

Computer Network Midterm 109-1

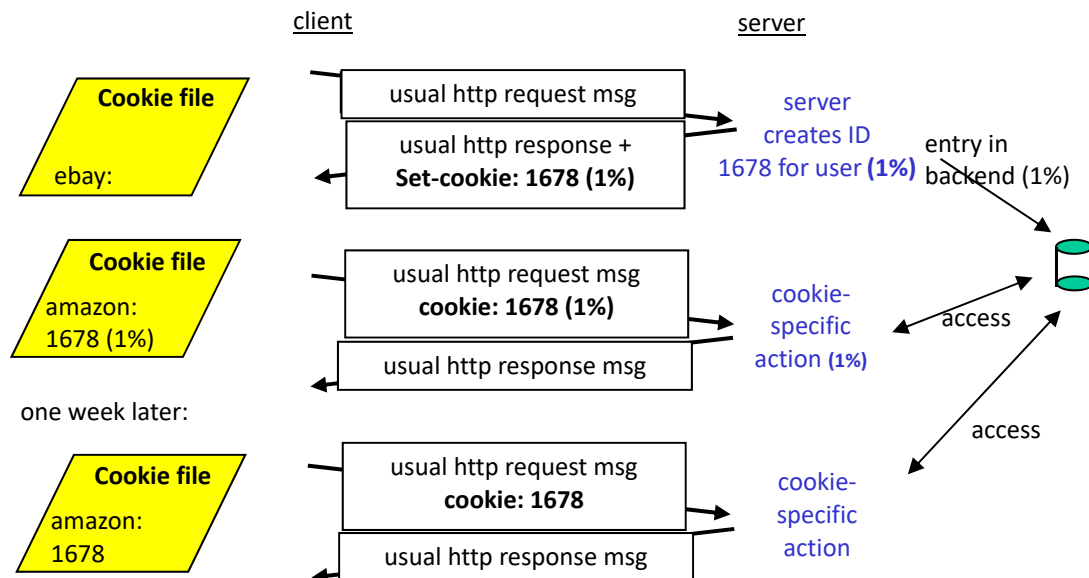
1. ADAAD ABBDB (3% each, 30% total)

11. Describe detailed operations of HTTP cookie, web caching and conditional GET. (6*3=18%) (說明其用處，並畫圖加解釋每步驟)

Ans:

☐ cookie:

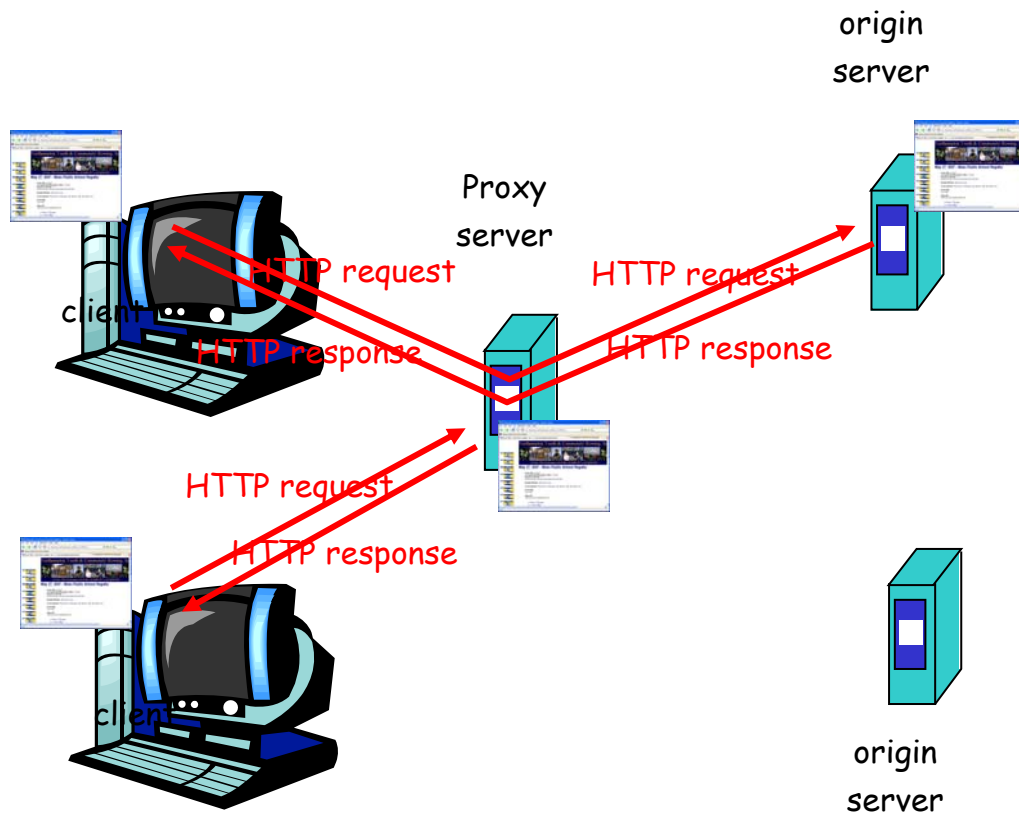
when a user visits a specific web site for first time and initial HTTP requests arrives at site, site creates a unique ID and creates an entry in backend database for recording user states of this ID.
=> keep client's states (cookie-specific action)!



