

HTTP

Hypertext Transport Protocol

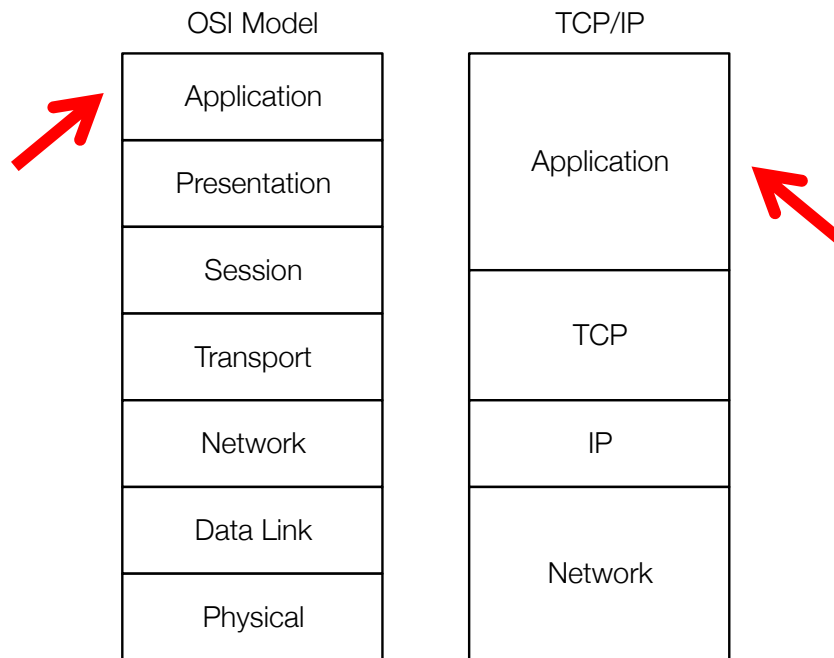


Terminology

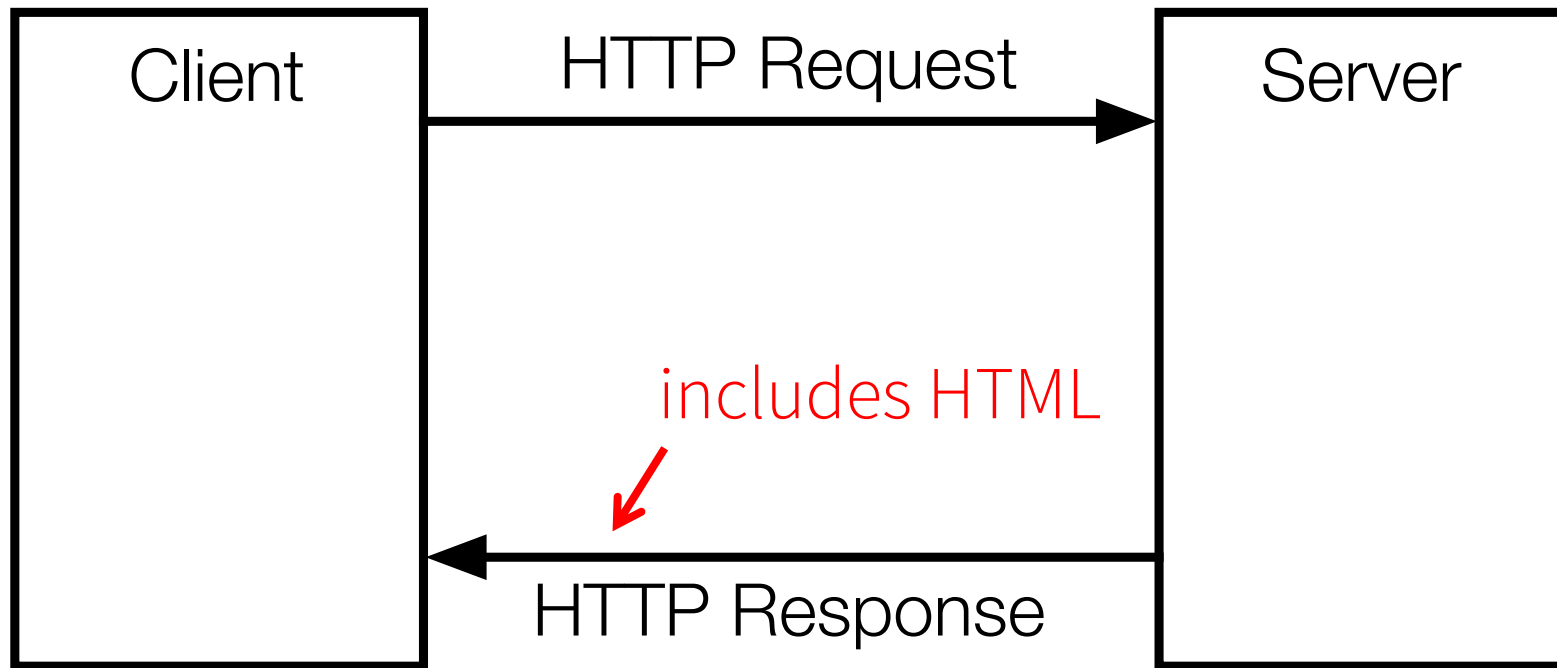
- **Uniform Resource Locator (URL)**
 - Used to identify webpages and other resources
- **Hypertext Transport Protocol (HTTP)**
 - Used to transfer webpages from server to browser
- **Hypertext Markup Language (HTML)**
 - Used to create webpages, parsed by browser



