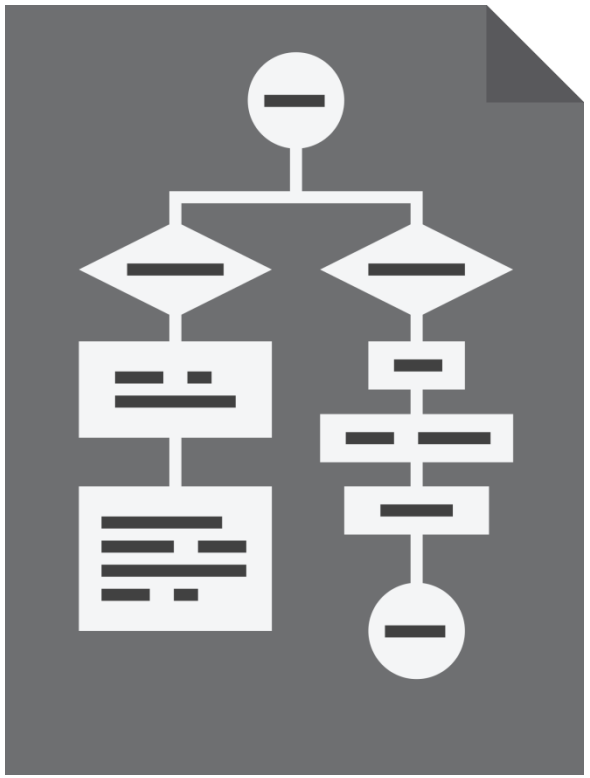
Basic Network Administration

Overview



- ifconfig
- ip
- route
- arp
- Configure wireless networks

Basic Network Configuration

```
$ ifconfig
$ sudo ifconfig eth0 192.168.0.4
$ sudo ifconfig add eth0 172.17.0.1 \
netmask 255.255.0.0 broadcast 172.17.255.255
$ sudo ifconfig eth0 down ; sudo ifconfig eth0 up
```

/sbin/ifconfig

Traditional command used to display and set IP Address information

Change IP Address

Add additional IP

Disable and enable interface

The command ifconfig is a traditional Linux command and many admins use it, although officially depreciated. It IS an LPI objective so make sure you know it

Demo: Using the ifconfig command

```
$ ip address show
$ ip route show
$ ip neighbor show
$ sudo ip link set eth0 up
$ sudo ip address add 192.168.0.5/24 dev eth0
```

Using the command ip

The newer command ip is a little swiss army knife

Working with many network objects, ARP cache, route table etc

A good administrator will know ‘ip’ or ‘ifconfig’; whereas a GREAT administrator will know both.

Demo: Using the ip command

Route Command

Route manipulates the kernel's IP routing tables. Its primary use is to set up static routes to specific hosts or networks

The command ip can also be used

```
$ route OR ip r s
$ route -n
$ strace route 2>&1 | grep network
$ strace route -n 2>&1 | grep network
```

Display route table

Use the -n option to display numbers not names of networks.

Names are resolved via **/etc/networks**

Route Flags

Possible flags include

- U (route is up)
- H (target is a host)
- G (use gateway)
- R (reinstate route for dynamic routing)
- D (dynamically installed by daemon or redirect)
- M (modified from routing daemon or redirect)
- A (installed by addrconf)
- C (cache entry)
- ! (reject route)

```
$ sudo route add default gw 192.168.0.1
$ grep default /etc/networks
```

Add a Default Route

Remember networks names including default are included in /etc/network

```
$ sudo route add -net 192.168.3.0 \
  netmask 255.255.255.0 gw 192.168.0.1
```

Add Route to Private Network

Private address ranges are not advertised so the route table needs to be populated

```
$ sudo route add -host 192.168.1.20 reject
```

Block Access to a Single Host

Persisting Static Routes

```
/etc/network/interfaces
auto eth0
allow-hotplug eth0
iface eth0 inet static
address 192.168.0.5
netmask 255.255.255.0
post-up route add -net 172.16.0.0 netmask 255.255.0.0 gw 192.168.0.3
```

Persisting Static Routes

```
/etc/sysconfig/network-scripts/route-eth0
default 192.168.0.1 dev eth0
10.10.10.0/24 via 192.168.0.3 dev eth0
172.16.1.0/16 via 192.168.0.1 dev eth0
```

Cent
OS

Demo: Manage Routes

Address Resolution Protocol

Maps layer 3 IP addresses to layer 2 MAC addresses

Used when the sending IP address and receiving IP address are on the same network

Displayed by the command arp which lists content of /proc/net/arp

```
$ arp OR ip n s
$ sudo arp -s <ip> <mac>
$ sudo arp -d <ip> OR <mac>
/etc/ethers <mac> <ip>
```

Using the arp command

Without options the arp cache is displayed (contents /proc/net/arp)

The -s option is used to add a static entry - d to delete an entry

Persistent entries can be created in /etc/ethers

Demo: Using ARP

Configuring WiFi

- wpa_supplicant.conf
- iwlist
- iwconfig

When Configuring WiFi from CLI

```
/etc/wpa_supplicant/wpa_supplicant.conf
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
network={
ssid="DIY-WLAN"
psk="secret-pre-shared-key"
proto=RSN
key_mgmt=WPA-PSK
pairwise=CCMP TKIP
}
```

```
$ sudo iwlist wlan0 scan
```

Scan for SSID

This can help you find information you need for wpa_supplicant.conf

```
$ iwconfig wlan0
$ cat /proc/net/wireless
```

Display device information

The command iwconfig can be used to both display and set adaptor information

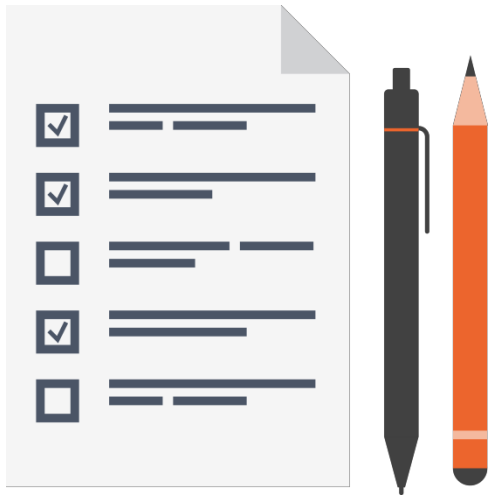
Information can also be displayed from /proc/net/wireless

```
$ sudo wpa_cli status
Selected interface 'wlan0'
bssid=74:44:01:fb:92:50
ssid=hobbit
id=0
mode=station
pairwise_cipher=CCMP
group_cipher=TKIP
key_mgmt=WPA2-PSK
wpa_state=COMPLETED
ip_address=192.168.0.5
address=80:1f:02:fd:9e:b7
```

Display status information for a connection

Demo: Configuring Wireless Access on the Raspberry Pi

Summary



- Compared ifconfig and ip
- Managed route tables
- Understanding of the ARP cache
- Configured wireless networks from the command line