

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

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Computers of the Realm...

- ❖ 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; μ -wave oven
 - ❖ PDA -- processor, RAM, LCD; mobility
 - ❖ Laptop -- processor, RAM, floppy, hard disk, LCD; portability
 - ❖ Desk Top -- processor, RAM, floppy, hard disk, CD, monitor; educational and office work
 - ❖ Server -- processors (4-32), RAM, many hard disks, CD; services
 - ❖ Supercomputer -- processors (16-1K), RAM, hard disks; big science

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Class Computers

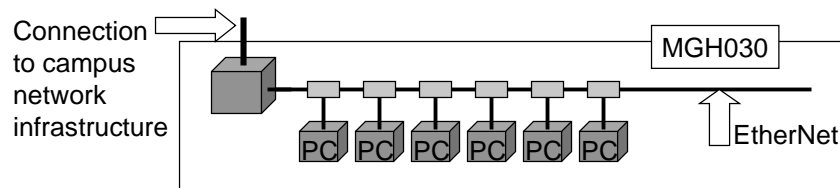
- ❖ FIT100 uses
 - Laptop for lectures
 - Desktop in Labs MGH, OUGL, SUZ
 - Dante server
- ❖ An unconnected computer can only access the data stored locally on its hard disk, run the software stored locally, etc.
- ❖ The UW computers are connected, I.e. networked, together allowing us to send email and access the World Wide Web

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Networks ...

- ❖ 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 ship >1/2 trillion bytes of data per day
 - Half this information goes to or comes from the Internet
- ❖ How are these networks arranged?

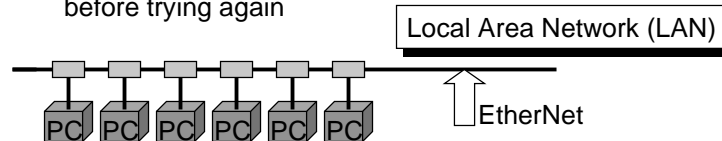


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Ethernet ... It's Like Conversation

- ❖ Ethernet, it's like students sitting around the dorm telling stories ...
 - ❖ Everyone listens while one person tells his/her story
 - ❖ When the story is finished, there is a pause
 - ❖ A person with a story to tell starts talking, listening all the while
 - If no one else started talking too, the person continues
 - If others started talking, he/she stops and waits briefly before trying again

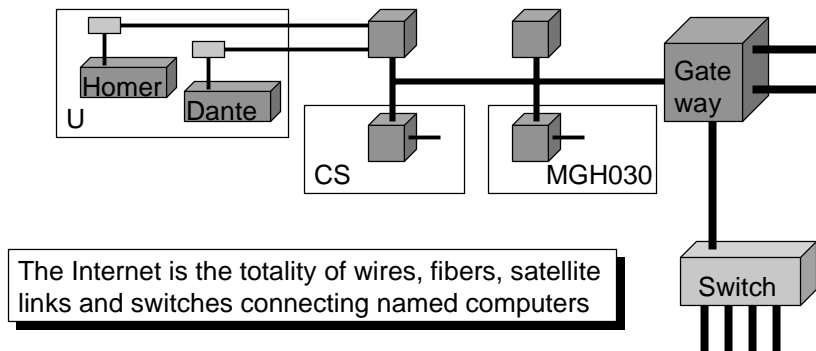


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UW Networks Connect To Internet

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



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How Are Computers Named Logically

- ❖ 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

- ❖ This scheme is hierarchical

- ❖ Easier to remember names
- ❖ Names are associated with like units
- ❖ No limit to size or organizational depth

Top Level

.com
.edu
.gov
.org
.mil
.net
.xx

Country Pairs

.ca --Canada
.uk -- United Kingdom
.fr -- France
.de -- Germany as in
Deutschland
.es -- Spain as in
España
.us -- United States

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How Are Computers Named Physically

- ❖ The *physical* way to name computers is to use an Internet protocol address, or *IP address*

spiff.cs.washington.edu's IP address is: 128.95.1.207

cs.washington.edu's IP address: 128.95.1.4

washington.edu's IP address: 140.142.15.163

- ❖ The domain name system (DNS) associates human readable names with the physical IP addresses for use by the computers and routers of the Internet

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Logical Network ... Physical Network

An important concept ...

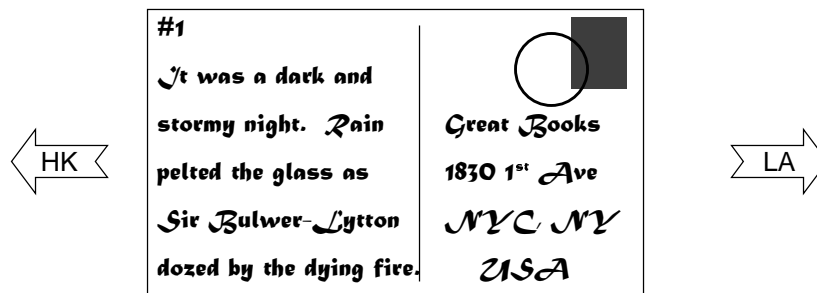
- ❖ In computing it is common to separate the *logical* idea of something -- the way you think about it -- from the *physical* implementation -- how it's actually built
- ❖ This is called a *physical / logical separation*
- ❖ In networking, the domain names make up our logical network, a hierarchical 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

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How Is Information Sent?

- ❖ Sending information over the Internet works like this:
- ❖ Imagine sending the novel you wrote from Tahiti where you live to New York City where your publisher is using only postcards



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The Internet Protocol

- ❖ How is the information sent?
 - ❖ Information -- email, web pages, phone calls, everything sent over the Internet -- is broken up into small units, called packets
 - ❖ Packets contain an IP address, a sequence number and some actual information, a part of the whole message
 - ❖ This scheme is called the Transmission Control Protocol and Internet Protocol, or TCP/IP
 - ❖ The packets are sent independently, usually taking different routes, and reassembled at the destination to reconstruct the original message

address # data

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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 or IE
- ❖ 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 will 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”

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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 special tools, eg Adobe Page Mill
- ❖ The Web page instructions 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

HTML From FIT100 Home Page

```
<HTML>
<HEAD>
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=windows-1252">
<META NAME="Generator" CONTENT="Microsoft Word 97">
<TITLE>Home Page</TITLE>
</HEAD>
<BODY LINK="#0000ff" VLINK="#800080" BGCOLOR="#ffffff">

<DL>
<DT><A NAME="top"></A></DT>
</DL>
<TABLE CELLSPACING=0 BORDER=0 CELLPADDING=10 WIDTH=702>
<TR><TD WIDTH="21%" VALIGN="TOP" ROWSPAN=4 BGCOLOR="#c0c0c0">
<P><A HREF="#Announcements"><I><FONT FACE="Verdana, Helvetica" SIZE=2
COLOR="#ff0000">Announcements</I></FONT></A></P>
<P><A HREF="vision.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>CSE100
Vision</B></FONT></A></P>
<P><A HREF="syllabus.htm"><B><FONT FACE="Verdana, Helvetica"
SIZE=2>Syllabus</B></FONT></A> </P>
<P><A HREF="notes.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Class
Notes</B></FONT></A></P>
<P><A HREF="assignments.htm"><B><FONT FACE="Verdana, Helvetica"
SIZE=2>Assignments</B></FONT></A> </P>
<P><A HREF="exams.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Exams &amp;
Tests</B></FONT></A></P>
<P><A HREF="hype/"><B><FONT FACE="Verdana, Helvetica" SIZE=2>E-mail
Announcement Archive</B></FONT></A></P>
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Caution: Not
for human
consumption