



Packet Tracer: Beyond the Basics



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Mind Wide Open™

PT Intermediate Session

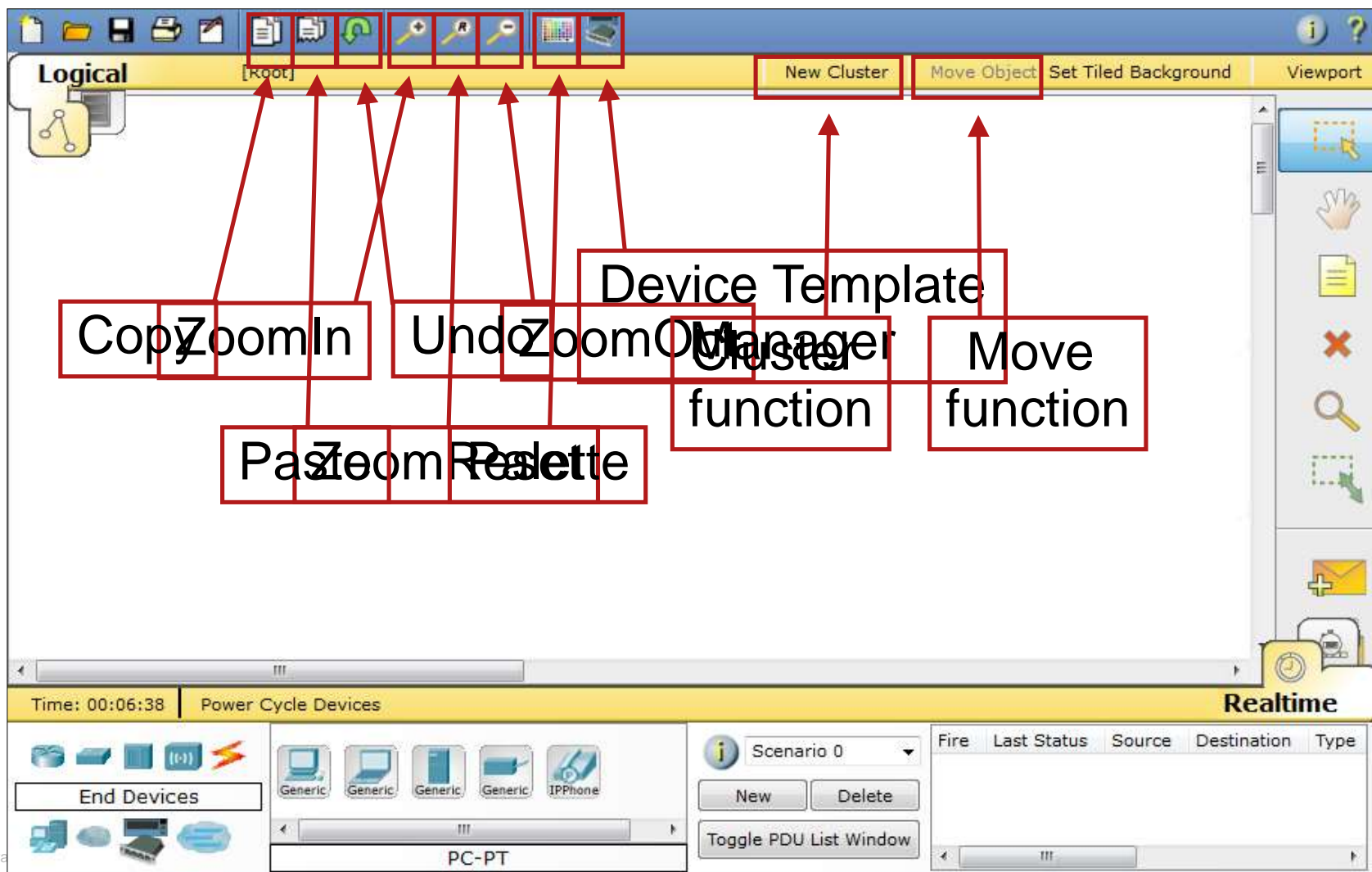
This presentation will cover these topics

- PT Features
- Simulation Mode
- PDU information
- Complex PDUs
- Challenge Mode
- Scenarios

