Sessions

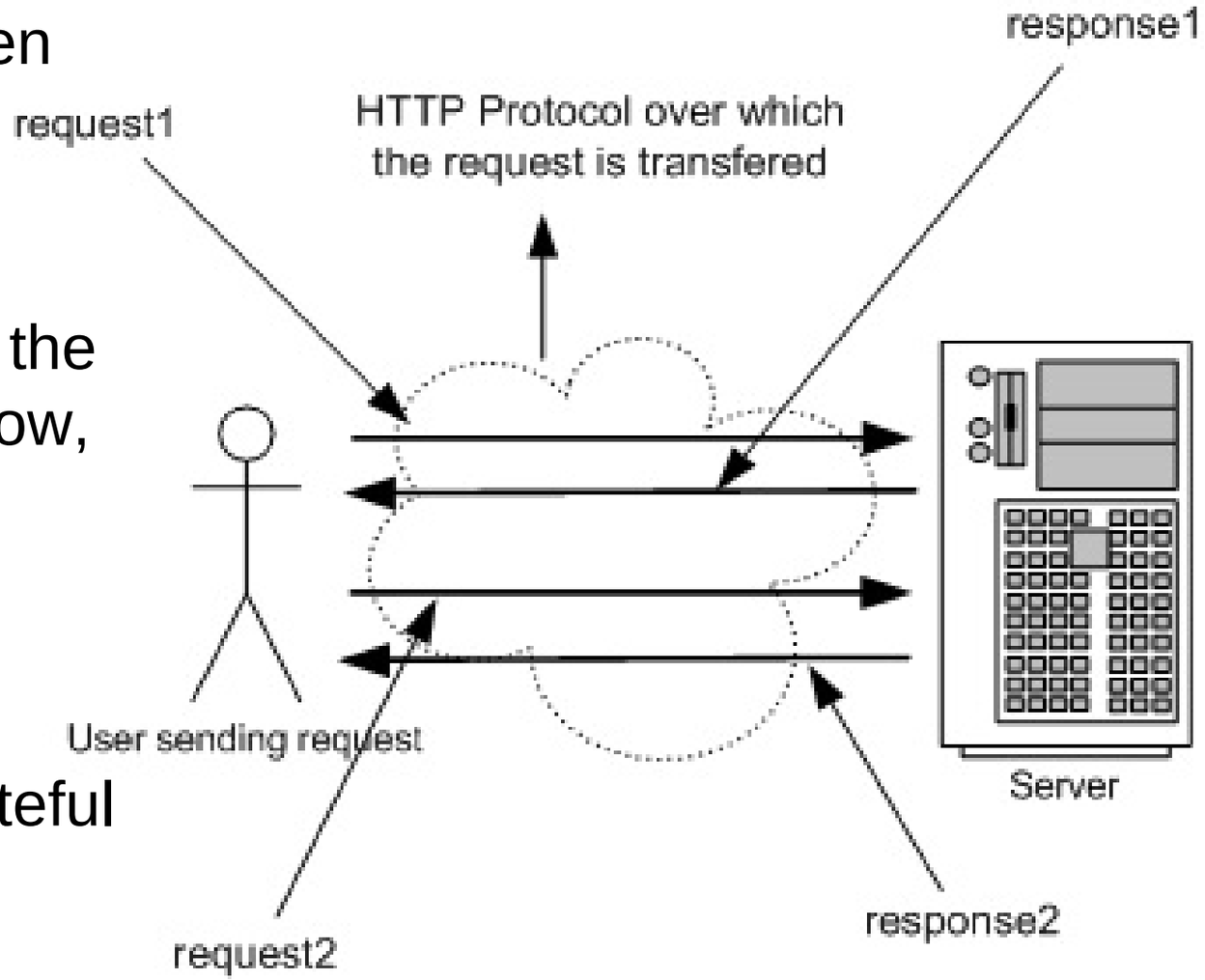
Web Development

How to Make an Application out of a Web Page?

