

Using Linux the CLI way - Cheat Sheet

1. Basic Operations

Linux, like any other Unix system is case sensitive so type them exactly as they are written in this article.

The File Separator

An important feature that differentiates Unix systems from Windows systems is the way one refers to the File Separator. On UNIX based systems it's as follows.

```
/usr/local/apache/httpd.conf  
----> the forward file separator.
```

```
While on Windows systems.  
C:\webserver\apache\httpd.conf ----> the backward file separator.
```

any_command --help | more

Display a brief help file on a command (works with most commands). --help works similar to DOS /h switch. The more pipe is needed if the output is longer than one screen.

|
This isn't an L, it is what we call the redirection operator. If you are trying to find it on your keyboard, you'll probably see it on the top row with the numerical keys. The main purpose of the redirector is to redirect output from one process to another. It works at the shell level and is very handy to have around. More on this later.

ls

Lists the content of the current directory. Under Linux, the command dir is an alias to ls. Many users have ls to be an alias to ls --color.

ls -al | more

List the content of the current directory, all files (also those starting with a dot), and in a long form. Pipe the output through the more command, so that the display pauses after each screen fill.

cd /path_to_directory

Change directory. cd - will take you to your previous directory and is a convenient way to toggle between two directories.

cp /path_to_copy_form /path_to_copy_to

Copy files from source to destination.

mv source destination

Move or rename files. The same command is used for moving and renaming files and directories.

ln source destination

Create a hard link called destination to the file called source. The link appears as a copy of the original files, but in reality only one copy of the file is kept, just two (or more) directory entries point to it. Any changes in the file are automatically visible throughout. When one directory entry is removed, the others stay intact. The limitation of the hard links is that the files have to be on the same file system. Hard links to directories or special files are impossible.

ln -s source destination

Create a symbolic (soft) link called destination to the file called source. The symbolic link just specifies a path where to look for the file. In contradistinction to hard links, the source and destination do not have to be on the same file system. Compared with hard links, the drawback of symbolic links is that if the original file is removed, the link is broken. Symbolic links can also create circular references (like circular references in spreadsheets or databases, (e.g., a points to b and b points back to a).

rm files

Remove (delete) files. You must own the file in order to be able to remove it.

mkdir directory

Make a new directory.

rmdir directory

Remove an empty directory.

rm -r files

(Recursive remove) Remove files, directories, and their subdirectories.

Be careful with this command when logged in as root-- you can easily remove all files on the system if you are not careful.

cat filename | more

View the contents of a text file called filename, one

page a time. The | is the pipe symbol (on many keyboards it is a shift \). The pipe makes the output stop after each screen. For long files, it is sometimes convenient to use the commands **head** and **tail** that display just the beginning and the end of the file. If you happened to use **cat** on a binary file and your terminal displays funny characters afterwards, you can restore it with the command reset.

less filename

Scroll through the contents of a text file. Press q when done. Less is roughly equivalent to more, the command you just read about.

pico filename

Edit a text file using the simple and standard text editor called **pico**. (comes with the pine mail program)

pico -w filename

Edit a text file, while disabling the long line wrap. Handy for editing configuration files. e.g. /etc/fstab. We advise you to disable the word wrap feature for the simple reason that you can easily mess up the configuration files with Word Wrap on, because the line length will differ from system to system.

lynx file.html

View an html file or browse the net from text mode.

tar -xvzf filename.tar.gz

Untar a tarred and compressed tarball (*.tar.gz or *.tgz) that you downloaded from the Internet.

tar -xvf filename.tar

Untar a tarred but uncompressed tarball (*.tar).

gunzip filename.gz

Decompress a zipped file (*.gz or *.z). Use gzip (also zip or compress) if you want to compress files.

bunzip2 filename.bz2

Decompress a file (*.bz2) zipped with bzip2 compression utility. Used for big files.

unzip filename.zip

Decompress a file (*.zip) zipped with a compression utility compatible with PKZIP for DOS.

