HYPERTEXT TRANSFER PROTOCOL (HTTP)

Application Protocol for the World Wide Web.

BY:

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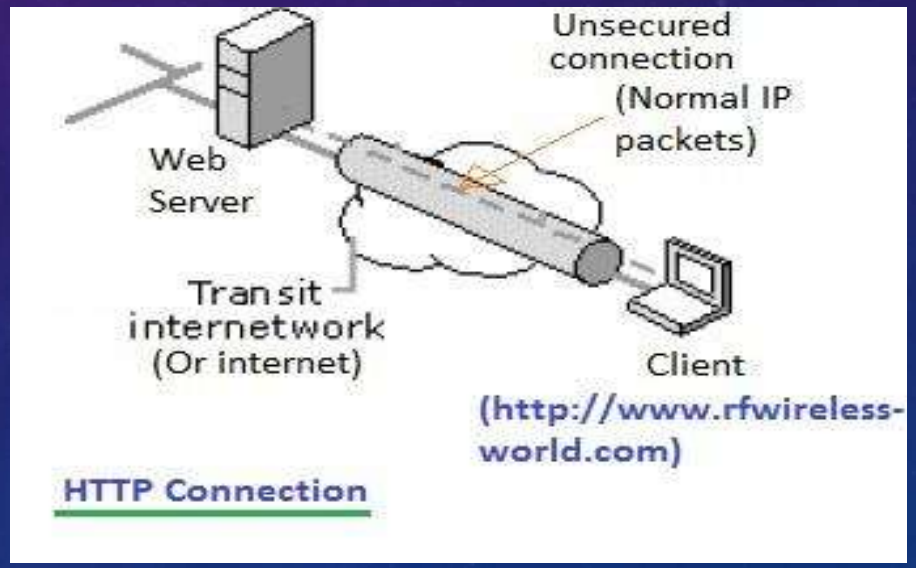
WHAT IS HTTP?

- **HTTP** stands for **Hypertext Transfer Protocol**, and is the language of the web.
- It's an **application-layer protocol** that allows your browser (client) and a web server to communicate.
- HTTP works on the request-response model as when any client sends the HTTP request to the server, the server responds to the requested resource through a web page or a file

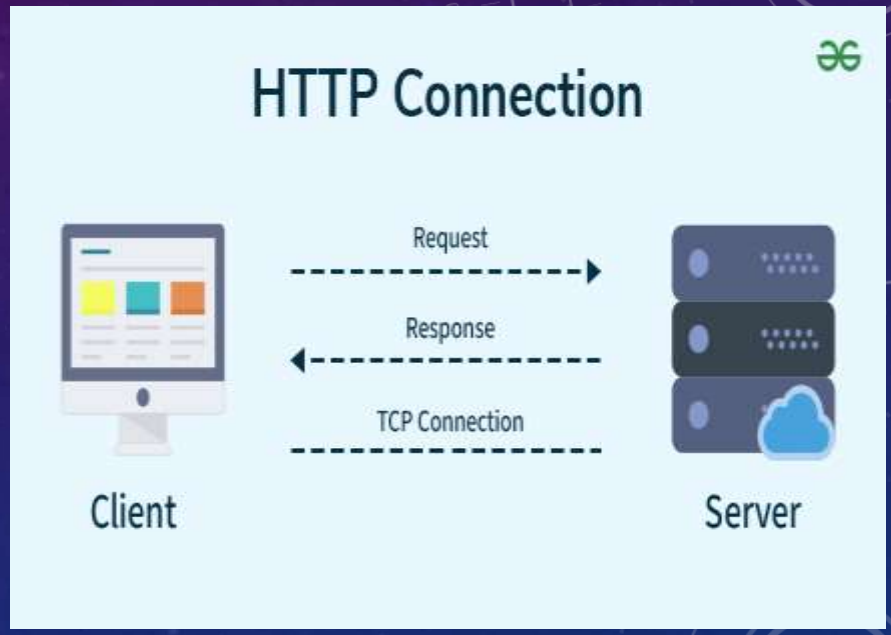
Versions of HTTP:

HTTP/0.9 -1991
HTTP/1.0 -1996
HTTP/1.1-1997
HTTP/2.0 -2015
HTTP/3.0 –(2020-present).



HOW HTTP WORKS?

