

Linux for iron mans





Linux ?

operating system

Linus Torvalds launched the Linux kernel 1991

open source

Many roads

Tux -



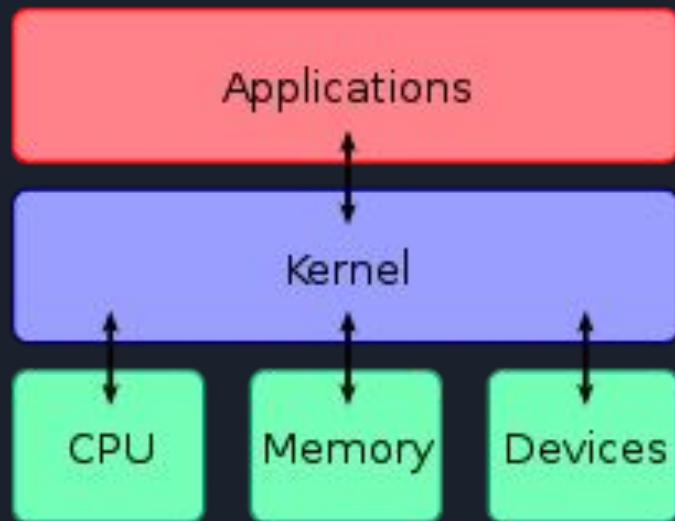


OS

- GPOS: General Purpose OS
 - Dynamic memory mapping
 - Random execution time
 - Response time not Guaranteed
 - Examples: linux windows, IOS, Andorid
 - usage: PC, Tabled , iphone
-
- RTOS - Real Time OS
 - Deterministic: no random execution patttern
 - Predictable response time
 - Preemptive Kernel: A preemptive kernel is one that can be interrupted in the middle of executing code
 - Examples: FreeRTOS, Nuttx, ChebiOS
 - Usage:
 - Embedded computing: pixhawk

Kernels

- Resource management
 - cpu
 - memory
 - i/o



Linux Concepts

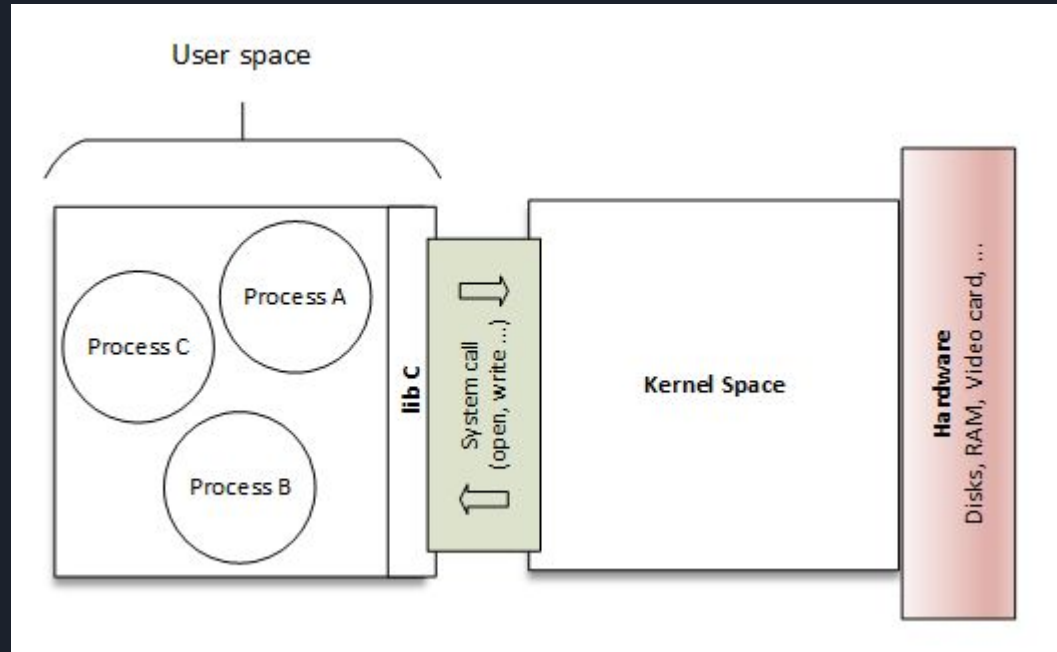
- Linux kernel
- Linux Distribution
- Server
- Desktop
- user space
- kernel space

[dist_graph view](#)

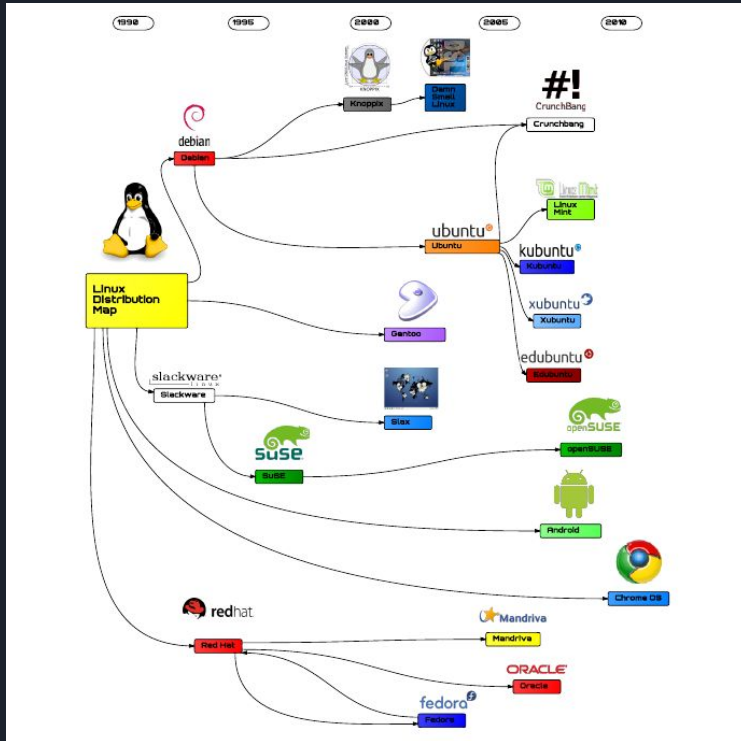
[kernel](#)



Kernel space / User space



Linux distribution Tree



Debian base


- | | | |
|--|--|---|
| <p>A</p> <ul style="list-style-type: none"> Tails (operating system) Ångström distribution AntiX Astra Linux AV Linux <p>B</p> <ul style="list-style-type: none"> BackBox Baltix Bharat Operating System Solutions <p>C</p> <ul style="list-style-type: none"> Canaima (operating system) Commodore OS Corel Linux CrunchBang Linux <p>D</p> <ul style="list-style-type: none"> Damn Small Linux Debian Pure Blend Debian-Med Deepin Devuan Dreamlinux Dyson (operating system) <p>E</p> <ul style="list-style-type: none"> Elementary OS Emdebian Grip Emmabuntüs <p>F</p> <ul style="list-style-type: none"> Finnix FreedomBox <p>G</p> <ul style="list-style-type: none"> GLinux GNewSense | <ul style="list-style-type: none"> GnuLinEx Google Cloud Shell Gmml Guadalinex <p>H</p> <ul style="list-style-type: none"> HandyLinux Huayra GNU/Linux <p>I</p> <ul style="list-style-type: none"> Instant WebKiosk Iskolinux <p>K</p> <ul style="list-style-type: none"> KaeIiOS Kali Linux Kali Linux NetHunter Edition Kanotix Knoppix <p>L</p> <ul style="list-style-type: none"> Libranet LiMux Linspire Linux Mint Debian Edition Loco Linux <p>M</p> <ul style="list-style-type: none"> Maemo MEPIS Mklivecd Musix GNU+Linux MX Linux <p>O</p> <ul style="list-style-type: none"> OpenZaurus <p>P</p> <ul style="list-style-type: none"> Pardus (operating system) Parrot OS Parsix | <ul style="list-style-type: none"> Pixart Progeny Linux Systems Proxmox Virtual Environment PureOS <p>R</p> <ul style="list-style-type: none"> Reconstructor <p>S</p> <ul style="list-style-type: none"> Sacix SalineOS Skolinux SolydXX SparkyLinux SteamOS Stormix Sunwah Linux Symphony OS <p>T</p> <ul style="list-style-type: none"> TurnKey Linux Virtual Appliance Library <p>U</p> <ul style="list-style-type: none"> Ubuntu Univention Corporate Server UserLinux USU (operating system) <p>V</p> <ul style="list-style-type: none"> Vyatta VyOS <p>W</p> <ul style="list-style-type: none"> Webconverger Wienux <p>X</p> <ul style="list-style-type: none"> Xandros <p>Y</p> <ul style="list-style-type: none"> YunoHost |
|--|--|---|

Ubuntu

1. Ubuntu is a free and open-source Linux distribution based on Debian
2. Ubuntu is officially released in three editions: Desktop, Server, and Core
3. Ubuntu is released every six months (19.10 , 20.04)
4. LTS every 2 years (18.04)
5. ubuntu naming: using an adjective and an animal with the same first letter (18.04 Bionic Beaver)



Desktop / server / core / ...



