

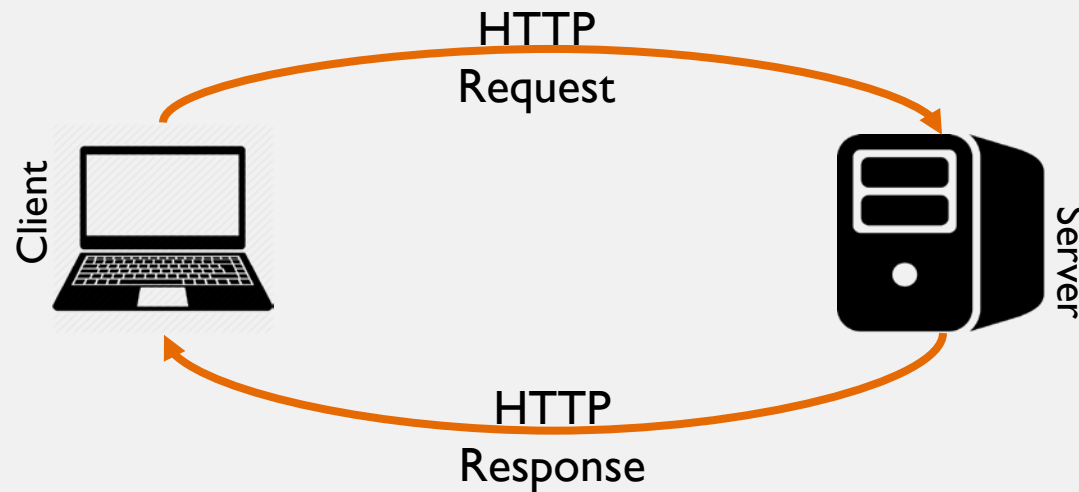
# HTTP PROTOCOL

CPSC 441 - Tutorial 3

Winter 2018

# WHAT IS A **HTTP**?

- **HyperText Transfer Protocol**
  - An application layer protocol used for transferring data between a client and server
- **Client-Server Model:**



# HTTP REQUEST

HTTP Client sends Request message and waits for response.

**Method** |Space| **URL** |Space| **Version** |New Line|

**Header-field-name**: |Space| **value** |New Line|

...

|New Line|

**Body** (data)

**GET** /page.html **HTTP/1.1**

**Host**: www.website.com

**Connection**: close

**User-agent**: Mozilla/57.0.4

**Accept-language**: en

## HTTP REQUEST **METHODS**

- HTTP Client use these methods to interact with HTTP Server

GET

POST

HEAD

PUT

DELETE

# HTTP **GET** AND **POST**

- GET:
  - Most useful HTTP request
  - Retrieve the information on requested **url**.
- POST:
  - For sending data to server (You don't know the actual URI)
  - Data can be updated version of the same resource or a subordinate of it

```
GET /page.html HTTP/1.1
Host: www.website.com
Connection: close
Accept-language: en-us
```

```
POST /page.html HTTP/1.1
Host: www.website.com
User-agent: Mozilla/57.0.4
Accept-language: en
Connection: Keep-Alive
|New Line|
(HTML data)
```

## OTHER METHODS

- HEAD:
  - For debugging purpose – acts like get but the response does not contain any data
- PUT:
  - For uploading an object to a specific path on the server (you know the exact URI)
- DELETE:
  - For deleting an object on the server

```
HEAD /page.html HTTP/1.1
Host: www.website.com
User-agent: Mozilla/57.0.4
Connection: keep-Alive
Accept-language: en-us
```

```
PUT /hi.html HTTP/1.1
Host: www.website.com
Connection: close
Content-Type: text/html
Content-Length: 182
|Blank Line|
<html>
<body>
<h1>Hi There</h1>
</body>
</html>
```

```
DELETE /textfiles/page.txt HTTP/1.1
Connection: close
Host: www.website.com
User-agent: Mozilla/52.0.01
```

## USEFUL REQUEST HEADERS

| Header                   | Example                                          | Description                                                                              |
|--------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Accept</b>            | Accept: text/plain                               | Content-Types that are acceptable for the response. See Content negotiation              |
| <b>Connection</b>        | Connection: keep-alive                           | Control options for the current connection and list of hop-by-hop request fields         |
| <b>Content-Length</b>    | Content-Length: 348                              | The length of the request body in Bytes                                                  |
| <b>Host</b>              | Host: www.ucalgary.ca:8080                       | The domain name of the server, and the TCP port number on which the server is listening. |
| <b>If-Modified-Since</b> | If-Modified-Since: Sat, 29 Oct 1994 19:43:31 GMT | Allows a 304 Not Modified to be returned if content is unchanged                         |
| <b>Range</b> ★           | Range: bytes=500-999                             | Request only part of an entity. Bytes are numbered from 0                                |

List of all HTTP/1.1 Headers:

[https://en.wikipedia.org/wiki/List\\_of\\_HTTP\\_header\\_fields](https://en.wikipedia.org/wiki/List_of_HTTP_header_fields)

# HTTP RESPONSE

- Status-Codes:
  - 1XX: Informational
  - 2XX: Success Notifications
  - 3XX: Redirection Notifications
  - 4XX: Client Errors
  - 5XX: Server Errors

**Version** |Space| **Status-Code** |Space| **Phrase**  
**Header-field-name**: |Space| **value** |New Line|

...

|New Line|

**Body** (data)

**HTTP/1.1 200 OK**

**Connection**: close

**Date**: Tue, 18 Jan 2018 15:44:04 GMT

**Server**: Apache/2.4.29 (CentOS)

**Last-Modified**: Tue, 18 Jan 2016 10:20:04 GMT

**Content-Length**: 6821

**Content-Type**: text/html

<html>...<html>

## USEFUL RESPONSE HEADERS

| Header                  | Example              | Description                                                                      |
|-------------------------|----------------------|----------------------------------------------------------------------------------|
| <b>Accept-Ranges</b>    | Accept-Ranges: bytes | What partial content range types this server supports                            |
| <b>Allow</b>            | Allow: GET, HEAD     | Valid methods for a specified resource                                           |
| <b>Connection</b>       | Connection: close    | Control options for the current connection and list of hop-by-hop request fields |
| <b>Content-Length</b> ★ | Content-Length: 348  | The length of the request body in Bytes                                          |

List of all HTTP/1.1 Headers:

[https://en.wikipedia.org/wiki/List\\_of\\_HTTP\\_header\\_fields](https://en.wikipedia.org/wiki/List_of_HTTP_header_fields)

## POPULAR RESPONSE-CODES

| Status-Code | Phrase                     | Description                                                |
|-------------|----------------------------|------------------------------------------------------------|
| <b>200</b>  | <b>OK</b>                  | Returned the recourse completely                           |
| <b>206</b>  | <b>Partial Content</b>     | Returned a part of the resource                            |
| <b>301</b>  | <b>Moved Permanently</b>   | Returned new <b>permanent</b> URL for resource             |
| <b>302</b>  | <b>Found – Redirection</b> | Returned new <b>temporary</b> URL for resource             |
| <b>304</b>  | <b>Not Modified</b>        | Resource has not been modified since the specified version |
| <b>404</b>  | <b>Not Found</b>           | Recourse does not exist anymore                            |

## BASIC EXAMPLE

Telnet

```
reza@reza:~$ telnet pages.cpsc.ucalgary.ca 80
Trying 136.159.2.17...
Connected to pages.cpsc.ucalgary.ca.
Escape character is '^['.
```

GET Request

```
GET /~carey/CPSC441/test1.html HTTP/1.1
Host: pages.cpsc.ucalgary.ca
Connection: Close
```

200 OK Response

```
HTTP/1.1 200 OK
Date: Thu, 18 Jan 2018 20:44:46 GMT
Server: Apache/2.2.15 (Scientific Linux)
Last-Modified: Tue, 09 Jan 2018 20:42:13 GMT
ETag: "442417c-177-5625df31eba65"
Accept-Ranges: bytes
Content-Length: 375
Connection: close
Content-Type: text/html; charset=UTF-8

<html>

<title>
Small HTML Test File for CPSC 441 Assignment 1
</title>
```

## CONDITIONAL GET

Conditional GET request

```
reza@reza:~$ telnet pages.cpsc.ucalgary.ca 80
Trying 136.159.2.17...
Connected to pages.cpsc.ucalgary.ca.
Escape character is '^]'.
GET /~carey/CPSC441/test1.html HTTP/1.1
Host: pages.cpsc.ucalgary.ca
If-modified-since: Thu, 18 Jan 2018 19:00:00 GMT
Connection: Close
```

304 Not Modified Response

```
HTTP/1.1 304 Not Modified
Date: Thu, 18 Jan 2018 20:57:52 GMT
Server: Apache/2.2.15 (Scientific Linux)
Connection: close
ETag: "442417c-177-5625df31eba65"
```

```
Connection closed by foreign host.
```

## HTTP/1.0 VS HTTP/1.1

- **Host header:** HTTP 1.1 has a required host header
- **Persistent connections:** By default, connections are assumed to be kept open after the transmission of a request and its response. The protocol permits closing of connections at any point. Connection: close header is used to inform the recipient that the connection will not be reused.
- **Pipelining:** A client need not wait to receive the response for one request before sending another request on the same connection
- **Stronger Cache Support**
- **Chunked transfer-encoding**
- **Options Method:** A way for a client to learn about the capabilities of a server without actually requesting a resource.

## REFERENCES

- RFC 2616 <http://tools.ietf.org/pdf/rfc2616.pdf>