

## ❖Networking Basics & Definitions

### □ Networking Basics (1–15)

**1. Q: What is computer networking?**

**A: Networking means connecting two or more computers to share data, files, or resources.**

**2. Q: What are the types of networks?**

**A: LAN (Local Area Network), MAN (Metropolitan Area Network), and WAN (Wide Area Network).**

**3. Q: What is IP address?**

**A: An IP address is a unique number that identifies a device on a network.**

**4. Q: What are the types of IP addresses?**

**A: IPv4 and IPv6.**

**5. Q: What is the difference between IPv4 and IPv6?**

**A: IPv4 uses 32 bits and IPv6 uses 128 bits, which allows more addresses.**

**6. Q: What is a private IP address?**

**A: It is used inside a private network (like your home or office LAN).**

**7. Q: What is a public IP address?**

**A: It is used to identify devices on the internet.**

**8. Q: What is a MAC address?**

**A: It's a unique hardware address given to every network device.**

**9. Q: What is a subnet?**

**A: A subnet divides a large network into smaller parts to improve performance and security.**

**10. Q: What is a gateway?**

**A: A gateway connects one network to another, usually to the internet.**

**11. Q: What is DNS?**

**A: DNS (Domain Name System) translates domain names (like google.com) into IP addresses.**

**12. Q: What is DHCP?**

**A: DHCP (Dynamic Host Configuration Protocol) automatically assigns IP addresses to devices.**

**13. Q: What is a router?**

**A: A router connects multiple networks and forwards data between them.**

**14. Q: What is a switch?**

**A: A switch connects multiple devices within the same network and helps them communicate.**

**15. Q: What is a hub?**

**A: A hub is a simple device that connects computers in a LAN but does not filter traffic.**

#### **□ Network Concepts (16–30)**

**16. Q: What is TCP/IP?**

**A: TCP/IP is a set of communication rules used to connect computers on the internet.**

**17. Q: What is the difference between TCP and UDP?**

**A: TCP is connection-based and reliable, UDP is faster but connectionless and less reliable.**

**18. Q: What is ping command used for?**

**A: It checks whether a system or server is reachable on the network.**

**19. Q: What is latency?**

**A: Latency is the time delay for data to travel from one point to another.**

**20. Q: What is bandwidth?**

**A: Bandwidth is the amount of data that can be transmitted per second.**

**21. Q: What is packet loss?**

**A: Packet loss happens when some data packets don't reach their destination.**

**22. Q: What is the OSI model?**

**A: OSI model is a framework of 7 layers that describe how data moves across a network.**

**23. Q: Name the 7 layers of OSI model.**

**A: Physical, Data Link, Network, Transport, Session, Presentation, Application.**

**24. Q: What is the difference between OSI and TCP/IP model?**

**A: OSI has 7 layers; TCP/IP has 4 layers (Network Access, Internet, Transport, Application).**

**25. Q: What is an IP class?**

**A: IP classes (A, B, C, D, E) define how many devices can exist in a network.**

**26. Q: What is a firewall?**

**A: A firewall controls incoming and outgoing network traffic based on security rules.**

**27. Q: What is NAT?**

**A: NAT (Network Address Translation) converts private IPs to public IPs for internet access.**

**28. Q: What is a proxy server?**

**A: It acts as an intermediary between user and internet to increase security and speed.**

**29. Q: What is VPN?**

**A: VPN (Virtual Private Network) provides secure remote access over the internet.**

**30. Q: What is port number?**

**A: A port number identifies a specific service or process on a device (e.g., port 80 for HTTP).**

## **🍀 ☐ Networking in Cloud & AWS (31–40)**

**31. Q: What is a VPC in AWS?