[Ubuntu Desktop](#) ›

Download Ubuntu desktop and replace your current operating system whether it's Windows or macOS, or run Ubuntu alongside it.

Do you want to upgrade? [Follow our simple guide](#) ↗

[Ubuntu Server](#) ›

Whether you want to configure a simple file server or build a fifty thousand-node cloud, you can rely on Ubuntu Server and its five years of guaranteed free upgrades.

[Ubuntu Cloud](#) ›

Ubuntu is the reference OS for OpenStack. Try Canonical's OpenStack on a single machine or start building a production cloud on a cluster — just add servers.

[Ubuntu flavours](#) ›

Ubuntu flavours offer a unique way to experience Ubuntu with different choices of default applications and settings, backed by the full Ubuntu archive for packages and updates.

[Ubuntu for IoT](#) ›

Are you a developer who wants to try snappy Ubuntu Core? The new, transactionally updated Ubuntu for clouds and devices.

flavours

Ubuntu flavours

Ubuntu flavours offer a unique way to experience Ubuntu, each with their own choice of default applications and settings. Ubuntu flavours are backed by the full Ubuntu archive for packages and updates.



Kubuntu 

Kubuntu offers the KDE Plasma Workspace experience, a good-looking system for home and office use.



Lubuntu 

Lubuntu is a light, fast, and modern Ubuntu flavor using LXQt as its default desktop environment. Lubuntu used to use LXDE as its default desktop environment.



Ubuntu Budgie 

Ubuntu Budgie provides the Budgie desktop environment which focuses on simplicity and elegance. It provides a traditional desktop metaphor based interface utilising a customisable panel based menu driven system.



Ubuntu Kylin 

The Ubuntu Kylin project is tuned to the needs of Chinese users, providing a thoughtful and elegant Chinese experience out-of-the-box.



Ubuntu MATE 

Ubuntu MATE expresses the simplicity of a classic desktop environment. Ubuntu MATE is the continuation of the GNOME 2 desktop which was Ubuntu's default desktop until October 2010.



Ubuntu Studio 

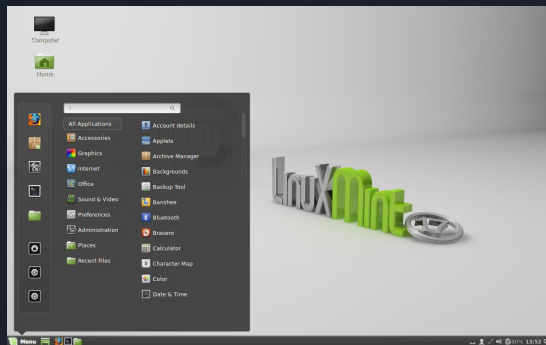
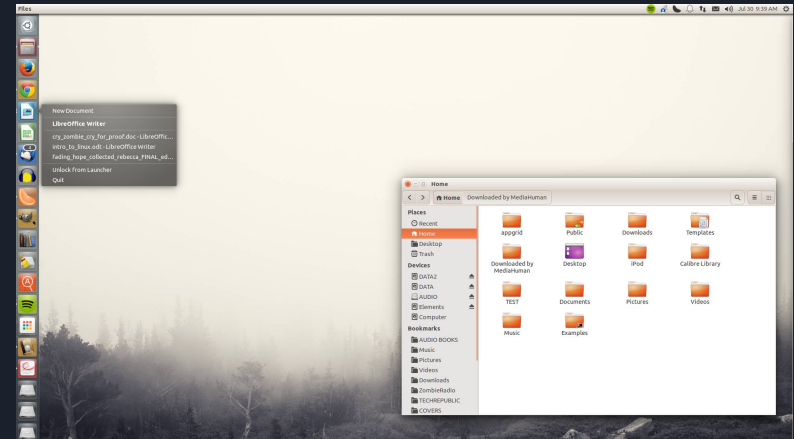
Ubuntu Studio is a multimedia content creation flavor of Ubuntu, aimed at the audio, video and graphic enthusiast or professional.



Xubuntu 

Xubuntu is an elegant and easy to use operating system. Xubuntu comes with Xfce, which is a stable, light and configurable desktop environment.

Desktop



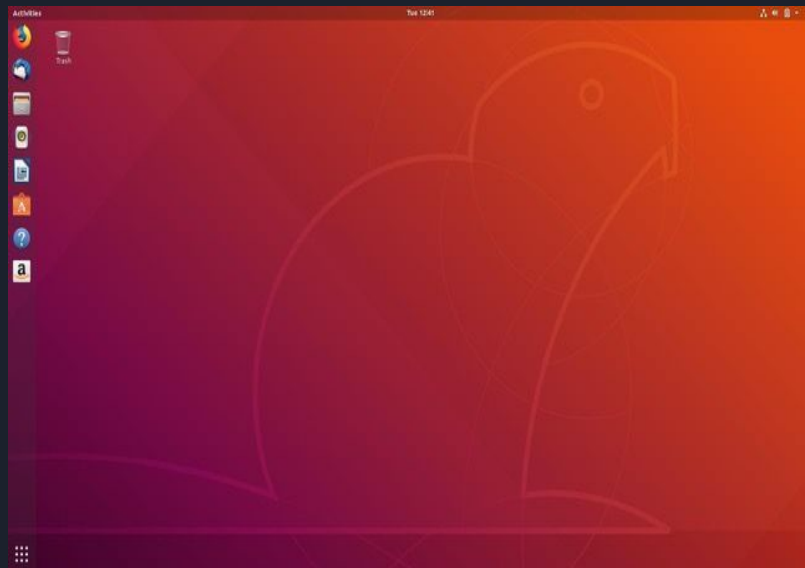
- GNOME
- UNITY
- mint cinnamon
- lxde
- [more](#)



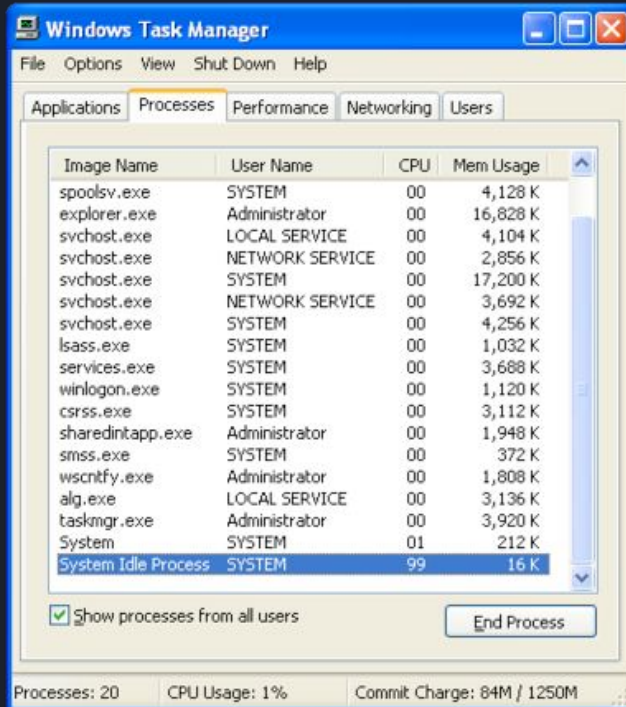
Demo

- Desktop
- Command lines
 - ls
 - cd
 - cat
 - ping
 - networking
- Edit file
- Install
 - tcpdump

