



Module 1 Mastery Network Discovery Using CDP and LLDP

Introduction

CDP (Cisco Discovery Protocol) is a Cisco proprietary protocol that collects system information from locally attached network devices. The information collected about hardware and protocols running on these neighboring devices can be helpful when troubleshooting or documenting the network. CDP runs on all Cisco devices by default. The Link Layer Discovery Protocol (LLDP) is a vendor-neutral link layer protocol that works similarly to CDP.

Objective(s)

In this lab the student will:

- Use Cisco Discovery Protocol (CDP) and Link Layer Discovery Protocol (LLDP) for device discovery. (LO1.3)

Assignment

Use CDP and LLDP protocols to discover and map devices on a network.

Equipment/Supplies Needed

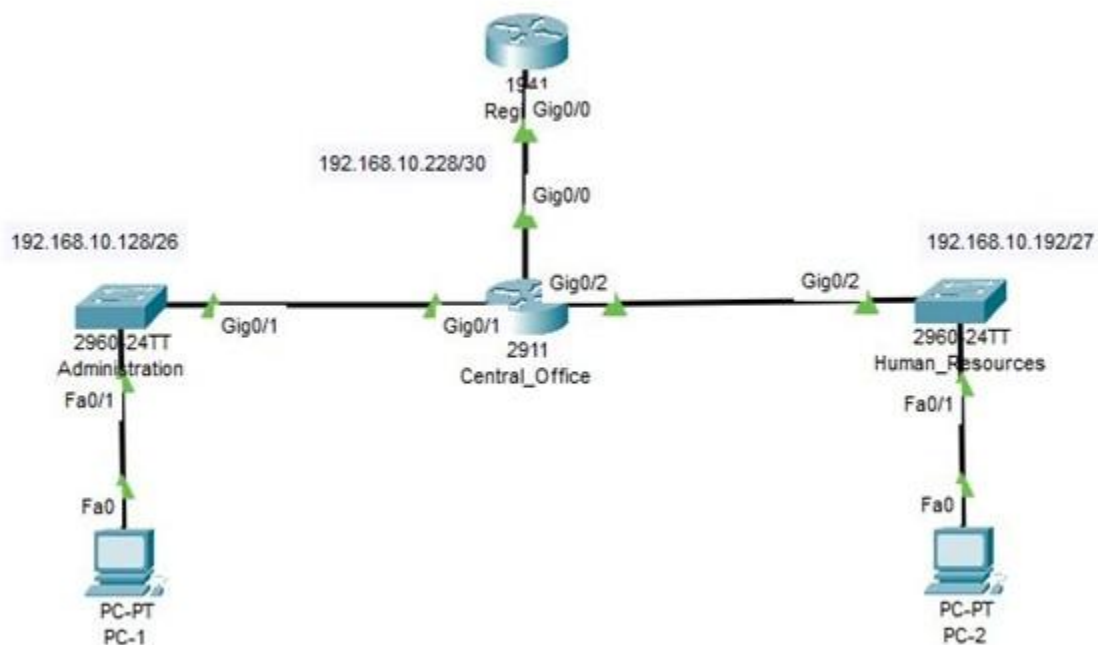
If working in a physical environment:

- Computer(s) (2)
- Routers (2) [2911 Cisco for Central_Office, 1900series Cisco for Region_1]
- Switches (2) [2960 Cisco]
- Cable(s) [if working in physical environment]
- Terminal Emulation Software (Putty / TeraTerm/ Hyperterm) If working

online:

- Your Computer workstation
- Cisco Packet Tracer
- Network Discovery with CDP and LLDP.pkt

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
Region_1	G0/0	192.168.10.229	255.255.255.252	n/a
Central_Office	G0/0	192.168.10.230	255.255.255.252	n/a
	G0/1	192.168.10.129	255.255.255.192	n/a
	G0/2	192.168.10.193	255.255.255.224	n/a
Administration	Vlan1	192.168.10.130	255.255.255.192	n/a
Human_Resources	Vlan	192.168.10.194	255.255.255.224	n/a
PC-1	Fa0	192.168.10.135	255.255.255.192	192.168.10.129
PC-2	Fa0	192.168.10.195	255.255.255.224	192.168.10.193

Procedure

Perform the steps in this lab in the order they are presented to you. Answer all questions and record the requested information in a file.

Part 1: Configure the Network

In Packet Tracer:

The Packet tracer file provided to you already has the devices you need for this lab as well as the correct cabling layout. However, these devices have no configuration on them. You will need to configure the appropriate interfaces with their IP addresses according to the Addressing Table above. Only very basic configs are needed.

Record your Network Info in your text file.

In a physical lab environment:

Configure the network as shown. If your router does not have interfaces as reflected in diagram, adopt lab as required to your router interfaces [ie. Serial 0/0 vs Serial 0/0/0 etc.] Annotate changes on your diagram to keep you on track. Before proceeding, confirm connectivity from Central_Office to Region_1 Router, Administration and Human_Resources switches, and Computers 1 and 2. **Record your Network Info in your text file.**

Part 2: Discover neighbors using CDP

The Cisco Discovery Protocol (CDP) is used to discover information about directly connected neighboring devices. It operates at the data link layer and is enabled by default in both routers and switches.