- **Open Web Browser**: First, you open your web browser and type a website URL (e.g., www.example.com).
- **DNS Lookup**: Your browser asks a Domain Name System(DNS) server to find out the IP address associated with that URL. Think of this as looking up the phone number of the website.
- **Send HTTP Request**: Once the browser has the website's IP address, it sends an HTTP **request** to the server. The request asks the server for the resources needed to display the page (like text, images, and videos).
- **Server Response**: The server processes your request and sends back an HTTP **response**. This response contains the requested resources (like HTML, CSS, JavaScript) needed to load the page.
- **Rendering the Web Page**: Your browser receives the data from the server and displays the webpage on your screen.



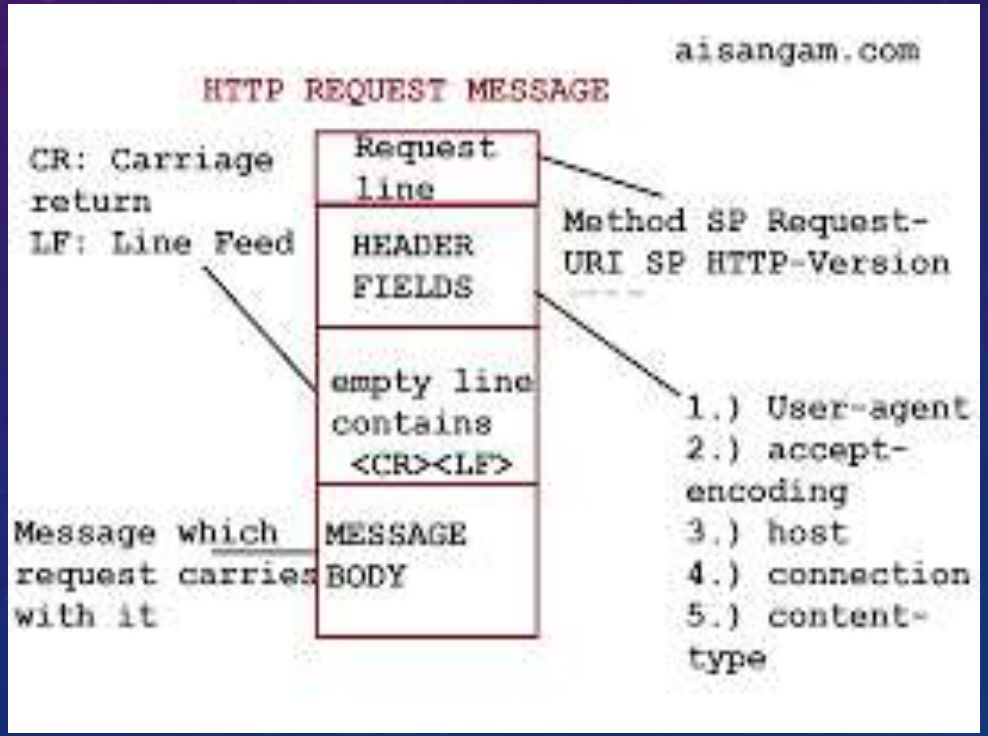
HTTP MESSAGES.

- The formats of the request and response messages are similar.
- A request message consists of a request line, a header, and sometimes a body.
- A response message consists of a status line, a header, and sometimes a body.

HTTP REQUEST:

HTTP Requests are messages sent by the **client** to a **server** to request data or perform specific actions. It consists of **three main parts**:

1. **Request Line**
   The first line of the request.
   Format: METHOD URL HTTP-VERSION
2. **Headers**
   Provide **additional information** about the request or client.
   Format: Header-Name: Value
3. **Body (Optional)**
   Contains the **data sent to the server**, mainly used in POST, PUT ,PATCH requests.
   Not used in **GET** or **DELETE** requests typically.



