Packet Tracer - Use Diagnostic Commands

Objectives

Part 1: Gather End User Device Settings

Part 2: Gather Information about Network Devices

Part 3: Diagnose Connectivity Issues

Background / Scenario

In this Packet Tracer (PT) activity, you will use various commands to gather device information and troubleshoot device configuration and connectivity issues. Device information includes IP address, default gateway, and DNS server settings. These settings are critical to enable a device to communicate on networks and connect to the internet.

Instructions

Part 1: Gather End User Device Settings

In this part, you will document the IP address settings for end devices.

****TASK 1****

Step 1: Document the IP address settings for HQ-Laptop-1.

a. The activity opens in the **HQ** cluster. The **Wiring Closet** is the tall, black chassis in the bottom left corner of the first floor. Locate all the devices on the first floor: PCs **1-1**, **1-2**, **1-3**, and **1-4**; printer **FL-1P**; and **HQ-Laptop-1**.

b. Click **HQ-Laptop-1** > **Desktop** tab > **Command Prompt**.

c. Enter the **ipconfig** command.

```
Wireless0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::20A:F3FF:FEE4:EEAA
   IPv6 Address.....: ::
   Autoconfiguration IPv4 Address..: 169.254.238.170
   Subnet Mask.....: 255.255.0.0
   Default Gateway.....: ::
                                0.0.0.0
```

****QUESTION 1****

Which IPv4 address is displayed for the Wireless0 Connection?

****ANSWER****

169.254.238.170

QUESTION 2

If the IPv4 address is in the 169.254.0.0/16 range, what method is being used to assign IPv4 addresses? Why is the laptop assigned an IPv4 address in the 169.254.0.0/16 range?

ANSWER

It indicates that the device was unable to obtain addressing from a DHCP server. Therefore, the device assigned itself an address 169.254.0.0/16 pool used for c private IP addressing (APIPA).

QUESTION 3

If the IPv4 address is in the 169.254.0.0/16, wait a few seconds and repeat the ipconfig command.

ANSWER

```
Wireless0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::20A:F3FF:FEE4:EEAA
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.50.3
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: ::
                                 192.168.50.1
```

QUESTION 4

When the IPv4 address is no longer from 169.254.0.0/16 range, what is the IP addressing information displayed? Record your answers in the table below.

ANSWER

Wireless0	IP Addressing Information
Link-local IPv6 Address	FE80::20A:F3FF:FEE4:EEAA
IPv6 Address	::
IPv4 Address	192.168.50.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.50.1
DNS Servers	N/A

QUESTION 5

Do you see a DNS server address? Explain.

ANSWER The ipconfig command does not report the DNS server address.

d. Enter the **ipconfig /all** command.

```
C:\>ipconfig /all

Wireless0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.................: 000A.F3E4.EEAA
   Link-local IPv6 Address.........: FE80::20A:F3FF:FEE4:EEAA
   IPv6 Address.....................: ::
   IPv4 Address.....................: 192.168.50.3
   Subnet Mask......................: 255.255.255.0
   Default Gateway..................: ::
                                      192.168.50.1
   DHCP Servers.....................: 192.168.50.1
   DHCPv6 IAID......................: 1898336164
   DHCPv6 Client DUID...............: 00-01-00-01-43-B9-1D-8A-00-0A-F3-E4-EE-AA
   DNS Servers......................: ::
                                      10.2.0.125
```

****QUESTION 6****

Do you see the DNS server address? What is it?

****ANSWER****

10.2.0.125

TASK 2

Step 2: Document the IP address settings for Net-Admin.

a. Click **Wiring Closet** > **Net-Admin** > **Desktop** tab > **Command Prompt**.

b. Enter the **ipconfig /all** command.

