CS3220 Web and Internet Programming

Cookies and Session Tracking

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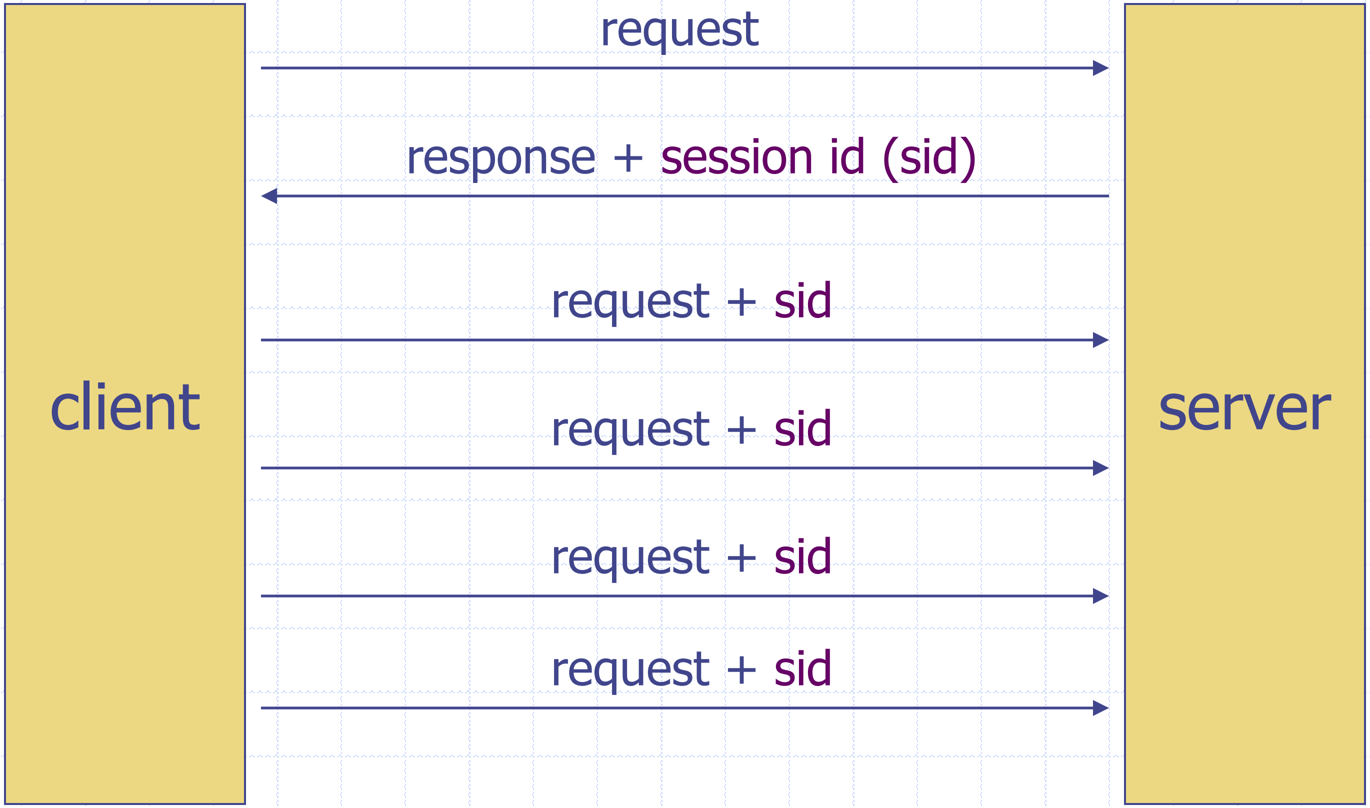
Session Tracking

- The Need
  - shopping cart, personalization, ...
- The Difficulty
  - HTTP is a “stateless” protocol
  - Even persistent connections only last seconds
- The Trick?

General Idea



Three Ways to Implement Session Tracking

- URL Re-writing
  - E.g. `http://csns.calstatela.edu/index.html;jsessionid=748D9512C9B19B0DCC9477696A88CF12`
- Hidden form fields
- Cookies

Cookies

- Set by the server as a *response header* Set-Cookie
- Added to each subsequent request by the browser as a *request header* Cookie

HTTP Response Example

```
HTTP/1.1 200 OK
Date: Mon, 11 Apr 2011 16:53:26 GMT
Set-Cookie: JSESSIONID=7E3019D5D76D41E0B42FC1410B0A; Path=/
Content-Type: text/html;charset=ISO-8859-1
Content-Language: en-US
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 2208
Keep-Alive: timeout=15, max=100
Connection: Keep-Alive

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html><head><title>CSNS</title></head>
… …
```

HTTP Request Example

```
GET /img/style/title_bg.gif HTTP/1.1
Host: csns.calstatela.edu
User-Agent: Mozilla/5.0 (Windows NT 6.0; rv:2.0) Firefox/4.0
Accept: image/png,image/*;q=0.8,*/*;q=0.5
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip, deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 115
Connection: keep-alive
Cookie: JSESSIONID=7E3019D5D76D41E0B42FC1410B0A
```

View Cookies in a Browser

- View cookies for the current page using Developer Tools
  - Chrome: Application → Storage → Cookies
  - Firefox: Storage → Cookies

