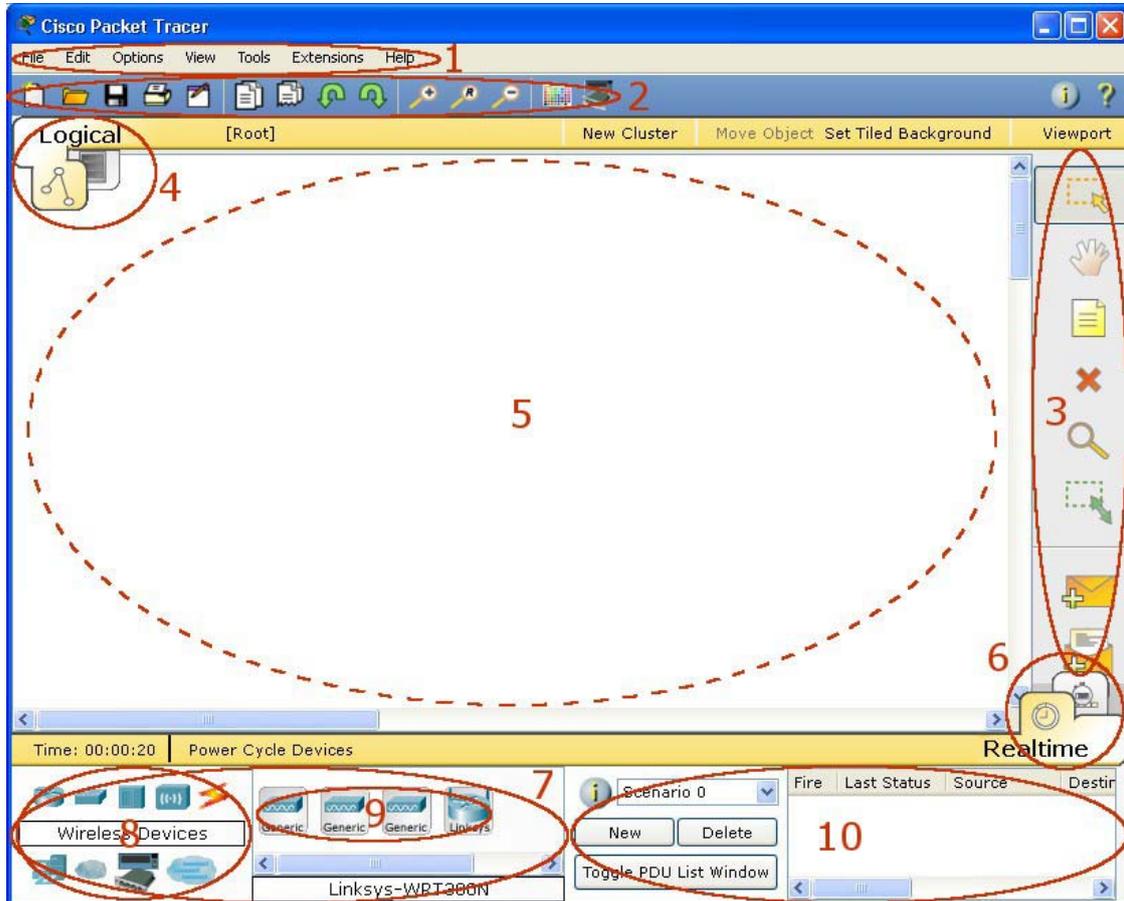


## Network II Lab 01

### Part 01: Interface Overview



This initial interface contains ten components. If you are unsure of what a particular interface item does, move your mouse over the item and a help balloon will explain the item.

#### Program interface

##### 1. Menu Bar

This bar provides the File, Edit, Options, View, Tools, Extensions, and Help menus. You will find basic commands such as Open, Save, Save as Pkz, Print, and Preferences in these menus. You will also be able to access the Activity Wizard from the Extensions menu.

##### 2. Main Tool Bar

This bar provides shortcut icons to the File and Edit menu commands. This bar also provides buttons for Copy, Paste, Undo, Redo, Zoom, the Drawing Palette, and the Custom Devices Dialog. On the right, you will also find the Network Information button, which you can use to enter a description for the current network (or any text you wish to include).



