

Linux Tutorial

A quick guide to the main commands

Comandi sui file	Informazioni di sistema
ls - elenco contenuto directory	date - mostra la data e l'ora correnti
ls -al - elenco formattato con file nascosti	cal - mostra il calendario del mese corrente
cd dir - cambia directory di lavoro a <i>dir</i>	uptime - da quanto tempo la macchina in funzione
cd - cambia directory di lavoro a directory home	w - mostra gli utenti collegati
pwd - mostra directory di lavoro corrente	whoami - mostra l'utente con cui si è collegati
mkdir dir - crea directory <i>dir</i>	finger user - mostra informazioni su <i>user</i>
rm file - cancella file <i>file</i>	uname -a - mostra le informazioni sul kernel
rm -r dir - cancella directory <i>dir</i>	cat /proc/cpuinfo - informazioni sulla CPU
rm -f file - forza cancellazione di <i>file</i>	cat /proc/meminfo - informazioni sulla memoria
rm -rf dir - forza cancellazione directory <i>dir</i> *	man command - manuale per il comando <i>command</i>
cp file1 file2 - copia da <i>file1</i> a <i>file2</i>	df - mostra informazioni sui dischi
cp -r dir1 dir2 - copia <i>dir1</i> a <i>dir2</i> ; crea <i>dir2</i> se non esiste	du - informazioni sull'utilizzo dello spazio disco
mv file1 file2 - rinomina o sposta <i>file1</i> in <i>file2</i> se <i>file2</i> è una directory esistente, sposta <i>file1</i> nella directory <i>file2</i>	free - informazioni sulla memoria libera e sullo spazio di scambio
ln -s file link - crea collegamento simbolico <i>link</i> al file <i>file</i>	whereis app - mostra possibili locazioni di <i>app</i>
touch file - crea o modifica <i>file</i>	which app - mostra quale <i>app</i> viene normalmente eseguita
cat > file - redireziona lo standard input in <i>file</i>	
more file - mostra il contenuto di <i>file</i>	Compressione
head file - mostra le prime 10 linee di <i>file</i>	tar cf file.tar files - crea un archivio tar con nome <i>file.tar</i> contenente <i>files</i>
tail file - mostra le ultime 10 linee di <i>file</i>	tar xf file.tar - estrai il contenuto dell'archivio <i>file.tar</i>
tail -f file - mostra il contenuto di <i>file</i> mentre viene aggiornato iniziando dalle ultime 10 linee	tar czf file.tar.gz files - crea un archivio tar compresso con Gzip
	tar xzf file.tar.gz - estrai un archivio tar decomprimendolo prima con Gzip
Gestione processi	tar cjf file.tar.bz2 - crea un archivio tar compresso con Bzip2
ps - mostra i processi attivi	tar xjf file.tar.bz2 - estrai un archivio tar decomprimendolo prima con Bzip2
top - mostra interattivamente tutti processi attivi	gzip file - comprime <i>file</i> e lo rinomina in <i>file.gz</i>
kill pid - uccide il processo con id <i>pid</i>	gzip -d file.gz - decomprime <i>file.gz</i> in <i>file</i>
killall proc - uccide tutti i processi con nome <i>proc</i> *	
bg - elenca i job fermati o in sottofondo; ripristina un job fermato e messo in sottofondo	Rete
fg - porta il job più recente in primo piano	ping host - effettua un ping di <i>host</i> e mostra il risultato
fg n - porta il job <i>n</i> in primo piano	whois domain - recupera le informazioni whois per il dominio <i>domain</i>
	dig domain - recupera le informazioni DNS per il dominio <i>domain</i>
Permessi file	dig -x host - effettua un reverse lookup di <i>host</i>
chmod octal file - cambia i permessi di <i>file</i> a <i>octal</i> , numero di 3 cifre, rispettivamente per l'utente, il gruppo e tutti gli altri, somme di:	wget file - scarica <i>file</i>
<ul style="list-style-type: none"> • 4 - lettura (r) • 2 - scrittura (w) • 1 - esecuzione o visita (x) 	wget -c file - prosegue un download interrotto
Esempi:	Installazione
chmod 777 - lettura, scrittura ed esecuzione per tutti	Installazione da sorgente:
chmod 755 - rwx per il proprietario, rx per il gruppo e tutti gli altri	./configure
Per ulteriori dettagli si esegua man chmod .	make
	make install
SSH	dpkg -i pkg.deb - installa un pacchetto (Debian)
ssh user@host - connessione a <i>host</i> come <i>user</i>	rpm -Uvh pkg.rpm - installa un pacchetto (RPM)
ssh -p port user@host - connessione a <i>host</i> sulla porta <i>port</i> come <i>user</i>	Scorciatoie
ssh-copy-id user@host - aggiunge la propria chiave ad <i>host</i> per l'utente <i>user</i> per permettere un accesso pre-autenticato o senza password	Ctrl+C - interrompe il comando corrente
	Ctrl+Z - ferma il comando corrente, da continuare con fg in primo piano o in sottofondo con bg
Ricerca	Ctrl+D - esci dalla sessione corrente, simile a exit
grep pattern files - cerca <i>pattern</i> in <i>files</i>	Ctrl+W - cancella una parola nella linea corrente
grep -r pattern dir - cerca ricorsivamente <i>pattern</i> in <i>dir</i>	Ctrl+U - cancella l'intera linea
command grep pattern - cerca <i>pattern</i> nel risultato dell'esecuzione di <i>command</i>	Ctrl+R - cicla attraverso la lista dei comandi recenti
locate file - trova tutte le occorrenze di <i>file</i>	!! - ripete l'ultimo comando
	exit - esci dalla sessione corrente
	* utilizzare con estrema cautela.

