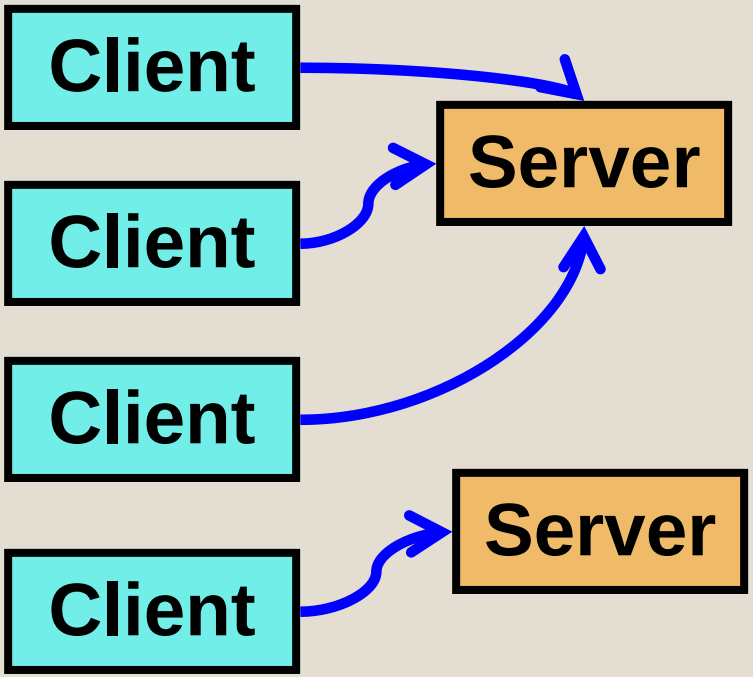
Announcements

- Look over class webpage
- TA Office hours are underway
- Laptops are not required for this course
- Make sure you are downloading “Komodo Edit” and not “Komodo IDE”

Client/Server Model

Relationship between two kinds of programs:



Client/Server TimeLine

Server	Client
Waits for client to show up…	
Waiting…	
Waiting…	
Waiting…	
	Contacts server and sends a request
Processes request from the client and sends back response	
	Receives response
Waits for another client to show up…	
Waiting…	
Waiting…	

Many kinds of servers…

What are the corresponding “Clients”?

- Mail servers
- Chat servers
- Game servers
- Software update servers
- Other customized servers
- We left one very important one out… Next slide, please…

Web Servers

- Client is typically a “web browser”
- Web server stores files to be “served” to the browser upon request:
  - Web pages (“html”)
  - Pictures
  - Pdf files
  - Many others…
- Web server and browser communicate via plain text!
- Protocol is called “http” (Hypertext Transfer Protocol)

HTTP Example

Let's put the following "html" file onto the Computer Science Department web server:

[File is called "/~fpe/example.html"]

```
<html>
<p style="color:green; font-size:40pt">
This is a boring web page.
</p>
</html>
```

HTTP Example

1. We type into browser:

http://www.cs.umd.edu/~fpe/example.html

2. Browser sends HTTP request to the web server in the Computer Science department:

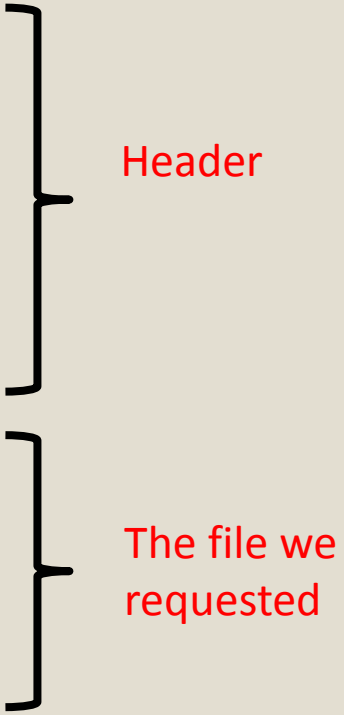
```
GET /~fpe/example.html HTTP/1.1
Host: www.cs.umd.edu
```

HTTP Example

3. Server sends back it's HTTP response:

```
HTTP/1.1 200 OK
Date: Thu, 26 Jan 2012 22:00:59 GMT
Server: Apache
Last-Modified: Thu, 26 Jan 2012 21:44:01 GMT
ETag: "1107-3f-4b775474a93c1"
Accept-Ranges: bytes
Content-Length: 63
Content-Type: text/html

<html>
<p style="color:green; font-size:40pt">
This is a boring web page.
</p>
</html>
```



HTTP Example

4. The Browser renders it's own interpretation of the file:

[Different browsers may render it slightly differently!]

