

Configuring LLDP

This chapter describes how to configure the Link Layer Discovery Protocol (LLDP) on Cisco MDS 9000 Family switches.

- About LLDP, on page 1
- Platforms Supported, on page 3
- Guidelines and Limitations for LLDP, on page 3
- Default Settings for LLDP, on page 4
- Configuring LLDP, on page 4
- Verifying the LLDP Configuration, on page 7
- Configuration Example for LLDP, on page 8

About LLDP

The Cisco Discovery Protocol (CDP) is a device discovery protocol that allows network management applications to automatically discover and learn about other Cisco devices that are connected to the network.

To permit the discovery of non-Cisco devices, the switch also supports the Link Layer Discovery Protocol (LLDP), a vendor-neutral device discovery protocol that is defined in the IEEE 802.1ab standard. LLDP allows 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 is a one-way protocol that transmits information about the capabilities and status of a device and its interfaces. LLDP devices use the protocol to solicit information only from other LLDP devices.

LLDP supports a set of attributes that it uses to discover other devices. These attributes contain type, length, and value (TLV) descriptions. LLDP devices can use TLVs to send and receive information to other devices on the network. Details such as configuration information, device capabilities, and device identity can be advertised using this protocol.

LLDP advertises the following TLVs by default:

- DCBXP
- Management address
- Port description
- Port VLAN

- System capabilities
- System description
- System name

About DCBX

The Data Center Bridging Exchange Protocol (DCBXP) is an extension of LLDP. It is used to announce, exchange, and negotiate node parameters between peers. DCBXP parameters are packaged into a specific DCBXP TLV. This TLV is designed to provide an acknowledgement to the received LLDP packet. In this way, DCBXP adds a lightweight acknowledgement mechanism on top of LLDP so that any application that needs a request-response semantic from a link-level protocol can make use of DCBXP.Other applications that need to exchange and negotiate parameters with peer nodes using DCBXP are as follows:

- Priority-based Flow Control (PFC)—PFC is an enhancement to the existing Pause mechanism in Ethernet. It enables Pause based on user priorities or classes of service. A physical link divided into eight virtual links with PFC provides the capability to use Pause on a single virtual link without affecting traffic on the other virtual links. Enabling Pause on a per-user-priority basis allows administrators to create lossless links for traffic requiring no-drop service while retaining packet-drop congestion management for IP traffic.
- Enhanced Transmission Selection (ETS)—ETS enables optimal bandwidth management of virtual links. ETS is also called priority grouping. It enables differentiated treatments within the same priority classes of PFC. ETS provides prioritized processing based on bandwidth allocation, low latency, or best effort, resulting in per-group traffic class allocation. For example, an Ethernet class of traffic may have a high-priority designation and a best effort within that same class. ETS allows differentiation between traffic of the same priority class, thus creating priority groups.
- Application Priority Configuration TLV—Carries information about which VLANs will be used by specific protocols.



Note For information on the quality of service (QoS) features, see the *Cisco MDS 9000 Series Quality of Service Configuration Guide, Release 9.x*.

DCBXP is enabled by default, provided LLDP is enabled. When LLDP is enabled, DCBXP can be enabled or disabled using the [**no**] **lldp tlv-select dcbxp** command. DCBXP is disabled on ports where LLDP transmit or receive is disabled.

High Availability

The LLDP feature supports stateless and stateful restarts. After a reboot or supervisor switchover, the running configuration is applied.

For more information on high availability, see the *Cisco MDS 9000 Series High Availability Configuration Guide, Release 9.x*.

Virtualization Support

One instance of LLDP is supported.

