



# Using Cisco Discovery Protocol

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Cisco Discovery Protocol (formerly known as CDP) is a Layer 2 media-independent and network-independent protocol that runs on Cisco devices. Cisco Discovery Protocol enables networking applications to learn about nearby and directly connected devices. Cisco Discovery Protocol facilitates the management of Cisco devices by discovering devices, determining their configuration, and allowing systems using different network-layer protocols to learn about one another.

This module describes Cisco Discovery Protocol 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 feature information and caveats, see 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 at the end of this document.

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.



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# 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

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## 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, Values

Type, length, values (TLVs) fields are blocks of information embedded in Cisco Discovery Protocol advertisements. Information in advertisements varies. The TLV frame format allows extension of advertisements when required. The table below summarizes the TLV field definitions.

**Table 1** *Type, Length, Values Field Definitions for Cisco Discovery Protocol*

TLV Field	Definition
Address TLV	Contains the 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. The device type 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/Half Duplex TLV	Indicates the duplex configuration of the Cisco Discovery Protocol broadcast interface. This field is used by network operators to diagnose connectivity problems between adjacent network devices.

TLV Field	Definition
IP Network Prefix TLV	Contains a list of network prefixes to which the sending device can forward IP packets. A prefix includes the interface protocol and port number; for example, Gigabit Ethernet 0/0/0.1.
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>• 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 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 the endpoint devices.</p>
Location-server TLV	Provides a mechanism for location servers to transfer the required information to the neighbor 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.
Port-ID TLV	Identifies the port on which a Cisco Discovery Protocol packet is sent.
Version TLV	Contains information about the software release that is running on the device.
VTP Management Domain TLV	Advertises the VTP domain name of the system. This field is used by network operators to verify the VTP domain configuration in adjacent network nodes.

## Cisco Discovery Protocol

Cisco Discovery Protocol (formerly known as CDP) is a Layer 2 media-independent, network-independent protocol. The networking devices use Cisco Discovery Protocol to learn about the nearby, and directly connected devices. Cisco Discovery Protocol is enabled by default in all Cisco devices except in Cisco ASR 1000 Series Aggregation Services Router. Each device that supports Cisco Discovery Protocol advertises at least one address at which it can receive announcements from neighbors. The device also sends periodic announcements (messages) to the multicast address 01:00:0C:CC:CC:CC. Devices discover each other by listening to the address specified to receive announcements. By listening to announcements, the devices also learn the interface status (up or down) of other devices.

Each device that supports Cisco Discovery Protocol stores the received announcements in a table. The information in the Cisco Discovery Protocol table is refreshed each time an announcement is received. By default, the Cisco Discovery Protocol announcements are sent every 60 seconds on the interfaces that support Subnetwork Access Protocol (SNAP) headers. The Cisco Discovery Protocol announcements contain the time-to-live information or the hold time, which specifies the lifetime of an entry in the Cisco Discovery Protocol table. The Cisco Discovery Protocol table information is refreshed each time an announcement is received, and the hold time for that entry is reinitialized. If no announcements are received from a device for a period in excess of the hold time, the device information is discarded. By default, the hold time is 180 seconds.

The information contained in Cisco Discovery Protocol announcements depends on the device type and the version of the operating system running on it. The following are examples of the types of information that can be contained in Cisco Discovery Protocol announcements:

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

Cisco Discovery Protocol Version 2 provides more intelligent device tracking features than Version 1. Version 2 of the protocol supports 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.

The **show cdp** command can provide detailed output on VLAN Trunking Protocol (VTP) management domains and duplex modes of neighboring devices, counters related to Cisco Discovery Protocol, and VLAN IDs of connecting ports.

- [Cisco Discovery Protocol and SNMP, page 4](#)
- [Cisco Discovery Protocol and On-Demand Routing Support for ATM PVCs, page 5](#)
- [Cisco Discovery Protocol Support in IPv6, page 5](#)
- [Cisco Discovery Protocol Enhancements for Location Support, page 5](#)

## Cisco Discovery Protocol and SNMP

Using Cisco Discovery Protocol with SNMP allows network management applications to learn the device type and the SNMP agent address of neighboring devices and to send SNMP queries to the devices.

