linuxnewbie
Certification Information	Linux Planet
Contact LPI	Linux Start
Other FREE Resources	Linux Today
LinuxDoc	Linuxprogramming.com
Linux ORG	PHPBuilder
Caldera	Linux Weekly News
Redhat	Slashdot
Debian	LILO Bible
Linux-Mandrake	GNU Project
Linux.com	Apache week
Linuxhelp.org	Apache FAQ's
Linixtoday.com	Unix FAQ's
All Linux Devices	Linux Presentation

For an excellent guide, visit the Cramsession for LPI 101 - [here](#)

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Note: Please read this free information – it will provide you with a wealth of information. There is no quick path to learning or mastering Unix / Linux. It is an operating system that has many different flavors due to its free source code. It will take a lot of work and effort – but unbelievably, most of the information you will need is available online. Please incorporate these resources into your study.

Knowing how to get to these resources is also built into the objectives of this exam. (*For example – how to download a new HOWTO*)

Exam Notes for 101

Linux documentation Basics

Note: you must know where to find information – these are the locations

- o Follow the links above or the locations below for help
- o Manual pages - `/usr/man`
- o man syntax is – `man {options} {section} {topic}`
- o man sections – NAME, SYNOPSIS, DESCRIPTION, OPTIONS, SEE ALSO, DIAGNOSTICS, FILES, HISTORY, BUGS, AUTHOR
- o Navigation keys: spacebar (advance) – **b** (back up) – **q** (quit) pressing {enter} will advance one line
- o Other keys – type **n** and this will be for next occurrence, if you want to search by string – use: `/ {string}`
- o Search order – 1, **8**, 2, 3, 4, 5, 6, 7, **9**
- o Info – `usr/info`
- o The info utility is similar to man but easier to use. Here is the syntax: spacebar – scrolls up delete key scrolls down. – **q** (quit) – **n** (Next topic) – **p** (previous topic)
- o Howto's – `usr/doc/HOWTO`
- o Faq – `usr/doc/FAQ`
- o Program documentation – `usr/doc/{program name}`
- o Internet resources – [click here](#) and also see all the Links provided above
- o Newsgroups – see links above
- o Most newsgroups archived at: www.altavista.com
- o Some newsgroups – `comp.os.linux.x` and `comp.os.linux.misc`
- o Mailing lists – see links above

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Information search with

- Whereis – this will return the path to the command
- Which – this will tell you what command is being executed now
- apropos – this will search short descriptions from the man pages
- Whatis – short description of a specific command

Booting Linux

Booting Linux – Kernel location – would either be on a boot floppy or on the hard drive (**/boot**) and the kernel calls upon the init daemon:

- Init Daemon – it will create processes to be used by the rest of your system
- /etc/inittab – this is where the init daemons configurations will be contained and each line of this file will have 4 fields
- The 4 fields are - **ID:RUNLEVEL:ACTION:PROCESS**
- Runlevels – these are a set of processes that will start as part of the system boot up.
- Runlevels 0 and 6 are reserved (For halt and reboot)
- LILO – LINUX LOADER – this is the boot loader. It can be on the hard disk or on a floppy. This will REPLACE THE MBR – therefore you will disable the booting abilities of Windows if you are not careful. You must also use FDISK /MBR to blow it out.
- LILO Facts – can use up to 16 different boot images, and all can be password protected – if none are selected, the default is usually loaded. The Config file is **/etc/lilo.conf**
- If you modify the Config file, you can write it to the boot sector by using this syntax: **/sbin/lilo**
- A wealth of LILO information exists here: [LILO BIBLE](#)
- **Note:** The above URL will also show you how to get LILO off the machine to get Windows back on which is usually a major problem for the Linux Newbie. This URL will also be helpful for partitioning facts as well. Please visit it and read it.
- Linux Booting Basics facts: [Here](#)
- Shutting Linux Down – NEVER TURN OFF A LINUX SYSTEM!
- You must gracefully shut it down, if you continue to just shut off the machine, you will see problems occur with your boot up and you will probably get kernel errors.

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- o Shutdown command options:

- c	Cancels a shutdown
- f	Will not run fsck on the reboot
- F	This WILL run fsck on reboot
- h	Halts system after shutdown
- k	Sends warning / does not shutdown
- n	Shuts down without calling init
- r	When shutdown, will reboot
- t {Seconds}	Delay time after killing process (before init)

Note: unless the etc/shutdown.allow file states – ONLY ROOT can use the shutdown command. Make sure you know how powerful the root user is. Therefore- you must know it needs to be protected at all costs.