### 3. Common Tools Bar

This bar provides access to these commonly used workspace tools: Select, Move Layout, Place Note, Delete, Inspect, Resize Shape, Add Simple PDU, and Add Complex PDU. See "Workspace Basics" for more information.

### 4. Logical/Physical Workspace and Navigation Bar

You can toggle between the Physical Workspace and the Logical Workspace with the tabs on this bar. In Logical Workspace, this bar also allows you to go back to a previous level in a cluster, create a New Cluster, Move Object, Set Tiled Background, and Viewport. In Physical Workspace, this bar allows you to navigate through physical locations, create a New City, create a New Building, create a New Closet, Move Object, apply a Grid to the background, Set Background, and go to the Working Closet.

### 5. Workspace

This area is where you will create your network, watch simulations, and view many kinds of information and statistics.

### 6. Realtime/Simulation Bar

You can toggle between Realtime Mode and Simulation Mode with the tabs on this bar. This bar also provides buttons to Power Cycle Devices as well as the Play Control buttons and the Event List toggle button in Simulation Mode. Also, it contains a clock that displays the relative Time in Realtime Mode and Simulation Mode.

### 7. Network Component Box

This box is where you choose devices and connections to put into the workspace. It contains the Device-Type Selection Box and the Device-Specific Selection Box.

#### 8. Device-Type Selection Box

This box contains the type of devices and connections available in Packet Tracer. The Device-Specific Selection Box will change depending on which type of device you choose.

#### 9. Device-Specific Selection Box

This box is where you choose specifically which devices you want to put in your network and which connections to make.

#### 10. User Created Packet Window\*

This window manages the packets you put in the network during simulation scenarios. See the "Simulation Mode" section for more details.

\* You can freely resize the User Created Packet Window (UCPW) by placing the cursor near the left edge of the window (it will turn into a "resize" cursor) and then drag the cursor left or right. You can hide the window from view by dragging the edge all the way to the right. When the

UCPW is hidden, you can bring it back by placing the cursor on the edge (notice when the resize cursor appears) and then dragging the edge back.

## Connections / Links

Packet Tracer supports a wide range of network connections. Each cable type can only be connected to certain interface types.

### 1. Console

Console connections can be made between PCs and routers or switches. Certain conditions must be met for the console session from the PC to work: the speed on both sides of the connection must be the same, the data bits must be 7 for both or 8 for both, the parity must be the same, the stop bits must be 1 or 2 (but they do not have to be the same), and the flow control can be anything for either side.

### 2. Copper Straight-through

This cable type is the standard Ethernet media for connecting between devices that operate at different OSI layers (such as hub to router, switch to PC, router to hub). It can be connected to the following port types: 10 Mbps Copper (Ethernet), 100 Mbps Copper (Fast Ethernet), and 1000 Mbps Copper (Gigabit Ethernet).

### 3. Copper Cross-over

This cable type is the Ethernet media for connecting between devices that operate at the same OSI layer (such as hub to hub, PC to PC, PC to printer). It can be connected to the following port types: 10 Mbps Copper (Ethernet), 100 Mbps Copper (Fast Ethernet), and 1000 Mbps Copper (Gigabit Ethernet).

### 4. Fiber

Fiber media is used to make connections between fiber ports (100 Mbps or 1000 Mbps).

### 5. Phone

Phone line connections can only be made between devices with modem ports. The standard application for modem connections is an end device (such as a PC) dialing into a network cloud.

