

CCNA Study Group Week 2

Preview

- Device Types
- Topology
- TCP vs UDP
- Getting the network info on Windows, OSX, and Linux
- Wireless Principles
- Cisco-specific Wireless
- Services

Routers

Routers route IP packets by looking at their routing table.

Routing tables are built using routing protocols.

ROUTERS ONLY LOOK AT THEIR ROUTING TABLES FOR FORWARDING DECISIONS.

L2 Switch

Switches frames based on forwarding table

Ages out old forwarding table entries.

Buffers frames to avoid collisions.

Firewall

Looks at packets and decides whether the packet should go through or not based on rules (Go/No Go).

Next Generation Firewalls (NGFWs) use rules AND stateful packet inspection.

Stateful packet inspection means that it can remember things and correlate packets.

Access Points (APs)

Are usually controlled by a Wireless LAN Controller (WLC). When controlled by a WLC, the WLC is only configured, NOT the APs.

AP placement is important because different antennas have different properties.

Additionally, APs that are too close, using the similar frequencies will degrade each other.

Servers

Run applications that clients want.

Examples:

- Web server: hosts websites
- Active Directory controller: manages Active Directory requests
- Database server: hosts databases
- Virtualization server: hosts Virtual Machines

Transmission Control Protocol (TCP)

Is connection-oriented (uses two-way communication).

Every segment (TCP PDU) is acknowledged by the receiver.

‘Yes, I have received segment 157’

If an acknowledgement is not made for a segment, the sender will resend the segment until the receiver acknowledges.

User Datagram Protocol (UDP)

Is connectionless (no two-way communication/acknowledgement)

Is faster than TCP.

Almost like a thin wrapper for IP packets.

Getting IP information on Windows

Command: ipconfig

```
PS C:\Users\Admin> ipconfig 1

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : ac3a::94bd:ac3a:94bd:bd67%11
    IPv4 Address. . . . . : 10.1.0.10
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.1.0.1

Wireless LAN adapter Wi-Fi:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Wireless LAN adapter Local Area Connection* 10:

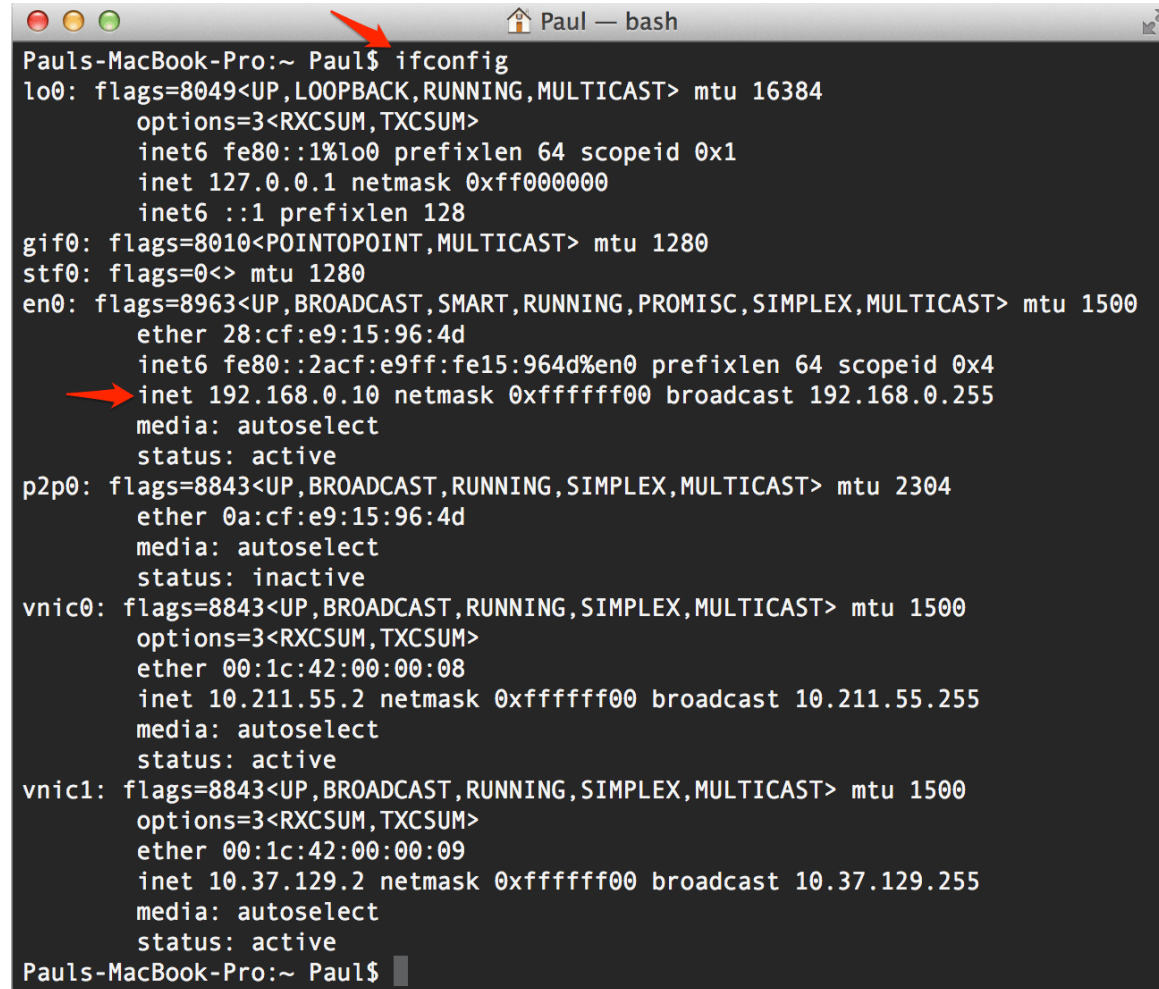
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
```

