



## **Cisco Discovery Protocol Configuration Guide Cisco IOS XE Release 3E**

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# Cisco Discovery Protocol Version 2

Cisco Discovery Protocol (formerly known as CDP) is a Layer 2, media-independent, and network-independent protocol that runs on Cisco devices and enables networking applications to learn about directly connected devices nearby. This protocol facilitates the management of Cisco devices by discovering these devices, determining how they are configured, and allowing systems using different network-layer protocols to learn about each other.

This module describes Cisco Discovery Protocol Version 2 and how it functions with Simple Network Management Protocol (SNMP).

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for Using Cisco Discovery Protocol

- Interfaces must support Subnetwork Access Protocol (SNAP) headers.

## Restrictions for Using Cisco Discovery Protocol

- Cisco Discovery Protocol functions only on Cisco devices.
- Cisco Discovery Protocol is not supported on Frame Relay multipoint subinterfaces.

## Information About Using Cisco Discovery Protocol

### VLAN Trunking Protocol

VLAN Trunking Protocol (VTP) is a discovery technique used by switches. A switch advertises its management domain, configuration revision number, VLANs, and their specific parameters on its trunk ports. A VTP domain is made up of a single device or interconnected devices that share the same VTP domain name. A switch can belong to only one VTP domain.

### Type-Length-Value Fields

Type-Length-Value (TLV) fields are blocks of information embedded in Cisco Discovery Protocol advertisements. Information in advertisements varies, and the TLV frame format allows for extending advertisements when needed. The table below summarizes the TLV definitions.

**Table 1: Type-Length-Value Definitions for Cisco Discovery Protocol Version 2**

TLV	Definition
Address TLV	Contains network addresses of both receiving and sending devices.
Application TLV	Provides a mechanism to send an application-specific TLV through Cisco Discovery Protocol.
Capabilities TLV	Identifies the device type, which indicates the functional capability of the device. For example, a switch.
Device-ID TLV	Identifies the device name in the form of a character string.
Full or Half Duplex TLV	Indicates the duplex configuration of the Cisco Discovery Protocol broadcast interface. This information is used by network operators to diagnose connectivity problems between adjacent network devices.

TLV	Definition
IP Network Prefix TLV	Contains a list of network prefixes to which a sending device can forward IP packets. A prefix includes the interface protocol and the port number. For example, Ethernet 1/0.
Location TLV	<p>Delivers location-based information to endpoint devices through access devices (switches or routers) by using Cisco Discovery Protocol. The location TLV can send the following types of information:</p> <ul style="list-style-type: none"> <li>• Civic location information—Provides the civic address information and the postal information. Examples include street address, road name, and postal community name.</li> <li>• 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.</li> </ul> <p>You must configure the location TLV on the device before Cisco Discovery Protocol can deliver location-based information to endpoint devices. For more information about configuring location TLV, see the <i>Using Link Layer Discovery Protocol in Multivendor Networks</i> module.</p>
Location-Server TLV	Provides a mechanism for location servers to transfer the required information to neighboring devices.
Native VLAN TLV	<p>Indicates, per interface, the assumed VLAN for untagged packets on the interface. Cisco Discovery Protocol learns the native VLAN for an interface.</p> <p>This field is implemented only for interfaces that support the IEEE 802.1Q protocol.</p>
Platform TLV	Identifies the hardware platform of the device. For example, Cisco 4500.
Port-ID TLV	Identifies the port on which a Cisco Discovery Protocol packet is sent.
Version TLV	Contains the device software release information.
VTP Management Domain TLV	Advertises the configured VLAN Trunking Protocol (VTP)-management-domain name of the system. This name is used by network operators to verify VTP-domain configuration in adjacent network nodes.

## Cisco Discovery Protocol

Cisco Discovery Protocol is a Layer 2, media-independent, and network-independent protocol that networking applications use to learn about nearby, directly connected devices. Cisco Discovery Protocol is enabled by default. Each device configured for Cisco Discovery Protocol advertises at least one address at which the device can receive messages and sends periodic advertisements (messages) to the well-known multicast address 01:00:0C:CC:CC:CC. Devices discover each other by listening at that address. They also listen to messages to learn when interfaces on other devices are up or go down.

Advertisements contain time-to-live information, which indicates the length of time a receiving device should hold Cisco Discovery Protocol information before discarding it. Advertisements supported and configured in Cisco software are sent, by default, every 60 seconds on interfaces that support Subnetwork Access Protocol (SNAP) headers. Cisco devices never forward Cisco Discovery Protocol packets. Cisco devices that support Cisco Discovery Protocol store the information received in a table. Information in this table is refreshed every time an advertisement is received, and information about a device is discarded after three advertisements from that device are missed.