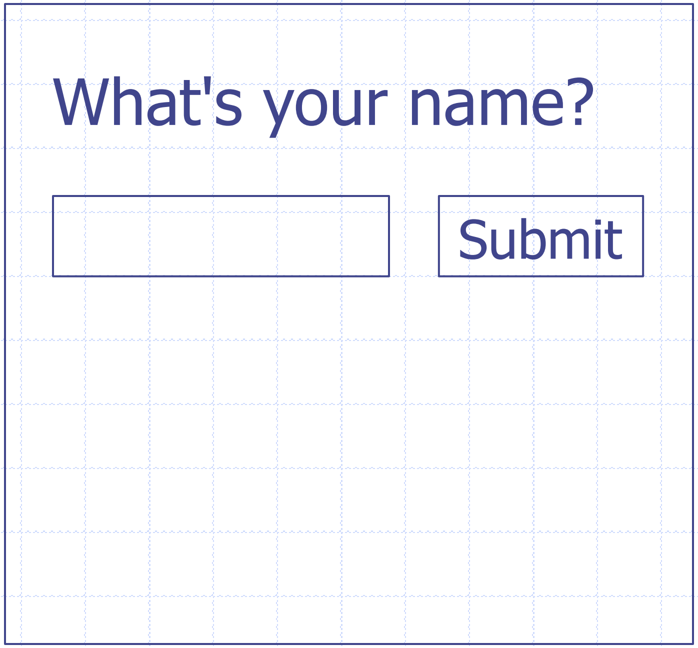
Cookie Attributes

- Name, Value
- Host/Domain, Path
  - Controls whether the cookie should be included in a request
- Require secure connection
- HttpOnly
  - Cannot be accessed by client-side scripts
- Max age
- Comment

Servlet Cookie API

- Cookie
  - http://download.oracle.com/javaee/7/api/javax/servlet/http/Cookie.html
- HttpServletResponse
  - addCookie(Cookie)
- HttpServletRequest
  - Cookie[] getCookies()

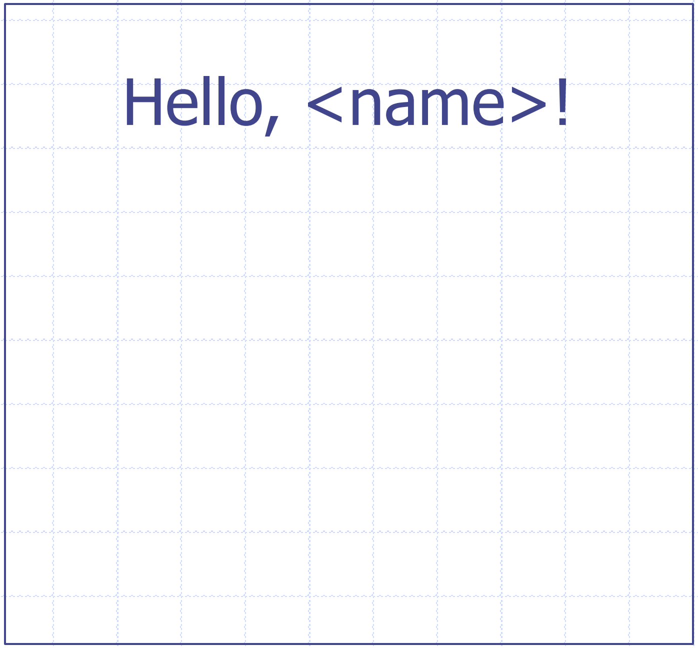
Example: Who Are You



What's your name?

Submit

First Request



Hello, <name>!

Subsequent Requests

Cookie or No Cookie?

- Is cookie a potential security problem?
  - Virus?
  - DoS?
- How about privacy?
  - It is indeed a privacy concern
  - You can configure how cookies are handled in your browser settings

Problems with Cookies

- Cookies have size limit
- Malicious users can fake cookie data
- Sometimes cookie is disabled in browser
- Cookie API is somewhat tedious to use

Servlet Session Tracking API

- HttpServletRequest
  - HttpSession getSession()
- HttpSession
  - http://download.oracle.com/javaee/7/api/javax/servlet/http/HttpSession.html
  - setAttribute(String, Object)
  - getAttribute(String)
  - invalidate()

About Session Tracking API

- Data is stored on the server, i.e. no size limit
- Each session is assigned a unique *session id*, which is used to access data associated with the session
- Session id is randomly generated and hard to fake
- Session tracking use cookie by default, but can automatically switch to URL rewriting if cookie is disabled

Example: GuestBook Using Session Tracking API

- Use Session Tracking API to remember the name of the user who left a message

Application Scope vs Session Scope

Data in Application Scope	**Data in Session Scope**
Accessible to all servlets	Accessible to all servlets
Shared by all users	Specific to a user

You can simulate two users using two browsers or Private/Incognito tabs in a browser.

Session Configuration in web.xml

- Default session timeout in Tomcat is 30 minutes
- Session timeout can be changed in web.xml
  - The timeout value must be an integer
  - Session never timeout if value <= 0

```
<session-config>
    <session-timeout>60</session-timeout>
</session-config>
```