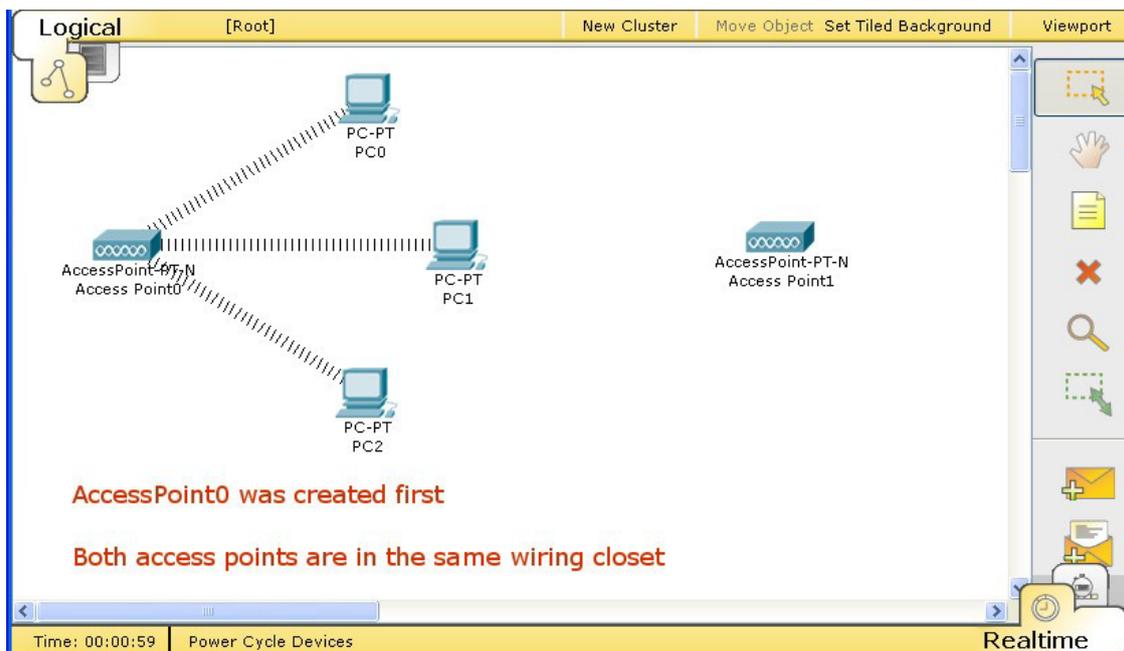
## 6. Coaxial

Coaxial media is used to make connections between coaxial ports such as a cable modem connected to a Packet Tracer Cloud.

## 7. Serial DCE and DTE

Serial connections, often used for WAN links, must be connected between serial ports. Note that you must enable clocking on the DCE side to bring up the line protocol. The DTE clocking is optional. You can tell which end of the connection is the DCE side by the small “clock” icon next to the port. If you choose the Serial DCE connection type and then connect two devices, the first device will be the DCE side and the second device will be automatically set to the DTE side. The reverse is true if you choose the Serial DTE connection type.

## Wireless Links



You can establish wireless links between access points and end devices (PCs, servers, and printers). To establish a link, simply remove the existing module on an end device, insert a wireless module, and turn on the device. The device will automatically try to associate itself with an access point. Typically, this means it will associate (physically) with the nearest access point. See the Wireless Devices page under the Physical Workspace section for more information regarding distances. However, if two or more access points are in the same closet, the distance from any access point to any end device is essentially the same. In this case, an end device will associate with the access point that was created first. Recall that the logical topology does not reflect physical distances, and everything that is created in the Logical Workspace is initially



placed in the same wiring closet in the Physical Workspace. The process for establishing wireless links between Linksys routers and end devices with Linksys network modules is similar, but described elsewhere.

### Link Status

When you connect two devices, you will typically see link lights on both ends of the connection. Some connections do not have link lights.

Link Light Status Meaning	status on the link.
Bright green	The physical link is up. However, this is not indicative of the line protocol
Blinking green	There is link activity.
Red	The physical link is down. It is not detecting any signals.
Amber	The port is in a blocking state due to the Layer 2 loop-breaking process in Packet Tracer. This appears only on switches.

### Workspaces and Modes

Packet Tracer has two workspaces (Logical and Physical) and two modes (Real-time and Simulation). Upon startup, you are in the Logical Workspace in Real-time Mode. You can build your network and see it run in real time in this configuration. You can switch to Simulation Mode to run controlled networking scenarios. You can also switch to the Physical Workspace to arrange the physical aspects (such as the location) of your devices. Note that you view a simulation while you are in the Physical Workspace. You should return to the Logical Workspace after you are done in the Physical Workspace.

