Networking

11 December 2024 18:02

1. What is networking?
   - **Networking** is the practice of connecting multiple computers, devices, and systems to share resources such as data, files, applications, and internet connections. This allows for communication between devices and is crucial for information exchange in both personal and business environments.

2. What is connation?
   - **Connection** in networking refers to the establishment of a communication link between two or more devices, allowing them to exchange data. This can be a physical connection (e.g., through cables) or a wireless connection (e.g., Wi-Fi, Bluetooth).

3. Type of networking ?
   - **LAN (Local Area Network)**: A network that connects devices within a small geographic area like a home, office, or building.
   - **WAN (Wide Area Network)**: A network that covers a large geographic area, such as a city, country, or even global connections, connecting multiple LANs.
   - **MAN (Metropolitan Area Network)**: A network that spans a city or a large campus.
   - **PAN (Personal Area Network)**: A small network, typically within a range of a few meters, connecting personal devices like smartphones, laptops, and tablets.
   - **VPN (Virtual Private Network)**: A secure, encrypted connection over the internet that allows users to access resources on a private network remotely.

4. Types of server? **With port numbers**
   - **Web Server**: Hosts websites and delivers web pages to users via HTTP.
   - **File Server**: Stores and manages files and data, allowing users to access and share files across a network.
   - **Database Server**: Hosts a database and provides access to users or applications that query the database.
   - **Mail Server**: Manages email services, sending and receiving emails for users.
   - **DNS Server**: Resolves domain names to IP addresses, allowing users to access websites by name instead of IP address.
   - **Proxy Server**: Acts as an intermediary between a client and another server, often used for security or performance reasons.

5. What is micro servers
   - **Microservers** are small, low-power servers that are designed for simple tasks such as web hosting, file sharing, or running small-scale applications. They are typically energy-efficient, cost-effective, and used in environments where space and power consumption are limited.

6. What is IP address

   An **IP address (Internet Protocol address)** is a unique identifier assigned to devices connected to a network. It allows devices to locate and communicate with each other over the internet or local networks. There are two types:
   - **IPv4**: A 32-bit address, written as four octets (e.g., 192.168.1.1).
   - **IPv6**: A 128-bit address designed to replace IPv4, written in hexadecimal format (e.g., 2001:0db8:85a3:0000:0000:8a2e:0370:7334).

7. Types of IP private IP and Public IP

   Private IP Address vs. Public IP Address

   Private IP Address
   - A **private IP address** is used within a private network and is not routable over the internet. It is typically assigned to devices within a local area network (LAN), such as computers, printers, and smartphones.
   - Private IP addresses are often used by home routers or enterprise network equipment to assign IPs to devices within a network.
   - These IP addresses are protected by NAT (Network Address Translation) when devices in a private network communicate over the internet.

   Private IP Address Ranges (for IPv4):
   - **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 to 192.168.255.255

   Example: 192.168.1.100, 10.1.1.1, 172.20.10.5

   Private IPs are typically used within a home or office network and are never routed on the public internet.

Public IP Address

- A **public IP address** is an address that can be routed over the internet. These IPs are unique and are assigned by an **Internet Service Provider (ISP)**. Public IPs allow devices to be accessed from outside the local network, such as when accessing a website or hosting a server.
- These IP addresses are globally unique and can be reached by anyone on the internet, depending on network configurations and firewall rules.

Example: 8.8.8.8 (Google's DNS), 172.217.9.206 (Google's public IP)

Key Differences:

Aspect	Private IP Address	Public IP Address
Scope	Used within a private network (LAN)	Used on the internet (WAN)
Routability	Not routable over the internet	Routable over the internet
Range	Defined by RFC 1918 (e.g., 10.x.x.x, 192.168.x.x)	Any IP that is assigned by the IANA
Security	Behind a router/firewall with NAT	Directly accessible over the internet
Usage	For internal devices like printers, computers, etc.	For websites, servers, and services that need internet access

NAT (Network Address Translation)

- NAT allows multiple devices on a local network to share a single public IP address. This is why multiple devices can have private IP addresses but still be able to access the internet through a single public IP provided by the ISP.

Public IP Examples:

- Websites and services that are accessed from anywhere over the internet (such as www.google.com) use public IP addresses.
- A home router typically has a public IP address assigned by the ISP, but it assigns private IP addresses to the devices inside the home network.

8. OSI modal

The **OSI (Open Systems Interconnection) model** is a conceptual framework that standardizes the functions of a network into seven layers:

1. **Physical Layer**: Deals with the transmission of raw data over physical media (e.g., cables, switches).
2. **Data Link Layer**: Handles error detection and correction, as well as framing for data transmission.
3. **Network Layer**: Manages IP addressing, routing, and packet forwarding.
4. **Transport Layer**: Ensures reliable data transfer between hosts (e.g., TCP, UDP).
5. **Session Layer**: Manages sessions or connections between applications.
6. **Presentation Layer**: Translates data between the application and transport layers (e.g., encryption, compression).
7. **Application Layer**: Provides network services to end-users (e.g., HTTP, FTP, email).

