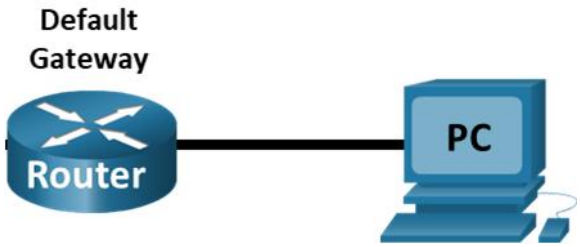
Lab 12.7.4 – Identify IPv6 Addresses

This lab has been updated for use on NETLAB+.
www.netdevgroup.com

Topology



Objectives

Part 1: Practice with Different Types of IPv6 Addresses

Part 2: Examine a Host IPv6 Network Interface and Address

Background / Scenario

With the depletion of the Internet Protocol version 4 (IPv4) network address space and the adoption and transition to IPv6, networking professionals must understand how both IPv4 and IPv6 networks function. Many devices and applications already support IPv6. This includes extensive Cisco device Internetwork Operating System (IOS) support and workstation/server operating system support, such as that found in Windows and Linux.

This lab focuses on IPv6 addresses and the components of the address. In Part 1, you will identify the IPv6 address types and IPv6 addresses abbreviation. In Part 2, you will view the IPv6 settings on a PC.

Instructions

Part 1: Practice with Different Types of IPv6 Addresses

In this part, you will identify the different types of IPv6 addresses and practice compressing and decompressing IPv6 addresses.

Step 1: Match the IPv6 address to its type.

Match the IPv6 addresses to their corresponding address type. Notice that the addresses have been compressed to their abbreviated notation and that the slash network prefix number is not shown. Some answer choices **must** be used more than once.

Answer choices:

a. Loopback address

b. Global unicast address

c. Link-local address

d. Unique-local address

e. Multicast address

IPv6 Address	Answer
2001:0db8:1:acad::fe55:6789:b210	B
::1	A
fc00:22:a:2::cd4:23e4:76fa	D
2033:db8:1:1:22:a33d:259a:21fe	B
fe80::3201:cc01:65b1	C
ff00::	E
ff00::db7:4322:a231:67c	E
ff02::2	E

Step 2: Practice compressing and decompressing IPv6 addresses.

Using the rules of IPv6 address abbreviation, either compress or decompress the following addresses:

a. 2002:0ec0:0200:0001:0000:04eb:44ce:08a2

Type your answers here.

2002:ec0:200:1::4eb:44ce:8a2

b. fe80:0000:0000:0001:0000:60bb:008e:7402

Type your answers here.

fe80::1:0:60bb:8e:7402

c. fe80::7042:b3d7:3dec:84b8

Type your answers here.

fe80:0000:0000:0000:7042:b3d7:3dec:84b8

d. ff00::

Type your answers here.

ff00:0000:0000:0000:0000:0000:0000:0000

e. 2001:0030:0001:acad:0000:330e:10c2:32bf

Type your answers here.

2001:30:1:acad::330e:10c2:32bf

Part 2: Examine a Host IPv6 Network Interface and Address

In Part 2, you will check the IPv6 network settings of a PC to identify the network interface IPv6 address.

Step 1: Check the PC IPv6 network address settings.

Verify that the IPv6 protocol is installed and active on the NETLAB+ PC.

a. Navigate to the **Control Panel**.

b. In the Category View, click **Network and Sharing Center** icon. Click **View network status and tasks**.

c. In the Network and Sharing Center window, you will see your active networks.

d. On the left side of the window, click **Change adapter settings**. You should now see icons representing your installed network adapters. Right-click your active network interface (it may be **Ethernet** or **Wi-Fi**), and then click **Properties**.

e. In the Properties window, scroll through the list of items to determine whether IPv6 is present, which indicates that it is installed, and if it is also check marked, which indicates that it is active.

f. Select the item **Internet Protocol Version 6 (TCP/IPv6)** and click **Properties**. You should see the IPv6 settings for your network interface. Your IPv6 properties window is likely set to **Obtain an IPv6 address automatically**. This does not mean that IPv6 relies on the Dynamic Host Configuration Protocol (DHCP). Instead of using DHCP, IPv6 looks to the local router for IPv6 network information and then auto-configures its own IPv6 addresses. To manually configure IPv6, you must provide the IPv6 address, the subnet prefix length, and the default gateway. Click **Cancel** to exit the properties windows.

Note: The local router can refer host requests for IPv6 information, especially Domain Name System (DNS) information, to a DHCPv6 server on the network.

g. After you have verified that IPv6 is installed and active on your PC, you should check your IPv6 address information.

Open a command prompt and type **ipconfig /all** and press Enter. Your output should look similar to this:

```
C:\Users\sysadmin> ipconfig /all

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Intel(R) PRO/1000 MT Network Connection
   Physical Address. . . . . . . . . :00-50-56-A4-2C-94
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::d829:6d18:e229:a705%5(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.147(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Wednesday, November 29, 2019 4:29:07 PM
   Lease Expires . . . . . . . . . . : Thursday, November 30, 2019 4:29:08 PM
   Default Gateway . . . . . . . . . : 192.168.1.1
   DHCP Server . . . . . . . . . . . : 192.168.1.1
   <output omitted>
```

h. You can see from the output that the client PC has an IPv6 link-local address with a randomly generated interface ID.

What does it indicate about the network regarding IPv6 global unicast address, IPv6 unique-local address, or IPv6 gateway address?

Having only the link-local address indicates that there is not an IPv6 enabled gateway to provide subnet information, a local address, or a global address.

What kind of IPv6 addresses did you find when using **ipconfig /all**?

Usually at least a link-local address, a global address, and a temporary address.

Reflection Questions

1. How do you think you must support IPv6 in the future?

All newly manufactured devices should support both IPv4 and IPv6.

2. Do you think IPv4 networks continue on, or will everyone eventually switch over to IPv6? How long do you think it will take?

I think IPv4 will continue on for a while, but a a few years I think mostly everyone will switch over to IPv6. Switching over to IPv6 can also be expensive when a company has to convert all of the devices on the network and replace ones that don't support IPv6. Many companies go for the cheaper and simpler option of using IPv4.

Router and Switch Interface Summary Table

Router / Switch Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2960	Fast Ethernet 0/1 (F0/1)	Fast Ethernet 0/2 (F0/2)	n/a	n/a
3560	Fast Ethernet 0/1 (F0/1)	Fast Ethernet 0/2 (F0/2)	n/a	n/a
3650	Gigabit Ethernet 1/0/1 (G1/0/1)	Gigabit Ethernet 1/0/2 (G1/0/2)	n/a	n/a
4221	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
4300	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.