Ubuntu 18.04 GNOME



Process -> kill



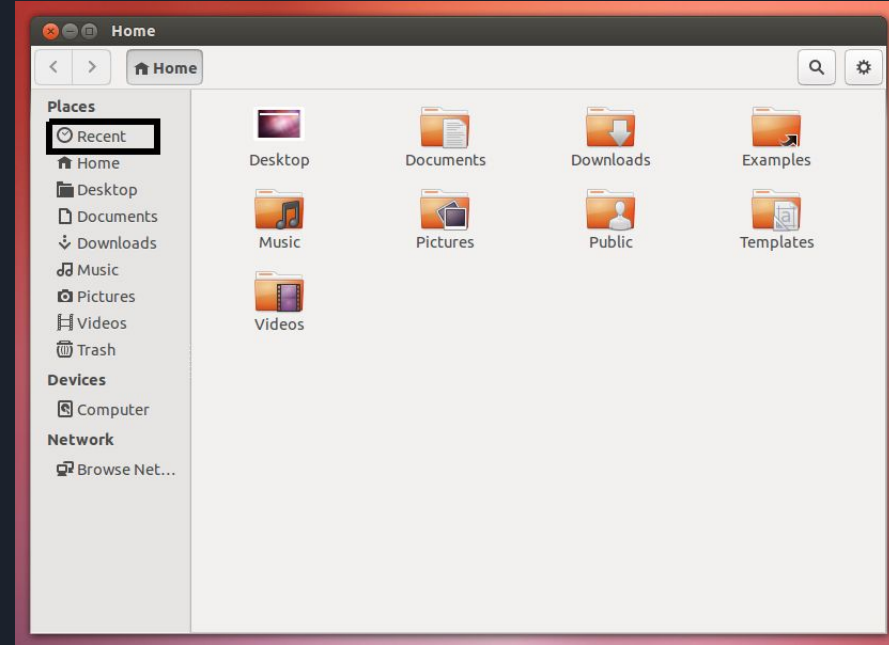
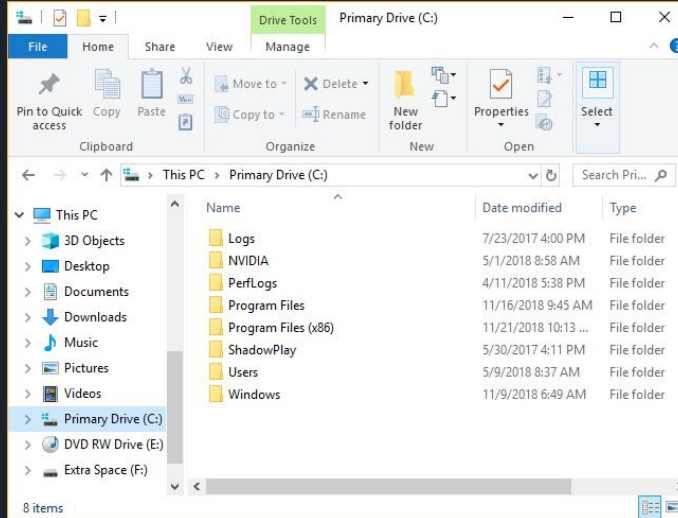
```
snorlax212@snorlax212: ~/Desktop/lab6
snorlax212@snorlax212:~/Desktop/lab6$ ps -el
F S  UID    PID  PPID  C PRI  NI ADDR SZ WCHAN TTY          TIME CMD
4 S   0      1     0  0  80   0  -  6144 poll_s ?      00:00:00 init
1 S   0      2     0  0  80   0  -    0 kthrea ?      00:00:00 kthread
1 S   0      3     2  0  80   0  -    0 smpb00 ?      00:00:02 ksofttrqd/0
1 S   0      5     2  0  60 -20 -    0 worker ?      00:00:00 kworker/0:0H
1 S   0      7     2  0  60 -20 -    0 worker ?      00:00:00 kworker/u:0H
1 S   0      8     2  0 -40 -    0 cpu_st ?      00:00:00 migration/0
1 S   0      9     2  0  80   0  -    0 rcu_gp ?      00:00:00 rcu_bh
1 S   0     10     2  0  80   0  -    0 rcu_gp ?      00:00:10 rcu_sched
5 S   0     11     2  0 -40 -    0 smpb00 ?      00:00:00 watchdog/0
5 S   0     12     2  0 -40 -    0 smpb00 ?      00:00:00 watchdog/1
1 S   0     13     2  0  80   0  -    0 smpb00 ?      00:00:02 ksofttrqd/1
1 S   0     14     2  0 -40 -    0 cpu_st ?      00:00:00 migration/1
1 S   0     16     2  0  60 -20 -    0 worker ?      00:00:00 kworker/1:0H
5 S   0     17     2  0 -40 -    0 smpb00 ?      00:00:00 watchdog/2
1 S   0     18     2  0  80   0  -    0 smpb00 ?      00:00:02 ksofttrqd/2
1 S   0     19     2  0 -40 -    0 cpu_st ?      00:00:00 migration/2
1 S   0     21     2  0  60 -20 -    0 worker ?      00:00:00 kworker/2:0H
5 S   0     22     2  0 -40 -    0 smpb00 ?      00:00:00 watchdog/3
1 S   0     23     2  0  80   0  -    0 smpb00 ?      00:00:01 ksofttrqd/3
1 S   0     24     2  0 -40 -    0 cpu_st ?      00:00:00 migration/3
1 S   0     26     2  0  60 -20 -    0 worker ?      00:00:00 kworker/3:0H
1 S   0     27     2  0  60 -20 -    0 rescue ?      00:00:00 cpuset
```

kill <pid>

kill -9 <pid>

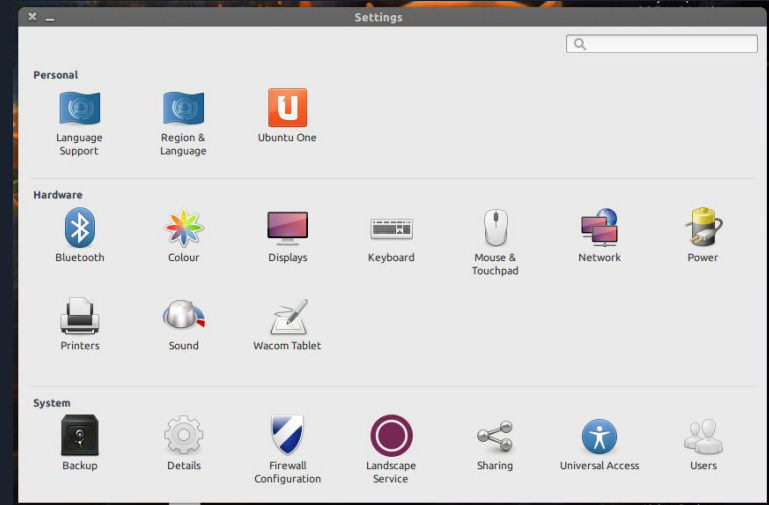
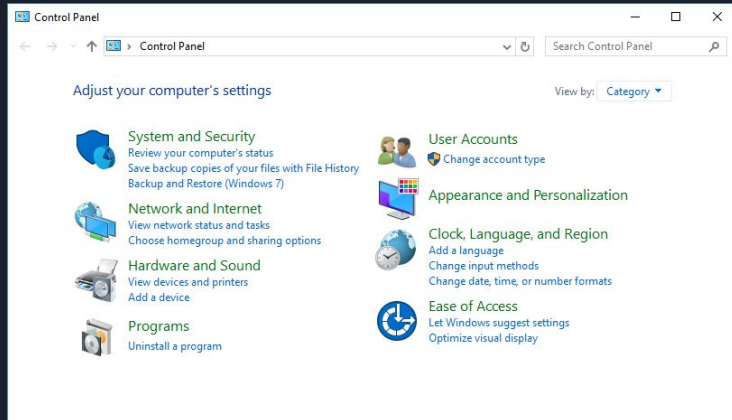
killall <process name>

File Explorer



Linux always has More

Control Panels / Settings



Network settings

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 30

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 1

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 8 . 8 . 8 . 8

Alternate DNS server: 8 . 8 . 4 . 4

☐ Validate settings upon exit

Advanced...

OK Cancel

Network

All Settings

Editing Auto Ethernet

Connection name: Auto Ethernet

☒ Connect automatically

ON

Wired 802.1x Security IPv4 Settings IPv6 Settings

Method: Manual

Addresses

Address	Netmask	Gateway	Add
192.168.72.131	255.255.255.0	192.168.72.2	Delete

DNS servers: 192.168.72.2

Search domains:

DHCP client ID:

☒ Require IPv4 addressing for this connection to complete

Routes...