☐ web caching:

- user sets browser: Web accesses via cache
- browser sends all HTTP requests to cache (2%)
 - if object in cache
 - cache returns object (2%)
 - else
 - cache requests object from origin server, then returns object to client (2%)

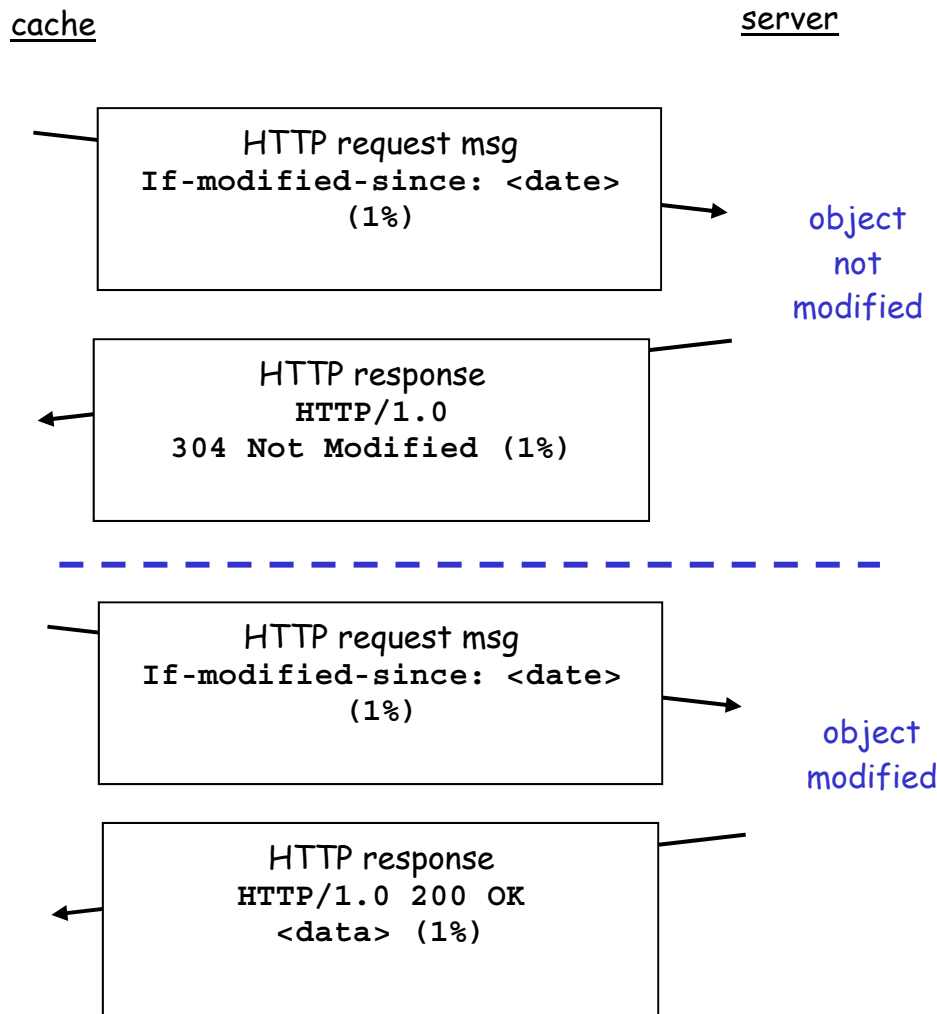
Computer Network Midterm 109-1



conditional GET (6%)

