Announcements

- Start your project and don’t wait until the day before is due

Accessing Web Resources

- Submitting through the submit server
- Accessing grades through grades.cs.umd.edu
- For the project you don’t need to install Mac OS X

Some Network Terminology

- **LAN** – Local Area Network - Computers that are relatively close to each other. Close mean in a room, building, campus.
- **Segment** – Part of a network separated by network device.
- **Node** – Anything connected to the network (e.g. a computer, a printer, etc.)
- **Backbone** – main data carrier in a network. You can can have a backbone
- **Mbps** – Mega bits per second
- **Switch** – Device that connects network segments
- **Router** - Specialized computer that makes possible the flow of packets

Routers

- Internet is a collection of computer networks
- As already discussed a message is divided in packets.
- Router – Specialized computer that makes possible the flow of packets between networks. It "joins" the network by allowing them to communicate.
- Router Responsibilities
  - Route a packet to its destination
  - Provides network security
  - Determine the most efficient route a packet must follow
- Routers – Come in different sizes
  - Your PC can act as a router in a simple network
  - You can have a dedicated computer whose only task is routing packets

TCP/IP

- IP – Internet Protocol
  - Defines the format of packets
  - Defines addressing scheme
- TCP – Transmission Control Protocol
  - Guarantees the delivery of packets between two computers
- TCP/IP – Sets a connection between two computers where data can then be exchanged

Identifying Computers on the Internet

- Two approaches to tag computers
  - Host Name (sitename) (e.g., why.cs.umd.edu)
  - IP number (e.g., 128.8.129.103)
- IP Number: 32-bit number written in groups of four numbers separated by three periods
- Each number's value ranges from 0 to 255
- Domain name – Identifies one or more IP addresses.

  Ex. microsoft.com

IP Addresses

- There are a total of 4,294,967,296 theoretically available internet addresses (256*256*256*256) or 2^{32}
- IPV4 – Internet Protocol version 4and basis of the current internet
- Problem
  - We are running out of IP addresses
- IPV6 – Internet Protocol version 6 that will eventually replace IPV4
  - IPv6 supports about 3.4 x 10^{38}
  - Address format: XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX

NAT

- In a home network you can have a router connected to the internet and a set of machines at home
- Each computer at home is “behind a NAT”
- NAT – **N**etwork **A**ddress **T**ranslation table
- All your computers have a “local” Internet-style address.
- NAT makes possible for you to use a single IP (provided by ISP) for several computers.
- 192.168.XXX.XXX subnet

DHCP

- IP Address unique to subnet.
- Portable computer can not carry the IP
- How can we communicate?
- Using DHCP (Dynamic Host Configuration Protocol)
- DHCP – Allows a node to be assigned an IP dynamically when connected to a network