The information contained in Cisco Discovery Protocol advertisements varies based on the type of device and the installed version of the operating system. Some of the information that Cisco Discovery Protocol can learn includes:

- Cisco IOS version running on Cisco devices
- Hardware platform of devices
- IP addresses of interfaces on devices
- Locally connected devices advertising Cisco Discovery Protocol
- Interfaces active on Cisco devices, including encapsulation type
- Hostname
- Duplex setting
- VLAN Trunking Protocol (VTP) domain
- Native VLAN

Cisco Discovery Protocol Version 2 provides more intelligent, device-tracking features than those available in Version 1. One of the features available is an enhanced reporting mechanism for more rapid error tracking, which helps to reduce network downtime. Errors reported include mismatched native VLAN IDs (IEEE 802.1Q) on connected ports and mismatched port-duplex states between connected devices. Messages about reported errors can be sent to the console or to a logging server.

You can use **show** commands for getting detailed output on VTP management domains and duplex modes of neighboring devices, counters related to Cisco Discovery Protocol, and VLAN IDs of connecting ports.

### Using Cisco Discovery Protocol with SNMP

Using Cisco Discovery Protocol with Simple Network Management Protocol (SNMP) allows network management applications to learn the type of device and the SNMP agent address of neighboring devices. Applications can also send SNMP queries to these neighboring devices.

The SNMP management application learns protocol addresses and types of neighboring devices by retrieving the Cisco Discovery Protocol tables from SNMP agents on those devices. When enabled, the network



management module (NMM) SNMP agent discovers neighboring devices and builds its local cache with information about these devices. A management workstation can retrieve this cache by sending SNMP requests to access CISCO-CDP-MIB.

## Cisco Discovery Protocol and On-Demand Routing Support for ATM PVCs

Cisco Discovery Protocol and On-Demand Routing (ODR) support exists for ATM point-to-point permanent virtual circuits (PVCs). ODR uses Cisco Discovery Protocol to propagate IP address information in hub-and-spoke topologies. When ODR is enabled, spoke routers automatically advertise their subnets by using Cisco Discovery Protocol.

Cisco Discovery Protocol is disabled by default on ATM PVC interfaces. To enable Cisco Discovery Protocol, use the **cdp run** command in global configuration mode and the **cdp enable** command in interface configuration mode on both ends of the PVC. To enable ODR, use the **router odr** command in global configuration mode on the hub router, and turn off all dynamic-routing protocols on the spoke routers. For details about configuring ODR, see the “Configuring On-Demand Routing” section in the *IP Routing: ODR Configuration Guide*.

## Cisco Discovery Protocol Support in IPv6

Cisco Discovery Protocol in IPv6 functions in the same way as in IPv4 and offers the same benefits. The IPv6 enhancement allows Cisco Discovery Protocol to exchange IPv6 and neighbor addressing information. The enhancement also provides IPv6 information to network management products and troubleshooting tools.

## Benefits of Cisco Discovery Protocol

Cisco Discovery Protocol provides the following benefits:

- Allows systems using different network layer protocols to learn about one another.
- Facilitates management of Cisco devices by discovering them and discovering how they are configured.
- Assists with troubleshooting Type-Length-Value Fields (TLV) fields.
- Works with SNMP by learning SNMP agent addresses and sending SNMP queries.

# How to Use Cisco Discovery Protocol Version 2

## Disabling and Enabling Cisco Discovery Protocol on a Cisco Device

### Disabling Cisco Discovery Protocol on a Supported Device

#### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `no cdp run`
4. `end`

#### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>no cdp run</b>  <b>Example:</b> Device(config)# no cdp run	Disables Cisco Discovery Protocol on a supported device.
<b>Step 4</b>	<b>end</b>  <b>Example:</b> Device(config)# end	Returns the CLI to privileged EXEC mode.

## Enabling Cisco Discovery Protocol on a Supported Device

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cdp run**
4. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>cdp run</b>  <b>Example:</b> Device(config)# cdp run	Enables Cisco Discovery Protocol on a supported device.
<b>Step 4</b>	<b>end</b>  <b>Example:</b> Device(config)# end	Exits configuration mode and returns to privileged EXEC mode.

