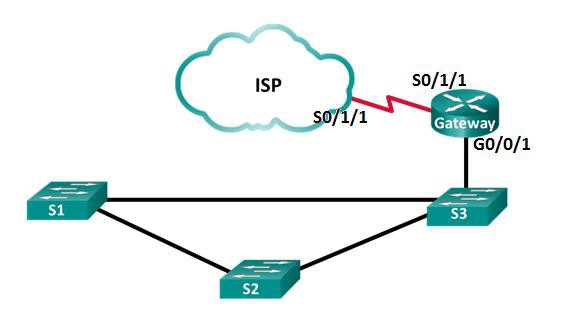


**Lab 10.1.2.5 - Configure CDP and LLDP**

## Topology



**Addressing Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** |
| Gateway | G0/0/1 | 192.168.1.254 | 255.255.255.0 |
|  | S0/1/1 | 209.165.200.226 | 255.255.255.252 |
| ISP | S0/1/1 (DCE) | 209.165.200.225 | 255.255.255.252 |

**Objectives**

#### Part 1: Build the Network and Configure Basic Device Settings Part 2: Network Discovery with CDP

**Part 3: Network Discovery with LLDP**

**Background / Scenario**

Cisco Discovery Protocol (CDP) is a Cisco proprietary protocol for network discovery on the data link layer. It can share information such as device names and IOS versions, with other physically connected Cisco devices. Link Layer Discovery Protocol (LLDP) is vendor-neutral protocol using on the data link layer for network discovery. It is mainly used with network devices in the local area network (LAN). The network devices advertise information, such as their identities and capabilities to their neighbors.

In this lab, you must document the ports that are connected to other switches using CDP and LLDP. You will document your findings in a network topology diagram. You will also enable or disable these discovery protocols as necessary.

**Note**: The routers used with CCNA hands-on labs are Cisco 4321 Integrated Services Routers (ISRs) with Cisco IOS Release 15.2(4)M3 (universalk9 image). The switches used are Cisco Catalyst 2960s with Cisco IOS Release 15.0(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used.

Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of this lab for the correct interface identifiers.

**Note**: Make sure that the routers and switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

## Required Resources

* 1 Router (Cisco 4321 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
* 3 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
* Console cables to configure the Cisco IOS devices via the console ports
* Ethernet cables as shown in the topology

# Part 1: Build the Network and Configure Basic Device Settings

In Part 1, you will set up the network topology and configure basic settings on the router and switches.

### Step 1: Cable the network as shown in the topology.

The Ethernet ports used on the switches are not specified in the topology. You may choose to use any Ethernet ports to cable the switches as shown in the topology diagram.

### Step 2: Initialize and reload the network devices as necessary. Step 3: Configure basic device settings for the switches.

1. Console into the device and enable privileged EXEC mode.
2. Enter configuration mode.
3. Disable DNS lookup to prevent the switch from attempting to translate incorrectly entered commands as though they were host names.
4. Configure the hostname according to the topology.
5. Verify that the switchports with connected Ethernet cables are enabled.

**Step 4: Configure basic device settings for the routers.**

1. Console into the device and enable privileged EXEC mode.
2. Enter configuration mode.
3. Copy and paste the following configurations into the routers.

**ISP:**

hostname ISP

no ip domain lookup interface Serial0/1/1

ip address 209.165.200.225 255.255.255.252

clock rate 128000

no shutdown

**Gateway:**

hostname Gateway no ip domain lookup

interface GigabitEthernet0/0/1

ip address 192.168.1.254 255.255.255.0

ip nat inside no shutdown

interface Serial0/1/1

ip address 209.165.200.226 255.255.255.252

ip nat outside no shutdown

ip nat inside source list 1 interface Serial0/1/1 overload

access-list 1 permit 192.168.1.0 0.0.0.255

**Part 2: Network Discovery with CDP**

On Cisco devices, CDP is enabled by default. You will use CDP to discover the ports that are currently connected.

a. On router Gateway, enter the **show cdp** command in the privileged EXEC mode to verify that CDP is currently enabled on router Gateway.

Gateway# **show cdp** Global CDP information:

Sending CDP packets every 60 seconds Sending a holdtime value of 180 seconds Sending CDPv2 advertisements is enabled

How often are CDP packets sent?

If CDP is disabled on Gateway, enable CDP by issuing the **cdp run** command in the global configuration mode.

Gateway(config)# **cdp run**

Gateway(config)# **end**

b. Issue the **show cdp interface** to list the interfaces that are participating in CDP advertisements.

Gateway# **show cdp interface** Embedded-Service-Engine0/0 is administratively down, line protocol is down

Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

GigabitEthernet0/0/0 is administratively down, line protocol is down Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

GigabitEthernet0/0/1 is up, line protocol is up Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

Serial0/1/0 is administratively down, line protocol is down Encapsulation HDLC

Sending CDP packets every 60 seconds Holdtime is 180 seconds

Serial0/1/1 is up, line protocol is up Encapsulation HDLC

Sending CDP packets every 60 seconds Holdtime is 180 seconds

How many interfaces are participating in the CDP advertisement? Which interfaces are up?

c. Issue the **show cdp neighbors** command to determine the CDP neighbors.