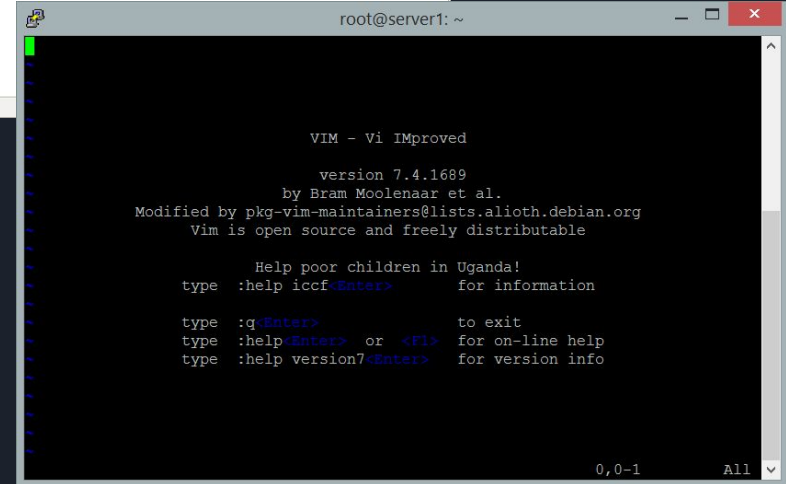
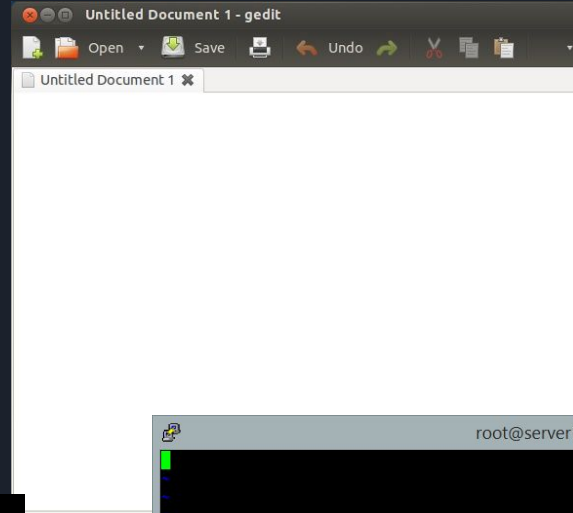
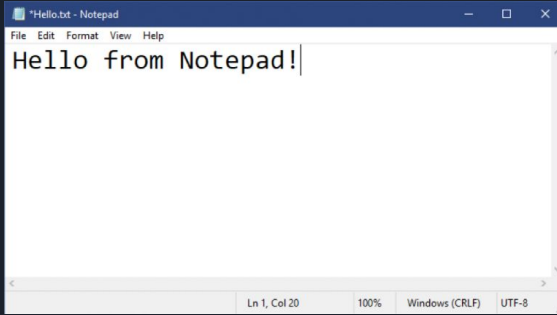
Available to all users

Cancel Save...

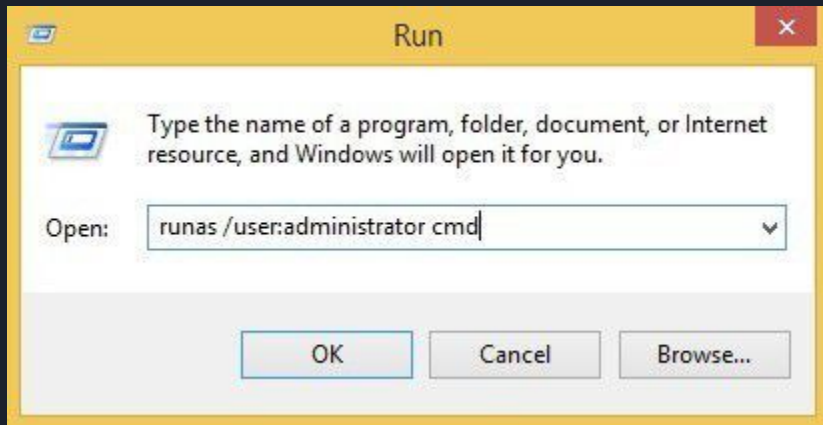
Configure...

Mode OFF

Editors



Run as



```
user@dev:~$ sudo su
root@dev:/home/user#
```

Troubleshoot



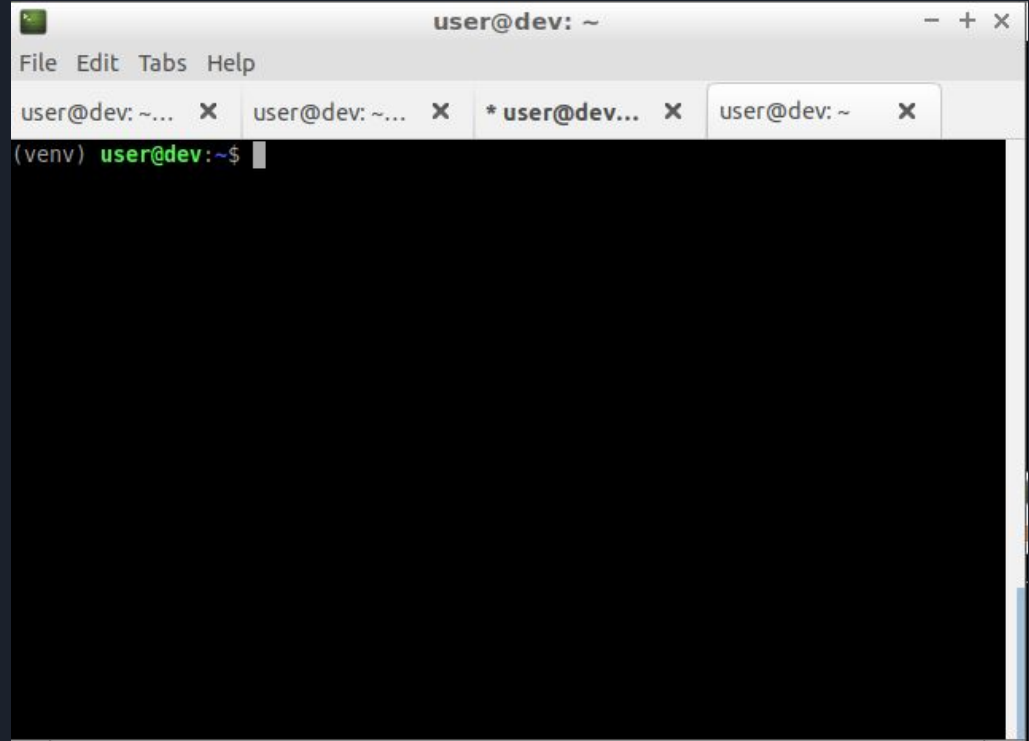


Terminal

- New terminal: ctrl-alt-t

New tab in terminal :
ctrl-shift-t

BASH





Ping

```
bob@susel:~> ping 192.168.198.130
PING 192.168.198.130 (192.168.198.130) 56(84) bytes of data.
64 bytes from 192.168.198.130: icmp_seq=1 ttl=64 time=6.14 ms
64 bytes from 192.168.198.130: icmp_seq=2 ttl=64 time=0.778 ms
64 bytes from 192.168.198.130: icmp_seq=3 ttl=64 time=0.599 ms
64 bytes from 192.168.198.130: icmp_seq=4 ttl=64 time=0.558 ms
64 bytes from 192.168.198.130: icmp_seq=5 ttl=64 time=0.615 ms
64 bytes from 192.168.198.130: icmp_seq=6 ttl=64 time=0.608 ms
64 bytes from 192.168.198.130: icmp_seq=7 ttl=64 time=0.645 ms
64 bytes from 192.168.198.130: icmp_seq=8 ttl=64 time=0.619 ms
64 bytes from 192.168.198.130: icmp_seq=9 ttl=64 time=0.698 ms
^C
--- 192.168.198.130 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8000ms
rtt min/avg/max/mdev = 0.558/1.252/6.149/1.732 ms
```



dmesg

dmesg prints the message buffer of the kernel. The output of this command typically contains the messages produced by the device drivers

```
sudo dmesg -C
```

```
dmesg | grep -i usb
```

```
dmesg | tail -20
```

```
dmesg | grep -i tty
```

```
dmesg | less
```

```
user@dev:~$ dmesg | grep tty
[ 0.000000] console [tty0] enabled
[ 4.368335] usb 3-2: pl2303 converter now attached to ttyUSB0
```

DNS Resolve

cat /etc/resolv.conf

nslookup google.com

Connection name: **home**

General | Ethernet | 802.1X Security | DCB | Proxy | IPv4 Settings | IPv6 Settings

Method: Automatic (DHCP) ▼

Additional static addresses

Address	Netmask	Gateway

Add
Delete

Additional DNS servers:

