

LPI - 103.3 Perform basic file management

Curs 2021 - 2022

ASIX M01-ISO 103 GNU and unix commands

Perform basic file management	2
Description	2
Part 1: General file management	3
List & change & create & delete directories	3
Copy & move & delete files and directories	3
File Globbing	4
Part 2: Find system files (also 104.7)	5
Locate & updatedb	5
find	6
Part 3: Split & zip	9
Compare	9
split	9
Zip & others	10
Example Exercises	11
Exercises (1):	11
Exercises (2):	13
Exercises (3)	14
Exercises (4)	14

Perform basic file management

Description

Candidates should be able to use the basic Linux commands to manage files and directories.

Key Knowledge Areas:

- ☐ Copy, move and remove files and directories individually.
- ☐ Copy multiple files and directories recursively.
- ☐ Remove files and directories recursively.
- ☐ Use simple and advanced wildcard specifications in commands.
- ☐ Using find to locate and act on files based on type, size, or time.
- ☐ Usage of tar, cpio and dd.

The following is a partial list of the used files, terms and utilities:

- ☐ cp
- ☐ find
- ☐ mkdir
- ☐ mv
- ☐ ls
- ☐ rm
- ☐ rmdir
- ☐ touch
- ☐ tar
- ☐ cpio
- ☐ dd
- ☐ file
- ☐ gzip
- ☐ gunzip
- ☐ bzip2
- ☐ bunzip2
- ☐ xz
- ☐ unxz
- ☐ file globbing

Part 1: General file management

List & change & create & delete directories

- `ls [-aAlhR][--full time] [file]...`
 - type perm link user group size date name
 - type: d l s p b c
 - perm: rwx, user, group, others
- `pwd`
- `cd, cd ~, cd .., cd relativePath, cd absolutaPath`
- `tree`
- `mkdir [-p] dir...`
- `rmdir dir (empty)`

- `file file (magi cookie)(type)`
- `touch -t timestamp file`
- timestamps:
 - modified, accessed, changed, birth
 - stat

Copy & move & delete files and directories

- `cp`
 - copy, copy and chage destination name, copy multiples files to dir destination. Recursive with `-r` or `-R`.
 - `cp [options] source destination`
 - `cp source destination/newname`
 - `cp source... dirdestination`
 - `cp -R source destination`
- `mv`
 - change name to file o directory. Move file or directory. Move file or directory and change destination name. Move multiple files or directories to directory destination.
 - `mv [options] source destination`
 - `mv source destination/newname`
 - `mv source... dirdestination`
 - [no use of `-r` or `-R`, move directories recursively automatically]
- `rm`
 - remove files or directories
 - `rm file...`
 - `rm -r directory`
 - `rm [-rf] [-i]`

File Globbing

- *
- ?
- [char]
- [^char]
- [a-z][A-Z][0-9]

Part 2: Find system files (also 104.7)

Commands:

- updatedb
- locate
- find
- whereis
- which
- type
- file

Locate & updatedb

- updatedb (sudo or root)
- generate index table (updated by cron)
- /etc/updatedb.conf (configure path to exclude)
- locate strng (case sensitive, user need read permission)

```
#1

$ updatedb

$ cat /etc/updatedb.conf
PRUNE_BIND_MOUNTS = "yes"
PRUNEFS = "9p afs anon_inodefs auto autofsvfs bdev binfmt_misc cgroup cifs coda
configfs cpuset debugfs devpts ecryptfs exofs fuse fuse.sshfs fusectl gfs gfs2
gpfs hugetlbfs inotifyfs iso9660 jffs2 lustre mqueue ncpfs nfs nfs4 nfsd pipefs
proc ramfs rootfs rpc_pipefs securityfs selinuxfs sfs sockfs sysfs tmpfs ubifs
udf usbfs ceph fuse.ceph"
PRUNENAMES = ".git .hg .svn .bzip2 .arch-ids {arch} CVS"
PRUNEPATHS = "/afs /media /mnt /net /sfs /tmp /udev /var/cache/ccache
/var/lib/yum/yumdb /var/lib/dnf/yumdb /var/spool/cups /var/spool/squid /var/tmp
/var/lib/ceph /sysroot/ostree/depl"
```

```
#2

$ locate usermod
/usr/sbin/lusermod
/usr/sbin/usermod
/usr/share/bash-completion/completions/lusermod
/usr/share/bash-completion/completions/usermod
/usr/share/doc/usermode
...

$ locate ifcfg
/etc/sysconfig/network-scripts/ifcfg-Redmif
/etc/sysconfig/network-scripts/ifcfg-enpls0
/etc/sysconfig/network-scripts/ifcfg-lo

$ locate label | grep bin
/usr/bin/grub2-render-label
/usr/bin/mlabel
/usr/sbin/dosfslabel
/usr/sbin/e2label
/usr/sbin/fatlabel
/usr/sbin/ntfslabel
/usr/sbin/selabel_digest
/usr/sbin/selabel_get_digests_all_partial_matches
```

```

/usr/sbin/selabel_lookup
/usr/sbin/selabel_lookup_best_match
/usr/sbin/selabel_partial_match
/usr/sbin/swaplabel

