CS0424IT - S1/L3 - Cisco Packet Tracer pt. 1

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May 29, 2024

1 Assignment

Create a network with 2 switches and 6 hosts, 3 for each switch. These 6 hosts should all be part of the same network and should be able to communicate with each other.

1.1 Network topology (link to .pkz file)

For the creation of this network, the Network IP address chosen is 192.168.1.0/24, a Class C network, with CIDR notation /24, capable of hosting up to a maximum of $2^8 = 254$ hosts. Higher classes could accommodate a greater number of hosts, but for the current purpose, it would be an overabundance of resources.

Initially, the first 3 hosts of the network (LAPTOP 1, DESKTOP 1 and LAPTOP 2), shown on the left side of the figure below, were set up and configured with valid static IPv4 addresses, as indicated next to each one. They were then connected to SWITCH 1, a Layer 2 device in the ISO/OSI model that connects devices within the same IP network. The same process was mirrored for the other 3 hosts (LAPTOP 3, DESKTOP 2 and LAPTOP 4) and another switch, SWITCH 2. Finally, the two switches were connected to allow communication between all 6 hosts.

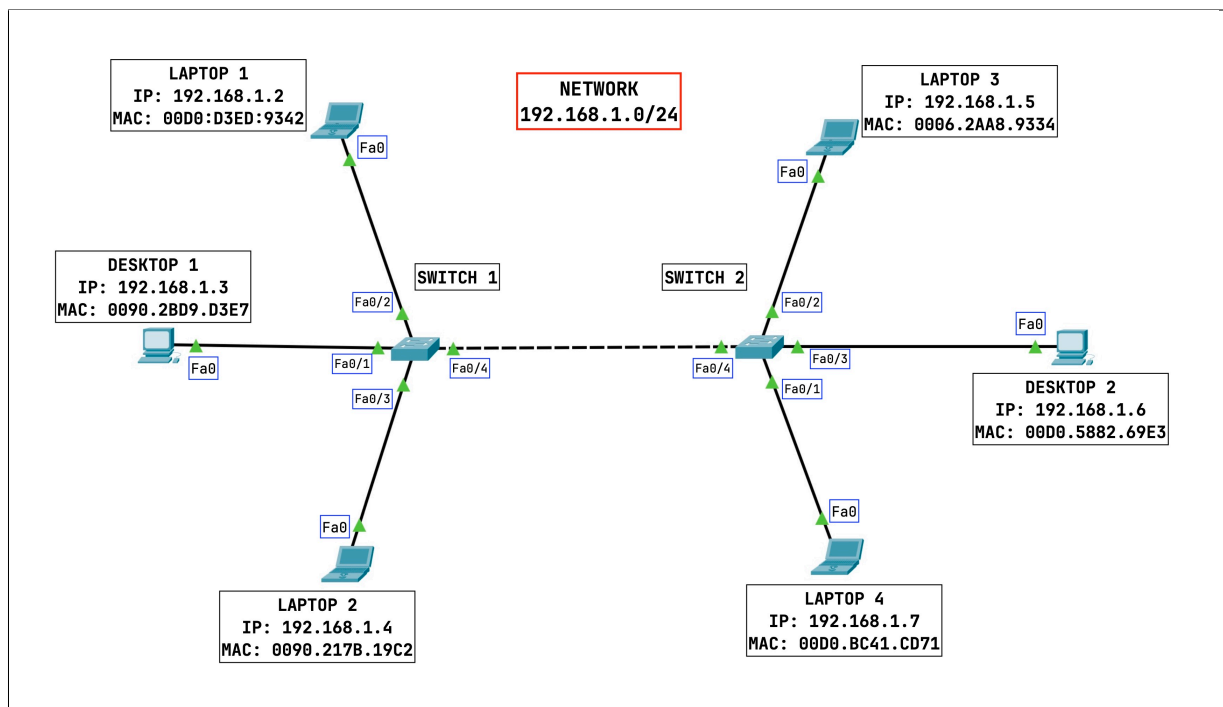The summary diagram of the network topology is shown in Figure 1.

