جامعة الانبار

كلية علوم الحاسوب وتكنولوجيا المعلومات

قسم تكنولوجيا المعلومات

مبادئ شبكات الحاسوب (عملي)

principles of computer network(LAB)

LAB (3)

المرحلة الثالثة

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Connect Switch with Devices

Switch is devices to create Local Area Network (LAN). operating on layer 2 which allow it to inspect the

moving traffic. Because it is operate on layer 2, it depends on the MAC address on managing the flow.

Upon receiving the traffic the switch checks the MAC address of the destination to make the decision to

where the frame show go. The switch is more intelligent than hub and it can have different algorithms

that used to enhance the functionality and reachability within a network. Using switches is has some

Advantages of Switch

- Reducing network congestion.
- Reduce collisions.
- Enhancing network security.
- Suitable for both small and large networks

Disadvantages of Switch

- More expensive
- Managing and configuring switches can be more complex.
- Consume more power

How does it Work?

Addressing Resolution Protocol (ARP)

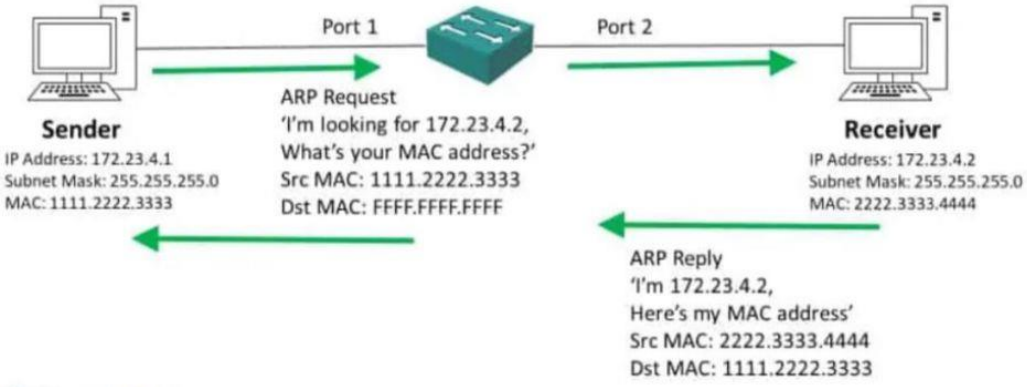
It is a protocol that used to translate an IP address into MAC address. It is not exactly translation but is

more like learning. Switches used ARP to send request to all connected host (broadcast) within the

network. The request is asking for the MAC address of the given IP address. All host will receive the

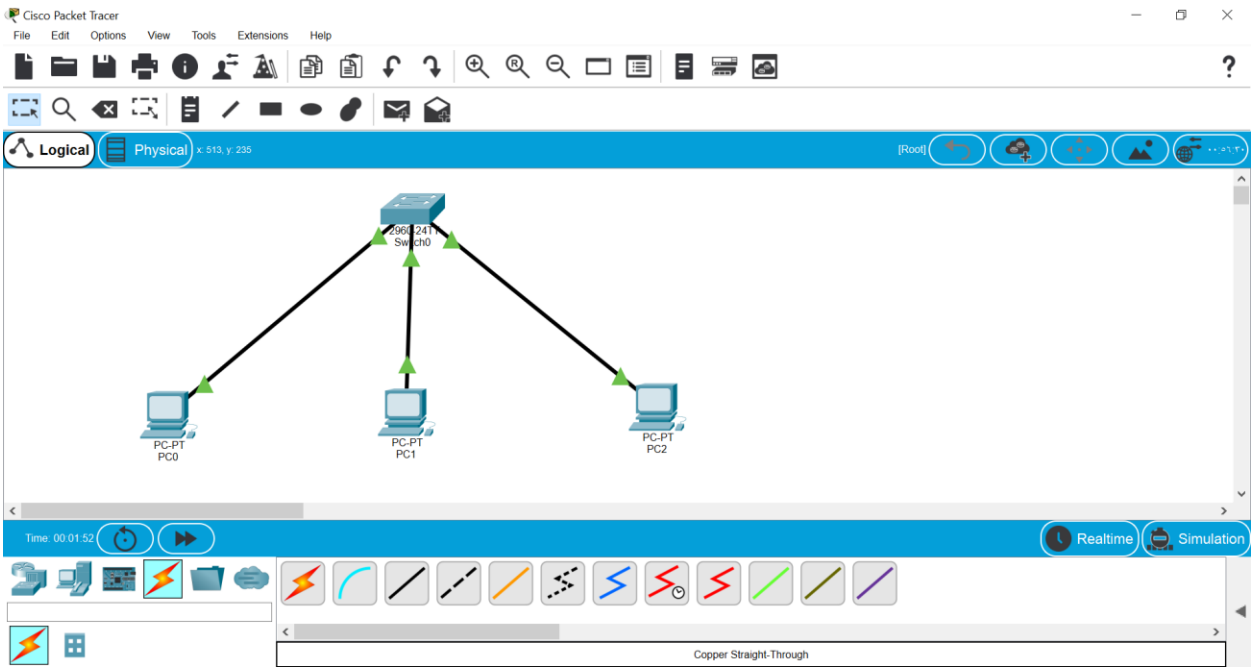
request. All host will ignore/decline the request except the host that own the given IP address which will