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find / -name filename

Find the file called filename on your file system starting the search from the root directory / . The filename may contain wildcards (*, ?).

locate filename

Find the file name of which contains the string filename. Easier and faster than the previous command but depends on a database that normally rebuilds at night.

pine

A good text-mode mail reader. Pine will let you read your local mail, e.g. the mail you get from a computer on your home network.

talk username1

Talk to another user currently logged on your machine (or use **talk username1 @machinename** to talk to a user on a different computer). To accept the invitation to the conversation, type the command **talk username2**. If somebody is trying to talk to you and it disrupts your work, you may use the command **mesg n** to refuse accepting messages. You may want to use **who** or **rwho** to determine the users who are currently logged-in.

mc

Launch the Midnight Commander file manager (looks like Norton Commander) for Linux.

telnet server

Connect to another machine using the TELNET protocol. Use a remote machine name or IP address. You will be prompted for your login name and password--you must have an account on the remote machine to login. Telnet will connect you to another machine and let you operate on it as if you were sitting at its keyboard (almost). Telnet is not very secure--everything you type goes in open text, even your password!

rlogin server

(Rremote login) Connect to another machine. The login name/password from your current session is used; if it fails you are prompted for a password. (Not very secure!)

rsh server (remote shell)

Yet another way to connect to a remote machine. The login name/password from your current session is used; if it fails you are prompted for a password.

ftp server

Ftp to another machine. (There is also ncftp which adds extra features and gftp for GUI). Ftp is good for copying files to/from a remote machine. Try user anonymous if you don't have an account on the remote server.

The essential ftp commands are:

ls - list the files on the remote system

ASCII - set the file transfer mode to text mode

binary set the file transfer mode to binary mode

get - copy a file from the remote system to the local system

mget - get many files at once - (use *.*)

put - copy a file from the local system to the remote system

mput - put many files at once

bye - disconnect

For automation in a script, you may want to use ncftpput and ncftpget, for example:

```
ncftpput -u my_user_name -p my_password -a  
remote.host.domain remote_dir *local.html
```

minicom

Minicom program. It's a communication program that somewhat resembles the famous old DOS communication program, Telex. You could always use your existing shell accounts via minicom.

/program_name

Run an executable in the current directory, which is not on your PATH

xinit

Start a barebone X-windows server (without a window manager).

startx

Start an X-windows server and the default window manager. Works like typing win under DOS with Win3.1

startx -- :1

Start another X-windows session on the display 1 (the

default is opened on display 0). You can have several GUI terminals running concurrently. Switch between them using Ctrl+Alt+F7, Ctrl+Alt+F8, etc.

xterm (an X terminal)

Run a simple X-windows terminal. Typing exit will close it.

shutdown -h

Shut down the system to a halt. Allowed only when logged in as root. From the console you may use Ctrl+Alt+Del to issue a **shutdown -r now**. This can be done by any user.

halt

Halt the machine, simpler to type than the previous command.

man topic

Display the contents of the system manual pages (help) on the topic. Try man man first. Press q to quit the viewer. The command info works in a similar fashion and may contain more up-to-date information. Manual pages can sometimes be hard to read.

--help

Brings up a short, easy to digest help on a command. If you need more info, go to the directory /usr/doc and look for the command.

2. System Information

who

List the users logged in on the machine. --

rwho -a

List all users logged in on your network. The **rwho** service must be enabled for this command to work.

finger user_name

System info about a user. Try: **finger root last**. This lists the users last logged-in on your system.

history | more

Show the last (1000 or so) commands executed from the command line on the current account. The | **more** causes the display to stop after each screen fill.

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pwd

Print working directory, i.e. display the name of your current directory on the screen.

hostname

Print the name of the local host (the machine on which you are working).

whoami

Print your login name.

id username

Print user id (uid) and his/her group id (gid), effective id (if different than the real id) and the supplementary groups.

date

Print or change the operating system date and time. E.g., change the date and time to 2000-12-31 23:57 use this command `date 123123572000`

To set the hardware clock from the system clock, use the command (as root) **setclock**

time

Determine the amount of time that it takes for a process to complete+ other info. Don't confuse it with date command. For e.g. we can find out how long it takes to display a directory content using **ls**

uptime

Amount of time since the last reboot

ps

List the processes that are beeing run by the current user.

ps aux | more

List all the processes currently running, even those without the controlling terminal, together with the name of the user that owns each process.

top

Keep listing the currently running processes, sorted by cpu usage (top users first).

uname -a

Info on your server.