Application-Level Protocol



Client/Server Architecture



HTTP Requests

- **Versions**

- HTTP/1.1 Specification

<http://www.w3.org/Protocols/rfc2616/rfc2616.html>

- HTTP/1.0 Specification

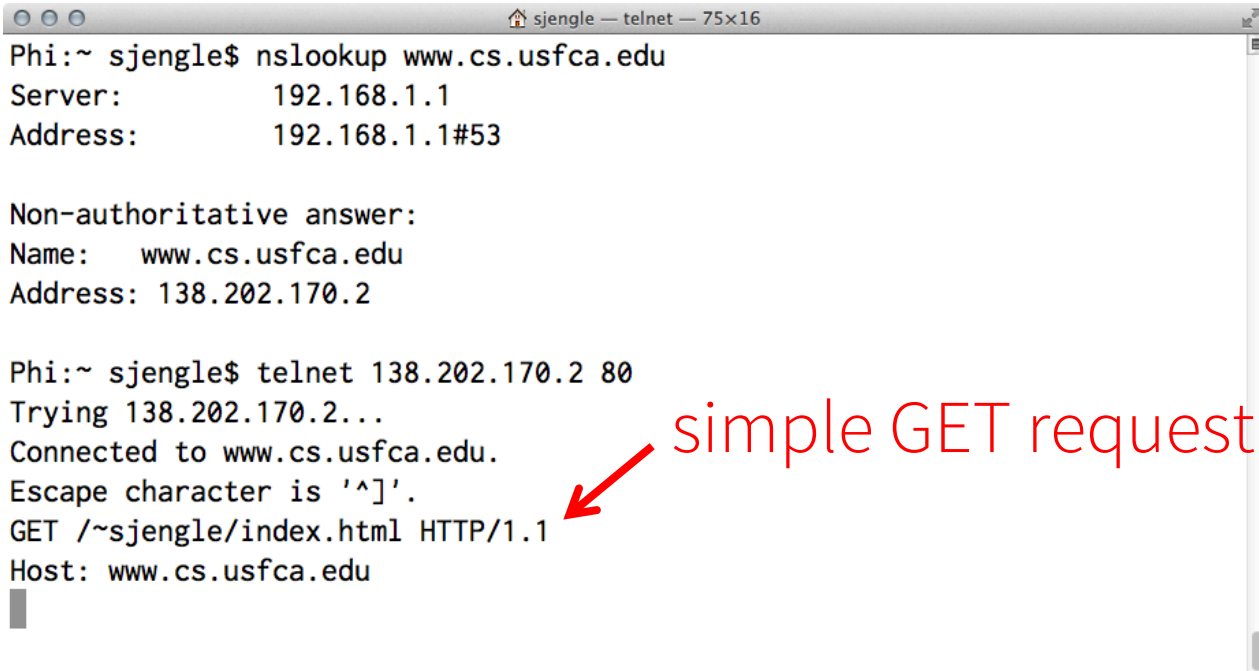
<http://www.w3.org/Protocols/rfc1945/rfc1945.txt>

