



HTTP PROTOCOL

Technical Report

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Course: PHP Diploma

Date: 19-Apr-2025

INDEX

1. INTRODUCTION
2. HISTORY & VERSIONS
3. HTTP REQUEST CYCLE
4. HTTP REQUEST DETAILS
 - 4.a HTTP METHODS
 - 4.b HTTP REQUEST HEADERS
 - 4.c HTTP REQUEST BODY
- 5 HTTP RESPONSE
 - 5.a HTTP STATUS CODES
 - 5.b HTTP RESPONSE HEADER
 - 5.c HTTP RESPONSE BODY
- 6 REFERENCES

1. INTRODUCTION

HTTP (Hyper Text Transfer Protocol) is the main communication protocol of the world wide web (WWW) communication. It is the link between clients (web browsers) and web servers to allow data exchange between them, retrieving webpages, fetching data from server's database, or store data into it.

2. HISTORY & VERSIONS

HTTP was introduced first time by Tim Berners Lee, in 1989 and went public in 1992 after building the first world's server in 1991.

HTTP 0.9 is the first HTTP version was published in 1991, it was only supporting the GET method, to retrieve webpages from the server side, status or error messages returns.

HTTP 1.0 was published in 1996, the header concept was introduced in this version, and status codes were supported in the response line, big disadvantage was that the connection has to be closed after each response.

HTTP 1.1 the standardized protocol was published in 1997, it supported many client's requests for same connection, the pipelining, and supported different methods (GET, POST, PUT, DELETE).

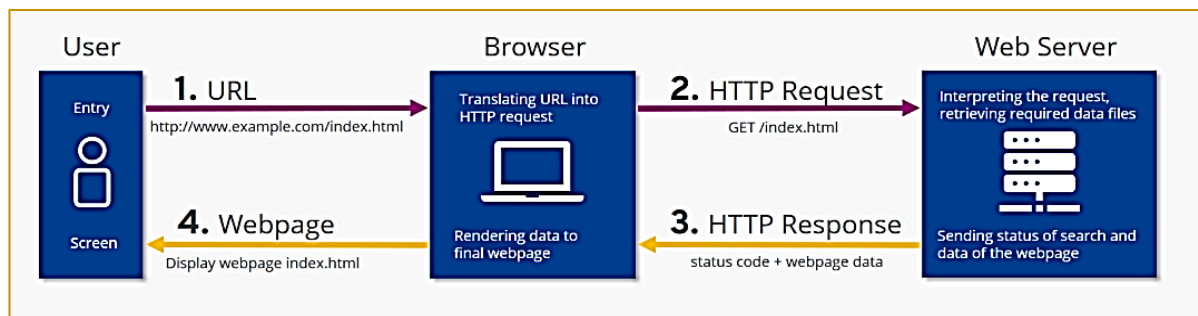
HTTP 2 in 2015, introducing the SERVER Push that allows the server to push CSS and JS files to the client before requesting them. And multiplexing that allows the multi-requests and multi-responses within same connection, and header compression.

HTTP 3 in 2022, using QUICK that can establish multi-stream connections using the UDP protocol.

3. HTTP REQUEST/RESPONSE CYCLE

The communication between the client (browser) and the server is being established in two steps; REQUEST and RESPONSE.

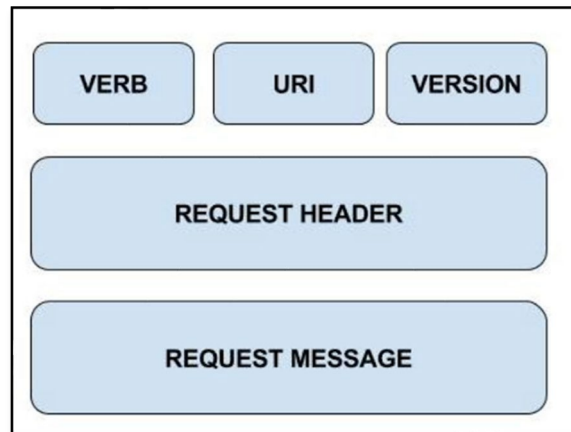
1. When the end user clicks a hyperlink on the webpage in the browser, to open some webpage or to search specific information.
2. The browser then collects required information and search parameters and send them to the web server using the HTTP protocol, in a predetermined request template "HTTP" request.
3. The server then analyzes the received information, collects the requested information, and the status of the request and responds to the browser (CLIENT) with HTTP response.
4. The browser in turn will render the received data and prepare the final webpage, to display it to the end user.



4. HTTP REQUEST

This is the way that the web browsers ask the web browsers to send them webpages or information.

An HTTP request should contain: HTTP Method, HTTP version type, URL, HTTP request Headers, HTTP request body{optional}.



4.a HTTP METHODS

GET

POST

PUT

DELETE

4.b HTTP REQUEST HEADERS

The HTTP request header contains the information that being sent to the server in a form of a key-value pair, to tell the server what information is required or what agent is being used.

SAMPLE HTTP REQUEST METHOD

host: www.google.com

content-type: text/html

user-agent: chrome

accept: text/html

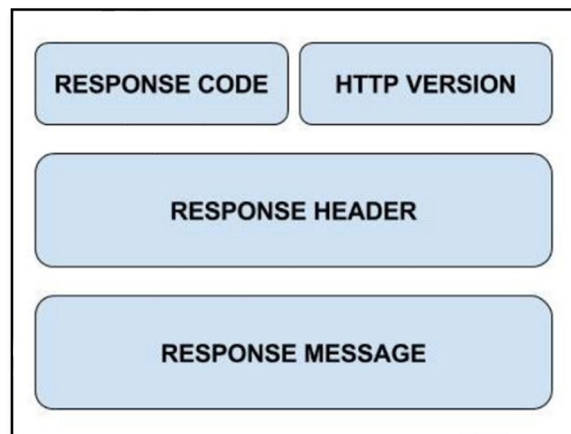
4.c HTTP REQUEST BODY

The body of the HTTP request contains the information needed to transfer from the HTML to the server like, username, password, or the data entered to a form.

5. HTTP RESPONSE

HTTP response is the message that is received by web browsers in response from servers to their requests.

An HTTP request should contain: HTTP status code, HTTP response header, HTTP response body {optional}.



5.a HTTP STATUS CODES

1xx informational

2xx success

3xx Redirection

4xx Client error

5xx Server error

The xx represents a number from 00 to 99.

SOME COMMON HTTP STATUS CODES

200	Successful - OK
201	Created - OK
203	Non-Authoritative Information
404	Resources Not Found
500	Internal Server Error

HTTP RESPONSE HEADER

It contains some additional information related to the response being sent to the client.

SAMPLE OF THE RESPONSE HEADER

Date: Sun, 28 Mar 2023 10:15:00 GMT

Content-Type: application/Json

Server: Apache/2.4.39 (Unix) OpenSSL/1.1.1c PHP/7.3.6

Content-Length: 1024

5.c HTTP RESPONSE BODY

It contains the actual response from web servers, it can be in a form of HTML/XML/JSON.

SAMPLE OF THE RESPONSE BODY (JSON format)

```
{  
  "id": "ErDd1JRRT",  
  "url": "https://cdn2.thecatapi.com/images/ErDd1JRRT.jpg",  
  "width": 4282,  
  "height": 6424,  
  "original_filename": "cat1.jpg",  
  "pending": 0,  
  "approved": 1  
}
```

6. REFERENCES

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developer.mozilla.org

w3schools.com

cloudflare.com

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