

Configure LLDP

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Feature History for LLDP

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature Name and Description	Supported Platform
Cisco IOS XE 26.2.1ea	Link Layer Discovery Protocol: LLDP feature support has been introduced.	Cisco C9550 Series Smart Switches
Cisco IOS XE 17.18.1	Link Layer Discovery Protocol (LLDP) is an Layer 2 protocol that enables network devices to advertise their identity, capabilities, and connectivity information to directly connected devices.	Cisco C9350 Series Smart Switches Cisco C9610 Series Smart Switches

Link Layer Discovery Protocol

Link Layer Discovery Protocol (LLDP) is a Layer 2 protocol that enables network devices to advertise their identity, capabilities, and connectivity information to directly connected devices.

On Cisco switches, LLDP allows the switch to discover neighboring devices and learn about their configuration, regardless of the device type or vendor. This information is exchanged between devices on a port-by-port basis. LLDP operates by sending and receiving LLDP Data Units (LLDPDUs) that contain Type-Length-Value (TLV) elements. These TLVs carry specific pieces of information about the sending device and its port.

Key information exchanged

LLDP advertisements typically include details such as:

- **Chassis ID:** A unique identifier for the device, often its MAC address.

- **Port ID:** A unique identifier for the specific port (e.g., port number, interface name).
- **Port Description:** A textual description of the port.
- **System Name:** The hostname of the device.
- **System Description:** A description of the operating system software and hardware.
- **System Capabilities:** The major functions of the device (e.g., router, switch, WLAN AP).
- **Management Address:** The IP address for managing the device.
- **Power over Ethernet (PoE) Information:** Details about power requirements and capabilities.

Benefits of LLDP

LLDP is invaluable for network administrators for:

- **Network topology discovery:** Quickly mapping out network connections and understanding physical connectivity.
- **Troubleshooting:** Identifying connectivity issues, verifying physical connections, and detecting misconfigurations.
- **Asset management:** Gaining visibility into connected devices and their attributes, aiding in inventory and documentation.
- **Deployment and configuration:** Informing other protocols or automated systems, particularly for Power over Ethernet (PoE) devices, to ensure proper power delivery and network policy application.

Restrictions and limitations of LLDP

LLDP, while highly beneficial, has specific operational characteristics and potential considerations:

- **Layer 2 only operation:** LLDP operates strictly at Layer 2 (the data link layer) of the OSI model. This means it can only discover and exchange information with directly connected neighbors on the same physical segment. It does not provide information about devices across Layer 3 boundaries.
- **Information disclosure:** LLDP broadcasts device information, which could potentially be leveraged by unauthorized parties if enabled on untrusted or publicly accessible ports. It is not an authentication mechanism and does not verify the identity of the neighbor.
- **Resource consumption:** Although generally minimal, enabling LLDP on a large number of ports, especially in very dense environments, can consume a small amount of CPU and memory resources for processing and storing neighbor information.
- **No configuration enforcement:** LLDP is a discovery protocol; it gathers and advertises information. It does not automatically apply or propagate configurations to neighboring devices. Other protocols or manual configurations are required to act upon the discovered information.
- **Vendor-specific TLVs:** While LLDP is an open standard, vendors may implement proprietary TLVs for specific features or information. These vendor-specific TLVs might not be understood or processed by devices from other manufacturers.

- **Unidirectional operation:** If LLDP is configured in send-only or receive-only mode on a port, the full discovery capability between two devices might be limited. For complete neighbor discovery, both devices should be configured to send and receive LLDP packets.

Types of LLDP

LLDP is primarily a single protocol, but its functionality can be extended, and it operates in different modes.