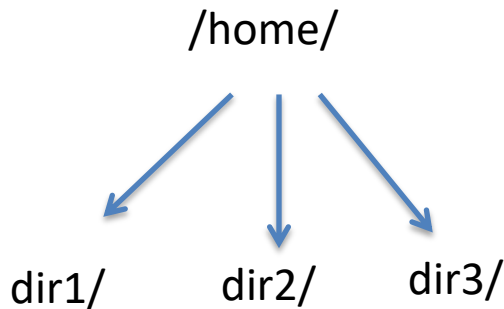


Outline

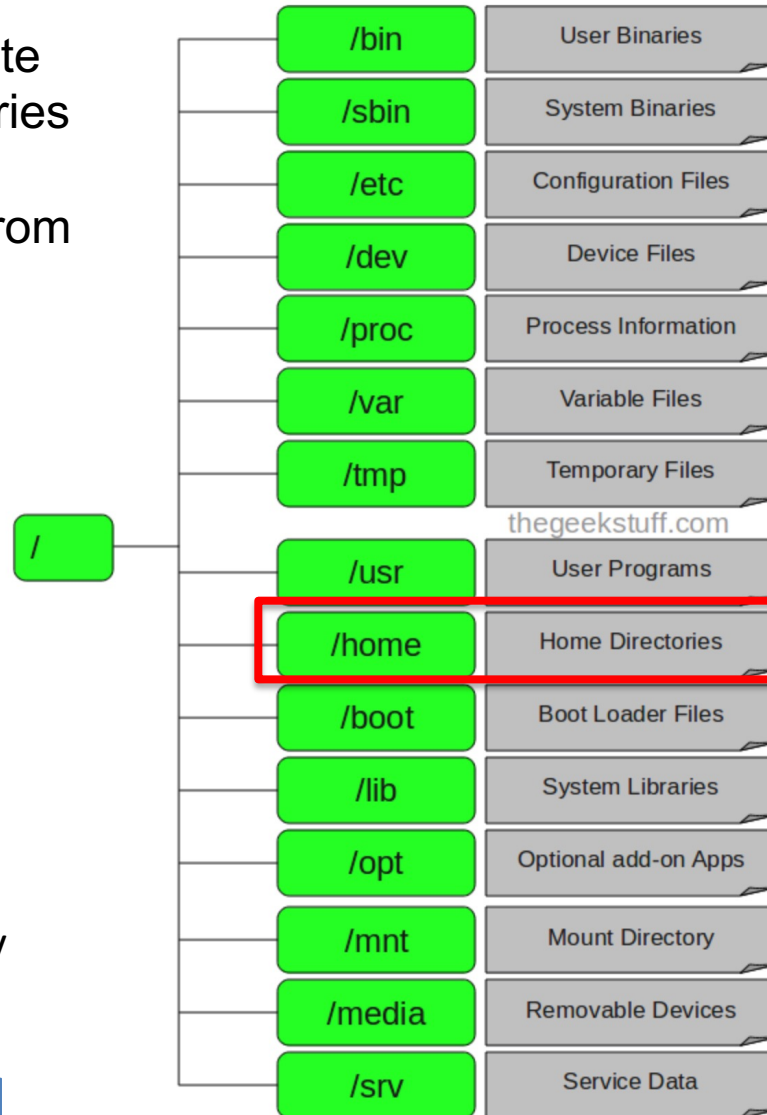
- General help + instructions
- Managing files and directories
- Searching files/pattern in a file
- Archiving and compressing files
- Information about the system
- Other useful commands
- Editors for text
- Remote connection