### Operating Modes

Packet Tracer operating modes reflect the network time scheme.

#### In Realtime Mode,

your network runs in a model of real time, within the limits of the protocol models used. The network responds to your actions immediately as they would in a real device. For example, as soon as you make an Ethernet connection, the link lights for that connection will appear, showing the connection state (see the "Connections/Links" page for details). Whenever you type a command in the CLI (such as **ping** or **show**), the result or response is generated in real time and you see it as such. All network activity, particularly the flow of PDUs across the network, happens in the Packet Tracer model of real time.

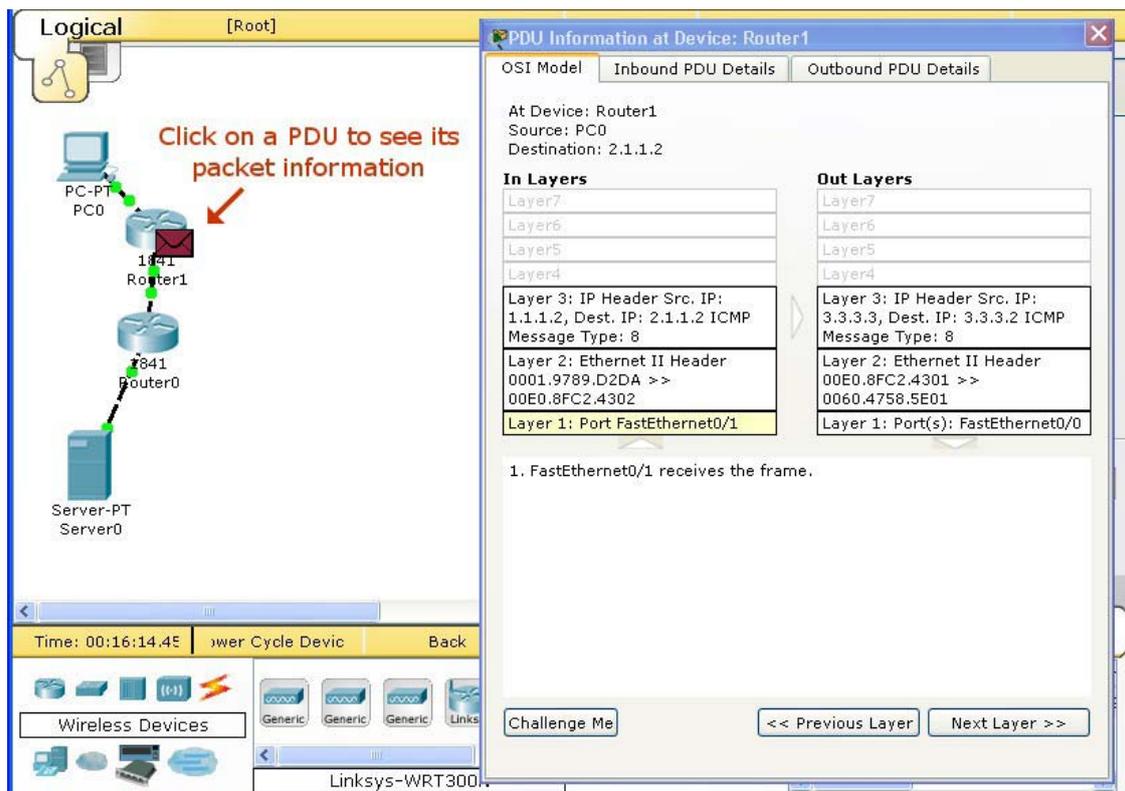
#### In Simulation Mode,

you can "freeze" time -- you have direct control over time related to the flow of PDUs. You can see the network run step by step, or event by event, however quickly or slowly you like. You can set up scenarios, such as sending a ping packet from one device to another. However, nothing "runs" until you capture it (the first time through, as with a protocol sniffer) or play it (re-playing the captured events as an animation). When you capture or play the simulation, you will see graphical representations of packets traveling from one device to another. You can pause the

simulation, or step forward or backward in time, investigating many types of information on specific PDUs and devices at specific times. However, other aspects of the network will still run in real time. For example, if you turn off a port, its link light will respond immediately by turning red.

