



# 1. Core Internet Technologies

## 1.1 HTTP and HTTPS

- HTTP - Core Operational Protocol - Communication Protocol
  - Transfer HTML, IMG, CSS, JS, and other files
  - Request-Response based Communication Protocol
- **HTTP Request**

```
GET / HTTP/1.1  
Host: developer.mozilla.org
```

- **HTTP Request Components**
  - Method
    - GET - To retrieve
    - POST - To send
    - PUT - To update
    - DELETE - To remove
  - Path
    - Specifies where the resources are located on the web server

- Version
  - Specifies the version of HTTP in use
  - Most common - 1.1 and 2.0
- Headers
  - Contains additional information about the client making request
- Body
  - Might be sent by the client
- **HTTP Response**
  - Similar to HTTP Requests
  - Also, contain a body where the content is stored
  - Contains Status Code and Status Message
  - **Status Codes - Five Groups**
    - *Information - 100 to 199*
      - Provisional
      - Interim Responses
      - Most Common - 100 CONTINUE
    - *Successful - 200 to 299*
      - Indicates successful request
      - Most Common - 200 OK
      - Depending on the Method - OK can mean different and several things
        - GET - Founded/Included
        - POST - Successfully Transmitted
        - PUT - Successfully Transmitted
        - DELETE - Deleted
    - *Redirection - 300 to 399*
      - Indicate Requested Resource - Moved to a Different Path
      - 301 MOVED PERMANENTLY

- 302 FOUND → Temporary Redirection
    - Web Browsers automatically submit request for new path
  - *Client Error - 400 to 499*
    - Request contains bad content or syntax
    - 400 - Client submitted bad data
    - 401 - User must login
    - 403 - Request Valid but Web Server is refusing.
    - 404 - Requested resources not found.
  - *Server Error - 500 to 599*
    - 500 INTERNAL SERVER ERROR - Server failed to process the request.
  - **HTTPS**
    - Sends Encrypted Code
    - Only the specified server can process the code
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## 1.2 Internet Protocol

- **DHCP**
  - Dynamic Host Configuration Protocol.
  - Assigns IP addresses to the computer.
  - The computer communicates using UDP with the DHCP server.
  - This server keeps track of IP addresses and computer on the network.
- **DNS**
  - Domain Name Service
  - Helps in identification of associated IP address with a specific website.
- **IMAP**
  - Internet Message Access Protocol
  - Used for accessing email from mail server
- **SMTP**

- Simple Mail Transfer Protocol
  - Used for sending emails from client
  - **POP**
    - Post Office Protocol
    - Old protocol for downloading emails
    - It deletes the email once it has been downloaded from the server
    - Developers use it to implement email automation - more straightforward than IMAP
  - **FTP**
    - File Transfer Protocol
    - Used for transferring file between local machine and web server
  - **SSH**
    - Secure Shell Protocol
    - Method for secure remote login from one computer to another
    - Provides strong authentication, security, integrity, and encryption
  - **SFTP**
    - SSH File Transfer Protocol
    - Allows transmission of files in a secure manner
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## 1.3 Frameworks and Libraries

- **Library**
    - Re-usable pieces of Code
    - Purpose Built - To provide specific functionality
  - **Framework**
    - Acts as a structure for development
    - Handle functionality that are common to all web applications
    - Issues - Structure Constraints and Compatibility Issues
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## 1.4 API and Services

- **API**
  - Application Programming Interface
  - Set of functions and procedures
    - To create application that access feature or OS or Application
  - *Types*
    - Browser API
    - Rest API
    - Sensor-Based API
  - Examples
    - DOM API
    - Geolocation API
    - Fetch API
    - Canvas API
    - History API
    - Web Storage API
  - **REST**
    - Representational State Transfer
    - Set of principles to build highly efficient APIs
    - Using end-points, we can specify the type of resources we want to obtain
    - Once the endpoint is hit, the API → resolves the request and then provide the necessary output
      - This could be in the form of JSON