# Ch 3: Making the Connection

*CSE 3*

- The Basics of Networking, continued

  - Learn about client/server structure

  - Distinguish between Internet and World Wide Web

  - Ways to connect to the net

# Client/Server Structure

- Much Internet functionality relies on a *client/server* structure

- Servers provide services, clients use them
  - Sample servers: *email server, web server, DNS server,...*
  - UCSD servers: ieng6, www, www.cse,...
  - A "server" might actually be many computers e.g. www.google.com is a cluster of *thousands* of servers

Client packages a request, and sends it to a server; Server responds and sends a reply

# Client/Server for the Web

- *Server* is the computer that stores web pages

- *Client* is the computer that asks to get a web page

- When you click a link in a web browser program, your computer enters client/server relationship with web server

- After the page is sent to you, the client/server relationship ends; there is no persistent connection

  – but the server can remember information about the client

- This client/server relationship is brief

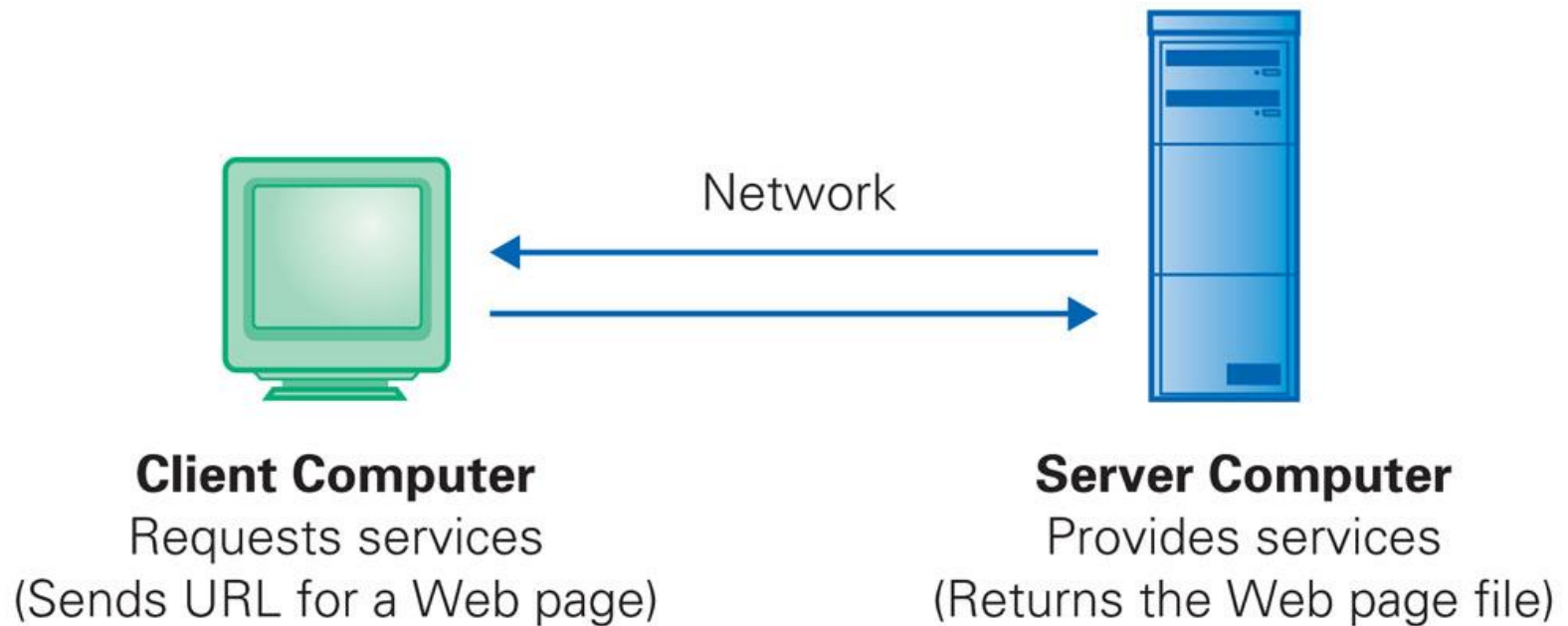  – a typical server can serve many clients per second

**Client Computer**
Requests services
(Sends URL for a Web page)

Network

**Server Computer**
Provides services
(Returns the Web page file)

*Figure 3.2.* The basic client/server interaction, as illustrated by the browser (client) requesting Web pages provided by the Web server.