## Simulation Mode: PDU Information

During a simulation, you can click on a packet (on the topology or the corresponding event in the Event List) to bring up its information window and view its details. The details window contains three possible tabs: OSI Model, Inbound PDU Details, and Outbound PDU Details.



The screenshot shows a network simulation interface. On the left, a topology window titled "Logical [Root]" displays a network diagram with a PC-PT (PC0), a Server-PT (Server0), and two routers (Router1 and Router0). A red arrow points to a packet icon on Router1 with the text "Click on a PDU to see its packet information". On the right, a "PDU Information at Device: Router1" window is open, showing the "OSI Model" tab. The window displays details for an incoming packet from PC0 to Router1. The "In Layers" section shows the packet's structure from Layer 1 to Layer 7, with Layer 3 (IP Header) and Layer 2 (Ethernet II Header) expanded to show their respective fields. The "Out Layers" section shows the same structure for an outgoing packet. The "OSI Model" tab also includes a list of layers and a description of the current layer's activity: "1. FastEthernet0/1 receives the frame."

The **OSI Model** tab shows how the packet is processed at each layer of the OSI model by the current device. The process is further separated by the direction in which the packets are traveling, incoming versus outgoing. The incoming layers (**In Layer**) show how the device processes an incoming or a buffered packet, and the outgoing layers (**Out Layer**) show the process a device goes through when it sends a packet to one or multiple ports.

The **In Layer** is meant to be read starting from bottom to top (from Layer 1 to Layer 7), while the **Out Layer** is read from top to bottom (from Layer 7 to Layer 1). This is because the physical layer is the first layer at which incoming PDUs are processed, and it is the last layer at which outgoing PDUs are processed when they exit the device.

The **Inbound PDU Details** tab only applies if the PDU you clicked on is being received on the device; it will not appear if the PDU originated from that device. The tab shows exactly what is in the headers of the PDU, broken up into header type and the individual fields in each header. For example, a PDU may have an Ethernet II and an ARP header, so the tab will show information such as the preamble, FCS, and source and destination addresses.

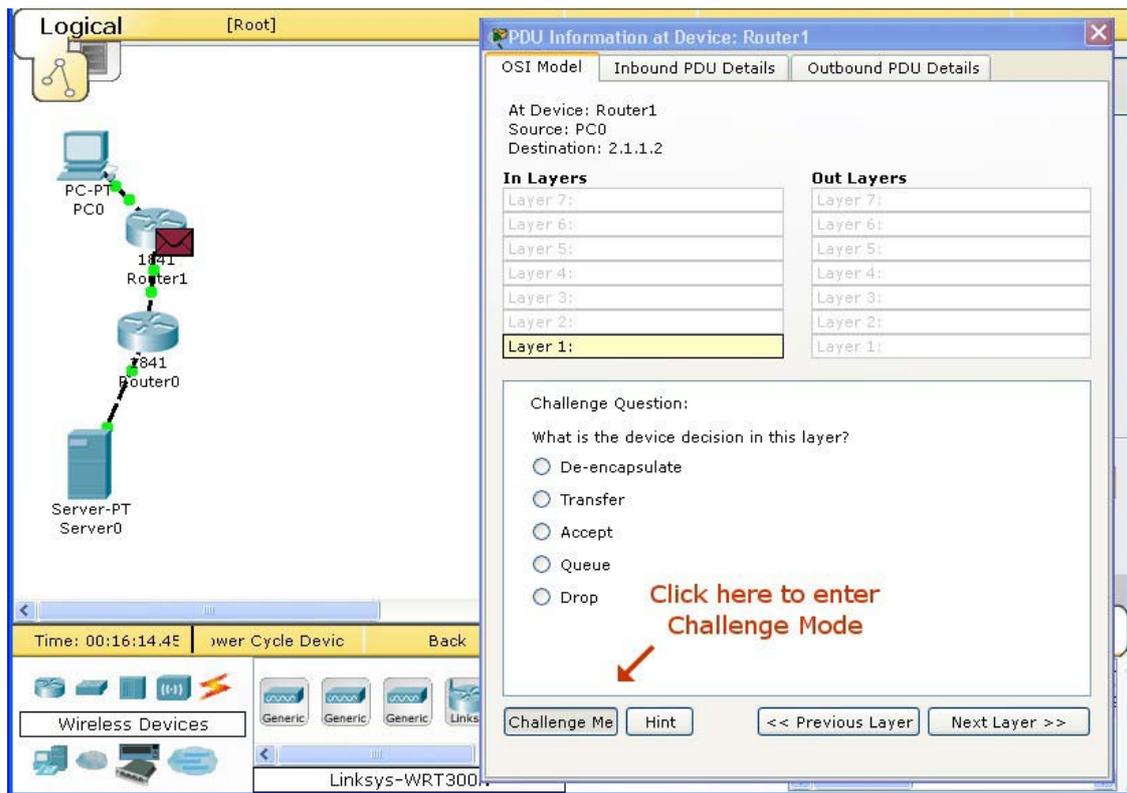
The **Outbound PDU Details** tab shows similar information for outgoing packets.

