



Configuring LLDP and LLDP-MED

This chapter describes how to configure the Link Layer Discovery Protocol (LLDP) and LLDP Media Endpoint Discovery (LLDP-MED) on the Cisco ME 3400E switch.



Note

For complete syntax and usage information for the commands used in this chapter, see the command reference for this release and the “System Management Commands” section in the *Cisco IOS Configuration Fundamentals Command Reference, Release 12.2*.

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Understanding LLDP and LLDP-MED

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Understanding LLDP

The Cisco Discovery Protocol (CDP) is a device discovery protocol that runs over Layer 2 (the data link layer) on all Cisco-manufactured devices (routers, bridges, access servers, and switches). CDP allows network management applications to automatically discover and learn about other Cisco devices connected to the network.

To support non-Cisco devices and to allow for interoperability between other devices, the switch supports the IEEE 802.1AB Link Layer Discovery Protocol (LLDP). LLDP is a neighbor discovery protocol that is used for network devices to advertise information about themselves to other devices on the network. This protocol runs over the data-link layer, which allows two systems running different network layer protocols to learn about each other.

LLDP supports a set of attributes that it uses to discover neighbor devices. These attributes contain type, length, and value descriptions and are referred to as TLVs. LLDP supported devices can use TLVs to receive and send information to their neighbors. Details such as configuration information, device capabilities, and device identity can be advertised using this protocol.

LLDP is enabled by default on network node interfaces (NNIs). It is disabled on enhanced network interfaces (ENIs), but you can enable it. LLDP is not supported on user network interfaces (UNIs).

The switch supports these basic management TLVs. These are mandatory LLDP TLVs.

- Port description TLV
- System name TLV
- System description
- System capabilities TLV
- Management address TLV

These organizationally specific LLDP TLVs are also advertised to support LLDP-MED.

- Port VLAN ID TLV ((IEEE 802.1 organizationally specific TLVs)
- MAC/PHY configuration/status TLV(IEEE 802.3 organizationally specific TLVs)

Understanding LLDP-MED

LLDP for Media Endpoint Devices (LLDP-MED) is an extension to LLDP that operates between endpoint devices such as IP phones and network devices such as switches. It specifically provides support for voice over IP (VoIP) applications and provides additional TLVs for capabilities discovery, network policy, Power over Ethernet, and inventory management.

LLDP-MED supports these TLVs:

- LLDP-MED capabilities TLV

Allows LLDP-MED endpoints to determine the capabilities that the connected device supports and what capabilities the device has enabled.
- Network policy TLV

Allows both network connectivity devices and endpoints to advertise VLAN configurations and associated Layer 2 and Layer 3 attributes for the specific application on that port. For example, the switch can notify a phone of the VLAN number that it should use. The phone can connect into any switch, obtain its VLAN number, and then start communicating with the call control
- Power management TLV

Enables advanced power management between LLDP-MED endpoint and network connectivity devices. Allows switches and phones to convey power information, such as how the device is powered, power priority, and how much power the device needs.
- Inventory management TLV

Allows an endpoint to transmit detailed inventory information about itself to the switch, including information hardware revision, firmware version, software version, serial number, manufacturer name, model name, and asset ID TLV.
- Location TLV

Provides location information from the switch to the endpoint device. The location TLV can send this information:

 - Civic location information

Provides the civic address information and postal information. Examples of civic location information are street address, road name, and postal community name information.
 - ELIN location information

Provides the location information of a caller. The location is determined by the Emergency location identifier number (ELIN), which is a phone number that routes an emergency call to the local public safety answering point (PSAP) and which the PSAP can use to call back the emergency caller.

Configuring LLDP and LLDP-MED

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Default LLDP Configuration

[Table 1-1](#) shows the default LLDP configuration. To change the default settings, use the LLDP global configuration and LLDP interface configuration commands.