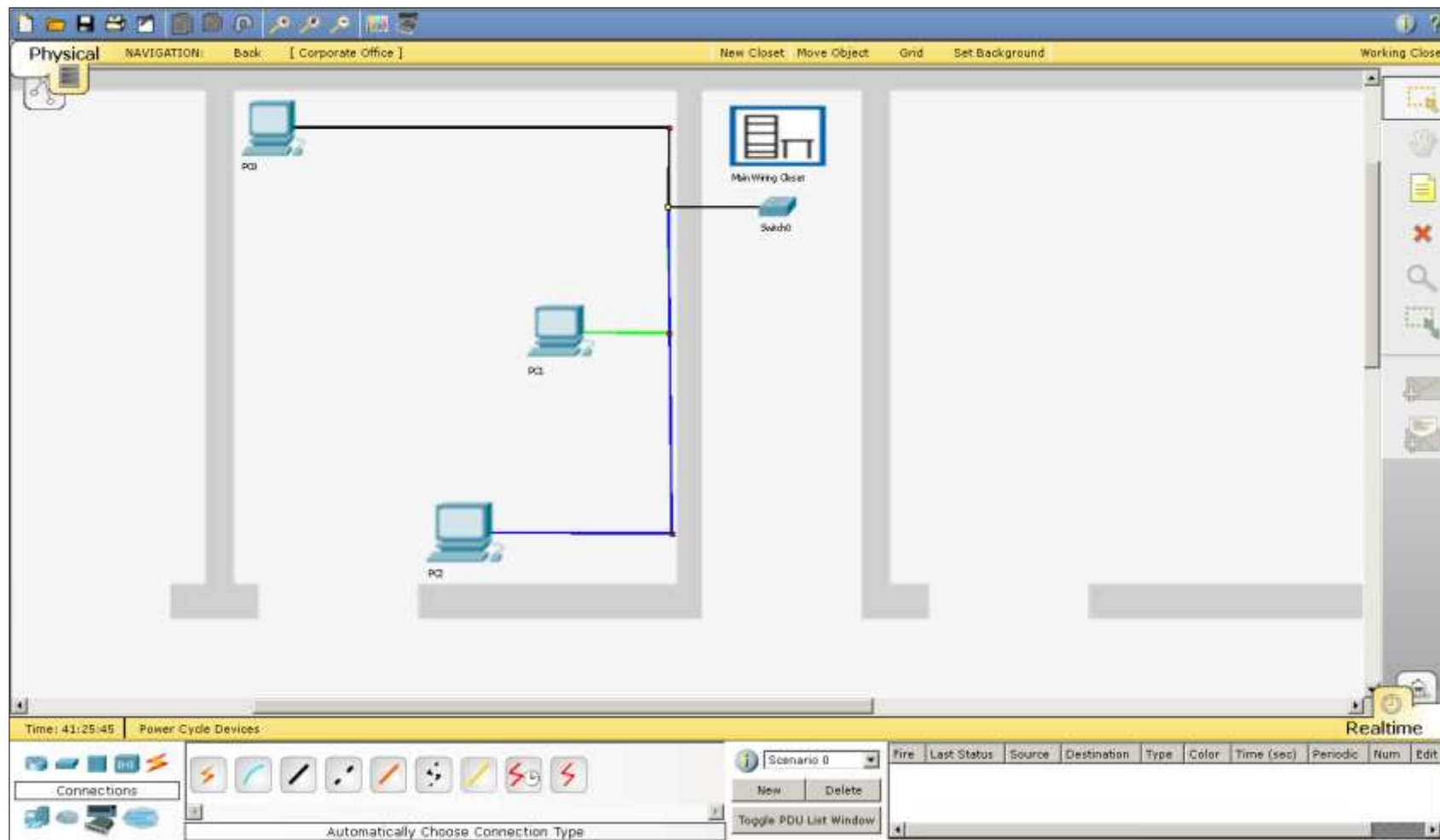
PT Features



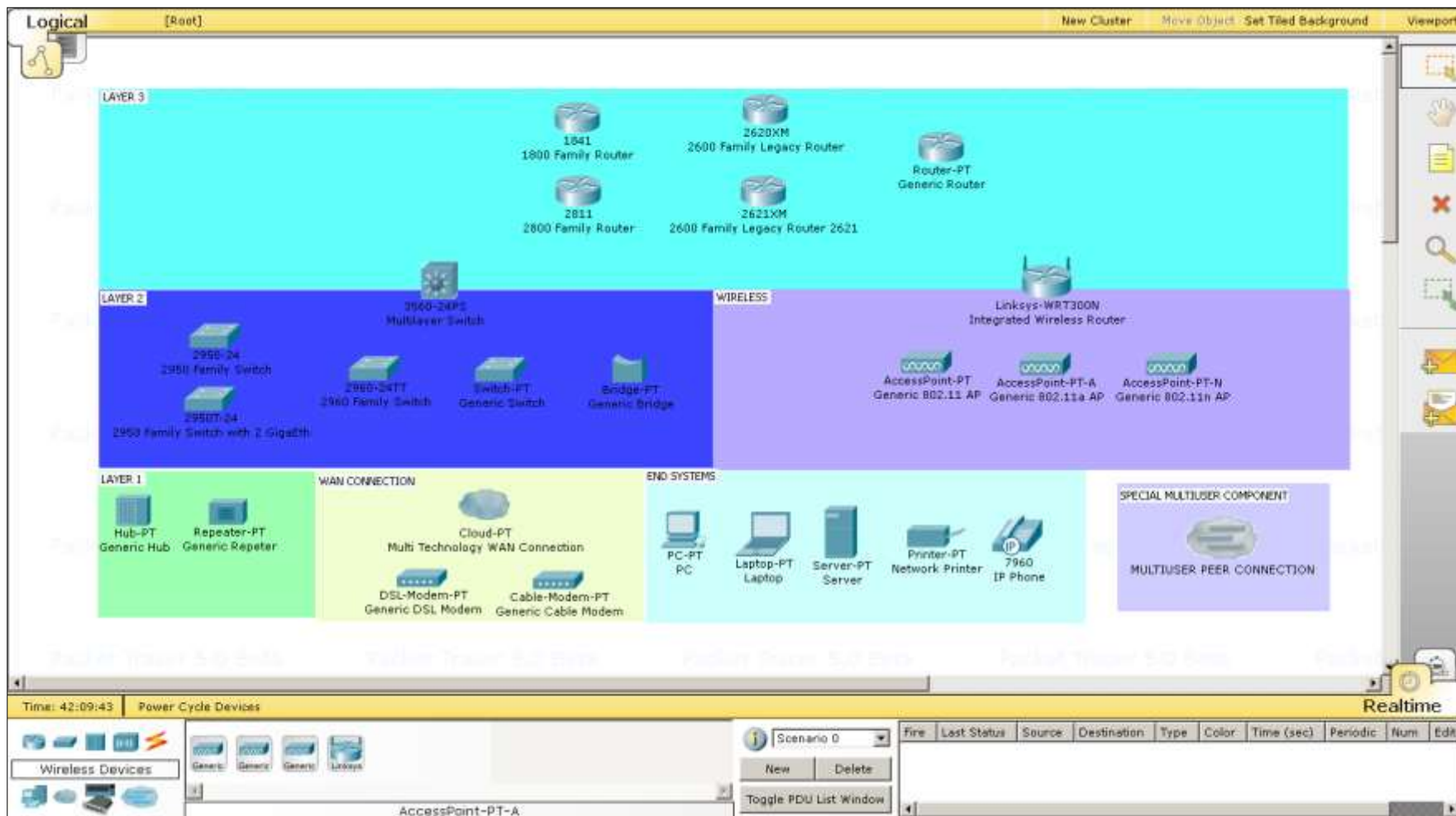
Features



Create Bend Point

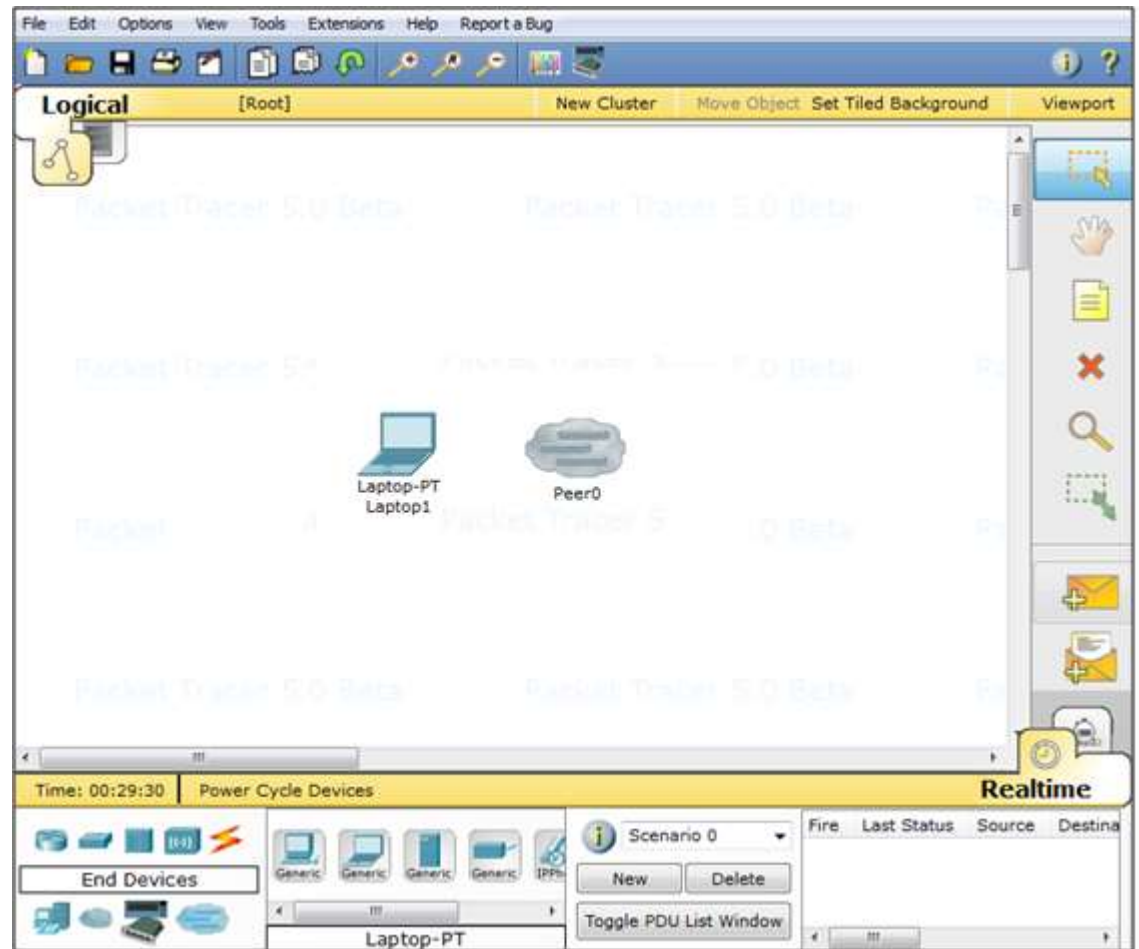


Legacy Devices (PT5.x)

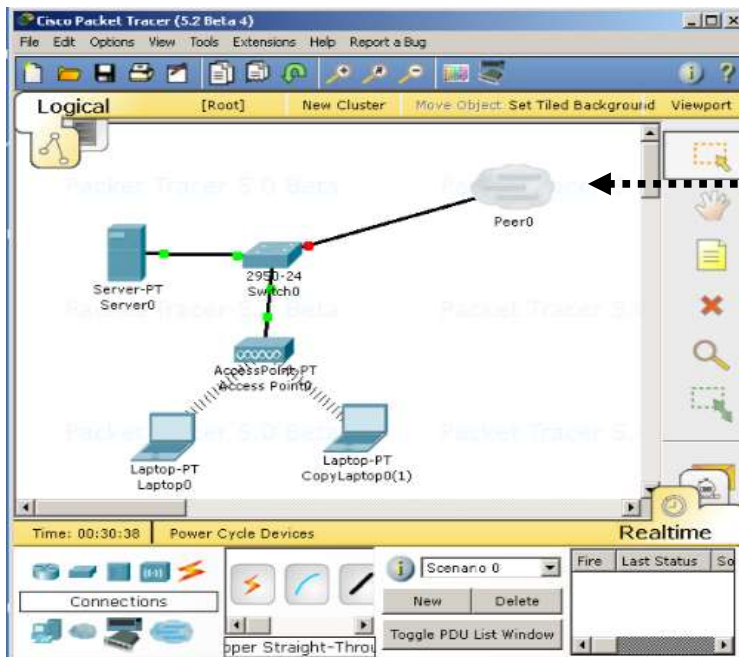


New Devices (PT5.x)