## Disabling and Enabling Cisco Discovery Protocol on a Supported Interface

### Disabling Cisco Discovery Protocol on a Supported Interface

If the encapsulation of an interface is changed, Cisco Discovery Protocol is reenabled on that interface even if Cisco Discovery Protocol was previously disabled. For example, when interface encapsulation changes from PPP to High-Level Data Link Control (HDLC), Cisco Discovery Protocol is reenabled on that interface even though it was explicitly disabled with the **no cdp run** command on that interface. This behavior is by design. The encapsulation changes the Layer 2 protocol configured for that interface and resets the interface

configuration to the default Cisco Discovery Protocol state of being enabled, assuming that Cisco Discovery Protocol is enabled globally on the device.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number* [*name-tag*]
4. **no cdp enable**
5. **end**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i> [ <i>name-tag</i> ]  <b>Example:</b> Device(config)# interface GigabitEthernet 1/0/1	Configures the specified interface and enters interface configuration mode.
<b>Step 4</b>	<b>no cdp enable</b>  <b>Example:</b> Device(config-if)# no cdp enable	Disables Cisco Discovery Protocol on the interface.  <b>Note</b> If the encapsulation of an interface is changed, Cisco Discovery Protocol is reenabled on that interface even if Cisco Discovery Protocol was previously disabled.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Device(config-if)# end	Exits to privileged EXEC mode.

### Example

In the following example, Cisco Discovery Protocol is first disabled on an interface:

```
Device(config)# interface GigabitEthernet 1/0/1
```

```

Device(config-if)# no ip address

Device(config-if)# shutdown
Device(config-if)# no cdp enable
! Cisco Discovery Protocol is disabled.
Device(config-if)# end

```

## Enabling Cisco Discovery Protocol on a Supported Interface



**Note** If the encapsulation of an interface is changed, Cisco Discovery Protocol is reenabled on that interface, even if Cisco Discovery Protocol was previously disabled.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number* [*name-tag*]
4. **cdp enable**
5. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i> [ <i>name-tag</i> ]  <b>Example:</b> Device(config)# interface GigabitEthernet 1/0/1	Configures the specified interface and places the CLI in interface configuration mode.  <b>Note</b> If the encapsulation of an interface is changed, Cisco Discovery Protocol is reenabled on that interface, even if Cisco Discovery Protocol was previously disabled.
<b>Step 4</b>	<b>cdp enable</b>  <b>Example:</b> Device(config-if)# cdp enable	Enables Cisco Discovery Protocol on the interface.

	Command or Action	Purpose
Step 5	<b>end</b>  <b>Example:</b> Device(config-if)# end	Returns the CLI to privileged EXEC mode.

## Setting the Transmission Timer and Hold Time

Perform this task to set the frequency of Cisco Discovery Protocol transmissions and the hold time for Cisco Discovery Protocol packets.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cdp timer** *seconds*
4. **cdp holdtime** *seconds*
5. **end**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>cdp timer</b> <i>seconds</i>  <b>Example:</b> Device(config)# cdp timer 30	Specifies the frequency of transmission of Cisco Discovery Protocol packets.

	Command or Action	Purpose
<b>Step 4</b>	<b>cdp holdtime</b> <i>seconds</i>  <b>Example:</b> Device(config)# cdp holdtime 90	Specifies the time for which a receiving device should hold information before discarding it.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Device(config)# end	Enters privileged EXEC mode.

## Disabling and Reenabling Cisco Discovery Protocol Version 2 Advertisements

The broadcasting of Cisco Discovery Protocol Version 2 advertisements is enabled by default on Cisco devices. To disable or reenabling this broadcasting, perform these tasks.

### Disabling Cisco Discovery Protocol Version 2 Advertisements

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **no cdp advertise-v2**
4. **end**

#### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>no cdp advertise-v2</b>  <b>Example:</b> Device(config)# no cdp advertise-v2	Disables the broadcasting of Cisco Discovery Protocol Version 2 advertisements.
<b>Step 4</b>	<b>end</b>  <b>Example:</b> Device(config)# end	Exits to privileged EXEC mode.

## Enabling Cisco Discovery Protocol Version 2 Advertisements

### SUMMARY STEPS

1. enable
2. configure terminal
3. cdp advertise-v2
4. end

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>cdp advertise-v2</b>  <b>Example:</b> Device(config)# cdp advertise-v2	Enables the broadcasting of Cisco Discovery Protocol Version 2 advertisements.



	Command or Action	Purpose
Step 4	<b>end</b>  <b>Example:</b> Device(config)# end	Exits to privileged EXEC mode.

## Monitoring and Maintaining Cisco Discovery Protocol

Perform this task to monitor and maintain Cisco Discovery Protocol on a device. This task and all its steps are optional, and the steps can be performed in any sequence.