Platforms Supported

- Cisco MDS 9700 series
- Cisco MDS 9148S
- Cisco MDS 9148T
- Cisco MDS 9148V
- Cisco MDS 9132T
- Cisco MDS 9396S
- Cisco MDS 9396T
- Cisco MDS 9396V
- Cisco MDS 9124V
- Cisco MDS 9220i
- Cisco MDS 9250i

Guidelines and Limitations for LLDP

LLDP has the following configuration guidelines and limitations:

- LLDP feature is enabled by default in MDS 9700 series and MDS 9250i fabric switch.LLDP feature needs to be enabled on all other MDS switches to use the LLDP support on management interfaces.
- LLDP feature cannot be disabled on on MDS 9250i and MDS 9700 series.
- LLDP must be enabled on the device before you can enable or disable it on any interfaces.
- LLDP is supported only on physical interfaces.
- LLDP can discover up to one device per port.
- LLDP can discover Linux servers, provided they are not using a converged network adapter (CNA). LLDP cannot discover other types of servers.
- DCBXP incompatibility messages might appear when you change the network QoS policy if a physical loopback connection is in the device. The incompatibility exists for only a short time and then clears.
- DCBXP is supported only on FCoE ports not on Management ports.
- LLDP is supported forFCoEon MDS 9700 series and MDS 9250i Multiservice Fabric Switch.
- LLDP is supported on management port (management port 0) for all the MDS switches.
- From Cisco MDS NX-OS Release 9.4(1), ensure that the LLDP feature is disabled before you perform the downgrade to target releases on all MDS switches except MDS 9250i Mutliservice Fabric Switch and MDS 9700 series
- LLDP is not supported on IPS ports.

Default Settings for LLDP

This table lists the LLDP default settings.

Parameters	Default
Global LLDP	Disabled
LLDP on interfaces	Enabled, after LLDP is enabled globally
LLDP hold time (before discarding)	120 seconds
LLDP reinitialization delay	2 seconds
LLDP timer (packet update frequency)	30 seconds
LLDP TLVs	Enabled
LLDP receive	Enabled, after LLDP is enabled globally
LLDP transmit	Enabled, after LLDP is enabled globally
DCBXP	Enabled, provided LLDP is enabled

Configuring LLDP

Note Cisco NX-OS commands for this feature may differ from Cisco IOS commands for a similar feature.

Enabling or Disabling LLDP Globally

You can enable or disable LLDP globally on a device. You must enable LLDP globally to allow a device to send and receive LLDP packets.

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# [**no**] **feature lldp**
3. (Optional) switch(config)# **show running-config lldp**
4. (Optional) switch(config)# **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.

	Command or Action	Purpose
Step 2	switch(config)# [**no**] **feature lldp**	Enables or disables LLDP on the device. LLDP is disabled by default.
Step 3	(Optional) switch(config)# **show running-config lldp**	Displays the global LLDP configuration. If LLDP is enabled, it shows "feature lldp." If LLDP is disabled, it shows an "Invalid command" error.
Step 4	(Optional) switch(config)# **copy running-config startup-config**	Copies the running configuration to the startup configuration.

Enabling or Disabling LLDP on an Interface

After you globally enable LLDP, it is enabled on all supported interfaces by default. However, you can enable or disable LLDP on individual interfaces or selectively configure an interface to only send or only receive LLDP packets.

Before you begin

Make sure that you have globally enabled LLDP on the device.

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **interface** *interface slot*/*port*
3. switch(config-if)# [**no**] **lldp transmit**
4. switch(config-if)# [**no**] **lldp receive**
5. (Optional) switch(config-if)# **show lldp interface** *interface slot*/*port*
6. (Optional) switch(config)# **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *interface slot*/*port*	Specifies the interface on which you are enabling LLDP and enters the interface configuration mode.
Step 3	switch(config-if)# [**no**] **lldp transmit**	Enables or disables the transmission of LLDP packets on an interface. After you globally enable LLDP, it is enabled on all supported interfaces by default.
Step 4	switch(config-if)# [**no**] **lldp receive**	Enables or disables the reception of LLDP packets on an interface. After you globally enable LLDP, it is enabled on all supported interfaces by default.

	Command or Action	Purpose
Step 5	(Optional) switch(config-if)# **show lldp interface** *interface slot*/*port*	Displays the LLDP configuration on the interface.
Step 6	(Optional) switch(config)# **copy running-config startup-config**	Copies the running configuration to the startup configuration.

Configuring Optional LLDP Parameters

You can configure the frequency of LLDP updates, the amount of time for a receiving device to hold the information before discarding it, and the initialization delay time. You can also select the TLVs to include in LLDP packets.