9. What is TCP/IP modal

The **TCP/IP (Transmission Control Protocol/Internet Protocol)** model is a set of communication protocols used for the internet and networking. It consists of four layers:

1. **Link Layer**: Deals with data link and physical layers (e.g., Ethernet).
2. **Internet Layer**: Handles logical addressing, routing, and packet forwarding (e.g., IP).
3. **Transport Layer**: Provides end-to-end communication and reliability (e.g., TCP, UDP).
4. **Application Layer**: Provides network services and applications (e.g., HTTP, FTP).

10. IP group created

- **IP Grouping** generally refers to categorizing a group of IP addresses for a particular purpose, such as defining an **IP range** for a specific network, subnet, or a set of devices within a private network. This helps manage resources, assign access levels, and organize networks more efficiently.

11. Range of IP group

- For IPv4, the IP address range is divided into **public and private address ranges**. Here are the private IP address ranges:
  - **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 to 192.168.255.255
- For **IPv6**, the address space is much larger and typically divided into **global unicast addresses** and **unique local addresses**.

12. Different types of servers in there port number

Web Servers

1. **HTTP (Hypertext Transfer Protocol):**
   - Port: **80**
   - Description: Standard protocol for serving web pages.
2. **HTTPS (HTTP Secure):**
   - Port: **443**
   - Description: Secure version of HTTP, using TLS/SSL encryption.

Email Servers

1. **SMTP (Simple Mail Transfer Protocol):**
   - Port: **25** (default), **587** (for mail submission), **465** (with SSL)
   - Description: Sending emails.
2. **IMAP (Internet Message Access Protocol):**
   - Port: **143** (default), **993** (with SSL/TLS)
   - Description: Accessing and managing emails.
3. **POP3 (Post Office Protocol version 3):**
   - Port: **110** (default), **995** (with SSL/TLS)
   - Description: Downloading emails to a local client.

Database Servers

1. **MySQL:**
   - Port: **3306**
   - Description: Open-source relational database.
2. **PostgreSQL:**
   - Port: **5432**
   - Description: Open-source relational database.
3. **Microsoft SQL Server:**
   - Port: **1433**
   - Description: Proprietary relational database.
4. **Oracle Database:**
   - Port: **1521**
   - Description: Enterprise database solution.

File Servers

1. **FTP (File Transfer Protocol):**
   - Port: **21**
   - Description: File transfer protocol.
2. **SFTP (Secure File Transfer Protocol):**
   - Port: **22** (uses SSH)
   - Description: Secure file transfer.
3. **SMB/CIFS (Server Message Block/Common Internet File System):**
   - Port: **445**
   - Description: File sharing on Windows.

DNS Servers

1. **DNS (Domain Name System):**
   - Port: **53**
   - Description: Resolves domain names to IP addresses.

Remote Access Servers

1. **SSH (Secure Shell):**
   - Port: **22**
   - Description: Secure remote login.
2. **Telnet:**
   - Port: **23**
   - Description: Unencrypted remote login (deprecated).
3. **RDP (Remote Desktop Protocol):**
   - Port: **3389**

- Description: Remote desktop access for Windows.

Chat and Messaging Servers

1. **IRC (Internet Relay Chat):**
   - Port: **6667**
   - Description: Real-time text communication.
2. **XMPP (Extensible Messaging and Presence Protocol):**
   - Port: **5222** (default), **5269** (server-to-server)
   - Description: Messaging protocol.

Streaming Media Servers

1. **RTSP (Real-Time Streaming Protocol):**
   - Port: **554**
   - Description: Streaming media.
2. **RTP (Real-Time Transport Protocol):**
   - Ports: Dynamic (commonly uses UDP)
   - Description: Audio and video streaming.

Game Servers

1. **Minecraft Server:**
   - Port: **25565+++**
   - Description: Minecraft multiplayer server.
2. **Counter-Strike:**
   - Port: **27015**
   - Description: Default port for Counter-Strike.

Proxy Servers

1. **HTTP Proxy:**
   - Port: **8080**
   - Description: Proxy service for web traffic.
2. **SOCKS Proxy:**
   - Port: **1080**
   - Description: A more versatile proxy protocol.

Other Common Server Ports

1. **NTP (Network Time Protocol):**
   - Port: **123**
   - Description: Synchronizing clocks over a network.
2. **SNMP (Simple Network Management Protocol):**
   - Port: **161/162**
   - Description: Network device management.