1. On the Central_Office router, use the **show cdp** command (privileged mode) to see information about CDP packets being sent out to all active interfaces on the router.

Router#**show cdp**

Note: If the router indicates that cdp is not enabled, use the cdp run command (global configuration mode) to enable it and try again.

How often are the CDP packets being sent out by default? 60

The CDP holdtime specifies the amount of time a CDP packet should be held by a receiving device before discarding it.

What is the default holdtime value on this router? 180

2. Use the following commands to change the CDP timer and holdtime values.

Note: If using Packet tracer, these commands are not supported. Review the command and the expected output and continue to Step 3.

```
Central_Office (config)#cdp timer 90
```

```
Central_Office (config)#cdp holdtime 360
```

Verify that the changes made to the CDP timer frequency and holdtime values have changed with the **show cdp**. **Record the command output.**

```
Central_Office#show cdp
```

```
Global CDP information:
```

```
Sending CDP packets every 90 seconds
```

```
Sending a holdtime value of 360 seconds
```

```
Sending CDPv2 advertisements is enabled
```

3. From the Central_Office and Region_1 routers, use CDP to gather information about the neighboring routers.
 - a. Use the **show cdp interface** command to see the interface information plus the default encapsulation used by the interface. It also shows the CDP timer information. **Record the output.**

- i. **What is the status of the connection?**
Vlan1 Down
G0/0 Up
G0/1 Up
G0/2 UP
- ii. **What is the encapsulation type?**
Vlna1
G0/0
G0/1
G0/2
- iii. **How often are CDP packets being sent? 60**
- iv. **What is the holddown time? 180**

b. Use the **show cdp neighbors** command to gather information about connected neighbors. **Record the output.**

- i. **How many neighbors are detected? 3 neighbors**
- ii. **What are the neighbors' device IDs? Administration, Human_Resources, and Region_1**
- iii. **What are the capability and platform of each detected device?**

Administration, Capability S, Platform 2960

Human_Resources, Capability S, Platform 2960

Region_1, Capability R, Platform C1900

c. Use the **show cdp entry *** command to see complete CDP information received from all devices. **Record the output.**

- i. **What is the IP address of each Device ID?**

Administration: 192.168.10.130

Human_Resources: 192.168.10.194

Region_1: 192.168.10.229

ii. **What is the outgoing interface and port number?**

Administration: Int:G0/1 Port ID: G0/1

Human_Resources: Int:G0/2 Port ID: G0/2

Region_1: Int:G0/0 Port ID: G0/0

iii. **What version of IOS is each device using?**

Administration: C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX

Human_Resources: C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX

Region_1: C1900 Software (C1900-UNIVERSALK9-M), Version 15.1(4)M4

Note: The **show cdp entry** *Device ID* will show information only about a specific device.

- d. Use the **show cdp neighbors** detail command to gather all information about connected neighbors.
 - e. Notice that it produces most of the same output as the **show cdp entry ***.
4. Use the **show cdp neighbors detail** command on the Administration switch to view what it knows about the Central_Office Router. **Record the output.**

- i. **What device ID does it show? Central_Office**
 - ii. **What is the IP address? 192.168.10.129**
 - iii. **What is the platform? C2900**
 - iv. **What is the version of software? C2900**
Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4
- What interface and port is being used? Int:G0/1 Port ID: G0/1**

Part 3: Discover neighbors using LLDP

Link Layer Discovery Protocol (LLDP) works similarly to CDP, but is a nonproprietary discovery protocol. To use this protocol, the devices must have it enabled first.

Note: If using Packet tracer, these commands are not supported. Review the command and the expected output and continue to the next section "Disable Discovery Protocols".

- 1. As done with CDP, enable LLDP with the **lldp run** command on the Central_Office router. View the defaults for lldp using the **show lldp** command.
- 2. The LLDP neighbor table can be viewed with the **show lldp neighbors** command. Enter the **show lldp neighbors detail** command on the Central_Office router.

Part 4: Disable Discovery Protocols

After CDP is running on your device, by default, CDP is enabled on all interfaces of the device. At times, you may want to disable CDP — for example, on the external interface of the Internet router connected to your ISP because the ISP does not need the details about the internal network configuration.

- a. To disable CDP globally, issue the **no cdp run** command.
- b. To disable LLDP globally, issue the **no lldp run** command. Record the output of the command.

Because of this vulnerability, these protocols should be disabled on external interfaces to prevent anyone from obtaining information about the internal network. Using this method only disables CDP on a specific interface where you choose not to transmit CDP data, but leaves it enabled on the device, so you are still able to receive CDP data. However, *this feature does not work in Packet Tracer*. To disable CDP on an interface, use Interface Configuration mode, as shown here:

```
Switch1>enable
```

```
Switch1#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Switch1(config)#interface fastEthernet 0/1
```

```
Switch1(config-if)#no cdp enable
```

```
Switch1(config)#end
```

1. Disable both CDP globally on the router. Use the global command to disable the CDP protocol on the Central_Office router.