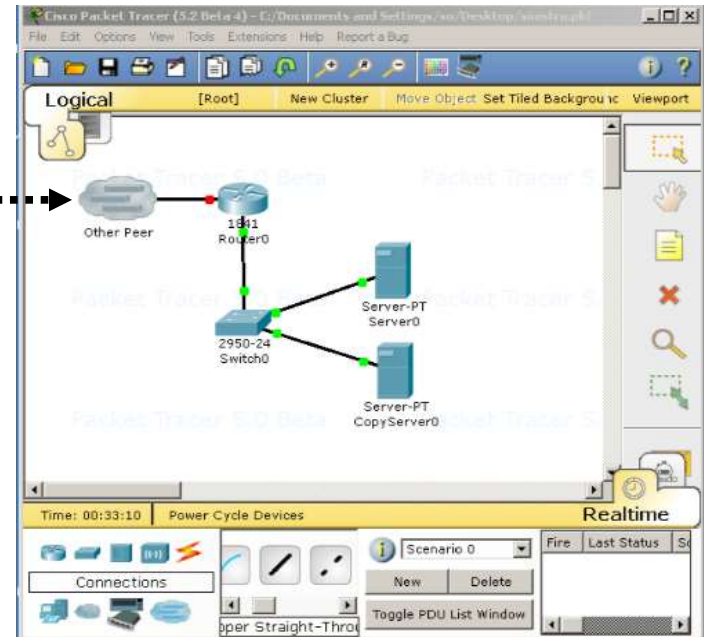
- The new device:
laptop-PT



Multuser Cloud and New Laptop

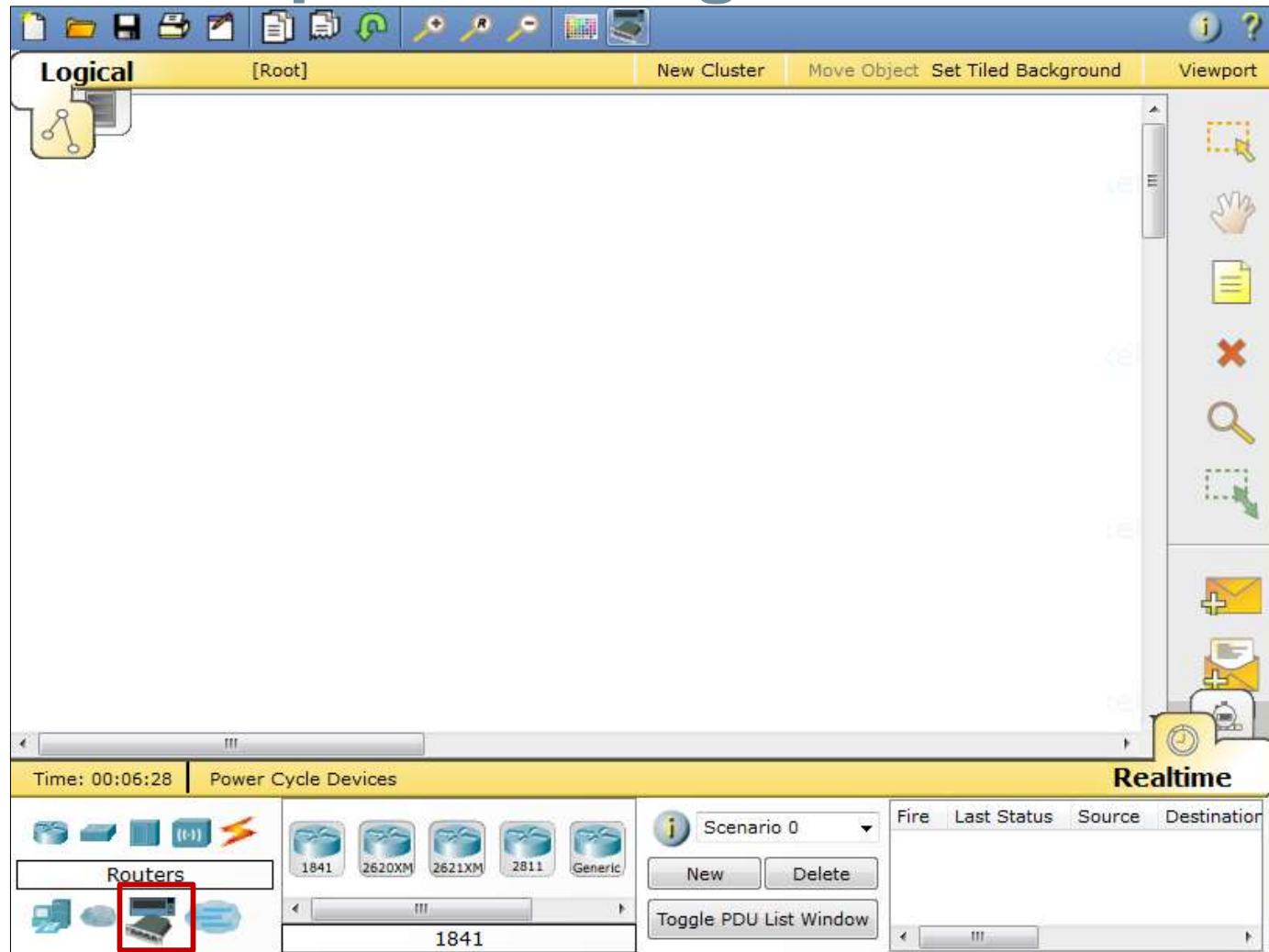


PTMP
TCP/IP

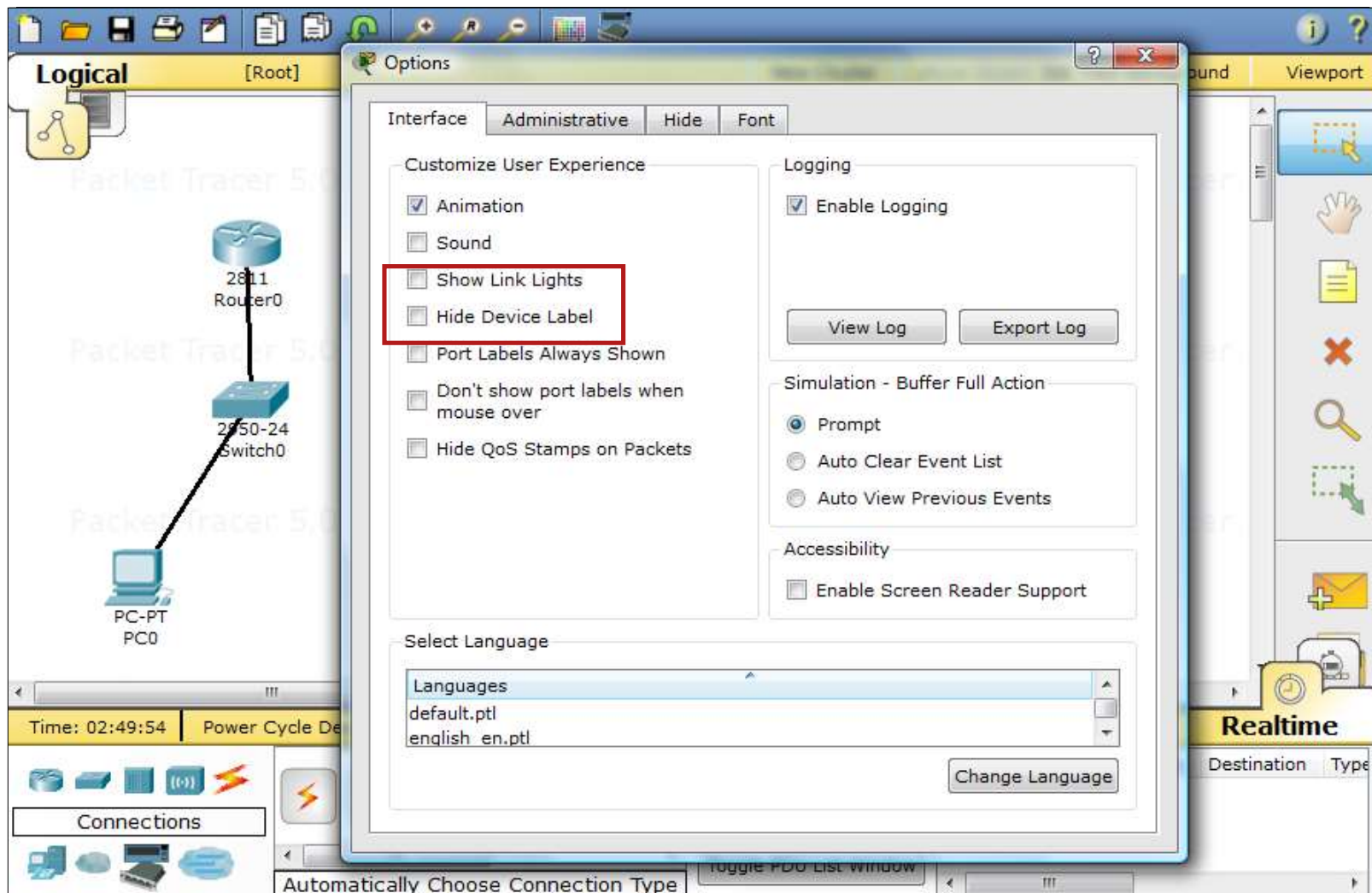


- The Multuser connection (Peer0 in the picture) can connect by TCP/IP to a Multuser connection of another PT (Instance on a different computer)