- **Request Types**

- GET: Requests or “gets” a resource
 - POST: Submits or “posts” a resource



HTTP/1.1 GET Request

A terminal window titled 'sjengle — telnet — 75x16' showing a series of commands and their outputs. The first command is 'nslookup www.cs.usfca.edu', which returns the IP address 192.168.1.1. The second command is 'telnet 138.202.170.2 80', which connects to the host and shows the 'GET /~sjengle/index.html HTTP/1.1' request. A red arrow points from the text 'simple GET request' to the 'GET' part of the request line.

```
Phi:~ sjengle$ nslookup www.cs.usfca.edu
Server:          192.168.1.1
Address:         192.168.1.1#53

Non-authoritative answer:
Name:   www.cs.usfca.edu
Address: 138.202.170.2

Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
GET /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu
```

simple GET request



HTTP/1.1 GET Response



```
sjengle — bash — 75x16
GET /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu

HTTP/1.1 200 OK
Date: Wed, 04 Apr 2012 03:39:15 GMT
Server: Apache/2.2.3 (CentOS)
Accept-Ranges: bytes
Content-Length: 3697
Connection: close
Content-Type: text/html; charset=UTF-8

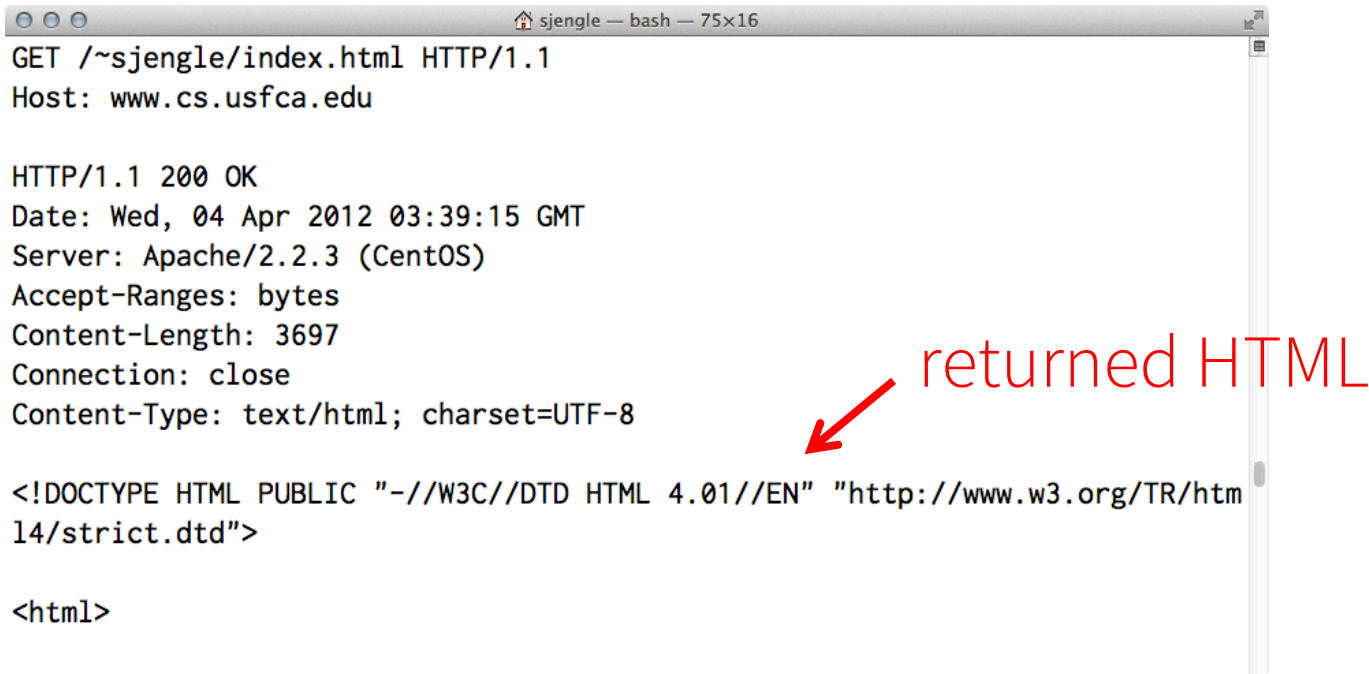
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">

<html>
```

returned headers



HTTP/1.1 GET Response



```
sjengle — bash — 75x16
GET /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu

HTTP/1.1 200 OK
Date: Wed, 04 Apr 2012 03:39:15 GMT
Server: Apache/2.2.3 (CentOS)
Accept-Ranges: bytes
Content-Length: 3697
Connection: close
Content-Type: text/html; charset=UTF-8

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">

<html>
```