free

Memory info (in kilobytes).

df -h

Print disk info about all the file systems in a human-readable form.

du / -bh | more

Print detailed disk usage for each subdirectory starting at root (in a human readable form).

lsmod

(as root. Use `/sbin/lsmod` to execute this command when you are a non-root user.) Show the kernel modules currently loaded.

set

Show the current user environment.

echo \$PATH

Show the content of the environment variable PATH. This command can be used to show other environment variables as well. Use **set** to see the full environment.

dmesg | less

Print kernel messages (the current content of the so-called kernel ring buffer). Press **q** to quit less. Use `less /var/log/dmesg` to see what dmesg dumped into the file right after bootup.

3. Commands for Process control

ps

Display the list of currently running processes with their process IDs (PID) numbers. Use **ps aux** or **ps -ef** to see all processes currently running on your system (also those of other users). Use **top** to keep listing the processes currently running.

fg

PID Bring a background or stopped process to the foreground.

bg

PID Send the process to the background. This is the opposite of fg. The same can be accomplished with **Ctrl z**

any_command &

Run any command in the background (the symbol '&' means run the command in the background?).

kill PID

Force a process shutdown. First determine the PID of the process to kill using **ps**.

killall -9 program_name

Kill program(s) by name.

xkill

(in an xwindow terminal) Kill a GUI-based program with mouse. (Point with your mouse cursor at the window of the process you want to kill and click.)

lpc

(as root) Check and control the printer(s). Type `???` to see the list of available commands.

lpq

Show the content of the printer queue.

lprm job_number

Remove a printing job `job_number` from the queue.

nice program_name

Run `program_name` adjusting its priority. Since the priority is not specified in this example, it will be adjusted by 10 (the process will run slower), from the default value (usually 0). The lower the number (of niceness to other users on the system), the higher the priority. The priority value may be in the range -20 to 19. Only root may specify negative values. Use **top** to display the priorities of the running processes.

renice -1 PID

(as root) Change the priority of a running process to -1. Normal users can only adjust processes they own, and only up from the current value (make them run slower).

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4. Basic System Administration Commands

printtool

(as root in X-terminal) Configuration tool for your printer(s).

To access the settings directly go to the file /etc/printcap.

setup

(as root) Configure the mouse, soundcard, keyboard, X-windows, system services. Works only on Red Hat Linux based systems. Most distributions however ship with a comparable tool, look up the documentation of your distribution.

xvditune

(in X-terminal). Adjust the settings of the graphical display for all resolutions so as to eliminate black bands, shift the display right/left/up/down, etc. (first use the adjustments on your monitor to fit your text mode correctly on the screen). To make the changes permanent, display the frequencies on the screen and transfer them to the setup file /etc/X11/XF86Config.

adduser user_name

Create a new account (you must be root).

E.g., adduser barbara

Don't forget to set up the password for the new user in the next step. The user home directory is /home/user_name.

passwd

Change the password on your current account. If you are root, you can change the password for any user using:

passwd user_name

useradd user_name

The same as the command adduser user_name .

userdel user_name

Remove an account (you must be root). The users home directory and the undelivered mail must be dealt with separately.

groupadd group_name

Create a new group on your system. Not essential on a home machine with a small number of users.

chmod perm filename

Change the file access permission for the files you own unless you are root in which case you can change any file.

You can make a file accessible in three modes: read (r), write (w), execute (x) to three classes of users: owner (u), members of the same group as the owner (g), others on the system (o).

Check the current access permissions using:

ls -l filename

If the file is accessible to all users in all modes it will show:

```
rwrxrwxrwx
```

The first triplet shows the file permission for the owner of the file, the second for his/her group, the third for others. No permission is shown as ' - ' E.g., this command will add the permission to read the file junk to all (user+group+others)

chmod a+r junk

This command will remove the permission to execute the file junk from others

chmod o-x junk

You can set the default file permissions for the new files that you create using this command.

umask (see man umask).

chown new_ownership filename and

chgrp new_groupname filename

Change the file owner and group. You should use these two commands after you copy a file for use by somebody else.

su

Assume the superuser (root) identity (you will be prompted for the password). Type exit to return you to your previous login. Don't habitually work on your machine as root. The root account is for administration and the su command is to ease your access to the administration account when you require it.

