Cyber Defense Organization

Spring 2019 - Intro to Networking



Ethernet



RJ-45 or Ethernet cable **Ethernet cables** physically connect devices within a local area network, like PCs, routers, and switches.



SWITCH





A **network switch** is a computer networking device that connects devices together on a computer network by using frame switching to receive, process, and forward data to the destination device

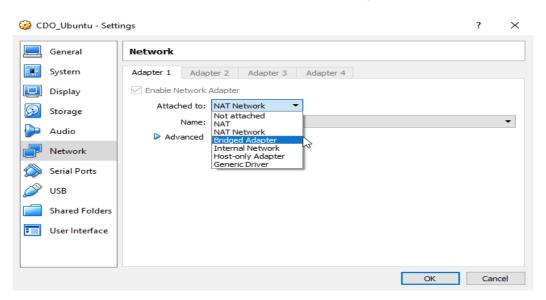
Let's build a network!

Let's do some things first...

At each tables choose 2 people to be linux, and 2 people to be windows.. Boot up those machines. MAC ADDRESS?

Let's continue to build a network!

Each virtualbox machine (linux and windows) network adapter settings needs to be set to a "bridged adapter". This will allow the devices connected to the switch to be networked together correctly when we do static addressing.



ICMP

```
PING google.com (172.217.10.46) 56(84) bytes of data.
64 bytes from lga34s13-in-f14.1e100.net (172.217.10.46): icmp_seq=1 ttl=252 time=9.53 ms
64 bytes from lga34s13-in-f14.1e100.net (172.217.10.46): icmp_seq=2 ttl=252 time=9.57 ms
64 bytes from lga34s13-in-f14.1e100.net (172.217.10.46): icmp_seq=3 ttl=252 time=12.3 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 9.530/10.472/12.315/1.305 ms
```

Internet Control Message Protocol, it is used to signal error conditions and used for diagnosis. In our case, ICMP traffic today will be used for testing connectivity (is the host up or down).

IP ADDRESSING

A unique string of numbers separated by periods that identifies each computer using the Internet Protocol (IPv4) to communicate over a network. So what does this all mean, inorder for our hosts (each computer your sitting at) to "talk" to each other they need to be servicing an IP address.

However, today we will be learning how to statically set an IP address opposed to DHCP. Statically addressing is the process of manually setting each IP.



How to...

Linux users:

/etc/network interfaces

auto <INTEFACE NAME>

```
netmask 255,255,255.0
                           gateway 192.168.0.1
              systemctl restart network
              ping <lp address>
  GNU nano 2.9.3
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback
auto <INTERFACE NAME>
iface <INTERFACE NAME> inet static
        address 192,168.0.X
        netmask 255,255,255.0
        gateway 192.168.0.1
```

iface <INTERFACE_NAME> inet static

address 192,168,0,X

Windows users:

Start Menu > Control panel > Network > Adapter

Settings > Local Connection > Properties

Open properties on IPv4, enable "Use the

following IP address"

IP address: 192.168.0.X

Subnet mask: 255.255.255.0

Default gateway: 192.168.0.1

Open CMD, ping <SOMEONE>

Ethernet Properties Internet Protocol Version 4 (TCP/IPv4) Properties Networking Sharing General Connect using You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator Intel(R) Ethemet Connection (2) I219-LM for the appropriate IP settings. Configure. Obtain an IP address automatically This connection uses the following items: Use the following IP address: Client for Microsoft Networks IP address: File and Printer Sharing for Microsoft Networks VirtualBox NDIS6 Bridged Networking Driver Subnet mask: QoS Packet Scheduler Default gateway: ✓ __ Internet Protocol Version 4 (TCP/IPv4) __ Microsoft Network Adapter Multiplexor Protocol Obtain DNS server address automatically ✓ ___ Microsoft LLDP Protocol Driver Use the following DNS server addresses: Preferred DNS server: Alternate DNS server: Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication Validate settings upon exit across diverse interconnected networks. Advanced... Cancel