### SUMMARY STEPS

1. **enable**
2. **clear cdp counters**
3. **clear cdp table**
4. **show cdp**
5. **show cdp entry** *device-name* [**protocol** | **version**]
6. **show cdp interface** [*type number*]
7. **show cdp neighbors** [*type number*] [**detail**]
8. **show cdp traffic**
9. **show debugging**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>clear cdp counters</b>  <b>Example:</b> Device# clear cdp counters	Resets Cisco Discovery Protocol traffic counters to zero.

	Command or Action	Purpose
<b>Step 3</b>	<p><b>clear cdp table</b></p> <p><b>Example:</b></p> <pre>Device# clear cdp table</pre>	Clears the table that contains Cisco Discovery Protocol information about neighbors.
<b>Step 4</b>	<p><b>show cdp</b></p> <p><b>Example:</b></p> <pre>Device# show cdp</pre>	Displays the interval between advertisements, the number (in seconds) for which an advertisement is valid for a given port, and the version of the advertisement.
<b>Step 5</b>	<p><b>show cdp entry <i>device-name</i> [protocol   version]</b></p> <p><b>Example:</b></p> <pre>Device# show cdp entry test-device protocol</pre>	Displays information about a specific neighbor.
<b>Step 6</b>	<p><b>show cdp interface [<i>type number</i>]</b></p> <p><b>Example:</b></p> <pre>Device# show cdp interface</pre>	Displays information about interfaces on which Cisco Discovery Protocol is enabled.
<b>Step 7</b>	<p><b>show cdp neighbors [<i>type number</i>] [detail]</b></p> <p><b>Example:</b></p> <pre>Device# show cdp neighbors</pre>	<p>Displays the type of device that has been discovered, the name of the device, the number and type of the local interface (port), the time (in seconds) the Cisco Discovery Protocol advertisement is valid for the interface, the device type, the device product number, and the port ID.</p> <ul style="list-style-type: none"> <li>The <b>detail</b> keyword displays information about the native VLAN ID, the duplex mode, and the VTP domain name associated with neighboring devices.</li> </ul>
<b>Step 8</b>	<p><b>show cdp traffic</b></p> <p><b>Example:</b></p> <pre>Device# show cdp traffic</pre>	Displays information about Cisco Discovery Protocol traffic, including the number of packets sent and received and checksum errors.
<b>Step 9</b>	<p><b>show debugging</b></p> <p><b>Example:</b></p> <pre>Device# show debugging</pre>	Displays information about the types of debugging that are enabled for the device.

# Configuration Examples for Cisco Discovery Protocol Version 2

## Example: Setting the Transmission Timer and Hold Time

In the following example, the timer is set to send updates every 30 seconds and a **show cdp interface** command is used to verify that the update is effective:

```
Device(config)# cdp timer 30
Device(config)# end
Device# show cdp interface

Serial0 is up, line protocol is up
Encapsulation is HDLC
Sending CDP packets every 30 seconds
Holdtime is 180 seconds
```

In the following example, the hold time is set to 90 seconds and a **show cdp interface** command is used to verify that the update is effective:

```
Device(config)# cdp holdtime 90
Device(config)# end
Device# show cdp interface

Serial0 is up, line protocol is up
Encapsulation is HDLC
Sending CDP packets every 30 seconds
Holdtime is 90 seconds
```

## Example: Monitoring and Maintaining Cisco Discovery Protocol

The following example shows a series of commands that you can use to view Cisco Discovery Protocol information:

```
Device# show cdp

Global CDP information:
  Sending CDP packets every 60 seconds
  Sending a holdtime value of 180 seconds
  Sending CDPv2 advertisements is enabled

Device# show cdp neighbors

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

Device ID          Local Interface    Holdtme  Capability  Platform  Port ID
C2950-1            Fas 0/0            148      S I         WS-C2950T-Fas 0/15
RX-SWV.cisco.com  Fas 0/1            167      T S         WS-C3524-XFas 0/13
Device# show cdp neighbors detail

-----
Device ID: C2950-1
Entry address(es):
Platform: Cisco WS-C2950T-24, Capabilities: Switch IGMP
Interface: FastEthernet0/0, Port ID (outgoing port): FastEthernet0/15
Holdtime : 139 sec
Version :
```

```

Cisco IOS C2950 Software (C2950-I6Q4L2-M), Version 12.1(9)EA1, RELEASE SOFTWARE
.
.
Device# show cdp traffic

CDP counters :
  Total packets output: 81684, Input: 81790
  Hdr syntax: 0, Chksum error: 0, Encaps failed: 0
  No memory: 0, Invalid packet: 0, Fragmented: 0
  CDP version 1 advertisements output: 0, Input: 0
  CDP version 2 advertisements output: 81684, Input: 81790

