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CEL 51, DCCN, Monsoon 2020
Lab 3: Learn usage of Packet Tracer

Objectives

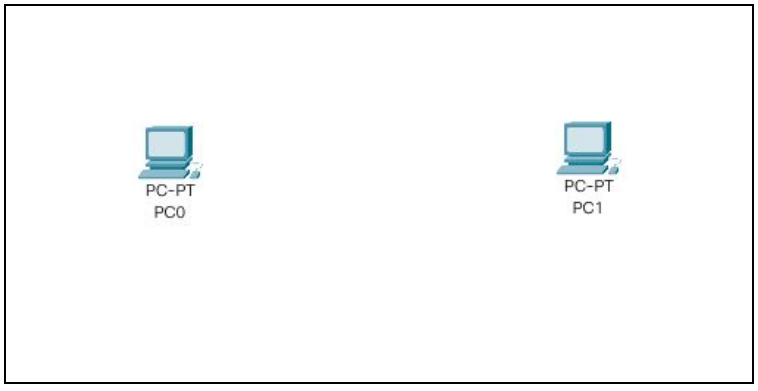
- Install Packet Tracer from https://www.ciscopods.com/install-packet-tracer-ubuntu/
- Develop an understanding of the basic functions of Packet Tracer.
- Create/model a simple Ethernet network using two hosts and a hub.
- Observe traffic behavior on the network.
- Observer data flow of ARP broadcasts and pings.

Step 1: Create a logical network diagram with two PCs and a hub

The bottom left-hand corner of the Packet Tracer screen displays eight icons that represent device categories or groups, such as Routers, Switches, or End Devices.

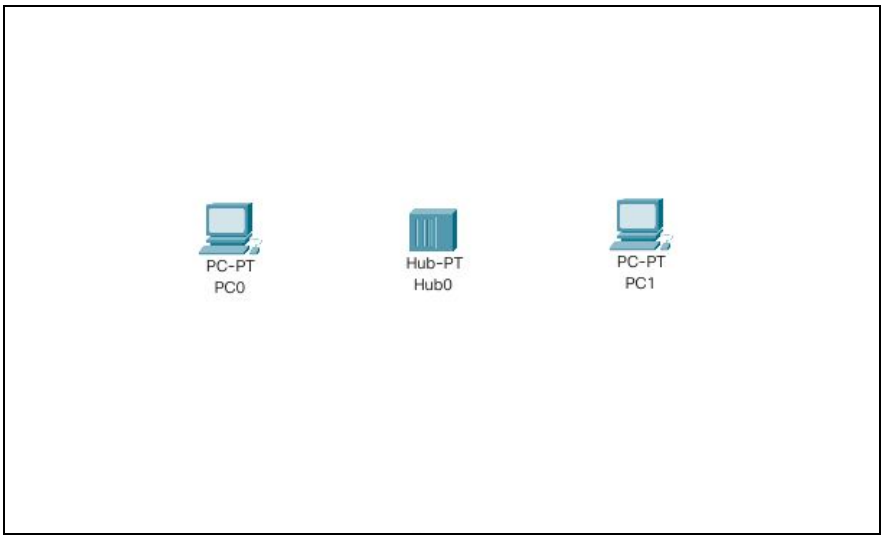
Moving the cursor over the device categories will show the name of the category in the box. To select a device, first select the device category. Once the device category is selected, the options within that category appear in the box next to the category listings. Select the device option that is required.

a) Select **End Devices** from the options in the bottom left-hand corner. Drag and drop two generic PCs onto your design area.



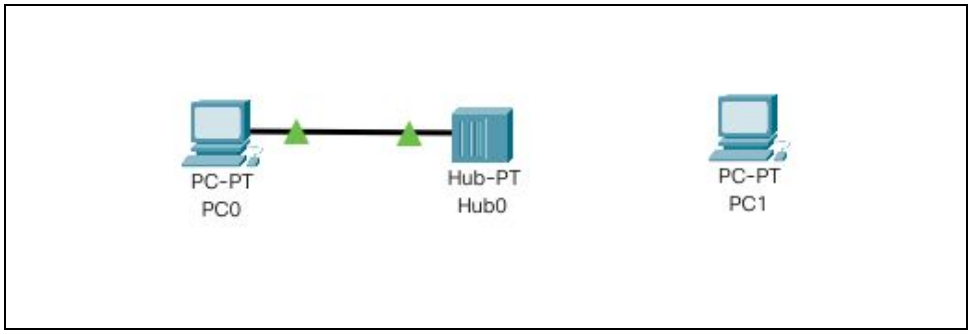
PC0 and PC1 appear in the design area.

b) Select **Hubs** from the options in the bottom left-hand corner. Add a hub to the prototype network by dragging and dropping a generic hub onto the design area.



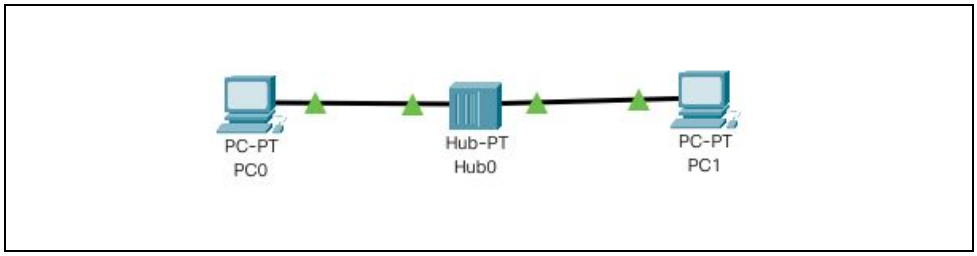
Hub0 appears in the design area

c) Select **Connections** from the bottom left-hand corner. Choose a **Copper Straight-through** cable type. Click the first host, **PC0**, and assign the cable to the **FastEthernet** connector. Click the hub, **Hub0**, and select a connection port, **Port 0**, to connect to **PC0**.



Green dots appear at both ends of the cable connection between PC0 and Hub0

d) Repeat Step c for the second PC, **PC1**, to connect the PC to **Port 1** on the hub.

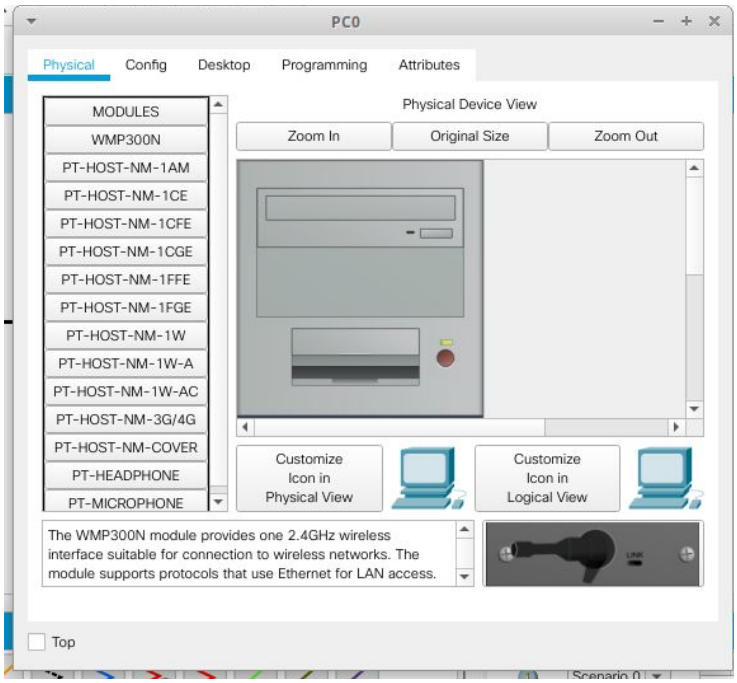


Green dots at both ends of each cable connection between PC1 and Hub0

*There should be green dots at both ends of each cable connection. If not, check the cable type selected.

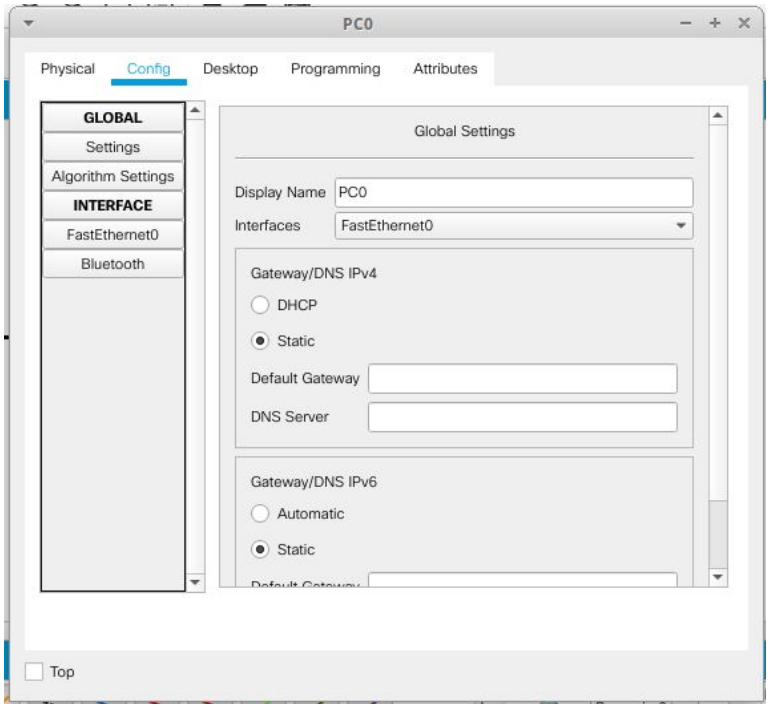
Step 2: Configure host names and IP addresses on the PCs

a) Click PC0. A PC0 window will appear.

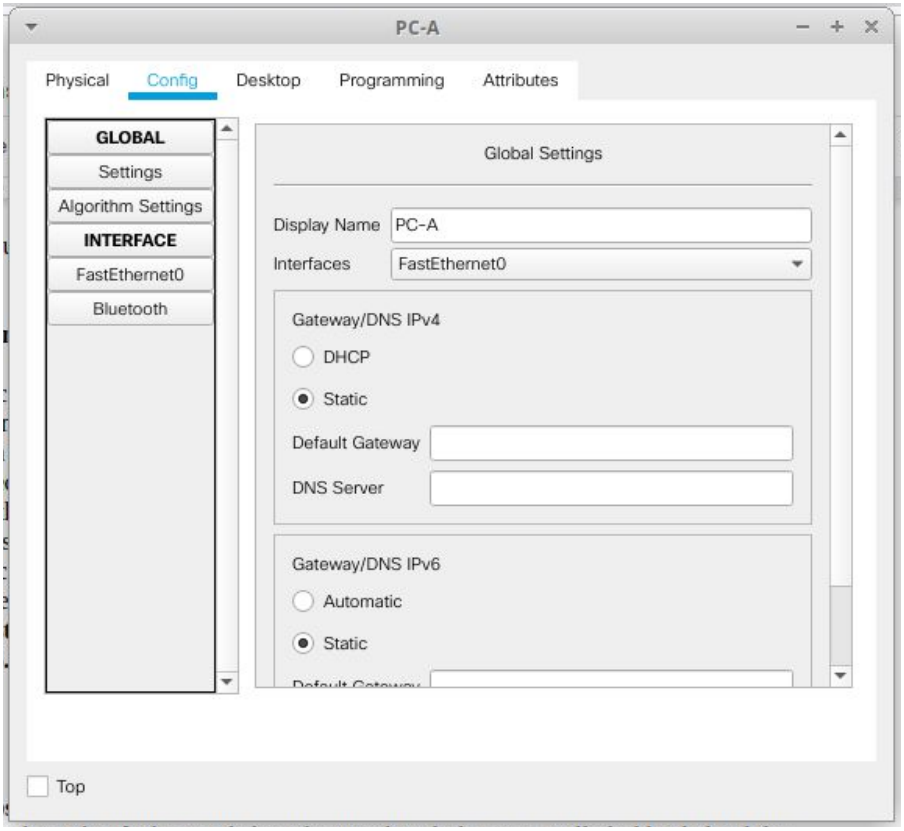


The PC0 window appears and the Physical tab is open by default.

