Ch. 8 Networking

Ethernet: hardware standard defining cabling, signaling, and behaviors that allow two or more computers to be connected.

- Each computer contains a Ethernet card, a special piece of hardware that has a unique Ethernet address

- Every computers Ethernet card is connected to the same piece of wire.

- When a computer wishes to send a message to another computer it broadcasts the message along with a destination address; Only the Ethernet card whose address matches the destination address accepts the message.

- When a collision occurs (two messages sent at the same time), both computers wait a random period of time and re-broadcast the message.

Bridges: Special hardware connecting two segments of Ethernet
cable (serial connection between two groups of computers)

Routers: hooks together two or more networks and automatically
routes messages to the proper network.

Gateways: High capacity routers which connect Local Area Networks
These are place geographically apart. (WAN)

Internet: Collection of LANs and WANS working together.

- packet switching: messages are split into small packets, each of which is routed independently (switched) through the network. specially encoded information in packets allow them to be recombined at the destination.

- internet addresses: Internet Protocol (IP version 4) addressing is a hardware independent labeling scheme; 32 bit address made up of 4 bytes; each part is has a value between 0 and 255

  (IP-version 6 scheme: 128 bit addresses)

- numerical addresses are not convenient; so names are used; /etc/hosts file contains names-numbers for all local host names.

- routing: done statically using information in /etc/route file
  or dynamically using /etc/routed and /etc/gated programs
  which constantly update the routing tables and sharing this
  with nearby hosts.

- remote shells: if a user has accounts on several machines in
  the network with the same userid, they are able to execute
  commands on other machines without providing a password.

  from tinman.cs.gsu.edu I can execute

```
% rsh zeus who
```

  if you have a file called .hosts in your home directory with a list
  of host names (full names) then this is possible (machine equivalence)

Network related Unix commands:

User Information:

```
% users
displays a simple list of users on your local host

% rusers -a {host}*
displays a list of users on all hosts on the local network

% who
% rwho
% w

all describe users logged on in more detail

% hostname
displays your host name

% finger {userId}*
display personal information about users
```

Communicating with other users:

```
% mesg [y | n]
enables or disables writing to your terminal

% write userId [tty]

% write userId [tty]

writes line by line to the userId's terminal
stop using CTRL-D

% talk userId [tty]
interactive writing (split screen)

% wall
write all
```

Moving Around:

```
% rlogin host

% ftp host

% telnet host

% rsh host command
```