HTTP/1.1 HEAD Request



```
sjengle — bash — 75x16
Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
HEAD /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu

HTTP/1.1 200 OK
Date: Wed, 04 Apr 2012 03:44:34 GMT
Server: Apache/2.2.3 (CentOS)
Accept-Ranges: bytes
Content-Length: 3697
Connection: close
Content-Type: text/html; charset=UTF-8

Connection closed by foreign host.
```

Response Code 200



HTTP/1.1 Response Codes



```
Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
HEAD ~/sjengle/index.html HTTP/1.1

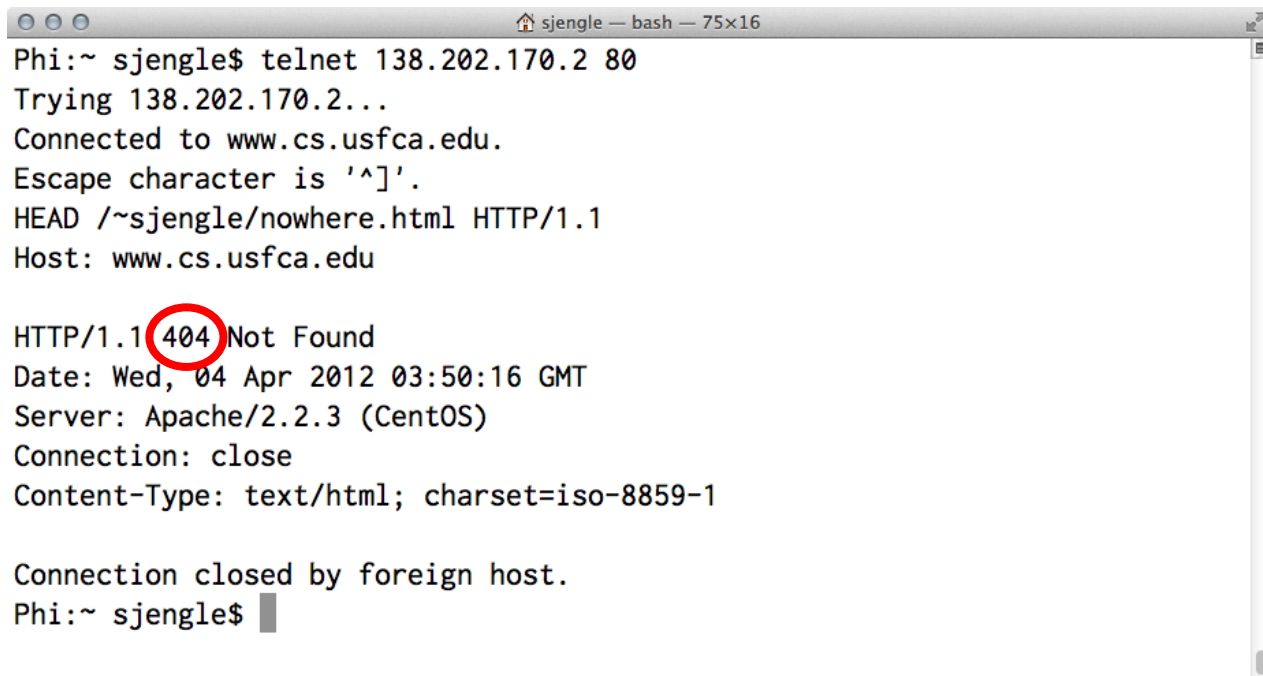
HTTP/1.1 400 Bad Request
Date: Wed, 04 Apr 2012 04:42:23 GMT
Server: Apache/2.2.3 (CentOS)
Connection: close
Content-Type: text/html; charset=iso-8859-1

Connection closed by foreign host.
Phi:~ sjengle$
```

