CS 312 Internet Concepts
Spring, 2005
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Objective
• Historical background of the Internet
• How Internet is structured
• How Internet works
• Using Internet tools

Texts
– In-line/On-line: Fundamentals of the Internet and WWW, 2nd ed., by Greenlaw and Hepp
  Used where applicable
– Online references
– Course Website
  http://www.cs.odu.edu/~shen/cs312/CS312_Announcements05S.html
  • Announcements
  • Slides
    – Used as supplement.
    – Students are responsible
    – for taking own notes.

Grading
• Homework, quizzes, participation: 10%
• Two projects: 30%
  Late or no submission of all above: 0 point each
• One midterm exam: 30%
• Final exam: 30%
• Extra credit:
  determined by the instructor
• Final grading is based on
  weighted total score, curved

Syllabus

The course is intended to be both educational and fun.

The syllabus page
My e-mail address
Office hours
Instructor contact
Course objective
Expectations
Evaluation
Etc.
Print, sign, and submit
May fax at: 757-683-4900
Before studying the core

- Must have a CS account
  - Not an ODU account
  - If none yet, go to www.cs.odu.edu
- Browsing the Web
- Searching the Web
- Using e-mail
- If need help
  - Let me know

Assignment 1
- Find the Online Learning Center for our textbook
- E-mail me, by (on or before) 1/20/2005:
  - The subject: CS312 Assignment 1
  - The content:
    - The page URL
    - Your full name
    - major
    - year at ODU

Some hints for Assignment 1

- Using a Web browser
- Using a search engine
- Using e-mail
  from your CS account
- If having difficulties
  - Contact me a.s.a.p.

What is the Internet?

- An electronic communications network
  Connects computer networks around the world
- Utilizes the TCP/IP protocols
  - IP, Internet Protocol:
    how message is fragmented into packets, packets and destination identified, routing, and reassembling
  - TCP, Transmission Control Protocol:
    how the packets are transmitted reliably and efficiently

- How are the packets like?
  - Each packet (datagram) is fewer than 1,500 bytes in size
  - Each packet is given a header
    - packet order number, checksum, etc.
  - Each packet is put into an IP envelope
    - sender and destination addresses, timing info
  - See Fig. 3.3, p. 113 of the textbook for an illustration of how packets are sent.

- Interconnected with routers
  Routers are devices that forward packets between networks
- Utilizes many additional protocols in its suite e.g., HTTP, SMTP, FTP, Telnet, etc.
- Utilizes many, and various kinds, of servers and clients
- Has become a global information and commerce system
Who “runs” the Internet?
• A variety of groups guide its growth
  – The Internet Society
  – the Internet Architecture Board
  – the Internet Engineering Task Force
  – the World Wide Web Consortium (W3C)

You can find references on them.

• Private companies, called registrars, oversee the regulation of Internet domains
  Domain managers pay them for the service.

• Many groups and individuals provide data and use them.
  Numbers of both sites and users are tremendously large and rapidly growing.

How popular is the Internet?
• Internet usage statistics

• A forecast by the World Atlas of the Internet

Servers and Clients on the Internet

Internet Illustrated
How is a computer identified on the Internet?

• A computer is uniquely identified by the local host name and its domain name. www.odu.edu: www is the local host name, edu is the top-level domain name, and odu is a sub-domain name under edu.

Domain names are in hierarchical structure.
– Top level domains
  • .com, .biz, .edu, .gov, .int, .mil, .net, .org, and so on.
  • Country code top level domains: e.g. .uk, .ca, .jp
– There are (sub-)domains within domains
  e.g., cs.odu.edu

What is the IP address?

• A local host name and domain name together is translated into a 32-bit IP address.
  Usually an IP address is expressed as 4 byte values in dot notation, e.g. 128.121.41.15
  It is really the decimal address:
  \[128 \times 256^3 + 121 \times 256^2 + 41 \times 256^1 + 15 \times 256^0\]

The way to represent (interpret) the IP address is a little complicated.
Basically, there are classes A, B, C, etc. The interpretation is based on the class, each using a different set of bits for

http://wombat.doc.ic.ac.uk/foldoc/foldoc.cgi?query=ip+address

• Finding the location of a machine on the Internet with a given IP address
  You can find where the machine is by visiting: http://www.ip2location.com/free.asp
  Example, try finding my desk computer: 128.82.5.183

To find out the IP address of your machine
Use DOS command ipconfig.

Example:
C:\Documents and Settings\shen\Desktop> ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection:
  Connection-specific DNS Suffix : cs.odu.edu
  IP Address . . . . . . . . . . . . . . . . : 128.82.5.183
  Subnet Mask . . . . . . . . . . . . . . : 255.255.254.0
  Default Gateway . . . . . . . . . . : 128.82.4.253
C:\Documents and Settings\shen\Desktop>
• More detailed explanation on IP address
  

Connecting to the Internet

• Dedicated network access
  Typically within institutions

• (Telephone) Dial-up
  – Online service provider (OSP), e.g., AOL
  – Internet service provider (ISP)
    Least expensive

• Broadband ISP
  – (Telephone line) Digital Subscriber Line (DSL)
  – (Television) Cable Internet Service

• Satellite Internet Service
  – One-way (IP multicast)
  – One-way (terrestrial return)
  – Two-way

• Wireless community network
  Currently using 802.11b (Wi-Fi, wireless fidelity) devices to build growing clusters of linked, citywide networks. Some are being used to link to the Internet.

  – Some pointers on setting up your WiFi:
    http://www.david-reid.com/toys/wireless.html
    http://reviews.cnet.com/4520-10163_7-5512709-1.html?tag=nl.e729

How your computer is typically connected

Information Flow over the Internet
Traceroute
A TCP/IP utility which allows the user to determine the route packets are taking to a particular host.

Normally none cares. But if someone is curious, then can find it out.

Many free traceroutes can be found from:
http://www.traceroute.org/

Example: How to reach google.com?

• Say, use the traceroute at cyberverse.net
  http://www.cyberverse.net/query/trace/
  At the site, give the query: google.com
  Try a couple of times and see what you get.

Some Interesting Websites
• Largest, and arguably the best, search engine
  www.google.com
• Trends of the Web wcp.oclc.org/
  Growth in number stabilized, sizes at sites increased.

• On information discovery on the Internet
  mappa.mundi.net/
• User surveys
  http://www.cc.gatech.edu/gvu/user_surveys/
• Statistics on world internet users