THE WORLD WIDE WEB
Outline

→ A recipe for success
→ The hyper-text transfer protocol
→ Advanced features
→ Performance improvement
A RECIPE FOR SUCCESS
A Web of Documents

Web pages contain references to others
A World Wide Web (WWW) “Anywhere” in the Internet
The Ingredients

→ Servers
→ Clients (browsers)
→ Document format (HTML)
→ Identifiers (URIs)
→ Protocol (HTTP)
Web Pages

→ Different objects combined in a framework

→ Multimedia
→ Hyper-Text Markup Language

→ Some objects are “sensitive”
Universal Resource Identifier (URI)

→ Identifies each object (resource)

→ Where to find it
  → URL: Universal Resource Locator

→ How to get it
  → Protocol
Universal Resource Identifier (URI)

http://www.polito.it/teach/cn/main.htm#bib

- Schema (protocol) and URI format
- Host (server)
- Path
- Object (document)
- Anchor
- Port
  - http://12.18.43.2:8080
List of Publications of Mario Baldi

Books


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Books


</body>
</html>
Web Browsers

- “Visualize” pages
- Download a new one upon a click
- Support several protocols
  - HTTP, FTP, SIP
- Object types
  - Images, video, sound
Success Factors

→ Intuitive
→ “Colorful”
→ Multimedia
HYPER-TEXT TRANSFER PROTOCOL (HTTP)
Features

→ Text based
→ Client-server
→ Based on TCP

→ Opened by client
→ Usually port 80 (server)
Request (C)-Response (S) Protocol

TCP Open

HTTP Request

HTTP Response

Stateless
Message Format

Request/Status Line

Header Field [<name>:<value>]

[CR LF]

Header Field [<name>:<value>]

Body

Header lines
Request Line
  <method> <URL> <ver>

➞ Methods
  ➞ GET, POST, PUT, HEAD

➞ Version
  ➞ HTTP/1.0
  ➞ HTTP/1.1
Sample Request Message

GET /baldi/pubs/index.htm HTTP/1.1
Host: staff.polito.it
User-Agent: Mozilla/5.0
Accept: text/html,application/xhtml
Accept-Language: en-us
Accept-Encoding: gzip, deflate
Connection: keep-alive
Status Line

<ver> <status code>

→200 OK
→301 Moved Permanently
→400 Bad Request
→404 Not Found
→500 Internal Server Error
Sample Response Message

HTTP/1.1 200 OK
Date: Sat, 15 Jun 2013 21:17:27 GMT
Server: Apache
Accept-Ranges: bytes
Content-Length: 93589
Keep-Alive: timeout=15, max=97
Connection: Keep-Alive
Content-Type: text/html

<html><head>
Status Code Categories

- 2xx Success
- 3xx Redirection
- 4xx Client problem
- 5xx Server problem
ADVANCED FEATURES
Authentication

To view this page, you must log in to this area on agateway.adp.com:443:

Portal Access [17:44:30:9112]

Your login information will be sent securely.

Name: [Field]

Password: [Field]

[ ] Remember this password in my keychain

[ ] Cancel [ ] Log In

- First Time Users Register Here
- Need Help Getting Started?
- Update My Security Profile
- Change your Password
- Make This Site Your Home Page
- Forgot your User Id
- Forgot your Password

©2013 Automatic Data Processing, Inc.
Authentication

GET ...

401 Unauthorized
WWW-Authenticate: <chlg>

GET ...
Authorization: <cred>

200 OK

GET ...
Authorization: <cred>
Cookie

→ Mechanism for the server to identify a returning client

→ Enables stateful interaction
   → E.g. shopping chart
   → User preferences
PERFORMANCE IMPROVEMENT
Caching

- Clients store pages and objects
- What if they change?
  - HEAD method
  - If-modified-since: <date> header
    - 304 Not Modified
Proxy

→ Reduce traffic
→ URL filtering
→ Centralized monitoring
→ Client protection
Content Delivery Network (CDN)