Module Practice and Quiz

13.3.1

Packet Tracer - Use ICMP to Test and Correct Network Connectivity

In this lab you will use ICMP to test network connectivity and locate network problems. You will also correct simple configuration issues and restore connectivity to the network.

Use ICMP to locate connectivity issues.

Configure network devices to correct connectivity issues.

Use ICMP to Test and Correct Network Connectivity

Use ICMP to Test and Correct Network Connectivity

13.3.2

Lab - Use Ping and Traceroute to Test Network Connectivity

Skills Practice Opportunity

You have the opportunity to practice the following skills:

- Part 1: Build and Configure the Network
- Part 2: Use Ping Command for Basic Network Testing
- Part 3: Use Tracert and Traceroute Commands for Basic Network Testing
- Part 4: Troubleshoot the Topology

You can practice these skills using the Packet Tracer or lab equipment, if available.

Packet Tracer - Physical Mode (PTPM)

Use Ping and Traceroute to Test Network Connectivity - Physical Mode

Use Ping and Traceroute to Test Network Connectivity - Physical Mode

Lab Equipment

Use Ping and Traceroute to Test Network Connectivity

13.3.3

What did I learn in this module?

ICMP Messages

The TCP/IP suite provides for error messages and informational messages when communicating with another IP device. These messages are sent using ICMP. The purpose of these messages is to provide feedback about issues related to the processing of IP packets under certain conditions. The ICMP messages common to both ICMPv4 and ICMPv6 are: Host reachability, Destination or Service Unreachable, and Time exceeded. An ICMP Echo Message tests the reachability of a host on an IP network. The local host sends an ICMP Echo Request to a host. If the host is available, the destination host responds with an Echo Reply. This is the basis of the **ping** utility. When a host or gateway receives a packet that it cannot deliver, it can use an ICMP Destination Unreachable message to notify the source. The message will include a code that indicates why the packet could not be delivered. An ICMPv4 Time Exceeded message is used by a router to indicate that a packet cannot be forwarded because the Time to Live (TTL) field of the packet was decremented to zero. If a router receives a packet and decrements the TTL field to zero, it discards the packet and sends a Time Exceeded message to the source host. ICMPv6 also sends a Time Exceeded in this situation. ICMPv6 uses the IPv6 hop limit field to determine if the packet has expired. Time Exceeded messages are used by the **traceroute** tool. The messages between an IPv6 router and an IPv6 device including dynamic address allocation include RS and RA. The messages between IPv6 devices include the redirect (similar to IPv4), NS and NA.

Ping and Traceroute Testing

Ping (used by IPv4 and IPv6) uses ICMP echo request and echo reply messages to test connectivity between hosts. To test connectivity to another host on a network, an echo request is sent to the host address using the ping command. If the host at the specified address receives the echo request, it responds with an echo reply. As each echo reply is received, ping provides feedback on the time between when the request was sent and when the reply was received. After all the requests are sent, the ping utility provides a summary that includes the success rate and average round-trip time to the destination. Ping can be used to test the internal configuration of IPv4 or IPv6 on the local host. Ping the local loopback address of 127.0.0.1 for IPv4 (::1 for IPv6). Use **ping** to test the ability of a host to communicate on the local network, by pinging the IP address of the default gateway of the host. A successful ping to the default gateway indicates that the host and the router interface serving as the default gateway are both operational on the local network. Ping can also be used to test the ability of a local host to communicate across an internetwork. The local host can **ping** an operational IPv4 host of a remote network. Traceroute (tracert) generates a list of hops that were successfully reached along the path. This list provides verification and troubleshooting information. If the data reaches the destination, then the trace lists the interface of every router in the path between the hosts. If the data fails at some hop along the way, the address of the last router that responded to the trace can provide an indication of where the problem or security restrictions are found. The round-trip time is the time a packet takes to reach the remote host and for the response from the host to return. Traceroute makes use of a function of the TTL field in IPv4 and the Hop Limit field in IPv6 in the Layer 3 headers, along with the ICMP time exceeded message.

13.3.4

Module Quiz - ICMP

1. A technician is troubleshooting a network where it is suspected that a defective node in the network path is causing packets to be dropped. The technician only has the IP address of the end point device and does not have any details of the intermediate devices. What command can the technician use to identify the faulty node?

   - **ipconfig /flushdns**
   - **tracert**
   - **ipconfig /displaydns**
   - **ping**

2. A user who is unable to connect to the file server contacts the help desk. The helpdesk technician asks the user to ping the IP address of the default gateway that is configured on the workstation. What is the purpose for this **ping** command?

   - to test that the host has the capability to reach hosts on other networks
   - to obtain a dynamic IP address from the server
   - to request that gateway forward the connection request to the file server
   - to resolve the domain name of the file server to its IP address

3. What is a function of the **tracert** command that differs from the **ping** command when they are used on a workstation?

   - The **tracert** command is used to test the connectivity between two devices.
   - The **tracert** command shows the information of routers in the path.
   - The **tracert** command sends one ICMP message to each hop in the path.
   - The **tracert** command reaches the destination faster.

4. Which ICMP message is used by the traceroute utility during the process of finding the path between two end hosts?

   - time exceeded
   - destination unreachable
   - ping
   - redirect

5. Which utility uses the Internet Control Messaging Protocol (ICMP)?

   - ping
   - RIP
   - NTP
   - DNS

6. Which protocol is used by IPv4 and IPv6 to provide error messaging?

   - DHCP
   - ICMP
   - NDP
   - ARP

7. A network administrator is testing network connectivity by issuing the **ping** command on a router. Which symbol will be displayed to indicate that a time expired during the wait for an ICMP echo reply message?

   - .
   - !
   - $
   - U

8. Which two things can be determined by using the **ping** command? (Choose two.)

   - [ ] the IP address of the router nearest the destination device
   - [x] the average time it takes a packet to reach the destination and for the response to return to the source
   - [ ] the number of routers between the source and destination device
   - [ ] the average time it takes each router in the path between source and destination to respond
   - [x] the destination device is reachable through the network

9. A user calls to report that a PC cannot access the internet. The network technician asks the user to issue the command **ping 127.0.0.1** in a command prompt window. The user reports that the result is four positive replies. What conclusion can be drawn based on this connectivity test?

   - The PC can access the network. The problem exists beyond the local network.
   - The PC can access the Internet. However, the web browser may not work.
   - The IP address obtained from the DHCP server is correct.
   - The TCP/IP implementation is functional.

10. Which command can be used to test connectivity between two devices using echo request and echo reply messages?

    - **ICMP**
    - **netstat**
    - **ipconfig**
    - **ping**

11. What field content is used by ICMPv6 to determine that a packet has expired?

    - Hop Limit field
    - Time Exceeded field
    - CRC field
    - TTL field

12. Which protocol provides feedback from the destination host to the source host about errors in packet delivery?

    - BOOTP
    - ARP
    - ICMP
    - DNS

13. A network administrator can successfully ping the server at www.cisco.com, but cannot ping the company web server located at an ISP in another city. Which tool or command would help identify the specific router where the packet was lost or delayed?

    - **traceroute**
    - **telnet**
    - **netstat**
    - **ipconfig**

14. What message is sent by a host to check the uniqueness of an IPv6 address before using that address?

    - ARP request
    - neighbor solicitation
    - router solicitation
    - echo request

Check

Show Me

Reset