- On the internet, a web page is a web page is a web page…
  - If you surf from ./page1.html to ./page2.html these are two unique requests.
  - The server doesn‘t know anything about the fact that both pages are visited by the same user.
- Sessions are the technique used to logically group several requests into a “group“ (called a session)
- If you start a session, the server will know that it‘s still the same user who surfed from ./page1.html to ./page2.html

Sessions

- HTTP itself is “stateless”
  - no state stored on the server between requests from the same client
- but many web apps are stateful
  - necessary to connect requests from the same user / browser / browser-window, e.g. shopping cart, appointments calendar etc...
- *Session*
  - multiple requests performed in a stateful context
- *Session tracking*
  - technique that allows sessions in stateless environments

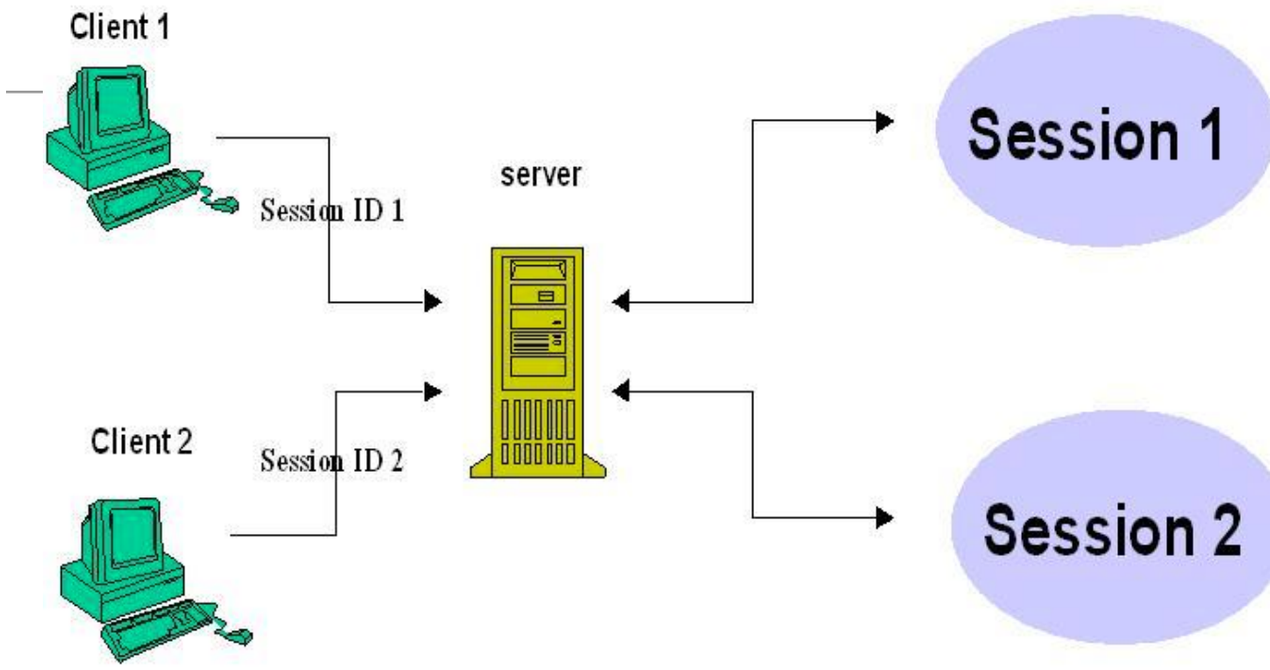


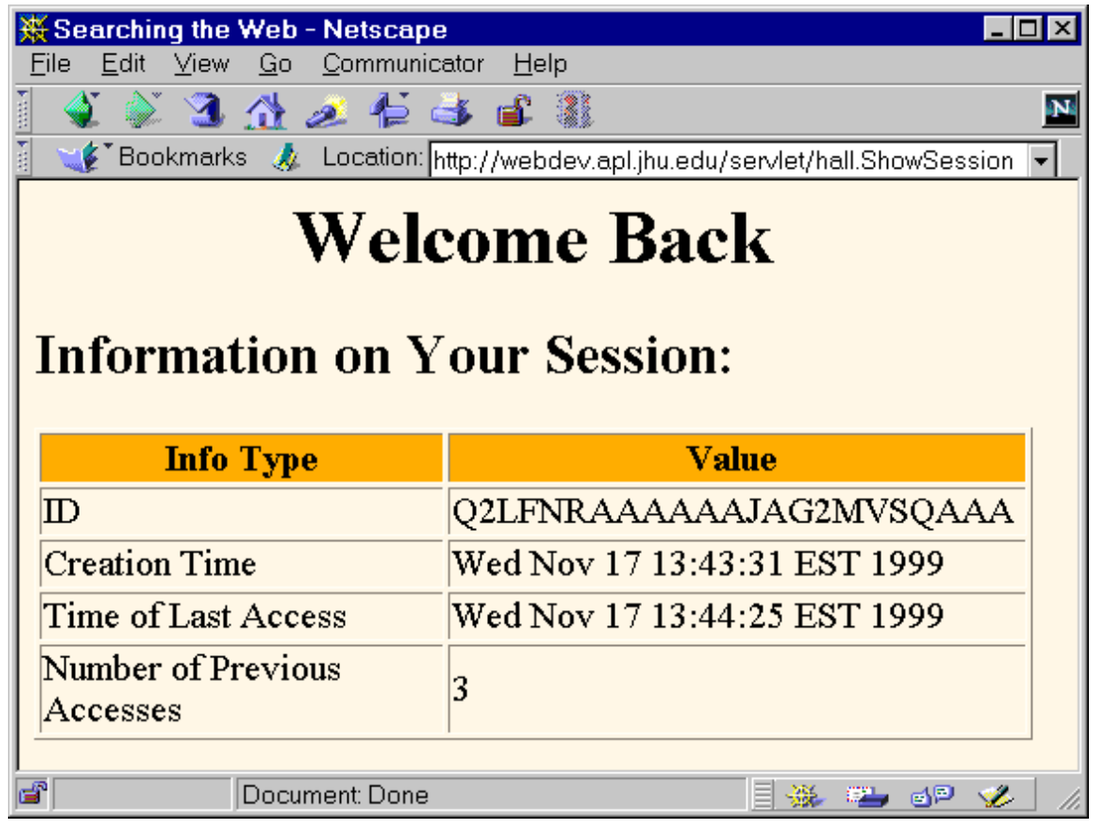
Sessions

- HTTP protocol is stateless by design, each request is done separately and is executed in a separate context.
- The idea behind *session management* is to put requests from the same client in the same context.
- This is done by issuing an identifier by the *server* and sending it to the *client*, then the client would save this identifier and resend it in subsequent requests so the server can identify it.

Session Tracking

- User surfs to http://demo.com
  - Server (on 1st request / if no sessionID stored on client)
    - generates unique session id, which is mapped to ...
    - ... a session-object
      - stored in memory (lost on shutdown), in a file or in database
      - can contain anything (list of articles, game state, counters, ...)
    - Session id is added to the response
- from now on:
  - each subsequent request from the same user (browser) must contain the session id ...
  - ... which is used by the server to map to the session-object
- No data gets stored on the client, except SessionID





Session Management

- **Session management** refers to the way web servers and web applications track a given user's interactions throughout their site pages while preserving their state between navigation.

- Due to the nature of HTTP, the protocol includes no built-in facility to uniquely identify or track a particular customer (or session) within an application without transmitting some data between the client and the server.

- Typically, the process of managing the state of a web-based client is through the use of session IDs. Session IDs are used by the application to uniquely identify a client browser, while background (server-side) processes are used to associate the session ID with the existing state of the user.