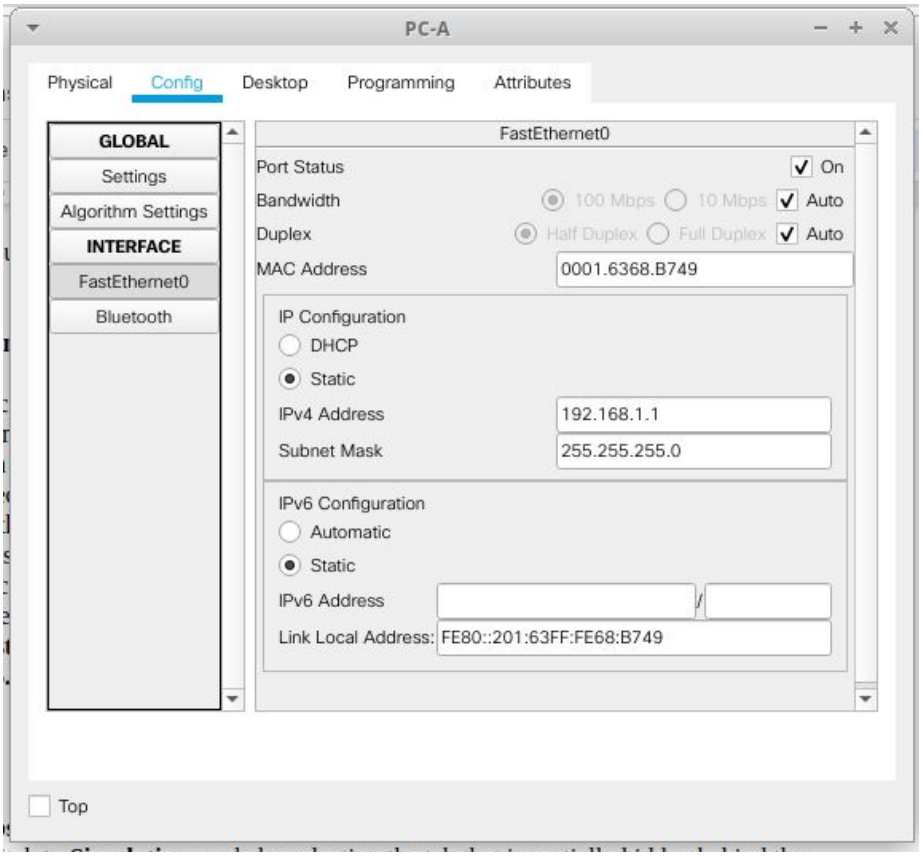
b) From the PC0 window, select the **Config** tab. Change the PC **Display Name** to **PC-A**. (An error message window will appear warning that changing the device name may affect scoring of the activity. Ignore this error message.) Select the **FastEthernet** tab on the left and add the IP address of **192.168.1.1** and subnet mask of **255.255.255.0**. Close the PC-A configuration window by selecting the **x** in the upper righthand corner.



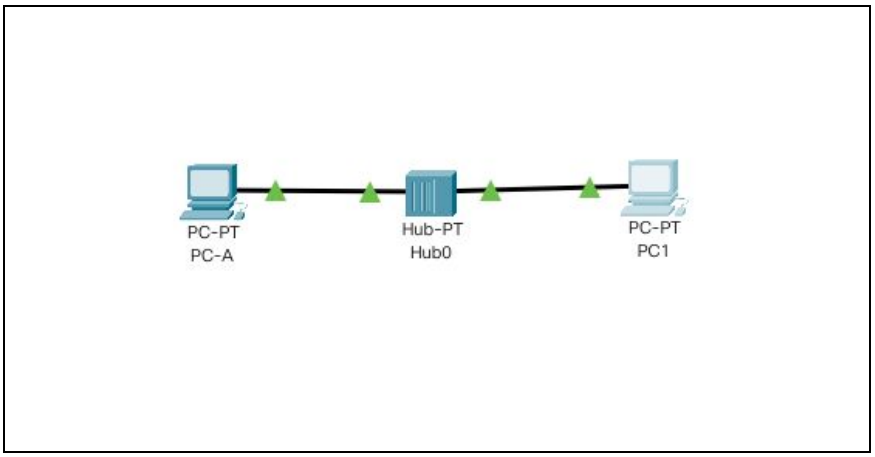
The Config tab shows the Display Name of PC0



Display Name is changed to PC-A



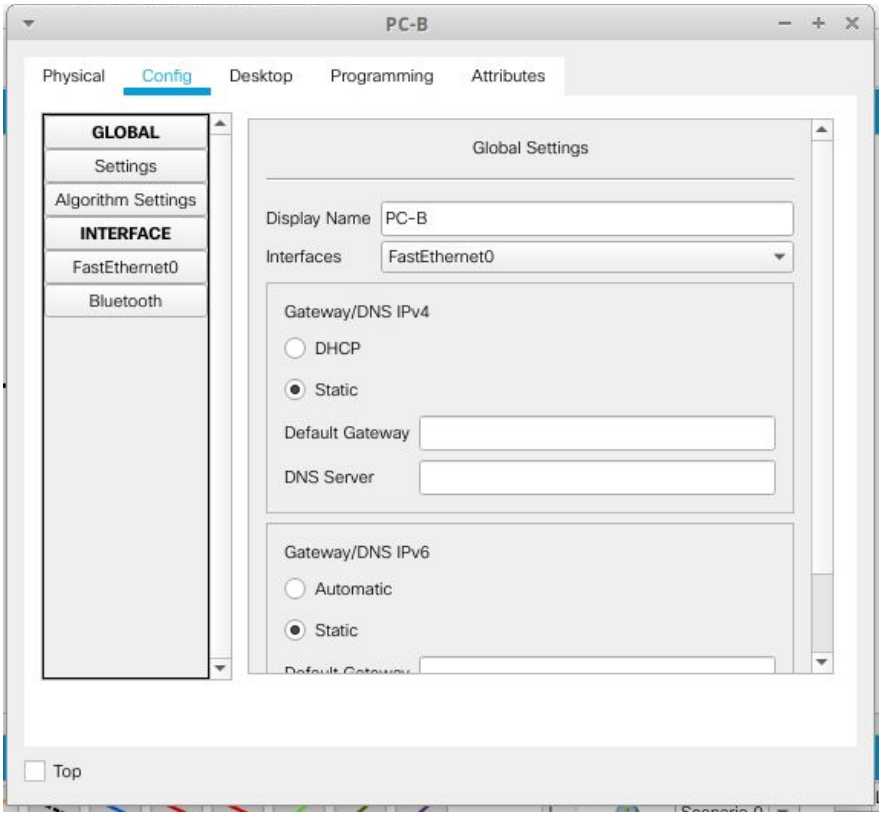
The IP Address and subnet mask for PC-A have been added in the FastEthernet() tab.



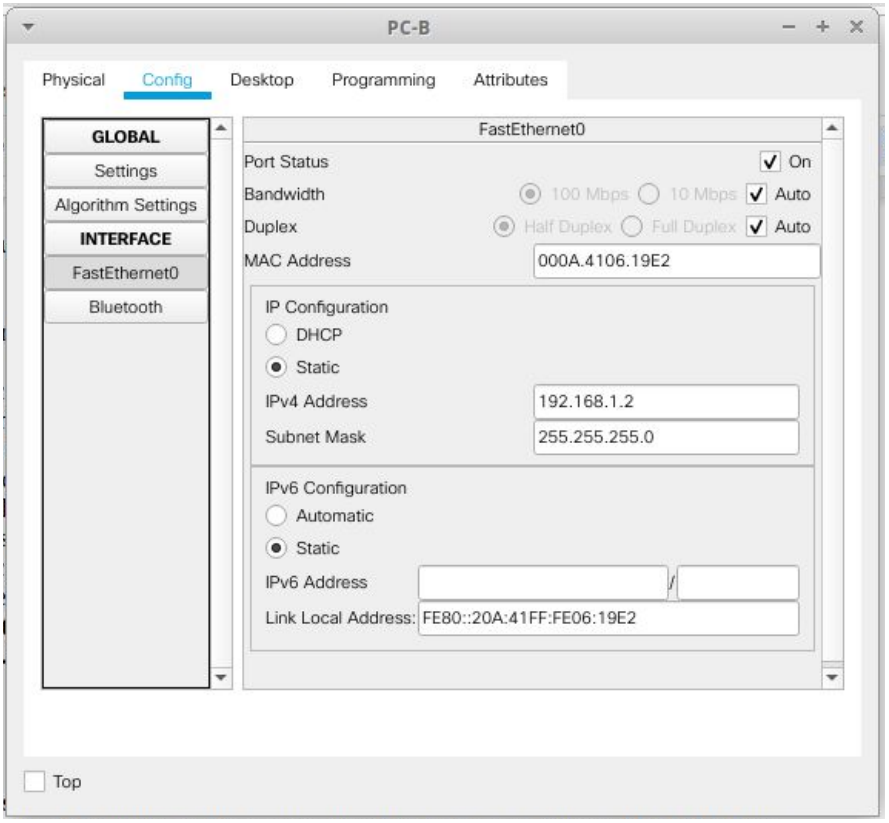
The Display Name is reflected as PC-A in the design area

c) Click PC1.

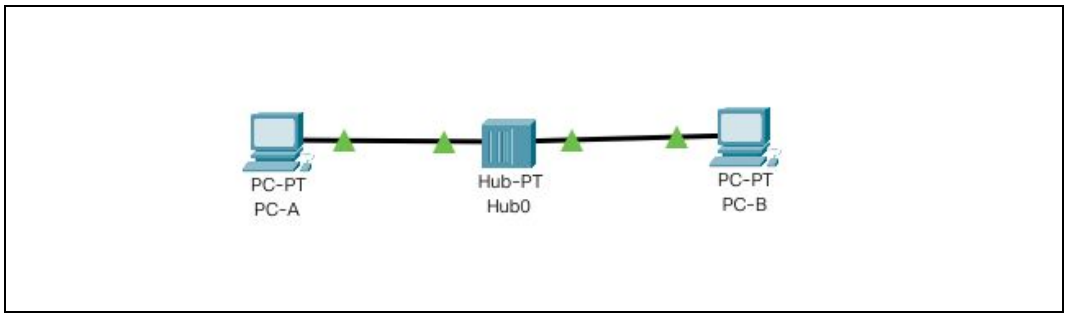
d) Select the **Config** tab. Change the PC **Display Name** to **PC-B**. Select the **FastEthernet** tab on the left and add the IP address of **192.168.1.2** and subnet mask of **255.255.255.0**. Close the PC-B configuration window.



After changing the Display Name to PC-B



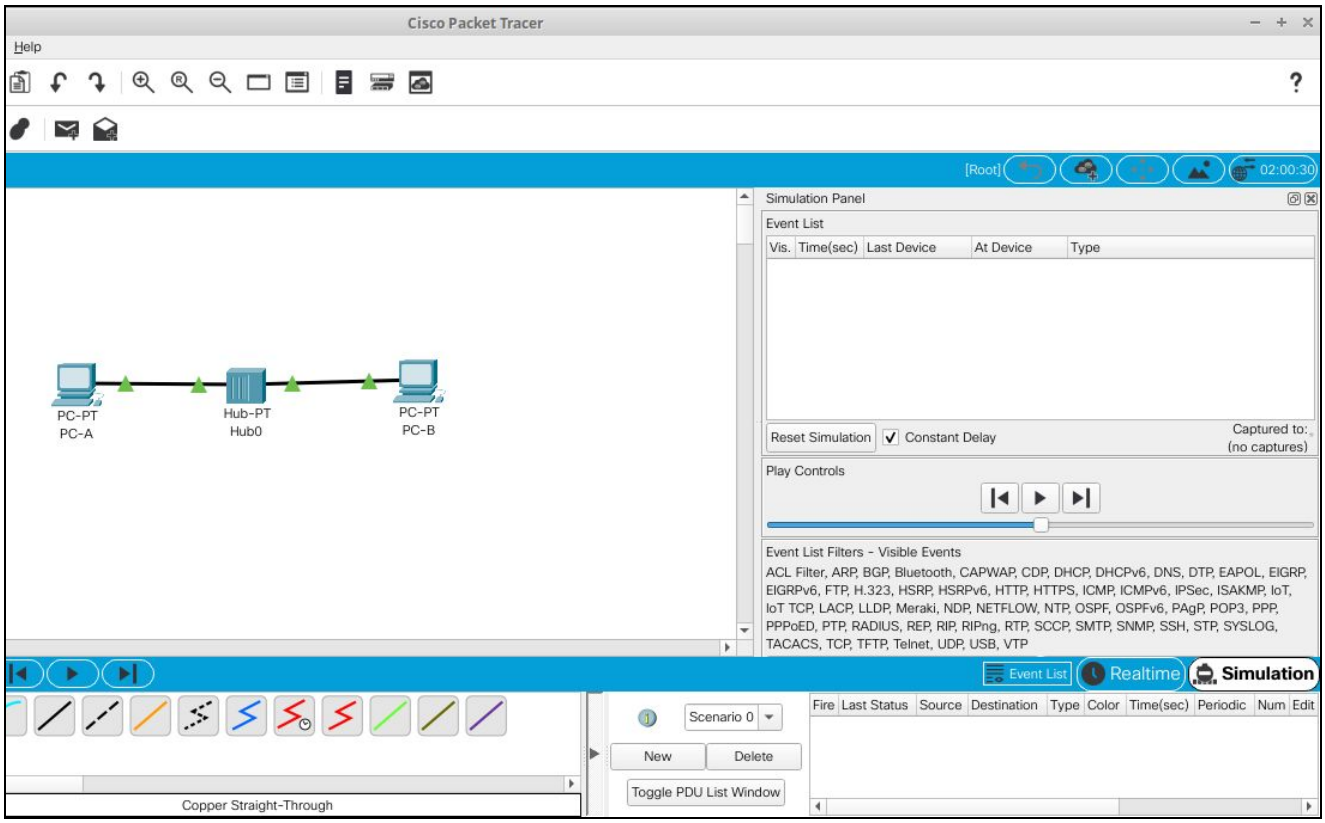
The IP Address and subnet mask for PC-B have been added in FastEthernet() tab



