

# System Administration: Week 3 Notes

February 13, 2006

## 1 Review

Last week was a basic intro to commands – hopefully you feel more comfortable now. **apropos** did not work on most of inst's servers, thank you for pointing that out. Should be fixed now.

## 2 Networking

### 2.1 Two models: Client/Server and Peer-to-Peer

Client/Server

- Client(you) request something from a server that is always on (hopefully).
- Web surfing, email, Napster

Peer-to-Peer

- direct interaction between clients
- Gnutella, KazaA

### 2.2 Forwarding Information

Good-Old' Switchboard

- The way telephone calls operate
- You take up the entire line until you are finished
- Outdated and very inefficient

Packet-based

- How Internet works – efficient
- Each packet contains a **header**, **data** and **trailer**.

- **header** contains the information so that the entire packet could reach the destination
- **data** contains the information you are trying to send
- **trailer** contains some sort of error-checking.

### 2.3 Three-Way Handshake

Used by TCP protocol to establish communication between 2 entities.

- You send a packet called SYN (synchronize) to the other party
- The destination sends you back a SYN/ACK packet
- You send back the ACK packet acknowledging the connection
- If you get a NAK packet =, something is wrong

### 2.4 Protocols

Protocols are the rules governing the syntax, semantics, and synchronization of communication. Ex: AIM, Bittorrent, HTTP, IMAP, SSH, etc. And there are 7 layers – services, each of which does its own job. Analogy could be drawn with delivering mail.

- Layer 1 - Physical. Truck carrying the mail.
- Layer 2 - Data link. Packs/Unpacks packages from various places.
- Layer 3 - Network. Sorts out the messages.
- Layer 4 - Transport. Letter put/withdrawn from mailbox.
- Layer 5 - Session. Puts right addresses/Takes a copy of the message.
- Layer 6 - Presentation. Assistant alerts manager of message/corrects errors and handwrites it.
- Layer 7 - Application. Reads messages/Writes message.

All of the applications live on Layer 7 and is what we are concerned with.

### 2.5 DHCP

**DHCP** stands for Dynamic Host Configuration Protocol.

- Allocates ip addresses for a computer on the network using one of 3 ways:
- manually – if you lock the network down by the mac address
- automatically – takes any free ip address
- dynamically – for a certain period of time

## 2.6 DNS

**DNS** translates host name into an ip address and vice-versa. We need DNS because otherwise we would have to resort to typing ip addresses for everything. Imagine having to type 66.102.7.104 every time you want to search something on Google. DNS is a hierarchical structure.

- top-level domain: edu, com, org, etc
- subdomain: berkeley, google, slashdot, etc
- hostname: ocf, ls, eecs, etc

There are many DNS servers spread around the world for redundancy. You find the host name for an ip address you need using a recursive process starting from the first DNS server, until you reach one that knows the ip address you are looking for. **Zone** is administrative authority responsible for a part of the hierarchy. Note: Zone is also a Solaris term used to describe a 'sandbox' like configuration to isolate processes, but wait until week 10.

## 2.7 NAT

**NAT** stands for Network Address Translation.

- Utilized by routers to allow more than one computer be connected via one ip address.
- Used by load balancing when you are trying to balance a load between more than one server.