Figure 1: Summary diagram of the network topology, indicating static IP addresses and MAC addresses of the devices.

```
         Mac Address Table                          Mac Address Table
-------------------------------------    -------------------------------------

Vlan    Mac Address     Type     Ports   Vlan    Mac Address     Type     Ports
----    -----------     --------  -----   ----    -----------     --------  -----

   1    0001.424c.0b04  DYNAMIC   Fa0/4      1    0006.2aa8.9334  DYNAMIC   Fa0/2
   1    0006.2aa8.9334  DYNAMIC   Fa0/4      1    0009.7cd6.6b04  DYNAMIC   Fa0/4
   1    0090.217b.19c2  DYNAMIC   Fa0/3      1    0090.217b.19c2  DYNAMIC   Fa0/4
   1    0090.2bd9.d3e7  DYNAMIC   Fa0/1      1    0090.2bd9.d3e7  DYNAMIC   Fa0/4
   1    00d0.5882.69e3  DYNAMIC   Fa0/4      1    00d0.5882.69e3  DYNAMIC   Fa0/3
   1    00d0.bc41.cd71  DYNAMIC   Fa0/4      1    00d0.bc41.cd71  DYNAMIC   Fa0/1
   1    00d0.d3ed.9342  DYNAMIC   Fa0/2      1    00d0.d3ed.9342  DYNAMIC   Fa0/4
```

(a) MAC Address Table for SWITCH 1. (b) MAC Address Table for SWITCH 2.

Figure 2: MAC Address Tables for the two switches.

1.2 Communication between devices

Once the PCs were configured with valid IP addresses from the network, the MAC addresses table of the switches began to fill with the MAC addresses of the devices connected to each switch, as shown in Figure 2. Every switch uses the MAC address table to identify the connected devices, as this table maps MAC addresses to IP addresses.

To verify the functionality of the network, a *ping* has been sent between each computer to test their connectivity. Pinging allows packets to be sent from one computer to another to verify that they are connected. During the pinging process, the information packet is sent from the sending computer with the destination IP address included. It arrives at the switch, which consults the MAC table to identify the destination IP address and then forwards the packet to the receiving computer.

Proof of connectivity is shown in Figures 3 and 4.

```
C:\>ping 192.168.1.2                             C:\>ping 192.168.1.5

Pinging 192.168.1.2 with 32 bytes of data:       Pinging 192.168.1.5 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128    Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=20ms TTL=128   Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128    Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=21ms TTL=128   Reply from 192.168.1.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:                 Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),   Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:   Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 21ms, Average = 10ms    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.3                             C:\>ping 192.168.1.6

Pinging 192.168.1.3 with 32 bytes of data:       Pinging 192.168.1.6 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128    Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128    Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128    Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128    Reply from 192.168.1.6: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.3:                 Ping statistics for 192.168.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),   Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:   Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms      Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.1.4                             C:\>ping 192.168.1.7

Pinging 192.168.1.4 with 32 bytes of data:       Pinging 192.168.1.7 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time<1ms TTL=128    Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128    Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128    Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128    Reply from 192.168.1.7: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.4:                 Ping statistics for 192.168.1.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),   Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:   Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms      Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 3: Pinging each network device from LAPTOP 1.

```
C:\>ping 192.168.1.2                              C:\>ping 192.168.1.5

Pinging 192.168.1.2 with 32 bytes of data:        Pinging 192.168.1.5 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128  Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128  Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128  Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128  Reply from 192.168.1.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:                  Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:    Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms       Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.3                              C:\>ping 192.168.1.6

Pinging 192.168.1.3 with 32 bytes of data:        Pinging 192.168.1.6 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128  Reply from 192.168.1.6: bytes=32 time=35ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128  Reply from 192.168.1.6: bytes=32 time=21ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128  Reply from 192.168.1.6: bytes=32 time=18ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128  Reply from 192.168.1.6: bytes=32 time=20ms TTL=128

Ping statistics for 192.168.1.3:                  Ping statistics for 192.168.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:    Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms       Minimum = 18ms, Maximum = 35ms, Average = 23ms

C:\>ping 192.168.1.4                              C:\>ping 192.168.1.7

Pinging 192.168.1.4 with 32 bytes of data:        Pinging 192.168.1.7 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time<1ms TTL=128  Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128  Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128  Reply from 192.168.1.7: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128  Reply from 192.168.1.7: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.4:                  Ping statistics for 192.168.1.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:    Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms       Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 4: Pinging each network device from DESKTOP 2.