Networking fundamentals question and Answers for DevOps Interview

What is a network?

- **Answer:** A network is a collection of interconnected devices, such as computers, servers, and other hardware, that communicate with each other to share resources and data.

What is an IP address?

- **Answer:** An IP address (Internet Protocol address) is a unique identifier assigned to each device connected to a network. It enables devices to locate and communicate with each other.

What is the difference between IPv4 and IPv6?

- **Answer:** IPv4 uses a 32-bit address format, allowing for approximately 4.3 billion unique addresses. IPv6 uses a 128-bit address format, allowing for a vastly larger number of unique addresses.

What is a subnet mask?

- **Answer:** A subnet mask is used in IP addressing to divide an IP address into network and host portions. It helps in defining the range of IP addresses within a particular network.

What is a MAC address?

- **Answer:** A MAC (Media Access Control) address is a unique identifier assigned to a network interface card (NIC) for communications at the data link layer of a network segment.

What is DNS?

- **Answer:** DNS (Domain Name System) translates human-readable domain names (like www.example.com) into IP addresses that computers use to identify each other on the network.

What is DHCP?

- **Answer:** DHCP (Dynamic Host Configuration Protocol) is a network management protocol used to dynamically assign IP addresses and other network configuration parameters to devices on a network.

What is a VLAN?

- **Answer:** A VLAN (Virtual Local Area Network) is a subnetwork that can group together a collection of devices from different physical LANs. VLANs improve network efficiency and security.

What is a router?

- **Answer:** A router is a networking device that forwards data packets between computer networks. It routes traffic from one network to another, usually connecting different IP networks.

What is a switch?

- **Answer:** A switch is a networking device that connects devices within a single network (such as a LAN) and uses MAC addresses to forward data to the correct destination.

What is the OSI model?

- **Answer:** The OSI (Open Systems Interconnection) model is a conceptual framework used to understand and implement network protocols in seven layers: Physical, Data Link, Network, Transport, Session, Presentation, and Application.

What is the difference between TCP and UDP?

- **Answer:** TCP (Transmission Control Protocol) is connection-oriented, providing reliable, ordered, and error-checked delivery of data. UDP (User Datagram Protocol) is connectionless, providing faster but less reliable communication.

What is NAT?

- **Answer:** NAT (Network Address Translation) is a method used by routers to translate private IP addresses within a local network to a public IP address for internet communication.

What is a firewall?

- **Answer:** A firewall is a network security device that monitors and controls incoming and outgoing network traffic based on predetermined security rules.

What is a VPN?

- **Answer:** A VPN (Virtual Private Network) extends a private network across a public network, allowing users to send and receive data securely as if their devices were directly connected to the private network.

What is ICMP?

- **Answer:** ICMP (Internet Control Message Protocol) is used for network diagnostics and error-reporting. It is commonly used by tools like ping and traceroute.

What is ARP?

- **Answer:** ARP (Address Resolution Protocol) is used to map IP addresses to MAC addresses, allowing communication within a local network.

What is a default gateway?

- **Answer:** A default gateway is a device, usually a router, that serves as an access point to other networks, typically the internet, for devices on a local network.

What is a DNS forwarder?

- **Answer:** A DNS forwarder is a DNS server that forwards DNS queries to an external DNS server when it cannot resolve them locally.

What is a load balancer?

- **Answer:** A load balancer distributes incoming network traffic across multiple servers to ensure no single server becomes overwhelmed, improving availability and reliability.

What is the difference between unicast, multicast, and broadcast?

- **Answer:** Unicast is one-to-one communication, multicast is one-to-many communication to a group of devices, and broadcast is one-to-all communication to all devices on a network.

What is a proxy server?

- **Answer:** A proxy server acts as an intermediary between a client and a server, providing caching, filtering, and security functions.

What is the role of a DNS resolver?

- **Answer:** A DNS resolver translates domain names into IP addresses by querying a DNS server. It is typically provided by an ISP or a public DNS service.

What is a packet?

- **Answer:** A packet is a unit of data transmitted over a network. It contains control information, such as source and destination addresses, and the actual data being transmitted.

What is the TTL field in an IP packet?