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.................: 0001.C910.22D6
   Link-local IPv6 Address.........: FE80::201:C9FF:FE10:22D6
   IPv6 Address.....................: ::
   IPv4 Address.....................: 192.168.99.9
   Subnet Mask......................: 255.255.255.0
   Default Gateway..................: ::
                                      192.168.99.1
   DHCP Servers.....................: 0.0.0.0
   DHCPv6 IAID......................:
   DHCPv6 Client DUID...............: 00-01-00-01-67-A3-E9-BD-00-01-C9-10-22-D6
   DNS Servers......................: ::
                                      10.2.0.125
```

QUESTION 1

What is the IP addressing information displayed under the FastEthernet0 interface? Record your answers in the table below.

ANSWER

FastEthernet0	IP Addressing Information
Physical Address	0001.C910.22D6
Link-local IPv6 Address	FF80::201:C9FF:FE10:22D6
IPv6 Address	::
IPv4 Address	192.168.99.9
Subnet Mask	255.255.255.0
Default Gateway	192.168.99.1
DNS Servers	10.2.0.125

TASK 3

Part 2: Gather Information about Network Devices

In this part, you will document information about the link to ISP. You will then document the IP addressing information for all the end devices in HQ and discover that devices belong to different virtual local area networks (VLANs).

Step 1: Gather network connection information about the link between HQ and ISP.

The **HQ-Edge** router is the router between the HQ network and the ISP. We need to identify the upstream device information located in the ISP.

a. In the **Wiring Closet** left rack, click **HQ-Edge** > **CLI** tab.

b. Press **Enter** to get the **HQ-Edge>** prompt, and then enter the **enable** command.

c. Enter the **show ip route | begin Gateway** command.

```
HQ-Edge>enable
HQ-Edge#show ip route | begin Gateway
Gateway of last resort is 0.0.0.0 to network 0.0.0.0
```

QUESTION 1

What is the address for the gateway of last resort (or default gateway)?

ANSWER

Gateway address: 0.0.0.0

****QUESTION 2****

Why is the next hop address not displayed?

****ANSWER****

It is not explicitly configured.

d. Enter the **show running-config | begin ip route** command.

```
HQ-Edge#
HQ-Edge#show running-config | begin ip route
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0/0
!
```

****QUESTION 3****

How is the default route configured? Does it use the next hop address?

****ANSWER****

It is configured with the exit interface instead of next hop address.

e. Enter the **show cdp neighbors detail** command.

```
HQ-Edge#show cdp neighbors detail

Device ID: ISP
Entry address(es):
  IP address : 10.0.0.49
Platform: cisco PT1000, Capabilities: Router
Interface: GigabitEthernet0/0/0, Port ID (outgoing port): GigabitEthernet1/0
Holdtime: 168

Version :
Cisco Internetwork Operating System Software
IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 27-Apr-04 19:01 by miwang

advertisement version: 2
Duplex: full
```

****QUESTION 4****

What is the IPv4 address of the next hop (ISP) address?

****ANSWER** 10.0.0.49**

****QUESTION 5****

Which port on the ISP router is connected to HQ-Edge?

****ANSWER** GigabitEthernet1/0**

****QUESTION 6****

What IOS version is used on the ISP router?

****ANSWER****

IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE(fc5)

f. Enter the **ping 10.0.0.49** command.

```
HQ-Edge#ping 10.0.0.49

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.49, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/31 ms
```

g. Enter the **show arp** command.

```
HQ-Edge#show arp
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.0.0.49               5   0060.2FE1.903B  ARPA   GigabitEthernet0/0/0
Internet  10.0.0.50               -   0000.0C99.CB04  ARPA   GigabitEthernet0/0/0
HQ-Edge#
```

****QUESTION 7****

What is the MAC address of the interface on the ISP router that is connected to HQ-Edge?

****ANSWER**** 0060.2FE1.903B

h. Close **HQ-Edge** and exit the **Wiring Closet**.

TASK 4

Step 2: Gather network connection information about the devices in HQ.

a. From **1-1**, **1-2**, **1-3**, **1-4**, **FL-1P**, and **HQ-Laptop-1**, use the **ipconfig** command to find their IPv4 addresses and Default Gateways.

****ANSWER****

Device	IPv4 Address	Default Gateway
1-1	192.168.10.3	162.168.10.1
1-2	192.168.10.2	192.168.10.1
1-3	192.168.20.4	192.168.20.1
1-4	192.168.20.2	192.168.20.1
FL-1P	192.168.50.2	192.168.50.1
HQ-Laptop-1	192.168.50.3	192.168.50.1

b. From PC **1-1**, open **Command Prompt**, and then enter the **arp -a** command.

What information is displayed?

****ANSWER****

```
C:\>arp -a
No ARP Entries Found
```

c. Use the **ping** command to ping **1-2**, **1-3**, **1-4**, **FL-1P**, and **HQ-Laptop-1**.

d. Enter the **arp -a** command.

What information is displayed?

****ANSWER****

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.10.1          000a.41ea.6b47        dynamic
  192.168.10.2          0002.4a8a.d20e        dynamic
```

****QUESTION 1****

Why do the entries in the ARP table not contain information about devices in the 192.168.20.0 and 192.168.50.0 networks while the ping is successful?