Table 1-1 **Default LLDP Configuration**

Feature	Default Setting
LLDP global state	Disabled
LLDP holdtime (before discarding)	120 seconds
LLDP timer (packet update frequency)	30 seconds
LLDP reinitialization delay	2 seconds
LLDP tlv-select	Disabled to send and receive all TLVs.
LLDP interface state	Disabled
LLDP receive	Enabled on network node interfaces (NNIs) Disabled on enhanced network interfaces (ENIs) Not supported on user network interfaces (UNIs)
LLDP transmit	Enabled on NNIs Disabled on ENIs Not supported on UNIs
LLDP med-tlv-select	Disabled to send all LLDP-MED TLVs

Configuring LLDP Characteristics

You can configure the frequency of LLDP updates, the amount of time to hold the information before discarding it, and the initialization delay time. You can also select the LLDP and LLDP-MED TLVs to be sent and received.

Beginning in privileged EXEC mode, follow these steps to configure these characteristics:

**Note**

Steps 2 through 5 are all optional and can be performed in any order.

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	lldp holdtime <i>seconds</i>	(Optional) Specify the amount of time a receiving device should hold the information sent by your device before discarding it. The range is 0 to 65535 seconds; the default is 120 seconds.
Step 3	lldp reinit	(Optional) Specify the delay time in seconds for LLDP to initialize on any interface. The range is 2 to 5 seconds; the default is 2 seconds.
Step 4	lldp timer <i>seconds</i>	(Optional) Set the transmission frequency of LLDP updates in seconds. The range is 5 to 65534 seconds; the default is 30 seconds.
Step 5ll	lldp tlv-select	(Optional) Specify the LLDP TLVs to send or receive.
Step 6	interface <i>interface-id</i>	Specify the interface on which you are enabling LLDP, and enter interface configuration mode.
Step 7	lldp med-tlv-select	(Optional) Specify the LLDP-MED TLVs to send or receive.
Step 8	copy running-config startup-config	(Optional) Save your entries in the configuration file.

Use the **no** form of each of the LLDP commands to return to the default setting.

This example shows how to configure LLDP characteristics.

```
Switch# configure terminal
Switch(config)# lldp holdtime 120
Switch(config)# lldp reinit 2
Switch(config)# lldp timer 30
Switch(config)# end
```

For additional LLDP **show** commands, see the [“Monitoring and Maintaining LLDP and LLDP-MED”](#) section on page 1-7.

Disabling and Enabling LLDP Globally

LLDP is disabled globally by default and is enabled on NNIs. It is disabled by default on ENIs, but can be enabled per interface. LLDP is not supported on UNIs.

Beginning in privileged EXEC mode, follow these steps to globally disable LLDP:

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	no lldp run	Disable LLDP.
Step 3	end	Return to privileged EXEC mode.

Beginning in privileged EXEC mode, follow these steps to enable LLDP-MED when it has been disabled:

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	lldp run	Enable LLDP.
Step 3	end	Return to privileged EXEC mode.

This example shows how to globally disable LLDP.

```
Switch# configure terminal
Switch(config)# no lldp run
Switch(config)# end
```

This example shows how to globally enable LLDP.

```
Switch# configure terminal
Switch(config)# lldp run
Switch(config)# end
```

Disabling and Enabling LLDP on an Interface

LLDP is disabled by default on all NNIs to send and to receive LLDP information. It is disabled by default on ENIs, but it can be enabled by entering the **lldp transmit** and **lldp receive** interface configuration commands. LLDP is not supported on UNIs.



Note

If the interface is configured as a tunnel port, LLDP is automatically disabled.

Beginning in privileged EXEC mode, follow these steps to disable LLDP on an interface.

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface on which you are disabling LLDP, and enter interface configuration mode. The interface must be an NNI or ENI for the lldp commands to be available.
Step 3	no lldp transmit	No LLDP packets are sent on the interface.
Step 4	no lldp receive	No LLDP packets are received on the interface.
Step 5	end	Return to privileged EXEC mode.
Step 6	copy running-config startup-config	(Optional) Save your entries in the configuration file.

