Project 2 Discussion

Ming Liu

Project Overview

- In this assignment, you will implement a HTTP proxy that passes requests and data between multiple web clients and web servers, concurrently.
  - ✓Capable of both relaying HTTP requests and HTTP CONNECT tunneling
  - ✓For non-CONNECT HTTP requests, you'll slightly edit the HTTP request header and communicate between the web browser and the origin server
  - ✓For CONNECT HTTP requests, you'll establish a TCP connection between the browser and the remote server then any data can be passed through
  - ✓Capable of handling the traffic caused by real user browsing

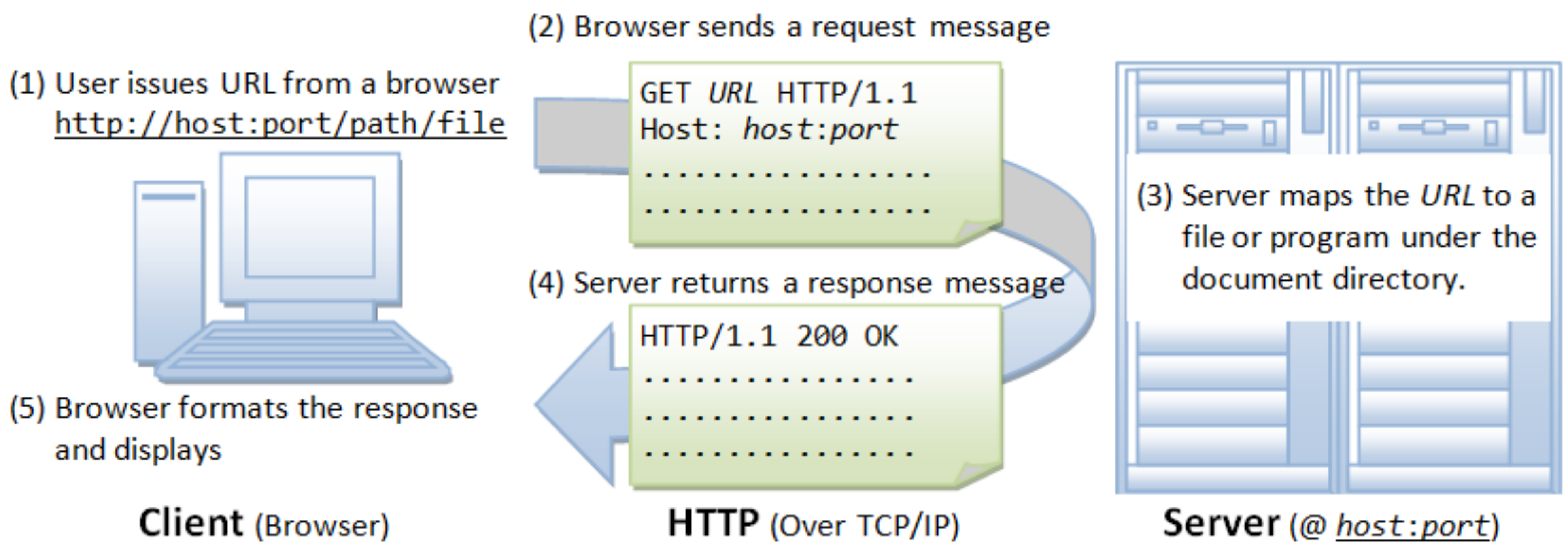
HTTP

- The Hypertext Transfer Protocol (HTTP) is the protocol used for communication on this web
- It defines how your web browser requests resources from a web server and how the server responds
  - ✓ Version 1.0 of the HTTP protocol
  - ✓ RFC 1945
- HTTP communications happen in the form of transactions
  - ✓ A client sending a request to a server and then reading the response

