NETWORKS AND PROTOCOLS

Lab 3

Introduction

The objectives of this lab are to :

- Differentiate between switch and hub operation,
- Use the Cisco IOS show *mac-address-table* command to examine MAC addresses MAC addresses and port associations at switch level.

Lab topologies

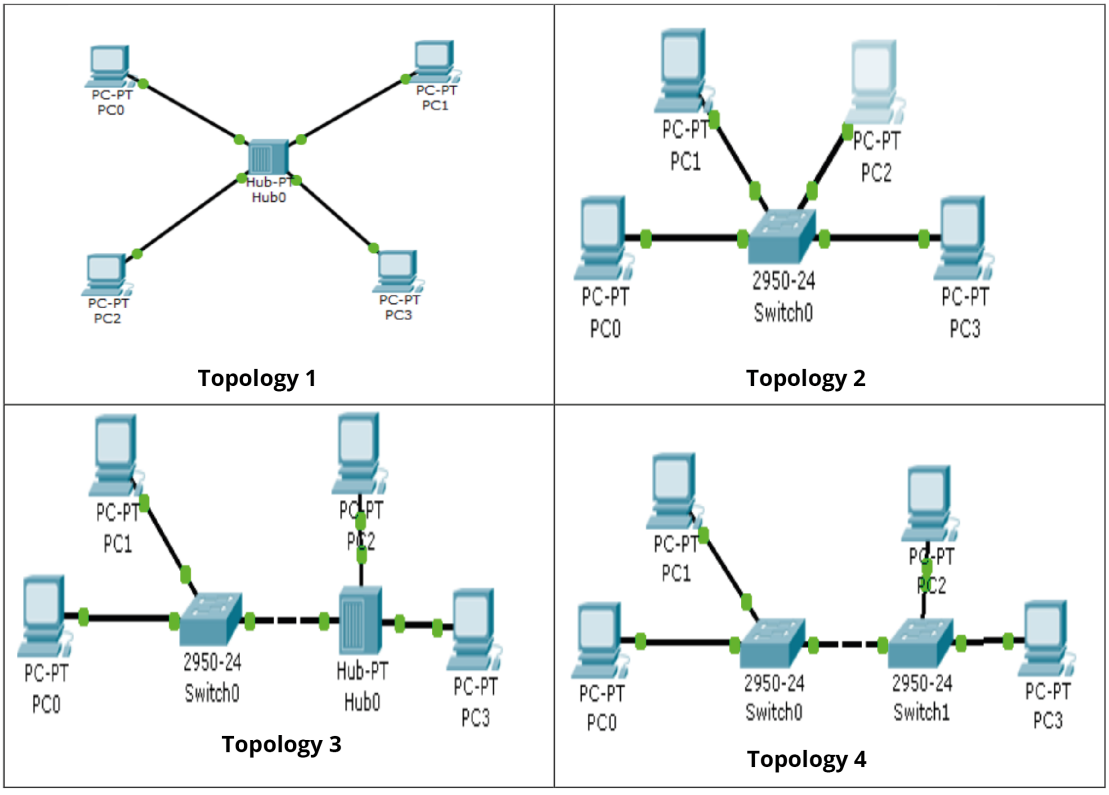

Figure 1: Topologies

- Initially, the tasks to be carried out will consider topology 1 and topology 2,
- Students will then repeat the work with topology 3 and topology 4,

- For PCs, use 192.168.1.x addresses in the Packet Tracer environment,

Task 1. Determining PC MAC addresses using Packet Tracer

- Create topology 1 using Packet Tracer,
- Use the *ipconfig /all* command (command line) and note the MAC addresses of each PC,
- Move the mouse over each PC and check the information displayed, or click on *PC0 – 'Config' tab – Ethernet Interface* and confirm the information already noted.

Task 2. Study of Hub operation (Topology 1)

Step 1:

- Starting from topology 1, activate simulation mode by clicking on the Simulation button, as shown in the figure below.

