

HTTP

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HTTP

- HTTP - Hypertext Transfer Protocol
 - HTTP is the primary protocol used on the WWW for serving websites and website **resources**
 - HTTP can be used for working with many types of resource (images, binary files, html, and so on)
- HTTP is encapsulated inside TCP/IP
 - Generally port 80 (http) or 443 (https)

TCP vs UDP

- TCP or Transmission Control Protocol is used to ensure packets arrive at their destination using a connection
- UDP or User Datagram Protocol is less reliable because it does not ensure that packets arrive

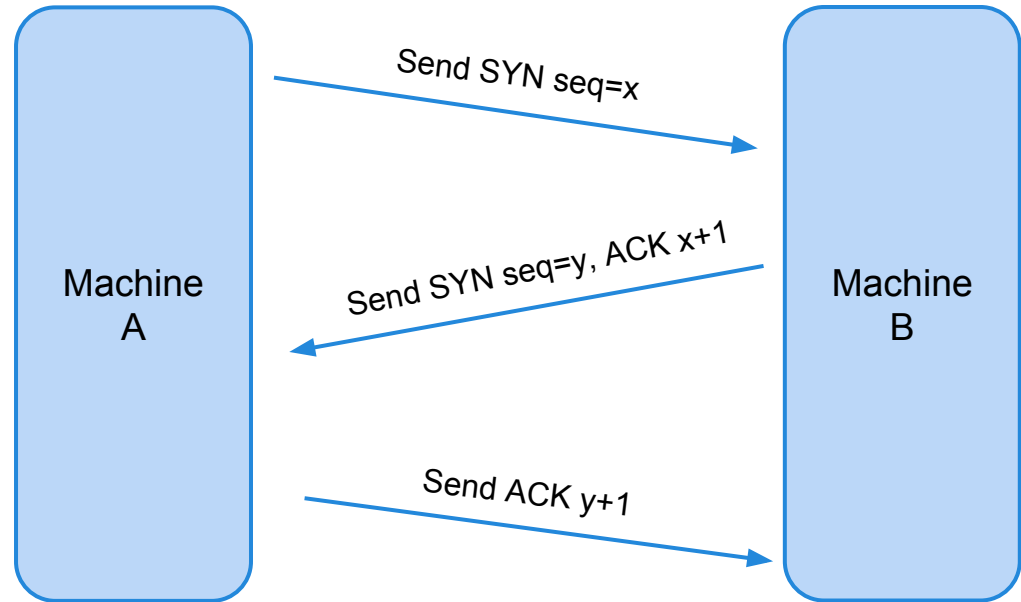
HTTP

- Lets look at TCP and HTTP