HTTP request and response message format

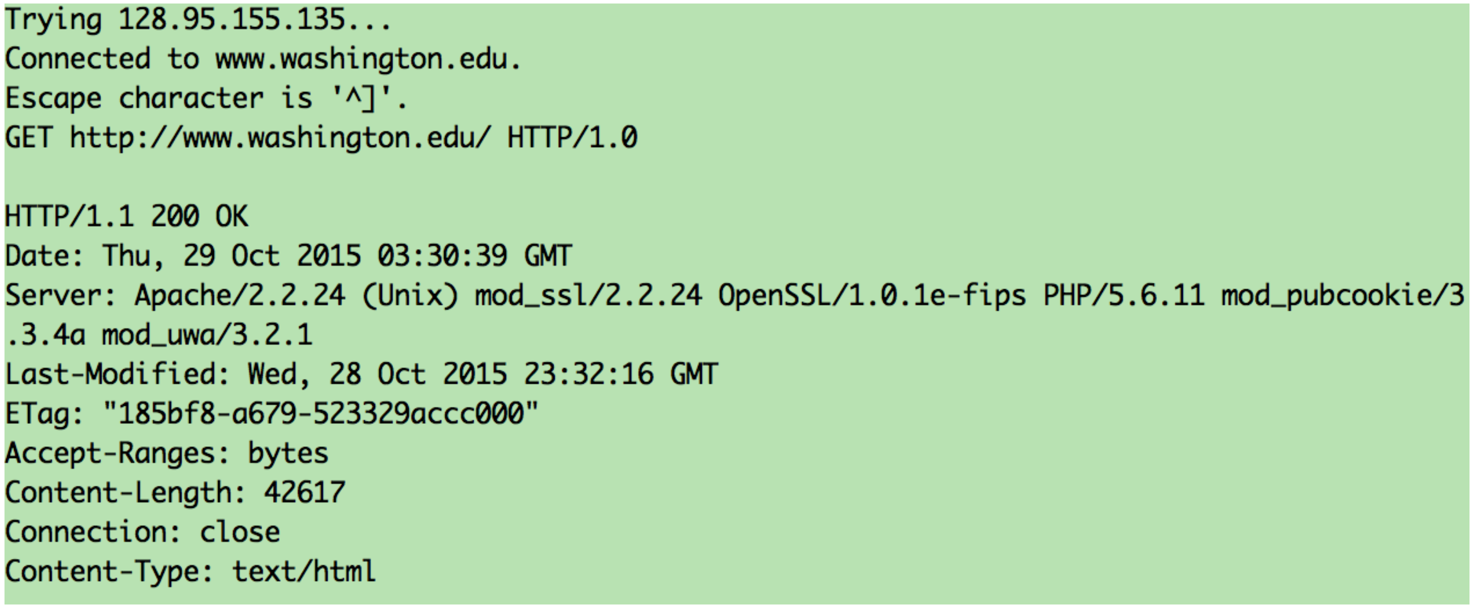
- An initial line (a request or response line, as defined below)
- Zero or more header lines
- A blank line (CRLF)
  - ✓The initial line and header lines are each followed by a "carriage-return line-feed" (\r\n) signifying the end-of-line
- An optional message body

HTTP protocol


(2) Browser sends a request message
(1) User issues URL from a browser
http://host:port/path/file
GET *URL* HTTP/1.1
Host: *host*:*port*
....
....
(3) Server maps the *URL* to a file or program under the document directory.
(4) Server returns a response message
HTTP/1.1 200 OK
....
....
....
(5) Browser formats the response and displays
Client (Browser)
HTTP (Over TCP/IP)
Server (@ *host*:*port*)

Demo

- *telnet* www.washington.edu 80
  - ✓ Telnet is an application layer protocol

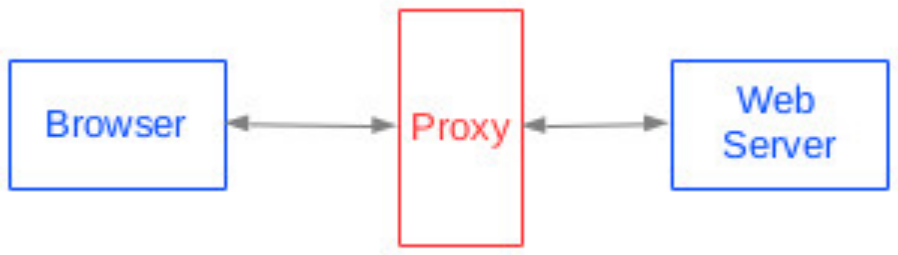


```
Trying 128.95.155.135...
Connected to www.washington.edu.
Escape character is '^]'.
GET http://www.washington.edu/ HTTP/1.0

HTTP/1.1 200 OK
Date: Thu, 29 Oct 2015 03:30:39 GMT
Server: Apache/2.2.24 (Unix) mod_ssl/2.2.24 OpenSSL/1.0.1e-fips PHP/5.6.11 mod_pubcookie/3
.3.4a mod_uwa/3.2.1
Last-Modified: Wed, 28 Oct 2015 23:32:16 GMT
ETag: "185bf8-a679-523329accc000"
Accept-Ranges: bytes
Content-Length: 42617
Connection: close
Content-Type: text/html
```

HTTP Proxy

- Proxies are an example of the use of "interposition" - placing something between two things that communicate using a well-defined interface.