```

## Additional References for Cisco Discovery Protocol Version 2

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
Cisco Discovery Protocol commands	<a href="#">Cisco IOS Cisco Discovery Protocol Command Reference</a>
SNMP support configuration tasks	“Configuring SNMP Support” module
On-Demand Routing configuration tasks	“Configuring On-Demand Routing” module
Debug commands	<a href="#">Cisco IOS Debug Command Reference</a>

### Standards

Standard	Title
IEEE 802.1Q	<i>Virtual LANs</i>

### MIBs

MIB	MIBs Link
CISCO-CDP-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**Technical Assistance**

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></p>

## Feature Information for Cisco Discovery Protocol Version 2

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [http://www.cisco.com/go/featurenavigator](#). An account on Cisco.com is not required.

**Table 2: Feature Information for Cisco Discovery Protocol Version 2**

Feature Name	Releases	Feature Information
Cisco Discovery Protocol Version 2	Cisco IOS XE 3.2SE	<p>Cisco Discovery Protocol is a Layer 2, media-independent, and network-independent protocol that runs on Cisco devices and enables networking applications to learn about nearby, directly connected devices. This protocol facilitates the management of Cisco devices and allows systems using different network layer protocols to learn about one another.</p> <p>In Cisco IOS XE 3.2SE, support was added for the Cisco Catalyst 3850 Series Switches.</p>





## Secure Cisco Discovery Protocol

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The Cisco Discovery Protocol does not possess inherent security mechanisms and is vulnerable to attacks. The Secure Cisco Discovery Protocol feature allows users to select the type, length, value (TLV) fields that are sent on a particular interface to filter information sent through Cisco Discovery Protocol packets.

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### Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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### Prerequisites for Secure Cisco Discovery Protocol

The Cisco software image must support basic Cisco Discovery Protocol functions.

# Restrictions for Secure Cisco Discovery Protocol

Blocking the type, length, value (TLV) fields on one device can affect the functionality of clients on other devices where Cisco Discovery Protocol packets with blocked TLV fields are received because different clients use different TLV fields.

## Information About Secure Cisco Discovery Protocol

### Secure Cisco Discovery Protocol

The Cisco Discovery Protocol does not possess inherent security mechanisms and is vulnerable to attacks. The Secure Cisco Discovery Protocol feature provides security by allowing users to select the type, length, value (TLV) fields that are sent on an interface to filter the fields in Cisco Discovery Protocol packets.

This feature supports the following functions:

- TLV lists can be configured globally and also at the interface level, but only one TLV fields list can be configured globally.
- A TLV list configured on an interface is given a higher precedence.
- All TLVs except the Device-ID TLV and the Application TLV can be blocked.
- Information about the Cisco Discovery Protocol TLV list configured on an interface is stored in each Cisco Discovery Protocol interface subblock.
- All TLVs are blocked on the sending side.
- The `cdp tlv-list` and `cdp filter-tlv-list` commands are required to configure a Cisco Discovery Protocol list and apply the list globally or on an interface.
- The `show cdp tlv-list` and `show cdp interface` commands display information about the TLV list.

### Supported Type, Length, Value Fields

*Table 3: Supported TLV fields*

Related command in TLV list configuration mode	TLV Fields	Description
<code>address</code>	Address TLV	Contains a list of device network-layer addresses. If a device uses Simple Network Management Protocol (SNMP), the first address is an address at which the device receives SNMP messages.  The device may advertise all of its addresses and may optionally advertise one or more loopback IP addresses.



Related command in TLV list configuration mode	TLV Fields	Description
<b>capability</b>	Capability TLV	Identifies the device type. The device type indicates the functional capability of the device, for example, a switch.
<b>cos</b>	Class of service TLV	<p>Describes the Layer 2 class of service (CoS) value in a Cisco Discovery Protocol packet. All Cisco Discovery Protocol packets received on an untrusted port are marked with a CoS value by a switching device that cannot classify individual packets.</p> <p>This TLV is used only in a Cisco Discovery Protocol packet that contains an Extended Trust TLV, which indicates the absence of extended trust with a CoS TLV that is one byte in length.</p>
<b>default</b>	Default	Specifies the default state of the configuration.
<b>duplex</b>	Duplex TLV	<p>Allows devices to recognize if a point-to-point Ethernet interface is running in full-duplex or in half-duplex mode. Network problems are caused if two ends of a link are in different modes.</p> <p>The TLV value is one byte in length with its least significant bit indicating the mode. A 1 indicates full-duplex and a 0 indicates half-duplex.</p>
<b>exit</b>	Exit	Exits current configuration.
<b>ext-port-id</b>	External Port Id TLV	<p>Identifies the physical connector port on which a Cisco Discovery Protocol packet is transmitted.</p> <p>This TLV is used in devices with optical ports in which signals from multiple hardware interfaces are multiplexed through a single physical port.</p> <p>The value of this TLV must be the same as the MIB object ifName for the ifTable entry for the external port.</p>