HTTP METHODS:

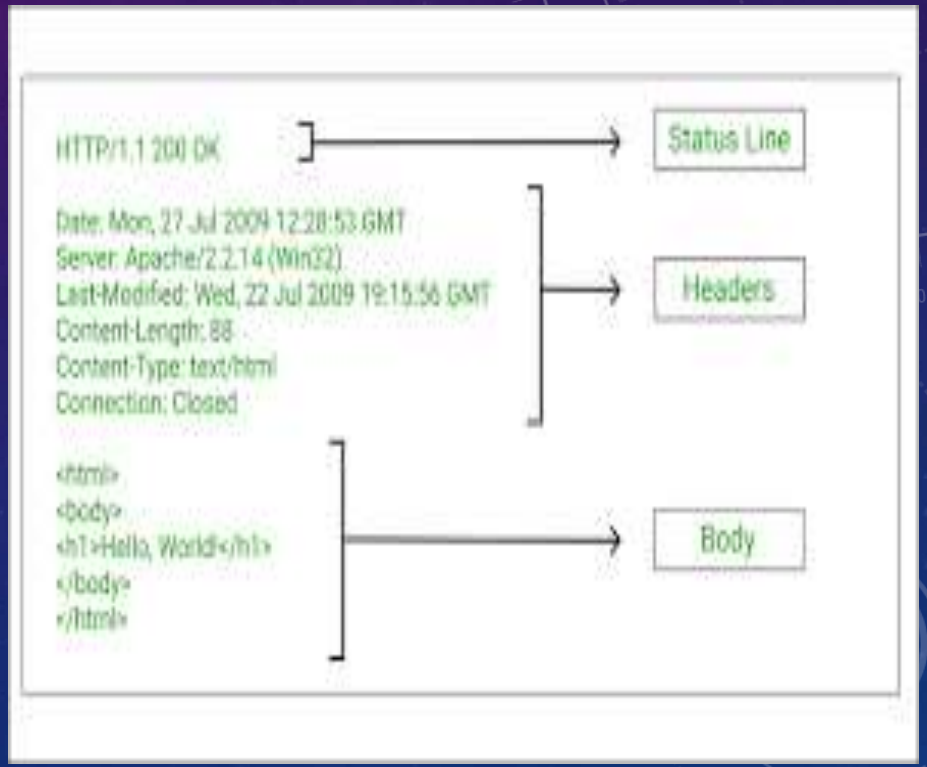
HTTP Requests are the message sent by the client to request data from the server or to perform some actions. Different HTTP requests are:

- **GET:** GET request is used to read/retrieve data from a web server. GET returns an HTTP status code of **200 (OK)** if the data is successfully retrieved from the server.
- **POST:** POST request is used to send data (file, form data, etc.) to the server. On successful creation, it returns an HTTP status code of **201**.
- **PUT:** A PUT request is used to modify the data on the server. It replaces the entire content at a particular location with data that is passed in the body payload. If there are no resources that match the request, it will generate one.
- **PATCH:** PATCH is similar to PUT request, but the only difference is, it modifies a part of the data. It will only replace the content that you want to update.
- **DELETE:** A DELETE request is used to delete the data on the server at a specified location.

HTTP RESPONSE:

An HTTP response is sent by the **server** to the **client** in reply to an HTTP request. It consists of **three main parts**:

1. **Status Line**
   The first line of the response.
   Format: HTTP-VERSION STATUS-CODE REASON-PHRASE
2. **Headers**
   Provide **metadata** about the response.
   Format: Header-Name: Value
3. **Body (Optional)**
   Contains the **actual data** requested by the client.
   Present in most responses like GET or POST.



HTTP - STATUS CODES

- HTTP Status Code can be defined as the 3-Digit Codes that produce the messages or simply tell us whether the HTTP Request that has been raised is completed or not.

There are five main categories. They are

i. **1xx -** Informational Response

These status codes are all about the information received by the server when a request is made.

ii. **2xx -** Success

This status code depicts that the request made has been fulfilled by the server and the expected response has been achieved.

iii. **3xx -** Redirection

The requested URL is redirected elsewhere.

iv. **4xx -** Client Errors

This indicates that the page is not found

v. **5xx -** Server Errors

A request made by the client but the server fails to complete the request.

Advantages:

- Platform independent.
- Efficient for web browsing
- Handles large files
- Reduced network congestion
- Error reporting

Disadvantages:

- Lack of security
- Point-to-point communication
- High power consumption
- Not mobile-friendly
- Poor data integrity

