The World Wide Web (WWW): Cookies

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Cookies

- HTTP is a stateless protocol, but servers like to maintain state specific to a user

  - E.g. shopping cart info; user's preference settings; browsing activity; state of user login

- Solution: Cookies

  - Server sends 'small amount of data (cookie)' to store at client   ⌐ amazon.com

  - Every time client contacts the server (same domain), browser sends cookie (of the domain) to server

Cookie Structure

300 - Total

20 - Per Domain

Browsers need to support at least 4KB cookie size

- Name of cookie

- Value of cookie

- Expiry of cookie

- Path the cookie is good for   /account

- Domain of the cookie   amazon.com

- Type of connection needed

Example

- Browser to Server

  Post /users/info HTTP/1.1

  [form contents which includes user identification]

- Server to Browser

  HTTP/1.1 200 OK

  Set-Cookie: Customer="Pappu"

  (Server also maintains an entry in backend database)

Example

- Browser to Server

  GET /info.html HTTP/1.1

  Cookie: Customer="Pappu"

[Server accesses backend to retrieve information logged and acts accordingly]

Privacy and Third-party Cookies

- A web page (a given domain) may contain objects (e.g. Ads) from other domains

- Cookies set when retrieving those objects are called third-party cookies

- Third party cookies can help track user browsing habits

Tracking

www.xyz.com

- Website A can have an AD object
  http://maliciousads.com/65438990.jpg

- User visits A and contacts maliciousads.com to retrieve image

- maliciousads returns a cookie (first time user) containing id 11111 and notes against this id IP address and website A

  – 65438990 is associated with website A

- User visits website B with an AD object http://maliciousads.com/91538793.jpg

- When user requests above image, it also includes all cookies associated with the domain
  - Cookie: 11111

- Maliciousads now knows user 1111 visited website B
  - 91538793 is associated with website B

Browser Settings

- Can see and selectively delete current cookies

- Can disable third-party cookies

- Can disable cookies completely as well

- There also cookie-eating software you can install that give more fine grained control

Summary

- Cookies can provide useful features by enabling state maintenance via HTTP

- Cookies can also lead to privacy violations