

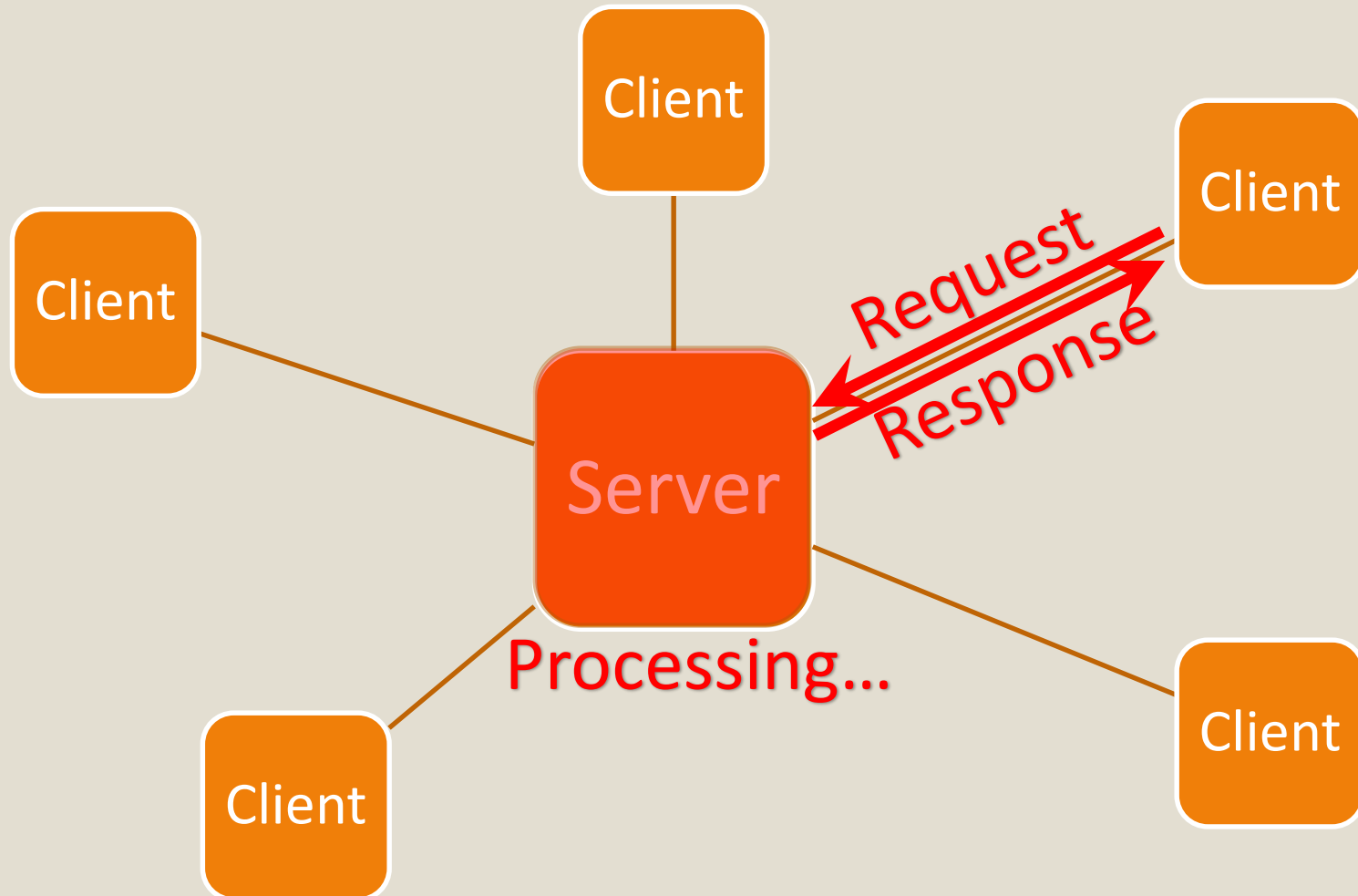
Announcements

- You must come to lecture for which you are registered!
- If you are going to be routinely late (or leave early) please try to adjust your class schedule.
- Look over class webpage
- Lectures slides are being posted
- TA Office hours have begun
- Make sure you are downloading “Komodo Edit” and not “Komodo IDE”

Very Brief History of “The Internet”

- In the late 1960’s **ARPANET** (Advanced Research Projects Agency Network) was created by U.S. Department of Defense with help from academics.
- First transmission attempted from UCLA to Stanford in 1969. (It didn’t really work!)
- By 1971 there were 14 machines on ARPANET. A few other small networks sprung up in Europe.
- During the 1970’s numerous separate networks were developed. TCP became more and more popular.
- 1983 ARPANET started using TCP and becomes “The Internet”
- By 1992 there were about 1 million machines “online”
- Today over 8 billion devices are connected

Client/Server Model



Many kinds of servers...

Look at your mobile device... Many of your apps are Clients that communicate with a Server...

(Let's go through some of them...)

What kind of client are we interested in?

Web Servers

- Client is typically a “web browser”
- Web server stores files that will be sent back to the browser upon request:
 - Web pages
 - Pictures
 - Pdf files
 - Many others...
- Client’s “request” and server’s “response” use “HTTP” Protocol (Hypertext Transfer Protocol)

HTTP Example

I have placed the following “HTML” file onto the Computer Science Department’s 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 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
```

Header

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

The file we requested

HTTP Example

4. The Browser renders interpretation of the file:

This is a boring web page.

[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?

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?