Getting IP information on OS X & Old Linux

Command: ifconfig

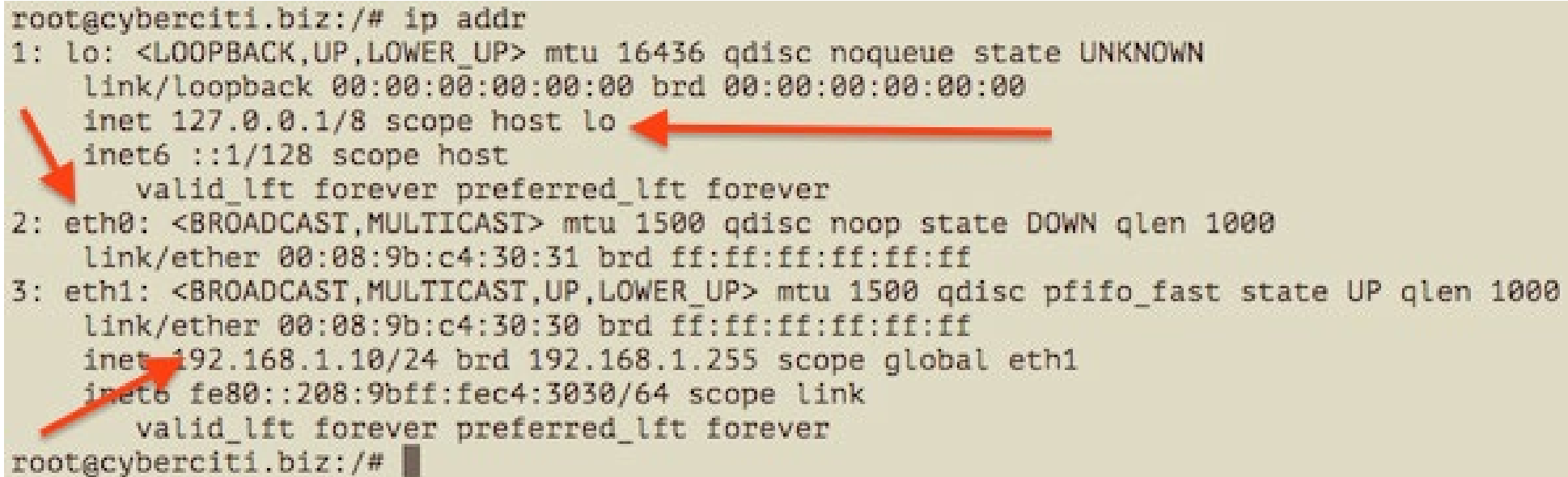
A screenshot of a macOS terminal window titled "Paul — bash". The terminal shows the output of the "ifconfig" command. The output lists network interfaces: lo0, gif0, stf0, en0, p2p0, vnic0, and vnic1. Each interface's configuration is displayed, including flags, MTU, options, and IP addresses with netmasks. A red arrow points to the terminal title bar, and another red arrow points to the IP address "192.168.0.10" for the en0 interface.

```
Pauls-MacBook-Pro:~ Paul$ ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
    options=3<RXCSUM,TXCSUM>
    inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
    inet 127.0.0.1 netmask 0xff000000
    inet6 ::1 prefixlen 128
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
en0: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
    ether 28:cf:e9:15:96:4d
    inet6 fe80::2acf:e9ff:fe15:964d%en0 prefixlen 64 scopeid 0x4
    inet 192.168.0.10 netmask 0xfffff00 broadcast 192.168.0.255
    media: autoselect
    status: active
p2p0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 2304
    ether 0a:cf:e9:15:96:4d
    media: autoselect
    status: inactive
vnic0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    options=3<RXCSUM,TXCSUM>
    ether 00:1c:42:00:00:08
    inet 10.211.55.2 netmask 0xfffff00 broadcast 10.211.55.255
    media: autoselect
    status: active
vnic1: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    options=3<RXCSUM,TXCSUM>
    ether 00:1c:42:00:00:09
    inet 10.37.129.2 netmask 0xfffff00 broadcast 10.37.129.255
    media: autoselect
    status: active
Pauls-MacBook-Pro:~ Paul$
```

Getting IP information on New Linux

Command: ip addr

```
root@cyberciti1.biz:/# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
    inet6 ::1/128 scope host
    valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN qlen 1000
    link/ether 00:08:9b:c4:30:31 brd ff:ff:ff:ff:ff:ff
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 00:08:9b:c4:30:30 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.10/24 brd 192.168.1.255 scope global eth1
    inet6 fe80::208:9bff:fec4:3030/64 scope link
    valid_lft forever preferred_lft forever
root@cyberciti1.biz:/#
```

A terminal window showing the output of the 'ip addr' command. Three red arrows are overlaid on the image: one points to the 'inet 127.0.0.1/8' line, another points to the 'inet6 ::1/128' line, and a third points to the 'inet 192.168.1.10/24' line.

Wireless concepts

You want to use different channels for each AP in the same area.

Channels close to each other will interfere.