Gateway# **show cdp neighbors** Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone, D - Remote, C - CVTA, M - Two-port Mac Relay

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Device | ID | Local Intrfce | Holdtme | Capability Platform | Port ID |
| ISP |  | Ser 0/0/1 | 158 | R B S I CISCO1941 | Ser 0/0/1 |
| S3 |  | Gig 0/1 | 170 | S I WS-C2960- | Fas 0/5 |

d. For more details on CDP neighbors, issue the **show cdp neighbors detail** command.

Gateway# **show cdp neighbors detail**

-------------------------

Device ID: ISP Entry address(es):

IP address: 209.165.200.225

Platform: Cisco CISCO1941/K9, Capabilities: Router Source-Route-Bridge Switch IGMP

Interface: Serial0/1/1, Port ID (outgoing port): Serial0/0/1 Holdtime : 143 sec

Version :

Cisco IOS Software, C1900 Software (C1900-UNIVERSALK9-M), Version 15.4(3)M2, RELEASE SOFTWARE (fc2)

Technical Support: <http://www.cisco.com/techsupport> Copyright (c) 1986-2015 by Cisco Systems, Inc.

Compiled Fri 06-Feb-15 17:01 by prod\_rel\_team

advertisement version: 2 Management address(es):

IP address: 209.165.200.225

-------------------------

Device ID: S3 Entry address(es):

Platform: cisco WS-C2960-24TT-L, Capabilities: Switch IGMP

Interface: GigabitEthernet0/1, Port ID (outgoing port): FastEthernet0/5 Holdtime : 158 sec

Version :

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE7, RELEASE SOFTWARE (fc1)

Technical Support: <http://www.cisco.com/techsupport> Copyright (c) 1986-2014 by Cisco Systems, Inc.

Compiled Thu 23-Oct-14 14:49 by prod\_rel\_team

advertisement version: 2

Protocol Hello: OUI=0x00000C, Protocol ID=0x0112; payload len=27, value=00000000FFFFFFFF010221FF0000000000000CD996E87400FF0000

VTP Management Domain: '' Native VLAN: 1

Duplex: full

e. What can you learn about ISP and S3 from the outputs of the **show cdp neighbors detail** command?

f. Configure the SVI on S3. Use an available IP address in 192.168.1.0 / 24 network. Configure 192.168.1.254 as the default gateway.

S3(config)# **interface vlan 1**

S3(config-if)# **ip address 192.168.1.3 255.255.255.0**

S3(config-if)# **no shutdown**

S3(config-if)# **exit**

S3(config)# **ip default-gateway 192.168.1.254**

g. Issue the **show cdp neighbors detail** command on Gateway. What additional information is available?

h. For security reasons, it is a good idea to turn off CDP on an interface facing an external network. Issue the **no cdp enable** in the interface configuration mode on the S0/1/1 interface on Gateway.

Gateway(config)# **interface S0/1/1**

Gateway(config-if)# **no cdp enable**

Gateway(config-if)# **end**

To verify that CDP has been turned off on the interface S0/1/1, issue the **show cdp neighbors** or **show cdp interface** command. You may need to wait for the hold time to expire. The hold time is the amount of time the network devices will hold the CDP packets until the devices discard them.

Gateway# **show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone, D - Remote, C - CVTA, M - Two-port Mac Relay

|  |  |  |  |
| --- | --- | --- | --- |
| Device ID | Local Intrfce | Holdtme | Capability Platform Port ID |
| S3 | Gig 0/1 | 161 | S I WS-C2960- Fas 0/5 |

The interface S0/1/1 on Gateway no longer has a CDP adjacency with the ISP router. But it still has CDP adjacencies with other interfaces.

Gateway# **show cdp interface**

Embedded-Service-Engine0/0 is administratively down, line protocol is down Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

GigabitEthernet0/0/0 is administratively down, line protocol is down Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

GigabitEthernet0/1/1 is up, line protocol is up Encapsulation ARPA

Sending CDP packets every 60 seconds Holdtime is 180 seconds

Serial0/1/0 is administratively down, line protocol is down Encapsulation HDLC

Sending CDP packets every 60 seconds Holdtime is 180 seconds

cdp enabled interfaces : 4 interfaces up : 1

interfaces down : 3

i. To disable CDP globally, issue the **no cdp run** command in the global configuration mode.

Gateway# **conf t** Gateway(config)# **no cdp run** Gateway(config)# **end**

Which command(s) would you use to verify that CDP has been disabled?

j. Enable CDP globally on Gateway. How many interfaces are CDP enabled? Which interfaces are CDP disabled?

k. Console into all the switches and use the CDP commands to determine the Ethernet ports that connected to other devices. An example of the CDP commands for S3 is displayed below.