The SNMP management application learns the protocol addresses and types of neighboring devices by retrieving Cisco Discovery Protocol tables from SNMP agents in those devices. When enabled, the network management module (NMM) SNMP agent discovers neighboring devices and builds a local cache with device information. A management workstation can retrieve the local cache by sending SNMP requests to access the CISCO-CDP-MIB.

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

Cisco Discovery Protocol and On-Demand Routing (ODR) support is available 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 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 in the spoke routers.

## Cisco Discovery Protocol Support in IPv6

Cisco Discovery Protocol in IPv6 functions the same as IPv4 and offers the same benefits as in IPv4. IPv6 enhancements allow Cisco Discovery Protocol to exchange IPv6 and neighbor addressing information, provide IPv6 information to network management products, and provide troubleshooting tools.

## Cisco Discovery Protocol Enhancements for Location Support

The CDP Medianet Support feature allows Cisco Discovery Protocol to identify the endpoint devices and provides the ability to exchange the medianet location information between the endpoint and switch. Location information can be provisioned statically by the user on the platform, can be received through updates from the location server, or can be received from the endpoint itself through Cisco Discovery Protocol.

The Propagation of Location Information over CDP feature ensures location information to be transmitted from wired switches to the attached end devices.

Cisco Discovery Protocol allows only one wired switch to report the location information by identifying and indicating the location of neighbor ports, thereby ensuring that there is no duplicate location information of the same device.

When you configure Cisco Discovery Protocol location information on a per-port basis, remote devices can send medianet location information to the switch.

## Benefits of Cisco Discovery Protocol

- Allows systems using different network layer protocols to learn about the other systems.
- Facilitates Cisco device management by discovering the devices and their configuration.
- Assists with troubleshooting TLV fields.
- Functions with SNMP to learn SNMP agent addresses and to send SNMP queries.

# How to Use Cisco Discovery Protocol

- [Disabling and Enabling Cisco Discovery Protocol on a Supported Device](#), page 6
- [Disabling and Enabling Cisco Discovery Protocol on a Supported Interface](#), page 7
- [Setting the Transmission Timer and Hold Time for Cisco Discovery Protocol Packets](#), page 8
- [Disabling and Reenabling Broadcast of Cisco Discovery Protocol Version 2 Advertisements](#), page 9
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## Disabling and Enabling 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
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>[no] cdp run</b>  <b>Example:</b> Device(config)# cdp run	Disables or enables Cisco Discovery Protocol on a supported device.
Step 4	<b>end</b>  <b>Example:</b> Device(config)# end	Returns to privileged EXEC mode.

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



### Note

If the encapsulation for an interface is changed, Cisco Discovery Protocol is enabled back on that interface, even if Cisco Discovery Protocol was previously disabled. For example, when interface encapsulation changes from Point-to-Point (PPP) to High-Level Data Link Control (HDLC), Cisco Discovery Protocol becomes active even if it is 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 its default Cisco Discovery Protocol state of enabled, assuming Cisco Discovery Protocol is enabled globally on the device.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *slot/subslot/port[.subinterface]*
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. <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>slot/subslot/port[.subinterface]</i>  <b>Example:</b> Device(config)# interface FastEthernet 0/0/0.1	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 or enables Cisco Discovery Protocol on the interface.

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

## Setting the Transmission Timer and 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
<b>Step 1</b> <code>enable</code>  <b>Example:</b> <code>Device&gt; enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b> <code>configure terminal</code>  <b>Example:</b> <code>Device# configure terminal</code>	Enters global configuration mode.
<b>Step 3</b> <code>cdp timer seconds</code>  <b>Example:</b> <code>Device(config)# cdp timer 30</code>	Specifies the frequency of transmission of Cisco Discovery Protocol packets in seconds.
<b>Step 4</b> <code>cdp holdtime seconds</code>  <b>Example:</b> <code>Device(config)# cdp holdtime 90</code>	Specifies the hold time (duration, in seconds, for which a receiving device should hold information before discarding it).