```

```
$ locate LPI
```

```
$ locate httpd | head
```

```

/etc/httpd
/etc/httpd/conf
...

```

find

- find dir1... -name text -print
- -name
- -print, -print0
- -ls
- -type b c d p f s
- -size n° +n° -n°
- -time, -mtime, -mmin, -newer, etc
 - mtime -3 less than 3 days
 - mtime +3 more than 3 days
 - mtime 3 exactly 3 days
 - mmin -10 less than 10 minutes
 - mmin +10 more than 10 minutes
 - mmin 3 exactly 10 minutes
 - newer file use file as a reference
- tests: -user, -nouser, -empty, -max-depth, -iname, etc
- actions: -print, -print0, -ls, -exec, -delete, etc
- multiple criteria =>and

```
# 3
```

```
$ find /usr/bin -name ls*
```

```

/usr/bin/lsinitrd
/usr/bin/lslocks

```

```
# find /etc /usr/sbin -name mkfs* -print
```

```

/usr/sbin/mkfs.ntfs
/usr/sbin/mkfs.xfs
/usr/sbin/mkfs.btrfs
/usr/sbin/mkfs.ext3

```

```
# find /etc /usr/sbin -name mkfs* -ls
```

```

2634039      0 lrwxrwxrwx   1 root    root          16 Jan 29  2020 /usr/sbin/mkfs.ntfs -> /usr/sbin/mkntfs
2638683     488 -rwxr-xr-x   1 root    root        498424 Jan 31  2020 /usr/sbin/mkfs.xfs
2636834     516 -rwxr-xr-x   1 root    root       527728 May 10  2021 /usr/sbin/mkfs.btrfs
2633518     144 -rwxr-xr-x   4 root    root       146024 Jan 31  2020 /usr/sbin/mkfs.ext3

```

```
#4
```

```
$ find /var/tmp -user guest
```

```
$ find /var/tmp -user guest 2> /dev/null
```

```
# find /var/tmp -user root
```

```
#5
```

```
# types: d dir, f file, b block, c char, p pipe, s socket
```

```
$ find /etc -type d
```

```
$ find /etc -type d -maxdepth 2
```

```
$ find /dev -type b
```

```
/dev/dm-0
```

```
/dev/nvme0n1p3
```

```
/dev/nvme0n1p2
```

```
/dev/nvme0n1p1
```

```
/dev/nvme0n1
```

```
$ find /tmp -type s -ls 2> /dev/null
```

35	0	srwxrwxrwx	1	gdm	gdm	0	Jan	31	16:14	/tmp/.ICE-unix/1305
39	0	srwxr-xr-x	1	gdm	gdm	0	Jan	31	16:14	/tmp/.X11-unix/X1025
37	0	srwxr-xr-x	1	gdm	gdm	0	Jan	31	16:14	/tmp/.X11-unix/X1024

```
#6
```

```
# size n exact, +n more than, -n less than
```

```
$ find /boot -size +10M -ls 2> /dev/null
```

18	10360	-rwxr-xr-x	1	root	root	10605360	May	19	2021	/boot/vmlinuz-5.11.22-100.fc32.x86_64
33	10352	-rwxr-xr-x	1	root	root	10598224	Apr	21	2021	/boot/vmlinuz-5.11.16-100.fc32.x86_64
27	10352	-rwxr-xr-x	1	root	root	10600272	Mar	30	2021	/boot/vmlinuz-5.11.11-100.fc32.x86_64

```
$ find /boot -size +10M -size -12M -ls 2> /dev/null
```

