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Assignment Submission 1

## Simulation of LAN (Local Area Network) using switches by Cisco Packet Tracer

Switch is a hardware network component, which is used to connect multiple devices across a network. Switch uses packet switching to receive and forward data to a given destination. It uses MAC (Media Access Control) address to forward data at the data link layer of the OSI (Open System Interconnection) model.

We can build a simulation of Local Area Network or LAN easily using the Cisco Packet Tracer tool. With few simple steps:

- 1) Drag and drop a switch on the workspace from the Cisco devices listed at the bottom menu.
- 2) Add end devices like computers or laptops to the workspace from the bottom menu.
- 3) Connect all the computers and other devices we added with the switch using Copper Straight-Through cable from the cable options listed.
- 4) Configure IP address for each end device we used.
- 5) In case if we have many devices to connect with the switch, we can just add ethernet ports by turning off the switch and add input ports.
- 6) Finally we can use the **ping** command to check out if the connections we created are successful.
- 7) If we want to connect several switches with each other we have to use the Copper Crossover cable instead of the Straight-Through cable.

For this assignment we will build a LAN network with 20 computers and 3 switches.

In order to get the mac address table from a particular switch we can use the following set of commands:

- 1) Open the switch and go to the CLI tab
- 2) Type *enable*
- 3) Then *show mac-address-table*

Switch0

Physical Config CLI

IOS Command Line Interface

```
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#show mac-address-table
Mac Address Table
```

Vlan	Mac Address	Type	Ports
1	0001.6456.267c	DYNAMIC	Fa0/3
1	0001.c777.ec9a	DYNAMIC	Fa0/6
1	0001.c786.4548	DYNAMIC	Fa0/4
1	0001.c9ad.acc9	DYNAMIC	Fa0/1
1	0009.7c68.d5ed	DYNAMIC	Fa0/7
1	0060.2fcc.1b08	DYNAMIC	Fa0/8
1	00d0.d3d0.7e79	DYNAMIC	Fa0/5
1	00e0.a321.044e	DYNAMIC	Fa0/2

Switch#

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Switch1

Physical Config CLI

IOS Command Line Interface

```
Switch#show mac-address-table
Mac Address Table
```

Vlan	Mac Address	Type	Ports
1	0001.978a.88b7	DYNAMIC	Fa0/1
1	0001.c9ad.acc9	DYNAMIC	Fa0/8
1	0004.9a7c.aa07	DYNAMIC	Fa0/9
1	0009.7c5e.43ec	DYNAMIC	Fa0/9
1	0009.7c68.d5ed	DYNAMIC	Fa0/8
1	000a.41ac.3a31	DYNAMIC	Fa0/2
1	000a.f3e9.e728	DYNAMIC	Fa0/9
1	0010.1196.4a43	DYNAMIC	Fa0/3
1	0040.0b55.a5ca	DYNAMIC	Fa0/4
1	0050.0f1a.7731	DYNAMIC	Fa0/6
1	0060.7042.a6d6	DYNAMIC	Fa0/9
1	0090.21d1.ce0c	DYNAMIC	Fa0/9
1	00d0.583a.8b27	DYNAMIC	Fa0/9
1	00d0.d314.5474	DYNAMIC	Fa0/5
1	00e0.a306.be08	DYNAMIC	Fa0/8
1	00e0.f73d.3365	DYNAMIC	Fa0/7
1	00e0.f91c.clad	DYNAMIC	Fa0/9

Switch#

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Switch2

Physical Config CLI

IOS Command Line Interface

```
Switch>
Switch>enable
Switch#show mac-address-table
Mac Address Table
```

