Hypertext Transfer Protocol - HTTP/1.1

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HTTP Usage

- Protocol to support the communication between web browsers and web server
- A “Web Server” is a HTTP server
- Most of clients/server speaks HTTP/1.1
- According to RFC,
  - HTTP is an application-level protocol with the lightness and speed necessary for distributed, hypermedia information systems
HTTP Usage (cont.)

1. Get document request (HTTP)

2. Server fetches document from local file

3. Response

Client machine

Browser

OS

Server machine

Web server

Database
HTTP Request Message

(a)
HTTP Methods

- **GET** : Request to return a document to the client
- **POST** : Provide a data to be added to document
- **HEAD** : Request to return the header of document
- **PUT** : Request to store a document
- **DELETE** : Request to delete a document
- **TRACE** : To trace HTTP forwarding through proxies
- **OPTIONS** : Used to determine the capabilities of the server, or characteristics of a named resource
Request headers

- Request headers provide information to server about the client
  - What kind of client
  - What kind of content will be accepted
  - Who is making the request

Accept: text/html
Host: www.umbc.edu
From: relan1@umbc.edu
User-agent: Mozilla/4.0
Referer: http://www.foo.com/blah
POST Request

- POST request includes some content after headers
- There is no format for the data (just a raw bytes)

POST /add.php HTTP/1.1
Accept: text/html
Host: www.example.com
User-agent: Mozilla/4.0
**Content-Length: 18**
Referer: http://www.example.com/page1.html

a=1&b=2&add=submit
HTTP Response Message

![Diagram of HTTP response message structure]

- **Status line**
  - Version
  - Status code
  - Phrase

- **Response message headers**
  - Message header name
  - Value

- **Message body**
Status Codes

1XX – Informational
2XX – Success
3XX – Redirection
4XX – Client Error
5XX – Server Error
Response headers

- Provide the client with information about the returned document
  - What kind of document
  - How big the document is
  - How the document is encoded
  - When the document was last modified

Date: Wed, 12 Nov 2008 11:12:45 EST
Server: Apache/1.16
Last-Modified: Tues, 11 Nov 2008 23:12:44 EST
Content-Type: text/html
Content-Length: 1656
Single request-reply

- Client sends a complete request
- Server sends back the entire reply
- Server closes its socket

- If a client needs another document it must open a new connection.
HTTP Connections

(a) Using non persistent connections

(b) Using persistent connections
HTTP session state

- HTTP is stateless protocol
- Hosts do not need to retain information about users between requests
- User's state is maintained by Web developers
- Session-IDs are used to maintain a state
  - Cookies
    - Cookie: jsessid=4fst5dhbljt
  - GET parameters
    - http://abc.com/index.jsp?sessid=hfgg5fkgve64
  - POST parameters
  - Path parameters
    - http://abc.com/index.jsp;jsessid=h3hgt8fbdr5?id=4
Web Caching

- Document caching entities
  - Web browser
  - Web proxy

- Cache-control directive of response header controls caching of document
  - Cache the document, if “Cache-Control” header is not present.
  - Cache-control: no-cache
    - Web browser will not cache the document. Web proxy will cache the document.
  - Cache-control: no-store
    - Neither web browser nor web proxy will cache the document
Cache coherence

- It is important to maintain a cache coherence

- Headers are used to check consistency of cache

  - Request headers
    - If-Modified-Since
    - If-Unmodified-Since

  - Response headers
    - Last-Modified
References

- RFC 2616 – HTTP/1.1
  http://www.w3.org/Protocols/rfc2616/rfc2616.htm

- Chapter-12, Distributed Web-Based Systems
  http://www.csee.umbc.edu/~yisun1/chap-12v2.ppt
THANK YOU!