18	10360	-rwxr-xr-x	1	root	root	10605360	May	19	2021	/boot/vmlinuz-5.11.22-100.fc32.x86_64
33	10352	-rwxr-xr-x	1	root	root	10598224	Apr	21	2021	/boot/vmlinuz-5.11.16-100.fc32.x86_64
27	10352	-rwxr-xr-x	1	root	root	10600272	Mar	30	2021	/boot/vmlinuz-5.11.11-100.fc32.x86_64
24	10352	-rwxr-xr-x	1	root	root	10600272	Apr	8	2021	/boot/vmlinuz-0-rescue-f8bfb953853f49b4963ed3aa06461c80

```
#7
```

```
# mtime, mmin, newer n° +n° -n° (atime, ctime...)
```

```
$ find /etc -mtime -10 2> /dev/null
```

```
/etc
```

```
/etc/resolv.conf
```

```
$ find /etc -mtime -30 2> /dev/null
```

```
/etc
```

```
/etc/systemd/system/multi-user.target.wants
```

```
/etc/systemd/system/sockets.target.wants
```

```
/etc/group-
```

```
/etc/cups
```

```
$ find /tmp -mmin +30 2> /dev/null
```

```
/tmp/ssh-jW4F9Ovx27pA
```

```
/tmp/ssh-jW4F9Ovx27pA/agent.17050
```

```
/tmp/m01
```

```
/tmp/m01/dnis
```

```
$ find ~ -newer ~/.bash_history
```

```
#8
```

```
$ mkdir test
```

```
$ cd test
```

```
$ touch f1 f2 f3 f4
```

```
$ stat f1
```

```
File: f1
```

```
Size: 0
```

```
Blocks: 0
```

```
IO Block: 4096
```

```
regular empty file
```

```
Device: fd02h/64770d
```

```
Inode: 6554125
```

```
Links: 1
```

```
Access: (0664/-rw-rw-r--)  Uid: ( 1001/  ecanet)   Gid: ( 1001/  ecanet)
Context: unconfined_u:object_r:user_home_t:s0
Access: 2022-01-31 20:24:07.477373652 +0100
Modify: 2022-01-31 20:24:07.477373652 +0100
Change: 2022-01-31 20:24:07.477373652 +0100
Birth: -
```

```
$ date
Mon 31 Jan 2022 08:25:09 PM CET
$ touch n1 n2 n3
$ find . -newer n1
$ find . -newer f1
.
./n3
./n2
./n1
```

```
#9
$ touch -d "20210101" reference
$ stat reference
  File: reference
  Size: 0          Blocks: 0          IO Block: 4096   regular empty file
Device: fd02h/64770d Inode: 6554241   Links: 1
Access: (0664/-rw-rw-r--)  Uid: ( 1001/  ecanet)   Gid: ( 1001/  ecanet)
Context: unconfined_u:object_r:user_home_t:s0
Access: 2021-01-01 00:00:00.000000000 +0100
Modify: 2021-01-01 00:00:00.000000000 +0100
Change: 2022-01-31 20:27:58.077829950 +0100
Birth: -

$ find /etc -newer reference
```


Part 3: Split & zip

Commands:

- `cmp`
- `diff`
- `diff3`
- `split`
- `gzip`
- `gunzip`
- `zcat`
- `bzip...`

Compare

- `cmp`
- `diff`, `diff3`

```
#10
$ cmp /usr/bin/date /usr/bin/date

$ cp /etc/services myservices
$ echo "bye bye" >> myservices

$ cmp /etc/services myservices
cmp: EOF on /etc/services after byte 692241, line 11473

$ diff /etc/services myservices
11473a11474
> bye bye
```

```
#11

$ diff3 /etc/services /etc/services /etc/services
$ diff3 /etc/services /etc/services myservices
====3
1:11473a
2:11473a
3:11474c
   bye bye
```