****ANSWER****

192.168.10.0/24, 192.168.20.0/24, and 192.168.50.0/24 are on different VLANs. Ping from 192.168.10.0 network to other VLAN networks would need to go through the default gateway first. Therefore, the ARP table only contains the information about devices within the same network or the same VLAN.

e. To find the route a packet takes to reach the DNS server, enter the **tracert** 10.2.0.125 command.

What information is displayed?

****ANSWER****

```
C:\>tracert 10.2.0.125

Tracing route to 10.2.0.125 over a maximum of 30 hops:

  1    0 ms      0 ms      0 ms      192.168.10.1
  2    0 ms      0 ms      0 ms      10.0.0.49
  3    1 ms      0 ms      0 ms      10.2.0.125

Trace complete.
```

****TASK 5****

Part 3: Diagnose Connectivity Issues

In this part, you will use a variety of diagnostic commands and techniques. You will use the **nslookup** command to query a DNS server and troubleshoot a DNS database. You will then diagnose why a ping fails but web access is successful. Finally, you will use the **netstat** command to discover which ports are listening on the target device.

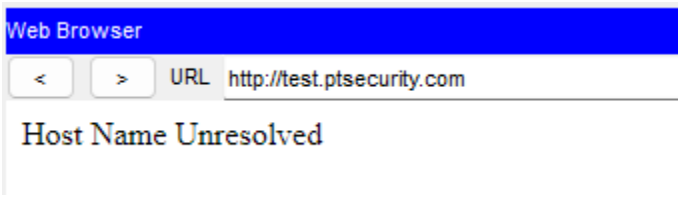
Step 1: Test a URL to investigate a connectivity issue.

a. On PC **1-1**, close the **Command Prompt**, and then click **Web Browser.**

b. Enter the URL **test.ptsecurity.com**.

Does the web page display? If not, what is the message?

****ANSWER****



c. Enter the IP address **192.168.75.2**.

Does the web page display?

****ANSWER****

Why does the web page display by using the IP address but not the domain name?

****ANSWER****

The PC cannot resolve the domain name to the IP address.

Step 2: Use the nslookup command to verify DNS service.

a. **Close Web Browser, and then click Command Prompt.**

b. **Enter the ping test.ptsecurity.com command.**

What message is displayed?

****ANSWER****

```
C:\>ping test.ptsecurity.com
Ping request could not find host test.ptsecurity.com. Please check the name and try
again.
```

What does the message indicate?

****ANSWER****

The DNS entry is not in the database of the DNS server.

c. Enter the **nslookup test.ptsecurity.com** command.

What message is displayed?

****ANSWER****

```
C:\>nslookup test.ptsecurity.com

Server: [10.2.0.125]
Address:  10.2.0.125
*** UnKnown can't find test.ptsecurity.com: Non-existent domain.
```

Which server is the default DNS server?

****ANSWER****

DNS Server:10.2.0.125

d. The **nslookup** command supports the use of alternate DNS server. Enter the **nslookup /?** command to learn options available for the command.

e. Enter the **nslookup test.ptsecurity.com 192.168.99.3** command and press **Enter**.

Note: Packet Tracer may take several seconds to converge.

What message is displayed?

****ANSWER****

```
C:\>nslookup test.ptsecurity.com 192.168.99.3

Server: [192.168.99.3]
Address:  192.168.99.3
DNS request timed out.
          timeout was 15000 milli seconds.

Server: [192.168.99.3]
Address:  192.168.99.3

Non-authoritative answer:
Name:   test.ptsecurity.com
Address:   192.168.75.2
```

In Step 2c, why is the domain name unable to be resolved

****ANSWER****

When a domain name is entered in the URL box, the PC is trying to resolve it through the default DNS server. In this case, the default DNS server does not contain the information in its database.

Step 3: Use output from the ping command to diagnose connectivity issues.

a. Enter the **ping mail.cybercloud.com** command.

What message is displayed?

****ANSWER****

```
C:\>ping mail.cybercloud.com

Pinging 172.19.0.4 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.19.0.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

What information is indicated by the message?

****ANSWER****

The DNS name resolution is successful. However, the ping failed. Possible reasons are that the host is inactive or the ICMP echo/echo-reply is disabled on the host.

b. Enter the **ping www.ptsecurity.com** command.

What message is displayed?

****ANSWER****

```
C:\>ping www.ptsecurity.com

Pinging 10.0.0.3 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 10.0.0.3: Destination host unreachable.
Reply from 10.0.0.3: Destination host unreachable.