Vlan	Mac Address	Type	Ports
1	0001.978a.88b7	DYNAMIC	Fa0/7
1	0001.c9ad.acc9	DYNAMIC	Fa0/7
1	0009.7c5e.43ec	DYNAMIC	Fa0/3
1	000a.41ac.3a31	DYNAMIC	Fa0/7
1	000a.f3e9.e728	DYNAMIC	Fa0/2
1	0010.1196.4a43	DYNAMIC	Fa0/7
1	0040.0b55.a5ca	DYNAMIC	Fa0/7
1	0050.0f1a.7731	DYNAMIC	Fa0/7
1	0060.2fcc.1b09	DYNAMIC	Fa0/7
1	0060.7042.a6d6	DYNAMIC	Fa0/6
1	0090.21d1.ce0c	DYNAMIC	Fa0/1
1	00d0.583a.8b27	DYNAMIC	Fa0/5
1	00d0.d314.5474	DYNAMIC	Fa0/7
1	00e0.f73d.3365	DYNAMIC	Fa0/7
1	00e0.f91c.clad	DYNAMIC	Fa0/4

Switch#

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Figure 1 : Mac-address-table for switch 0, 1, 2

```
Command Prompt
Ping request could not find host 192.1. Please check the name and try again.
PC>
PC>ping 192.168.2.120

Pinging 192.168.2.120 with 32 bytes of data:

Request timed out.

Ping statistics for 192.168.2.120:
    Packets: Sent = 2, Received = 0, Lost = 2 (100% loss),

Control-C
^C
PC>
PC>ping 192.168.1.120

Pinging 192.168.1.120 with 32 bytes of data:

Reply from 192.168.1.120: bytes=32 time=1ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Reply from 192.168.1.120: bytes=32 time=1ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.120:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.1.140

Pinging 192.168.1.140 with 32 bytes of data:

Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Reply from 192.168.1.140: bytes=32 time=0ms TTL=128
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.140:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.1.127

Pinging 192.168.1.127 with 32 bytes of data:

Reply from 192.168.1.127: bytes=32 time=1ms TTL=128
Reply from 192.168.1.127: bytes=32 time=7ms TTL=128
Reply from 192.168.1.127: bytes=32 time=15ms TTL=128
Reply from 192.168.1.127: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.127:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 15ms, Average = 5ms

PC>
```

```
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.128

Pinging 192.168.1.128 with 32 bytes of data:

Reply from 192.168.1.128: bytes=32 time=1ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128
Reply from 192.168.1.128: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.1.129

Pinging 192.168.1.129 with 32 bytes of data:

Reply from 192.168.1.129: bytes=32 time=0ms TTL=128
Reply from 192.168.1.129: bytes=32 time=0ms TTL=128
Reply from 192.168.1.129: bytes=32 time=1ms TTL=128
Reply from 192.168.1.129: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.1.132

Pinging 192.168.1.132 with 32 bytes of data:

Reply from 192.168.1.132: bytes=32 time=1ms TTL=128
Reply from 192.168.1.132: bytes=32 time=0ms TTL=128
Reply from 192.168.1.132: bytes=32 time=1ms TTL=128
Reply from 192.168.1.132: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

