Interface and Hardware Components Configuration Guide, Cisco Catalyst IE3x00 Rugged, IE3400 Heavy Duty, and ESS3300 Series Switches

Cisco Catalyst IE3200 Rugged Series
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1 Configuring LLDP

Topics:

- Information about LLDP
- Restrictions for LLDP
- Enable LLDP
- Disable LLDP
- Configure LLDP characteristics
- Monitor and maintain LLDP

Information about LLDP

Describes the Link Layer Discovery Protocol (LLDP), LLDP Media Endpoint Discovery (LLDP-MED), and wired location service components for network device discovery and location identification.

This reference provides technical details regarding the implementation and functionality of LLDP, LLDP-MED, and wired location services within the network environment.

LLDP

Describes a neighbor discovery protocol that enables network devices to advertise information about themselves to other devices on the network.

LLDP is a neighbor discovery protocol that

- is used for network devices to advertise information about themselves to other devices on the network
- runs over the data-link layer, which allows two systems running different network layer protocols to learn about each other, and
- supports non-Cisco devices and allows for interoperability between other devices.

LLDP and CDP comparison

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, switches, and controllers). 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 device supports the IEEE 802.1AB Link Layer Discovery Protocol (LLDP).

LLDP supported TLVs

Lists LLDP and TLV values that support neighbor device discovery and information exchange.

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. This protocol can advertise details such as configuration information, device capabilities, and device identity.

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

- Port description TLV
- System name TLV
- System description TLV
- 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 or PHY configuration or status TLV (IEEE 802.3 organizationally specific TLVs)

LLDP TLVs are used by Common Industrial Protocol, (CIP) in industrial automation applications. The switch supports these CIP identification TLVs:

- Vendor ID
- Product type
- Product code
- Product major revision
- Product minor revision
- Product CIP serial number

For information about CIP, see CIP and MODBUS Configuration Guide, Cisco Catalyst IE3x00 Rugged, IE3400 Heavy Duty, and ESS3300 Series Switches.

The **show LLDP neighbors detail TLV-dump** command displays LLDP TLVs. See Monitor and maintain LLDP on page 13 for more information about **show LLDP** commands.

Default LLDP configuration

Lists the default LLDP configuration settings and parameters for the device.

This reference provides the default configuration settings for LLDP features and parameters. These settings are applied when LLDP is first configured or reset to defaults.

Table 1: Default LLDP configuration

Feature	Default Setting
LLDP global state	Enabled
LLDP holdtime (before discarding)	120 seconds
LLDP timer (packet update frequency)	30 seconds
LLDP reinitialization delay	2 seconds
LLDP tlv-select	Enabled to send and receive all TLVs
LLDP interface state	Enabled
LLDP receive	Enabled
LLDP transmit	Enabled

Restrictions for LLDP

Outlines configuration limitations and requirements when implementing LLDP protocol functionality.

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

If you first configure a network-policy profile on an interface, you cannot apply the **switchport voice VLAN** command on the interface. If the **switchport voice VLAN** *VLAN-id* command is already configured, you may apply a network-policy profile. In this case, the interface will have the voice or voice-signaling VLAN network-policy profile applied.

You cannot configure static secure MAC addresses on an interface that has a network-policy profile.

When Cisco Discovery Protocol and LLDP are both in use within the same switch, it is necessary to disable LLDP on interfaces where Cisco Discovery Protocol is in use for power negotiation. LLDP can be disabled at the interface level with the commands **no LLDP tlv-select power-management** or **no LLDP transmit** or **no LLDP receive**.

Enable LLDP

Configure LLDP globally on the device and enable LLDP transmission and reception on a specific interface.

Enable Link Layer Discovery Protocol (LLDP) to allow the device to discover and be discovered by neighboring network devices, facilitating network topology mapping and device identification.

LLDP is a vendor-neutral protocol that enables network devices to advertise information about themselves to other devices on the network. This configuration enables LLDP globally and on specific interfaces to support network discovery and management.

Procedure

1. Use the **enable** command to access privileged EXEC mode.

   Example

   ```
   Device> enable
   ```

2. Use the **configure terminal** command to access global configuration mode.

   Example

   ```
   Device# configure terminal
   ```

3. Use the **lldp run** command to enable LLDP globally on the device.

   Example

   ```
   Device(config)# lldp run
   ```

4. Use the **interface** *interface-id* command to enter interface configuration mode for the interface on which you want to enable LLDP.

   Example

5. Use the **lldp transmit** command to enable the interface to send LLDP packets.

   Example

   ```
   Device(config-if)# lldp transmit
   ```

6. Use the **lldp receive** commmand to enable the interface to receive LLDP packets.

   Example

   ```
   Device(config-if)# lldp receive
   ```

7. Use the **end** command to return to privileged EXEC mode.

Example

```
Device(config-if)# end
```

8. Use the **show LLDP** command to verify the LLDP configuration.

Example

```
Device# show lldp
```

9. Optional: Use the **copy running-config startup-config** command to save your entries in the configuration file.

Example

```
Device# copy running-config startup-config
```

Disable LLDP

Configure the switch to disable LLDP globally and maintain the configuration across reloads by also disabling the PROFINET protocol.