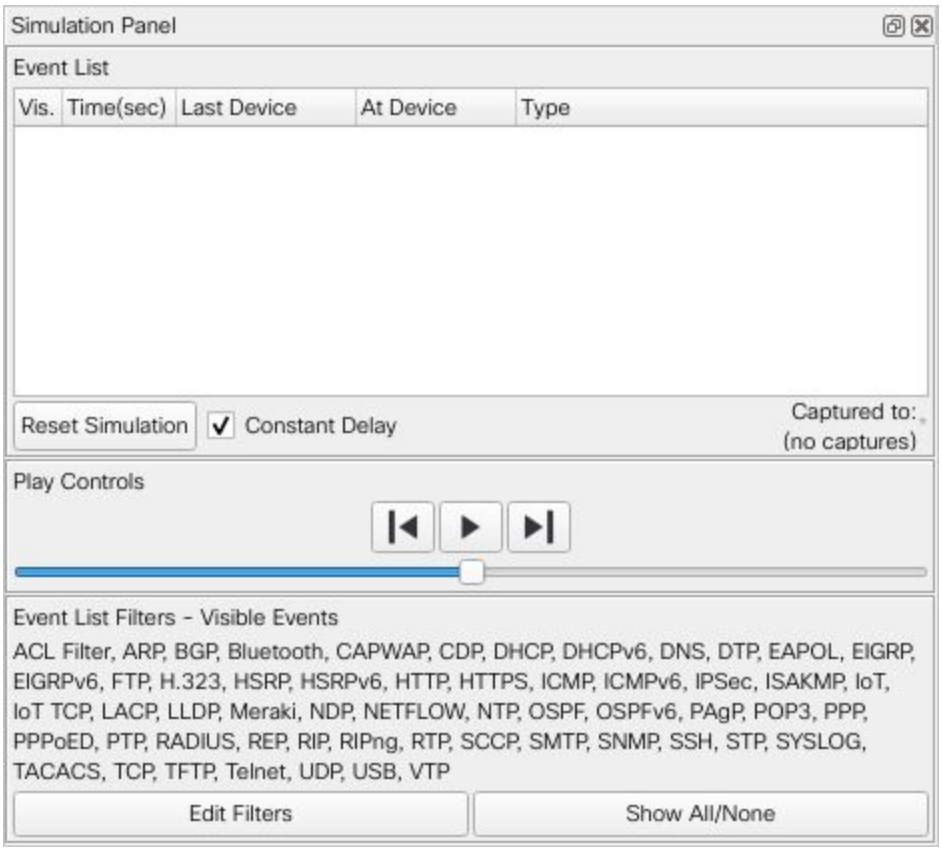
The Display Name is reflected as PC-B in the design area

Step 3: Observe the flow of data from PC-A to PC-B by creating network traffic

a) Switch to **Simulation** mode by selecting the tab that is partially hidden behind the **Realtime** tab in the bottom right-hand corner. The tab has the icon of a stopwatch on it.

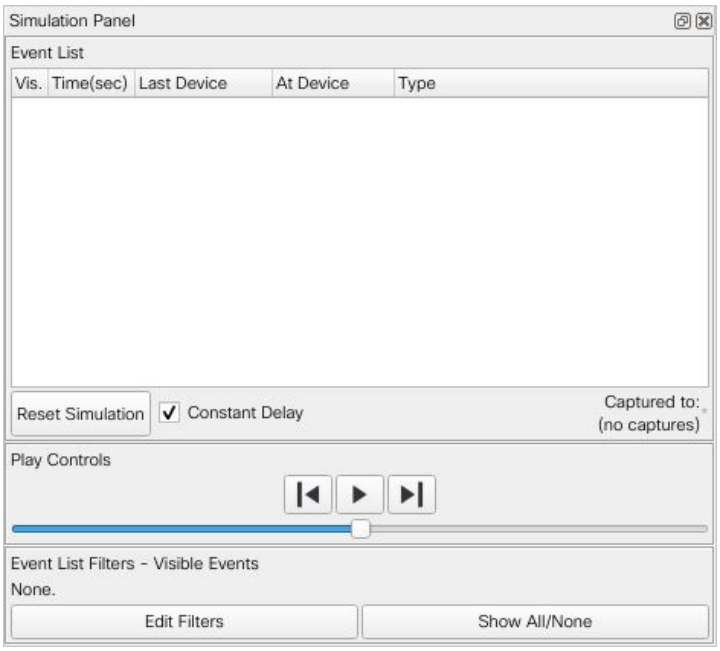


The Simulation Panel pops up.



View of the Simulation Panel. All the event list filters are selected by default and listed in the Event List Filters area.

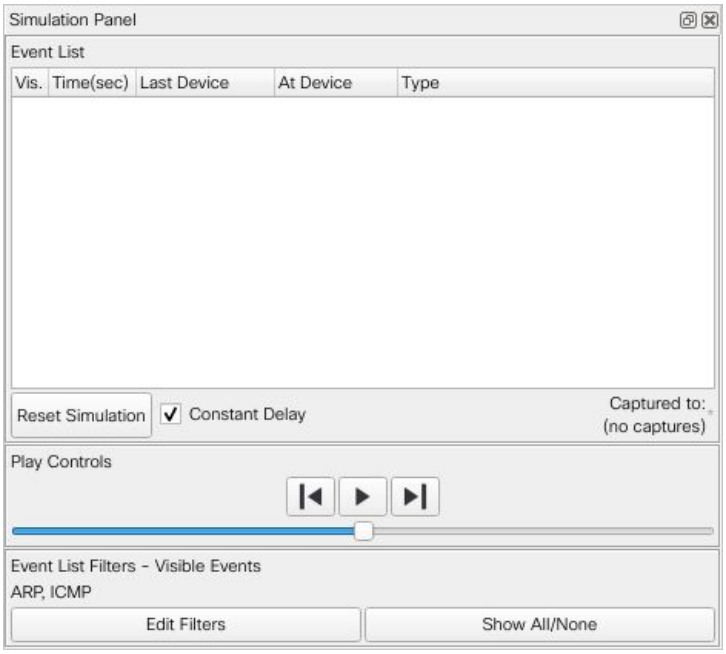
b) Click the **Edit Filters** button in the **Edit List Filters** area. Clicking the **Edit Filters** button will create a pop-up window. In the pop-up window, click the **Show All/None** box to deselect every filter. Select just the **ARP** and **ICMP** filters.



After clicking the Show All/None button, all the filters are deselected. The Event List Filters area shows None.

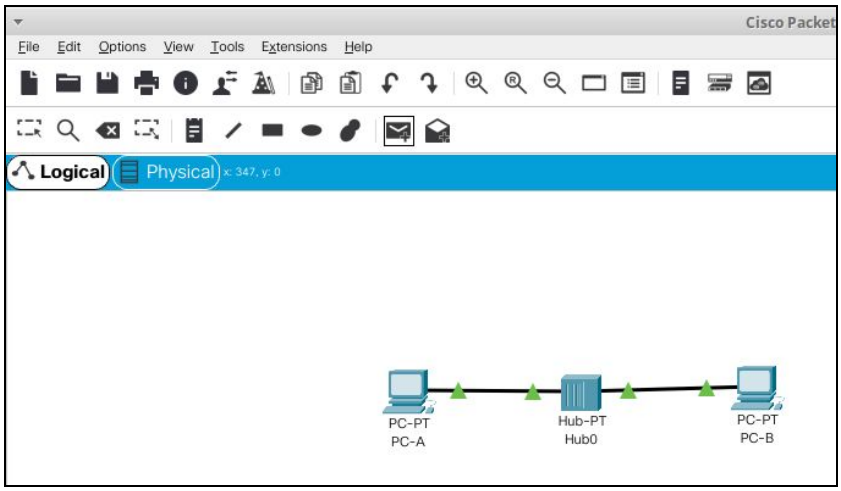
The pop-up window after clicking the Edit Filters button.

Select ARP and ICMP filters in the pop-up window

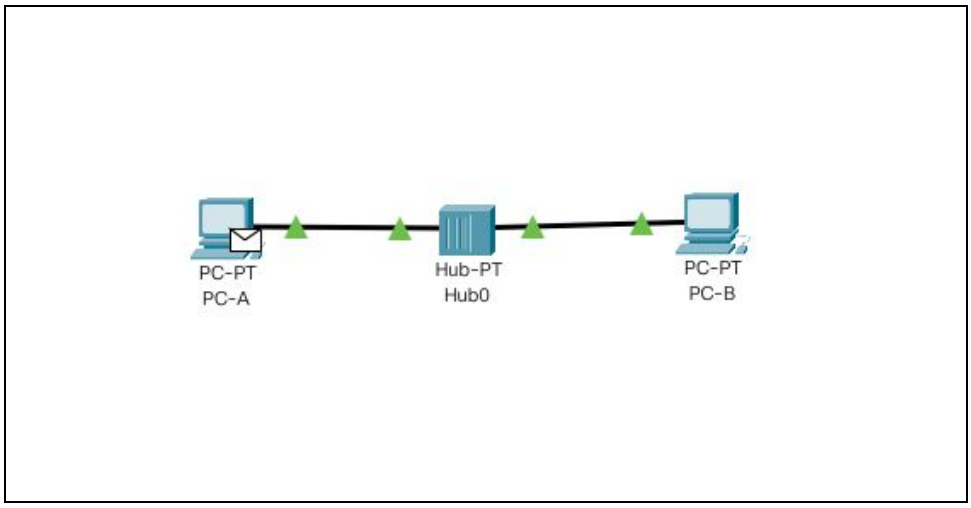


The selected filters appear in the Event List Filters area

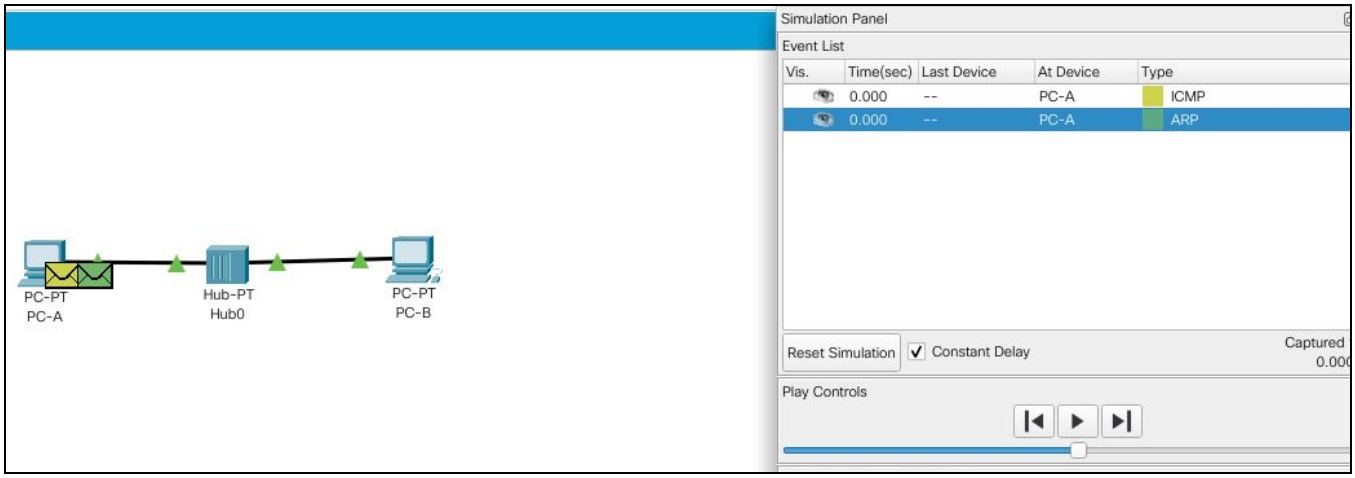
c) Select a **Simple PDU** by clicking the closed envelope on the right vertical toolbar. Move your cursor to the display area of your screen. Click **PC-A** to establish the source. Move your cursor to **PC-B** and click to establish the destination.



Simple PDU is selected by clicking on the closed envelope



After clicking on PC-A, a closed envelope appears next to it. The source is established.

