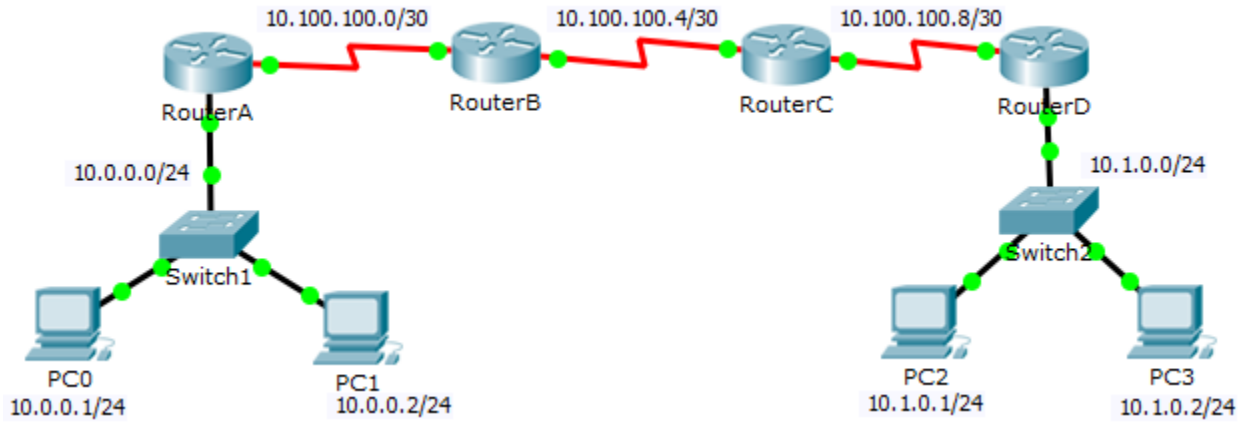
Packet Tracer - Testing Connectivity with Traceroute

Topology



Objectives

Part 1: Test End-to-End Connectivity with the tracert Command

Part 2: Compare to the traceroute Command on a Router

Background

This activity is designed to help you troubleshoot network connectivity issues using commands to trace the route from source to destination. You are required to examine the output of **tracert** (the Windows command) and **traceroute** (the IOS command) as packets traverse the network and determine the cause of a network issue. After the issue is corrected, use the **tracert** and **traceroute** commands to verify the completion.

Part 1: Test End-to-End Connectivity with the tracert Command

Step 1: Send a ping from one end of the network to the other end.

Click **PC1** and open the **Command Prompt**. Ping **PC3** at **10.1.0.2**. What message is displayed as a result of the ping?

Destination host unreachable

Step 2: Trace the route from PC1 to determine where in the path connectivity fails.

a. From the **Command Prompt** of **PC1**, enter the **tracert 10.1.0.2** command.

b. When you receive the **Request timed out** message, press **Ctrl**+**C**. What was the first IP address listed in the **tracert** output?

10.0.0.254, which is the gateway of the PC

c. Observe the results of the **tracert** command. What is the last address reached with the **tracert** command?

10.100.100.6

Step 3: Correct the network problem.

a. Compare the last address reached with the **tracert** command with the network addresses listed on the topology. The furthest device from the host 10.0.0.2 with an address in the network range found is the point of failure. What devices have addresses configured for the network where the failure occurred?

RouterB and RouterC

b. Click **RouterC** and then the **CLI** tab. What is the status of the interfaces?

They seem to be up and active

c. Compare the IP addresses on the interfaces with the network addresses on the topology. Does there appear to be anything extraordinary?

The Serial 0/0/0 interface has an incorrect IP address

d. Make the necessary changes to restore connectivity; however, do not change the subnets. What is solution?

Change the IP address to 10.100.100.9/30

Step 4: Verify that end-to-end connectivity is established.

a. From the **PC1 Command Prompt**, enter the **tracert 10.1.0.2** command.

b. Observe the output from the **tracert** command. Was the command successful? Yes

Part 2: Compare to the traceroute Command on a Router

a. Click **RouterA** and then the **CLI** tab.

b. Enter the **traceroute 10.1.0.2** command. Did the command complete successfully? Yes

c. Compare the output from the router **traceroute** command with the PC **tracert** command. What is noticeably different about the list of addresses returned?

The router has one less IP address because it will be using RouterB as the next device along the path

Part 3: Using Extended Traceroute

In addition to **traceroute,** Cisco IOS also includes extended traceroute. Extended traceroute allows the administrator to adjust minor traceroute operation parameters by asking simple questions.

As part of the verification process, use extended traceroute on **RouterA** to increase the number of ICMP packets traceroute sends to each hop.

Note: Windows **tracert** also allows the user to adjust a few aspects through the use of command line options.

a. Click **RouterA** and then the **CLI** tab.

b. Enter the **traceroute** and press **ENTER**. Notice that just the traceroute command should be entered.

c. Answer the questions asked by extended traceroute as follows. Extended **traceroute** should run right after the last question is answered.

```
Protocol [ip]: ip
Target IP address: 10.1.0.2
Source address: 10.100.100.1
Numeric display [n]: n
Timeout in seconds [3]: 3
Probe count [3]: 5
```

```
Minimum Time to Live [1]: 1
Maximum Time to Live [30]: 30
```

Note: the value displayed in brackets is the default value and will be used by **traceroute** if no value is entered. Simply press **ENTER** to use the default value.

How many questions were answered with non-default values? What was the new value?

The normal value is 3 but the new value given was 5

How many ICMP packets were sent by **RouterA**?

5

Note: Probe count specifies the number of ICMP packets sent to each hop by **traceroute**. A higher number of probes allows for a more accurate average round trip time for the packets.

d. Still on **RouterA**, run extended **traceroute** again but this time change the timeout value to 7 seconds.

What happened? How does the different timeout value affect **traceroute**?

Traceroute is told by the timeout parameter how long it must wait for a response before concluding that the hop is unreachable, the 3 second default value

Can you think of a use for the timeout parameter?

To ensure that traceroute waits a sufficient amount of time before declaring a hop unreachable, the timeout value can be changed if the path is too congested but still functional

Suggested Scoring Rubric

Activity Section	Question Location	Possible Points	Earned Points
Part 1: Test End-to-End Connectivity with the **tracert** Command	Step 1	10	
	Step 2b	10	
	Step 2c	10	
	Step 3a	10	
	Step 3c	10	
	Step 3d	5	
	Step 3e	5	
	Step 4b	10	
	Part 1 Total	**80**	
Part 2: Compare to the **traceroute** Command on a Router	a	2	
	b	3	
	c	5	
	Part 2 Total	**10**	
Part 3: Extended Traceroute	a	2	
	b	3	
	c	2	
	d	3	
	Part 3 Total	**10**	
	Packet Tracer Score	**10**	
	Total Score	**100**	