Open Source Community

Network Fundamentals

Agenda;

what is the meaning of a network?

Types of networks

How the internet works

what is the meaning of ISP and why do we need it?

Mac address

IP address (v4&v6)

subnet mask

DNS & Network topologies

What is the meaning of network ?

Two or more computers that are connected with one another for the purpose of communicating data electronically.

Types of networks

Lan (local area network)
Wan (wide area network)
Man (Metropolitan area network)
Pan (Personal area network)

How the internet works & why do we need anISP?

MAC address(Media access control)

Physical address
Consists of 48 bit
Hexadecimal
00:0a:95:9d:68:16

IP (Internet protocol)

Ipv4

- Logical address
- decimal
- Consists of 32 bit
- It consists of 4 octets xxx.xxx.xxx.xxx
- example : 192.168.1.1

Ipv6

- Logical address
- Consists of 128 bit
- Hexadecimal
- example 684D:1111:0222:3333:4444:5555:6666:0077

Subnet Mask	Range	Classes
255.0.0.0	(First octet) 0-127	Class a
255.255.0.0	(First octet) 128-191	Class b
255.255.255.0	(First octet) 192-223	Class c
Not defined	(First octet) 224-239	Class d
Doesn't have	(First octet) 240-255	Class e

Private VS Public IPs

Private IP	Public IP
Used with LAN or Network	Used on Public Network
Not recognized over Internet	Recognized over Internet
Assigned by LAN administrator	Assigned by Service provider / IANA
Unique only in LAN	Unique Globally
Free of charge	Cost associated with using Public IP
Range – Class A -10.0.0.0 to 10.255.255.255 Class B – 172.16.0.0 to 172.31.255.255 Class C – 192.168.0.0 – 192.168.255.255	Range – Class A -1.0.0.0 to 9.255.255.255 11.0.0.0 – 126.255.255.255 Class B -128.0.0.0 to 172.15.255.255 172.32.0.0 to 191.255.255.255 Class C -192.0.0.0 – 192.167.255.255 192.169.0.0 to 223.255.255.255

Subnet Mask

Determine the reserved parts of the network and the parts that can be
used from the hosts within the network.
Binary
11111111.11111111.11111111.0
Decimal
255.255.255.0
192.168.1.5/24

OSI(Open Systems Interconnection) MODEL

Consists of 7 layers:

7.Application
6.Presentation
5.Session
4.Transport (TCP,UDP,Ports)
3.Network
2.Datalink
1.Physical

7 . Application Layer

6. Presentation

5. Session

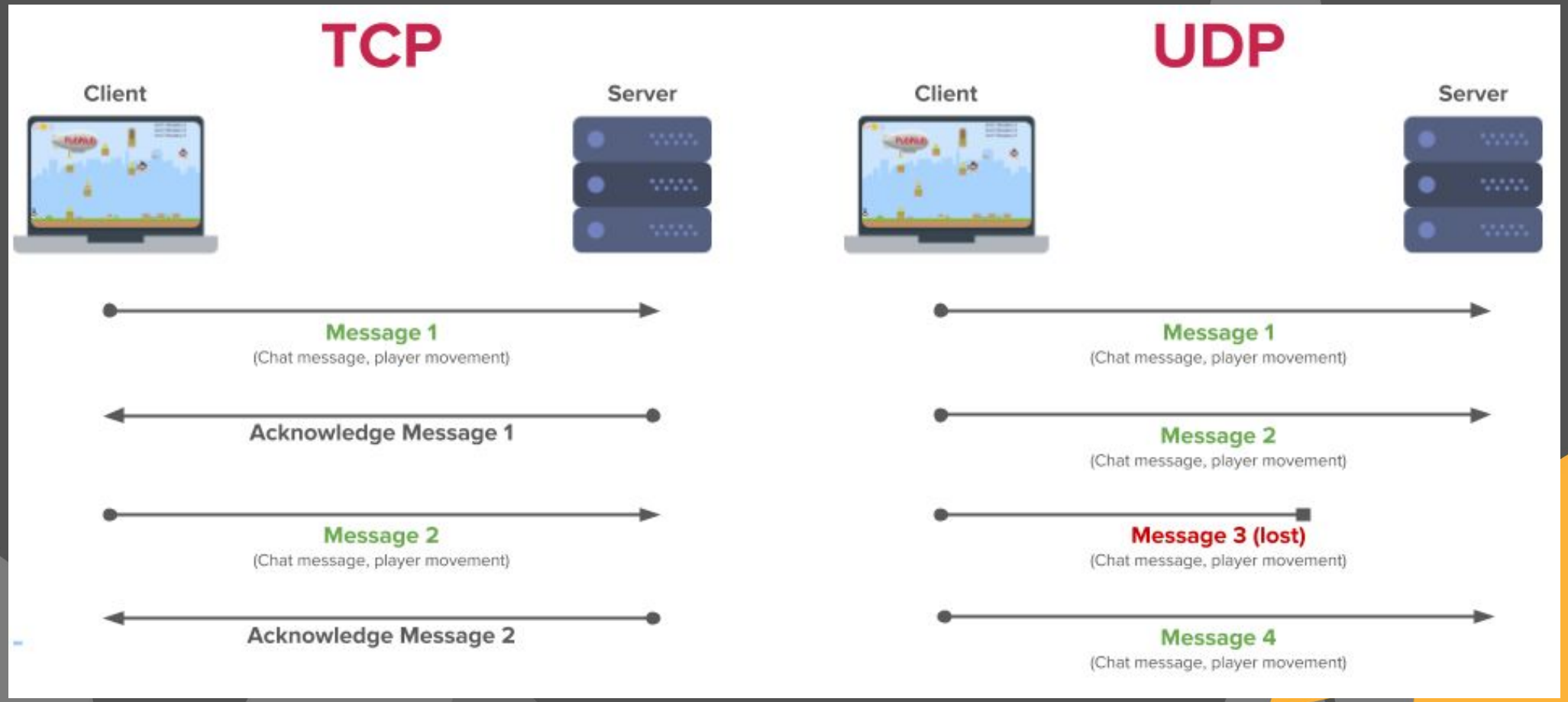
4. Transport (TCP,UDP,Ports)

