Networking At UW, The Internet And Beyond

Various computers will be used in this class, so a quick introduction to their arrangement and networking is useful. Along the way we answer the pressing question: What is the difference between the Internet and the World Wide Web?

Accomplishments To Date …

- You have a UWNetID that gives you access to the UW’s computers, but also access to the World Wide Web ... your account is on Dante
  - You have sent email, set up folders, set up an address book
  - You have visited home pages for UW, CSE100, other sites
  - You have tried out a search engine
- Other things you should find out about …
  - Printing is possible for most computer applications … how do you use the printers at OUGL or SUZ labs?
  - In Pine, it is possible to “postpone” a mail message that you are writing -- that is, set it aside to use Pine in other ways and then return to it. Try out “postpone” in your next mail.

Factoid: Pine was developed at UW and is used worldwide
We will discuss how computers really work later, but for now think of them as having many forms:

- Embedded -- processor, ROM, channels to sensor/actuators; microoven
- Laptop -- processor, RAM, floppy disk, hard disk, LCD; mobility
- Desk Top -- processor, RAM, floppy, hard disk, CD, CRT; office work
- Server -- processors (4-32), RAM, many hard disks, CD; services
- Supercomputer -- processors (16-1K), RAM, hard disks; big science

CSE100 uses:
- Laptop for lectures
- Desktop in Collabs, OUGL, SUZ
- Dante server

An unconnected computer can only access the data stored locally, run the software stored locally, etc.

Networks connect computers, making them much more useful because:

- Access more information and software
- Help users communicate, share information
- Perform services for one another

UW's networks move 1/2 trillion bytes of data per day:
- Half this information goes to or comes from the Internet

How are these networks arranged?

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[Diagram of network connections: Connection to campus network infrastructure, Collab 2, EtherNet, PC nodes.]
CSE 100  UW Networks Connect To Internet

- The subnetworks of campus interconnect the computers of the UW domain (.washington.edu), which is connected to the Internet via a Gateway

The Internet is the totality of wires, fibers, satellite links and switches connecting named computers

CSE 100  How Are Computers Named

- The logical way to name computers is using domains
  + All educational institutions .edu
  + U Dub .washington.edu
  + CSE .cs.washington.edu
  + Me spiff.cs.washington.edu

- The physical way to name computers is using an internet protocol address, or IP address
  + spiff.cs.washington.edu’s IP address: 128.95.1.207
  + cs.washington.edu’s IP address: 128.95.1.4
  + washington.edu’s IP address: 140.142.15.163

- A domain name server (DNS) looks up human readable names and converts them to IP addresses for the Internet routers
Logical Network … Physical Network

An important concept ...

- In computing it is common to separate the *logical* idea of something -- the way you think about it -- from the *physical* implementation -- how it's built
- This is called a physical / logical separation
- In networking, the domain names make up our logical network, a hierarchical arrangement of names that tell us associations: cs.washington.edu
- The computers actually use physical addresses
- The DNS enables the separation by making the correspondence between the two

Transmitting Information

- How is the information sent?
  - Information -- email, web pages, phone calls, etc. -- are broken up into small units, called packets
  - Think of sending a long message to a friend in Australia using postcards … write a few sentences on each postcard, number them as you write them, and mail
  - Your friend gets lots of postcards, probably on different days and out of order, and so must reassemble them to put the message back together
  - This scheme is called the Transmission Control Protocol and Internet Protocol, or TCP/IP

```plaintext
address #          data
```
World Wide Web

- The world wide web is composed of those computers, called web servers, capable of sending information to your browser, e.g. Netscape
- In most domains the computer that is the web server is called “www”, e.g. www.washington.edu
  - But, a web server can have any name … your pages will be served by students.washington.edu
  - The actual pages can be stored somewhere else, e.g. Dante
- There are different ways to connect to these servers
  - Hyper-text transfer protocol, http for web pages
  - File transfer protocol, ftp for files of information

Factoid: “WWW” is not short for “World Wide Web”

Web Pages

- Web pages are just text files containing instructions to your browser on how to lay out the web page
  - Web pages can be created with a text editor
  - Web pages can be created with tools, Front Page Express
- Web page files are written in a special language, hyper-text mark-up language, HTML
- It is possible to see the HTML that is producing the page you are looking at by selecting “source” from the View menu in your browser
<table>
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<td>CSE100 Vision</td>
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<td>Exams &amp; Tests</td>
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<td>E-mail Announcement Archive</td>
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Caution: Not for human consumption