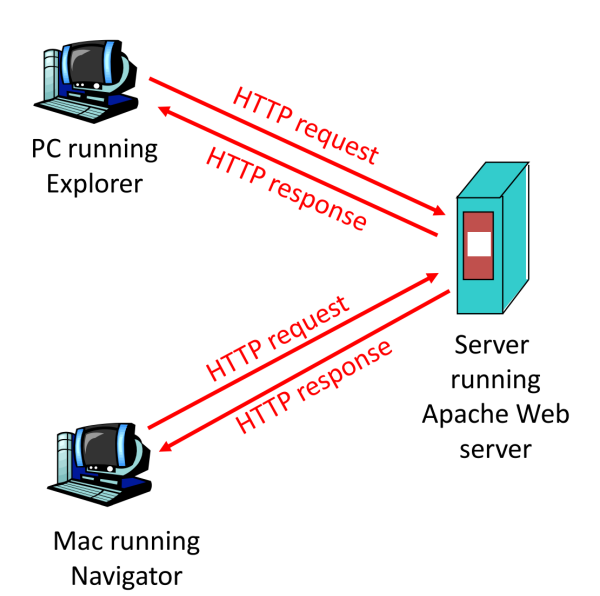
1. What is HTTP? Describe its message flow.

> HTTP: hypertext transfer protocol
>
> Web's application layer protocol
>
> client/server model
>
> client: browser that requests, receives, 'displays' Web objects
>
> server: Web server sends objects in response to requests
>
> Use TCP, client initiates TCP connection(creates socket) to server, port 80
>
> Server accepts TCP connection from client
>
> HTTP messages(application-layer protocol messages) exchanged between browser(HTTP client) and Web server(HTTP server)
>
> TCP connection closed
>
> 
>

2. What is difference between non-persistent and persistent HTTP?

> Nonpersistent HTTP: At most one object is sent over a TCP
>
> Persistent HTTP: Multiple objects can be sent over single TCP connection between client and server

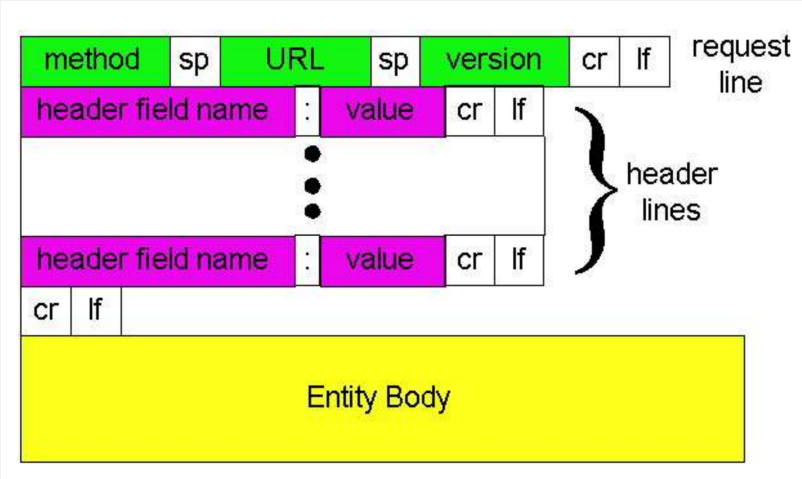
3. What is the general format of HTTP request? Describe the usage of Header line.

request line(GET, POST, HEAD commands)

header lines

Carriage return, line feed(cr lf) (indicates end of message)

Entity body



header lines是HTTP request和response的核心，它承載了關於client瀏覽器、request頁面、server等相關的資訊，可以自己根據需要定義。它會揭露client端處理的能力(例如能夠接受的格式)

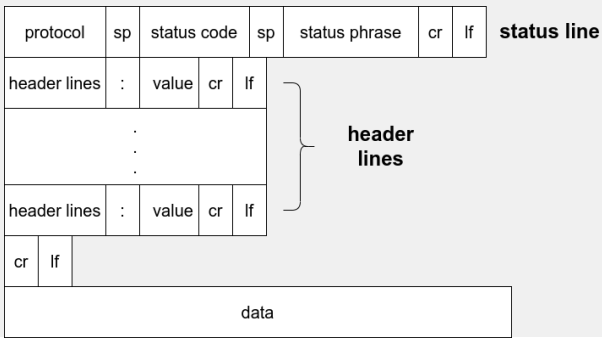
4. What is the general format of HTTP response?