rpm -ivh filename.rpm

Redhat Package Manager, install, verbose, hashes displayed to show progress, as root.) Install the contents of a rpm package and print info on what

happened.

rpm -qpi filename.rpm

Redhat Package Manager, query, package, list.) Read the info on the contents of a un-installed package filename.rpm.

rpm -qpl filename.rpm

(Redhat Package Manager, query, package, information.) List the files contained in a yet un-installed package filename.rpm.

rpm -qf filename

(Redhat Package Manager, query, file.) Find out the name of the *.rpm package to which the file filename (on your hard drive) belongs.

rpm -e packagename

(Redhat Package Manager, erase un-install.) Un-install a package packagename. Package name is the same as the beginning of the *.rpm package (without the dash and version number).

lsmod

List currently loaded kernel modules.

modprobe -l |more

List all the modules available for your kernel.

insmod parport

insmod = ppa (as root) Insert modules into the kernel (a module is roughly an equivalent of a DOS device driver). This example shows how to insert the modules for support of the external parallel port zip drive (it appears to be a problem to get the external zip drive to work in any other way under RH6.0).

rmmod module_name

(as root, not essential). Remove the module module_name from the kernel.

setserial /dev/cua0 port 0x03f8 irq = 4

(as root) Set a serial port to a non-standard setting. The example here shows the standard setting for the first serial port (cua0 or ttyS0).

The standard PC settings for the second serial port (cua1 or ttyS1) are: address of i/o port 0x02f8, irq 3.

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The third serial port (cua2 or ttyS2): 0x03e8, irq 4.
The fourth serial port (cua3 or ttyS3): 0x02e8, irq 3.
Add your setting to /etc/rc.d/rc.local (Red Hat) if you want it to be set at the boot time. See man setserial for a good overview.

fdisk

(as root) Linux hard drive partitioning utility (DOS has a utility with the same name)

mkfs -c=20 -t ext2

(floppy disk format, two commands, as root) Perform a low-level format on a floppy in the first floppy drive (/dev/fd0), high density (1440 kB). Then make a Linux filesystem (-t ext2), checking/marking bad blocks (-c). Making the file system equivalent to the high-level format.

fsck -t ext2 /dev/hda2

(file system check, as root) Check and repair a file system. The example uses the partition hda2, file system type ext2.

dd if=/boot/vmlinuz of=/dev/fd0

dd, stands for Data Duplicator. The above command copies data, i.e. the file vmlinuz in RAW format from /boot to the floppy. This is useful for making a boot disk.

mount -t iso9660 -r /dev/cdrom /mnt/cdrom

(root) You need to have permission from root to read from this drive. This command basically makes the CD in the CD drive available in the /mnt/cdrom. The CD device is in the /dev/cdrom directory.

5. Basic Networking tools

ping machine_name

Stands for Packet Internet Groper and allows you to check if you can contact another machine (give the machine's name or IP). Press Ctrl+C when done.

route -n

Show the routing table.

nslookup host_to_find

Query your default domain name server (DNS) for an Internet name host_to_find.

ifconfig

(as root) Display info on the network interfaces currently active (ethernet, ppp, etc). Your first ethernet device should show up as eth0, the second one as eth1, etc, first ppp over modem as ppp0, second as ppp1, etc. The lo is the loopback only interface which should be always active.

Use the options (see ifconfig --help) to configure the interfaces.

ifup interface_name

(/sbin/ifup to it run as a user) Startup a network interface.

E.g.: ifup eth0

ifup ppp0

Users can start up or shutdown the ppp interface only when the rights permission was checked during the ppp setup.

ifdown interface_name

(/sbin/ifdown to run it as a user). Shut down the network interface.

E.g.: ifdown ppp0

Also, see the previous command.

netstat | more

Displays a lot of (too much perhaps!) information on the status of your network connections.

6. Common shortcuts you should know

Ctrl+Alt++: Using this command switches you to a higher resolution than your GUI started up in.

Ctrl+Alt+-: Using this command switched the screen resolution lower.

Ctrl+Alt+Backspace: Kills the X server. Use it if your normal logout option does not work.

Shift+PageUp: Scrolls up through the terminal output. Use this and the one below to move through screens of information.

