Clarifications from last time

Regarding Dotted-Decimal Notation

Every IPv4 address is 32 bits long.

32 bits			
8 bits	8 bits	8 bits	8 bits

Internet Protocol

NAT (Network Address Translation)

Used to get more mileage out of IPv4.

Reserved Address Blocks

Certain blocks of addresses have been reserved and have been defined as non-routable. While they can be used on private networks, they should never get out on the internet.

10.0.0.0 – 10.255.255.255
172.16.0.0 – 172.31.255.255
192.168.0.0 – 192.168.255.255

If setting up a private network, though, these IP address ranges can be used. There can be many networks throughout the world that are using these addresses. You keep these addresses confined to your local, private network. However, a special type of router is needed to translate these addresses to non-private IP addresses.

NAT-Enabled Router

Captures datagrams before going out. These will have local source addresses.
The router has a pool of publicly routable IP addresses

When a datagram with a non-routable Source Address is received, the router intercepts it and replaces the private SA with a valid, routable SA.

The router maintains an address translation table. When the return packet comes back with the routable address in it, it will look up in the address translation table to determine which internal node it belongs to.

It replaces the destination address of the received message with the private, non-routable address.

Overloaded NAT

What if there is only one routable address and two computers (or more) want to send information out at the same time? How does the router know where to send information back to?

When TCP is used, there is an ephemeral (dynamic), freely used port number available.

The address translation now has three items in it: a public address, private address, and an ephemeral port number.

Transport Layer

Two Protocols Used

TCP and UDP. UDP is not connection oriented and does not do error checking on its data.

TCP

HDLC is used at the data link layer for *node-to-node* communication
IP is used at the network layer for *end-to-end* communication
TCP is used at the transport layer for *process-to-process* communication

TCP allows applications on either end to communicate with one another.

Connection-oriented. Uses something like sliding window for error checking. There is link establishment and link termination, error checking and error correction.