- **Base LLDP:** This refers to the core LLDP protocol (IEEE 802.1AB) that provides the fundamental device discovery and information exchange capabilities. It includes the standard TLVs for chassis ID, port ID, system name, system description, and capabilities.
- **LLDP-MED (Media Endpoint Devices):** This is an extension to the base LLDP standard (ANSI/TIA-1057) designed specifically for Voice over IP (VoIP) phones, video conferencing units, and other media endpoint devices. LLDP-MED provides additional TLVs that are crucial for these applications, such as:
  - **Network policy:** Advertises VLAN IDs, Layer 2 priority (802.1p), and Layer 3 Differentiated Services Code Point (DSCP) values for voice and video traffic.
  - **Power over MDI (Media Dependent Interface):** Provides detailed power management information for PoE devices, including power type, source, priority, and allocated power.
  - **Inventory:** Allows discovery of hardware and software versions of the endpoint.
  - **Location identification:** Enables the endpoint to send its physical location (e.g., civic address, coordinate-based location) to the switch, which is critical for emergency services (E911).
- **LLDP modes of operation:** On Cisco switches, LLDP can be configured to operate in different modes on a per-interface basis:
  - **Transmit (Tx):** The interface sends LLDPDUs but does not process incoming LLDPDUs.
  - **Receive (Rx):** The interface processes incoming LLDPDUs but does not send its own LLDPDUs.
  - **Transmit and Receive (TxRx):** The interface sends and receives LLDPDUs. This is typically the default and recommended mode for full discovery.
  - **Disabled:** LLDP is not active on the interface.

Configure LLDP

Follow these steps to configure LLDP on your switch:

Before you begin

You must have privileged EXEC mode access to the switch.

Procedure

	Command or Action	Purpose
Step 1	Switch# enable	Enables privileged EXEC mode. Enter your password if prompted
Step 2	Switch# configure terminal	Enters global configuration mode.
Step 3	Switch(config)# lldp run	Enables LLDP globally on the switch. This command allows the LLDP process to start running on the device.
Step 4	Switch(config)# interface GigabitEthernet0/1	Specifies the interface on which to configure LLDP, and enters interface configuration mode. Replace type and number with your specific interface (e.g., GigabitEthernet1/0/1).
Step 5	Switch(config-if)# lldp transmit	Configures the interface to send LLDPDUs.
Step 6	Switch(config-if)# lldp receive	Configures the interface to receive LLDPDUs. **Note** Note: For full bidirectional discovery, you typically configure both lldp transmit and lldp receive on the interface. The lldp transmit receive command is a shortcut for both.
Step 7	Switch(config-if)# end	Returns to privileged EXEC mode.
Step 8	Switch# copy running-config startup-config	Saves the running configuration to the startup configuration. This ensures that your LLDP configuration is retained after a switch reload. Press Enter when prompted to confirm the destination filename.

Verify LLDP

After configuring LLDP, use these commands in privileged EXEC mode to verify its operation:

Table 1: Commands for displaying LLDP status

Command	Purpose	Example Output
show lldp	Displays the global LLDP status, including whether it's enabled and the default timer values.	LLDP is enabled LLDP advertisements are sent every 30 seconds LLDP hold time is 120 seconds

show lldp interface <interface name>	Shows LLDP status for all interfaces or a specific interface, indicating whether transmit and receive are enabled.	GigabitEthernet1/0/1: Tx: enabled Rx: enabled
show lldp neighbors	Displays a summary of discovered LLDP neighbors, including their local port, device ID, and remote port ID.	Device ID Local Intf Hold-time Capabilities Port ID --- Router1 Gig 0/1 120 R, B GigabitEthernet0/0 IPPhone Gig 0/2 120 T MAC:aabb.ccdd.eeff
show lldp neighbors detail	Provides detailed information about all discovered LLDP neighbors, including all advertised TLVs (system name, description, capabilities, management IP, etc.).	--- Chassis id: 0011.2233.4455 Port id: GigabitEthernet0/0 Port Description: Uplink to Switch System Name: Router1 System Description: Cisco IOS Software …
show lldp entry {all | <neighbor-name>}	Displays information for all LLDP neighbors or the specified LLDP neighbor.	(Similar detailed output as show lldp neighbors detail but filtered for a single device.)