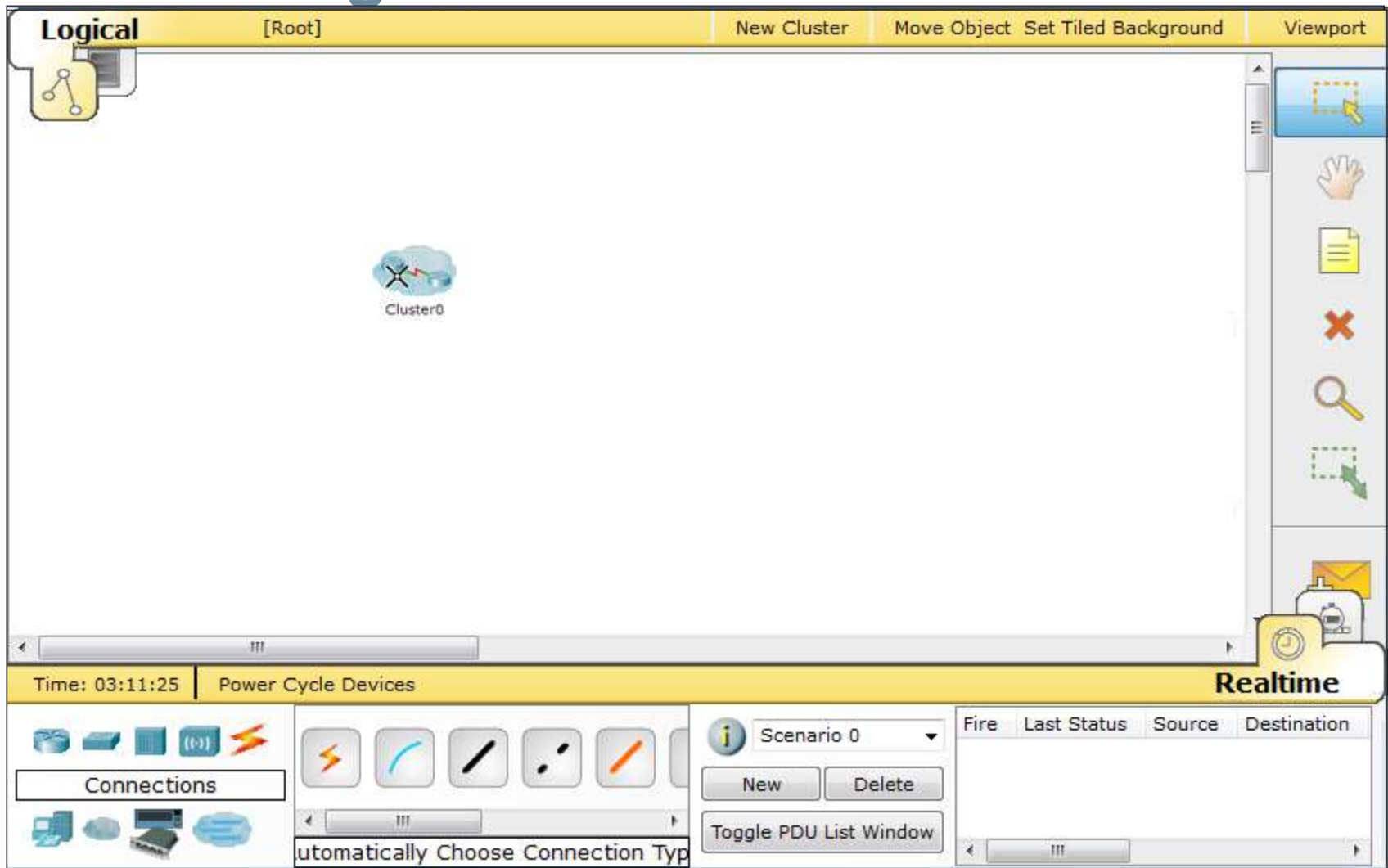
Device Template Manager



Port Label Options and Other Options



Clustering Devices



The screenshot shows the Packet Tracer 5.x interface. The top bar is yellow and contains the following elements:

- Logical** (selected tab)
- [Root]**
- New Cluster** (button)
- Move Object** (button)
- Set Tiled Background** (button)
- Viewport** (button)

The main workspace is white and contains a single object labeled **Cluster0**, which is represented by a blue cloud icon with a red 'X' inside. A toolbar on the right side of the workspace contains the following icons (from top to bottom):

- Selection tool (dashed box with arrow)
- Hand tool (hand icon)
- Document tool (yellow document icon)
- Delete tool (red 'X' icon)
- Zoom tool (magnifying glass icon)
- Move tool (dashed box with arrow)
- Envelope tool (yellow envelope icon)
- Clock tool (yellow clock icon)

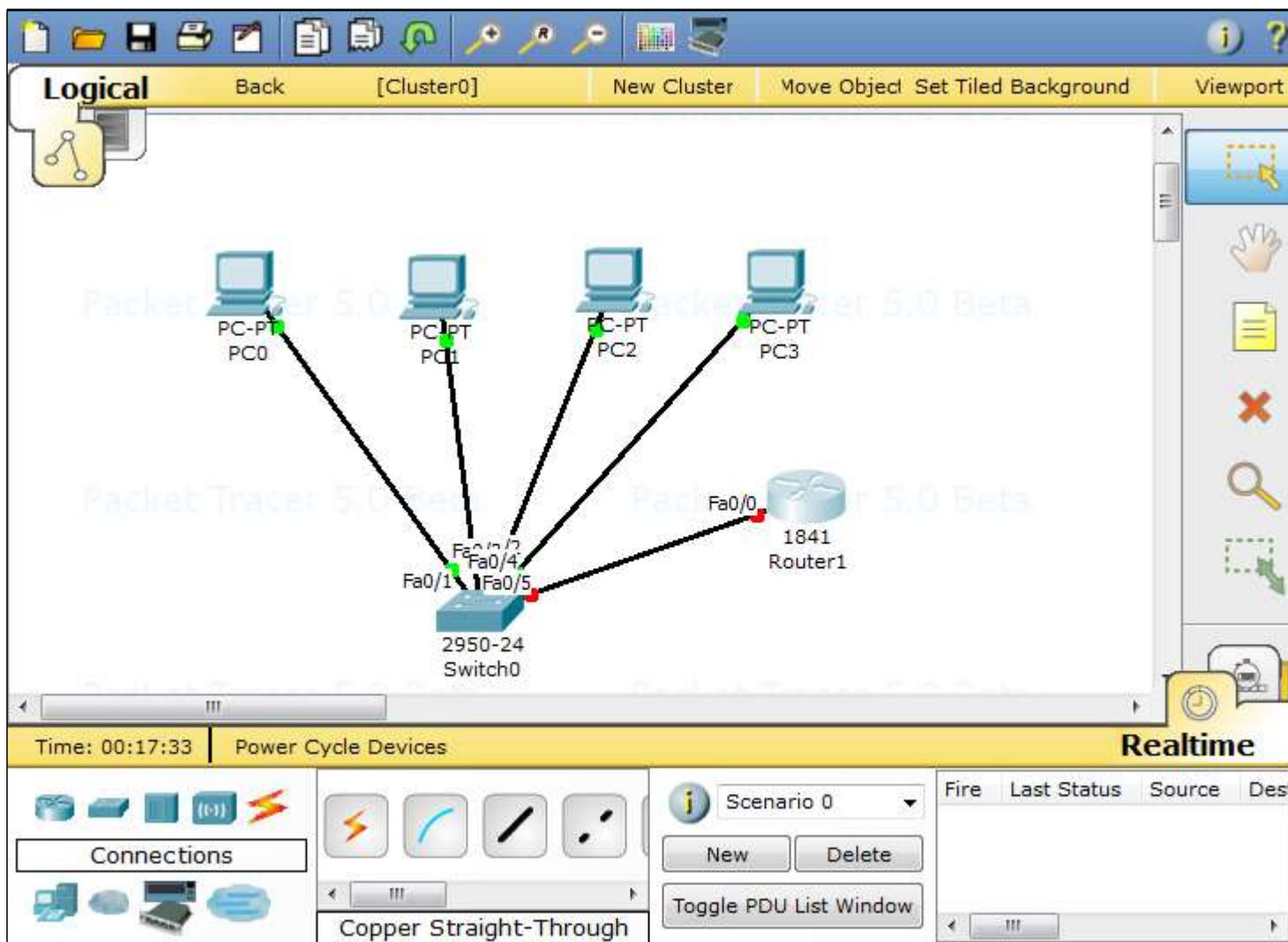
The bottom bar is yellow and contains the following elements:

- Time: 03:11:25**
- Power Cycle Devices** (button)
- Realtime** (button)

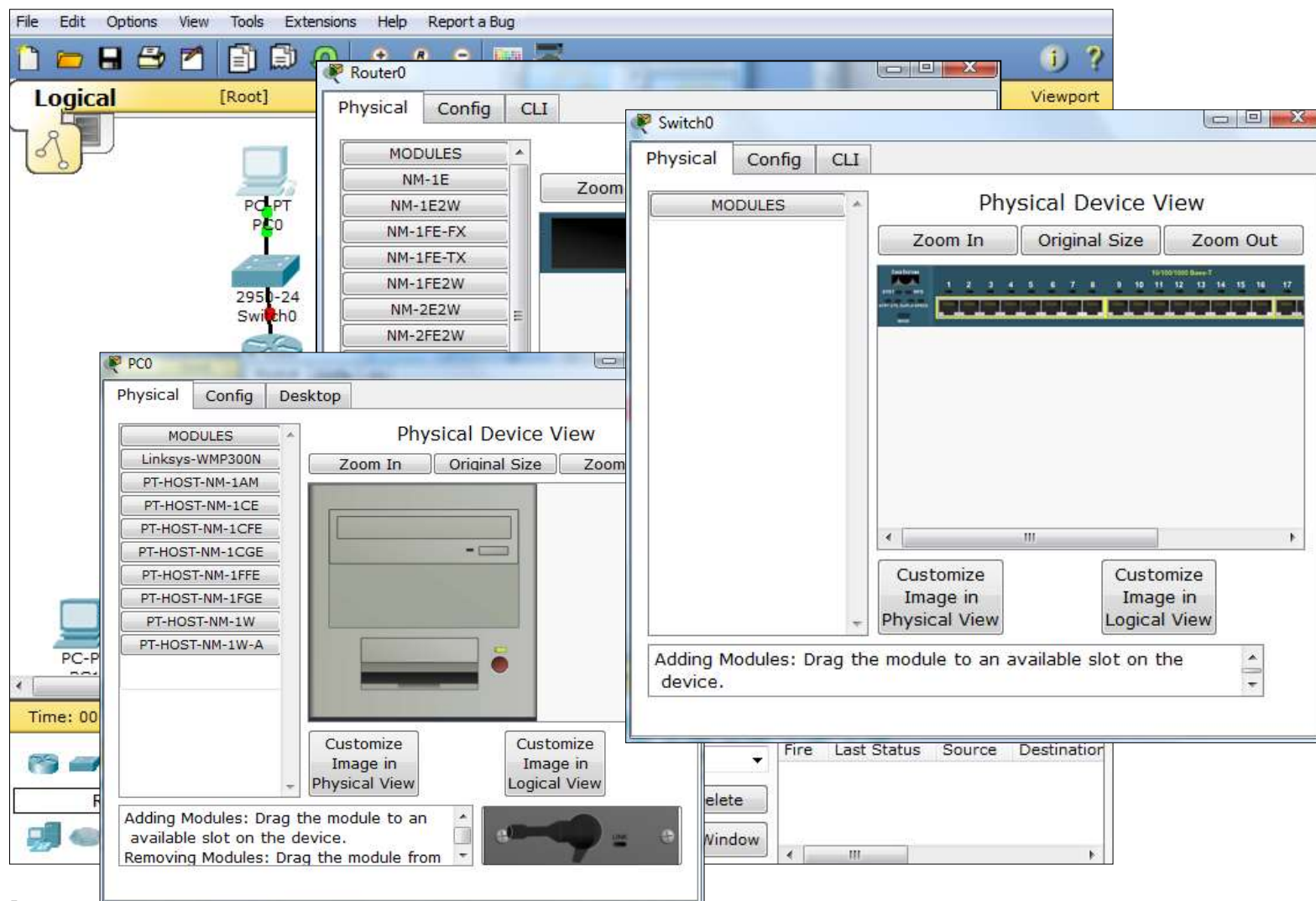
The bottom left panel is titled **Connections** and contains icons for various connection types (cable, serial, fiber, etc.). The bottom right panel is titled **Scenario 0** and contains the following elements:

- New** (button)
- Delete** (button)
- Toggle PDU List Window** (button)
- Fire** (button)
- Last Status** (button)
- Source** (button)
- Destination** (button)

Connect to a Device Within a Cluster



Multiple Device Windows



Where is the Activity Instructions Window?