split

- `-n chunks`
- `-b bytes`
- `xaa xab ...`
- `prefix`
- `concatenate cat xaa xab > newfile`

```
#12
```

```

$ cp /bin/uname .
$ split -n 3 uname

$ ls
uname  xaa  xab  xac

$ cat xaa xab xac > new

$ cmp uname new

$ ll
total 136
-rw-rw-r--. 1 ecanet ecanet 42368 Jan 31 20:42 new
-rwxr-xr-x. 1 ecanet ecanet 42368 Jan 31 20:41 uname
-rw-rw-r--. 1 ecanet ecanet 14122 Jan 31 20:41 xaa
-rw-rw-r--. 1 ecanet ecanet 14122 Jan 31 20:41 xab
-rw-rw-r--. 1 ecanet ecanet 14124 Jan 31 20:41 xac

```

```

#13

$ ls -l uname
-rwxr-xr-x. 1 ecanet ecanet 42368 Jan 31 20:41 uname

$ split -b 20k uname part

$ ls
new  partaa  partab  partac  uname
$ cat part* > new

$ cmp uname new

```

Zip & others

- **attention:** zip command change the original file!

```

#14

$ cp /etc/os-release .

$ gzip os-release

$ ls
os-release.gz

$ file os-release.gz
os-release.gz: gzip compressed data, was "os-release", last modified: Mon Jan 31
19:51:20 2022, from Unix, original size modulo 2^32 762

$ gunzip os-release.gz

$ file os-release
os-release: ASCII text

```

```

#15

$ bzip2 os-release

$ ls
os-release.bz2

$ file os-release.bz2
os-release.bz2: bzip2 compressed data, block size = 900k

```

```

$ bzcat os-release.bz2
NAME=Fedora
VERSION="32 (Workstation Edition)"
ID=fedora
VERSION_ID=32
VERSION_CODENAME=""
PLATFORM_ID="platform:f32"
PRETTY_NAME="Fedora 32 (Workstation Edition)"
ANSI_COLOR="0;34"
LOGO=fedora-logo-icon
CPE_NAME="cpe:/o:fedoraproject:fedora:32"
HOME_URL="https://fedoraproject.org/"
DOCUMENTATION_URL="https://docs.fedoraproject.org/en-US/fedora/f32/system-administrators-guide7"
SUPPORT_URL="https://fedoraproject.org/wiki/Communicating_and_getting_help"
BUG_REPORT_URL="https://bugzilla.redhat.com/"
REDHAT_BUGZILLA_PRODUCT="Fedora"
REDHAT_BUGZILLA_PRODUCT_VERSION=32
REDHAT_SUPPORT_PRODUCT="Fedora"
REDHAT_SUPPORT_PRODUCT_VERSION=32
PRIVACY_POLICY_URL="https://fedoraproject.org/wiki/Legal:PrivacyPolicy"
VARIANT="Workstation Edition"
VARIANT_ID=workstation

$ bunzip2 os-release.bz2

$ file os-release
os-release: ASCII text

```

```

#16

$ whereis uname
uname: /usr/bin/uname /usr/share/man/man2/uname.2.gz
      /usr/share/man/man3p/uname.3p.gz /usr/share/man/man1/uname.1.gz
      /usr/share/man/man1p/uname.1p.gz

$ zcat /usr/share/man/man1/uname.1.gz | head
.\" DO NOT MODIFY THIS FILE! It was generated by help2man 1.47.3.
.TH UNAME "1" "February 2021" "GNU coreutils 8.32" "User Commands"
.SH NAME
uname \- print system information
.SH SYNOPSIS
.B uname
[\fI\,OPTION\[/fR]...
.SH DESCRIPTION
.\" Add any additional description here
.PP

```

Example Exercises

- Realitza els exercicis indicats a: 103.3 Perform basic file management
- Realitza els exercicis del Question-Topics 103.3

Exercises (1):

1. Show the current directory.

2. Change to the root directory.
3. Change to the user's home directory.
4. Go to the parent directory. Show the current working directory.
5. Go to the directory /tmp
6. Create the directory lpi and make it the active directory

[]

[create & delete directories] (active directory is /tmp/lpi)

7. Create the directory system.
8. Create the directories monday, tuesday and test.
9. Delete the directories monday, tuesday.
10. Create the directories network/captures (in one shot).