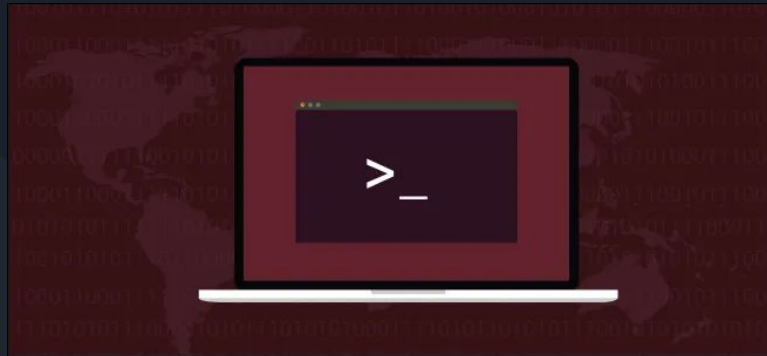
Additional search domains:

```
user@dev:~$ nslookup google.com
Server:      8.8.8.8
Address:     8.8.8.8#53
```

```
Non-authoritative answer:
Name:   google.com
Address: 216.58.211.110
Name:   google.com
Address: 2a00:1450:400e:809::200e
```

```
user@dev:~$ cat /etc/resolv.conf
nameserver 8.8.8.8
```


Linux Commands



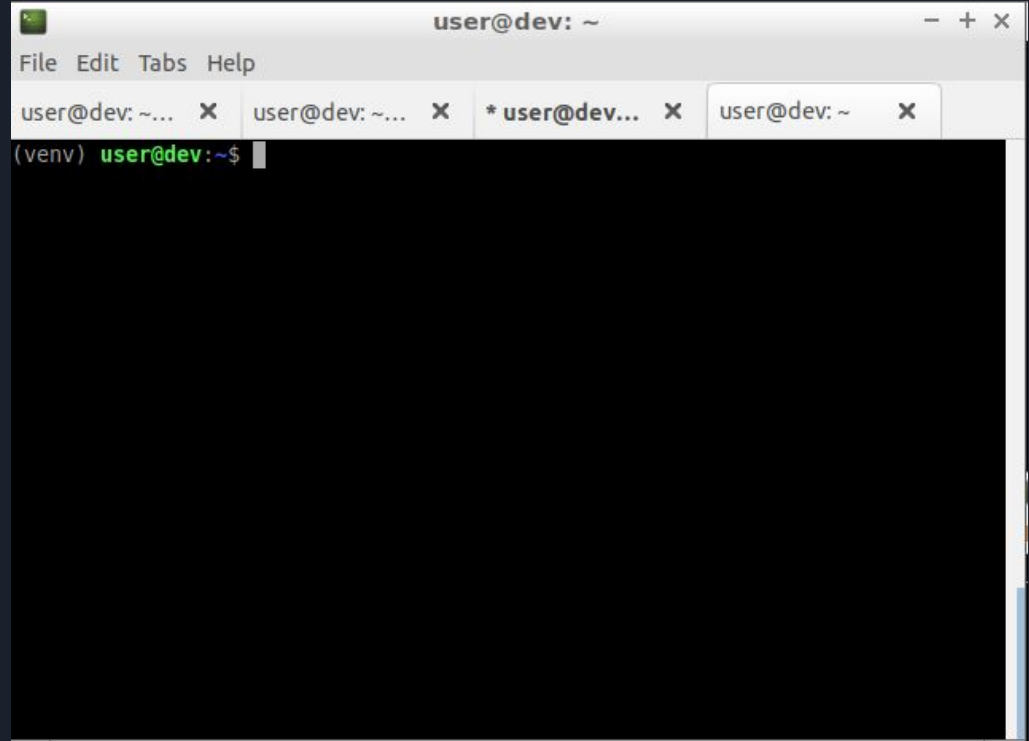


Terminal

- New terminal: ctrl-alt-t

New tab in terminal :
ctrl-shift-t

BASH





man, command manual

man ls

man -k

man ls

```
LS(1)                                User Commands                                LS(1)

NAME
  ls - list directory contents

SYNOPSIS
  ls [OPTION]... [FILE]...

DESCRIPTION
  List information about the FILES (the current directory by default).
  Sort entries alphabetically if none of -cftuvSUX nor --sort is speci-
  fied.

  Mandatory arguments to long options are mandatory for short options
  too.

  -a, --all
        do not ignore entries starting with .

  -A, --almost-all
        do not list implied . and ..

  --author
        with -l, print the author of each file

  -b, --escape
        print C-style escapes for nongraphic characters

  --block-size=SIZE
        scale sizes by SIZE before printing them; e.g.,
        '--block-size=M' prints sizes in units of 1,048,576 bytes; see
        SIZE format below
```

Everything is a file

“Everything is a File” and Types of Files in Linux

Normal	-	Normal file
Directories	d	Normal directory
Hard link	-	additional name for existing file
Symbolic link	l	Shortcut to a file or directory
Socket	s	Pass data between 2 process
Named pipe	p	like sockets, user can't work directly with it
Character device	c	Processes character hw communication
Block device	b	Major and minor numbers for controlling dev

File System

/

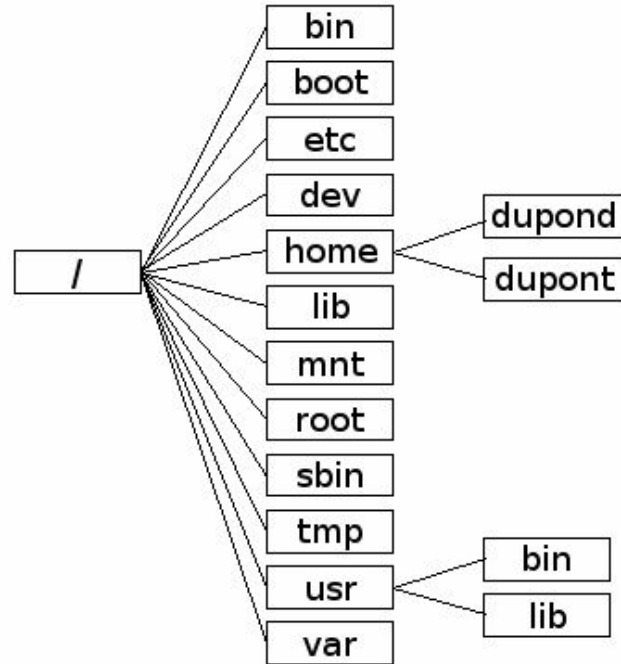
/home

/etc

/tmp

/mnt

/bin





TAB and Other shortcut

TAB

!!

./

cd ~

cd -

cd /



Files

pwd

cd, mkdir, rm

cat

cp

tree

Hand-on Time

ls

ls -la

ll

alias ll

man ls

ls -ltr

```
drwxrwxr-x   2 user user 4096 Jan  7 23:40 ./
drwxr-xr-x 112 user user 4096 Jan  7 23:40 ../
-rw-rw-r--   1 user user    0 Jan  7 23:40 1.txt
```



Files copy rename and delete

Hand-on Time

```
mkdir my_folder  
cd my_folder  
touch config.txt  
cat config.txt  
mv config.txt config.json  
cp config.json ~/  
rm config.json
```


Permission

Mode		Owner	Group	File Size	Last Modified	Filename
drwxrwxrwx	2	sammy	sammy	4096	Nov 10 12:15	everyone_directory
drwxrwx---	2	root	developers	4096	Nov 10 12:15	group_directory
-rw-rw----	1	sammy	sammy	15	Nov 10 17:07	group_modifiable
drwx-----	2	sammy	sammy	4096	Nov 10 12:15	private_directory
-rw-----	1	sammy	sammy	269	Nov 10 16:57	private_file
-rwxr-xr-x	1	sammy	sammy	46357	Nov 10 17:07	public_executable
-rw-rw-rw-	1	sammy	sammy	2697	Nov 10 17:06	public_file
drwxr-xr-x	2	sammy	sammy	4096	Nov 10 16:49	publicly_accessible_directory
-rw-r--r--	1	sammy	sammy	7718	Nov 10 16:58	publicly_readable_file
drwx-----	2	root	root	4096	Nov 10 17:05	root_private_directory

Linux Permission

```
# ls -l file
-rw-r--r-- 1 root root 0 Nov 19 23:49 file
```

Diagram illustrating the breakdown of the permissions `-rw-r--r--`:

- Owner (rw-)**: The first three characters (`rw-`) represent the permissions for the owner.
- Group (r- -)**: The next three characters (`r- -`) represent the permissions for the group.
- Other (r- -)**: The final three characters (`r- -`) represent the permissions for others.

