


Test Your Tech

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- An exclusive social club.
- A group of computers, usually in a single building, connected by cables.
- Local television affiliates of the big networks.

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
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Special Guests


- Scott Barker, Director of IT and Chair of the Informatics program for the Information School (iSchool)
- Marshall Bjerke, Senior, Informatics



Announcements

- Deadlines at noon today
 - * HW1 and Lab 2
- Watch for your grades on MyUW's Student tab in the CS pane
- Last week's quiz:
 - * Students who answered that RAM is measured in MB *or* GB will receive credit for that question.


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Announcements

- Videocasts of the course are available within a couple hours after each lecture
 - * Linked at top of Calendar on the course Web site


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Announcements

- Office hours
 - * Listed on course Web site's Home page
 - * Maps to our offices for office hours
- In addition to office hours
 - * Drop-in labs

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Networking

More than just a social interaction

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Networks...

Computers are useful alone, but are better when connected (networked)

- * Access more information and software than is stored locally
- * Help users to communicate, exchange information ... changing ideas about social interaction
- * Perform other services -- printing, Web,...

UW's networks move more than trillion bytes per day




Networking Changes Life

The Internet is making fundamental changes

1. Nowhere is remote—access to info is no longer bound to a place
2. Connecting with others—email is great
3. Revised human relationships—too much time spent online could be bad
4. English becoming a universal language
5. Enhanced freedom of speech, assembly

Can you think of others?

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Network Structure

Networks are structured differently based (mostly) on how far apart the computers are

- * Local area network (LAN) -- a small area such as a room or building
- * Wide area networks (WAN) -- large area, e.g. distance is more than 1 Km

Internet: all of the wires, fibers, switches, routers etc. connecting named computers


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Basic Types of Networks

| Network Type | Differentiating Factors |
|-----------------------------------|---|
| Peer-to-Peer | • No computer running server software |
| Server-Based Networks | • Computer running server software manages network traffic |
| • Local Area Network (LAN) | • Limited geographical area • One-time capital cost (wire or fiber optics cable installation) |
| • Wide Area Network (WAN) | • Across town or across the globe • Third-party service provider (monthly \$\$) • More bandwidth = more expense • Connects to LANs with a router |
| • Campus Network | • One-time capital expense • Buildings in close proximity |
| • Metropolitan Area Network (MAN) | • Clusters of buildings in close proximity separated from other clusters • Third-party service provider (monthly \$\$) |

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Protocol Rules!

To communicate computers need to know how to set up the info to be sent and interpret the info received

- * Communication rules are a *protocol*
- * Example protocols
 - EtherNet for physical connection in a LAN
 - TCP/IP—transmission control protocol / internet protocol—for Internet
 - HTTP—hypertext transfer protocol—for Web

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Naming Computers I

People name computers by a domain name -- a hierarchical scheme that groups like computers

- .edu All educational computers
- .washington.edu All computers at UW
- dante.washington.edu A UW computer
- .ischool.washington.edu iSchool computers ←
- Peers → .cs.washington.edu CSE computers ←
- june.cs.washington.edu A CSE computer

Domains begin with a "dot" and get "larger" going right




Naming Computers II

Computers are named by IP address, four numbers in the range 0-255

cse.washington.edu: 128.95.1.4
 ischool.washington.edu: 128.208.100.150

- * Remembering IP addresses would be brutal for humans, so we use domains
- * Computers find the IP address for a domain name from the *Domain Name System* -- an IP address-book computer

A computer needs to know IP address of DNS server!




Domains

.edu .com .mil .gov .org .net domains are "top level domains" for the US

- * Recently, new TLD names added
- * Each country has a top level domain name: .ca (Canada), .es (Spain), .de (Germany), .au (Australia), .at (Austria), .us

The FIT book contains the complete list

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Logical vs Physical

There are 2 ways to view the Internet

- Humans see a hierarchy of domains relating computers -- logical network
- Computers see groups of four number IP addresses -- physical network
- Both are ideal for the "users" needs
- The Domain Name System (DNS) relates the logical network to the physical network by translating domains to IP addresses

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Client/Server Structure

The Internet computers rely on the client/server protocol: servers provide services, clients use them

- Sample servers: *email server, web server, ...*
- UW servers: dante, courses, www, student, ...
- Frequently, a "server" is actually many computers acting as one, e.g. dante is a group of more than 50 servers


Protocol: Client packages a request, and sends it to a server; Server does the service and sends a reply



World Wide Web

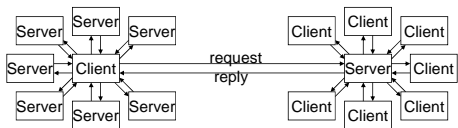
World Wide Web is the collection of servers (subset of Internet computers) & the information they give access to

- Clearly, WWW ≠ Internet
- The "server" is the web site computer and the "client" is the surfer's browser
- Many Web server's 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.org₂₄




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




Dissecting a URL

Web addresses are URLs, *uniform resource locator*, an IP address+path

- URLs are often *redirected* to other places; e.g. `http://www.cs.washington.edu/100/` goes to `http://www.cs.washington.edu/education/courses/100/04wi/index.htm`

| | |
|----------------|---|
| protocol | = http:// |
| Web server | = www |
| domain | = .cs.washington.edu |
| path | = /education/courses/100/04wi/ <i>directories (folders)</i> |
| file | = index |
| file extension | = .htm <i>hypertext markup language</i> |



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

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