Beginning in privileged EXEC mode, follow these steps to enable LLDP on an interface when it has been disabled:

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface on which you are enabling LLDP, and enter interface configuration mode. LLDP is supported only on NNIs and ENIs. It is not supported on UNIs. If necessary, use the port-type { eni nni } interface configuration command to change the port type.
Step 3	no shutdown	If necessary, enable the port. By default NNIs are enabled, and ENIs and UNIs are disabled.
Step 4	lldp transmit	LLDP packets are sent on the interface.
Step 5	lldp receive	LLDP packets are received on the interface.
Step 6	end	Return to privileged EXEC mode.
Step 7	copy running-config startup-config	(Optional) Save your entries in the configuration file.

This example shows how to enable LLDP on an interface.

```
Switch# configure terminal
Switch(config)# interface GigabitEthernet1/0/1
Switch(config-if)# no shutdown
Switch(config-if)# port-type nni
Switch(config-if)# lldp transmit
Switch(config-if)# lldp receive
Switch(config-if)# end
```

Configuring LLDP-MED TLVs

By default, the switch only sends LLDP packets until it receives LLDP-MED packets from the end device. It will then send LLDP packets with MED TLVs as well. When the LLDP-MED entry has been aged out, it only sends LLDP packets again.

Using the **lldp** interface configuration command, you can configure the interface not to send the TLVs listed in [Table 1-2](#).

Table 1-2 LLDP-MED TLVs

LLDP-MED TLV	Description
inventory-management	LLDP-MED inventory management TLV
location	LLDP-MED location TLV
network-policy	LLDP-MED network policy TLV
power-management	LLDP-MED power management TLV

Beginning in privileged EXEC mode, follow these steps to disable a TLV on an interface:

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface on which you are configuring a LLDP-MED TLV, and enter interface configuration mode.
Step 3	no lldp med-tlv-select <i>tlv</i>	Specify the TLV to disable.
Step 4	end	Return to privileged EXEC mode.
Step 5	copy running-config startup-config	(Optional) Save your entries in the configuration file.

Beginning in privileged EXEC mode, follow these steps to enable a TLV on an interface:

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface on which you are configuring an LLDP-MED TLV, and enter interface configuration mode.
Step 3	lldp med-tlv-select <i>tlv</i>	Specify the TLV to enable.
Step 4	end	Return to privileged EXEC mode.
Step 5	copy running-config startup-config	(Optional) Save your entries in the configuration file.

This example shows how to enable a TLV on an interface when it has been disabled.

```
Switch# configure terminal
Switch(config)# interface GigabitEthernet1/0/1
Switch(config-if)# lldp med-tlv-select inventory-management
Switch(config-if)# end
```

Monitoring and Maintaining LLDP and LLDP-MED

To monitor and maintain LLDP and LLDP-MED on your device, perform one or more of these tasks, beginning in privileged EXEC mode.

Command	Description
clear lldp counters	Reset the traffic counters to zero.
clear lldp table	Delete the LLDP table of information about neighbors.
show lldp	Display global information, such as frequency of transmissions, the holdtime for packets being sent, and the delay time for LLDP to initialize on an interface.
show lldp entry <i>entry-name</i>	Display information about a specific neighbor. You can enter an asterisk (*) to display all neighbors, or you can enter the name of the neighbor about which you want information.
show lldp interface [<i>interface-id</i>]	Display information about interfaces where LLDP is enabled. You can limit the display to the interface about which you want information.

Command	Description
show lldp neighbors [<i>interface-id</i>] [detail]	Display information about neighbors, including device type, interface type and number, holdtime settings, capabilities, and port ID. You can limit the display to neighbors of a specific interface or expand the display to provide more detailed information.
show lldp traffic	Display LLDP counters, including the number of packets sent and received, number of packets discarded, and number of unrecognized TLVs.