Legend:

- `r` = Readable
- `w` = Writeable
- `x` = Executable
- `-` = Denied

File type: The first character (`-`) indicates the file type (regular file).

chown chmod commands

Change ownership

`chown [-R] user files`

`chgrp [-R] group files...`

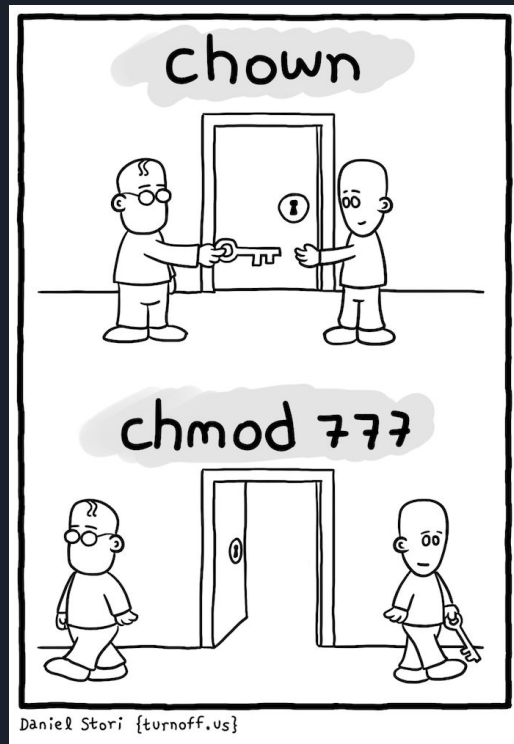
Change permission

`chmod [-R][perms files`

`chmod +x my_script.sh`

`chmod u+x my_script.sh`

`chmod -x my_script.sh`



Old style

	u g o								
	754								
access	r	w	x	r	w	x	r	w	x
binary	4	2	1	4	2	1	4	2	1
enabled	1	1	1	1	0	1	1	0	0
result	4	2	1	4	0	1	4	0	0
total	7			5			4		



user\$, root# and sudo - super user do

- /home
- /root

sudo

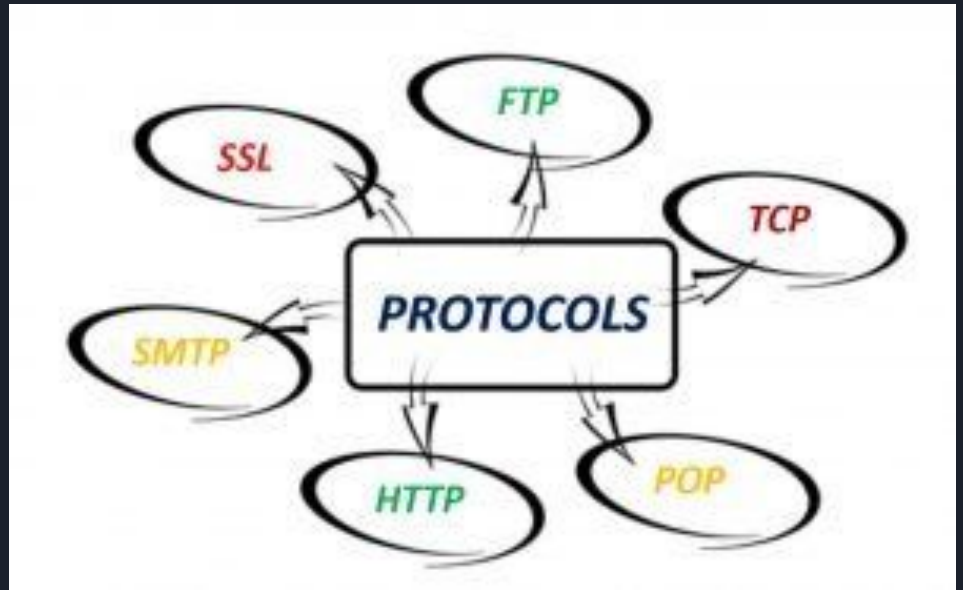
sudo is a command that lets you run other command as root temporarily



lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc no
net 192.168.1.10/24 scope host 10
valid_lft forever preferred_lft
inet6 ::1/128 scope host
valid_lft forever preferred_lft
enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500
link/ether 08:00:27:c6:43:bc
inet 192.168.1.10/24 brd 192.168.1.255 scope eth0
valid_lft forever preferred_lft
inet6 fe80::a00:27ff:fec6:43bc scope link
valid_lft forever preferred_lft