S3# **show cdp neighbors** Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone, D - Remote, C - CVTA, M - Two-port Mac Relay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device ID | Local Intrfce | Holdtme | Capability Platform | Port ID |
| Gateway | Fas 0/5 | 143 | R B S I CISCO1941 | Gig 0/1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S2 | Fas 0/2 | 173 | S I | WS-C2960- Fas 0/4 |
| S1 | Fas 0/4 | 171 | S I | WS-C2960- Fas 0/4 |

# Part 3: Network Discovery with LLDP

On Cisco devices, LLDP maybe enabled by default. You will use LLDP to discover the ports that are currently connected.

a. On Gateway, enter the **show lldp** command in the privileged EXEC mode.

Gateway# **show lldp**

% LLDP is not enabled

If LLDP is disabled, enter the **lldp run** command in the global configuration mode.

Gateway(config)# **lldp run**

b. Use the **show lldp** command to verify that LLDP is enabled on Gateway.

Gateway# **show lldp**

Global LLDP Information: Status: ACTIVE

LLDP advertisements are sent every 30 seconds LLDP hold time advertised is 120 seconds

LLDP interface reinitialisation delay is 2 seconds

Issue the **show lldp neighbors** command. Which devices are neighbors to Gateway?

c. If there are no LLDP neighbors for Gateway, enable LLDP on the switches and ISP. Issue **lldp run** in the global configuration mode on the devices.

S1(config)# **lldp run** S2(config)# **lldp run** S3(config)# **lldp run**

ISP(config)# **lldp run**

d. Issue the **show lldp neighbors** command on the switches and router to list the LLDP enabled ports. The output for Gateway is shown below.

Gateway# **show lldp neighbors** Capability codes:

(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device

(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device ID | Local Intf | Hold-time | Capability | Port ID |
| S3 | Gi0/1 | 120 | B | Fa0/5 |

Total entries displayed: 1

e. Issue the **show lldp neighbors detail** command on Gateway.

Gateway# **show lldp neighbors detail**

------------------------------------------------

Local Intf: Gi0/1

Chassis id: 0cd9.96e8.7400 Port id: Fa0/5

Port Description: FastEthernet0/5 System Name: S3

System Description:

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE7, RELEASE SOFTWARE (fc1)

Technical Support: <http://www.cisco.com/techsupport> Copyright (c) 1986-2014 by Cisco Systems, Inc.

Compiled Thu 23-Oct-14 14:49 by prod\_rel\_team

Time remaining: 103 seconds System Capabilities: B Enabled Capabilities: B Management Addresses:

IP: 192.168.1.3

Auto Negotiation - supported, enabled Physical media capabilities:

100base-TX(FD)

100base-TX(HD)

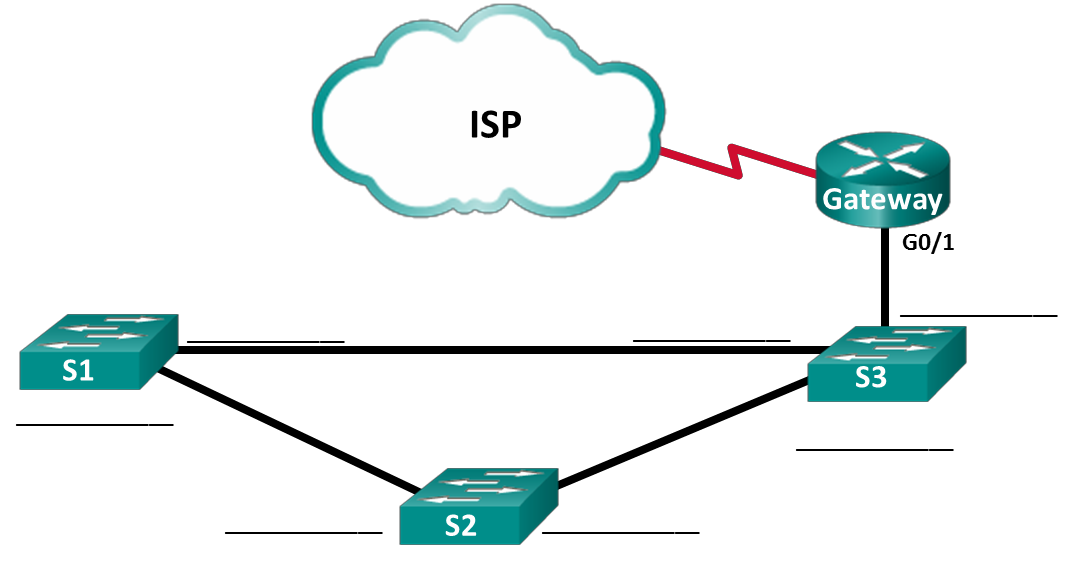
10base-T(FD) 10base-T(HD)

Media Attachment Unit type: 16 Vlan ID: 1

Total entries displayed: 1

What port is used on S3 to connect to the Gateway router?

f. Use the **show** command outputs from CDP and LLDP to document the connected ports in the network topology.



**Reflection**

|  |
| --- |
| Within a network, on which interfaces should you not use discovery protocols? Explain. |
|  |
|  |
|  |