2 Communicating over the Network
2.2 LANs, WANs, and Internetworks
2.2.4 Network Representations

CCNA Exploration
Network Fundamentals

Cisco Packet Tracer (5.2 Beta 4) - C:\Users\ycarroll\AppData\Local\Temp\pka.pka

File Edit Options View Tools Extensions Help Report a Bug

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

PT Activity: 00:05:30

Activity 2.2.4: Network Representations

Addressing Table:

This Lab does not include an Addressing Table.

Learning Objectives:

- Explore the PT interface
- Locate the key components used to place device symbols in the logical workplace
- Examine the devices that can be placed in the logical workplace

Time Elapsed: 00:05:30 Completion: 0%

Top Check Results Reset Activity 1/1

Time: 00:05:30 Power Cycle Devices

Routers

1841 2620XM 2621XM

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source

Realtime

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Taskbar: Packet Tracer 5.x: Intermediate Session, 2 Firefox, 2 Windows..., 2 Microsof..., Microsoft Po..., Adobe Phot..., Cisco Packet..., PT Activity: 0...

Simulation Mode Basics



What is Simulation Mode?

- In Simulation Mode, 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.
- Nothing "runs" until you play it. When you 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 objects at specific times.

Simulation Mode in Classroom Instruction

- A picture is worth a thousand words...
- Many students are visual learners. Using “packet” icons that travel along graphical topologies allows these students to “see” how the network operates.
- Add to this graphical environment the ability to pause and rewind...

Opening Simulation Mode

The Simulation Panel will open where you can control details of the simulation.

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info

Reset Simulation ☒ Constant Delay Captured to: * (no captures)

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Filters

Visible Events: ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, SSH, ICMPv6, LACP, PAP, IPSec, ISAKMP, ACL Filter, SNMP, TACACS, RADIUS, NTP, SYSLOG, HTTPS

Edit Filters Show All

Time: 00:38:46 Power Cycle Devices Back Auto Capture / P Capture / Forward Event List **Simulation**

Connections

Serial DTE

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination

Adding a Simple PDU

Logical [Root]

2620XM GAD 2620XM BNM

2950-24 Switch0 2950-24 Switch1

PC-PT HostA PC-PT HostB

Time: 0

Connections

Serial DTE

Scenario 0

New Delete

Toggle PDU List Window

Fire In

Visible Events: SSH, ICMPv6, LA, ACL Filter, SNMP, SYSLOG, HTTPS

ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, CDP, ICMP, DHCP, RIP, VTP, DTP, HTTP, SSH, LACP, PAgP, ICMPv6, IPsec, SNMP, NTP, Syslog, HTTPS, Show All/None

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.000	--	HostB	ICMP	

Reset Simulation [x] Constant Delay Captured to: * (no captures)

Play Controls [x] Back

Event List Filters

ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, CDP, ICMP, DHCP, RIP, VTP, DTP, HTTP, SSH, LACP, PAgP, ICMPv6, IPsec, SNMP, NTP, Syslog, HTTPS, Show All/None

Edit Filters

To create a basic ping, click on the Simple PDU tool.

A packet icon will be added to your topology and to the Event List.

Click on the source.

Then click on the destination.

Playing the Simulation

The screenshot shows the Packet Tracer 5.0 Beta interface. On the left, a network diagram is visible with two 2620XM routers (GAD and BHM) connected by a red line. Each router is connected to a 2950-24 switch (Switch0 and Switch1), which are in turn connected to PC-PT HostA and PC-PT HostB respectively. The right side of the interface displays the simulation controls panel. A red box highlights the text: "The simulation will start when you click either **Auto Capture/Play** or **Capture/Forward**." Two red arrows point from this text to the "Auto Capture / Play" and "Capture / Forward" buttons in the "Play Controls" section. The "Event List" section shows a list of visible events including ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, SSH, ICMPv6, LACP, PAgP, IPSec, ISAKMP, ACL Filter, SNMP, TACACS, RADIUS, NTP, SYSLOG, and HTTPS. The "Simulation" tab at the bottom right shows a table with the following data:

Fire	Last Status	Source	Destination	Type
	In Progress	HostB	HostA	ICMP

ARP Before PING!

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.000	--	HostB	ICMP	
	0.000	--	HostB	ARP	

Constant Delay Captured to: * (no captures)

Auto Capture / Play Capture / Forward

Event List Filters

Visible Events: ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, SSH, ICMPv6, LACP, PAgP, IPSec, ISAKMP, ACL Filter, SNMP, TACACS, RADIUS, NTP, SYSLOG, HTTPS

Edit Filters Show All

Time: 00:45:14.105 Power Cycle Devices PLAY Back Auto Capture / Play Capture / Forward Event List Simulation

Connections

Serial DTE

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type

	In Progress	HostB	HostA	ICMP
--	-------------	-------	-------	------

If the destination MAC address is not in the ARP table, an ARP request will be generated.

ARP Tables Before...

Use the Play Controls to play the simulation.

ARP Table for GAD

IP Address	Hardware Address	Interface
192.168.1.1	0000.0C98.E096	FastEthernet0/0

ARP Table for BHM

IP Address	Hardware Address	Interface
192.168.2.1	0005.5E1C.5ACA	FastEthernet0/0

ARP Table for HostA

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for HostB

IP Address	Hardware Address	Interface
------------	------------------	-----------

Event List

(sec)	Last Device	At Device	Type	Info
0.000	--	HostB	ICMP	
0.000	--	HostB	ARP	

Simulation Controls

Reset Simulation ☒ Constant Delay Captured to: * (no captures)

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Filters

Visible Events: ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, SSH, ICMPv6, LACP, PAgP, IPSec, ISAKMP, ACL Filter, SNMP, TACACS, RADIUS, NTP, SYSLOG, HTTPS

Edit Filters Show All

Simulation

Fire	Last Status	Source	Destination	Type
	In Progress	HostB	HostA	ICMP

ARP Tables after...

The screenshot shows the Packet Tracer 5.0 Beta interface. The main workspace displays a network topology with two routers (GAD and BHM) connected to two switches (Switch0 and Switch1), which are connected to two PCs (HostA and HostB). The ARP tables for GAD, BHM, HostA, and HostB are open, showing populated entries. The Event List window shows a list of events, including ARP requests and a failed ICMP packet. The Simulation window shows the failed ICMP packet with a status of 'Failed'.

ARP Table for GAD

IP Address	Hardware Address	Interface
192.168.1.1	0000.0C98.E096	FastEthernet0/0
192.168.1.2	0060.2FCE.4C48	FastEthernet0/0

ARP Table for BHM

IP Address	Hardware Address	Interface
192.168.2.1	0005.5E1C.5ACA	FastEthernet0/0
192.168.2.2	00E0.A329.B9E0	FastEthernet0/0

ARP Table for HostA

IP Address	Hardware Address	Interface
192.168.1.1	0000.0C98.E096	FastEthernet

ARP Table for HostB

IP Address	Hardware Address	Interface
192.168.2.1	0005.5E1C.5ACA	FastEthernet

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.009	Switch0	HostA	ARP	
	0.010	HostA	Switch0	ARP	
	0.011	Switch0	GAD	ARP	

Simulation Window

Fire	Last Status	Source	Destination	Type
Failed	Failed	HostB	HostA	ICMP

The ARP tables are populated.

First ICMP will fail.

Reset and Replay

ARP Table for GAD

IP Address	Hardware Address	Interface
192.168.1.1	0000.0C98.E096	FastEthernet0/0
192.168.1.2	0060.2FCE.4C48	FastEthernet0/0

ARP Table for BHM

IP Address	Hardware Address	Interface
192.168.2.1	0005.5E1C.5ACA	FastEthernet0/0
192.168.2.2	00E0.A329.B9E0	FastEthernet0/0

ARP Table for HostA

IP Address	Hardware Address	Interface
192.168.1.1	0000.0C98.E096	FastEthernet

ARP Table for HostB

IP Address	Hardware Address	Interface
192.168.2.1	0005.5E1C.5ACA	FastEthernet

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.008	GAD	BHM	ICMP	
	0.009	BHM	Switch1	ICMP	
	0.010	Switch1	HostB	ICMP	

Simulation

Fire	Last Status	Source	Destination	Type
	Successful	HostB	HostA	ICMP

Second ICMP will be Successful

Event List

The screenshot shows the Packet Tracer 5.0 Beta interface. On the left is a network topology with two switches (Switch0 and Switch1) connected to two PCs (HostA and HostB). On the right is the 'Event List' window, which displays a table of events. The table has columns: Vis., Time (sec), Last Device, At Device, Type, and Info. The third row is highlighted, showing an ICMP event at 0.010 seconds from Switch1 to HostB. Annotations with red boxes and arrows point to specific elements: 'Time since simulation began' points to the top toolbar; 'Device that sent this packet' points to the 'Last Device' column; 'Device that currently has the packet' points to the 'At Device' column; 'Eye indicates which Event is shown in topology.' points to the eye icon in the 'Vis.' column; 'Click an Info box to show details of the packet at that hop.' points to the 'Info' column; and another 'Click an Info box to show details of the packet at that hop.' points to the 'Info' column of the highlighted row. The bottom status bar shows 'Time: 00:45:14.105' and 'Simulation' mode.

