

# NETWORK CONFIGURATION AND SERVICES

```
route add default gw 192.168.0.1  
/etc/init.d/apache restart
```

# NETWORK CONFIGURATION

- There are two main approaches to configuring a machine for network access:
  - Static configuration
  - Dynamic configuration
- Static configuration uses set parameters for the configuration, which is known by the machine and the network and never changes. Generally used with servers.
- Dynamic configuration configures network machines on the fly, where a service on the network provides all configuration parameters to a machine when it joins the network. Generally used with workstations.

# DYNAMIC CONFIGURATION

- Dynamic configuration is the easiest to use.
- The machine just needs to set up its interfaces with the DHCP protocol.
- DHCP: Dynamic Host Configuration Protocol.
- A lease is obtained from the DHCP server, providing all network configuration details for the client. The lease expires after some amount of time and is renewed by the client to maintain network access.

# STATIC CONFIGURATION

- Static configuration requires four configuration parameters in order to allow full network functionality:
  - IP Address
  - Netmask
  - Default Gateway or Router
  - DNS Server(s)

# DNS?

- Domain Name Service: This is the glue between network names and IP addresses.
- Remember: Humans like names, computers like numbers. DNS is a service like so many others, mapping names to numbers and numbers to names. Mostly a convenience.
- Also provides for email functionality, geographic load balancing and limited service failover capabilities.

# STATIC CONFIGURATION

- The first two components of static configuration are IP address and netmask.
- These provide LAN-level access
- `ifconfig`: Network Interface configuration tool
- Basic idea:
  - `ifconfig eth0 192.168.0.100 netmask 255.255.255.0`

# GATEWAYS

- The third configuration parameter is the default gateway.
- Provides access to *inter-networking*, or moving from just the local LAN to other LAN's
- `route`: Kernel routing table tool
  - Displays and manipulates network routing table
  - `route add default gw 192.168.0.1`

# DNS SERVERS

- Final piece of configuration information.
- List of one or more IP addresses which provide the DNS service, allowing name to IP address mapping
- Very simple to configure. Add `nameserver` lines to `/etc/resolv.conf`:
  - `nameserver 192.168.7.15`
- Also consider `/etc/nsswitch.conf`



# STATIC CONFIGURATION

- Once all four pieces of information are configured on the system, full network service will be available.
- Best practice:
  - Configure IP address and netmask. Check LAN connectivity.
  - Configure default gateway. Check intra-LAN connectivity.
  - Configure DNS: Check name resolution.

# ONE MORE THING...

- ifconfig and route directly manipulate the running kernel, and are not permanent changes to the system. After a reboot, changes will be lost.
- To make IP address, netmask and gateway changes permanent, you have to edit two configuration files:
  - `/etc/sysconfig/network-services/ifcfg-eth0`
  - `/etc/sysconfig/network`

SO...

Demonstrations are Good

# EXERCISES

- Check your current IP address, default route and DNS servers.
- Restart networking services using the proper init script.

# NETWORK SERVICES

- There are hundreds, even thousands of different network services out there. And each individual service might have one or a dozen plus applications which can provide the service.
- The big ones, and the ones introduced in this course:
  - HTTP, SMTP, SSH, FTP, MySQL

# HTTP

- Hypertext Transfer Protocol: Used to ship webpages and associated files across the network.
- Popular servers: Apache, IIS, lighttpd

# SMTP

- Simple Mail Transfer Protocol: Delivers email messages
- Popular servers: qmail, sendmail, postfix, exchange

# SSH

- Secure Shell: Encrypted remote shell access
- Server: OpenSSH



# FTP

- File Transfer Protocol: Used to move files around the network
- Popular Servers: wu-ftp, vsftpd

# MYSQL

- MySQL: Extremely powerful, open-source relational database management system
- MySQL is the server, and the only one, as this service is completely defined and implemented by the application

```
slideshow.end();
```