Linux Filesystem Basics

- o Partitions – you should know that a drive must have at least one partition – made bootable – and can have at least 4. The rule of thumb here is that each disk can have not more than 4 total partitions that can all be primary (or you can have 3 primary – one extended)
- o The minimum number of partitions used to install Linux is 2
- o The partitions are: Primary - / (root) and swap
- o Swap should be 2 times the physical RAM. It should be at least 16 MB, no bigger than 128 and there are 16 separate swap partitions allowable on the system.
- o Partition Names – SCSI – sda(n) – IDE – hda(n)
- o fips – fips.exe can be used to divide a FAT16 partition in 2.
- o fdisk – USE ONLY THE LINUX VERSION! This is used to create.
- o Formatting – you can create a file system by using the mkfs
- o Common syntax is: **mkfs – t fs - {type} {device} {blocks}**
- o Inodes – an Inode is a data structure used to store specific information. The inode will hold info on: file pointers, file name, file size, file owners group ID, rules for access to the file, date and time last accessed, modified, or when the inode was modified. It will also hold the links to the file.

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- o File types:

l	Links
d	Directory
c	Character device
b	Block Device
-	File (Ordinary)

- o fsck – used to verify and check the integrity of the Filesystem
- o du – disk usage – know the options used with the du command
- o df – reports on partition size, it will give the device size, number of free or occupied or total blocks, and name of the device.

Linux Directories:

/	Root
/bin	Binaries (command)
/etc	System configuration files
/dev	Device files
/home	Home directories (user)
/mnt	Mounting partitions / temporary
/lib	Libraries – shared
/proc	Virtual Filesystem (kernel - processes)
/tmp	Temp files (applications)
/var	Log files – any files changing during system operation
/usr	Non changing info, documentation directories, and user commands

Linux File Management

Commands:

cd	Used to change to other directories
ls	Directory listing
file	Name of file – brief classification
cat	Used to create new file – display contents
more and less	Scrolling (Spacebar and b)
wc	Number of characters, words, lines in a file
head and tail	Beginning lines – end of file display
touch	Change timestamp
cp	Copy files / directories – will overwrite
dd	Device to device copy
mv	Move or rename files – will overwrite
rm	Remove files and directories (Multiple)
mkdir	Create directory
rmdir	Remove ONLY EMPTY directories
grep	Searches a file (for a pattern)
sed	Stream editor
tar	Used to create an archive
gzip	Used with tar to create the archive
zcat	Used to display contents of gzip files

Note: ALL commands will contain at least one if not tons of options that can be used with them. You will need to be familiar with using many of these options.

Shells – Command Line Editing

Shells:

bash	Bourne Again
ash	The smallest
ksh	Korn / public domain
tcsh	Emulates csh
zsh	One of the biggest shells

Note: A good way to find out what shell you are using –

Type: **echo \$shell**

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Command line editing

Ctrl + B	Backward
Ctrl + F	Forward
Ctrl + A	Beginning of line
Ctrl + E	End of line
Ctrl + D	Delete – one character to right of cursor
Ctrl + K	Delete from cursor – to the end of line
Esc + b	Cursor to the beginning
Esc + f	Cursor to the beginning of word to right
Esc + d	Delete the word (to right of cursor)
Esc + Del	Delete the word (to left of cursor)
Del	Delete - one character to left of cursor

Maintaining the Filesystem

Note: I really request that you visit this page –[LINUX Structure](#) – for a very well organized – highly detailed, informative review on the LINUX Filesystem. It is a very good read.

- Mounting – know how to mount the Filesystem – make sure you know all the syntax with its options:
- Syntax: **mount {options} {Device} mount-point**
- Disk quotas – are set on partition-by-partition basis. If you try to exceed the quota, it will fail.
- Hard links – creates a new pointer to a file – not a new copy of the file. They can only be created to an existing file.
- Symbolic links – (or soft Link) new directory entry that will contain a path to the existing file and can be created by non-existent file.
- Find lost files – use the commands: **find**, **locate** and **which**

Users and groups

- Root – *KNOWN AS SUPERUSER*. Has a UID of zero. It has the power to do anything and it should be secured for security reasons.
- Creating user accounts – kept in the passwd file

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- o Passwd – fields contained are:

Username
Password
UID
GID
Users Home Directory
Comment
Login Command

- o Shadow – contains username and ENCRYPTED password – used for security reasons.

Last Tips:

Like any other course - Please do not try this without preparation. The test may look easy but it really isn't. You really need to have the hands on - study the objectives intensely and use these supplements to help your focus

Make sure you are comfortable with what LPI is asking on the objectives and If you have any in depth questions feel free to email me for help and I will help you if I can.

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