Introduction to Packet Tracer and Exploring OSI Layers

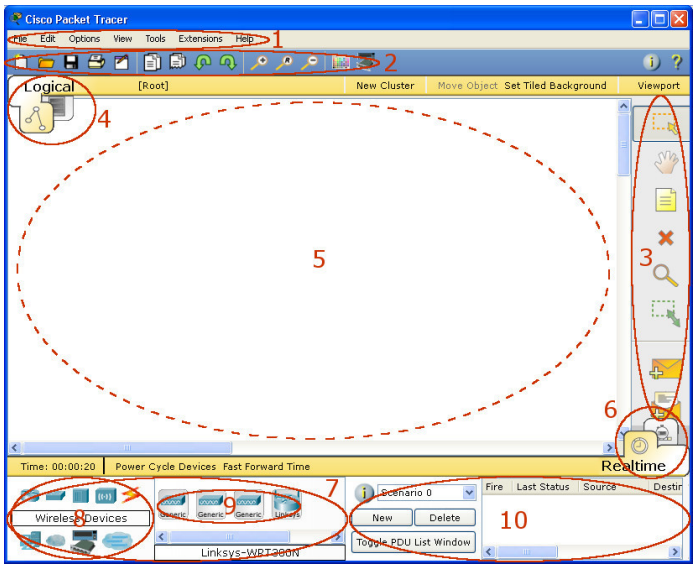
1. Objectives

- To introduce **Packet Tracer** (**PT**) and become familiar with its operations.
- Create a simple network using **Hub**, **Switch**.
- To explore the **OSI layering model**.

2. Instructions

Packet Tracer (PT) is a network simulator that enables you build, configure, observe, initiate, modify and troubleshoot networks and network activity. It allows you to observe and better understand how data (packets) travel across a network, as well as enabling you to configure routers and switches using Cisco's IOS (Internetwork Operating System).

Exercise 1: Open Packet Tracer ***(start -> cisco packet tracer)*** and click on ***help -> Contents***. Go to: **Getting Started → Interface Overview**.

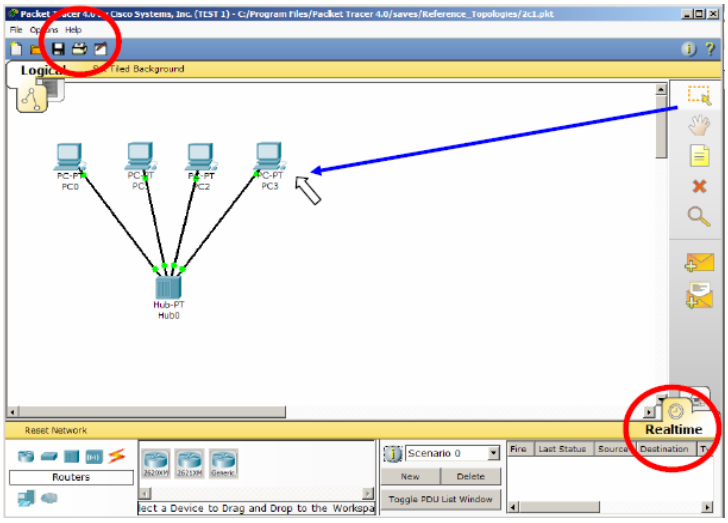


Familiarize yourself with the functions of the two screen modes; **Realtime** and **Simulation**.

- **Real time Mode** is used to build and configure your network,
- **Simulation mode** is used to generate network traffic (packets) and observe network activity.

Exercise 2: To create **a single-segment network** using a Hub and a Switch.

Step 1: Start Packet Tracer and create the shown topology using Hub, Switch and PCs.



By default, the topology opens in **Realtime** mode. We will examine the difference between **Realtime** and **Simulation** modes.

Help can be obtained by using the Help menu. Both online help one each topic and tutorials are available. Please take advantage of these facilities.

To view the **IP address**, **subnet mask**, **default gateway**, and **MAC address of a host**, move the cursor over that computer.

Step 2: Configure the PCs with **Host IP Address, Subnet Mask** as follows:

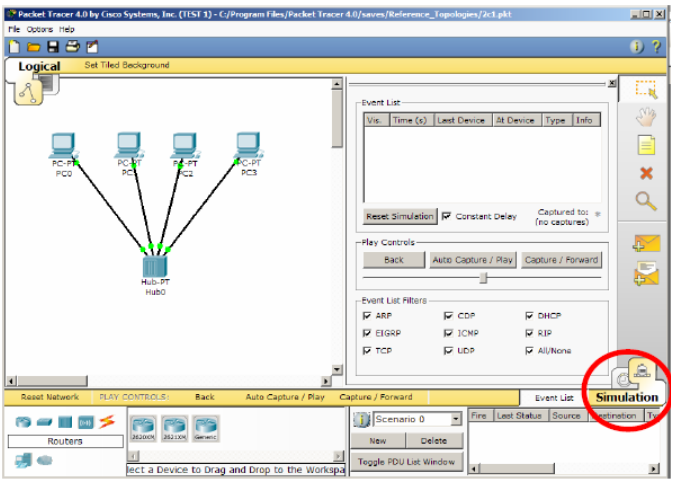
Host	IP Address	Subnet Mask
PC0	192.168.10.10	255.255.255.0
PC1	192.168.10.11	255.255.255.0
PC2	192.168.10.12	255.255.255.0
PC3	192.168.10.13	255.255.255.0

Step 3: Test the network, e.g., ping PC3 from PC0.