SUMMARY STEPS

1. switch# **configure terminal**
2. (Optional) switch(config)# [**no**] **lldp holdtime** *seconds*
3. (Optional) switch(config)# [**no**] **lldp reinit** *seconds*
4. (Optional) switch(config)# [**no**] **lldp timer** *seconds*
5. (Optional) switch(config)# **show lldp timers**
6. (Optional) switch(config)# [**no**] **lldp tlv-set**
7. (Optional) switch(config)# **show lldp tlv-set**
8. (Optional) switch(config)# [**no**] **lldp tlv-select** *tlv*
9. (Optional) switch(config)# **show lldp tlv-select**
10. (Optional) switch(config)# **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	(Optional) switch(config)# [**no**] **lldp holdtime** *seconds*	Specifies the amount of time in seconds that a receiving device should hold the information sent by your device before discarding it. The range is 10 to 255 seconds; the default is 120 seconds.
Step 3	(Optional) switch(config)# [**no**] **lldp reinit** *seconds*	Specifies the delay time in seconds for LLDP to initialize on any interface. The range is 1 to 10 seconds; the default is 2 seconds.
Step 4	(Optional) switch(config)# [**no**] **lldp timer** *seconds*	Specifies the transmission frequency of LLDP updates in seconds. The range is 5 to 254 seconds; the default is 30 seconds.

	Command or Action	Purpose
Step 5	(Optional) switch(config)# **show lldp timers**	Displays the LLDP hold time, delay time, and update frequency configuration.
Step 6	(Optional) switch(config)# [**no**] **lldp tlv-set**	Sets the TLVs to send and receive in LLDP packets. The available TLVs are dcbxp, management-address, and port-vlan All available TLVs are enabled by default.
Step 7	(Optional) switch(config)# **show lldp tlv-set**	Displays the defined LLDP TLV configuration.
Step 8	(Optional) switch(config)# [**no**] **lldp tlv-select** *tlv*	Specifies the selected TLVs to send and receive in LLDP packets. The available TLVs are dcbxp, management-address, port-description, port-vlan, system-capabilities, system-description, and system-name. All available TLVs are enabled by default.
Step 9	(Optional) switch(config)# **show lldp tlv-select**	Displays the selected LLDP TLV configuration.
Step 10	(Optional) switch(config)# **copy running-config startup-config**	Copies the running configuration to the startup configuration.

Verifying the LLDP Configuration

To display the LLDP configuration, perform one of the following tasks:

Command	Purpose
show running-config lldp	Displays the global LLDP configuration.
show lldp interface *interface slot*/*port*	Displays the LLDP interface configuration.
show lldp timers	Displays the LLDP hold time, delay time, and update frequency configuration.
show lldp tlv-set	Displays the defined LLDP TLV configuration.
show lldp tlv-select	Displays the selected LLDP TLV configuration.
show lldp dcbx interface *interface slot*/*port*	Displays the local DCBX control status.
show lldp neighbors {**detail** | **interface** *interface slot*/*port*}	Displays the LLDP neighbor device status.
show lldp traffic	Displays the LLDP counters, including the number of LLDP packets sent and received by the device, the number of discarded packets, and the number of unrecognized TLVs.
show lldp traffic interface *interface slot*/*port*	Displays the number of LLDP packets sent and received on the interface.

Use the **clear lldp counters** command to clear the LLDP statistics.

Configuration Example for LLDP

This example shows how to enable LLDP on a device; disable LLDP on some interfaces; configure optional parameters such as hold time, delay time, and update frequency; and disable several LLDP TLVs:

```
switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# feature lldp
switch(config)# interface ethernet 7/9
switch(config-if)# no lldp transmit
switch(config-if)# no lldp receive
switch(config-if)# exit
switch(config)# interface ethernet 7/10
switch(config-if)# no lldp transmit
switch(config-if)# no lldp receive
switch(config-if)# exit
switch(config)# lldp holdtime 200
switch(config)# lldp reinit 5
switch(config)# lldp timer 50
switch(config)# no lldp tlv-select port-vlan
switch(config)# no lldp tlv-select system-name
```