**

**A: A VPC (Virtual Private Cloud) is your private network in AWS where you can launch resources.**

**32. Q: What is a subnet in AWS?**

**A: A subnet is a smaller network inside a VPC used to organize and control resources.**

**33. Q: What is the difference between public and private subnet?**

**A: Public subnet has internet access; private subnet does not.**

**34. Q: What is an Internet Gateway in AWS?**

**A: It connects your VPC to the internet.**

**35. Q: What is a NAT Gateway?**

**A: It allows instances in a private subnet to access the internet securely.**

**36. Q: What is a route table in AWS?**

**A: It defines how traffic is directed within the VPC.**

**37. Q: What is a Security Group in AWS?**

**A: It controls inbound and outbound traffic to EC2 instances.**

**38. Q: What is a Network ACL in AWS?**

**A: It controls traffic at the subnet level (like a firewall).**

**39. Q: What is an Elastic IP in AWS?**

**A: A static public IP address that you can attach to an instance.**

**40. Q: What is a Load Balancer in AWS?**

**A: It distributes traffic across multiple servers to ensure high availability.**

#### **□ Network Commands & Troubleshooting (41–50)**

**41. Q: What does the ifconfig or ip addr command do?**

**A: It displays or configures network interface details.**

**42. Q: What does the ping command do?**

**A: It checks the connectivity between two systems.**

**43. Q: What is traceroute used for?**

**A: It shows the path data takes from your computer to a destination.**

**44. Q: What does netstat command show?**

**A: It shows active network connections and ports.**

**45. Q: What is the use of nslookup command?**

**A: It checks DNS records for a domain name.**

**46. Q: What does dig command do?**

**A: It provides detailed DNS information for troubleshooting.**

**47. Q: What is ARP?**

**A: ARP (Address Resolution Protocol) maps IP addresses to MAC addresses.**

**48. Q: How do you check open ports in Linux?**

**A: Using netstat -tuln or ss -tuln.**

**49. Q: How do you check the default gateway in Linux?**

**A: Using ip route show or route -n.**

**50. Q: What will you do if your instance is not reachable?**

**A: Check security group, network ACLs, route table, and instance status.**

**Q: What is difference between unicast, broadcast, and multicast?**

**A: “Unicast = one to one. Broadcast = one to all. Multicast = one to many.”**

**Q: What is port number?**

**A: “Port number identifies specific service (example: 80 for HTTP, 22 for SSH).”**

**Q: Why is networking important in AWS & DevOps?**

**A: “Because cloud services, servers, and applications all communicate through networks. Without networking, nothing works.”**

**Q: What is IPv4?**

**A: “IPv4 is Internet Protocol version 4. It uses 32-bit addresses (like 192.168.1.1).”**

**Q: What is IPv6?**

**A: “IPv6 is Internet Protocol version 6. It uses 128-bit addresses (like 2001:db8::1).”**

## **NETWORKING CLASSES AND RANGE**

### **□ IP Addressing – Basics**

**Q: What does “IP” stand for?**

**A: Internet Protocol.**

**Q: How many bits are in an IPv4 address?**

**A: 32 bits.**

**Q: How many bits are in an IPv6 address?**

**A: 128 bits.**

**Q: How many octets are there in an IPv4 address?**

**A: 4 octets (each has 8 bits).**

**Q: What is the total number of possible IPv4 addresses?**

**A: 4,294,967,296 ( $2^{32}$ ).**

**Q: What is the default subnet mask for Class A?**

**A: 255.0.0.0 or /8.**

**Q: What is the default subnet mask for Class B?**

**A: 255.255.0.0 or /16.**

**Q: What is the default subnet mask for Class C?**

**A: 255.255.255.0 or /24.**

**Q: Which IP class is most commonly used in home and office networks?**

**A: Class C.**

**Q: Which IP class supports the largest number of hosts?**

**A: Class A.**

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## **IP Classes and Ranges**