Note: This is a different network than all the previous steps in this lab document and is a separate exercise. In this exercise, use default subnet masks for all networks. In this exercise use the default subnet masks when configuring ip address on device interfaces.

Part 5: Build and Configure Network topology using CDP

Given the following command outputs from CDP LDP, diagram/map the network using Visio or build the topology in your packet tracer file you used for this lab as a separate network. (This is a different network than all the previous steps in this lab document.)

Manufacturing#**show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
SanAntonio	Gig 0/1	149	R	C2900	Gig 0/1

Manufacturing#**show cdp neighbors detail**

Device ID: SanAntonio Entry address(es):

IP address : 192.168.30.1

Platform: cisco C2900, Capabilities: Router

Interface: GigabitEthernet0/1, Port ID (outgoing port): GigabitEthernet0/1

Holdtime: 167 Version :

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

Technical Support: <http://www.cisco.com/techsupport>

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advertisement version: 2

Duplex: full

Engineering#**show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID Local Intrfce Holdtme Capability Platform Port ID

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Austin	Gig 0/1	167	R	C2900	Gig 0/1

Engineering#**show cdp neighbors detail**

Device ID: Austin

Entry address(es):

IP address : 192.168.1.1

Platform: cisco C2900, Capabilities: Router

Interface: GigabitEthernet0/1, Port ID (outgoing port): GigabitEthernet0/1

Holdtime: 138 Version :

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

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advertisement version: 2 Duplex: full

Austin#**show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Houston	Gig	0/2	164	R	C2900 Gig 0/2
SanAntonio	Gig 0/0	165	R	C2900	Gig 0/0
Engineering	Gig	0/1	158	S	2960 Gig 0/1

Austin#**show cdp neighbors detail**

Device ID: Houston Entry

address(es):

IP address : 192.168.20.2

Platform: cisco C2900, Capabilities: Router

Interface: GigabitEthernet0/2, Port ID (outgoing port): GigabitEthernet0/2

Holdtime: 137 Version :

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

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Device ID: SanAntonio

Entry address(es):

IP address : 192.168.10.2

Platform: cisco C2900, Capabilities: Router

Interface: GigabitEthernet0/0, Port ID (outgoing port): GigabitEthernet0/0

Holdtime: 138

Version : Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)

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advertisement version: 2

Duplex: full

Device ID: Engineering

Entry address(es):

Platform: cisco 2960, Capabilities: Switch

Interface: GigabitEthernet0/1, Port ID (outgoing port): GigabitEthernet0/1

Holdtime: 131 Version :

Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)

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SanAntonio#**show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Austin	Gig 0/0	168	R	C2900	Gig 0/0
Manufacturing	Gig 0/1	129	S	2950	Gig 0/1

SanAntonio#**show cdp neighbors detail**

Device ID: Austin

Entry address(es):

IP address : 192.168.10.1

Platform: cisco C2900, Capabilities: Router

Interface: GigabitEthernet0/0, Port ID (outgoing port): GigabitEthernet0/0

Holdtime: 129 Version :

Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)
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advertisement version: 2 Duplex: full

Device ID: Manufacturing
Entry address(es):
Platform: cisco 2950, Capabilities: Switch
Interface: GigabitEthernet0/1, Port ID (outgoing port): GigabitEthernet0/1
Holdtime: 150
Version : Cisco Internetwork Operating System Software IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE(fc1) Copyright (c) 1986-2005 by cisco Systems, Inc. Compiled Wed 18-May-05 22:31 by jharirba
advertisement version: 2 Duplex: full

Houston#**show cdp neighbors**

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Austin	Gig 0/2	137	R	C2900	Gig 0/2

Houston#**show cdp neighbors detail**

Device ID: Austin
Entry address(es):
IP address : 192.168.20.1
Platform: cisco C2900, Capabilities: Router
Interface: GigabitEthernet0/2, Port ID (outgoing port): GigabitEthernet0/2
Holdtime: 167
Version : Cisco IOS Software, C2900 Software (C2900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)
Technical Support: <http://www.cisco.com/techsupport>
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advertisement version: 2 Duplex: full

Submit Your Work:

Packet Tracer:

Submit two Packet Tracer files and any documentation you created for each.

- One is for Parts 1-4 of this lab for the network with the Central_Office router.
- The second file is for Part 5, which is a completely different network.

Concerns Working Towards Proficiency	Criteria Standards for This Competency	Accomplished Evidence of Mastering Competency
	Criteria #1: Answer CDP and LLDP related questions using show commands. (50 Pts)	Answer CDP and LLDP related questions using show commands. (50 Pts)
	Criteria #2: Given the following command outputs from CDP LDP, diagram/map the network using Visio or build the topology in your packet tracer file you used for this lab as a separate network.(50 pts)	Given the following command outputs from CDP LDP, diagram/map the network using Visio or build the topology in your packet tracer file you used for this lab as a separate network.(50 pts)