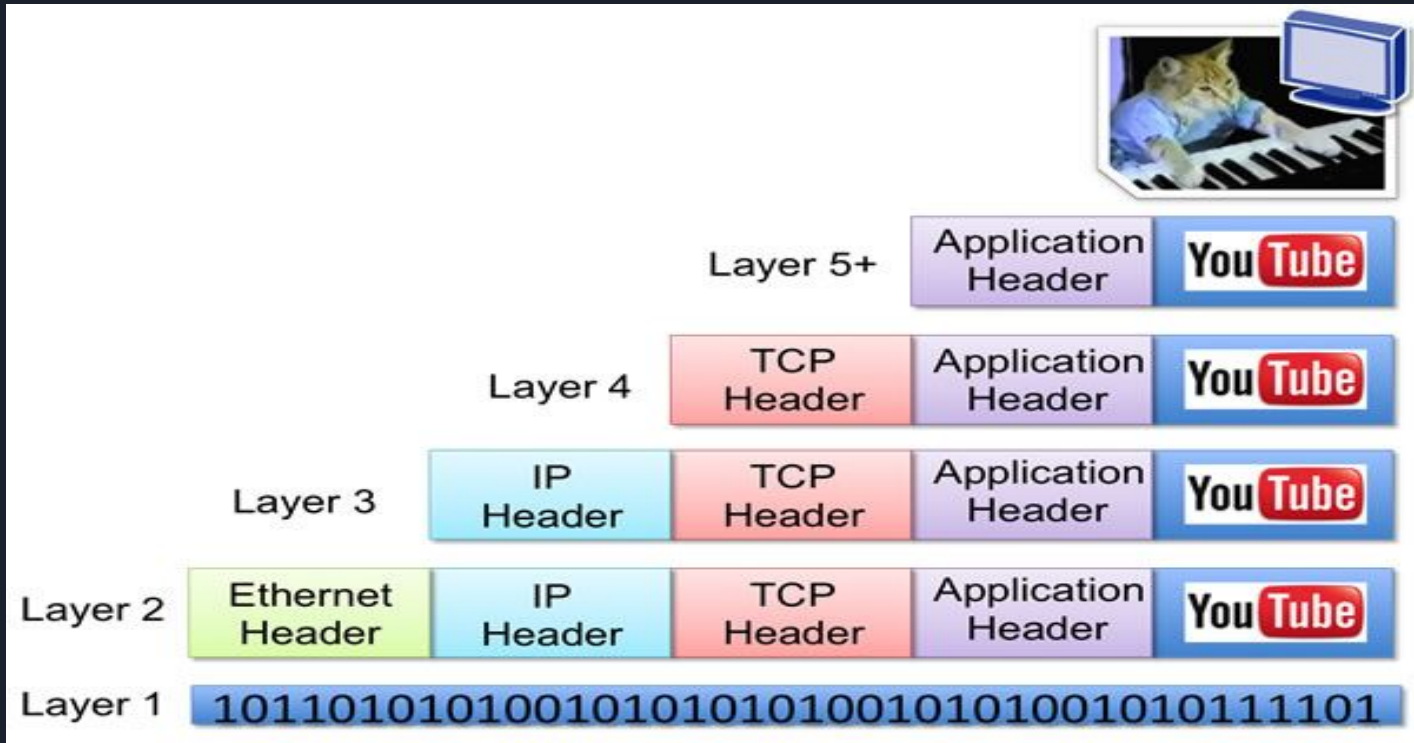
protocols



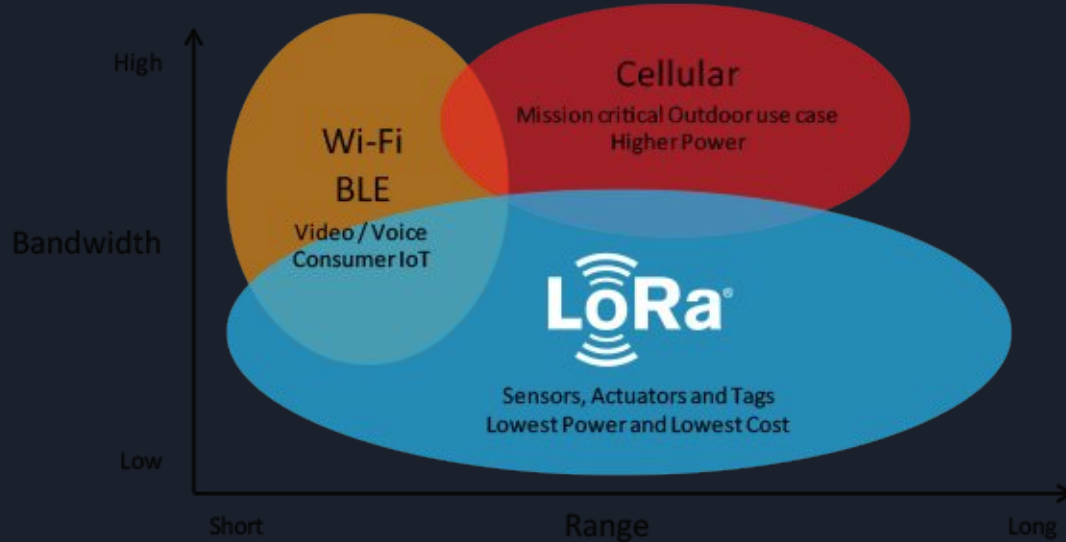
Network

TCP/IP model	Protocols and services	OSI model
Application	HTTP, FTTP, Telnet, NTP, DHCP, PING	Application
		Presentation
		Session
Transport	TCP, UDP	Transport
Network	IP, ARP, ICMP, IGMP	Network
Network Interface		Data Link
	Ethernet	Physical

Encapsulation



Physical layer



METHODS OF WIRELESS CONNECTIVITY

All the different ways to connect your wireless devices

LAN (SHORT RANGE-COMMUNICATING DEVICES)

Bluetooth
4.2



Wi-Fi

- Mobile
- In-home
- Short range

- Battery life
- Long range

zigbee

CELLULAR (LONG RANGE W/ POWER-TRADITIONAL M2M)

3G/4G



3G/4G

- Long range
- High data rate
- Coverage

- Battery life

LOW POWER WAN (LONG RANGE W/ BATTERY-IOT)

sigfox



LoRa

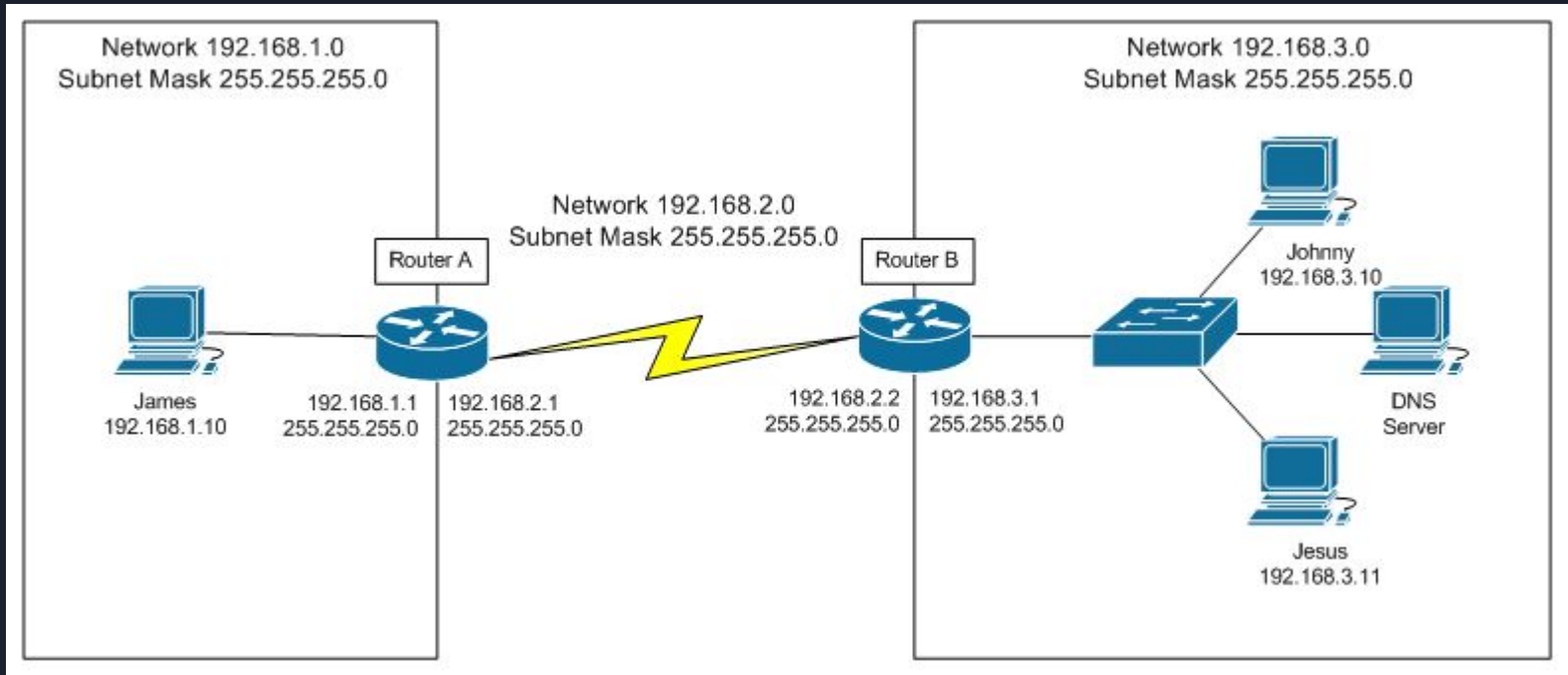
- Long range
- Long battery
- Low cost

- High data rate

nb-iot

FOR MORE INFO VISIT: WWW.SYMMETRYELECTRONICS.COM

IP Internet Protocol





IP Header

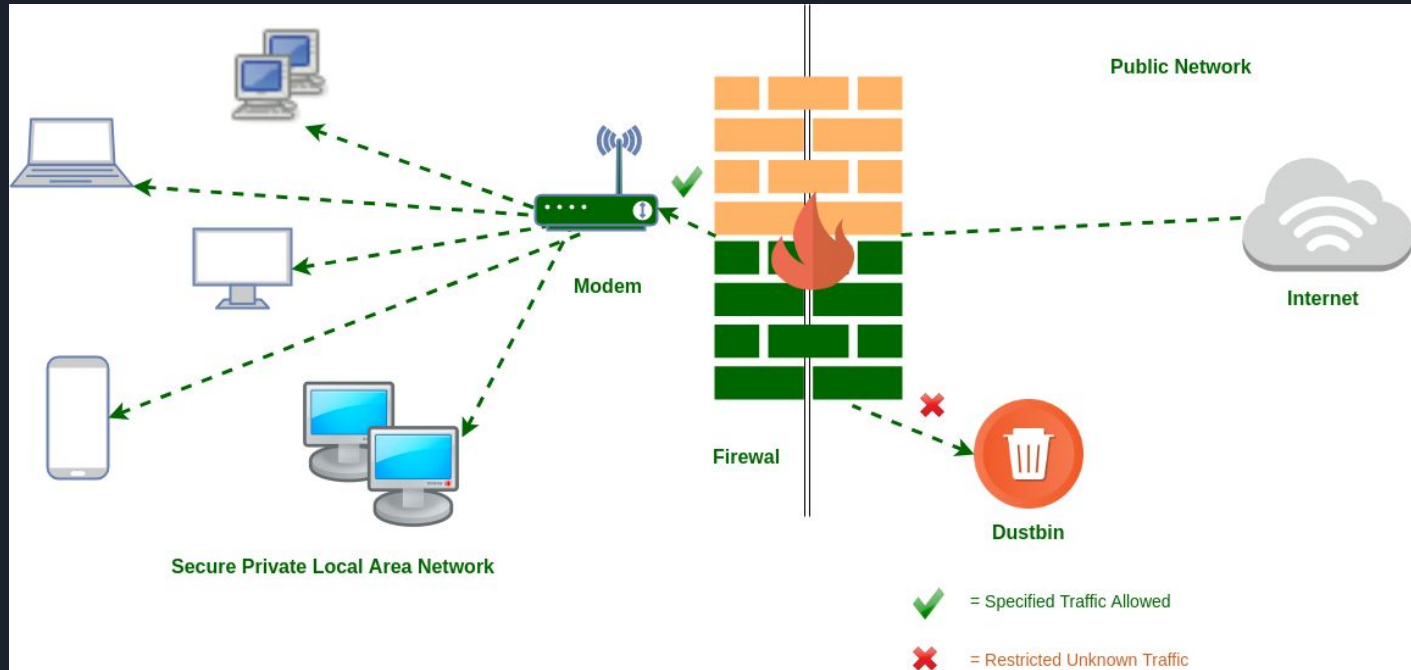
Version	IHL	Type of Service	Total Length	
Identification			Flags	Fragment Offset
Time to Live	Protocol		Header Checksum	
Source Address				
Destination Address				
Options				Padding

