1. TCP and UDP are two types of transport layer protocols that are used to transmit data across a network. TCP establishes a reliable connection before sending any data and uses error-checking and retransmission mechanisms to ensure accurate delivery. On the other hand, UDP does not establish a connection before sending data and does not have error-checking mechanisms, making it faster but less reliable.
2. A hub is a device that connects multiple devices on a network and acts as a central point for data transmission. A switch is an advanced version of a hub, which uses MAC addresses to forward data to specific devices, instead of broadcasting data to all connected devices. A router is a device that connects multiple networks together and directs traffic between them.
3. A layer 3 switch is a switch that can perform routing functions in addition to its switching capabilities. It uses IP addresses to forward data instead of just MAC addresses.
4. IPv4 and IPv6 are two versions of the Internet Protocol. IPv4 is the most widely used version, while IPv6 is being adopted to address the shortage of IP addresses in IPv4. IPv6 addresses are 128 bits long and represented in hexadecimal, while IPv4 addresses are 32 bits long and represented in decimal.
5. In IPv4, a subnet mask is used to separate the network and host portions of an IP address. It is a 32-bit number that, when combined with an IP address, can be used to divide a network into smaller subnetworks.
6. In IPv4 addressing, a prefix is the number of bits in the subnet mask that are set to 1. For example, a prefix of /24 represents a subnet mask of 255.255.255.0, which is often used for small networks. A prefix of /16 represents a subnet mask of 255.255.0.0, which is often used for larger networks.
7. The default gateway is the IP address of a device on a network that serves as an entry point to other networks. DNS translates domain names to IP addresses, while DHCP is used to automatically assign IP addresses to devices on a network.
8. A MAC address is a unique identifier assigned to a network device and is used to identify the device at the data link layer of a network. A port address is a unique identifier assigned to a specific process or service running on a device and is used to identify the process or service at the transport layer of a network.
9. LANs are networks that connect devices in a small geographical area, such as a home or office. WANs are networks that connect devices in a larger geographical area, such as a city or country.
10. Some typical LAN topologies are bus, star, ring, and mesh.
11. A loopback address is a special IP address (127.0.0.1) that refers to the local host. It is used for testing network connectivity and communication between the host and its own network stack.
12. ICMP is used to send error messages and operational information indicating success or failure when communicating over an IP network. ARP is a network protocol used to map a network address, such as an IP address, to a physical (MAC) address on a local network. ARP is used to determine the MAC address of a device on the same network segment as the device sending the ARP request, this allows a device to communicate with other devices on the network using their MAC address instead of their IP address. It is mainly used for resolving network addresses to physical addresses on a local network segment.