- **Answer:** TTL (Time to Live) is a field in an IP packet that specifies the maximum number of hops the packet can take before being discarded. It prevents packets from circulating indefinitely.

What is port forwarding?

- **Answer:** Port forwarding is a network technique that allows external devices to access services on a private network by redirecting traffic from a specific port on a router to a designated port on a device within the network.

What is a socket?

- **Answer:** A socket is an endpoint for communication between two devices on a network. It consists of an IP address and a port number.

What is a collision domain?

- **Answer:** A collision domain is a network segment where data packets can collide with each other when being sent on a shared medium, reducing network efficiency.

What is a broadcast domain?

- **Answer:** A broadcast domain is a network segment where a broadcast frame is forwarded to all devices, but not beyond the segment's boundaries.

What is network latency?

- **Answer:** Network latency is the time it takes for a data packet to travel from its source to its destination. It is often measured in milliseconds.

What is a CDN?

- **Answer:** A CDN (Content Delivery Network) is a network of distributed servers that deliver web content and media to users based on their geographic location, improving access speed and reliability.

What is QoS?

- **Answer:** QoS (Quality of Service) is a set of techniques to manage network resources and ensure the performance of critical applications by prioritizing certain types of traffic.

What is a hop in networking?

- **Answer:** A hop is a step or segment of the journey a data packet takes from its source to its destination. Each router a packet passes through counts as a hop.

What is MTU?

- **Answer:** MTU (Maximum Transmission Unit) is the largest size of a data packet that can be transmitted over a network. It includes headers and payload.

What is a BGP?

- **Answer:** BGP (Border Gateway Protocol) is a standardized exterior gateway protocol used to exchange routing information between autonomous systems on the internet.

What is a mesh network?

- **Answer:** A mesh network is a network topology where each node connects to multiple other nodes, providing multiple pathways for data to travel, increasing reliability and fault tolerance.

What is SNMP?

- **Answer:** SNMP (Simple Network Management Protocol) is used for collecting and organizing information about managed devices on IP networks and for modifying that information to change device behavior.

What is a DMZ?

- **Answer:** A DMZ (Demilitarized Zone) is a physical or logical subnet that separates an internal network from untrusted external networks, typically the internet, providing an additional layer of security.

What is the difference between a hub and a switch?

- **Answer:** A hub broadcasts data to all devices on a network segment, whereas a switch forwards data only to the device with the specific MAC address.

What is a network topology?

- **Answer:** Network topology refers to the arrangement of different elements (links, nodes, etc.) in a computer network. Common topologies include star, ring, mesh, and bus.

What is the function of the transport layer in the OSI model?

- **Answer:** The transport layer is responsible for end-to-end communication, error recovery, and flow control. It ensures complete data transfer with protocols like TCP and UDP.

What is a ping?

- **Answer:** Ping is a network utility used to test the reachability of a host on an IP network and to measure the round-trip time for messages sent from the source to the destination.

What is a traceroute?

- **Answer:** Traceroute is a network diagnostic tool used to track the path that data takes from one computer to another, identifying each hop along the way.

What is an IPsec?

- **Answer:** IPsec (Internet Protocol Security) is a suite of protocols used to secure IP communications by authenticating and encrypting each IP packet in a communication session.

What is the difference between static and dynamic IP addresses?

- **Answer:** Static IP addresses are manually assigned to a device and remain constant, while dynamic IP addresses are automatically assigned by a DHCP server and can change over time.

What is network redundancy?

- **Answer:** Network redundancy is the practice of providing multiple pathways for data to travel in a network, ensuring that a single point of failure does not disrupt communication.

What is network segmentation?

- **Answer:** Network segmentation involves dividing a network into smaller segments or subnets to improve performance, security, and manageability.

What is PoE?

- **Answer:** PoE (Power over Ethernet) allows network cables to carry electrical power to devices like IP cameras, VoIP phones, and wireless access points, reducing the need for additional power sources.

What is the role of a network administrator?

- **Answer:** A network administrator is responsible for the day-to-day operation, maintenance, and troubleshooting of a network, ensuring its performance, reliability, and security.

What is a network protocol?

- **Answer:** A network protocol is a set of rules and conventions that define how data is transmitted and received over a network, ensuring proper communication between devices.