# Client/Server Interaction

- For Web pages, the client requests a page, the server returns it: there's no connection, just two transmissions
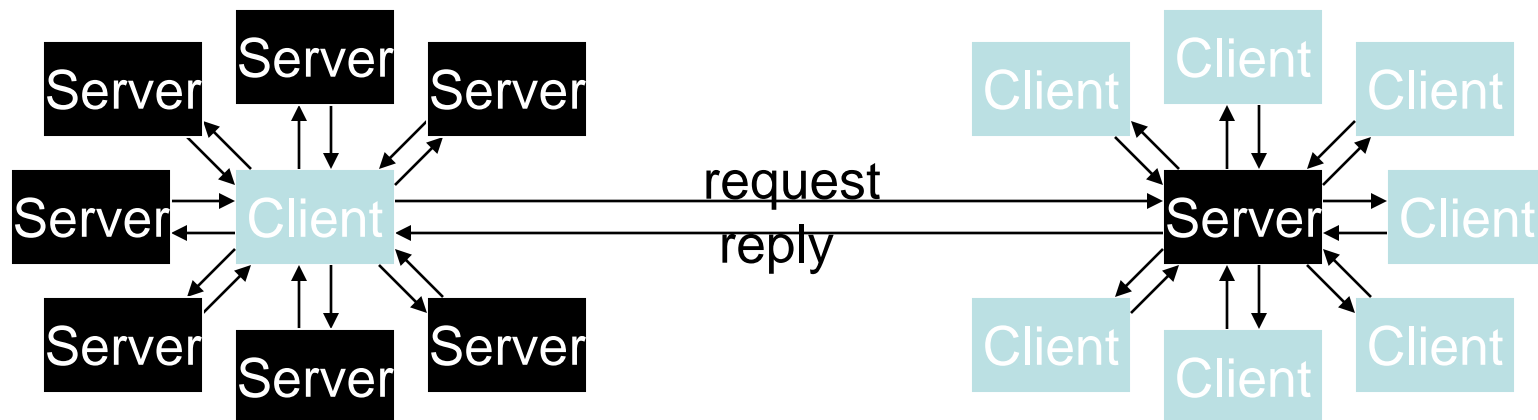
**Servers serve many clients; clients visit many servers**

# The World Wide Web

- *Web servers*:  Computers programmed to send files to browsers running on other computers connected to the Internet

- Web servers and their files make up the World Wide Web

- The World Wide Web is a subset of the Internet

# World Wide Web

- World Wide Web is the collection of servers (subset of Internet computers) + the information they give access to

  - Clearly, WWW < Internet

  - The "server" is the web site computer and the "client" is the surfer's browser

  - Many Web servers' domain names begin with www by tradition, but any name is OK

  - Often multiple server names map to the same site: MoMA.org and www.MoMA.org

# Requesting a Web Page: URL's

- To specify what web page you want, use a *URL*

- Uniform Resource Locator (URL) has three main parts

  1. Protocol specifier:
     - http://
     - Specifies that Hypertext Transfer Protocol should be used to handle the information transmission

  2. Server computer's name:
     - Can be domain name, or numerical IP address

  3. Page's pathname:
     - Tells the server which file (page) is requested and what folder it is in

# What's in a Web Page: HTML

- A web server stores many web pages, and may also create custom pages 'on the fly' in response to client requests

- A web page on the server contains a list of instructions for how to display the page

- The instructions are written in Hypertext Markup language: HTML

- When the client browser receives a page from the server, it uses those HTML instructions to display the page

# HTML

- *Hypertext Markup Language (HTML)*

- *Markup* describes the layout of a document, e.g.:
    - Margin width
    - Font
    - Text style
    - Image placement
    - Etc.

- *Hypertext* provides a way to jump from point to point across documents (non-linear)

- Combination of hypertext with markup language lets us build nonlinear documents for the dynamic and interconnected Web

# The Internet and the Web

- The domain name of a web server often starts with www

- ... but not always

- How do you know?  It is important, because  for DNS to work, you must give the correct domain name

- To reduce confusion, some tricks are used:

  1. Redirection: browser inserts the "www" even if you don't type it

  2. Registering multiple domain names

     - Museum of Modern Art has registered both "moma.org" and "www.moma.org" to the same IP address

# Dissecting a URL

- ## Web addresses are URLs, *Uniform Resource Locators*:

  - ### URLs are often *redirected* to other places; e.g.
    http://ieng6.ucsd.edu/~cs3s      goes to

    http://ieng6.ucsd.edu/cs3s/public_html/index.html

| | | |
|---|---|---|
| protocol | = http:// | |
| Web server | = ieng6 | |
| domain | =.ucsd.edu | |
| path | = /~cs3s/public_html/ | *home directory / web directory* |
| file | = index | |
| file extension | = .html | *hypertext markup language* |

# Connecting a Computer to the Internet

- By ISP:

  – Internet Service Providers (like AOL and Earthlink) sell connections to Internet

  – User plugs into telephone system or dedicated connection to ISP

  – Home computer talks to ISP's computer

  – ISP's computer is connected to Internet, and relays information for its customers

# Connecting a Computer to the Internet (cont'd)

- By Enterprise Network Connections (LAN):

  – Large networked organizations such as schools, businesses, or governmental units

  – The organization creates a LAN or *intranet*

  – The intranet connects to the Internet by a gateway

  – Information from a Web computer is sent across Internet, through gateway, across LAN to user's computer

# Wireless Networks

- A variation on the LAN connection

- A device (called the *wireless hub* or *access point*) is physically connected to the Internet

- The hub broadcasts and receives radio frequency (rf) signals

- Computers with wireless capability send and receive signals to communicate with the hub

- The hub relays Internet requests for those computers

# Summary

- Networking is changing the world

  Internet: named computers using TCP/IP

  WWW: servers providing access to info

  - Principles

    - Logical network of domain names
    - Physical network of IP addresses
    - Protocols rule: LAN, TCP/IP, http, ...
    - Domain Name System connects the two
    - Client/Server, fleeting relationship on WWW