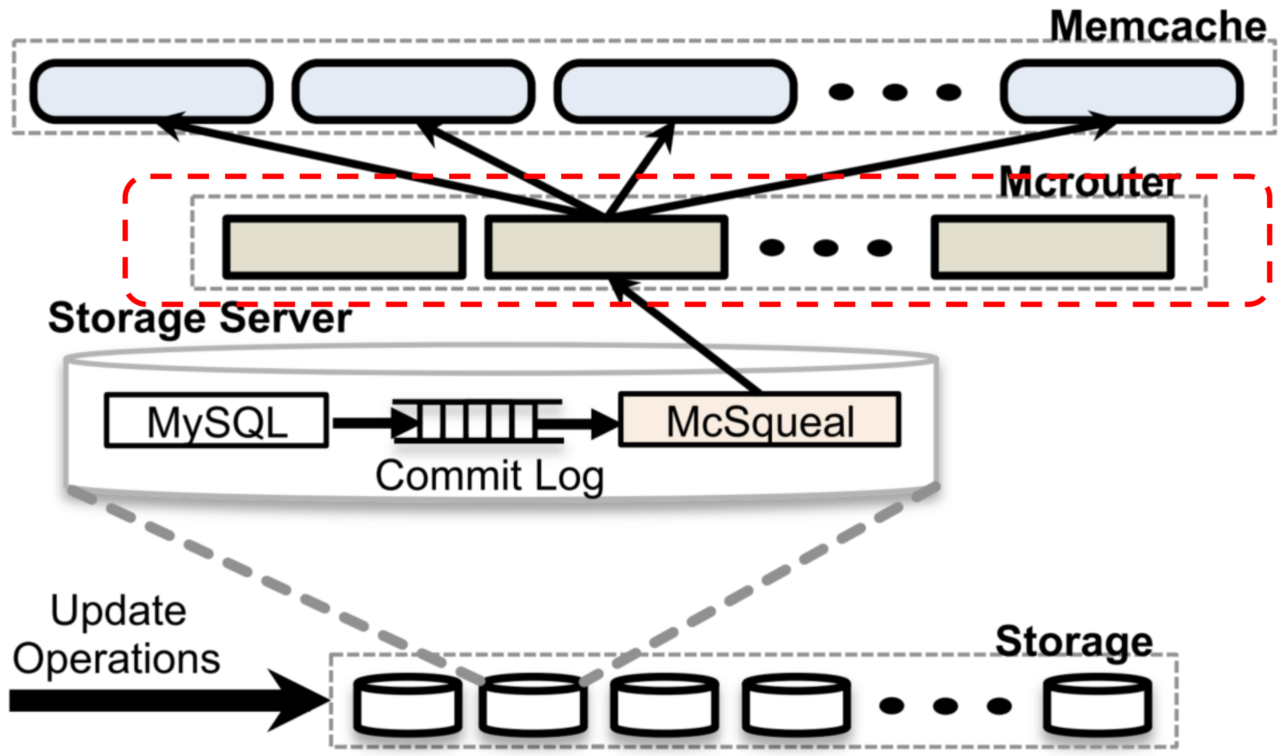


✓Monitoring or debugging (by capturing a log of browser requests and server responses)

✓Improve performance by maintaining a cache of web pages

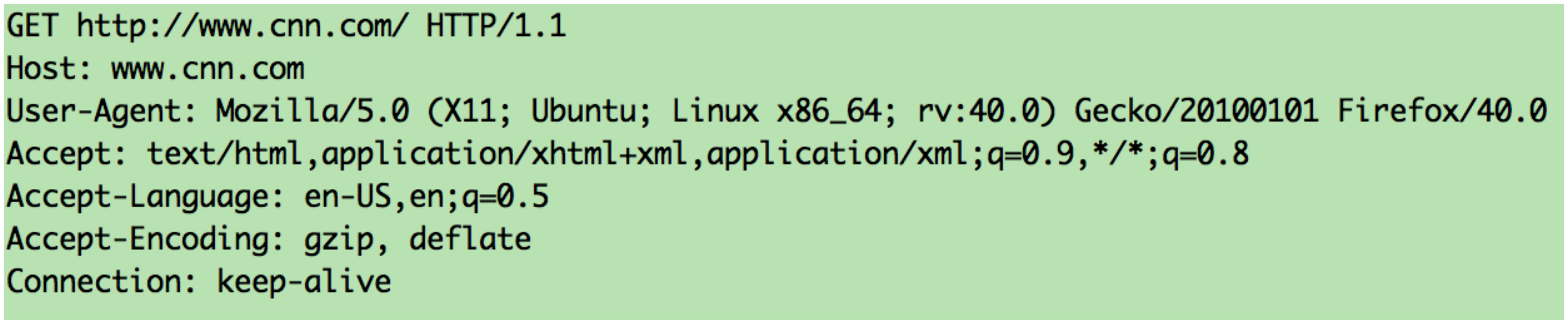
✓Enforce some policy about which sites can be accessed.

More proxy example: FB Memcached



Assignments Details 1

- Fetch the request page from the origin web server and return it to the browser
- Print out the first line of each HTTP request
- Demo



```
GET http://www.cnn.com/ HTTP/1.1
Host: www.cnn.com
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:40.0) Gecko/20100101 Firefox/40.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
```

Assignments Details 2

- Determine the web server's address
  - ✓ Parse the header and find the Host line
- Turn off keep-alive
  - ✓ keep-alive → close
- Change HTTP version
  - ✓ Lower the version of the request to HTTP 1.0
- HTTP CONNECT tunneling
  - ✓ A two-hop TCP connection between the client and some server via Proxy
  - ✓ Forward to the server any bytes it receives after the request header on its connection with the client
  - ✓ Forward to the client any bytes it receives on its connection with the server

Restrictions

- TCP socket
- Any method
- Any language
- run script
- Testing
  - ✓ Configuring the Firefox
  - ✓ Check sample outputs → Don’t need to be exactly the same.
- Demo