Response Code 400



HTTP/1.1 Response Codes



```
Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
HEAD /~sjengle/nowhere.html HTTP/1.1
Host: www.cs.usfca.edu

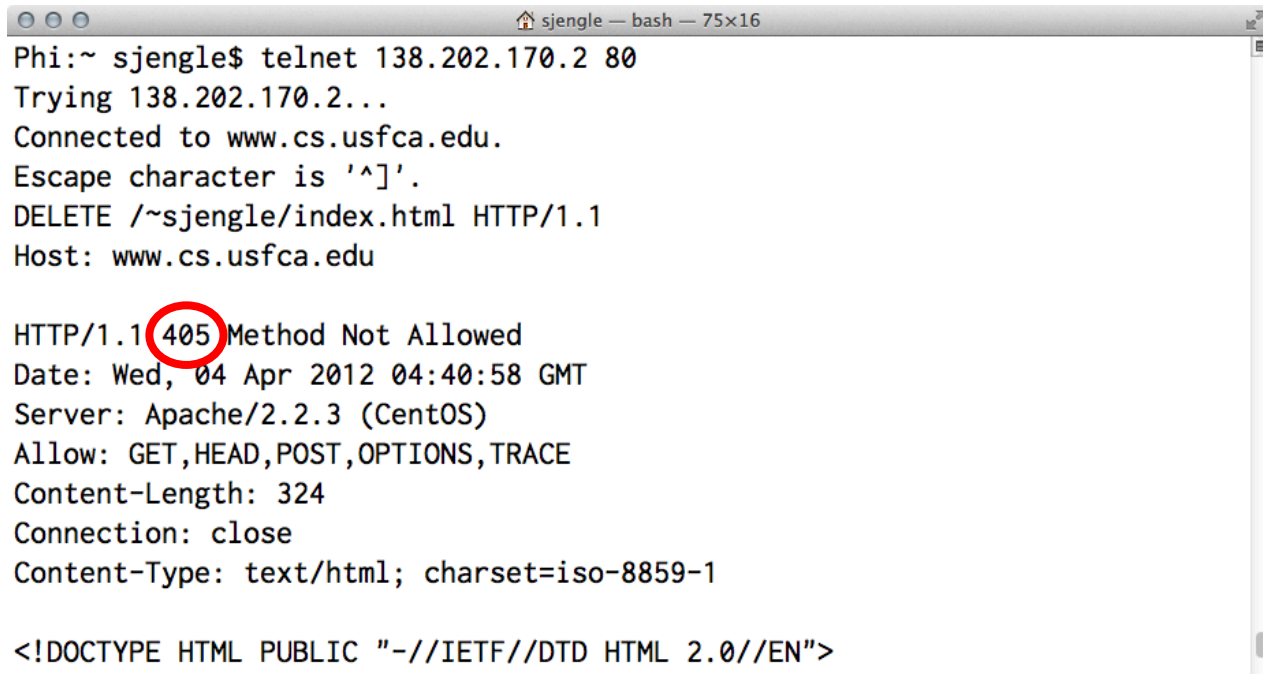
HTTP/1.1 404 Not Found
Date: Wed, 04 Apr 2012 03:50:16 GMT
Server: Apache/2.2.3 (CentOS)
Connection: close
Content-Type: text/html; charset=iso-8859-1

Connection closed by foreign host.
Phi:~ sjengle$
```

Response Code 404



HTTP/1.1 Response Codes

A terminal window titled 'sjengle — bash — 75x16' showing a telnet session. The user enters 'telnet 138.202.170.2 80', and the terminal shows the connection process and the resulting HTTP 405 response. The response code '405' is circled in red.

```
Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
DELETE /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu

HTTP/1.1 405 Method Not Allowed
Date: Wed, 04 Apr 2012 04:40:58 GMT
Server: Apache/2.2.3 (CentOS)
Allow: GET,HEAD,POST,OPTIONS,TRACE
Content-Length: 324
Connection: close
Content-Type: text/html; charset=iso-8859-1

<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">
```

Response Code 405



HTTP/1.1 OPTIONS Request



```
sjengle — bash — 75x16
Phi:~ sjengle$ telnet 138.202.170.2 80
Trying 138.202.170.2...
Connected to www.cs.usfca.edu.
Escape character is '^]'.
OPTIONS /~sjengle/index.html HTTP/1.1
Host: www.cs.usfca.edu

HTTP/1.1 200 OK
Date: Wed, 04 Apr 2012 04:44:23 GMT
Server: Apache/2.2.3 (CentOS)
Allow: GET,HEAD,POST,OPTIONS,TRACE
Content-Length: 0
Connection: close
Content-Type: text/html; charset=UTF-8

Connection closed by foreign host.
```

allowed operations

A red arrow points from the text "allowed operations" to the "Allow" header in the response, which lists the permitted HTTP methods: GET, HEAD, POST, OPTIONS, and TRACE.



Submitting Data

- **GET Method**

- Encodes data in URL as query string
(e.g. <http://www.google.com/search?q=usfca>)
- Good for getting or retrieving specific data

- **POST Method**

- Encodes data in request message body
- Good for posting data to be stored on server





CHANGE THE WORLD FROM HERE