status line(protocol, status code, status phrase)

header lines

Carriage return, line feed(cr lf)

data (e.g., requested HTML file)

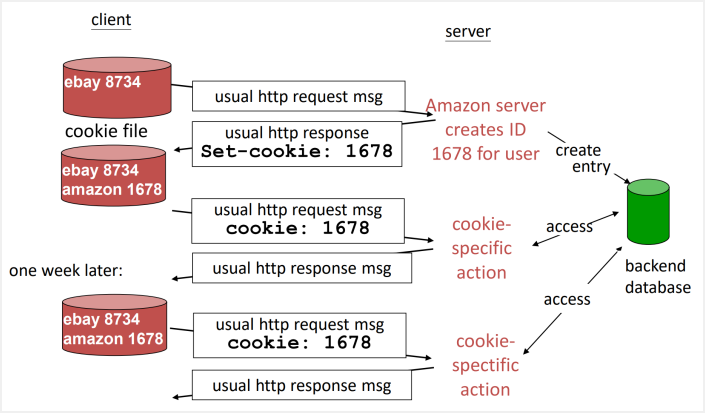


5. What are methods in HTTP 1.0 and 1.1 and their functions?

> GET: browser requests an object, with the requested object identified in the URL field
>
> POST: Web page often includes form input. Input is uploaded to server in entity body
>
> HEAD: ask server to leave requested object out of response
>
> PUT: uploads file in entity body to path specified in URL field
>
> DELETE: deletes file specified in the URL field

6. How does Cookie work in HTTP? Please list header lines. (重要！！)

> Cookies allow sites to keep track of users
>
> User's browser sent http request msg to site, in the first time, the site create unique user ID and entry in backend database for ID, response **Set-cookie: number of ID** to user's browser. After that, when user request the same site, the request head line will contain the ID, then the site can do specific action for user.



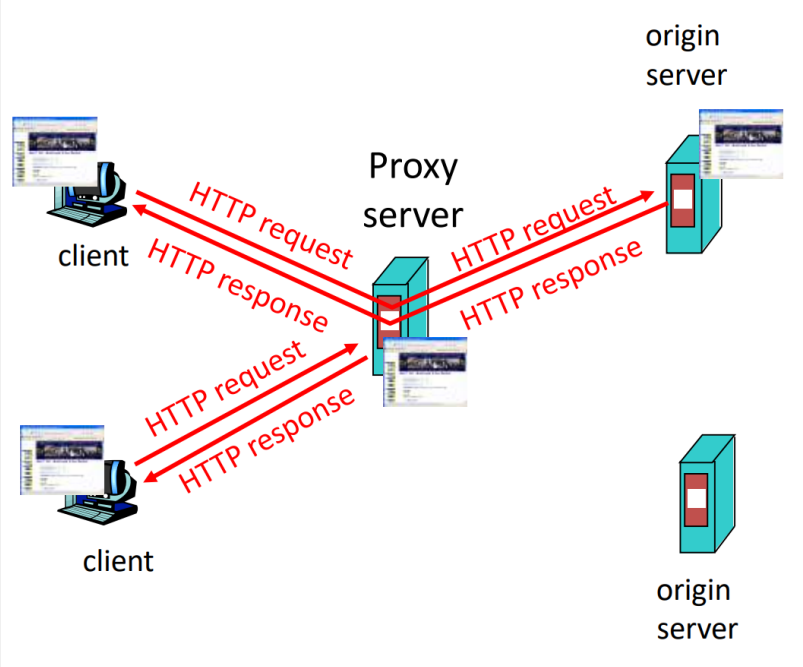
> Four components:
>
> 1. cookie header line of HTTP response message
> 2. cookie header line in HTTP request message
> 3. cookie file kept on user's host, managed by user's browser
> 4. back-end database at Web site
>
> header lines: **cookie**, **Set-cookie**

7. How does web proxy work? Describe its message flow and functions.

user sets browser: Web accesses via cache

browser sends all HTTP requests to cache

- object in cache: cache returns objecct
- else cache requests object from origin server, then returns object to client