Shift+PageDown: Scrolls down through the terminal output.

Ctrl+Alt+F1: Linux allows you to work on more than one virtual terminal at a time. You can have any number of virtual terminals but most Linux system are setup for six that are accessible through 'ctrl + alt + f1' to 'ctrl + alt + f6'. So, basically f1-fn tells your system to switch to the virtual terminal corresponding to the function key number. You can use this to jump from one terminal to another.

Ctrl+Alt+F7: While working in the Unix command line interface, you can issue this command to get back into GUI mode.

Ctrl+C: This command halts a running process. Use this to quickly exit from any program that you are running.

Ctrl+D: This command is used to log you out of a particular terminal. It also issues an EOF (End Of File) to the program that you are working in.

Ctrl+Z: Sends a current process into the background. Also if your terminal is messed up because you 'cat' a binary file 'ctrl + z' will clear up the screen for you and give you a clean prompt.

Ctrl+S: Scroll lock. Your screen will not be updated.

Ctrl+Q: Remove the scroll lock set above. You will now be able to interact properly with your terminal.

Tab: One of the most used keys. Pressing the 'tab' key while typing the path to any directory or a filename is very helpful. Write the first few characters of the file or directory and press the tab key to complete the name or give you a list of possibilities. When pressed during an incomplete command, the 'tab' key completes the command for you.

Ctrl+Alt+Del: When used at the console it reboots the machine. Remember it causes a soft boot and not a cold boot. The system will shutdown all services before rebooting.

UP Arrow: In the terminal, it cycles through the list of commands that you have executed.

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7.TIPS

GPM: Let's look at copying data from one virtual terminal to another. This requires your mouse to be setup for GPM. Use mouseconfig under Red Hat and Yast under SuSE to set up your mouse correctly. Also make sure the package GPM is installed beforehand.

MiddleMouseButton: Just select the text you would want to copy using your mouse. Do as you would under Windows. Press and hold the right mouse button and then drag to select the text. Then switch to the terminal you want to copy to and click the middle mouse button. This will paste the text at the current cursor location.

~: This represents your home directory. Use this in a command and the ~ will get replaced by your home directory. `cd ~/freos`. This command gets you to the 'freos' directory, which is a sub-directory under your home directory.

Setting the speed of your mouse in X: Do a "man xset" and look at the option 'm'.

```
'Very Fast' xset m 7 10  
'Normal(Fast)' xset m 3 10  
'System Default' xset m default  
'Glacial' xset m 0 10
```

The xset -m option takes two parameters: the first is the speed and the second is the threshold value. But these values will be reset as soon as you log out. To make this setting permanent, just add it to the ".xsession" file in your home directory.

Ctrl+Right-Mouse-button: Setting your Font Size in xterm. To set your font size in an Xterm you can make use of the command 'setfont' or simply just do the following. If you are in an xterm use 'ctrl + right mouse button'. This will popup a menu where you can choose some (standard) font-sizes.

How to kill Netscape but have it save your bookmarks and history:

'kill -12' (USR2) is more gracious. When used to terminate Netscape, it will save the bookmarks and history files of the current session.

Disable Blanking in Text consoles:

setterm -blank 0. To make this setting permanent, just add it to your .xsession file in your home directory.

To disable X-Server screen blanking:

xset s off

To make this setting permanent, just add it to your .xsession file in your home directory.

Turning off PING reply:

PING (Packet Internet Groper) is a service used most commonly to figure out the network status of your machine. Many a time the useful service provided by it could be used for a D.O.S. (Denial Of Service) attack against you. Simply

```
echo 1 > /proc/sys/net/ipv4/icmp_echo_ignore_all  
will do the trick. To turn it back on,  
echo 0 > /proc/sys/net/ipv4/icmp_echo_ignore_all
```

Killing a Virtual Console without rebooting:

Log in as root, type '**!sof /dev/ttyx**' where the 'x' in /dev/ttyx is the terminal number of the hung virtual console. This will show you the process that occupies this tty. Kill it and the getty process for that virtual console should respawn.

That's all for now. We will keep you all posted as we find some more good tips to add to this list. By the way, do mail us your tips and we will include them in here.

For more info go to <http://www.freeos.com/>.

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