PRELIMS NOTES

**Internet** - refers to the global information system that -- (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein.

**Internetwork**

**Intra** – within

**Network** – connection

**ISP** – Internet Service Provider

**Interconnection Technology**

* Wired – physical
* Wireless – no physical connection, through infared, radio, Bluetooth, wifi

**World Wide Web** – 1989

* Allows documents to be connected to other documents by hypertext links

**WAIS (Wide Area Information Servers) -** is an Internet system in which specialized subject databases are created at multiple server locations, kept track of by a directory of servers at one location, and made accessible for searching by users with WAIS client programs.

**Gopher** - The Gopher protocol is a TCP/IP application layer protocol designed for distributing, searching, and retrieving documents over the Internet.

**Usenet** - is a worldwide distributed discussion system available on computers.

HTTP

* application layer used to access resources on the World Wide Web
* Tim Berners-Lee
* Jointly developed by the W3C and the IETF (Internet Engineering Task Force)
* HTTP Version History
* 0.9 (1991)
* 1.0 (RFC 1945, May 1996)
* 1.1 (RFC 2068, Jan 1997)
* 2 (RFC 7540 , May 2015)
* HTTP is based on a client-server architecture
  + Clients a.k.a. user agents (any application accessing HTTP)
    - Web Browser, Web Crawler, Spiders, others
* Servers : origin ,proxy , gateways, tunnels
* HTTP uses a request-response standard protocol
  + Client sends an HTTP request message
  + Server processes the request and replies with an HTTP response message
    - “poll” – frequent request
* HTTP is a stateless communications protocol
  + Servers do not keep information about the clients
* HTTP provides support for other functionalities
  + Cache Control
    - Locality of Reference Principle
    - Caching Server
* Content Media Type MIME (Multipurpose Internet Mail Extension)
* Language and character set specification
* Content / Transfer Coding – server will send to client some characters
* Content Negotiation – version
* Client Server Protocol Negotiation
* Persistent Connections – establish a request
* Request Pipelining
* Authentication / Authorization

HTTP Resource Addressing

* HTTP resources are identified using URLs (RFC 3986)
  + Scheme (http or https)
  + Authority
    - User info or credentials
    - Host
    - Domain name(DNS)
    - Port number
* Path to resource (resolved relative to the document root on the server)
* Query

**HTTP Request Message**

* Request Line
  + Method
  + Request URI
  + HTTP Protocol Version
* Message Header (general ,request, entity header)
* Empty Line (CRLF)
* Message body aka payload

**HTTP Response Message**

* Status Line – 3 space separated value
  + HTTP Protocol Version
  + Status Code
  + Reason Phrase
* Message Header(general ,response, entity header)
* Empty Line
* Message Body

**HTTP Request**

* Standard
  + GET
    - Transfer a current selected representation without message body
    - Most commonly used
    - Compliant general-purpose servers
* HEAD
* Entity not included
* Used to retrieve metadata about the entity implied by the request
* Must also be compliant to general-purpose servers
* POST
  + Submit information
  + Perform resource-specific processing of the entities
* PUT
  + Store the enclosed entity in the message body under the specified request URI
* DELETE
  + - Remove the resource associated with the Request URI
* Extension Methods
  + WEBDAV, PROPFIND, PROPPATCH, MKCOL, COPY , MOVE, LOCK, UNLOCK
* TRACE
  + Request a loop-back of the request message
  + Testing/diagnostics of the request/response chain
* CONNECT
  + Establishment of a tunnel to the destination of the origin server
* Safe methods
  + Doesn’t affect change in the resources (GET, OPTIONS, TRACE, HEAD)
* Idempotent Methods
  + If you use it once and you use it again, the result should be the same (GET , HEAD, PUT,DELETE)
* Cacheable Methods
  + The response we get can be cached

**HTTP Message Header**

* General Header Fields
* Cache-control
* Connection (keep-alive)
* Date
* Pragma
* Trailer
* Transfer-Encoding
* Upgrade
* Via
* Warning
* Request header field
  + Accept
  + Accept-charset
  + Accept-encoding
  + Accept-Language
  + Authorization
  + Expect
  + From – email address of the client
  + Host – required header
  + If-Match – conditional request
  + If-Modified-Since
  + If-None-Match
  + If-Range
  + If-Unmodified-Since
  + Max-forward – limit the trace
  + Proxy-Authorization
  + Range
  + Referer
  + Trailer – message header at the end of the content
  + User-Agent
* Response Header Fields
  + Accept-Range (bytes, fetch portions) - retrieve
  + Age( age of the resource, last modified/ETag)
  + E-Tag
  + Location(where to find the redirect)
  + Proxy-Authenticate
  + Retry-After
  + Server
  + Vary
  + WWW-Authenticate
* Entity Header Fields
  + Allow
  + Content-encoding
  + Content-language
  + Content-length
  + Content-location – where it came from
  + Content-MD5 – digest algorithm, computes hash , depricated
  + Content-range
  + Content-type
  + Expires
  + Last Modified
* HTTP Status Codes

Informational (1xx)

* + 100 Continue
  + 101 Switching Protocols

Success (2xx)

* + 200 OK
  + 201 Created
  + 202 Accepted
  + 203 Non-Authoritative Information
  + 204 No Content
  + 205 Reset Content
  + 206 Partial Content

Redirection (3xx)

* + 300 Multiple Choices
  + 301 Moved Permanently
  + 302 Found
  + 303 See Other
  + 304 Not Modified
  + 305 Use Proxy
  + 306 (unused)
  + 307 Temporary Redirect

Client Error (4xx)

* + 400 Bad Request – missing something
  + 401 Unauthorized
  + 402 Payment Required
  + 403 Forbidden
  + 404 Not Found
  + 405 Method not Allowed
  + 406 Not Acceptable
  + 407 Proxy Authentication Required
  + 408 Request Timeout
  + 409 Conflict
  + 410 Gone
  + 411 Length Required
  + 412 Precondition Failed
  + 413 Request Entity Too Large
  + 414 Request-URI Too Long
  + 415 Unsupported Media Type
  + 416 Request Range Not Satisfiable
  + 417 Expectation Failed
  + 426 Upgrade Required

Server Error (5xx)

* + 500 Internal Server Error
  + 501 Not Implemented
  + 502 Bad Gateway
  + 503 Service Unavailable - maintenance
  + 504 Gateway Timeout
  + 505 HTTP Version Not Supported