[]

[copy] (active directory is /tmp/lpi)

11. Using the tree command to show the directory structure.
12. Copy the file /etc/services to the active directory
13. Copy the file /etc/issue to the active directory and call it benvinguda.txt.
14. Copy the file benvinguda.txt to the directory /tmp/lpi/network/captures.
15. Copy the file /usr/bin/date to the directory network //tmp/lpi/network).

[]

[move & rename] (active directory is /tmp/lpi)

16. Change the name of the file services for myservices.txt.
17. Change the directory name network for mynet
18. Move directory capture (/tmp/lpi/mynet/captures) to test (/tmp/lpi/test). Verify the contents of test, using ls and tree.
19. Move the directory test (/tmp/lpi/test) to mynet (/tmp/lpi/mynet) changing his name to mytest. Verify the directory structure using tree /tmp/lpi.

[]

[delete files & directories] (active directory is /tmp/lpi)

20. Using rmdir remove the directory /tmp/lpi/mynet/mytest/captures. Is possible?
21. Using rm -r (caution!) remove the directory captures (/tmp/lpi/mynet/mytest/captures).
22. Remove the contents of the directory mytest (/tmp/lpi/mynet/mytest) but not the directory.
23. Remove the directory mynetwork, the directory and all its contents.

[]

[file globbing] (active directory is /tmp/lpi)

24. Use: touch file1.txt file2.txt file35.txt file1a.txt file1b.txt filea.txt filea1.txt filename.pdf carta.pdf oldcarta.pdf to create the requested files.
25. Show all the filenames with txt extension.
26. Show all the filenames beginning with f.
27. Show all the filenames containing carta in the name.
28. Show all the filenames beginning with the letter c or o or m and pdf extension.
29. Show all the filenames beginning with file followed by 2 characters and txt extension.
30. Show all the filenames with exactly 5 characters in the name and whatever extension.
31. Show the filenames beginning with file followed by two digits and txt extension.
32. Show the filenames containing two digits in the name and txt extension.

Exercises (2):

33. Make active the home directory
34. Using find search for the file .bash_history. Show a long list.
35. Using find search for the files in the /usr/sbin directory starting with user.
36. As user root find the files in the /etc and /usr/sbin directories containing user in the filename.

[]

37. Find the files in /tmp owned by your user.
38. Find the files in the /tmp directory uned by root.
39. Using find list the directory entries of /etc directory.
40. Using find list the block devices entries in the /dev directory. Idem as char devices. Is there any socket device?

[]

41. List the /boot directory using long and human options.
42. Using find list the files in the /boot directory less than 15M.
43. Using fins list the files in the /boot directory with size between 5M and 20M.
44. List all the files in the system greater than 200M. Send the stderr to /dev/null.

[]

45. Using find list the files newer than 5 days in the /var directory (mtime).
46. Using find list the files in /tmp newer than 1h (mmin).

47. Using find list the files in your home newer than the file .bashrc (newer).

[]

48. Use updatedb to create the locate database.

49. Using locate list all the files with the string ifcfg in the name.

50. Using locate list all the filenames containing the string user.

51. Using locate identify the file containing the filesystem tabulation information: fstab.

Exercices (3)

52. Change to the /tmp/lpi directory, create if doesn't exist.

53. Copy the file /usr/bin/date to the directory.

54. Split the file in three parts.

55. Concatenate the three parts again in a file called mydate.

56. Compare date and mydate.

[]

57. Copy the file /etc/passwd and rename the copy as passwd.txt

58. Using gzip compress the file. Observe the new name, where is the original?

59. Use file to show information of the new file. Use ls -lh to show the size.

60. Use zcat to show the contents of the compressed file.

61. Using gunzip decompress the file. Use the command file to show information of passwd.txt. Use ls -ls to show the size.

62. Repeat the last two exercises using bzip2 and bunzip2.

63. Locate the man page of the date command. Show the contents of the file containing the man page.

[]

64. Create a copy of the file date and call it date.original.

65. Using the local copy of the file date, compress it using gzip.

66. Split the compressed file in 20K portions. How many chunks are created?

67. Join the portions concatenating them in a new file called newdate.gz.

68. Compare that file with the compressed one.

69. Uncompress the file newdate.gz and compare it with the original.

Exercices (4)

tar cpio dd