3. Network

2. Data Link

1. **Physical**

TCP VS UDP


TCP
Client
Server
Message 1
(Chat message, player movement)
Acknowledge Message 1
Message 2
(Chat message, player movement)
Acknowledge Message 2
UDP
Client
Server
Message 1
(Chat message, player movement)
Message 2
(Chat message, player movement)
Message 3 (lost)
(Chat message, player movement)
Message 4
(Chat message, player movement)

Domain Name System - DNS

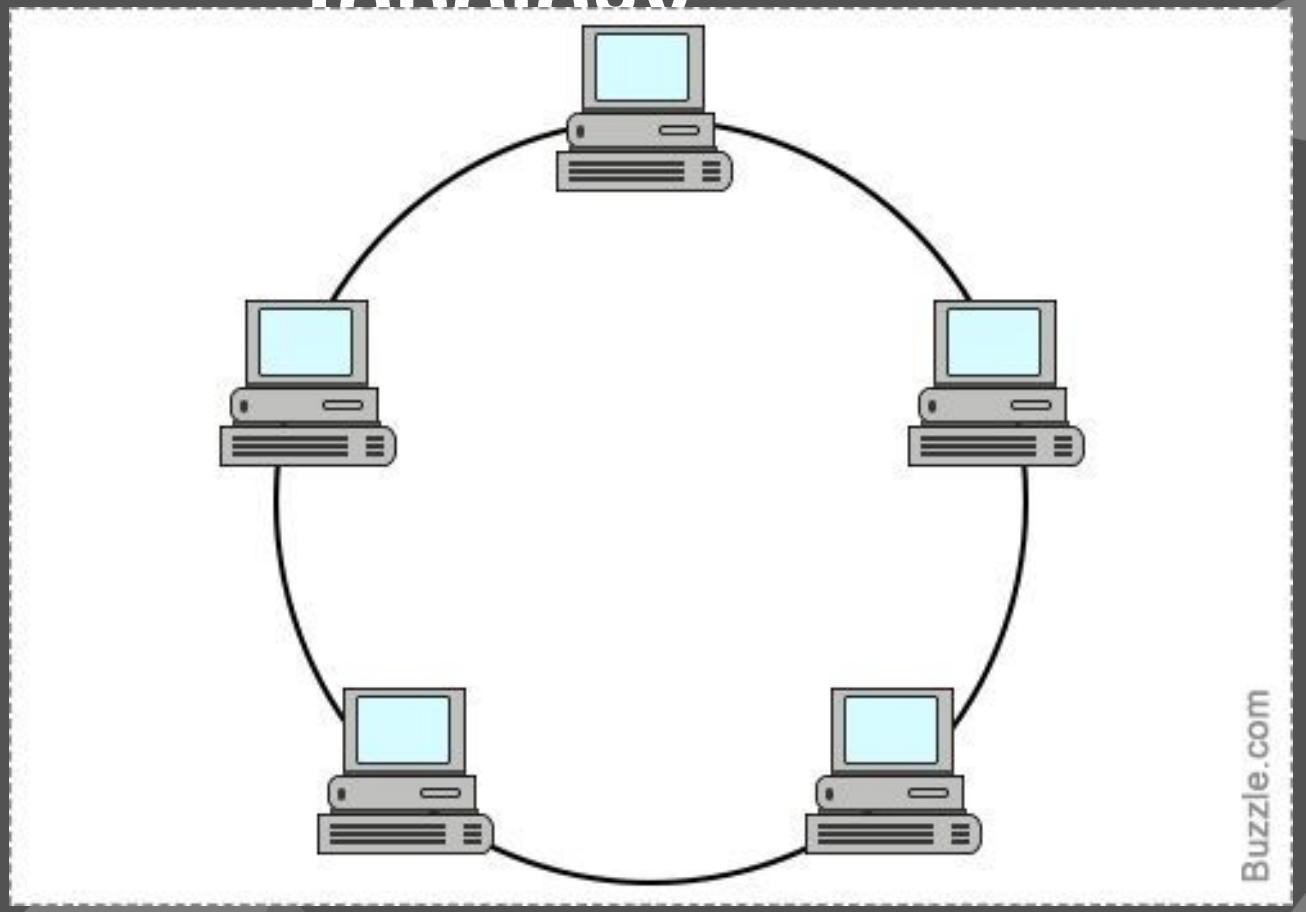
HTTP(HyperText Transfer Protocol)