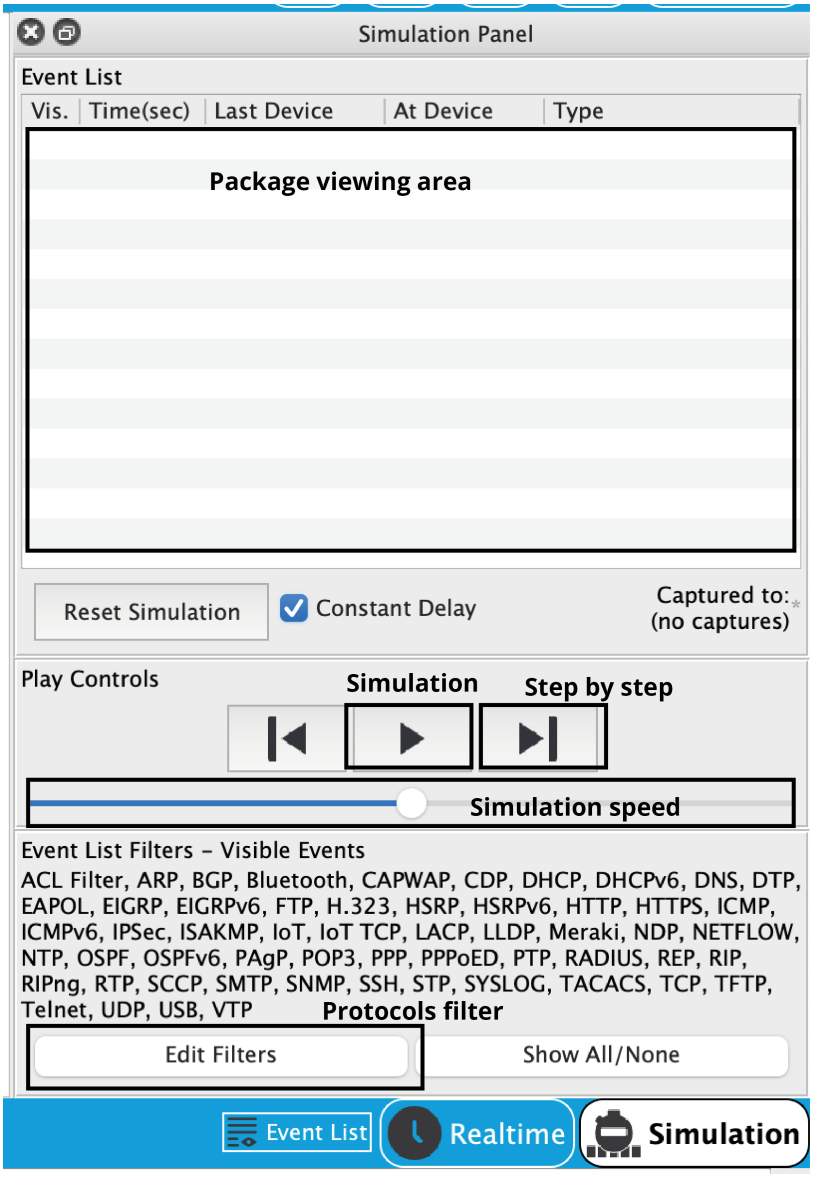

Figure 2: Simulation mode

Step 2:

- To view **ICMP** packets only:
- click on the *Edit Filters* button,
- and uncheck all protocols except **ICMP**.

Step 3:

- Start the PC0 terminal and send a ping to the PC1 terminal. Nothing happens (this is normal),
- Click the Capture/Forward button several times to see how ICMP packets are routed,
- Every time you click, Packet Tracer displays the progress of the ping process in the network,
- You can also use the Auto capture / play button to set the viewing speed. speed.

Step 4:

- Repeat step 3 several times (you can also use another terminal),
- Record observations. What does the Hub do each time?

Task 3. Study the switch MAC table using Packet Tracer, topology 2.

- Switches allow to keep a table of MAC addresses and associated ports (in the switch),
- When a switch receives a frame, the destination MAC address is checked in the table. table,
- The corresponding port is then used to route the frame out of the switch,
- If a switch does not know the port of the frame, or if the frame is a broadcast, it is forwarded to all ports except the one from which it originated.

Step 1:

- Repeat task 3 with topology 3,
- Does the switch behave in the same way as the hub?

Step 2:

- Click on the switch to access the CLI (Command Line Interface) tab,
- The CLI is the switch's command interface, enabling the administrator to configure it and diagnose any anomalies,
- Several commands are possible: as soon as the prompt appears (>), type *enable* to switch from user mode to privileged mode. The prompt changes form and becomes (#). The following figure shows the switch CLI:

Step 3:

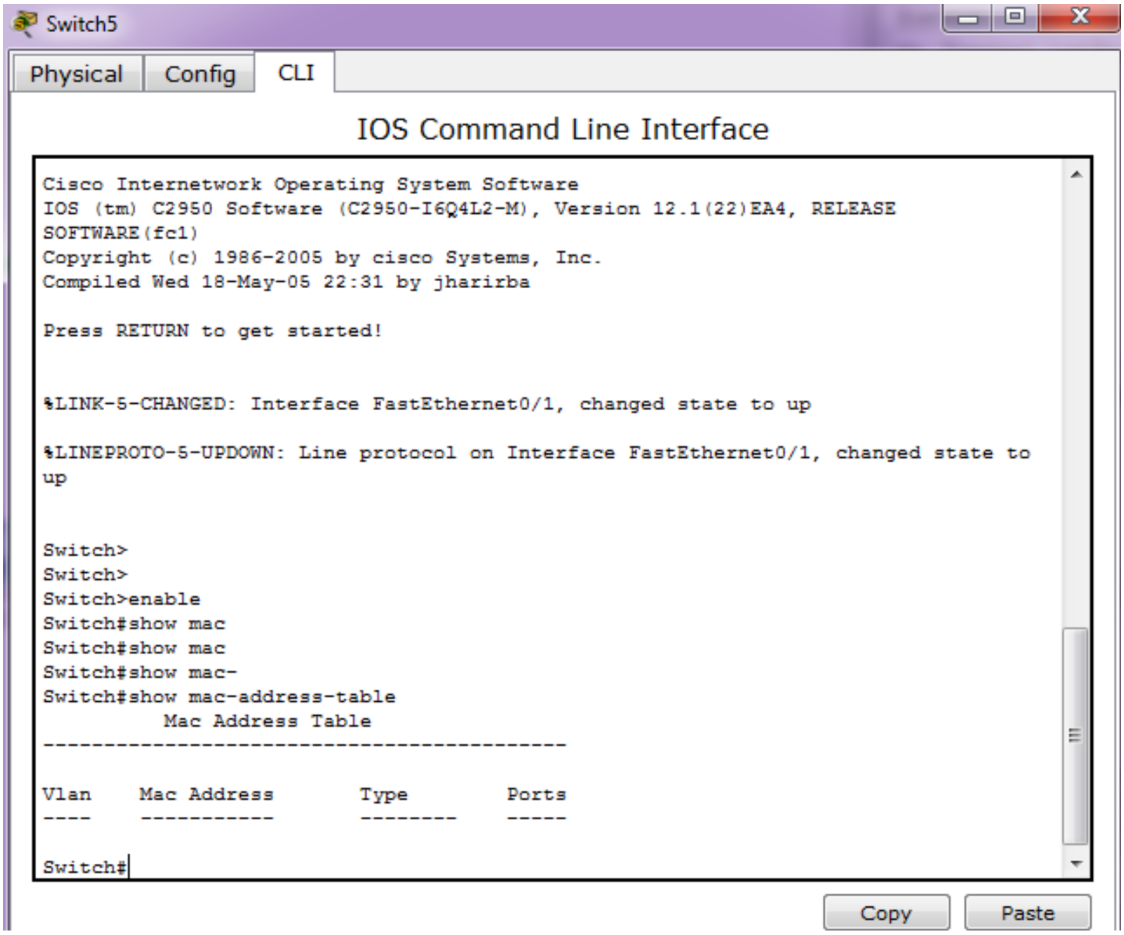

Figure 3: Command Line Interface

- In front of the (#) type the command *show mac-address-table*,
- Analyze results.

Step 4:

- Add a PC4 to topology 2,
- Noter son adresse MAC,
- Repeat step 3,
- Is there a change in the MAC address table?

Step 5:

- Ping from PC0 to PC4 (in simulation mode),
- Observe switch behavior,
- Repeat step 3,
- Is there a change in the MAC address table?

Task 4: Study the switch MAC table with the presence of a router

Step 1:

- Using Packet Tracer in real-time mode, set up topology 5,

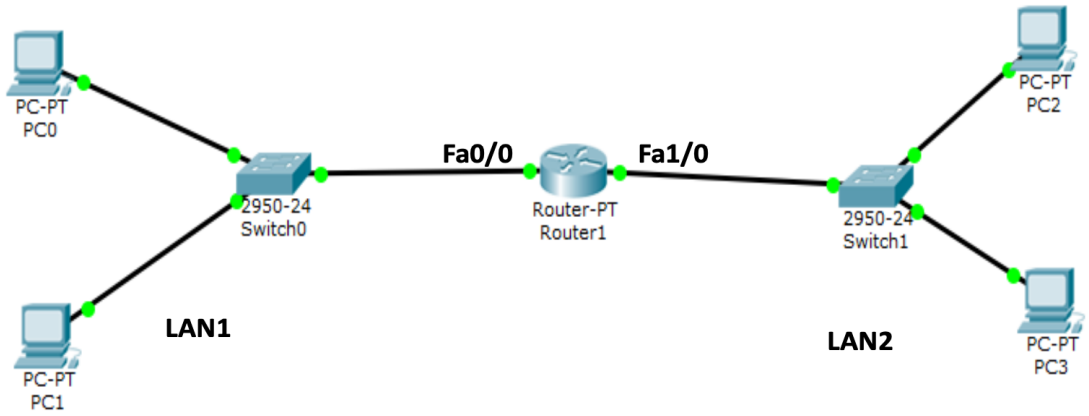

Figure 4: Topology 5

- Ping from PC0 to PC3,
- Observe the MAC address table of switch0,
- Is there a new entry in the table ?
- Which interface does the new MAC address stored in switch0 belong to ?
- What can we learn from this experience ?