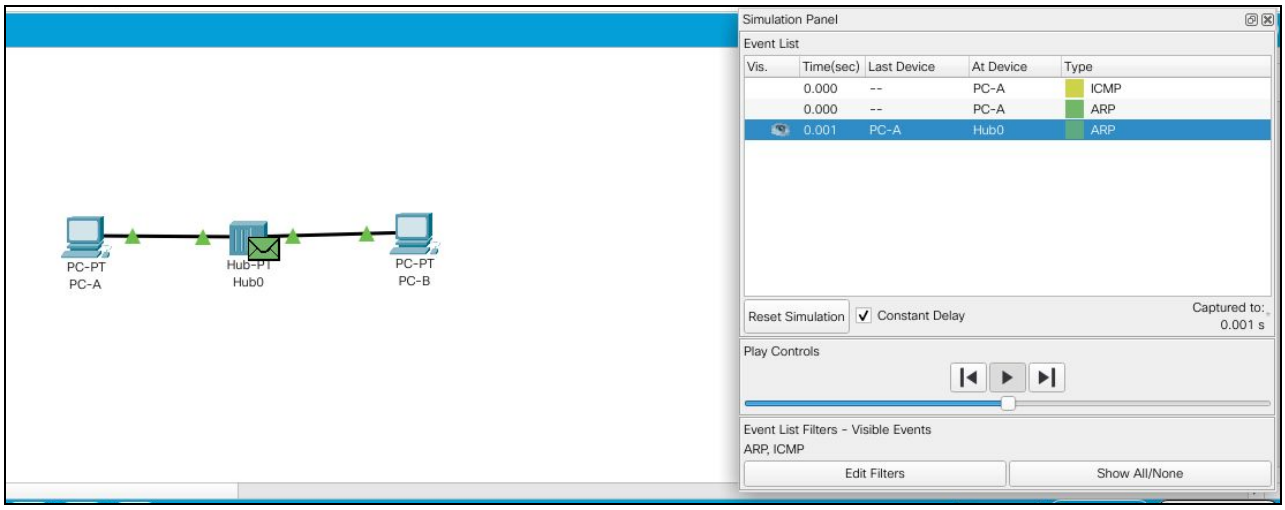


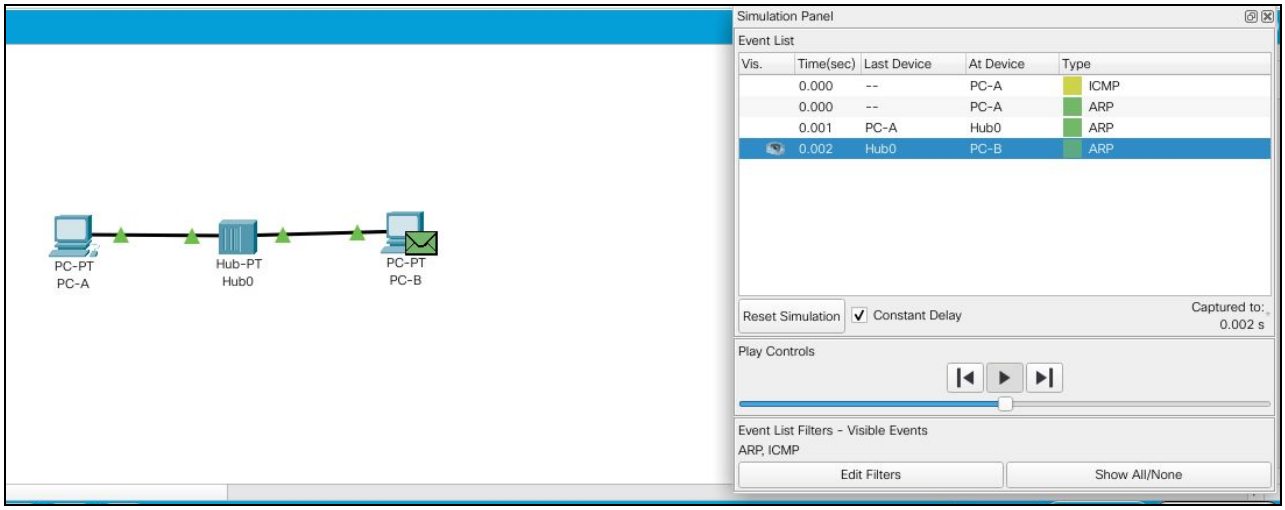
After clicking on PC-B, another closed envelope appears next to PC-A. The connection is established. The Simulation Panel shows that the yellow envelope is for ICMP and the green envelope is for ARP.

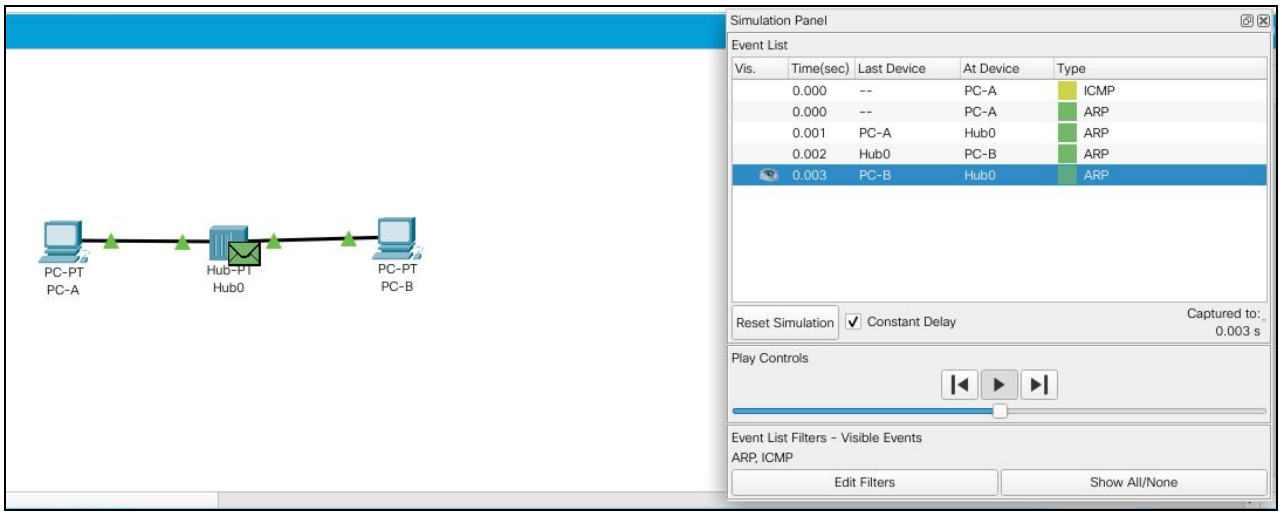
**Notice that two envelopes are now positioned beside PC-A. One envelope is ICMP, while the other is ARP. The Event List in the Simulation Panel will identify exactly which envelope represents ICMP and which represents ARP.

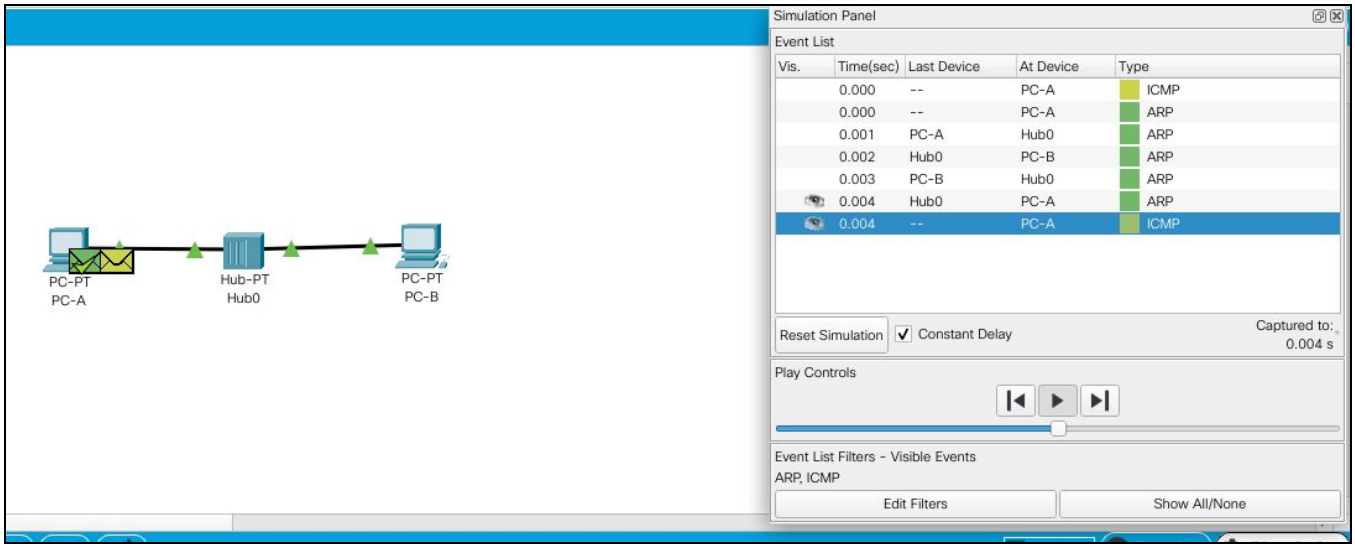
d) Select **Auto Capture / Play** from the **Play Controls** area of the Simulation Panel. Below the **Auto Capture / Play** button is a horizontal bar, with a vertical button that controls the speed of the simulation. Dragging the button to the right will speed up the simulation, while dragging is to the left will slow down the simulation.

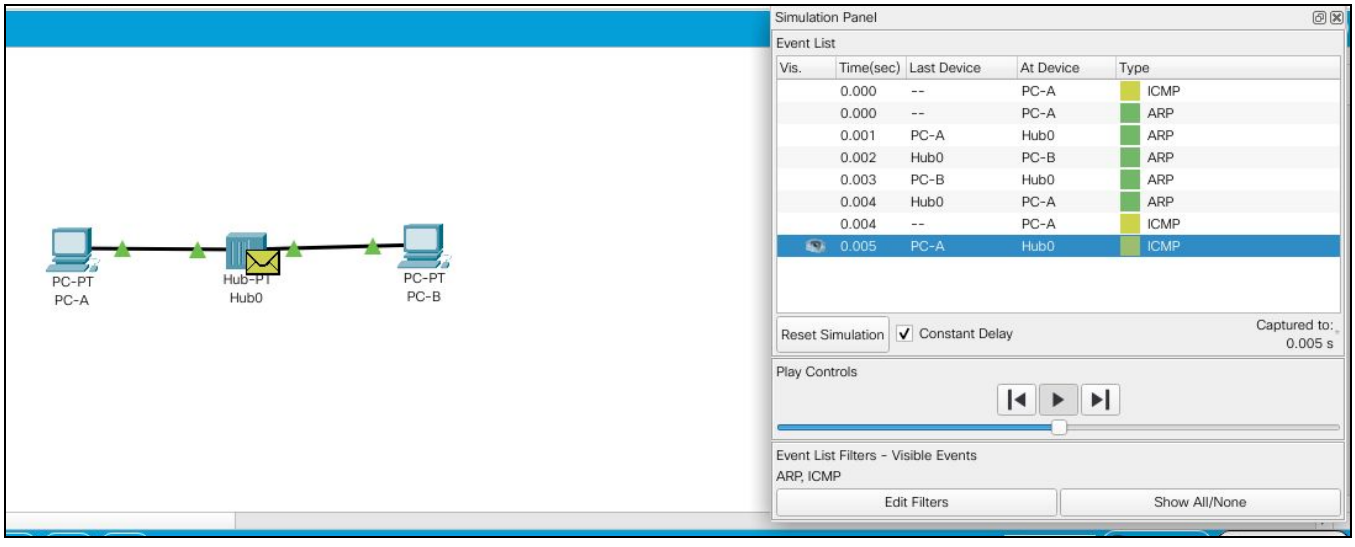
Simulation carries out as follows.

