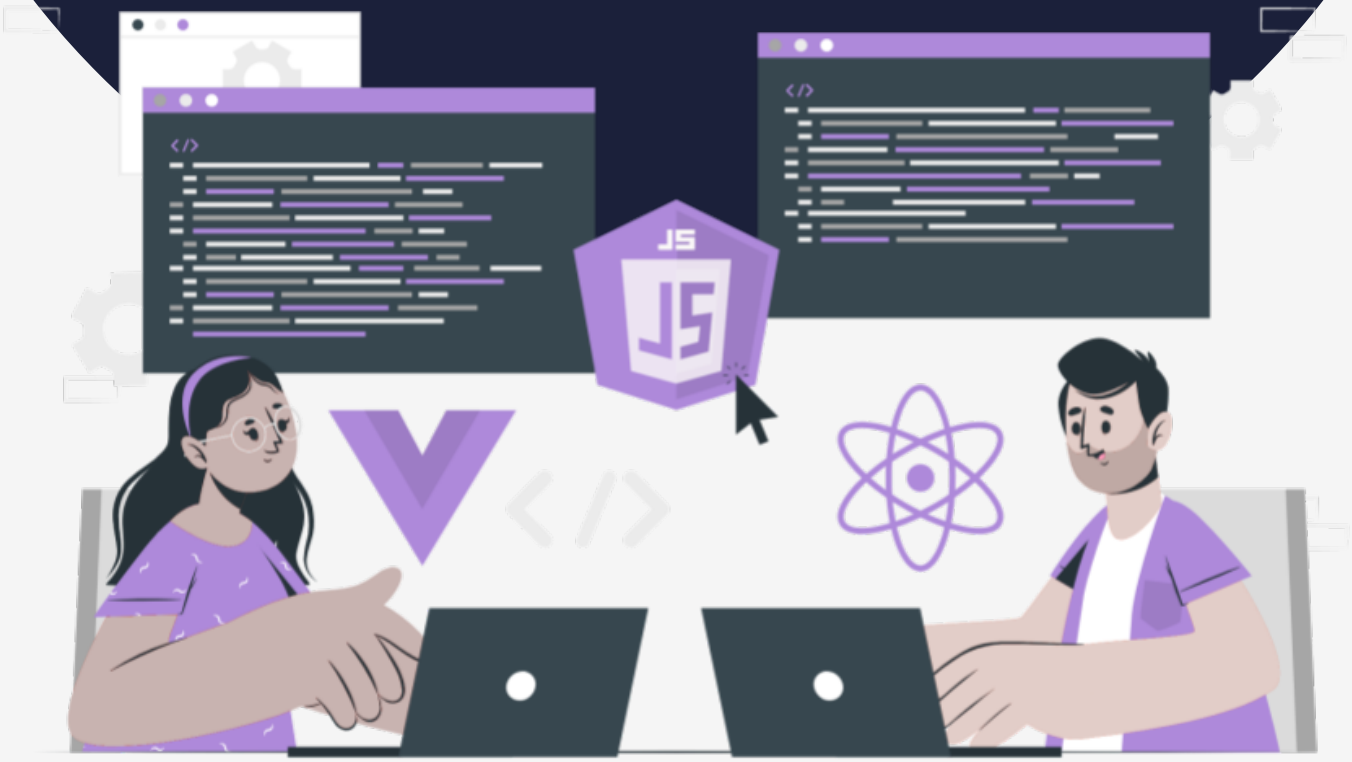
Lesson:

PORT



Topics to be covered

- What is PORT number
- Different types of PORT numbers
- Best practices of using PORT number.

What is PORT number

In computer networking, a port is a **logical construct** that is used to identify a **specific process or service running** on a computer or other networked device. Each port is associated with a **unique number**, called a port number, which allows data to be routed to the correct application or service.

A port number is always **associated with** a **network address** of a host, such as an **IP address,** and the type of transport protocol used for communication. It completes the destination or origination address of a message. Specific port numbers are reserved to identify specific services so that an arriving packet can be easily forwarded to a running application.

Different types of PORT numbers.

There are **65,535** available port numbers, which can be classified into 3 different types -

1. **Well-known Port**
2. **Registered Port**
3. **Dynamic or Private port**

Well-known Port

Well-known ports are port numbers that have been assigned by the **Internet Assigned Numbers Authority** (IANA) to specific services or protocols. These ports range from **0 to 1023 and are reserved** for use by well-known services and applications.

Some examples of well-known default ports and their associated services include:

1. Port **80**: HTTP (Hypertext Transfer Protocol)
2. Port **443**: HTTPS (HTTP Secure)
3. Port **25**: SMTP (Simple Mail Transfer Protocol)
4. Port **22**: SSH (Secure Shell)
5. Port **53**: DNS (Domain Name System)
6. Port **110**: POP3 (Post Office Protocol version 3)
7. Port **143**: IMAP (Internet Message Access Protocol)

These ports are used by many applications and services on the internet, and they are essential for enabling communication between computers and devices.

Registered Port

Registered ports are port numbers that have been assigned by the Internet Assigned Numbers Authority (IANA) to specific services or protocols. These ports range from **1024 to 49151** and are typically used by applications or services that are not considered well-known.

Some examples of registered ports and their associated services include:

1. Port **8080**: HTTP alternate (used as a secondary web server port)
2. Port **3306**: MySQL (database management system)
3. Port **5432**: PostgreSQL (database management system)
4. Port **3389**: Remote Desktop Protocol (used for remote access to a computer)
5. Port **1863**: MSN Messenger (instant messaging service)
6. Port **5060**: Session Initiation Protocol (used for VoIP and video conferencing

These ports are often used by specific applications or services, and they may **require configuration to allow them through firewalls or other network security measures**.

Dynamic Port

Dynamic ports, also known as **private ports**, are port numbers that are **used temporarily by the operating system for client-server communication**. These ports range from **49152 to 65535** and are available for use by any application or service.

For example, **When a client program initiates a connection to a server program**, the operating system assigns a unique dynamic port number to the client side of the connection. This dynamic port number is **used for the duration of the connection and is released when the connection is closed**.

Best Practices of using PORT number.

Here are some of the best practices for using PORT numbers in web development -

1. **Use standard ports whenever possible -** Use the standard HTTP port (80) for unencrypted web traffic and the standard HTTPS port (443) for encrypted web traffic.
   Using standard ports will ensure compatibility with most client devices and minimize the likelihood of firewall or network configuration issues.

2. **Avoid using non-standard ports -** Avoid using non-standard ports (ports other than 80 and 443) unless absolutely necessary. Using non-standard ports can cause problems with some network configurations and may be blocked by firewalls or other security measures

3. **Consider using port forwarding -** If you need to run a web server on a non-standard port, **consider using port forwarding on your router or firewall** to map incoming traffic from a standard port (such as 80 or 443) to the non-standard port used by the web server.

4. **Document port usage -** Document the port numbers used by your web applications and services to make it easier for others to manage and troubleshoot the system.

5. **Secure port usage -** If using non-standard ports, consider implementing security measures such as SSL/TLS (Secure Sockets Layer/Transport Layer Security) encryption to protect sensitive data in transit.

6. **Test port accessibility -** Before deploying your web applications or services, test the accessibility of the required ports from both internal and external networks to ensure that they are available and accessible to users.

By following these best practices, you can ensure that your web applications and services are accessible, compatible, and secure, and minimize the risk of network configuration issues or security vulnerabilities.