Disable LLDP on the switch and maintain the configuration across reloads by also globally disabling the PROFINET protocol.

The PROFINET protocol relies on LLDP for its functionality, and PROFINET is enabled by default on the switch. If you disable LLDP using the **no LLDP run** command, and subsequently run the **wr mem** and **reload** commands, PROFINET becomes globally enabled after boot up. As a result, PROFINET re-enables LLDP automatically.

If you want to disable LLDP on the switch and maintain the configuration across reloads, you must also globally disable the PROFINET protocol.

Procedure

1. Use the **configure terminal** command to access global configuration mode.

Example

```
Device# configure terminal
```

2. Use the **no profinet** command to globally disable PROFINET.

Example

```
Device(config)# no profinet
```

3. Use the **no lldp run** command to globally disable LLDP.

Example

```
Device(config)# no lldp run
```

4. Use the **end** command to return to privileged EXEC mode.

   Example

   ```
   Device(config-if)# end
   ```

5. Use the **write memory** command to save the running configuration to nonvolatile random-access memory (NVRAM).

   Example

   ```
   Device# write memory
   ```

6. Use the **reload** command to reload the switch operating system.

   Example

   ```
   Device# reload
   ```

Configure LLDP characteristics

Configure the frequency of LLDP updates, the amount of time to hold the information before discarding it, and the initialization delay time.

Configure LLDP characteristics to control the frequency of LLDP updates, set the amount of time devices retain information before discarding it, and adjust the initialization delay time. You can also select which LLDP TLVs to send or receive.

You can configure the frequency of LLDP updates, set the duration information is held before discarding, and adjust the initialization delay time. You can also select which LLDP TLVs to send or receive.

> **Note**
>
> Steps 3 through 7 are optional and can be performed in any order.

Procedure

1. Use the **enable** command to access privileged EXEC mode.

   Example

   ```
   Device> enable
   ```

2. Use the **configure terminal** command to access global configuration mode.

Example

```
Device# configure terminal
```

3. (Optional) Use the **LLDP holdtime** *seconds* command to set how long receiving devices keep information from your device before removing it.

   Example

   ```
   Device(config)# lldp holdtime 120
   ```

   The range is 0 to 65535 seconds; the default is 120 seconds.

4. (Optional) Use the **LLDP reinit** *delay* command to specify the delay time in seconds for LLDP to initialize on an interface.

   Example

   ```
   Device(config)# lldp reinit 2
   ```

   The range is 2 to 5 seconds; the default is 2 seconds.

5. (Optional) Use the **LLDP timer** *rate* command to set the sending frequency of LLDP updates in seconds.

   Example

   ```
   Device(config)# lldp timer 30
   ```

   The range is 5 to 65534 seconds; the default is 30 seconds.

6. (Optional) Use the **interface** *interface-id* command to enable LLDP on an interface. This command also places you in interface configuration mode.

   Example

   ```
   Device(config)# interface
   gigabitethernet2/1
   ```

7. (Optional) Use the **LLDP tlv-select** *tlv* command to specify the LLDP TLV to send or receive on an interface.

   Example

   ```
   Device(config-if)# lldp tlv-select inventory management
   ```

> **Note**
>
> To disable LLDP TLVs, use the **no LLDP tlv-select tlv** command.

8. Use the**end** command to return to privileged EXEC mode.

   Example

   ```
   Device(config-if)# end
   ```

9. Use the **show LLDP** command to display the global LLDP configuration and status on the device.

   Example

   ```
   Device# show lldp
   ```

   (Optional) Use the **copy running-config startup-config** command to save your entries in the configuration file.

   Example

   ```
   Device# copy running-config startup-config
   ```

Monitor and maintain LLDP

Provides commands for monitoring and maintaining LLDP.

Commands for monitoring and maintaining LLDP.

Command	Description
clear LLDP counters	Resets the traffic counters to zero.
clear LLDP table	Deletes the LLDP neighbor information table.
show LLDP	Displays global information, such as frequency of transmissions, the holdtime for packets being sent, and the delay time before LLDP initializes on an interface.
show LLDP entry *entry-name*	Displays information about a specific neighbor. You can enter an asterisk (*) to display all neighbors, or you can enter the neighbor name.
show LLDP interface [*interface-ID*]	Displays information about interfaces with LLDP enabled. You can limit the display to a specific interface.

Command	Description
show LLDP neighbors [*interface-ID*] [**detail**] [**TLV-dump**]	Displays 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 for more detailed information. The TLV-dump option displays LLDP TLV attributes.
show LLDP traffic	Displays LLDP counters, including the number of packets sent and received, number of packets discarded, and number of unrecognized TLVs.
show CIP object LLDP-management instance	Displays CIP LLDP management and data objects.
show CIP object LLDP-management class	
show CIP object LLDP-datatable instance <0-1000>	
show CIP object LLDP-datatable class	