**Q: How many classes are there in IPv4?**

**A: Five — Class A, B, C, D, and E.**

**Q: What is the range of Class A?**

**A: 1.0.0.0 to 126.255.255.255**

**Q: What is the range of Class B?**

**A: 128.0.0.0 to 191.255.255.255**

**Q: What is the range of Class C?**

**A: 192.0.0.0 to 223.255.255.255**

**Q: What are Class D and E used for?**

**A: D is for multicast, E is for research and experiments.**

**Q: What is a private IP address?**

**A: Used inside networks (not on the internet) — e.g., 10.x.x.x or 192.168.x.x.**

**Q: What is a public IP address?**

**A: It's used to communicate on the internet and is globally unique.**

**Q: What is the private IP range for Class A?**

**A: 10.0.0.0 to 10.255.255.255**

**Q: What is the private IP range for Class B?**

**A: 172.16.0.0 to 172.31.255.255**

**Q: What is the private IP range for Class C?**

**A: 192.168.0.0 to 192.168.255.255**

## **□ Private vs Public IP**

**Q: What is a public IP?**

**A: It's an IP that can be accessed from the internet.**

**Q: What is a private IP?**

**A: It's used only inside a local network and not reachable from the internet.**

**Q: Can two devices have the same private IP in different networks?**

**A: Yes, because private IPs are reused in separate local networks.**

**Q: Can two devices have the same public IP?**

**A: No, public IPs are unique globally.**



**Q: In AWS, which IP is used by EC2 instances inside a VPC?**

**A: Private IP.**

**Q: In AWS, when does an EC2 instance get a public IP?**

**A: When it's launched in a public subnet or manually assigned.**

**Q: What is the private IP range used by AWS default VPC?**

**A: 172.31.0.0/16.**

**Q: What is NAT used for?**

**A: To convert private IPs into public IPs for internet access.**

**Q: What does the "Elastic IP" in AWS represent?**

**A: A static public IP that you can attach to instances.**

**Q: Why do companies use private IPs?**

**A: To secure internal networks and save public IP usage.**

## **□ Subnetting Concepts**

**Q: What is a subnet mask used for?**

**A: It separates the network and host parts of an IP address.**

**Q: What does /24 mean in CIDR notation?**

**A: The first 24 bits are for the network; last 8 bits for hosts.**

**Q: How many usable IPs are in a /24 subnet?**

**A: 254 usable IPs (256 total - 2 reserved).**

**Q: How many usable IPs are in a /16 subnet?**

**A: 65,534 usable IPs.**

**Q: How many usable IPs are in a /20 subnet?**

**A: 4,094 usable IPs.**

**Q: Which two IP addresses in a subnet cannot be assigned to hosts?**

**A: Network address and broadcast address.**

**Q: What is the network address?**

**A: The first IP in a subnet (represents the subnet itself).**

**Q: What is the broadcast address?**

**A: The last IP in a subnet (used to send messages to all hosts).**

**Q: What is CIDR?**

**A: Classless Inter-Domain Routing — it allows flexible subnetting using “/” notation.**

**Q: Why was CIDR introduced?**

**A: To avoid waste of IPs caused by fixed class-based addressing.**

**□ Subnet Examples (AWS Related)**

**Q: If VPC CIDR is 10.0.0.0/16, how many IPs does it have?**

**A: 65,536 total IPs.**

**Q: If a subnet CIDR is 10.0.1.0/24, what is its range?**

**A: 10.0.1.0 – 10.0.1.255.**

**Q: In AWS, how many IPs are reserved in each subnet?**

**A: 5 IPs (by AWS).**

**Q: Why does AWS reserve 5 IPs in every subnet?**

**A: For network management (like router, DNS, and broadcast functions).**

**Q: What is a typical CIDR block used for a public subnet in AWS?**

**A: Example: 10.0.1.0/24.**

**Q: What is a typical CIDR block used for a private subnet in AWS?**

**A: Example: 10.0.2.0/24.**

**Q: Can two VPCs have the same CIDR block?**

**A: Yes, but they cannot be peered together if CIDRs overlap.**

**Q: What happens if two networks have overlapping CIDR ranges?**

**A: Routing conflicts occur; they can't communicate directly.**

**Q: How do you choose a CIDR block for a VPC?**

**A: Based on expected subnets and number of instances — e.g., 10.0.0.0/16 for medium VPCs.**

**Q: What is the benefit of subnetting in AWS?**

**A: Better traffic control, security (public/private separation), and scalability.**

## **IP Address Classes and Ranges (IPv4)**

### **□ Class A**

**Range: 1.0.0.0 to 126.255.255.255**

**Default subnet mask: 255.0.0.0 ( /8 )**

**Use: Very large networks**

**□ Example: 10.0.0.1**

### **□ Class B**

**Range: 128.0.0.0 to 191.255.255.255**

**Default subnet mask: 255.255.0.0 ( /16 )**

**Use: Medium-sized networks**

**□ Example: 172.16.0.1**

### **□ Class C**

**Range: 192.0.0.0 to 223.255.255.255**

**Default subnet mask: 255.255.255.0 ( /24 )**

**Use: Small networks (most common for LANs)**

**□ Example: 192.168.1.1**

### **□ Class D (Multicast)**

**Range: 224.0.0.0 to 239.255.255.255**

**Use: Multicast communication (one-to-many).**

**Not used for normal IP hosts.**

## □ Class E (Reserved)

**Range: 240.0.0.0 to 255.255.255.255**

**Use: Experimental, research only (not for normal use).**

## □ Private IP Address Ranges

**These are not routable on internet. Used inside LAN, AWS VPC, etc.**

**Class A private range: 10.0.0.0 – 10.255.255.255**

**Class B private range: 172.16.0.0 – 172.31.255.255**

**Class C private range: 192.168.0.0 – 192.168.255.255**

□ **Example: In AWS VPC, by default you often see 10.x.x.x or 172.31.x.x**

## □ Quick Trick to Remember

**A = 1–126 (Big networks)**

**B = 128–191 (Medium networks)**

**C = 192–223 (Small networks)**

**D = 224–239 (Multicast)**

**E = 240–255 (Reserved)**

## □ Most Important Protocols & Ports (Fresher Must-Know)

Protocol / Service	Port No.	Why It's Important (Fresher Level)
SSH	22	to connect securely to Linux servers (AWS EC2).
HTTP	80	for all website traffic.
HTTPS	443	for secure website traffic (SSL/TLS).
DNS	53	for domain name resolution (AWS Route53).
DHCP	68 (UDP)	Automatically gives IP addresses to devices.
TFTP	69	File transfer (basic knowledge).
SMTP	25	for sending emails.
IMAP / POP3	143 / 110	for receiving emails (IMAP keeps copy, POP downloads).
Windows Services		for remote Desktop (Windows servers).

Tool / Service / No.	Why It's Important (Fresher Level)
MySQL DB	Database (AWS RDS for MySQL).
PostgreSQL DB	Database (AWS RDS for PostgreSQL).
Jenkins	CI/CD pipelines (DevOps tool).
Prometheus	Monitoring metrics.
Datadog	Monitoring boards and monitoring.