TCP/IP: Connection Establishment

Three Way Handshake

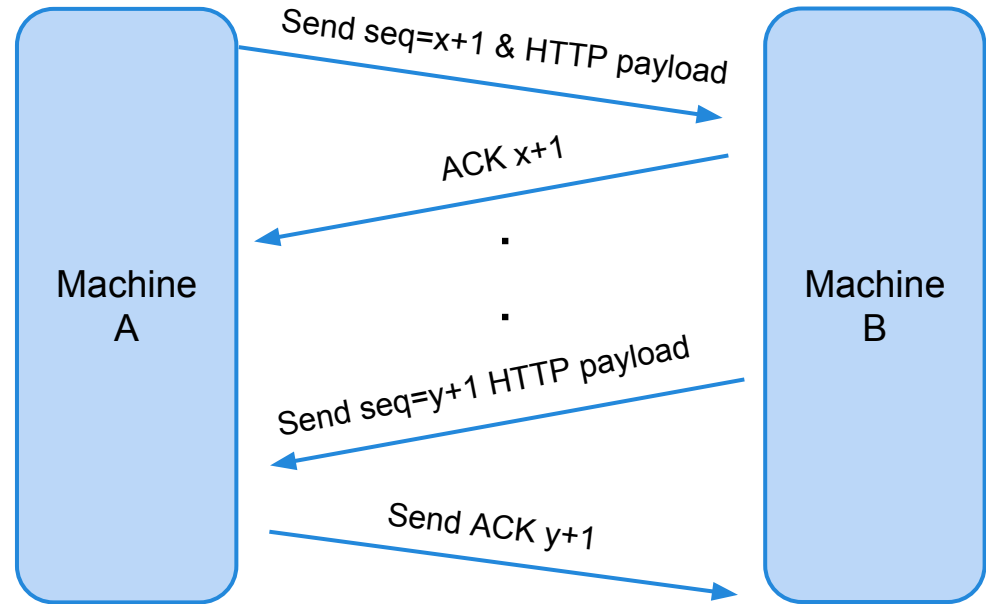
SYN, SYN-ACK, ACK



TCP/IP: Data Transfer

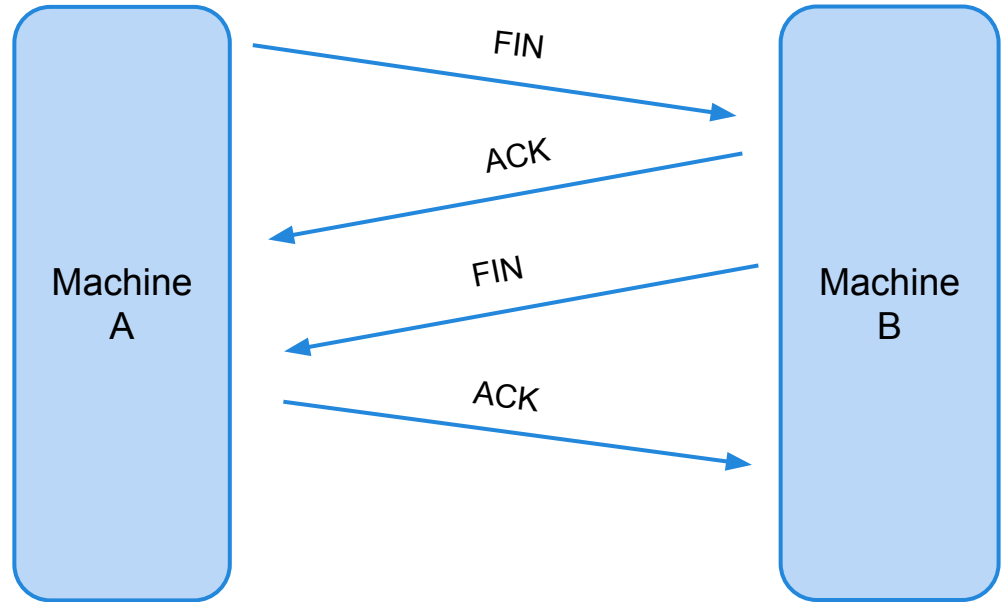
Send HTTP Request using sequence number

Get HTTP Response also using a sequence number



TCP/IP: Close connection

Four way handshake



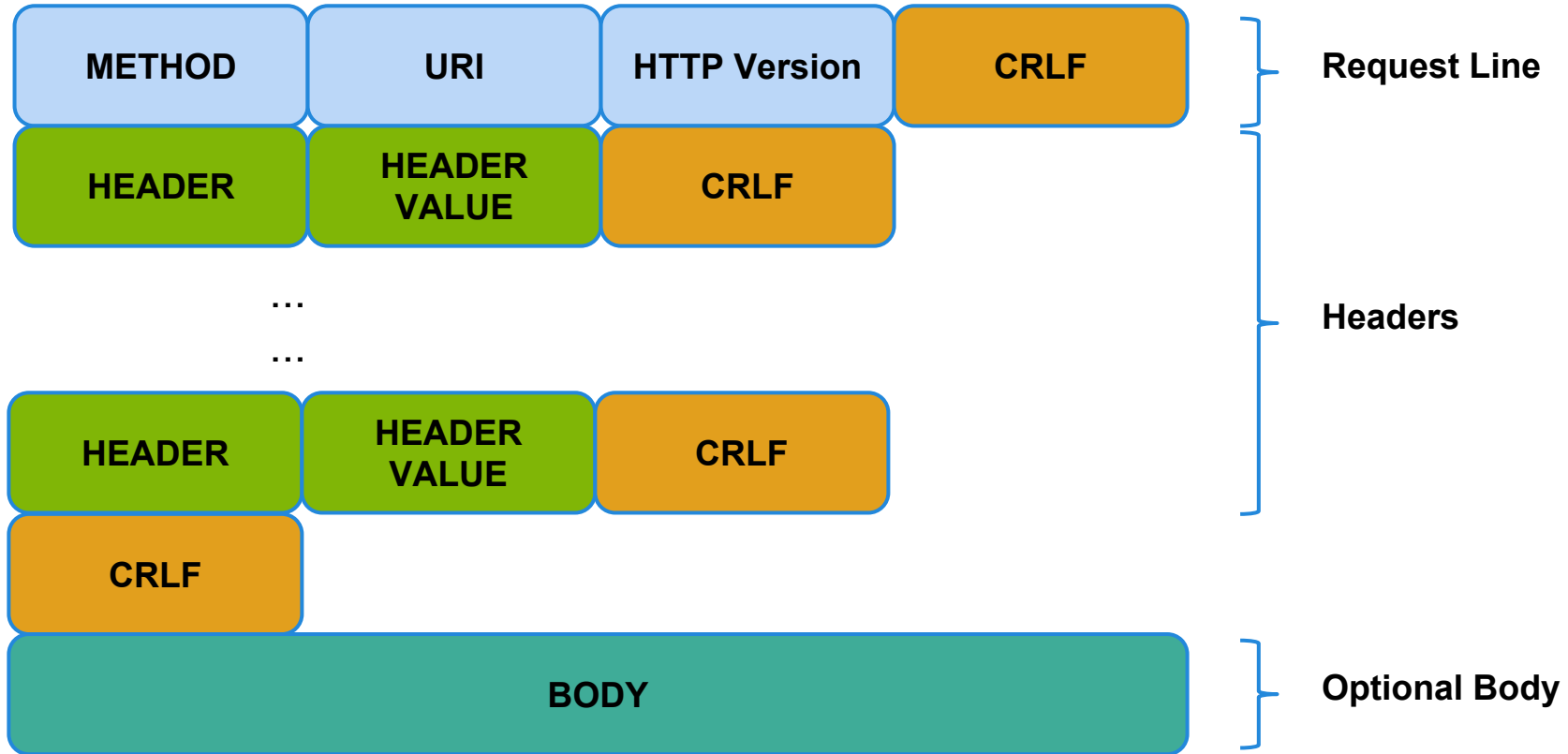
HTTP

- Lets look at winthrop.edu using Chrome
 - F12 - Network
 - How many HTTP requests?
 - How long?

HTTP

- HTTP is stateless - connection is closed after **Request** is received and corresponding **Response** is sent.
 - No information kept between requests
- What does that mean for:
 - HTTP?
 - TCP connection?
 - For people?

HTTP Request



HTTP Request Methods

- GET - Retrieve resource to URI
- POST - Store/send data to server
- HEAD - Retrieve header (not body) at URI
- PUT - Make message body new resource @ URI
- OPTIONS - What methods are allowed?
- DELETE - Remove the resource @ URL
- TRACE - Echo request back
- CONNECT - Proxy Request

HTTP Headers

- There are **many** headers available
 - Connection - Keep TCP alive
 - Date - Indicates local date
 - Host - Virtual host on server to use
 - Accept-Language - Request languages, en-us
 - User-Agent - Client software identification
 - Content-Length - Number of Bytes in message body
- HTTP/1.1 **requires** *Host:* header!!!!

