



Application Layer , HTTP

Lec 8

Web and HTTP

First some jargon

- **Web page** consists of **objects**
- Object can be HTML file, JPEG image, Java applet, audio file,...
- Web page consists of **base HTML-file** which includes several referenced objects
- Each object is addressable by a **URL**
- Example URL:

`www.someschool.edu/someDept/pic.gif`

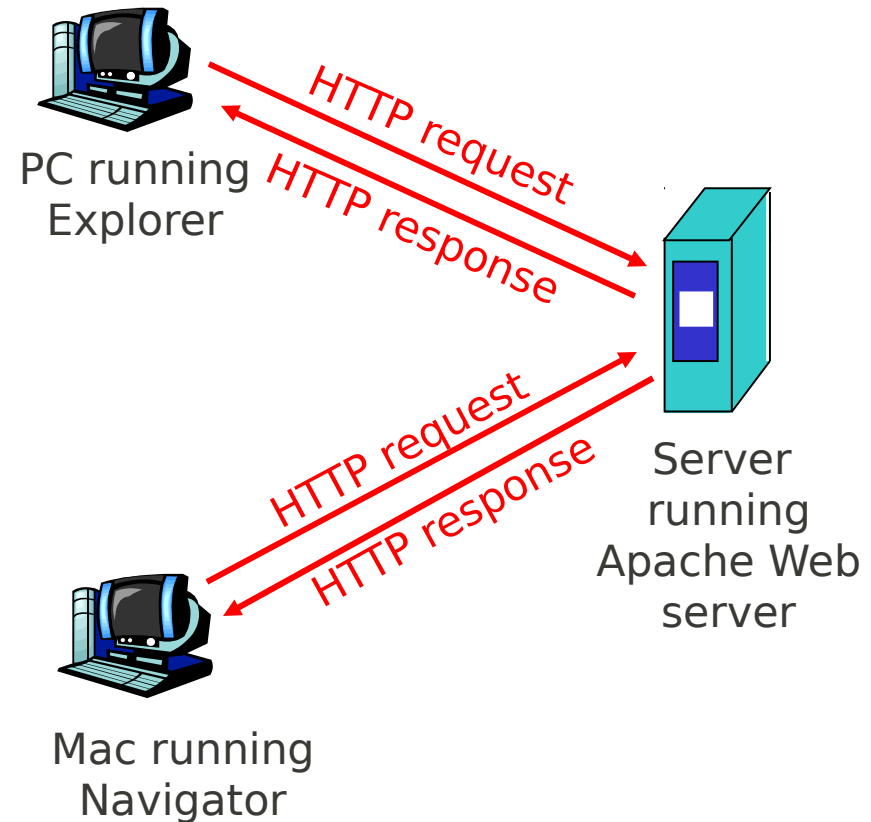
host name

path name

HTTP overview

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
- HTTP 1.0: RFC 1945
- HTTP 1.1: RFC 2068



HTTP overview (continued)

Uses 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

HTTP is “stateless”

- server maintains no information about past client requests

aside

Protocols that maintain “state” are complex!

- past history (state) must be maintained
- if server/client crashes, their views of “state” may be inconsistent, must be reconciled

HTTP connections

Nonpersistent HTTP

- At most one object is sent over a TCP connection.
- HTTP/1.0 uses nonpersistent HTTP

Persistent HTTP

- Multiple objects can be sent over single TCP connection between client and server.
- HTTP/1.1 uses persistent connections in default mode

Nonpersistent HTTP



(contains text,
references to 10
jpeg images)

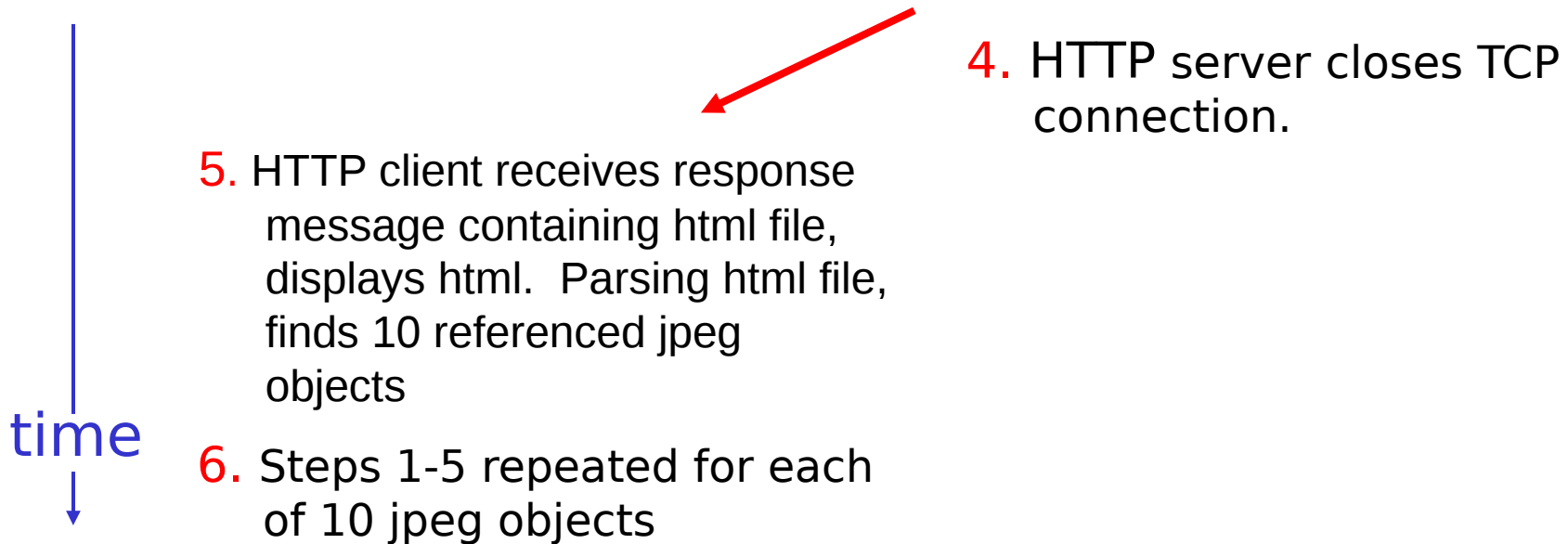
Suppose user enters URL

`www.someSchool.edu/someDepartment/home.index`

- 1a. HTTP client initiates TCP connection to HTTP server (process) at `www.someSchool.edu` on port 80
- 1b. HTTP server at host `www.someSchool.edu` waiting for TCP connection at port 80. "accepts" connection, notifying client
2. HTTP client sends HTTP *request message* (containing URL) into TCP connection socket. Message indicates that client wants object `someDepartment/home.index`
3. HTTP server receives request message, forms *response message* containing requested object, and sends message into its socket

time
↓

Nonpersistent HTTP (cont.)



Non-Persistent HTTP: Response time



Definition of RTT: time to send a small packet to travel from client to server and back.

Response time:

- one RTT to initiate TCP connection
- one RTT for HTTP request and first few bytes of HTTP response to return
- file transmission time

total = 2RTT + transmit time

