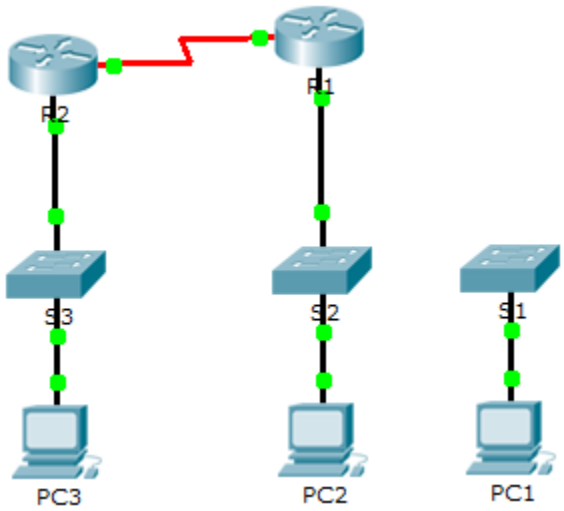
Packet Tracer – Investigating Convergence (Instructor Version)

Instructor Note: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	209.165.0.1	255.255.255.0	N/A
	G0/1	64.100.0.1	255.0.0.0	N/A
	S0/0/0	192.168.1.2	255.255.255.0	N/A
R2	G0/0	10.0.0.1	255.0.0.0	N/A
	S0/0/0	192.168.1.1	255.255.255.0	N/A
PC1	NIC	64.100.0.2	255.0.0.0	64.100.0.1
PC2	NIC	209.165.0.2	255.255.255.0	209.165.0.1
PC3	NIC	10.0.0.2	255.0.0.0	10.0.0.1

Objectives

Part 1: View the Routing Table of a Converged Network

Part 2: Add a New LAN to the Topology

Part 3: Watch the Network Converge

Background

This activity will help you identify important information in routing tables and witness the process of network convergence.

Part 1: View the Routing Table of a Converged Network

Step 1: Use show commands and interpret the output.

a. Show the directly connected networks of **R1**. How many routes are connected to **R1**? 2

```
R1# show ip route connected
```

b. Show the running configuration of **R1**. What routing protocol is in use? RIP

c. Are the IP addresses in the configuration advertised by RIP the same as those that are connected? Yes

d. Are these IP addresses assignable, network, or broadcast? Network

e. Show the networks of **R1** learned through RIP. How many routes are there? 1

```
R1# show ip route rip
```

f. Show all of the networks that **R1** has in its routing table. What do the leading letters represent?

C=Connected, R=RIP L=local

```
R1# show ip route
```

g. Repeat step 1, a to f on **R2**. Compare the output of the two routers.

Step 2: Verify the state of the topology.

a. Ping **PC3** from **PC2**. The ping should be successful.

b. Show the interface status on **R2**. Two interfaces should have assigned addresses. Each address corresponds to a connected network.

```
R2# show ip interface brief
```

c. Show the interface status on **R1**. How many interfaces have assigned addresses? 3

```
R1# show ip interface brief
```

Part 2: Add a New LAN to the Topology

Step 1: Add an Ethernet cable.

a. Connect the correct Ethernet cable from **S1** to the appropriate port on **R1**.

b. Ping from **PC1** to **PC2** after the affected **S1** port turns green. Was the ping successful? Yes

c. Ping from **PC1** to **PC3**. Was the ping successful? Why?

No, R1 is not advertising the 64.0.0.0 network to R2 which was unable to return packets.

Step 2: Configure a route.

a. Switch from Realtime mode to Simulation mode.

b. Enter a new route on **R1** for the 64.0.0.0 network.

```
R1(config)# router rip
R1(config-router)# network 64.0.0.0
```

c. Examine the PDUs leaving **R1**. What type are they? RIPv1

Part 3: Watch the Network Converge

Step 1: Use debug commands.

a. Enable debugging on **R2**.

```
R2# debug ip rip
R2# debug ip routing
```

b. For reference, show the routing table of **R2** as in step 1f.

c. Click **Capture / Forward** from simulation mode. What notification appeared in the terminal of **R2**?

There was a RIPv1 update from R1.

d. According to the debugging output, how many hops away from R2 is 64.0.0.0? One hop

e. What interface does **R2** send packets destined for the 64.0.0.0 network? S0/0/0

f. Show the routing table of **R2**. Record the new entry.

R 64.0.0.0/8 [120/1] via 192.168.1.2, 00:00:00, Serial0/0/0

Step 2: Verify the state of the topology.

Ping from **PC1** to **PC3**. Was the ping successful? Why?

Yes, R1 advertised the 64.0.0.0 network to R2 which was able to return packets.

Suggested Scoring Rubric

Activity Section	Question Location	Possible Points	Earned Points
Part 1: View the Routing Table of a Converged Network.	Step 1-a	6	
	Step 1-b	6	
	Step 1-c	6	
	Step 1-d	6	
	Step 1-e	6	
	Step 1-f	6	
	Step 2-c	6	
	Part 1 Total	**42**	
Part 2: Add a New LAN to the Topology	Step 1-b	6	
	Step 1-c	6	
	Step 2-c	6	
	Part 2 Total	**18**	
Part 3: Watch the Network Converge	Step 1-c	6	
	Step 1-d	6	
	Step 1-e	6	
	Step 1-f	6	
	Step 2-a	6	
	Part 3 Total	**30**	
	Packet Tracer Score	**10**	
	Total Score	**100**	