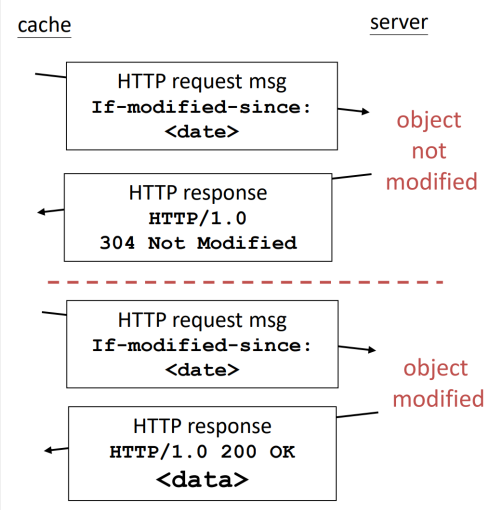


8. How does Conditional Get work?

don't send object if cache has up-to-date cached version

cache: specifiy date of cached copy in HTTP request

server: response contains no object if cached copy is up-to-date

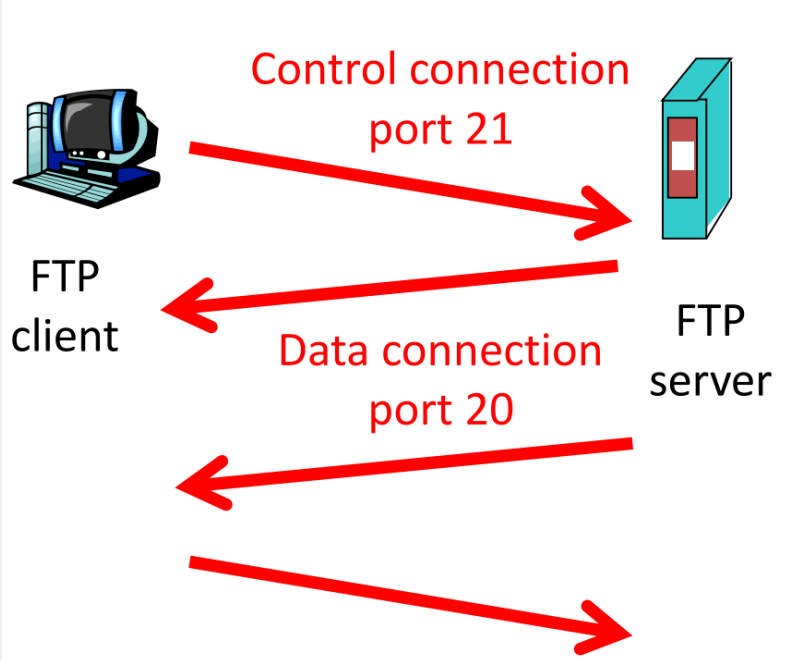


9. What is out-of-band in FTP?

server opens another TCP data connections to transfer another file

control connection: 'out of band'

FTP server maintains 'state': current directory, earlier authentication



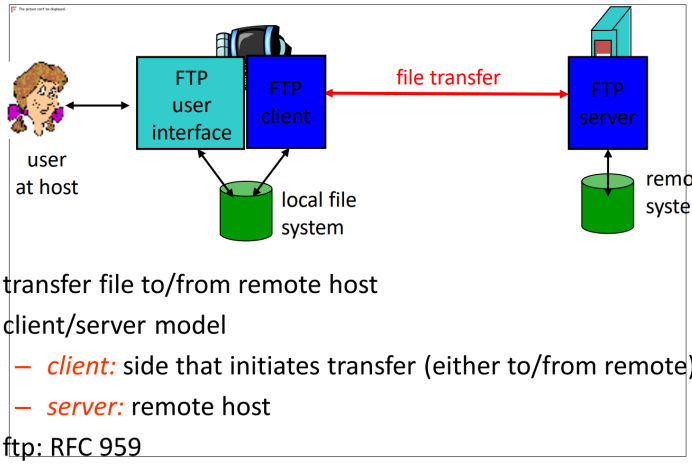
10. How does FTP work? Describe its message flow.

FTP client contacts FTP server at port 21, TCP is transport protocol

client authorized over control connection

client browses remote directory by sending commands over control connection
when server receives file transfer command, server opens 2nd TCP connection (for file) to client

after transferring one file, server closes data connction



- transfer file to/from remote host
- client/server model
  - *client:* side that initiates transfer (either to/from remote)
  - *server:* remote host
- ftp: RFC 959
- ftp server: port 21

11. What are the functionalities of five FTP basic commands?

USER: username

PASS: password

LIST: return list of file in current directory

RETR filename: retrieves(gets) file

STOR filename: stores(puts) file onto remote host

12. How does passive FTP solve the firewall problem? (重要！！)

For passing through Firewall at client side

PASV command: client enter passive mode

Server must configure passive mode ports