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

What information is indicated by the message?

****ANSWER****

There is a firewall in the path that blocks the ping to the destination.

c. Close the **Command Prompt**, open **Web Browser**, and then navigate to **www.ptsecurity.com**.

Does the web page display?

****ANSWER****

What conclusion can be drawn?

****ANSWER****

The web host is running; however, the ping to the web server is blocked.

Step 4: Use the netstat command to find active and listening ports.

a. Close **Web Browser** and reopen **Command Prompt**.

b. In **HQ**, click the **Wiring Closet**

c. From the right track, click the **FTP** server > **Desktop** tab > **Command Prompt**.

d. Arrange the PC **1-1** and FTP server **Command Prompt** windows side by side.

e. From the PC **1-1** window, enter the **netstat** command.

What message is displayed? Does it show any data?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
C:\>
```

f. From the **FTP** server, enter the **netstat** command.

What message is displayed? Does it show any data?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
C:\>
```

g. On **FTP** server, enter the **ipconfig** command to determine its IP address.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::290:21FF:FE64:E9B9
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.75.2
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: ::
                                 192.168.75.1
```

h. From **PC 1-1**, start an FTP session with the FTP server.

```
C:\>ftp 192.168.75.2
Trying to connect...192.168.75.2
Connected to 192.168.75.2
220- Welcome to PT Ftp server
```

i. On the **FTP** server, enter the **netstat** command.

What message is displayed? Is there any new information?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
  TCP    192.168.75.2:21        192.168.10.3:1027      ESTABLISHED
C:\>
```

Which port is the listening port and what is the status of the connection?

****ANSWER****

The listening port is TCP 21 and the TCP connection is established.

j. From PC **1-1**, enter **bob** as the username.

k. From the **FTP** server, enter the **netstat** command.

Does the displayed information change?

No

l. From **PC 1-1**, enter **cisco123** as the password.

m. From **PC 1-1**, enter the **dir** command.

```
C:\>ftp 192.168.75.2
Trying to connect...192.168.75.2
Connected to 192.168.75.2
220- Welcome to PT Ftp server
Username:bob
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>dir

Listing /ftp directory from 192.168.75.2:
ftp>
```

n. From the **FTP** server, enter the **netstat** command.

Does the displayed information change?

Yes

What is indicated by this new entry?

Nothing is changed

o. From **PC 1-1**, enter the **Sample2.txt** command and press **Enter**. This will upload the Sample2.txt file to the **FTP** server.

****ANSWER****

```
Listing /ftp directory from 192.168.75.2:
ftp>put Sample2.txt

Writing file Sample2.txt to 192.168.75.2:
File transfer in progress...

[Transfer complete - 43 bytes]

43 bytes copied in 0.035 secs (1228 bytes/sec)
ftp>
```

p. From the **FTP** server, enter the **netstat** command.

Does the displayed information change?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
  TCP    192.168.75.2:21        192.168.10.3:1027      ESTABLISHED
  TCP    192.168.75.2:1032      192.168.10.3:1030      CLOSING
C:\>
```

q. Wait for a few seconds and then enter the **netstat** command again.

Does the displayed information change?

****ANSWER****

Yes. The “CLOSING” line is gone.

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
  TCP    192.168.75.2:21        192.168.10.3:1027      ESTABLISHED
C:\>
```

r. From **PC 1-1**, enter the **quit** command.

```
ftp>quit

221- Service closing control connection.
```

s. From the **FTP** server, enter the **netstat** command.

Does the displayed information change?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
C:\>
```

t. From **PC 1-1**, close **Command Prompt**, and then open **Web Browser**.

u. Navigate to **192.168.75.2**.

v. From the **FTP** server, enter the **netstat** command.

Does the displayed information change?

****ANSWER****

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:25             0.0.0.0:0              CLOSED
  TCP    0.0.0.0:110            0.0.0.0:0              CLOSED
  TCP    0.0.0.0:8443           0.0.0.0:0              CLOSED
  TCP    192.168.75.2:80        192.168.10.3:1031      CLOSED
C:\>
```

What does this new entry indicate?

****ANSWER****

A web page request is made by the host 192.168.10.3. The web page is transmitted (displayed on the web browser of PC 1-1) and the TCP connection is closed.