send reply informing the switch that it has IP and provide within the reply the MAC address.



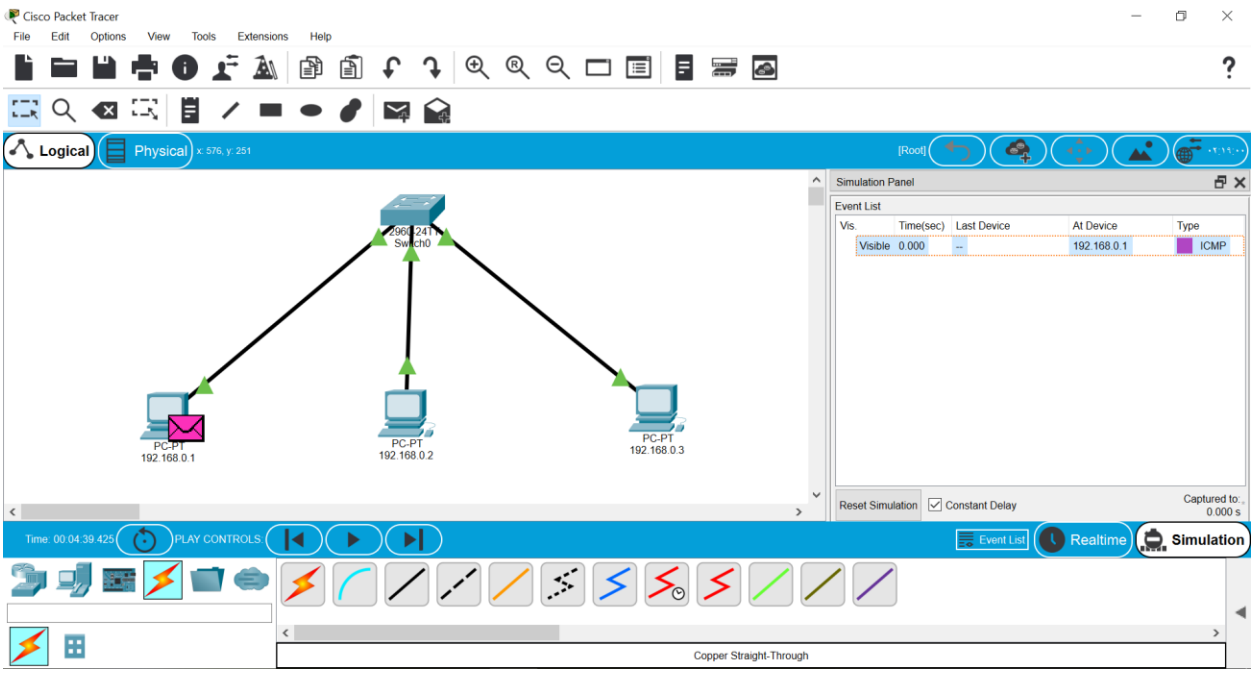
Connect Devices

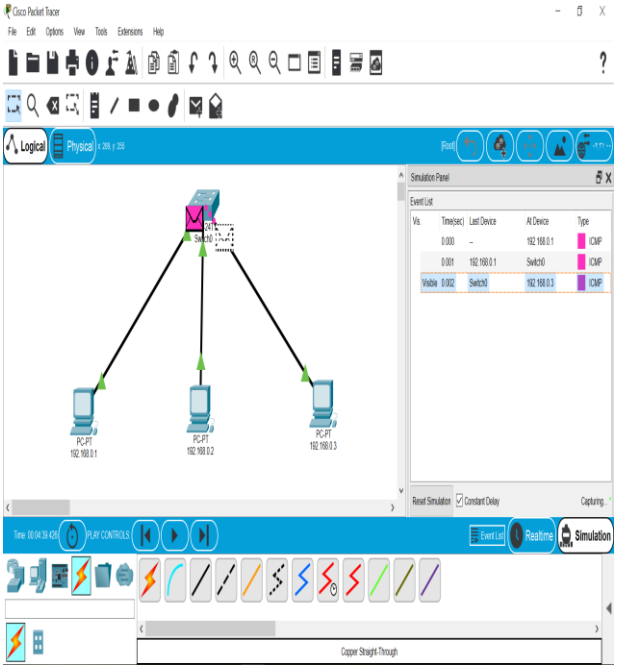
- Connect between all devices.
- Click on the devices to make configuration to all devices.
- Enter IP address **(192.168.0.1)** and subnet **(2555.255.255.0)** to all devices and close the window.
- Enter IP address **(192.168.0.2)** and subnet **(2555.255.255.0)** and close the window.
- To test the connection, use the 'ping' command followed by the IP address of another device, such as **(ping 192.168.0.1)** or **(ping 192.168.0.2)**