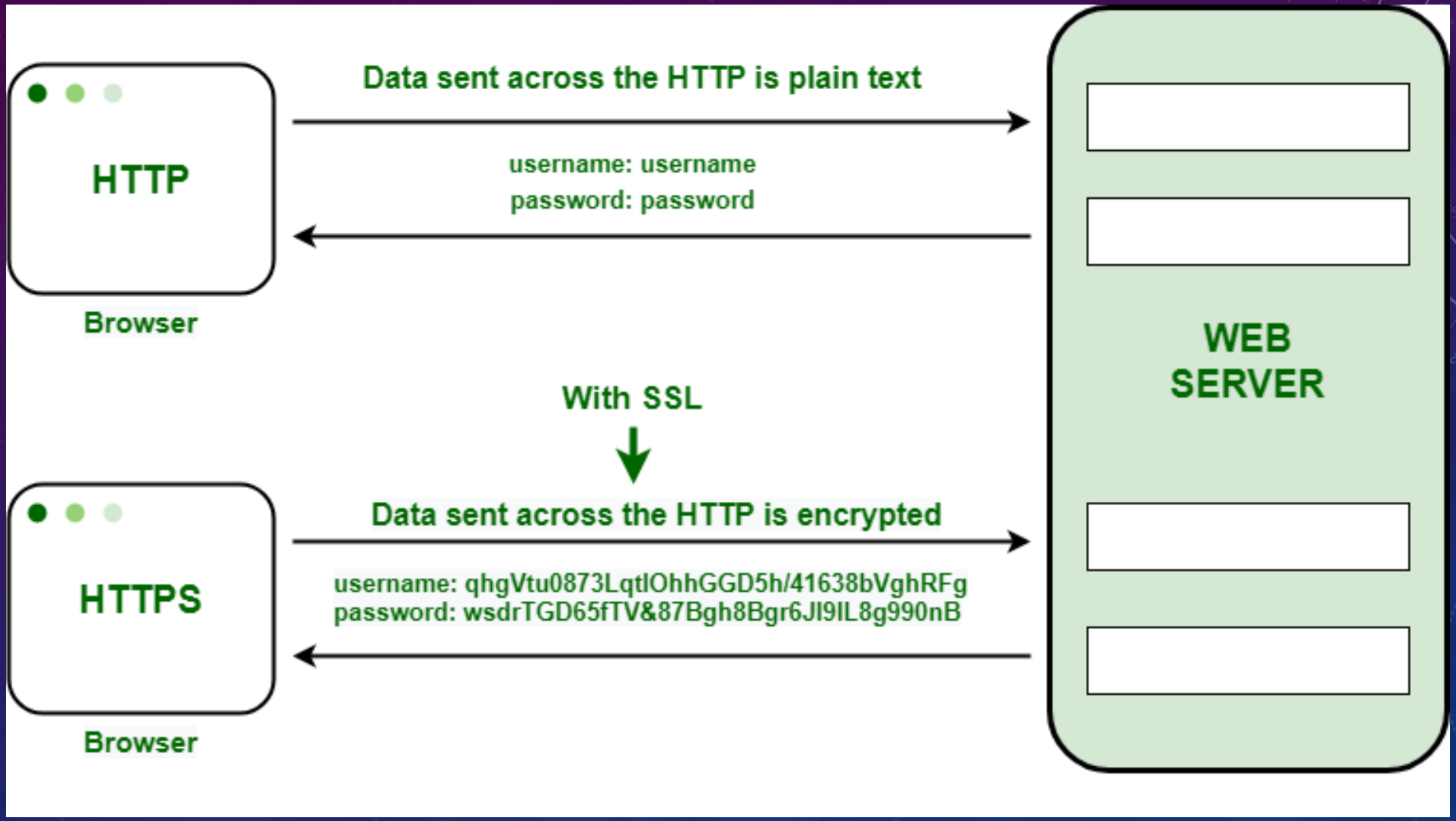
HTTP VS HTTPS

HTTP

- HTTP stands for HyperText Transfer Protocol
- In HTTP, the URL begins with “http://”.
- HTTP uses port number 80 for communicate on.
- HTTP Works at the Application Layer.
- Data sent as plain text.

HTTPS

- HTTPS stands for Hyper Text Transfer Protocol Secure
- In HTTPS, the URL starts with “https://”.
- HTTPS uses port number 443 for communication.
- HTTPS works at Transport Layer.
- Data is encrypted.


HTTP
Browser
Data sent across the HTTP is plain text
username: username
password: password
WEB SERVER
With SSL
HTTPS
Browser
Data sent across the HTTP is encrypted
username: qhgVtu0873LqtlOhhGGD5h/41638bVghRFg
password: wsdrTGD65fTV&87Bgh8Bgr6JI9IL8g990nB

Thank you