Related command in TLV list configuration mode	TLV Fields	Description
<b>hello-protocol</b>	Protocol-Hello TLV	<p>Specifies that a particular protocol has asked Cisco Discovery Protocol to piggyback its “hello” messages within transmitted Cisco Discovery Protocol packets.</p> <p>The value of this TLV protocol is greater than or equal to 5 and lesser than or equal to 32 bytes. The first 5 bytes are the protocol’s 5-byte Subnetwork Access Protocol (SNAP) value, which contains three bytes of organizationally unique identifier (OUI) followed by two bytes of protocol ID.</p> <p>A Cisco Discovery Protocol packet may contain multiple protocol-hello TLVs, each for a different protocol.</p>
<b>ip-prefix</b>	IP Network Prefix TLV	<p>Describes a list of stub network prefixes to which the sending stub device can forward IP packets. These packets are used by On-Demand Routing (ODR).</p> <p>Each network prefix is formatted as a 4-byte IP address followed by a 1-byte network mask length. Thus, the length of the value sent by a stub device is a multiple of 5 bytes.</p>

Related command in TLV list configuration mode	TLV Fields	Description
<b>location</b>	Location TLV	<p>Delivers location-based information to endpoint devices through switches, routers, or access devices using the Cisco Discovery Protocol. The Location TLV can send the following types of information:</p> <ul style="list-style-type: none"> <li>• Custom location—Provides the location and attributes of the endpoint device.</li> <li>• Civic location information—Provides the civic address information and postal information; for example, street address, road name, and postal community information.</li> <li>• 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). The PSAP uses this information to call back.</li> <li>• Geo spatial location information—Provides the longitude, latitude, and altitude information of the endpoint device.</li> </ul> <p>You must configure the location TLV on the device before Cisco Discovery Protocol can deliver location-based information to the endpoint devices.</p>
<b>location-server</b>	Location-server TLV	Provides a mechanism for location servers to transfer the required information to the neighbor devices.
<b>mgmt-address</b>	Management Address TLV	<p>Contains a list of network layer addresses encoded similarly to the Address TLV.</p> <p>This TLV contains a list of all the addresses at which the device accepts SNMP messages.</p>
<b>native-vlan</b>	Native VLAN TLV	Indicates the Inter-Switch Link (ISL) number of the native interface VLAN on which the Cisco Discovery Protocol packet is sent, as well as whether the VLAN is enabled on the link and whether the link is a trunk or a host/edge port.
<b>platform</b>	Platform TLV	Describes the hardware platform of the device. Encoded as an ASCII character string. The TLV length determines the length of the string.

Related command in TLV list configuration mode	TLV Fields	Description
<b>port-id</b>	Port-ID TLV	<p>Identifies the port on which the Cisco Discovery Protocol packet is sent. This is encoded as an ASCII character string.</p> <p>The value of this TLV is the same as the MIB object ifName for the ifTable entry on which the Cisco Discovery Protocol packet is sent.</p>
<b>power -available</b>	Power Available TLV	<p>Specifies the information transmitted by all switch interfaces. This information permits a device that needs power to negotiate and select an appropriate power setting. The Power Available TLV includes four fields:</p> <ul style="list-style-type: none"> <li>• Request-ID field</li> <li>• Available-Power field</li> <li>• Power-Management-ID field</li> <li>• Management-Power-Level field</li> </ul>
<b>powernet</b>	Energywise TLV	<p>Discovers neighbor devices, communicates and negotiates power-related parameters with Cisco end devices such as an IP phone and access point.</p>
<b>trust</b>	Extended Trust TLV	<p>Specifies that the trust from the larger switch port is extended to other (external) ports of the simple switching device without explicitly configuring the trust on the simple switching device.</p> <p>Extending trust allows a network administrator to trust a host/server to mark the packets and the port on which this host/server is connected. Packets received on a trusted port are not marked again.</p> <p>The TLV value is one byte in length with its least significant bit indicating the trust mode. A 1 indicates extended trust and a 0 indicates the absence of extended trust. All other bits of the TLV value should be set to 0 on transmission and ignored on receipt.</p> <p>A Cisco Discovery Protocol packet without this TLV indicates the absence of extended trust.</p>