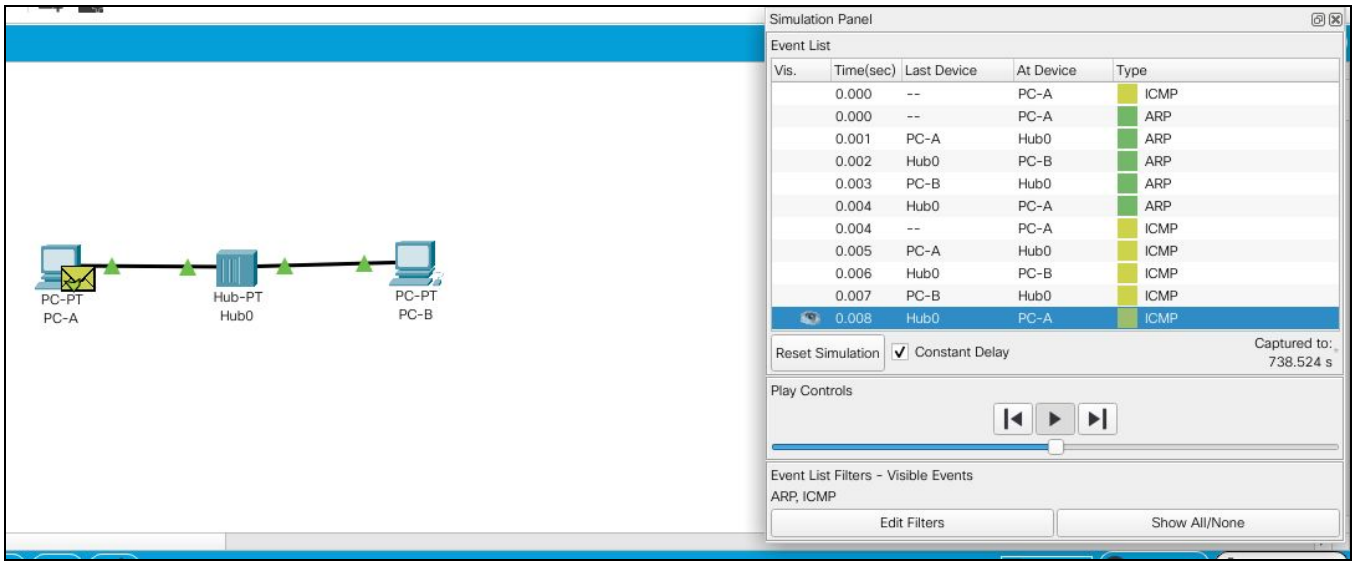





PC-PT
PC-A
Hub-PT
Hub0
PC-PT
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-B ARP
0.003 PC-B Hub0 ARP
Reset Simulation
Constant Delay
Captured to: 0.003 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None

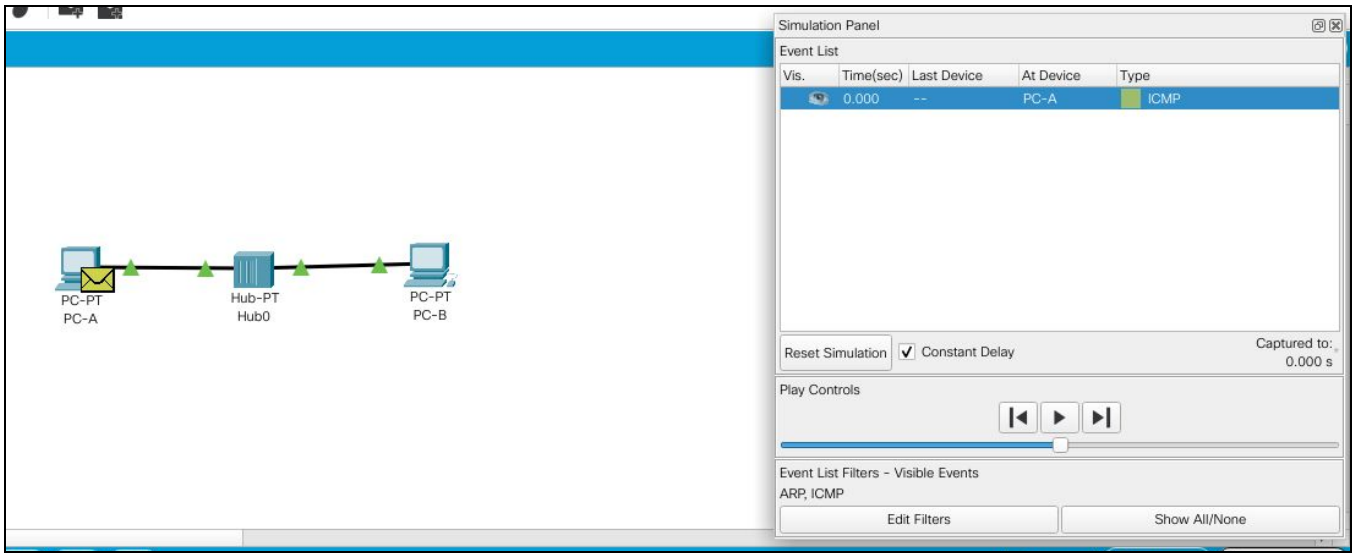

PC-PT
PC-A
Hub-PT
Hub0
PC-PT
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-B ARP
0.003 PC-B Hub0 ARP
0.004 Hub0 PC-A ARP
0.004 -- PC-A ICMP
Reset Simulation
Constant Delay
Captured to: 0.004 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None


PC-PT
PC-A
Hub-PT
Hub0
PC-PT
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-B ARP
0.003 PC-B Hub0 ARP
0.004 Hub0 PC-A ARP
0.004 -- PC-A ICMP
0.005 PC-A Hub0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.005 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None



e) The animation will run until the message window *No More Events* appears. All requested events have been completed. Select OK to close the message box.

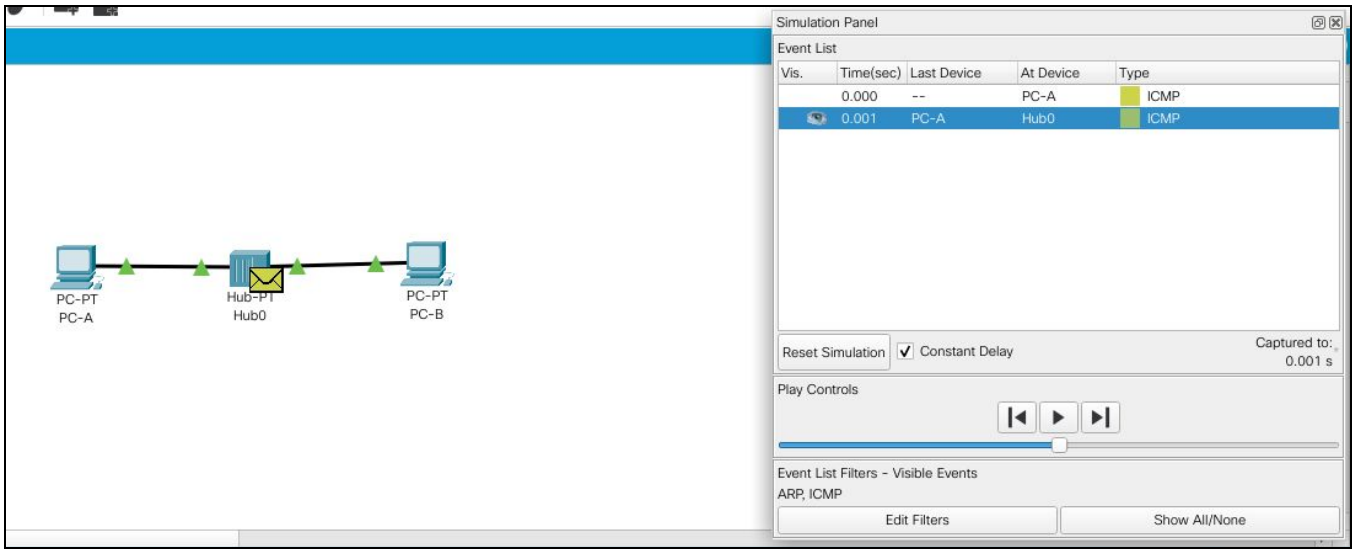
f) Choose the **Reset Simulation** button in the Simulation Panel. Notice that the ARP envelope is no longer present. This has reset the simulation but has not cleared any configuration changes or dynamic table entries, such as ARP table entries. The ARP request is not necessary to complete the **ping** command because PC-A already has the MAC address in the ARP table.

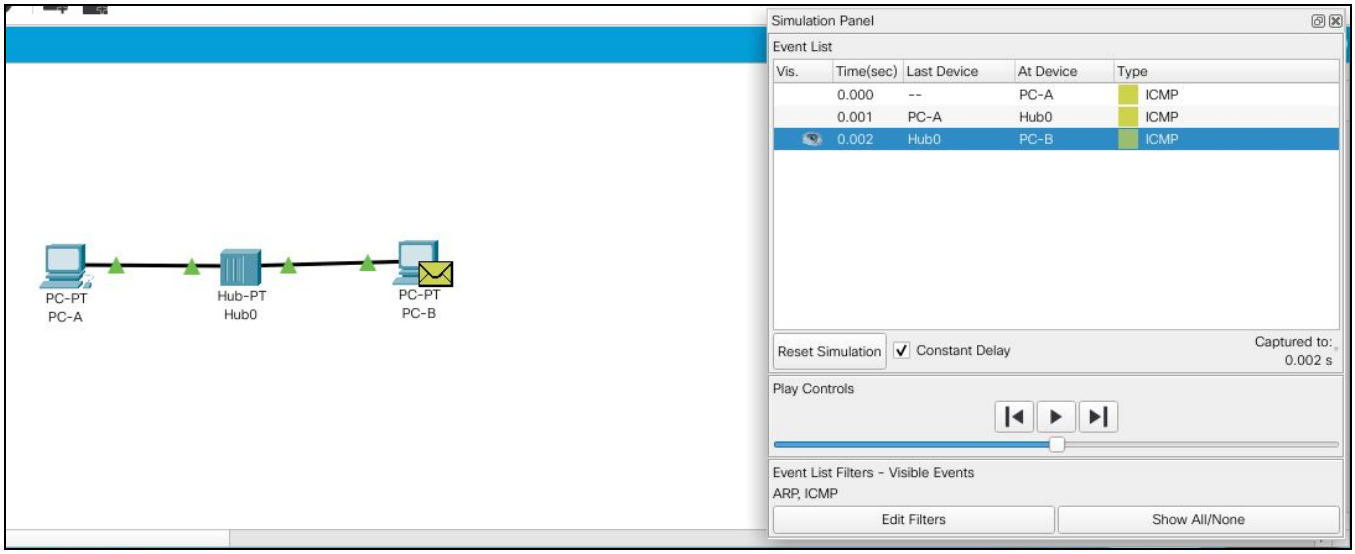


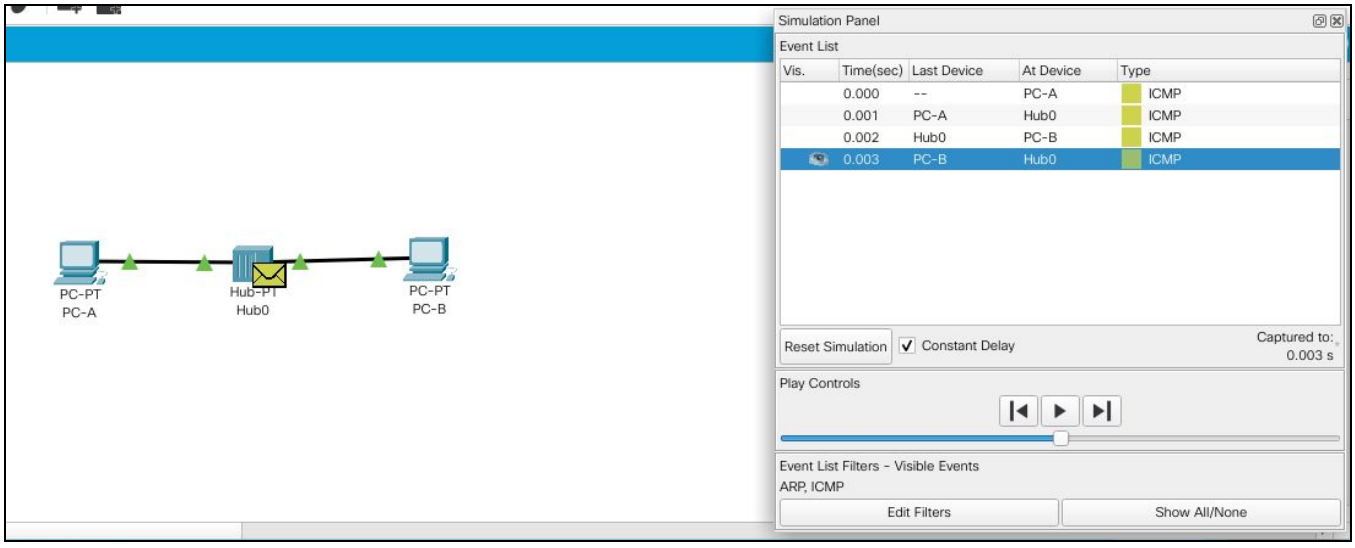
The Event List is reset and the ARP envelope is no longer present.