SSH(Secure shell)

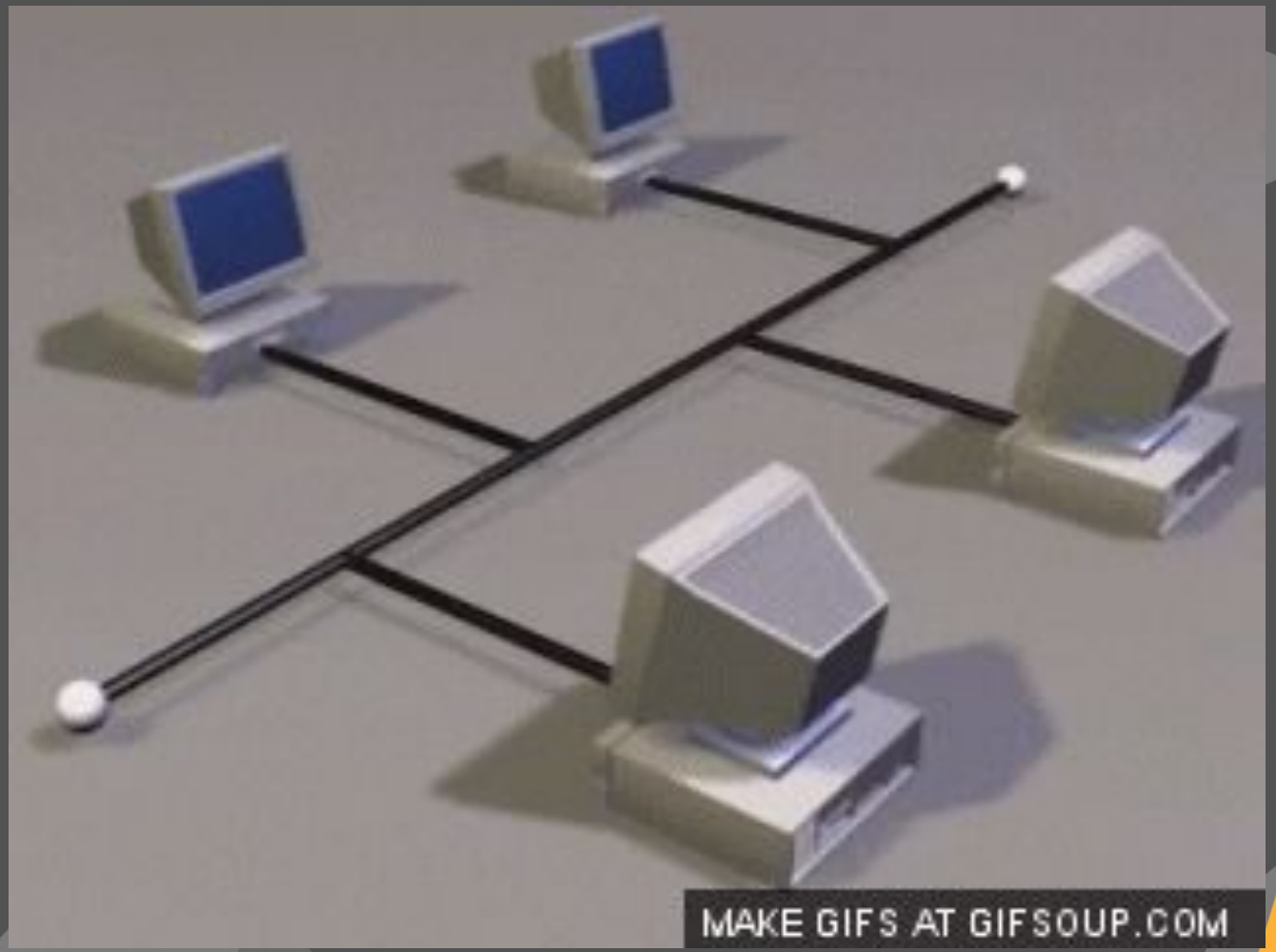
Network topologies

Network topology is how you arrange the devices in a network.
Think of the nodes or devices as cities and the topology is the road map!

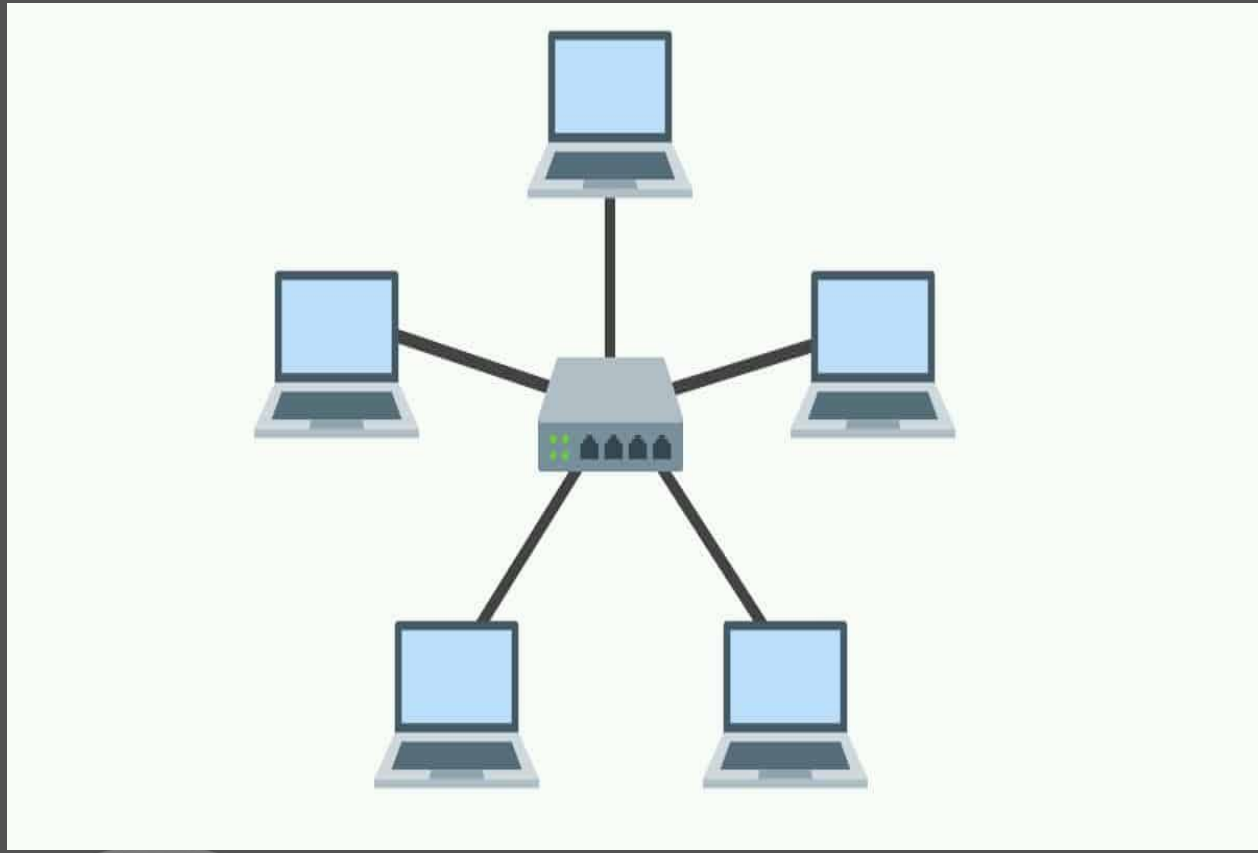
Ring Topology



Bus Topology



Star Topology



Star Topology

Advantages

1. better performance
2. easy to connect/disconnect new nodes
3. failure in one node doesn’t affect the rest of the network.

Dis-Advantages

1. too much dependence on the central device
2. the use of the central device increases the overall cost
3. performance and number of nodes depends on the central device.

Thank you

#Stay Safe#