Event List Table:

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.008	GAD	BHM	ICMP	
	0.009	BHM	Switch1	ICMP	
	0.010	Switch1	HostB	ICMP	

Annotations:

- Time since simulation began
- Device that sent this packet
- Device that currently has the packet
- Eye indicates which Event is shown in topology.
- Click an Info box to show details of the packet at that hop.
- Click an Info box to show details of the packet at that hop.

Simulation Controls

Logical [Root]

Packet Tracer 5.0 Beta

PC-PT HostA

PC-PT HostB

Time: 00:45:14.105

Power Cycle Devices

PLAY

Back

Auto Capture / Play

Capture / Forward

Event List

Simulation

Scenario 0

New

Delete

Toggle PDU List Window

Fire

Last Status

Source

Destination

Type

Successful

HostB

HostA

ICMP

Reset Simulation ☒ Constant Delay Captured to: 0.010 s

Play Controls

Back

Auto Capture / Play

Capture / Forward

Event List Filters

0.008 GAD BHM ICMP

0.009 BHM Switch1 ICMP

0.010 Switch1 HostB ICMP

Reset Simulation will clear the Event List so you can start the process over. However, device tables are not cleared. (ARP, MAC, routing, etc.)

A timer at the bottom of the Event List window shows the total time that has elapsed since the beginning of the simulation.

Constant Delay can be turned off so that actual processing delay and propagation delay is added to the simulation.

More Simulation Controls

The screenshot shows the Packet Tracer 5.0 Beta interface. The main workspace displays a network topology with two 2620XM routers (G0 and B0/M) connected by a red line. Below the routers are two PC-PT hosts (HostA and HostB). The interface includes a top toolbar with icons for file operations, a menu bar with options like 'Logical', 'New Cluster', 'Move Object', 'Set Tiled Background', and 'Viewport', and a right-hand toolbar with navigation and editing tools. At the bottom, there is a 'Simulation' panel with a 'Time' display (00:45:24.714), a 'Power Cycle Devices' button, 'PLAY CONTROLS' (Back, Auto Capture / Play, Capture / Forward), and an 'Event List' button. Below the simulation panel are sections for 'Connections', 'Serial DTE', and a 'Scenario 0' dropdown with 'New' and 'Delete' buttons, and a 'Toggle PDU List Window' button.

3. Power Cycle Devices is a global power cycle feature. Make sure your configs are saved!

2. Play Controls are still available.

1. You can open and close the **Simulation Panel** by clicking the “Event List” button.

PDU Information



What is PDU Information?

- The PDU Information window allows you to “open” a packet and look inside to see how it is being processed at each layer of the OSI Model.
- It’s like a very simple sniffer, presenting CCNA level information.

PDU Information

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Event List

Vis.	Time (sec)	Last Device	At Device	Type	Info
	0.007	Switch0	GAD	ICMP	
	0.008	GAD	BHM	ICMP	
	0.009	BHM	Switch1	ICMP	

Delay Captured to: * 0.010 s

Visible Events: ARP, CDP, DHCP, EIGRP, ICMP, RIP, TCP, UDP, VTP, STP, OSPF, DTP, Telnet, TFTP, HTTP, DNS, SSH, ICMPv6, LACP, PAgP, IPSec, ISAKMP, ACL Filter, SNMP, TACACS, RADIUS, NTP, SYSLOG, HTTPS

Edit Filters Show All

Time: 00:45:14.105 Power Cycle Devices PLAY Back Auto Capture / Play Capture / Forward Event List Simulation

Connections

Serial DTE

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type

	Successful	HostB	HostA	ICMP
--	------------	-------	-------	------

You can either click on the Info box for a specific PDU or click on the PDU in the topology window to bring up the **PDU Information** window.

OSI Model

The **OSI Model** shows the de-encapsulation and encapsulation process.

Logical [Root]

PDU Information at Device: GAD

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: GAD
Source: HostB
Destination: HostA

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2	Layer3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2
Layer2: Ethernet II Header 0060.2FCE.4C48 >> 0000.0C98.E096	Layer2: HDLC Frame HDLC
Layer1: Port FastEthernet0/0	Layer1: Port(s): Serial0/0

1. FastEthernet0/0 receives the frame.

Clicking on a layer will display detailed information about decisions made at that layer.

At Device Type Info

At Device	Type	Info
GAD	ICMP	
BHM	ICMP	
Switch1	ICMP	

Delay Captured to: 0.010 s

/ Play Capture / Forward

EIGRP, ICMP, RIP, TCP, UDP, TP, Telnet, TFTP, HTTP, DNS, CP, PAP, IPSec, ISAKMP, TACACS, RADIUS, NTP,

Show All

Event List Simulation

Scenario 0

New Delete

Toggle PDU List Window

Serial DTE

Time Last Status Source Destination Type

Time	Last Status	Source	Destination	Type
	Successful	HostB	HostA	ICMP

How can I use the OSI Model Tab?

- Demonstrate how switches process only to layer 2 (no layer 3 switches in PT) and routers process to layer 3.
- Show what happens to a packet with no ARP table entry.
- Show encapsulation and decapsulation to accommodate different interfaces. An Ethernet frame is changed to an HDLC frame when going from an Ethernet interface to a Serial interface.
- Show routing decisions. When a packet is at a router, the router will make a routing decision about the packet...either forwarding it or dropping based on routing table entries.
- Show operation of an ACL.
- Show operation of NAT.
- Many other ways!

Packet at Layer 2 Device

- Here the packet is at a layer 2 switch.
- Notice that the packet is only processed up through Layer 2 of the OSI Model.

PDU Information at Device: Switch0

OSI Model

Inbound PDU Details

Outbound PDU Details

At Device: Switch0

Source: HostB

Destination: HostA

In Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer 2: Ethernet II Header
0060.2FCE.4C48 >> 0000.0C98.E096

Layer 1: Port FastEthernet0/2

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer 2: Ethernet II Header
0060.2FCE.4C48 >> 0000.0C98.E096

Layer 1: Port(s): FastEthernet0/1

1. The frame source MAC address was found in the MAC table of Switch.

2. This is a unicast frame. Switch looks up its MAC table for the destination MAC address.

Challenge Me

<< Previous Layer

Next Layer >>

No ARP Table Entry

- In this example, the router does not have an ARP Table entry for the next hop.
- An ARP is generated.
- The packet is dropped.

PDU Information at Device: GAD

OSI Model

Inbound PDU Details

Outbound PDU Details

At Device: GAD

Source: HostB

Destination: HostA

In Layers

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.2.2, Dest. IP: 192.168.1.2

Layer 2: HDLC Frame HDLC

Layer 1: Port Serial0/0

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.2.2, Dest. IP: 192.168.1.2

Layer 2:

Layer1

1. The next-hop IP address is unicast. The ARP process looks it up in the ARP table.

2. The next-hop IP address is not in the ARP table. The ARP process tries to send an ARP request for that IP address and drops this packet.

Challenge Me

<< Previous Layer

Next Layer >>

Encapsulation

- In this example, a packet comes in on an Ethernet interface in an Ethernet II Header.
- The device decapsulates the packet for processing.
- The device then encapsulates the packet into the appropriate frame to be sent out the Serial interface.

PDU Information at Device: GAD

OSI Model

Inbound PDU Details

Outbound PDU Details

At Device: GAD

Source: HostB

Destination: HostA

In Layers

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2

Layer 2: Ethernet II Header 0060.2FCE.4C48 >> 0000.0C98.E096

Layer 1: Port FastEthernet0/0

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2

Layer 2: HDLC Frame HDLC

Layer 1: Port(s): Serial0/0

1. The device encapsulates the packet into an HDLC frame.

Challenge Me

<< Previous Layer

Next Layer >>

Routing

- Since this device is a router, it makes a routing decision on the packet.
- From the highlighted layer, we see that the router finds an entry for this destination in the routing table.

PDU Information at Device: GAD

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: GAD
Source: HostB
Destination: HostA

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2	Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.2.2
Layer 2: Ethernet II Header 0060.2FCE.4C48 >> 0000.0C98.E096	Layer 2: HDLC Frame HDLC
Layer 1: Port FastEthernet0/0	Layer 1: Port(s): Serial0/0

1. The routing table finds a routing entry to the destination IP address.
2. The router decrements the TTL on the packet.

Challenge Me << Previous Layer Next Layer >>

NAT

- In this example, the router is configured with NAT.
- A packet is processed going from an inside to an outside interface.
- There is no entry in the NAT table for this address.
- The router creates an entry and processes the packet.

PDU Information at Device: Houston

OSI Model
Inbound PDU Details
Outbound PDU Details

At Device: Houston
Source: PC4
Destination: 20.20.20.2

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 192.168.1.35, Dest. IP: 20.20.20.2
Layer 2: Ethernet II Header 0090.2B0C.DE93 >> 0001.C955.B754
Layer 1: Port FastEthernet0/1

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 195.56.5.9, Dest. IP: 20.20.20.2
Layer 2: HDLC Frame HDLC
Layer 1: Port(s): Serial0/1

1. The routing table finds a routing entry to the destination IP address.
2. The router decrements the TTL on the packet.
3. The packet is going from an inside to an outside network. The router looks up its NAT table for necessary translations.
4. The NAT table does not have existing translations with the inside local address and port. It goes through the inside source lists for necessary translations.
5. An inside source entry is created from a list. The new entry is added to the NAT table.
6. The NAT table has a matched entry for this packet. It replaces the inside local address and port with the global ones.

