# Link

link is a way to create reference to some file or library.

**Hard link:**

a. its a exact copy of the og file.
b. original file and ref link sharing the same inode number.
c. deleting a link will remove the data as well
d. if you make changes it will be reflected to the original file as well.

create folder named xyz and create one file inside the same
ln xyz/file1.txt mylink
(first file is the source file and 2nd one is the hard link)
to edit file use: nano mylink (add some content and save it)
read file: cat mylink

**Soft Link**

**Its a symbolic Link like a shortcut or a pointer to original file.**

- **can link to directories**
- **can span across file systems**
- **if the og file is deleted  the link become broken link.**

create folder named xyz and create one file inside the same
ln -s xyz/file1.txt mylink
(first file is the source file and 2nd one is the hard link)
to edit file use: nano mylink (add some content and save it)
read file: cat mylink

Key Differences

| Diffrences | Hard Link | SoftLink |
|---|---|---|
| Inode | using same Inode original | has the different inode |
| Directory Link | cannot | can |
| cross filesystem | cannot | can |
| dependent | yes on og file | yes on file path |
| broken link | NO | yes, if og file deleted |
| usefullness | used internally | between multiple users |

**Networking Tools:**
to check the interface configuration we have used ifconfig command which is apart of net-tools package.
see the configuration: ifconfig command
you can see the list of interfaces: if you want to see individual interface details
command: ifconfig eth0 (eth0 is the interface name)
to bring the interface up and down for some network connectivity you can use up and down value)
sudo ifconfig eth0 up
sudo ifconfig eth0 down

In morden system use ip command on replacement of ifconfig.
command: ip addr
to make it up and down:
command: ip link set eth0 up
command: ip link set eth0 down

**Common Connectivity Command**
ping command (you will receive packets from google.com if its connected)
it continuously sent responses, you can stop using ctrl+c
send a specific number of pings:
    ping -c 5 google.com
set an interval so after that 3 seconds it will ping
    ping -i 3 google.com

set timeout

ping -w 5 google.com

(wait for 5 seconds and then provide response)

set the packet size

ping -s 100 google.com

(by default its 56 bytes)

network Socket:

communicating machines they are are called sockets

Socket level Statistics

netstat (show routing active sockets)

ss (shows socket statistics (faster and modern)

commands

netstat -tuln (show all connections)

-t TCP, -u UDP, -l listening, -n numeric addresses

show Process ID

netstat -tulnp

ss -tuln (show all listening sockets)

ss -tulnp (show PID and processes)

System Performance and Monitoring

Top command:

it displays  a real time summary of process, also showing like UPU and memory usage also

showing some other metrics.

execute command: top

check output

**System Info:** Current Time, Uptime, Users,

load average called handling the overall load

how CPU is taking time for running processes

0.25 0.76 1.20

load over: 1 minute , 5 minutes and 15 minutes

Task Information:

total tasks, running, sleeping, stopped,

zombie task (terminated child process)

In Linux: when child process end it status is exited to its parent

parent call wait() or waitpid() and read the status
in between that time the process called zombie

CPU Usage:

us (user): processes used by user
sy (system) processes used by system
ni (nice) nice-priority processes
id(idle): Idle CPU percentage
wa (wait) CPU waiting for I/O
hi (hardware interrupts): service hardware interrupts
si (software interrupts): service software interrupts
st (stolen): time taken by VM

Memory Usage:

Total memory, free memory, used Memory, Buffer/cache memory, swap usage

Process table:

PID (process ID)
User (User owner this process)
PR (priority)
NI (nice value)
VIRT (VM used)
RES (Resident memory RAM)
SHR (shared memory)
S state: S (Sleeping), Z- zombie, R- running, T-stopped
CPU % (CPU Usage)
MEM (Memory usage)
TIME (CPU time used)
command (command/ process name)

Basic Command

Sort: by CPU (shift + P)
by Memory (shift + M)
by running (Shift +T)
Kill process: press k type PID
(search for top command PID which is running type that id and check process is killed or not)

Monitor specific things

User specific folder process

top -u www-data

for particular process ID

top -p 366 (track processes for processID)

top -b -n 1 > developers/top_output.txt

(save  output  to one file)

-b (for batch mode for not-iterative output)

-n (Set the number of updates before exit)