Directory tree

Main suggestion: create several working directories and separate raw/reprocessed data from your own products



structure like a tree



where you will work
(or in a similar directory)

my home directory:

```
/Users/chris/home> ls -ltr
```

list of files and directories produced with the command ls -ltr

```
total 8
drwxr-xr-x  17 chris  staff   578 Feb 20  2006 COORDINATES_CONV_CORR
drwxr-xr-x  15 chris  staff   510 Feb 20  2006 CATALOGS_MANAGE
drwxr-xr-x  13 chris  staff   442 Jun  6  2011 CROSS-CORRELATION
drwxr-xr-x   9 chris  staff   306 Dec 17  2013 ALMA
drwxr-xr-x   6 chris  staff   204 Apr 15  2014 palette1
drwxr-xr-x  47 chris  staff  1598 Nov 10  2015 Herschel
drwx----- 43 chris  staff  1462 Dec  1  2016 Dropbox
drwxr-xr-x   7 chris  staff   238 Aug 24 09:57 moons_etc_v1.3_linux
drwxr-xr-x  18 chris  staff   612 Aug 28 09:31 FOTO
drwxr-xr-x  38 chris  staff  1292 Nov 17 13:05 Didattica
drwxr-xr-x  29 chris  staff   986 Dec  5 15:07 Talks
drwxrwxr-x   7 chris  staff   238 Dec  5 15:11 SOFTW
drwxrwxr-x  25 chris  staff   850 Dec  5 15:12 QUICK_FILES
drwxr-xr-x  52 chris  staff  1768 Dec  5 15:37 papers
drwxr-x---  64 chris  staff  2176 Dec  5 15:40 PUBS
drwxr-xr-x  47 chris  staff  1598 Dec  5 16:24 works_in_progress
-rw-r--r--   1 chris  staff    74 Dec 14 15:52 unibo_address_mail_calvin
drwxr-xr-x  31 chris  staff  1054 Dec 15 18:27 DATA
drwxr-xr-x  14 chris  staff   476 Dec 15 18:43 HOBBS_VARIE
drwxr-xr-x  30 chris  staff  1020 Dec 15 23:04 LESSONS
drwxr-xr-x  46 chris  staff  1564 Dec 16 00:41 SPITZER
drwxr-xr-x  62 chris  staff  2108 Dec 16 00:51 Travels
drwxr-xr-x  18 chris  staff   612 Dec 16 00:53 REFEREE
drwxr-xr-x  62 chris  staff  2108 Dec 16 02:07 XXL
drwxr-xr-x  49 chris  staff  1666 Dec 16 02:07 topcat_files
drwxr-xr-x 149 chris  staff  5066 Dec 16 02:07 Varie
drwxr-xr-x   6 chris  staff   204 Dec 16 02:07 XSPEC_CODES
drwxr-xr-x  14 chris  staff   476 Dec 16 02:08 NuSTAR
drwxr-xr-x  35 chris  staff  1190 Dec 16 08:46 CASA
drwxr-xr-x 203 chris  staff  6902 Dec 18 12:42 nellie
drwxr-xr-x  24 chris  staff   816 Dec 18 13:00 INSTRUMENTS
drwxr-xr-x 146 chris  staff  4964 Dec 18 13:03 utils
drwxr-xr-x  41 chris  staff  1394 Dec 18 13:05 PROJECTS
drwxr-xr-x  10 chris  staff   340 Dec 18 13:17 palette2
```