Challenge Me
<< Previous Layer
Next Layer >>

ACLs

- In this example, an ACL is configured on an outgoing port of the router.
- The packet is checked against the ACL.
- The packet matches a “permit” statement in the ACL and is permitted.
- The router processes the packet.

PDU Information at Device: Houston

OSI Model

Inbound PDU Details

Outbound PDU Details

At Device: Houston

Source: PC3

Destination: Server1

In Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.1.34, Dest. IP: 192.168.1.98

Layer 2: Ethernet II Header 0060.5C19.E824 >> 0001.C955.B754

Layer 1: Port FastEthernet0/1

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.1.34, Dest. IP: 192.168.1.98

Layer 2: Ethernet II Header 0050.0FCD.0B9E >> 0003.E4BD.0670

Layer 1: Port(s): FastEthernet0/0

- The routing table finds a routing entry to the destination IP address.
- The destination network is directly connected. The router sets destination as the next-hop.
- The router decrements the TTL on the packet.
- The outgoing port has an outbound traffic access-list with an ID of HFW1. The router checks the packet against the access-list.
- The packet matches the criteria of the following statement: permit ip host 192.168.1.34 host 192.168.1.98. The packet is permitted.

Challenge Me

<< Previous Layer

Next Layer >>

Inbound/Outbound PDU Window

The screenshot displays the Packet Tracer 5.0 interface. On the left, a network topology is shown with a 2620XM GAD router connected to a 2950-24 Switch, which is connected to a PC-PT HostA. The main window shows the 'PDU Information at Device: BHM' window, specifically the 'Inbound PDU Details' tab. The PDU is an ARP request. The 'Ethernet II' section shows the preamble, destination MAC (FFFF.FFFF.FFFF), source MAC (00E0.A329.B9E0), type (0x806), and data (variable length). The 'ARP' section shows the hardware type (0x1), protocol type (0x800), HLEN (0x6), PLEN (0x4), and opcode (0x1). The source MAC is 00E0.A329.B9E0 (48 bits) and the source IP is 192.168.2.2 (32 bits). The target MAC is 0000.0000.0000 (48 bits) and the target IP is 192.168.2.1 (32 bits). The right sidebar shows a list of protocols (ICMP, ICMP, ICMP) and a capture time of 0.010 s. The bottom status bar shows the time as 00:45:14.105 and the power cycle device as PC-PT HostA.

PDU Information at Device: BHM

OSI Model | Inbound PDU Details | Outbound PDU Details

PDU Formats

Ethernet II

0	4	8	14	19	Bytes
PREAMBLE: 101010...1011		DEST MAC: FFFF.FFFF.FFFF		SRC MAC: 00E0.A329.B9E0	
TYPE: 0x806		DATA (VARIABLE LENGTH)		FCS: 0x0	

ARP

0	8	16	31	Bits
HARDWARE TYPE: 0x1		PROTOCOL TYPE: 0x800		
HLEN: 0x6		PLEN: 0x4		OPCODE: 0x1
SOURCE MAC: 00E0.A329.B9E0 (48 bits)				
SOURCE IP (32 bits) ==> 192.168.2.2				
TARGET MAC: 0000.0000.0000 (48 bits)				
TARGET IP: 192.168.2.1 (32 bits)				

Time: 00:45:14.105 | Power Cycle Device: PC-PT HostA

Connections

Event List | **Simulation**

Source	Destination	Type
HostB	HostA	ICMP

Inbound/Outbound PDU Details

PDU Information at Device: Houston

OSI Model | Inbound PDU Details | Outbound PDU Details

PDU Formats

HDLC

0	8	16	32	32+x	40+x	48+x	Bits
FLG:	ADR:	CONTROL:	DATA: (VARIABLE LENGTH)	FCS:	FLG:		
0111 1110	0x8f	0x0		0x0	0111 1110		

IP

0	4	8	16	19	31	Bits
4	IHL	DSCP: 0x0	TL			
ID: 0x0		0x0	FRAG OFFSET: 0x0			
TTL: 31		PRO: 0x1	CHKSUM			
SRC IP: 20.20.20.2						
DST IP: 195.56.5.9						
OPT: 0x0						0x0
DATA (VARIABLE LENGTH)						

ICMP

0	8	16	31	Bits
TYPE: 0x0		CODE: 0x0	CHECKSUM	

PDU Information at Device: Houston

OSI Model | Inbound PDU Details | Outbound PDU Details

PDU Formats

Ethernet II

0	4	8	14	19	Bytes
PREAMBLE: 101010...1011		DEST MAC: 0090.2B0C.DE93		SRC MAC: 0001.C955.B754	
TYPE: 0x800		DATA (VARIABLE LENGTH)		FCS: 0x0	

IP

0	4	8	16	19	31	Bits
4	IHL	DSCP: 0x0	TL			
ID: 0x0		0x0	FRAG OFFSET: 0x0			
TTL: 30		PRO: 0x1	CHKSUM			
SRC IP: 20.20.20.2						
DST IP: 192.168.1.35						
OPT: 0x0						0x0
DATA (VARIABLE LENGTH)						

ICMP

0	8	16	31	Bits
TYPE: 0x0		CODE: 0x0	CHECKSUM	

Complex PDUs



Why would I want a Complex PDU?

- Creating a Complex PDU allows you to control parameters of the packet such as:
 - Protocol
 - Source and Destination IP
 - Port
 - TTL
 - Sequence number
- This granular control allows you to test packets against ACLs.
- This also allows you to test connectivity to specific interfaces on a device.

Creating a Complex PDU

You can choose the outgoing port.

Select a wide variety of protocols.

Type the destination IP or click on the destination device to fill in the IP address.

Configure TTL and port numbers.

Choose to send one packet or send a packet at configured intervals.

Create Complex PDU

Source Settings

Source Device: HostB

Outgoing Port: FastEthernet ☒ Auto Select Port

PDU Settings

Select Application: HTTP

Destination IP Address: 192.168.1.2

Source IP Address:

TTL: 32

TOS:

Source Port: 80

Destination Port: 80

Size: 0

Simulation Settings

☒ One Shot Time: 0 Seconds

☐ Periodic Interval: Seconds

Create PDU

Click on the **Complex PDU** tool to configure more specifics for a packet.

Editing a PDU

Create Complex PDU

Source Settings
Source Device: HostB
Outgoing Port: FastEthernet ☒ Auto Select Port

PDU Settings
Select Application: PING
Destination IP Address: 192.168.1.2
TTL: 32
Sequence Number: 969

Simulation Settings
☒ One Shot Time: 0 Seconds
☐ Periodic Interval: Seconds

Apply Changes

Make any changes and click Apply Changes to save.

Vis.	Time (s)	Last Device	At Device	Type	Info
	0.000	--	HostB	ICMP	
	0.000	--	HostA	TCP	

Location	Type	Color	Time (sec)	Periodic	Num	Edit	Delete
8.2.2	ICMP		0.000	N	0	(edit)	(delete)
8.2.2	TCP		0.000	N	1	(edit)	(delete)

Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List **Simulation**

Connections

Copper Straight-through

Scenario 0

New Delete

Toggle PDU List Window

Managing Your Workspace

The screenshot displays the Packet Tracer 5.x interface. The main workspace shows a network topology with two 2620XM routers (GAD and BQM) connected by a red line. Below each router is a 2950-24 switch (Switch0 and Switch1), and at the bottom are two PC-PT hosts (HostA and HostB). The interface includes a top toolbar with icons for file operations, a 'Logical' tab, and a 'Simulation Panel' on the right. The 'Simulation Panel' contains an 'Event List' table, 'Play Controls' (Back, Auto Capture / Play, Capture / Forward), and 'Event List Filters' (Visible Events: ICMP, TCP, HTTP). The bottom status bar shows 'Power Cycle Devices', 'PLAY CONTROLS', 'Connections', and 'Copper Straight-through'.

Vis.	Time (s)	Last Device	At Device	Type
	0.000	--	HostB	ICMP
	0.000	--	HostA	TCP

Fire	Last Status	Source	Destination	Type	Color
	In Progress	HostB	HostA	ICMP	Yellow
	In Progress	HostA	192.168.2.2	TCP	Purple

Using Command Prompt in Simulation

The screenshot displays the Cisco Packet Tracer interface. On the left, a network topology is shown with two 2620XM routers (GAD and BHM) connected by a red line. Each router is connected to a 2950-24 switch (Switch0 and Switch1), which are in turn connected to a PC. A 'Logical' tab is selected at the top. In the center, a 'HostB' window is open, showing the 'Desktop' tab with a 'Command Prompt' window. The Command Prompt displays the results of a ping command to 192.168.1.2, showing 4 packets sent, 4 received, and 0% loss. On the right, a 'Simulation Panel' is docked, showing an 'Event List' table with ICMP events for HostB, Switch1, BHM, GAD, and Switch0. The bottom of the interface shows a 'Connections' panel with a 'Copper Straight-through' connection selected, and a 'Simulation' panel with a 'Scenario 0' dropdown and buttons for 'New', 'Delete', and 'Toggle PDU List Window'.

Once undocked, the panel can be moved so that you can see the pings in both the **Command Prompt** window as well as the **Simulation Panel**.

PDU List Window

Double click **Fire** to add a PDU to the Event List.

You can change the color of a PDU by double clicking on its color box.