```
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.120
Pinging 192.168.1.120 with 32 bytes of data:
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Reply from 192.168.1.120: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.120:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 192.168.1.124
Pinging 192.168.1.124 with 32 bytes of data:
Reply from 192.168.1.124: bytes=32 time=0ms TTL=128
Reply from 192.168.1.124: bytes=32 time=0ms TTL=128
Reply from 192.168.1.124: bytes=32 time=0ms TTL=128
Reply from 192.168.1.124: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.124:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
Control-C
^C
PC>ping 192.168.1.140
Pinging 192.168.1.140 with 32 bytes of data:
Reply from 192.168.1.140: bytes=32 time=1ms TTL=128
Reply from 192.168.1.140: bytes=32 time=0ms TTL=128
Reply from 192.168.1.140: bytes=32 time=0ms TTL=128
Reply from 192.168.1.140: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.140:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.1.138
Pinging 192.168.1.138 with 32 bytes of data:
Reply from 192.168.1.138: bytes=32 time=2ms TTL=128
Reply from 192.168.1.138: bytes=32 time=0ms TTL=128
Reply from 192.168.1.138: bytes=32 time=0ms TTL=128
Reply from 192.168.1.138: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.138:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms
PC>
```

*Figure 2 : Ping results from different computer to other end points*



PC1



Physical

Config

Desktop

Custom Interface

**Command Prompt**

Packet Tracer PC Command Line 1.0

PC&gt;ipconfig /a

Invalid Command.

PC&gt;ipconfig /all

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:

Physical Address.....: 0001.6456.267C

Link-local IPv6 Address.....: FE80::201:64FF:FE56:267C

IP Address.....: 192.168.1.125

Subnet Mask.....: 255.255.255.0

Default Gateway.....: 0.0.0.0

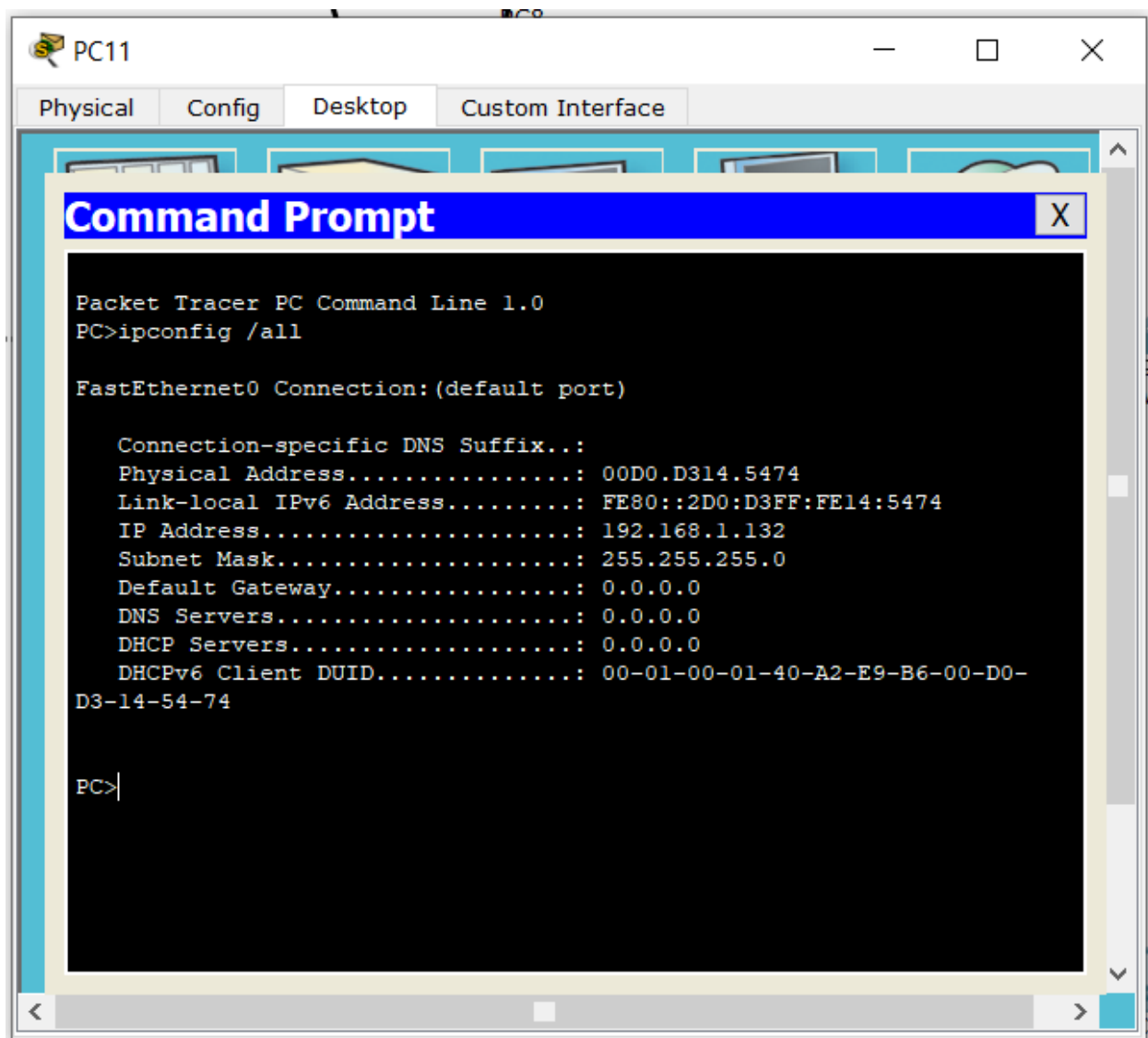
DNS Servers.....: 0.0.0.0

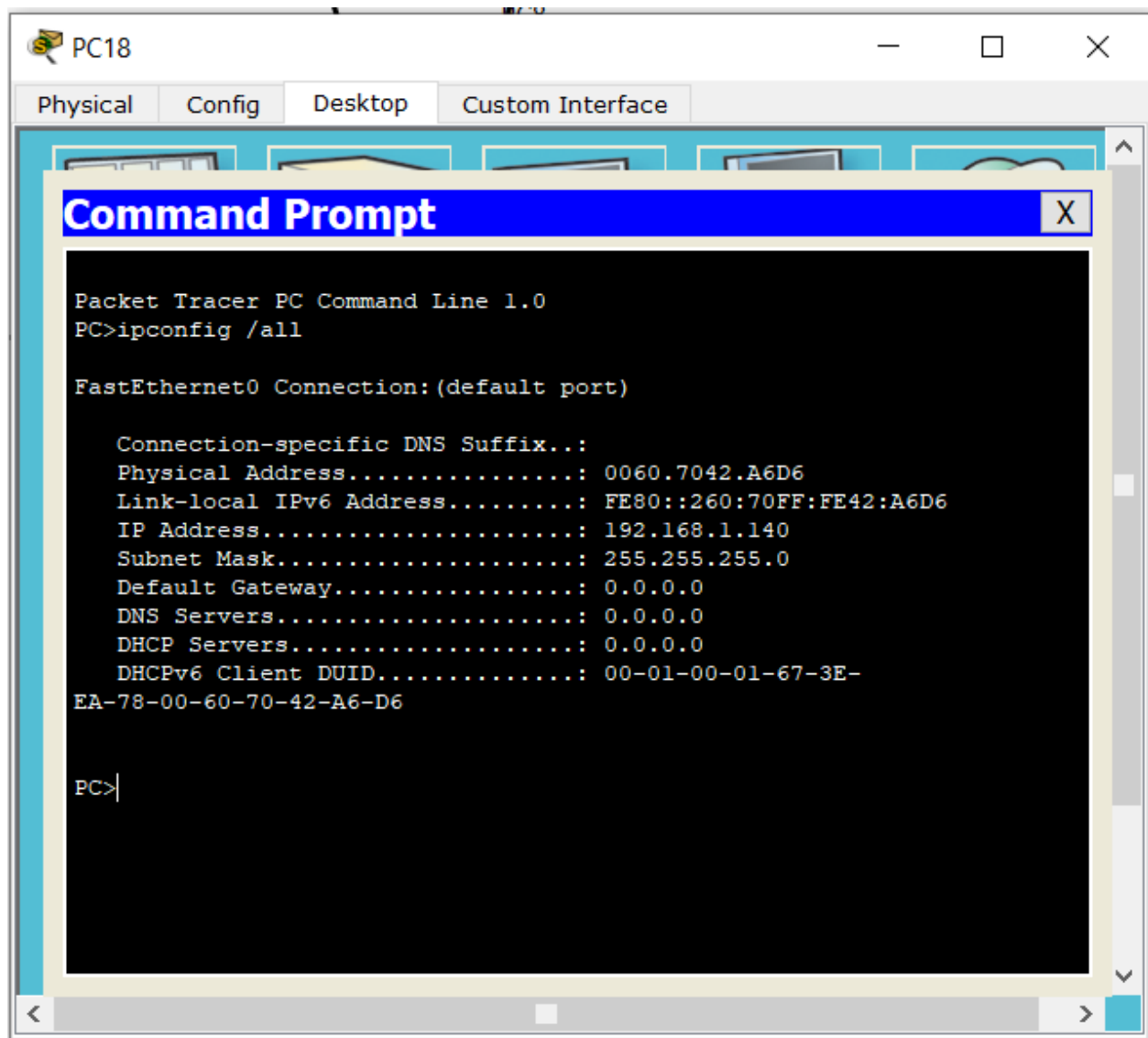
DHCP Servers.....: 0.0.0.0

DHCPv6 Client DUID.....: 00-01-00-01-E6-BD-

E2-4C-00-01-64-56-26-7C

PC&gt;|





*Figure 3: IP address and MAC address config of different computers*