Help/instructions about a command

- To get help/info about a command:

man [command]

Example: man /s

```
LS(1) BSD General Commands Manual LS(1)
NAME
  ls -- list directory contents
SYNOPSIS
  ls [-ABCFGHLOPRSTUW@abcdefghiklmnopqrstuwx1] [file ...]
DESCRIPTION
  For each operand that names a file of a type other than directory, ls displays its name as well as any requested, associated information. For each operand that names a file of type directory, ls displays the names of files contained within that directory, as well as any requested, associated information.
  If no operands are given, the contents of the current directory are displayed. If more than one operand is given, non-directory operands are displayed first; directory and non-directory operands are sorted separately and in lexicographical order.
  The following options are available:
  -@      Display extended attribute keys and sizes in long (-l) output.
  -1      (The numeric digit `one'.) Force output to be one entry per line. This is the default when output is not to a terminal.
  -A      List all entries except for . and ... Always set for the super-user.
  -a      Include directory entries whose names begin with a dot (.).
  -B      Force printing of non-printable characters (as defined by ctype(3) and current locale settings) in file names as \xxx, where xxx is the numeric value of the character in octal.
  -b      As -B, but use C escape codes whenever possible.
  -C      Force multi-column output; this is the default when output is to a terminal.
```

Managing files/directories. I

- **pwd**

shows the directory where you are working

- **ls**

lists the content of a directory

Example: `ls -ltr` (*the most recent ones at the end*), `ls -a` (*for 'invisible' files*)

- **cd**

used to move among directories

Example: `cd ..` (*one directory up*); `cd` (*to go to the home directory*)

`cd /Users/chris/home` (*moves following an absolute path*)

- **mkdir**

creates a directory

Example: `mkdir data/`

`mkdir ~/data` (*creates a directory /data*)

Managing files/directories. II

- **cp**

makes a copy of a file (in another file, in another directory) and of a directory

Example: `cp readme.txt save.dat`

`cp readme.txt data/`

`cp -r data/ new_data` (*copies an entire dir*)

- **mv**

mv files/directories, rename files/dirs (does not make a copy)

Example: `mv readme.txt data.txt`

- **rm**

removes files and dirs

Example: `rm readme.txt`

`rm -r data/` (*removes the entire directory*)

`rm -i readme.txt` (*asks confirmation before deleting*)

Searching files/pattern in a file

- **find**

finds a file among directories

Example: `find . -name "readme.txt" -ls` (*searches for the file readme.txt in all subdirectories; multiple entries if the file is present multiple times in the working directories*)

- **grep [options]**

searches a given pattern in a file (set of files)

Example: `grep 'AGN' readme.txt` (*selects lines from the file where the word AGN is present*)

Example: `cat readme.txt | grep AGN` (*alternative way to do the same*)

Archiving and compressing files

- **tar**

makes an archive of a given list of files/directories, etc.

Example: `tar cvf archive.tar *` (*prepares an archival file with all the content of a given directory (*); c: creates; v: verbose; f: with filename*)

`tar cvf myarchive.tar xmm*` (*prepares an archival file with all the files whose name starts with 'xmm'*)

Example: `tar xvf archive.tar` (*the opposite: x: extracts from an archive*)

- **gzip/gunzip**

compresses/de-compresses files

Example: `gzip spectrum.pi` (*compresses the file, which becomes spectrum.pi.gz*)

Example: `gzip -d spectrum.pi.gz` (*de-compresses the file*)

See also `bzip2/bunzip2` (files in format `.bz2`), `zip/unzip`, etc.