You can Edit or Delete a PDU by double clicking here.

Vis.	Time (s)	Last Device	At Device	Type	Info
	0.000	--	HostA	ICMP	

Fire	Last Status	Source	Destination	Type	Color	Time (sec)	Periodic	Num	Edit	Delete
	In Progress	HostA	HostB	ICMP		0.000	N	0	(edit)	(delete)

Challenge Mode



Challenge Mode

- Students can quiz themselves on the encapsulation process by entering Challenge Mode.
- The **Challenge Me** button from the OSI Model tab of the PDU Info window starts Challenge Mode.
- The layer details are hidden, and the information window is replaced by a question window that asks what the device does to a PDU on a given layer.
- Students select from a multiple-choice list. If they answer correctly, the details for that layer are shown and the question window advances to the next layer.
- The **Hint** button provides hints.

Challenge Mode

The screenshot shows the Packet Tracer 5.x interface in Challenge Mode. The main window displays a network diagram with a 2620XM router (GAD) and a PC (HostA). The 'PDU Information at Device: GAD' window is open, showing the OSI Model and Inbound PDU Details. The 'Challenge Question' window is also open, asking 'What is the device decision in this layer?' with options: De-encapsulate, Transfer, Accept, Queue, and Drop. The 'Layer 1' is highlighted in the 'In Layers' list. The 'Challenge Me' button is highlighted in the bottom toolbar. The 'Hint' button is also visible. The 'Next Layer >>' button is visible. The 'Event List' and 'Simulation' windows are visible on the right side of the interface.

Annotations:

- Float over answers for more details. (Points to the 'Challenge Question' window)
- Click on **Challenge Me** to answer the question, "What is the device decision in this layer?" (Points to the 'Challenge Me' button)
- Click **Hint** to get help. (Points to the 'Hint' button)
- Click **Next Layer** to check answer. (Points to the 'Next Layer >>' button)

Scenarios



The screenshot displays the Packet Tracer software interface. On the left, a network diagram is visible with two 2620XM routers (GAD and BLM) connected by a red line, and two 2950-2 switches (Switch0 and Switch1) connected to the routers. The top toolbar includes buttons for 'New Cluster', 'Move Object', 'Set Tiled Background', and 'Viewport'. The right side features an 'Event List' panel with a table header: 'Vis.', 'Time (s)', 'Last Device', 'At Device', 'Type', and 'Info'. Below the table are buttons for 'Reset Simulation', 'Constant Delay' (checked), and 'Captured to: (no captures)'. The bottom toolbar shows 'Power Cycle Devices', 'PLAY CONTROLS:', 'Back', 'Auto Capture / Play', 'Capture / Forward', and a dropdown menu for 'Scenario 0'. The 'Scenario 0' dropdown is highlighted by a red box with an arrow pointing to it from the text 'Highlight the Scenario name to type a new name.' Below the dropdown are 'New' and 'Delete' buttons, with the 'New' button highlighted by another red box and arrow from the text 'Click the New button to create a new scenario.' A third red box with an arrow points from the text 'You will get an empty Event List for each new scenario you create.' to the empty Event List table.

You will get an empty Event List for each new scenario you create.

Click the New button to create a new scenario.

Highlight the Scenario name to type a new name.

Adding a Scenario Description

Scenario 0 Description:

This scenario uses simple pings to test connectivity between HostA and HostB.

Play Controls:

Back Auto Capture / Play Capture / Forward

Event List Filters:

Visible Events: ARP, ICMP, TCP, VTP, STP, OSPF, DTP, TELNET, TFTP, HTTP, DNS

Edit Filters Show All

Simulation

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Col

Click on the **i** to add a description for this scenario.

Interested in More Help?

Packet Tracer 5.2

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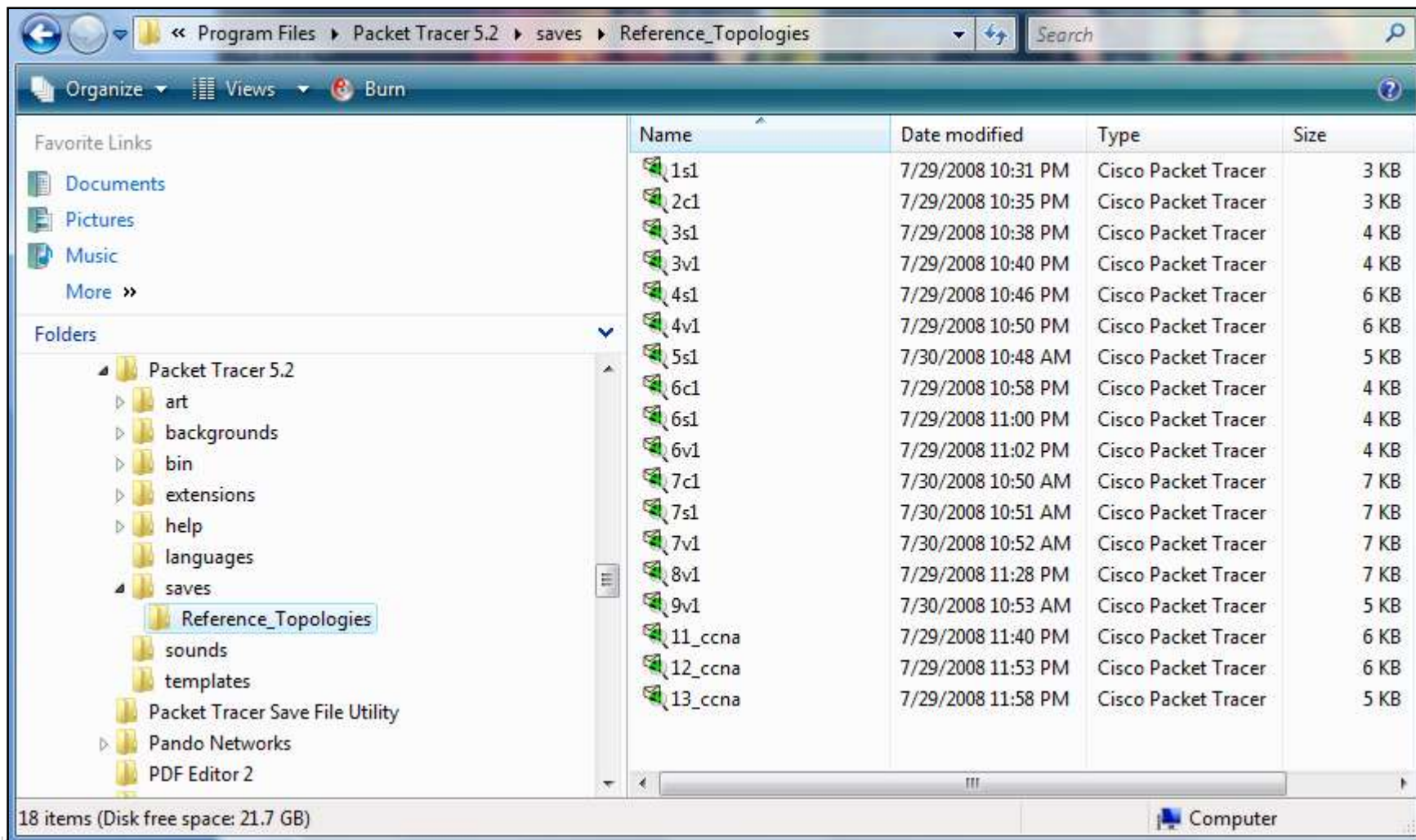


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Using the Help Files

The help files are designed to familiarize users with the Packet Tracer 5.2 interface, functions, and features. Although the help files may be used as a reference guide, the pages are meant to be read in order (especially the sections presented at the beginning). Annotated screenshots are used to aid your understanding. Important notes or tips are presented in tip boxes like the following:

Reference Topologies



Program Files ► Packet Tracer 5.2 ► saves ► Reference_Topologies

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Folders: Packet Tracer 5.2 (art, backgrounds, bin, extensions, help, languages, saves, Reference_Topologies, sounds, templates, Packet Tracer Save File Utility, Pando Networks, PDF Editor 2)

Name	Date modified	Type	Size
1s1	7/29/2008 10:31 PM	Cisco Packet Tracer	3 KB
2c1	7/29/2008 10:35 PM	Cisco Packet Tracer	3 KB
3s1	7/29/2008 10:38 PM	Cisco Packet Tracer	4 KB
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4s1	7/29/2008 10:46 PM	Cisco Packet Tracer	6 KB
4v1	7/29/2008 10:50 PM	Cisco Packet Tracer	6 KB
5s1	7/30/2008 10:48 AM	Cisco Packet Tracer	5 KB
6c1	7/29/2008 10:58 PM	Cisco Packet Tracer	4 KB
6s1	7/29/2008 11:00 PM	Cisco Packet Tracer	4 KB
6v1	7/29/2008 11:02 PM	Cisco Packet Tracer	4 KB
7c1	7/30/2008 10:50 AM	Cisco Packet Tracer	7 KB
7s1	7/30/2008 10:51 AM	Cisco Packet Tracer	7 KB
7v1	7/30/2008 10:52 AM	Cisco Packet Tracer	7 KB
8v1	7/29/2008 11:28 PM	Cisco Packet Tracer	7 KB
9v1	7/30/2008 10:53 AM	Cisco Packet Tracer	5 KB
11_ccna	7/29/2008 11:40 PM	Cisco Packet Tracer	6 KB
12_ccna	7/29/2008 11:53 PM	Cisco Packet Tracer	6 KB
13_ccna	7/29/2008 11:58 PM	Cisco Packet Tracer	5 KB

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Computer

Q and A