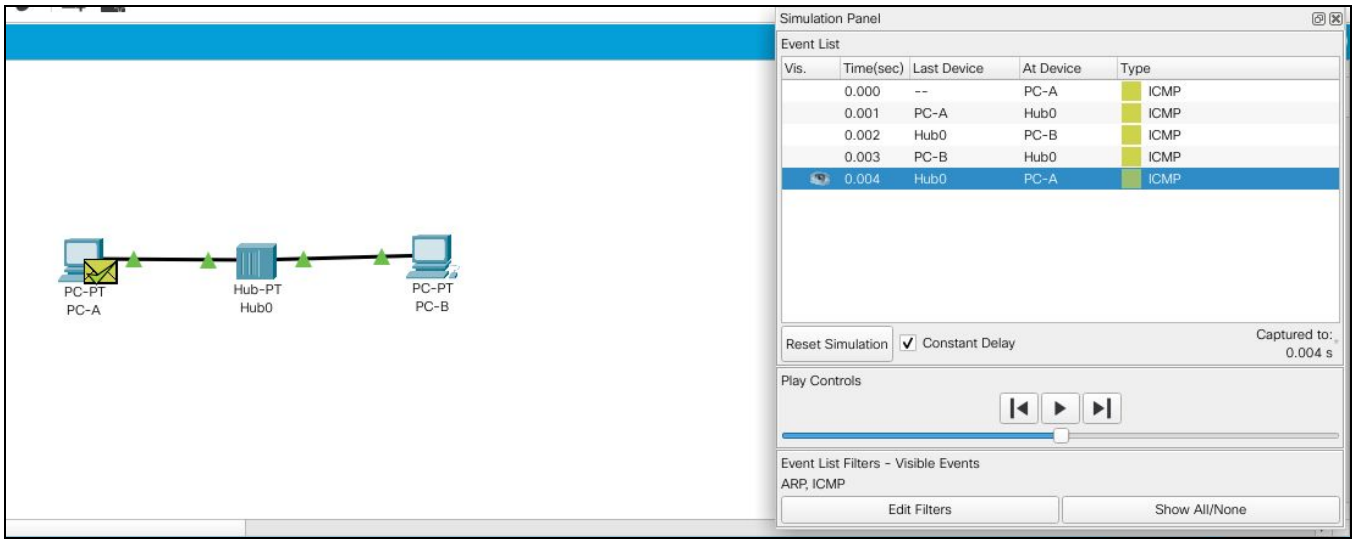
g) Choose the **Capture / Forward** button. The ICMP envelope will move from the source to the hub and stop. The **Capture / Forward** button allows you to run the simulation one step at a time. Continue selecting the **Capture / Forward** button until you complete the event.

Step wise view of clicking the **Capture / Forward** button



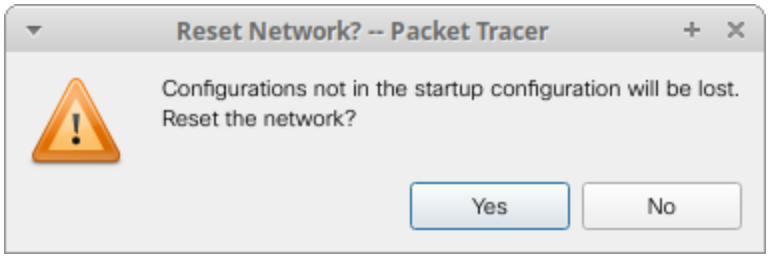




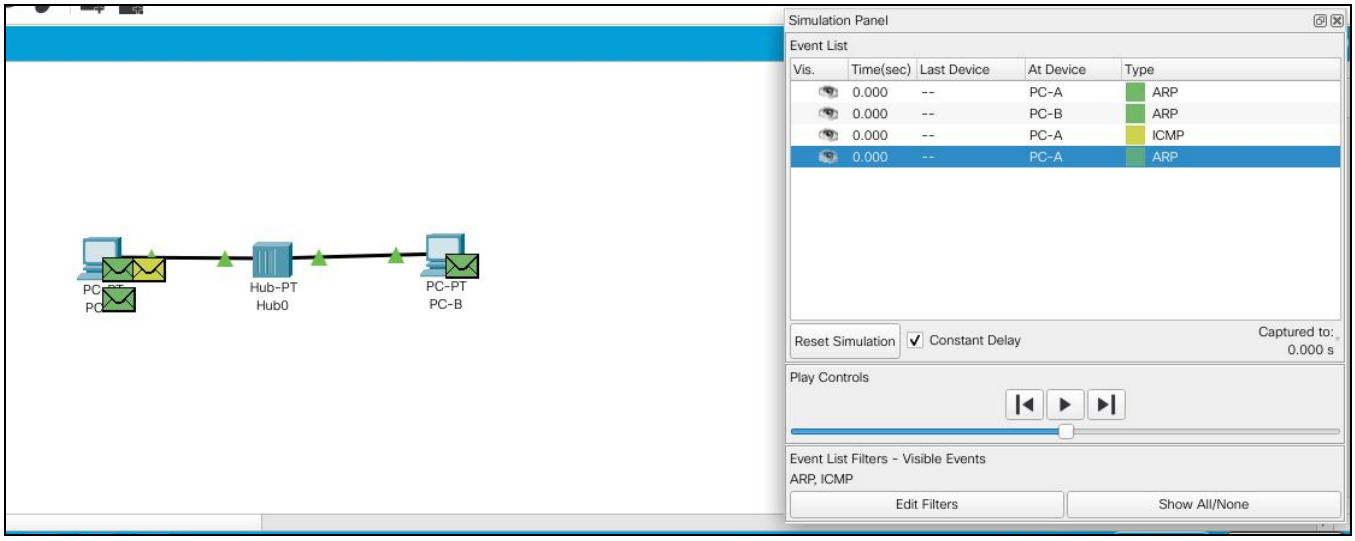


h) Choose the **Power Cycle Devices** button on the bottom left, above the device icons.

i) An error message will appear asking you to confirm reset. Choose **Yes**. Now both the ICMP and ARP envelopes are present again. The **Reset Network** button will clear any configuration changes not saved and will clear all dynamic table entries, such as the ARP and MAC table entries.



Reset Network error message appears on choosing Power Cycle Devices button

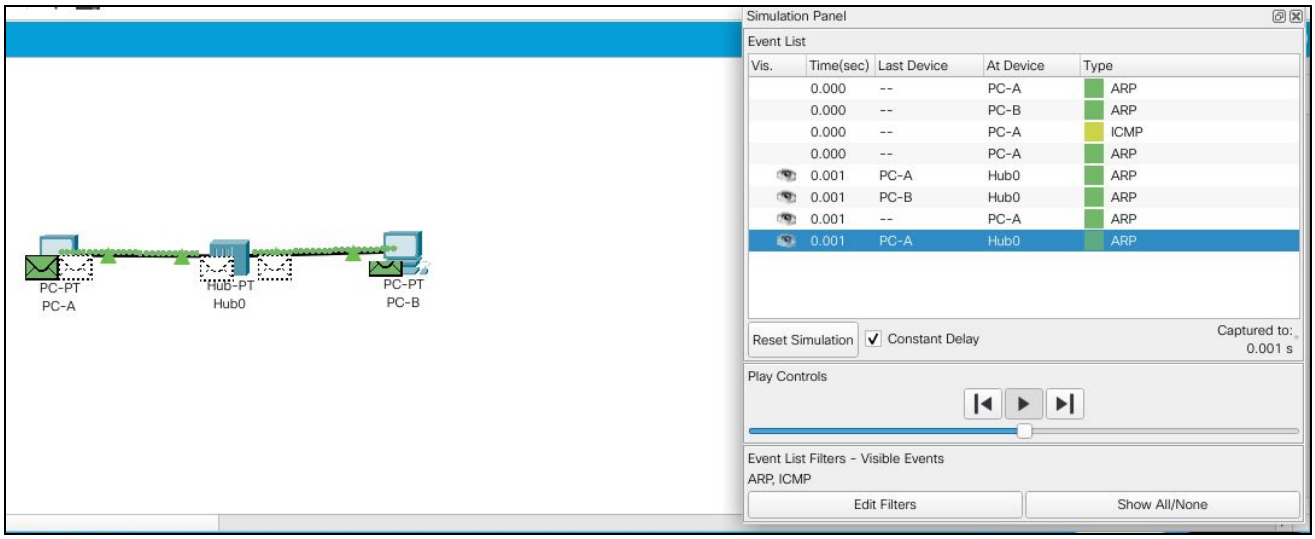


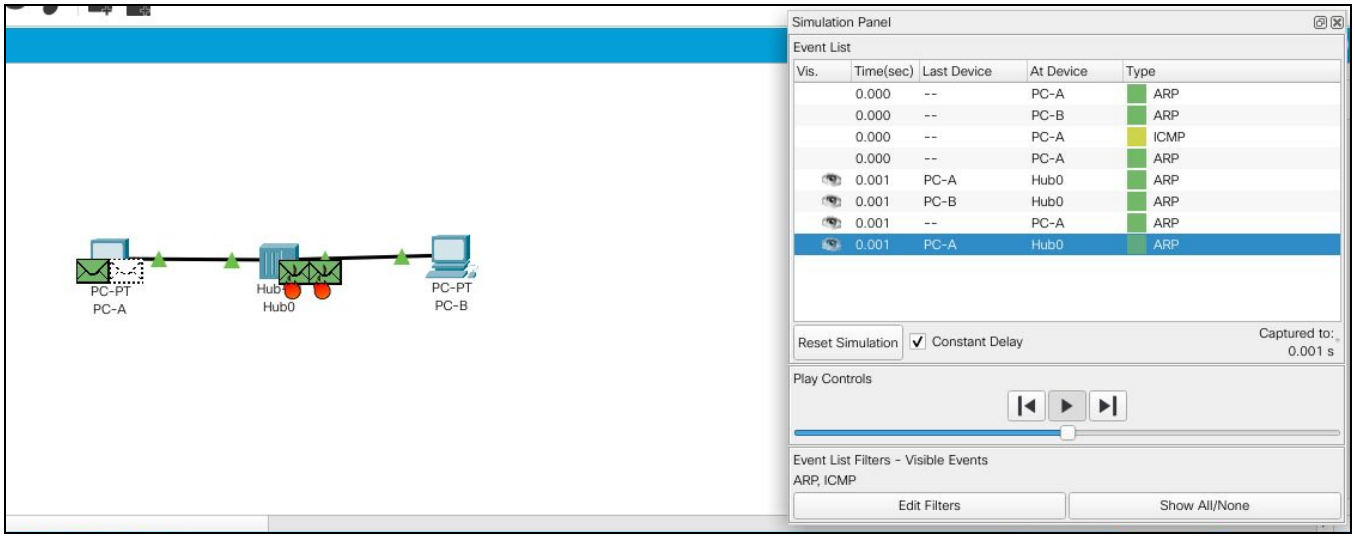
One ICMP and two ARP envelopes appear next to PC-A and one ARP envelope appear next to PC-B.