Getting information about the system. I.

- **du**

provides a visualization of the space occupied by a file/directory

Example: `du -ms *` (*lists the content in Mbyte, m, of the current directory*)

- **df**

provides a visualization of the space remained in the partitions of the disc

Example: `df -h` (*lists in Gbyte*)

- **uname**

provides information about the system

Example: `uname -a` (*all the information on the system, including the computer type, the node name, the kernel, the operating system...*)

- **whoami**

shows the name of the connected user

Getting information about the system. II.

- **echo \$SHELL**

provides the name of the shell you are using (e.g., tcsh, bash, etc.)

Other useful commands. I

- **ps**

shows the active processes

- **top**

shows all of the active processes interactively with their pid

- **kill [pid]**

kills the process with id pid

- **cat [namefile]**

shows the content of a file

Example: cat readme.txt

- **less [namefile]**

shows the content of a file and allows to move through it

Example: less readme.txt

Other useful commands. II

- **more**

shows the content of a file/directory with one screen at a time

Example: `more readme.txt`

`ls | more` (*lists the files in the directory*)

- **tail [file]**

shows the last ten lines of a file

Example: `tail -f readme.txt` (*shows the content of a file while it is being updated – e.g., the log file produced by the installation of a program – starting from the last 10 rows*)

- **head [file]**

shows the first ten lines of a file

- **clear**

clears the current screen

Other useful commands. III

- **Ctrl+C**

interrupts the current process

- **Ctrl+Z**

stops the current process. To keep on, use **fg** (foreground) and **bg** (background)

- **history [number]**

lists the last N=number commands.

Example: `!number` *(to run the command = number again)*

Text editors

- **emacs/xemacs/vi/gedit/nedit**

allows you to write into files (*not all of these editors are always available*)

Example: `emacs readme.txt` (&: *the terminal can be used while you are still editing the file*)

CTRL+X S: saves the file

CTRL+X C: quits

IT IS IMPORTANT TO SAVE INTO A TEXT FILE ALL THE NOTES
REGARDING THE COMMANDS YOU HAVE RUN AND THE PROCEDURE
YOU HAVE USED

COMMAND-LINE INSTRUCTIONS ARE VERY USEFUL ALSO FOR
CUT&PASTE

Remote connection and file transfer. I

- **ssh**

connects your laptop to a server/a remote computer. In this example, enter gruppo01 (as username)

- `ssh -X gruppo01@login06.iasfbo.inaf.it`
then type the password

- **sftp**

transfers files from the remote server to your laptop. In this example, enter gruppo01 (as username)

- `sftp gruppo01@login06.iasfbo.inaf.it`
then type the password

`cd /blasco/users/gruppo01/working_dir/` working_dir is where files are
`get filename` to take a file from the server to your laptop
`put filename` to put a file from the laptop to the server

Remote connection and file transfer. II

- **scp**

Alternative (to sftp) way to transfer file from/to your laptop.

Note: the following commands in one line

- scp

```
gruppo01@login06.iasfbo.inaf.it:/blasco/users/gruppo01/working  
_dir/namefile ./
```

then type the password



in one line (no break after scp) –
the same below

This copies the file (namefile) from the server to your laptop

- scp namefile1

```
gruppo01@login06.iasfbo.inaf.it:/blasco/users/gruppo01/working  
_dir/
```

then type the password

This copies the file (namefile1) from your laptop to the server

Remote connection and file transfer. III

- **scp -r**

To transfer an entire directory (here: working_dir) from the server to your laptop)

- **scp -r**

```
gruppo01@login06.iasfbo.inaf.it:/blasco/users/gruppo01/working_dir/ ./
```

then type the password



in one line (no break after scp -r)