TCP/UDP

Services

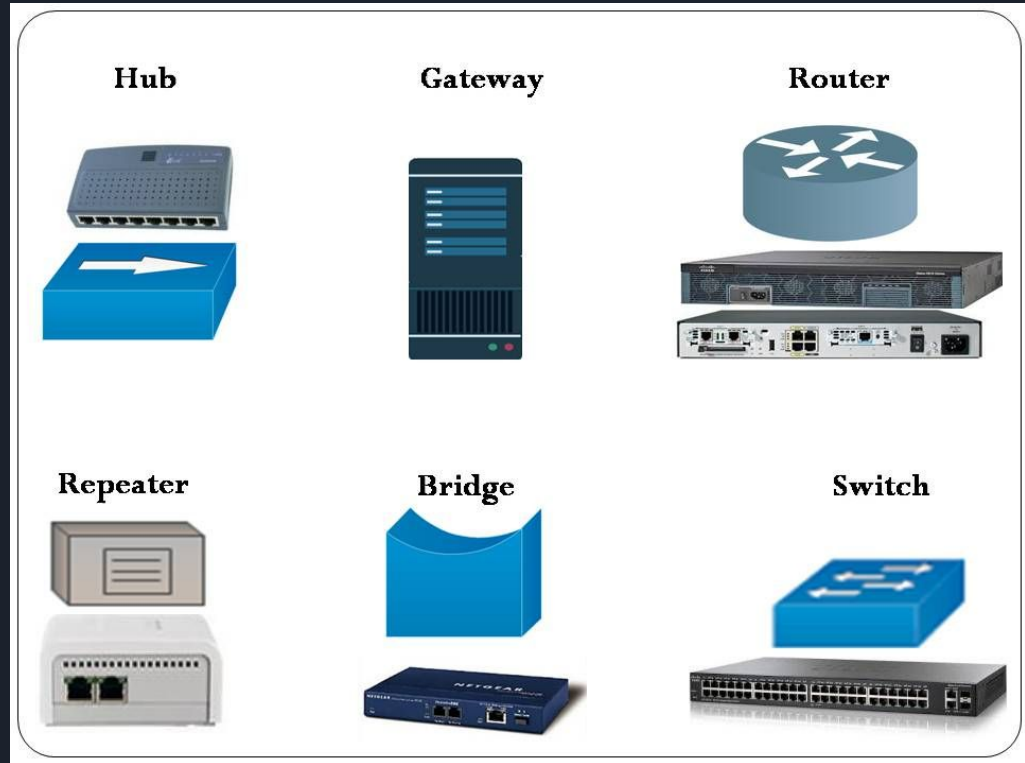


Firewall



Network hardware

- Switch
- Router
- Modem
- Repeater



Linux network command and configuration



ifconfig

```
rich@RichTurn01: ~  
rich@RichTurn01:~$ ifconfig  
eth1      Link encap:Ethernet  HWaddr 58:82:b8:92:11:ff  
          inet addr:10.202.84.67  Bcast:10.202.85.255  Mask:255.255.254.0  
          inet6 addr: 2201:4898:71:5:905e:aeb0:cb66:31b6/64 Scope:Global  
          inet6 addr: 2201:4898:71:5:f9b0:f60a:a0d5:d6fd/128 Scope:Global  
          inet6 addr: fe80::920e:aeb0:cb99:31b6/64 Scope:Global  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0  
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)  
  
lo        Link encap:Local Loopback  
          inet addr:127.0.0.1  Mask:255.0.0.0  
          inet6 addr: ::1/128 Scope:Global  
          UP LOOPBACK RUNNING  MTU:1500  Metric:1  
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0  
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)  
  
rich@RichTurn01:~$
```

ifconfig utility has been deprecated and completely removed in Ubuntu 18.04

sudo apt install net-tools



ARP

Address	HWtype	HWaddress	Flags Mask	Iface
192.168.2.1	ether	00:11:22:33:44:55	C	enp4s0
192.168.2.114	ether	00:27:19:b1:82:05	C	enp4s0
192.168.2.114	ether	00:27:19:b1:82:05	C	wlp3s0

Route

```
1. root@localhost:~ (ssh)
[root@localhost ~]# clear
[root@localhost ~]# route add default gw 192.168.1.1
[root@localhost ~]# route
Kernel IP routing table
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface
192.168.1.0      *                255.255.255.0    U        0      0        0 eth0
default          192.168.1.1     0.0.0.0          UG        0      0        0 eth0
[root@localhost ~]#
```

Netstat

```
user@dev:~$ sudo netstat -natp
[sudo] password for user:
Sorry, try again.
[sudo] password for user:
Active Internet connections (servers and established)

```

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	0.0.0.0:902	0.0.0.0:*	LISTEN	2664/vmware-authdla
tcp	0	0	127.0.0.1:8307	0.0.0.0:*	LISTEN	2687/vmware-hostd
tcp	0	0	127.0.0.53:53	0.0.0.0:*	LISTEN	813/systemd-resolve
tcp	0	0	0.0.0.0:22	0.0.0.0:*	LISTEN	1433/sshd
tcp	0	0	127.0.0.1:631	0.0.0.0:*	LISTEN	7182/cupsd
tcp	0	0	0.0.0.0:443	0.0.0.0:*	LISTEN	2687/vmware-hostd
tcp	0	0	0.0.0.0:1883	0.0.0.0:*	LISTEN	1203/mosquitto
tcp	0	0	0.0.0.0:17500	0.0.0.0:*	LISTEN	3098/dropbox
tcp	0	0	127.0.0.1:17600	0.0.0.0:*	LISTEN	3098/dropbox
tcp	0	0	127.0.0.1:17603	0.0.0.0:*	LISTEN	3098/dropbox
tcp	0	0	192.168.2.253:39816	216.58.204.225:443	TIME_WAIT	-
tcp	0	0	192.168.2.253:46280	172.217.20.65:443	TIME_WAIT	-

Linux network configuration



ip settings

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 30

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 1

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 8 . 8 . 8 . 8

Alternate DNS server: 8 . 8 . 4 . 4

☐ Validate settings upon exit

Advanced...

OK Cancel

```
root@server1: ~
GNU nano 2.5.3      File: /etc/network/interfaces

This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

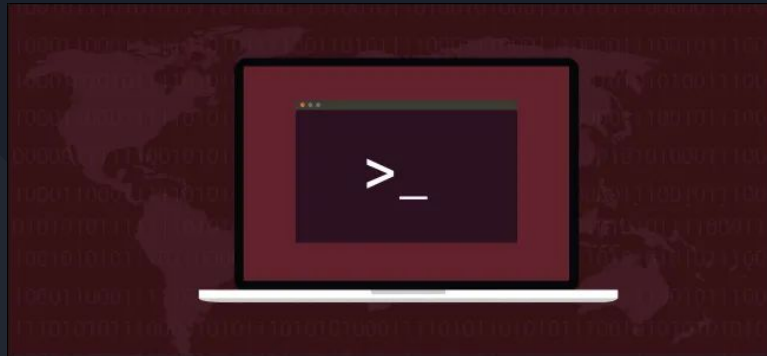
# The loopback network interface
auto lo
iface lo inet loopback

# test

# The primary network interface
auto ens33
iface ens33 inet static
    address 192.168.1.100
    netmask 255.255.255.0
    network 192.168.1.0
    broadcast 192.168.1.255
    gateway 192.168.1.1
    dns-nameservers 8.8.8.8 8.8.4.4

^G Get Help      ^O Write Out    ^W Where Is     ^K Cut Text     ^J Justify      ^C Cur Pos      ^Y Prev Page
^X Exit          ^R Read File    ^\ Replace      ^U Uncut Text   ^T To Spell     ^_ Go To Line    ^V Next Page
```

Linux Commands part II





History



Command shell

Common commands

Redirect

Pipeing



Install new application

GUI Way

Repository

apt

update

install

Remove



Text editor

GUI way

VIM

nano



Play at home

Virtual machine

Download and install ubuntu