Step 4: Run the test in **Simulation mode.**

Once the file is opened, click the **Simulation** icon, to enter **simulation mode**. Simulation mode allows you to view the **sequence of events** associated with the communications between two or more devices.

Realtime mode performs the operation with all of the sequence of events happening at "**real time**".



- **Demonstrate how to:**
  1. Set IP address, SM and Default gateway in a PC
  2. Ping from the command prompt
  3. Use the web browser of a PC
  4. Difference of **real-time** and **simulation modes** using a simple PDU.

Step 5: Change the IP address of PC3 to **192.168.20.13**. Perform a **ping from PC0 to PC3**. What is the **ping result**?_____

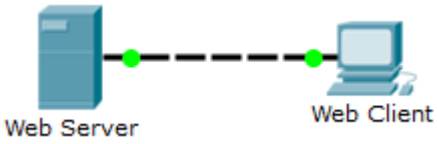
Step 6: Return the IP address of PC3 to **192.168.10.13**. Change the IP address of PC2 to **192.168.11.12**. Perform a ping from PC0 to PC2. What is the ping result?_____

Exercise 3: From the all **Exercises** you have done, **observe** and **explain** at least **4 points** about **hub vs. switch** and **real-time vs. simulation modes.**

Point 1:	
Point 2:	
Point 3:	
Point 4:	

Exercise 3: **Explore OSI and TCP/IP Layers**

This simulation activity is intended to provide a foundation for **understanding the TCP/IP protocol suite** and the relationship to the **OSI model**. **Simulation mode** allows you to view the data contents being sent across the network at each layer. Create the following **topology**:



Part 1: Examine HTTP Web Traffic

Step 1: Switch from Real time to Simulation mode.

a. Click the **Simulation** mode icon to switch from **Realtime** mode to **Simulation** mode.
b. Select **HTTP** from the **Event List Filters**.

Step 2: Generate web (HTTP) traffic.

a. Click **Web Client** in the far left pane.
b. Click the **Desktop** tab and click the **Web Browser** icon to open it.
c. In the URL field, enter **www.osi.local** and click **Go**.
d. Click **Capture/Forward** four times. There should be **four events** in the Event List.

Step 3: Explore the contents of the HTTP packet.

a. Click the **first colored square box** under the **Event List** > **Info** column.

b. Ensure that the **OSI Model** tab is selected. Under the **Out Layers** column, ensure that the **Layer 7** box is highlighted. What is the text displayed next to the **Layer 7** label?_____

c. Click **Next Layer**. Layer 4 should be highlighted. What is the **Dst Port** value? _____

d. Click **Next Layer**. Layer 3 should be highlighted. What is the **Dest. IP** value? _____

e. Click **Next Layer**. What information is displayed at this layer?_____

_____

f. Click the **Outbound PDU Details** tab.

What is the common information listed under the **IP** section of **PDU Details** as compared to the information listed under the **OSI Model** tab? With **which layer** is it associated?

_____

What is the common information listed under the **TCP** section of **PDU Details**, as compared to the information listed under the **OSI Model** tab, and with **which layer** is it associated?

_____

What is the **Host** listed under the **HTTP** section of the **PDU Details**? **What layer** would this information be associated with under the **OSI Model** tab?

_____

g. Click the **next colored square box** under the **Event List** > **Info** column. Only Layer 1 is active (not grayed out). The device is **moving the frame from the buffer and placing it on to the network**.

h. Advance to the next HTTP **Info** box within the **Event List** and click the colored square box. This window contains both **In Layers** and **Out Layers**. **The server is now sending the information back to the client**.

Comparing the information displayed in the **In Layers** column with that of the **Out Layers** column, what are the **major differences**?

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_____

i. Click the **Outbound PDU Details** tab. Scroll down to the **HTTP** section. What is the first line in the **HTTP message** that displays?

_____

j. Click the **last colored square box** under the **Info** column. How many tabs are displayed with this event and **why**?

_____

Part 2: Display Elements of the TCP/IP Protocol Suite

In Part 2 of this activity, you will use the Packet Tracer **Simulation mode** to view and examine some of the other protocols comprising of the **TCP/IP suite**.

Step 1: View Additional Events

a. Close any open PDU information windows.

b. In the **Event List Filters** > **Visible Events** section, click **Show All**. What additional **Event Types** are displayed?

_____

_____

c. Click the **first DNS event** in the **Info** column. As you look at the **OSI Model** tab with **Layer 7** highlighted, a description of what is occurring is listed directly below the **In Layers** and **Out Layers** ("1. **The DNS client sends a DNS query to the DNS server.**"). This is very useful information to help understand what is occurring during the communication process.

d. Click the **Outbound PDU Details** tab. What information is listed in the **NAME**: in the DNS QUERY section?

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e. Click the last DNS **Info** colored square box in the event list. Which device is displayed?

_____

What is the value listed next to **ADDRESS**: in the DNS ANSWER section of the **Inbound PDU Details**?

_____

Demonstrate your work to the instructors and submit lab report.