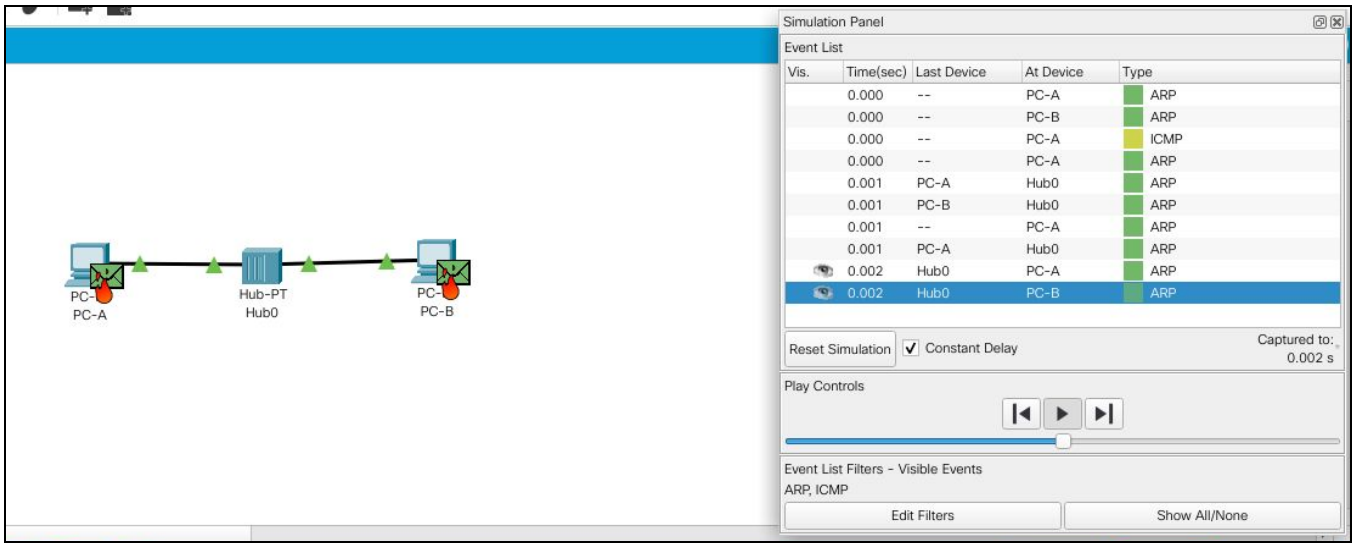
Step 4: View ARP Tables on each PC

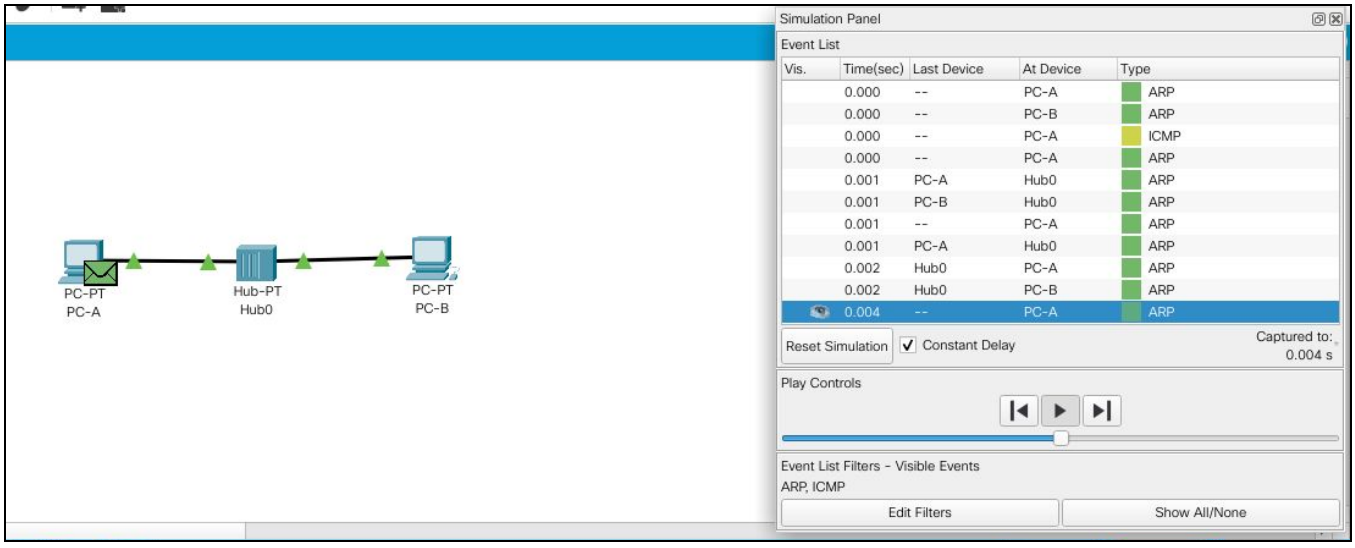
a) Choose the **Auto Capture / Play** button to repopulate the ARP table on the PCs. Click **OK** when the *No More Events* message appears.

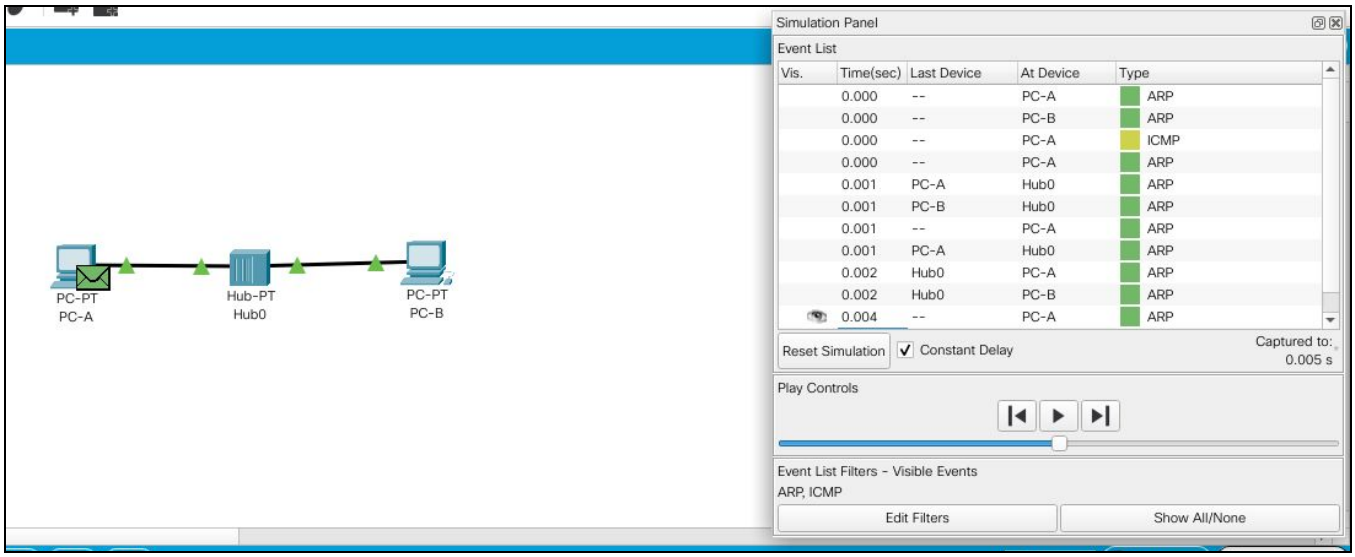
Simulation carries out as follows.

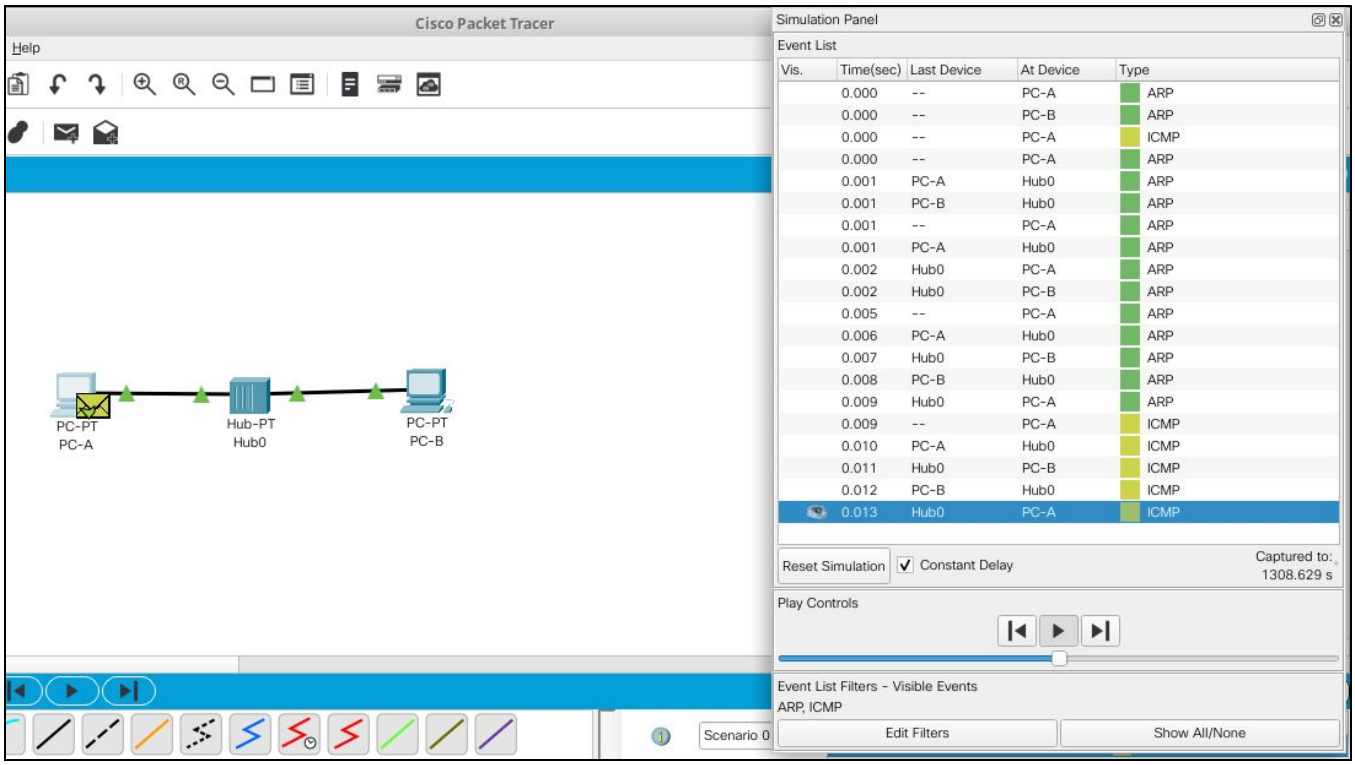





PC-
PC-A
Hub-PT
Hub0
PC-
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ARP
0.000 -- PC-B ARP
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.001 PC-B Hub0 ARP
0.001 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-A ARP
0.002 Hub0 PC-B ARP
Reset Simulation
Constant Delay
Captured to:
0.002 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None

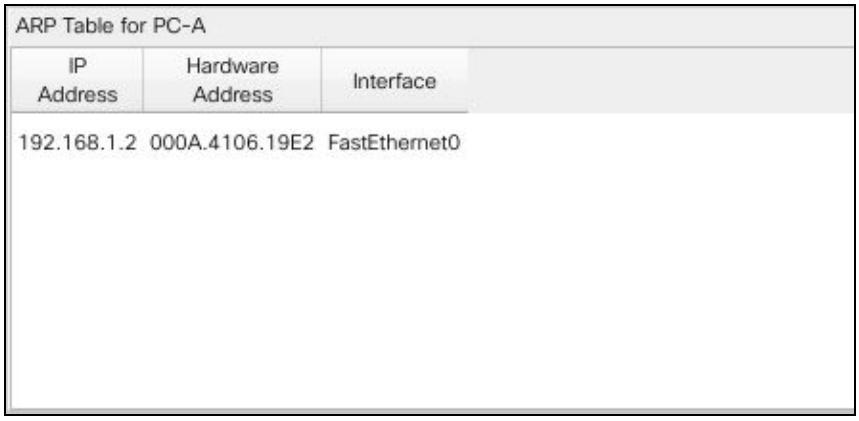

PC-PT
PC-A
Hub-PT
Hub0
PC-PT
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ARP
0.000 -- PC-B ARP
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.001 PC-B Hub0 ARP
0.001 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-A ARP
0.002 Hub0 PC-B ARP
0.004 -- PC-A ARP
Reset Simulation
Constant Delay
Captured to:
0.004 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None


PC-PT
PC-A
Hub-PT
Hub0
PC-PT
PC-B
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC-A ARP
0.000 -- PC-B ARP
0.000 -- PC-A ICMP
0.000 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.001 PC-B Hub0 ARP
0.001 -- PC-A ARP
0.001 PC-A Hub0 ARP
0.002 Hub0 PC-A ARP
0.002 Hub0 PC-B ARP
0.004 -- PC-A ARP
Reset Simulation
Constant Delay
Captured to:
0.005 s
Play Controls
Event List Filters - Visible Events
ARP, ICMP
Edit Filters
Show All/None

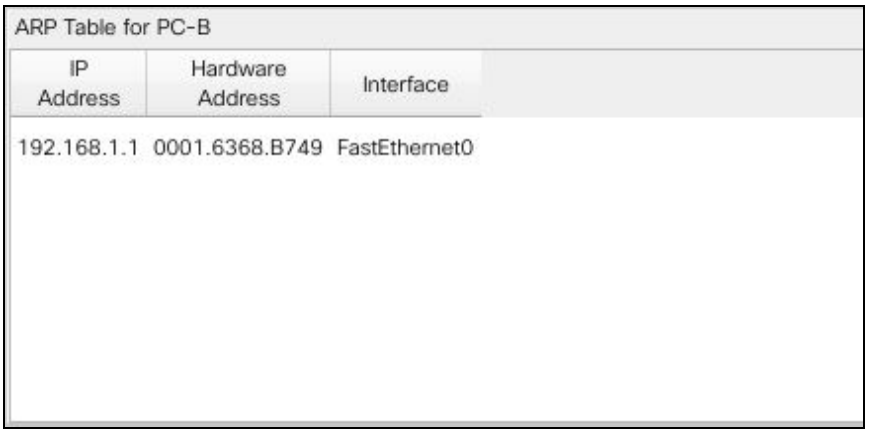


b) Select the magnifying glass on the right vertical tool bar.

c) Click **PC-A**. The ARP table for PC-A will appear. Notice that PC-A does have an ARP entry for PC-C. View the ARP tables for PC-B and PC-C as well. Close all ARP table windows.



ARP Table for PC-A shows the IP address of PC-B and FastEthernet is the Interface.