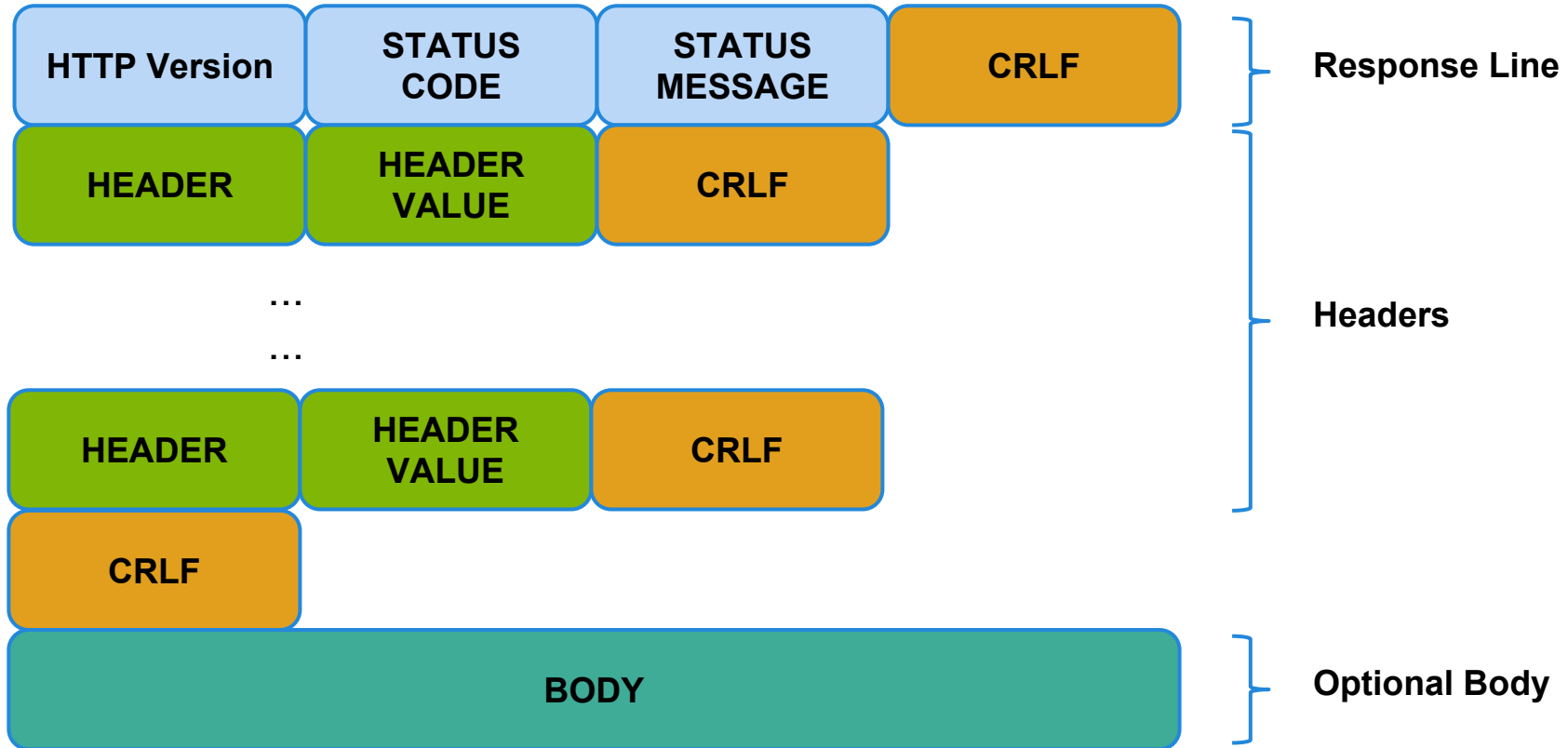
URL Encoding

- Certain characters are encoded to their hexadecimal values to prevent problems with parsing
 - I'm 100% sure, this, could be a giant mess!
 - I%27m%20100%25%20sure%2C%20this%2C%20could%20be%20a%20giant%20mess!

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- This will be decoded later to return back original data

HTTP Response



HTTP Response - Headers

- There are also headers sent by the server to the client
 - There is some overlap and some specific
 - One almost always sent back to client is *Content-Type*:
 - Represents the MIME type
 - *Content-Type*: is also sent to server to identify what client is sending.

MIME Types

- MIME stands for Multipurpose Internet Mail Extensions
 - Although originally for email can be used to tell clients how to interpret response
 - Seven top level MIME types: audio, application, image, message, multipart, video, text

MIME Types

- Common examples include:

application/json	<code>{ fname: "Michael", lname: "Whitney" }</code>
text/html	<code><!DOCTYPE html><html></code>
text/plain	Michael Whitney
text/css	<code>body { margin : 0px; }</code>
application/pdf	Adobe PDF Files
application/rss+xml	RSS Feeds
image/png	.png image files

HTTP Response - Status Codes

- 3 digit Integer with status message
 - Integer should follow HTTP spec
 - Message can change to suit needs
 - In general... integer is for computers, message is for humans
- First digit specifies general type of message, second two digits give specific message of the general type

HTTP Response - Status Codes

- 1xx - informational messages
- 2xx - success messages
- 3xx - redirection messages
- 4xx - client error messages
- 5xx - server error messages

HTTP Response - Status Codes

- Most Common
 - 200 OK
 - 301 Moved Permanently
 - 302 Moved Temporarily
 - 304 Not Modified
 - 400 Bad Request
 - 401 Unauthorized
 - 403 Forbidden
 - 404 Not Found
 - 500 Server Error
- There are lots more

Looking Forward

- Don't be afraid of HTTP and the headers
 - Dig into Network requests in Chrome console
 - Look up ones you don't know
 - We will utilize them down the road
- The more you learn the easier it is to write code