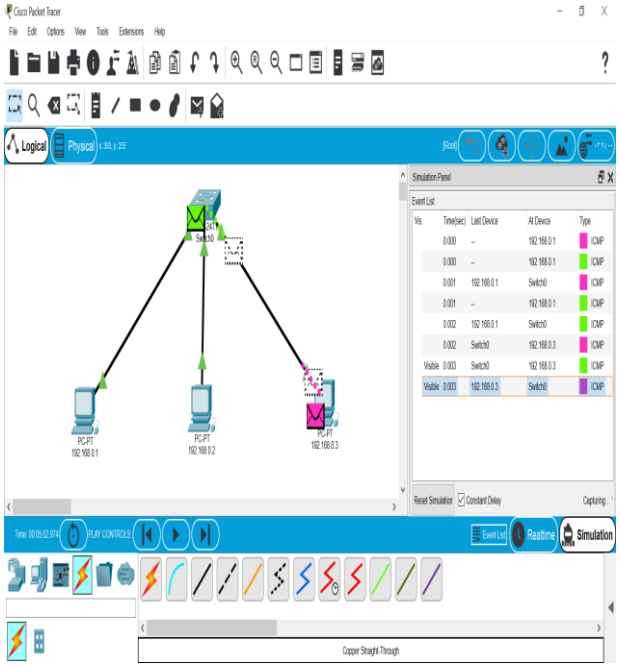


Real-time and Simulation

On the right side of the packet tracer, there are two options: **real-time** and **simulation**. Real-time closely mimics real-life network behavior, while simulation lets you observe communication processes. you can examine messages at each network layer. if you select simulation and then the simulation panel, you will find an event list showing message exchanges between devices. The source device indicates the message source, and the device shows the message destination. clicking on an entry reveals details like the message, IP address, and more.




Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 – 192.168.0.1 ICMP
0.000 – 192.168.0.1 ICMP
0.001 192.168.0.1 Switch0 ICMP
Visible 0.002 Switch0 192.168.0.3 ICMP
Reset Simulation
Constant Delay
Capturing...
PC-PT
192.168.0.1
PC-PT
192.168.0.2
PC-PT
192.168.0.3
Realtime
Simulation
Copper Straight-Through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0.001 – 192.168.0.1 ICMP
0.002 192.168.0.1 Switch0 ICMP
0.002 Switch0 192.168.0.3 ICMP
Visible 0.003 Switch0 192.168.0.3 ICMP
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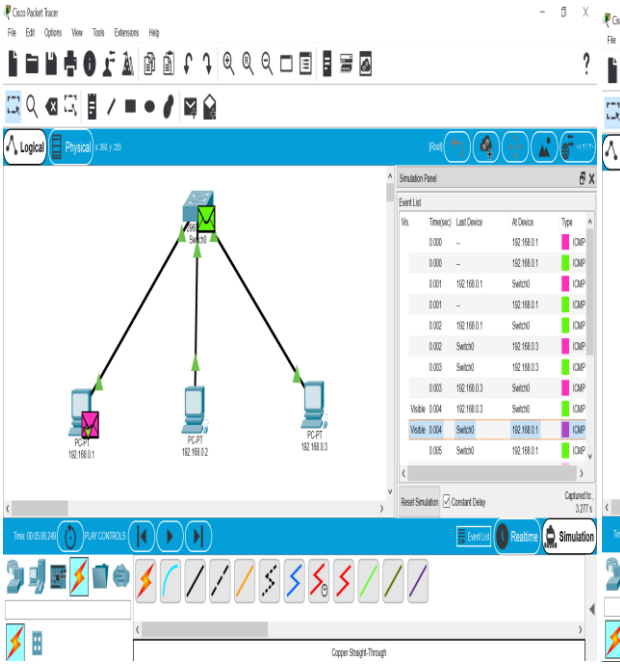
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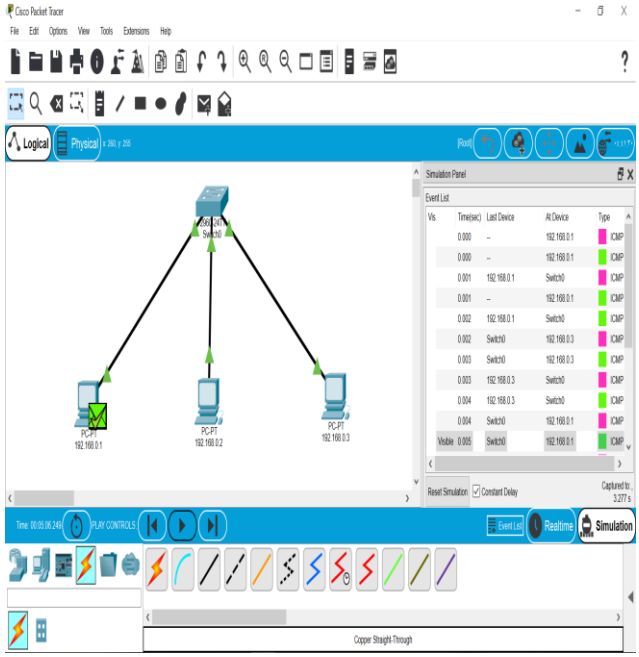
0.001 192.168.0.1 Switch0 ICMP
0.001 – 192.168.0.1 ICMP
0.002 192.168.0.1 Switch0 ICMP
0.002 Switch0 192.168.0.3 ICMP
0.003 Switch0 192.168.0.3 ICMP
0.003 192.168.0.3 Switch0 ICMP
Visible 0.004 192.168.0.3 Switch0 ICMP
Visible 0.004 Switch0 192.168.0.1 ICMP
0.005 Switch0 192.168.0.1 ICMP
Reset Simulation
Constant Delay
Captured to:
3.277 s
PC-PT
192.168.0.1
PC-PT
192.168.0.2
PC-PT
192.168.0.3
Realtime
Simulation
Copper Straight-Through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0.003 Switch0 192.168.0.3 ICMP
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What is the difference between Hub and Switch?

Terms	Hub	Switch
Duplex	Half duplex	Full duplex
Data Efficiency	Congestion and inefficiency	Reduces network traffic and enhances efficiency.
Collision Domain	collisions	Reduces collisions
Security	No security	Enhance security by isolating network traffic.
Cost	Low	Expensive

STP: **Spanning-Tree Protocol**

```
Switch>EN
Switch#show spanning-tree
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32769
Address 0001.64E7.4CD0
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 0001.64E7.4CD0
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
```

Interface Role Sts Cost Prio.Nbr Type
---------- ---- --- --------- -------- --------------------------------
Fa0/1 Desg FWD 19 128.1 P2p
Fa0/3 Desg FWD 19 128.3 P2p
Fa0/2 Desg FWD 19 128.2 P2p
Fa0/4 Desg FWD 19 128.4 P2p

CDP : Cisco Discovery Protocol

Switch#show cdp
Global CDP information:
Sending CDP packets every 60 seconds
Sending a holdtime value of 180 seconds
Sending CDPv2 advertisements is enabled
Switch#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Local Intrfce Holdtme Capability Platform Port ID
Switch Fas 0/4 170 S 2960 Fas 0/4

Switch#Conf
Switch(config)#no cdp run
Switch(config)#
Switch(config)#exit
Switch#
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#show cdp
% CDP is not enabled
Switch#conf
Switch(config)#cdp run
Switch(config)#
Switch(config)#exit
Switch#
Switch#show cdp
Global CDP information:
Sending CDP packets every 60 seconds
Sending a holdtime value of 180 seconds
Sending CDPv2 advertisements is enabled

DTP: Dynamic Trunking Protocol

Switch#show interfaces fastethernet 0/4 switchport
Name: Fa0/4
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)