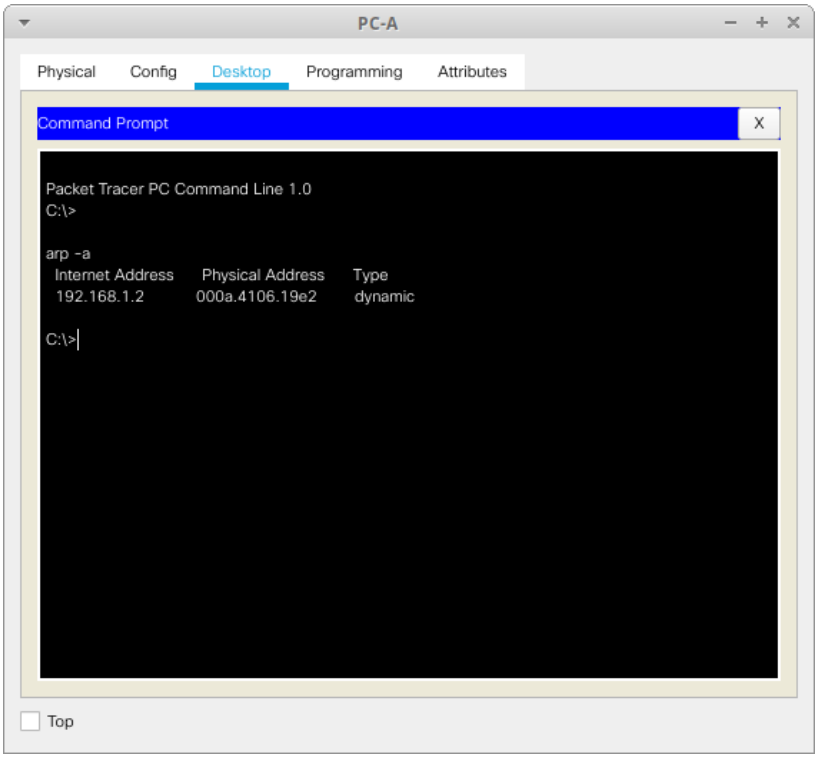


ARP Table for PC-B shows the IP address of PC-A and FastEthernet is the Interface

d) Click the **Select Tool** on the right vertical toolbar. (This is the first icon present in the toolbar.)

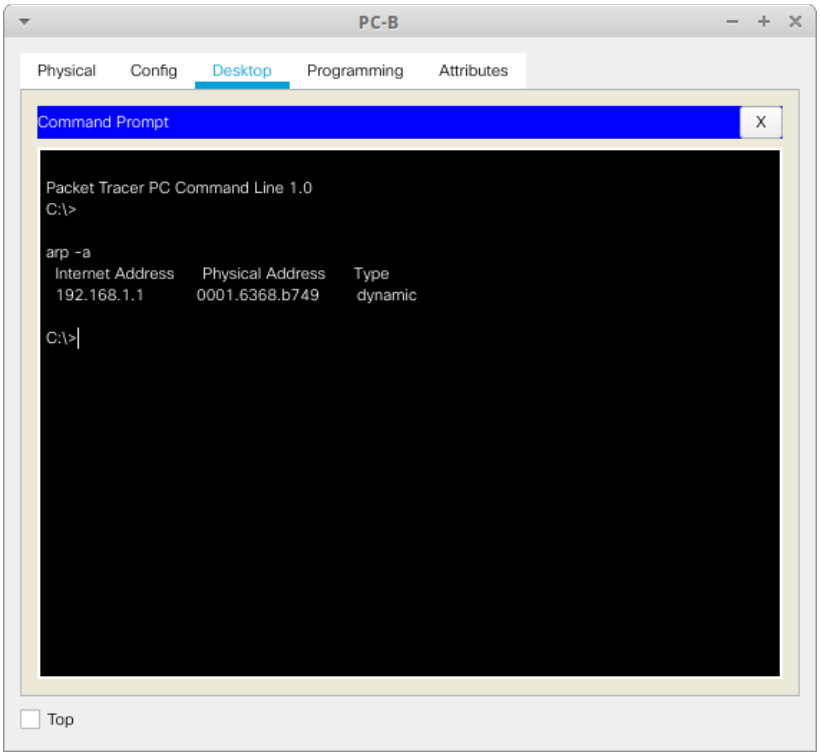
e) Click **PC-A** and select the **Desktop** tab.

f) Select the **Command Prompt** and type the command **arp -a** and press *enter* to view the ARP table from the desktop view. Close the PC-A configuration window.



The result is the ARP table of PC-A

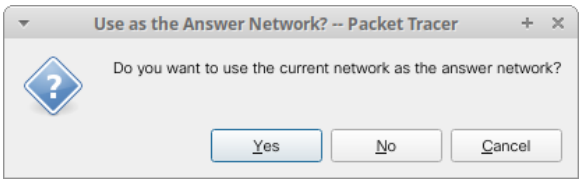
g) Examine the ARP table for **PC-B**.

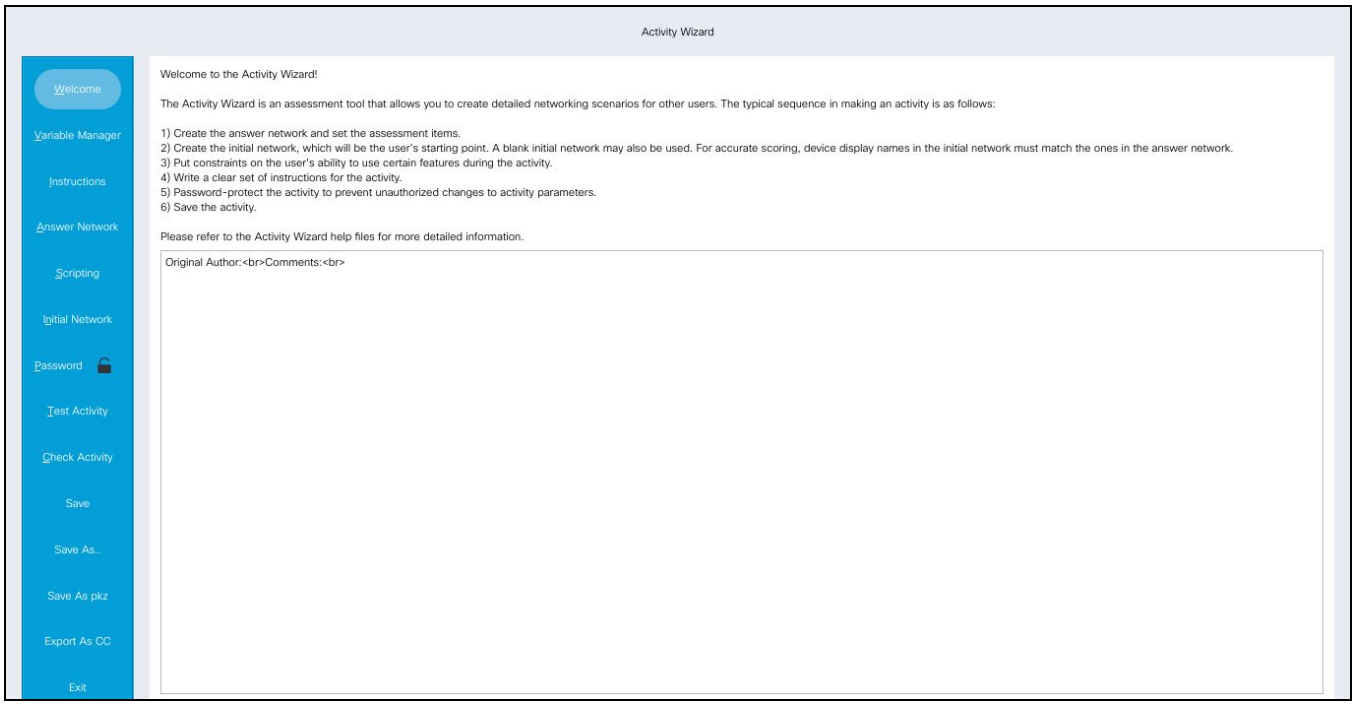


The result is the ARP table of PC-B

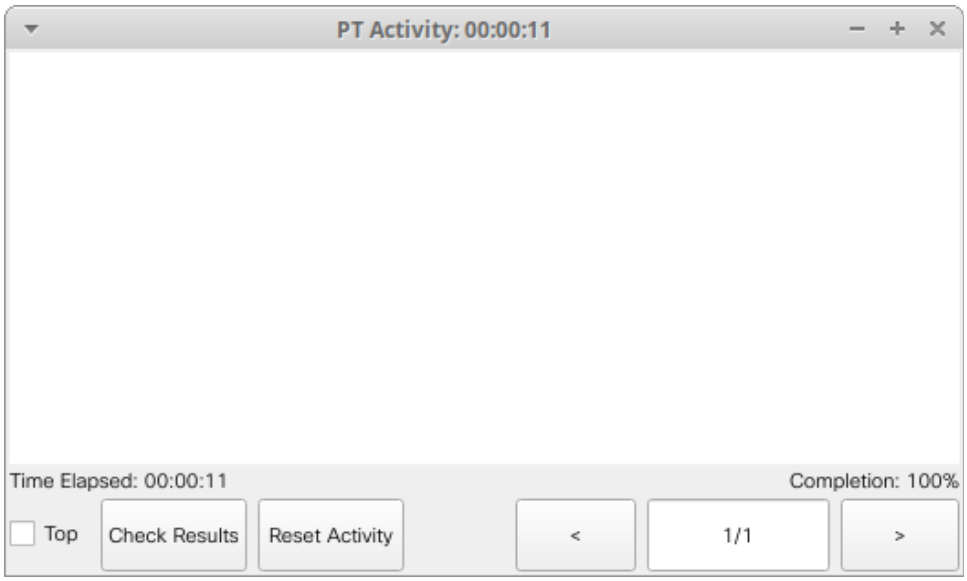
h) Close the PC-B configuration window.

i) Click the **Check Results** button at the bottom of the instruction window to verify that the topology is correct.

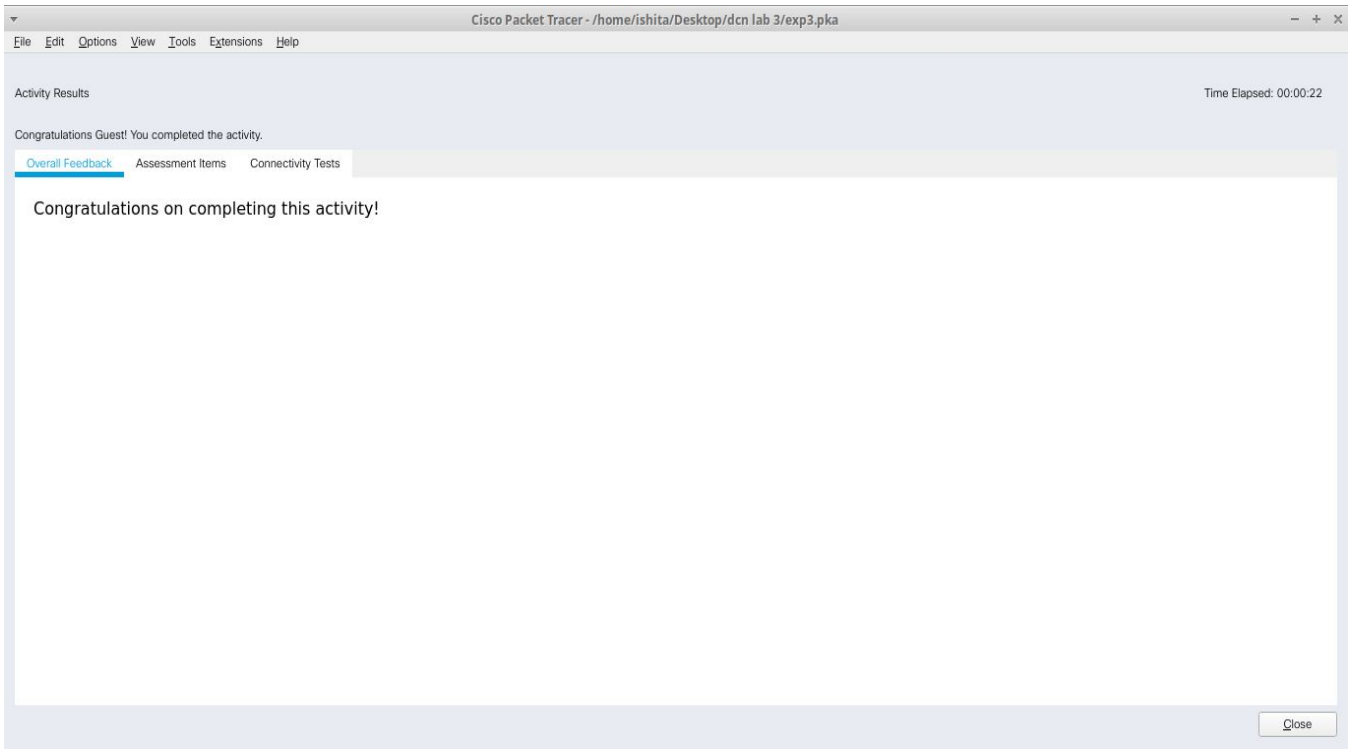




The Activity Wizard Window pops up. Click on the Check Activity button.



The PT Activity window pops up. The completion percentage is shown as 100%. Click on the Check Results button.



The Activity Results panel pops up. The following feedback is received. It confirms that the activity was completed successfully.

Deliverables:

Submit model schematic view along proper notations and the outcome of all steps you followed for this experiment, with proper description.

Conclusion:

- Packet Tracer provides an easy and intuitive way to practice network configurations without connecting any devices physically.
- It can be used to test protocols such as IPv4, IPv6, ARP, ICMP etc.
- It provides functionality to create PDUs to send between devices using the Add Simple PDU button and then pressing the Auto Capture / Play button to start the simulation scenario.
- In Simulation Mode, you can watch your network run at a slower pace, observing the paths that packets take and inspecting them in detail.