- Conditional GET: don't send object if cache has up-to-date cached version (1%) => reduce traffic loads (delays) on network links! (1%)
 - cache: specify date of cached copy in HTTP request (1%)
 - If-modified-since: <date>** (1%)
 - server: response contains no object if cached copy is up-to-date: (1%)
 - HTTP/1.0 304 Not Modified** (1%)

Computer Network Midterm 109-1



12. Consider a message that is to be sent from source to destination through 5 packet switches. Suppose each link is 10Mbps and the sum of each link's propagation, queuing, and processing delays is 10 msec. Suppose the message is segmented into 6000 packets, with each packet being 10000 bits long. How long (in second) does it take to move message from source to destination with message segmentation (12%) (要有中間過程的計算式或說明，以及最後答案)

Ans:

Time to send 1st packet from source host to first packet switch = $10000/10 \times 10^{-6} = 1$ msec. (4%)

Time at which 1st packet is received at the destination host = $(1+10)$ msec * 6 hops = 66 msec. (4%)

After this, every 1 msec one packet will be received; thus time at which last (6000th) packet is received = 66 msec + 5999×1 msec = 6.065 sec. (4%)

13. (a) Explain Internet protocol stack (1% each layer's name, 5% total) (b) Besides, you have to write the name of data unit of upper four layer. (寫出最上面四層資料單位的專有名稱，如 xx 層:yy) (4%) (9% total)

Ans:

(a)

application: supporting network applications (只需要寫每層的名字 1%)

transport: host-host data transfer

network: routing of datagrams from source to destination

link: data transfer between neighboring network elements

Computer Network Midterm 109-1

physical: bits “on the wire” (1% each layer’s name, 5% total)

application
transport
network
link
physical

(b)

application layer: message

transport layer: segment

network layer: datagram

link layer: frame

各 1% ， 共 4%

14. Consider the figure below, where a client is sending an HTTP GET message to a web server, gaia.cs.umass.edu. Suppose the client-to-server HTTP GET message is the following: (8%)

GET /kurose_ross/interactive/hello.htm HTTP/1.1

Host: gaia.cs.umass.edu

Accept: text/plain, text/html, text/xml, image/png, image/jpeg, audio/vnfwave, audio/basic, video/mpeg, video/wmv, application/, */**

Accept-Language: en-us, en-gb;q=0.6, en;q=0.1, fr, fr-ch, de, ar

If-Modified-Since: Mon, 13 Nov 2013 09:00:58 EST

User Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:10.0.2) Gecko/20100101 Firefox/10.0.2

Answer the following questions:

1. What tool can capture (“sniff”) messages being sent/received from/by your computer? (2%)
2. What header is used to show the native platform the browser is running on? (2%)
3. What is the name of the file that is being retrieved in this GET message? (2%)
4. What version of HTTP is the client running? (2%)

Ans:

1. The packet sniffer (Wireshark) (2%)
2. *User Agent:*. (2%)
3. The file being fetched is /kurose_ross/interactive/hello.htm (2%)
4. The client is running HTTP version 1.1. (2%)

Computer Network Midterm 109-1

15. Explain operations of the following protocols (3% each, 9% total)

- a. Nonpersistent HTTP with serial connections.
- b. Persistent HTTP with one connection.
- c. Persistent HTTP with pipelining

Ans:

- a. At most one object is sent over a TCP connection. (3%)
- b. Multiple objects can be sent over single TCP connection between client and server. (2%) The browser first waits to receive a HTTP response from the server before issuing a new HTTP request. (1%)
- c. persistent HTTP with pipelining:
The browser issues requests as soon as it has a need to do so, without waiting for response messages from the server. (3%)

16. Explain the following terms (a) bandwidth (2%) (b) IETF RFC (2%) (c) Network Throughput (2%) (d) Which two identifiers are used to identify a process? (2%) (e) Which program can provide delay measurement from source to router along end-end Internet path towards destination? (2%) (f) peer-to-peer mode (3%) (13% total)

Ans: (a) bandwidth: link transmission rate (2%)

(b) IETF RFC: Internet standards (2%)

(c) Network Throughput: rate (bits/time unit) at which bits transferred between sender/receiver (2%)

(d) Identifier includes both IP address and port numbers associated with process on host (2%)

(e) Traceroute (2%)

(f) peer-to-peer: (3%)

no always-on server (1%)

arbitrary end systems directly communicate (1%)

peers are intermittently connected and change IP addresses (1%)