Session Tracking Techniques

Cookies

1. Server creates a cookie with session-id on first request

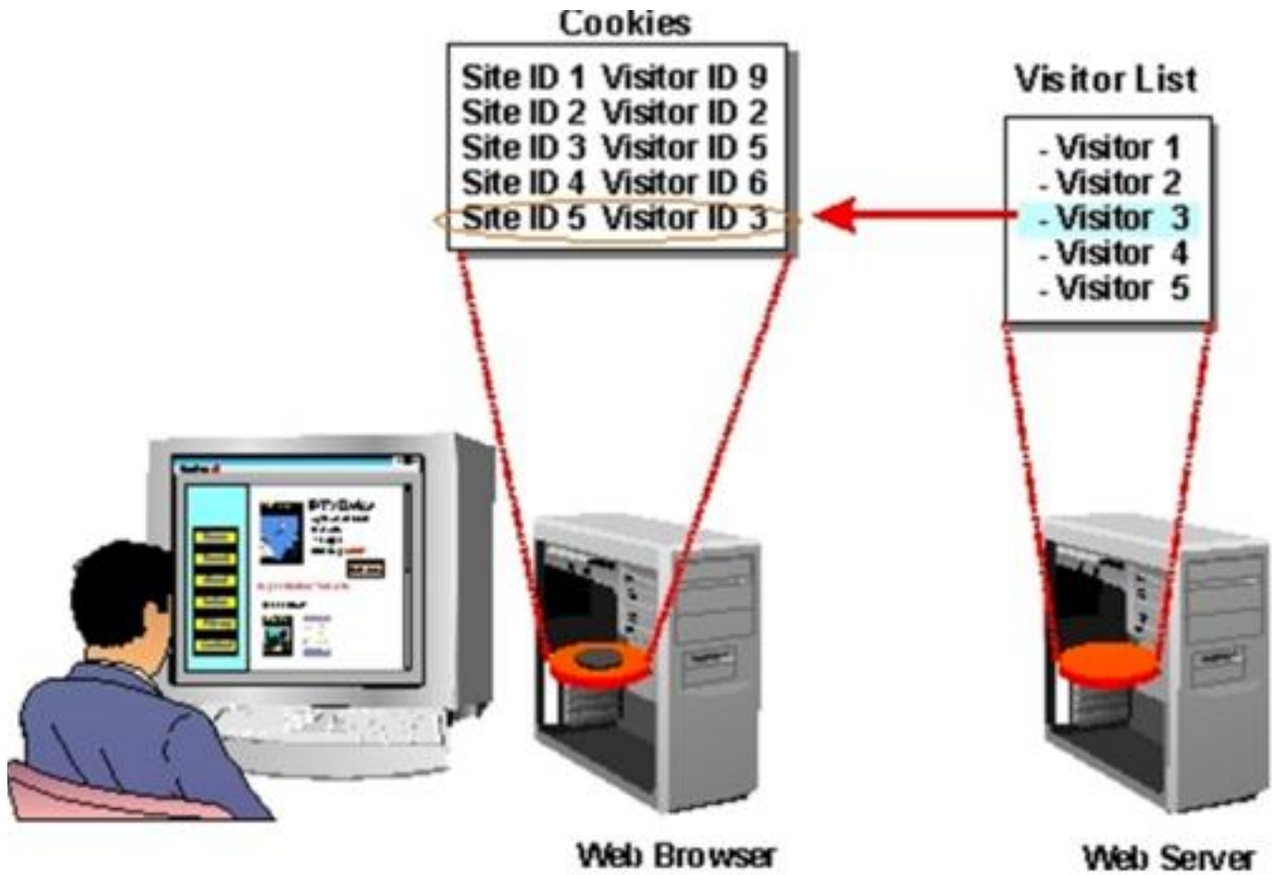
2. Server maps id to a new user-specific session object

3. The session-id is sent to the client with the first response

4. ..and automatically added by the browser on each further request (to the same address/domain/…)

5.Server receives request + cookie with session-id

6.Server maps session-id to session-object



URL Rewrite

- Basic idea:
  - Server adds the session-id to all links the user can follow
    - http://server/myhome
  - is changed to
    - http://server/myhome?sessionid=123
  - session-id must be dynamically added
    - functionality usually offered by scripting frameworks

Hidden Form Fields

- In HTML, we can define "hidden" fields in a form
  - <input type="hidden" name="sessionid" value="123">
- These fields are not visible and cannot be changed by the client
- Usage:
  - server creates a session-object for each client and generates a unique ID
- When HTML documents are created and sent back, the hidden form field is automatically generated containing the actual ID
- Upon form submit, the session ID is automatically sent back to the server
- The server can associate this call with an already existing session

Web Frameworks

- Cookies generally preferred.

- However, framework will try to ‘abstract away’ specific session management technology, and deliver simpler abstraction to the programmer

- Framework may in fact be able to switch between different techniques depending on circumstances.