World Wide Web

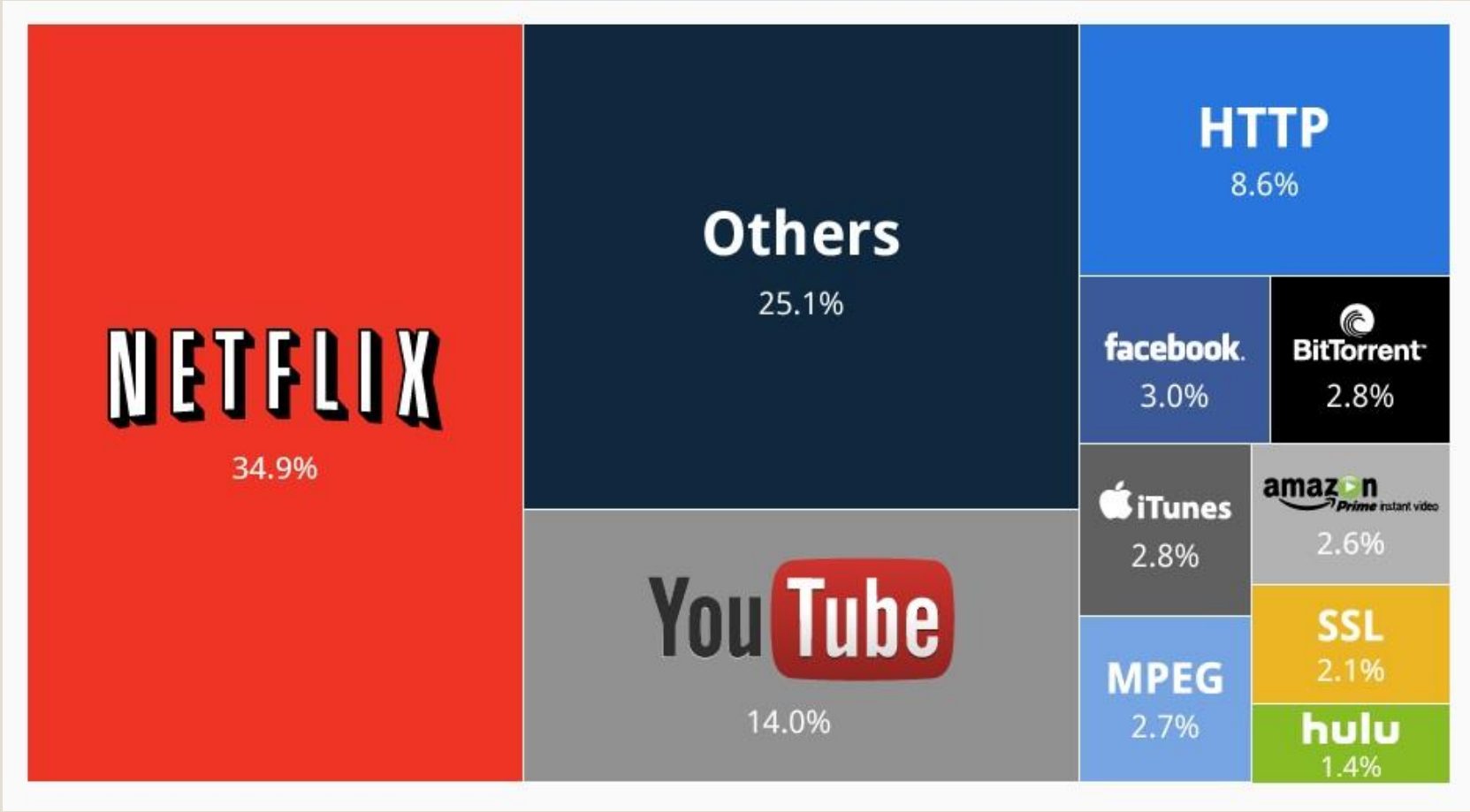
So what IS the "World Wide Web"?

Is it the same thing as "The Internet"?

Who came up with the World Wide Web?

Internet Traffic

North America, 2014
(Source: Sandvine)



The “father” of the World Wide Web

- **Tim Berners-Lee** defined the WWW formally in 1989.
- First web server / browser communication in 1990.

Good question…

I typed the “domain name” www.cs.umd.edu into my browser…

How does my browser know the IP Address for the web server?

Domain Name Service

Answer: Domain Name Service

- A DNS server translates a domain name into an IP Address.
- Remember the HTTP example? We left out **two steps**!

Domain Name Service

1. You type “http:www.cs.umd.edu/~fpe/example.html” into your browser
2. **Your browser sends request to DNS server to look up the IP Address for www.cs.umd.edu.**
3. **The DNS server’s response contains the IP address**
4. Browser sends “GET” request to web server located at this IP Address
5. Web server’s response contains the web page info
6. Browser renders the page

It’s complicated…

- Sometimes the DNS Server has to ask its friends
- Domain names have to be “registered” with DNS
- Sometimes your DNS Server may be down!
- How does your computer know the IP address of the DNS server?