**Port Numbers in Computer Networking**

**What is a Port Number?**

A **port number** is a numerical identifier used in computer networking to specify a particular process or service on a device. It works with IP addresses to direct data to the correct application.

**Think of an IP address as a house address, and the port number as the room number inside that house.**

**Why are Port Numbers Important?**

Port numbers help:

* Identify **specific services or applications** (e.g., web server, email, file transfer).
* Allow multiple services to run on the **same IP address** without confusion.
* Manage **incoming and outgoing traffic** for security and communication.

**Range of Port Numbers**

| **Range** | **Name** | **Description** |
| --- | --- | --- |
| 0–1023 | **Well-known Ports** | Assigned by IANA for common services (e.g., HTTP, FTP). |
| 1024–49151 | **Registered Ports** | Used by software/app developers (e.g., games, apps). |
| 49152–65535 | **Dynamic/Private Ports** | Used for temporary or private connections (client-side). |

**Common Well-Known Ports**

| **Service** | **Protocol** | **Port Number** |
| --- | --- | --- |
| HTTP | TCP | 80 |
| HTTPS | TCP | 443 |
| FTP | TCP | 20 (Data), 21 (Control) |
| SSH | TCP | 22 |
| Telnet | TCP | 23 |
| SMTP (Email) | TCP | 25 |
| DNS | UDP | 53 |
| DHCP | UDP | 67 (server), 68 (client) |
| POP3 (Email) | TCP | 110 |
| IMAP (Email) | TCP | 143 |
| SNMP | UDP | 161 |

**How Port Numbers Work**

When a device sends or receives data:

1. **IP Address** identifies the destination device.
2. **Port Number** identifies the correct application/service.
3. The **TCP or UDP protocol** handles the transport of data using these ports.

**TCP vs. UDP Ports**

| **Feature** | **TCP** | **UDP** |
| --- | --- | --- |
| Connection | Connection-oriented | Connectionless |
| Reliability | Reliable, error-checked | Faster, less reliable |
| Example Use | Web browsing, Email | Video streaming, DNS |

**Fun Fact**

* Each device can have **65,536 ports per IP address** (0–65535).
* Port 0 is **reserved** and usually not used for communication.

**Summary**

* Port numbers help route data to the right service.
* They work with IP addresses and protocols (TCP/UDP).
* Knowing common ports is essential for **network configuration, security, and troubleshooting**.