```

PC>arp -a

Internet Address      Physical Address      Type
192.168.1.120         0009.7c68.d5ed        dynamic
192.168.1.137         0009.7c5e.43ec        dynamic
192.168.1.138         00e0.f91c.clad        dynamic
192.168.1.140         0060.7042.a6d6        dynamic

PC>

```



```

PC>arp -a
  Internet Address      Physical Address      Type
  192.168.1.120         0009.7c68.d5ed       dynamic
  192.168.1.140         0060.7042.a6d6       dynamic
PC>

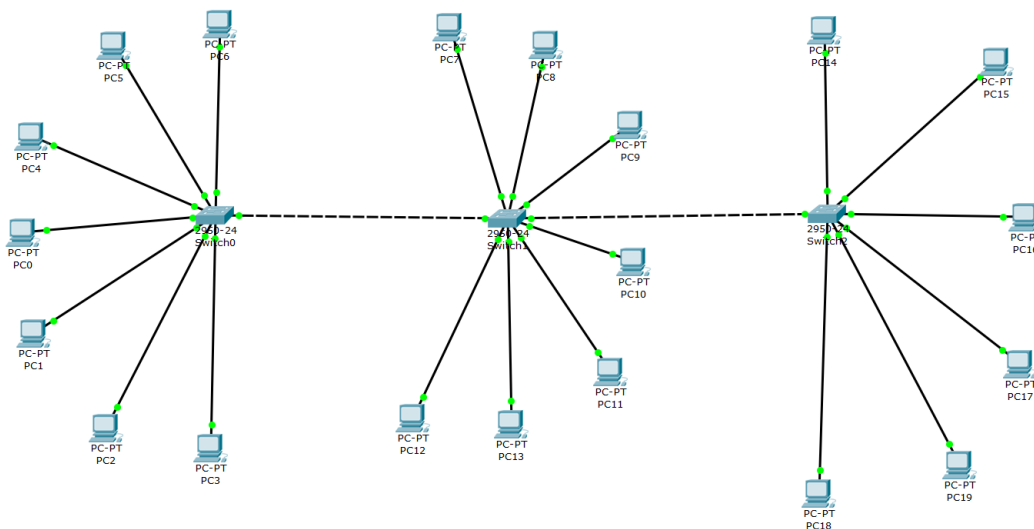
```

```

Packet Tracer PC Command Line 1.0
PC>arp -a
  Internet Address      Physical Address      Type
  192.168.1.137         0009.7c5e.43ec       dynamic
PC>

```

*Figure 4 : ARP table of different computers*



*Figure 5 : The overall network architecture*

The packet file (pkt) of this assignment can be found here

[https://github.com/mikias21/NADC/tree/main/assignment\\_1](https://github.com/mikias21/NADC/tree/main/assignment_1)