Related command in TLV list configuration mode	TLV Fields	Description
<b>version</b>	Version TLV	Contains information about the Cisco software image version the device is running. This is in the form of a character string. The TLV length determines the length of the string. This information is displayed in the output of the <b>show version</b> command.
<b>vtp-mgmt-domain</b>	VTP Management Domain TLV	Specifies the name of the VLAN Trunking Protocol (VTP) management domain for a device running the VTP on the particular interface on which the Cisco Discovery Protocol packet is sent.  The length of this TLV determines the length of the VTP management domain name. A length of zero indicates that a device is running VTP but has no management domain name assigned to it.
<b>vvid</b>	Appliance VLAN-ID TLV	Indicates the setting of the local configuration when a local 802.1Q interface has been configured to send and receive VoIP and related packets on a particular VLAN.  Devices receiving this TLV may adjust their configuration to match this setting.

**Note**

The Address TLV and Device ID TLV are mandatory TLVs and they cannot be blocked. Hence, they are not available in the Cisco software image for user configuration.

# How to Configure Secure Cisco Discovery Protocol

## Configuring a TLV List and Adding TLVs to the List

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `cdp tlv-list tlv-list-name`
4. `ip-prefix`
5. `hello-protocol`
6. `end`
7. `show cdp tlv-list tlv-list-name`

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>cdp tlv-list tlv-list-name</b>  <b>Example:</b> Device(config)# cdp tlv-list group1	Configures the type, length, value (TLV) list that allows users to select TLVs and enters TLV list configuration mode.
<b>Step 4</b>	<b>ip-prefix</b>  <b>Example:</b> Device(config-tlv-list)# ip-prefix	Adds the IP prefix TLV to the TLV list.
<b>Step 5</b>	<b>hello-protocol</b>  <b>Example:</b> Device(config-tlv-list)# hello-protocol	Adds the Protocol-Hello TLV to the TLV list.  <b>Note</b> In TLV list configuration mode, enter the CLI help (?) command to view a list of TLVs that are not added to the TLV list.

	Command or Action	Purpose
<b>Step 6</b>	<b>end</b>  <b>Example:</b> Device(config-tlv-list)# end	Exits TLV list configuration mode and returns to privileged EXEC mode.
<b>Step 7</b>	<b>show cdp tlv-list <i>tlv-list-name</i></b>  <b>Example:</b> Device# show cdp tlv-list group1	Displays information about the TLVs in a TLV list.

## Applying TLV List Configurations at the Interface Level

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface *type number***
4. **cdp filter-tlv-list *tlv-list-name***
5. **end**
6. **show cdp tlv-list *tlv-list-name***

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface <i>type number</i></b>  <b>Example:</b> Device# interface ethernet 0/0	Specifies an interface type and enters interface configuration mode.

	Command or Action	Purpose
<b>Step 4</b>	<b>cdp filter-tlv-list</b> <i>tlv-list-name</i>  <b>Example:</b> Device(config-if)# cdp filter-tlv-list group1	Applies a TLV list on an interface.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.
<b>Step 6</b>	<b>show cdp tlv-list</b> <i>tlv-list-name</i>  <b>Example:</b> Device# show cdp tlv-list group1	Displays information about the TLVs in a TLV list.

## Applying TLV List Configurations at the Global Level

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cdp filter-tlv-list** *tlv-list-name*
4. **end**
5. **show cdp tlv-list** *tlv-list-name*

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.



	Command or Action	Purpose
Step 3	<b>cdp filter-tlv-list</b> <i>tlv-list-name</i>  <b>Example:</b> Device(config)# cdp filter-tlv-list group1	Applies a TLV list globally.
Step 4	<b>end</b>  <b>Example:</b> Device(config)# end	Exits global configuration mode and returns to the privileged EXEC mode.
Step 5	<b>show cdp tlv-list</b> <i>tlv-list-name</i>  <b>Example:</b> Device# show cdp tlv-list group1	Displays information about the TLVs in a TLV list.

## Configuration Examples for Secure Cisco Discovery Protocol

### Example: Configuring a TLV List and Adding TLVs to the List

The following example shows how to create a type, length, value (TLV) list, group1 and add TLVs to the list:

```
Device> enable
Device# configure terminal
Device(config)# cdp tlv-list group1
Device(config-tlv-list)# ip-prefix
Device(config-tlv-list)# hello-protocol
Device(config-tlv-list)# trust
Device(config-tlv-list)# capability
```

The following example shows how to create a TLV list, group2 and add TLVs to the list:

```
Device(config)# cdp tlv-list group2
Device(config-tlv-list)# address
Device(config-tlv-list)# duplex
Device(config-tlv-list)# capability
Device(config-tlv-list)# end
```

The following example shows how to view the TLV lists and the TLVs that are added to the lists:

```
Device# show cdp tlv-list group1

Tlv-list : group1
Capability Hello-protocol Ip-prefix Trust

Device# show cdp tlv-list group2

Tlv-list : group2
Address Capability Duplex
```

```
Device# show cdp tlv-list *

Tlv-list : group1
Capability Hello-protocol Ip-prefix Trust

Tlv-list : group2
Address Capability Duplex
```

**Note**

- The **show cdp tlv-list \*** command displays all configured Cisco Discovery Protocol TLV lists.