This tab only applies if the device has a PDU to send.

Most of the time, a device will receive a PDU and then, as a result, send out a PDU. In this case, both the **Inbound PDU Details** and the **Outbound PDU Details** tabs apply.

## Challenge Mode

You can quiz yourself on the encapsulation process by entering Challenge Mode when viewing PDU information. Press the **Challenge Me** button to do so. The layer details are hidden, and the information window is replaced by a question window that asks you what the device does to a PDU at a given layer. Select from a multiple-choice list. If you answer correctly, the details for that layer are shown and the question window advances to the next layer. You can press the **int** button if you need help.



The screenshot shows a network simulation interface. On the left, a 'Logical' view displays a topology with a PC-PT (PC0) connected to Router1 (IP 1841), which is connected to Router0 (IP 7841), which is connected to a Server-PT (Server0). A 'Linksys-WRT300' device is also visible at the bottom.

The main window is titled 'PDU Information at Device: Router1'. It has three tabs: 'OSI Model', 'Inbound PDU Details', and 'Outbound PDU Details'. The 'Inbound PDU Details' tab is active, showing:

- At Device: Router1
- Source: PC0
- Destination: 2.1.1.2

Below this, there are two columns of layer selection boxes:

In Layers	Out Layers
Layer 7:	Layer 7:
Layer 6:	Layer 6:
Layer 5:	Layer 5:
Layer 4:	Layer 4:
Layer 3:	Layer 3:
Layer 2:	Layer 2:
Layer 1:	Layer 1:

The 'Layer 1' box in the 'In Layers' column is highlighted in yellow.

Below the layer boxes is a 'Challenge Question' section:

Challenge Question:  
What is the device decision in this layer?

- De-encapsulate
- Transfer
- Accept
- Queue
- Drop

An orange arrow points to the 'Challenge Me' button with the text 'Click here to enter Challenge Mode'.

At the bottom of the window, there are buttons for 'Challenge Me', 'Hint', '<< Previous Layer', and 'Next Layer >>'.



Each Challenge Question may contain the following answers:

- **Encapsulate:** Adds a header or a header and trailer to the PDU on this layer to create the PDU at the next lower layer.
- **De-encapsulate:** Removes a header or a header and trailer from the PDU on this layer to create the PDU at the next higher layer.
- **Transfer:** Moves the PDU from the inbound OSI stack to the outbound OSI stack.
- **Accept:** Accepts and finishes processing of the PDU.
- **Queue:** Holds the PDU for processing or sending at a later time.
- **Drop:** Eliminates the PDU.
- **Transmit:** Sends the signal out the physical media.