**HTTP Protocols And Status Codes**

**World Wide Web Communication**

The World Wide Web is about communication between web **clients** and web **servers**.

**Clients** are often browsers (Chrome, Edge, Safari), but they can be any type of program or device.

**Servers** are most often computers in the cloud.

**Web Client Cloud Web Server**

**HTTP Request / Response**

Communication between clients and servers is done by **requests** and **responses**:

1. A client (a browser) sends an **HTTP request** to the web
2. An web server receives the request
3. The server runs an application to process the request
4. The server returns an **HTTP response** (output) to the browser
5. The client (the browser) receives the response

**The HTTP Request Circle**

A typical HTTP request / response circle:

1. The browser requests an HTML page. The server returns an HTML file.
2. The browser requests a style sheet. The server returns a CSS file.
3. The browser requests an JPG image. The server returns a JPG file.
4. The browser requests JavaScript code. The server returns a JS file
5. The browser requests data. The server returns data (in XML or JSON).

**Features of HTTP:**

* **Connectionless protocol:** HTTP is a connectionless protocol. HTTP client initiates a request and waits for a response from the server. When the server receives the request, the server processes the request and sends back the response to the HTTP client after which the client disconnects the connection. The connection between client and server exist only during the current request and response time only.
* **Media independent:** HTTP protocol is a media independent as data can be sent as long as both the client and server know how to handle the data content. It is required for both the client and server to specify the content type in MIME-type header.
* **Stateless:** HTTP is a stateless protocol as both the client and server know each other only during the current request. Due to this nature of the protocol, both the client and server do not retain the information between various requests of the web pages.

**HTTP Methods**

The set of common methods for HTTP/1.1 is defined below and this set can be expanded based on requirements. These method names are case sensitive and they must be used in uppercase.

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| **S.N.** | **Method and Description** |
| 1 | **GET**  The GET method is used to retrieve information from the given server using a given URI. Requests using GET should only retrieve data and should have no other effect on the data. |
| 2 | **HEAD**  Same as GET, but transfers the status line and header section only. |
| 3 | **POST**  A POST request is used to send data to the server, for example, customer information, file upload, etc. using HTML forms. |
| 4 | **PUT**  Replaces all current representations of the target resource with the uploaded content. |
| 5 | **DELETE**  Removes all current representations of the target resource given by a URI. |
| 6 | **CONNECT**  Establishes a tunnel to the server identified by a given URI. |
| 7 | **OPTIONS**  Describes the communication options for the target resource. |
| 8 | **TRACE**  Performs a message loop-back test along the path to the target resource. |

**HTTP Status Code**

The Status-Code element in a server response, is a 3-digit integer where the first digit of the Status-Code defines the class of response and the last two digits do not have any categorization role. There are 5 values for the first digit:

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| **S.N.** | **Code and Description** |
| 1 | **1xx: Informational**  It means the request has been received and the process is continuing. |
| 2 | **2xx: Success**  It means the action was successfully received, understood, and accepted. |
| 3 | **3xx: Redirection**  It means further action must be taken in order to complete the request. |
| 4 | **4xx: Client Error**  It means the request contains incorrect syntax or cannot be fulfilled. |
| 5 | **5xx: Server Error**  It means the server failed to fulfill an apparently valid request. |

HTTP status codes are extensible and HTTP applications are not required to understand the meaning of all the registered status codes. Given below is a list of all the status codes.

**1xx: Information**

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| **Message** | | **Description** | |
| 100 Continue | Only a part of the request has been received by the server, but as long as it has not been rejected, the client should continue with the request. | |
| 101 Switching Protocols | The server switches protocol. | |

**2xx: Successful**

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| **Message** | **Description** |
| 200 OK | The request is OK. |
| 201 Created | The request is complete, and a new resource is created . |
| 202 Accepted | The request is accepted for processing, but the processing is not complete. |
| 203  Non-authoritative Information | The information in the entity header is from a local or third-party copy, not from the original server. |
| 204 No Content | A status code and a header are given in the response, but there is no entity-body in the reply. |
| 205 Reset Content | The browser should clear the form used for this transaction for additional input. |
| 206  Partial Content | The server is returning partial data of the size requested. Used in response to a request specifying a *Range* header. The server must specify the range included in the response with the *Content-Range* header. |

**3xx: Redirection**

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| **Message** | **Description** |
| 300  Multiple Choices | A link list. The user can select a link and go to that location. Maximum five addresses  . |
| 301  Moved Permanently | The requested page has moved to a new url . |
| 302 Found | The requested page has moved temporarily to a new url . |
| 303 See Other | The requested page can be found under a different url . |
| 304  Not Modified | This is the response code to an *If-Modified-Since* or *If-None-Match* header, where the URL has not been modified since the specified date. |
| 305 Use Proxy | The requested URL must be accessed through the proxy mentioned in the *Location* header. |
| 306 *Unused* | This code was used in a previous version. It is no longer used, but the code is reserved. |
| 307  Temporary Redirect | The requested page has moved temporarily to a new url. |

**4xx: Client Error**

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| **Message** | **Description** |
| 400 Bad Request | The server did not understand the request. |
| 401 Unauthorized | The requested page needs a username and a password. |
| 402  Payment Required | *You can not use this code yet*. |
| 403 Forbidden | Access is forbidden to the requested page. |
| 404 Not Found | The server can not find the requested page. |
| 405 Method  Not Allowed | The method specified in the request is not allowed. |
| 406 Not Acceptable | The server can only generate a response that is not accepted by the client. |
| 407  Proxy Authentication Required | You must authenticate with a proxy server before this request can be served. |
| 408  Request Timeout | The request took longer than the server was prepared to wait. |
| 409 Conflict | The request could not be completed because of a conflict. |
| 410 Gone | The requested page is no longer available . |
| 411  Length Required | The "Content-Length" is not defined. The server will not accept the request without it . |
| 412  Precondition Failed | The pre condition given in the request evaluated to false by the server. |
| 413 Request Entity Too Large | The server will not accept the request, because the request entity is too large. |
| 414  Request-url  Too Long | The server will not accept the request, because the url is too long. Occurs when you convert a "post" request to a "get" request with a long query information . |
| 415 Unsupported Media Type | The server will not accept the request, because the mediatype is not supported . |
| 416  Requested Range Not Satisfiable | The requested byte range is not available and is out of bounds. |
| 417  Expectation Failed | The expectation given in an Expect request-header field could not be met by this server. |

**5xx: Server Error**

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| **Message** | **Description** |
| 500 Internal  Server Error | The request was not completed. The server met an unexpected condition. |
| 501  Not Implemented | The request was not completed. The server did not support the functionality required. |
| 502 Bad Gateway | The request was not completed. The server received an invalid response from the upstream server. |
| 503  Service Unavailable | The request was not completed. The server is temporarily overloading or down. |
| 504  Gateway Timeout | The gateway has timed out. |
| 505 HTTP Version Not Supported | The server does not support the "http protocol" version. |