## Example: Applying TLV List Configurations at Interface Level

The **show cdp interface** command displays Cisco Discovery Protocol TLV lists on all interfaces.

The following example shows how to apply Cisco Discovery Protocol type, length, value (TLV) lists on an interface:

```
Device> enable
Device# configure terminal
Device(config)# interface ethernet 0/0
Device(config-if)# cdp filter-tlv-list group1
03:22:15: %CDP-6-TLV_LIST_INTERFACE: Tlv-list group1 applied on
interface Ethernet0/0
Device(config-if)# exit
Device(config)# interface ethernet 0/1
Device(config-if)# cdp filter-tlv-list group2
03:22:45: %CDP-6-TLV_LIST_INTERFACE: Tlv-list group2 applied on
interface Ethernet0/1
Device(config-if)# end
Device# show cdp tlv-list group1

Tlv-list : group1
Capability Hello-protocol Ip-prefix Trust
Applied on:
Et0/0

Device# show cdp interface ethernet0/0

Ethernet0/0 is up, line protocol is up
Encapsulation ARPA
Sending CDP packets every 60 seconds
Holdtime is 180 seconds
Tlv-list applied : group1

Device# show cdp interface ethernet0/1

Ethernet0/1 is up, line protocol is up
Encapsulation ARPA
Sending CDP packets every 60 seconds
Holdtime is 180 seconds
Tlv-list applied : group2

Device# show cdp interface

Ethernet0/0 is up, line protocol is up
Encapsulation ARPA
Sending CDP packets every 60 seconds
Holdtime is 180 seconds
Tlv-list applied : group1
Ethernet0/1 is up, line protocol is up
Encapsulation ARPA
Sending CDP packets every 60 seconds
Holdtime is 180 seconds
Tlv-list applied : group2
```

```

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.
.

```

## Example: Applying TLV List Configurations Globally

The following example shows how to globally apply a Cisco Discovery Protocol type, length, value (TLV) list:

```

Device> enable
Device# configure terminal
Device(config)# cdp filter-tlv-list group1
03:28:44: %CDP-6-TLV_LIST_GLOBALLY: Tlv-list group1 applied globally on all
interfaces.
Device(config)# end
Device# show cdp interface

Ethernet0/0 is up, line protocol is up
  Encapsulation ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
  Tlv-list applied : group1
Ethernet0/1 is up, line protocol is up
  Encapsulation ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
  Tlv-list applied : group2
.
.
.

```



### Note

The `show cdp interface` command displays Cisco Discovery Protocol TLV lists on all interfaces.

## Additional References for Secure Cisco Discovery Protocol

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
Cisco Discovery Protocol commands	<a href="#">Cisco IOS Cisco Discovery Protocol Command Reference</a>
SNMP configuration tasks	<i>Configuring SNMP Support</i>
On-Demand Routing configuration tasks	<i>Configuring On-Demand Routing</i>

**Standards and RFCs**

Standard/RFC	Title
IEEE 802.1Q	<i>802.1Q—Virtual LANs</i>

**MIBs**

MIB	MIBs Link
CISCO-CDP MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Secure Cisco Discovery Protocol

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 4: Feature Information for Secure Cisco Discovery Protocol**

Feature Name	Releases	Feature Information
Secure Cisco Discovery Protocol	Cisco IOS XE 3.6 E	<p>The Secure Cisco Discovery Protocol feature allows you to select what information is sent in Cisco Discovery Protocol packets and block sensitive information.</p> <p>In Cisco IOS XE 3.6 E, this feature is supported on the following platforms:</p> <ul style="list-style-type: none"><li>• Catalyst 3750 Series Switches</li></ul> <p>In Cisco IOS XE Release 3.6E, this feature is supported on Cisco Catalyst 3850 Series Switches.</p> <p>The following commands were introduced or modified: <b>cdp filter-tlv-list</b>, <b>cdp tlv-list</b>, <b>show cdp interface</b>, <b>show cdp tlv-list</b>.</p>