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

## Disabling and Reenabling Broadcast of 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> enable  <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> configure terminal  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b> [no] cdp advertise-v2  <b>Example:</b> Device(config)# cdp advertise-v2	Disables or reenables the broadcasting of CDP Version 2 advertisements.
<b>Step 4</b> end  <b>Example:</b> Device(config)# end	Returns to privileged EXEC mode.

## Enabling Location TLV



### Note

When you configure location information from various modules, you can use the **location prefer** command to configure the priority.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **location** { **admin-tag** *string* | **civic-location** *identifier id* | **elin-location** *string identifier id*}
4. **exit**
5. **interface** *slot/subslot/port[,subinterface]*
6. **location** { **additional-location-information** *word* | **civic-location-id** *id* [**port-location**] | **elin-location-id** *id*}
7. **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>location</b> { <b>admin-tag</b> <i>string</i>   <b>civic-location</b> <i>identifier id</i>   <b>elin-location</b> <i>string identifier id</i> }	Specifies the location information for an endpoint and enters civic location configuration mode.
<b>Example:</b> Device(config)# location civic-location location1	
<b>Step 4</b> <b>exit</b>  <b>Example:</b> Device(config-civic)# exit	Returns to global configuration mode.

Command or Action	Purpose
<b>Step 5</b> <code>interface slot/subslot/port[.subinterface]</code>  <b>Example:</b> <pre>Device(config)# interface fastethernet 0/0/0.1</pre>	Specifies the interface on which you are configuring the location information and enters interface configuration mode.
<b>Step 6</b> <code>location {additional-location-information word   civic-location-id id [port-location]   elin-location-id id}</code>  <b>Example:</b> <pre>Device(config-if)# location civic-location-id 1 port-location</pre>	Specifies location information for an interface and enters civic location port configuration mode. <ul style="list-style-type: none"> <li>You can configure port-specific information in civic location port configuration mode.</li> </ul>
<b>Step 7</b> <code>end</code>  <b>Example:</b> <pre>Device(config-if-port)# end</pre>	Returns to privileged EXEC mode.

## Configuring Location Support on Cisco Discovery Protocol

Perform this task to configure location support on Cisco Discovery Protocol.

You must configure the location TLV before configuring location support on Cisco Discovery Protocol.

### SUMMARY STEPS

- enable
- configure terminal
- `cdp tlv {app | location | location-server}`
- `interface type number`
- `cdp tlv {app [tlvtype tlvtype value value] | location | server-location}`
- end

### DETAILED STEPS

Command or Action	Purpose
<b>Step 1</b> <code>enable</code>  <b>Example:</b> <pre>Device&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>

Command or Action	Purpose
<b>Step 2</b> <code>configure terminal</code>  <b>Example:</b> <pre>Device# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b> <code>cdp tlv {app   location   location-server}</code>  <b>Example:</b> <pre>Device(config)# cdp tlv app</pre>	Configures location support.
<b>Step 4</b> <code>interface type number</code>  <b>Example:</b> <pre>Device(config)# interface fastethernet 0</pre>	Specifies the interface on which you are configuring the location support and enters interface configuration mode.
<b>Step 5</b> <code>cdp tlv {app [tlvtype tlvtype value value]   location   server-location}</code>  <b>Example:</b> <pre>Device(config-if)# cdp tlv tlvtype 20 value test12</pre>	Configures location support on a specified interface.
<b>Step 6</b> <code>end</code>  <b>Example:</b> <pre>Device(config-if)# end</pre>	Returns to privileged EXEC mode.

## Monitoring and Maintaining Cisco Discovery Protocol

To monitor and maintain Cisco Discovery Protocol on your device, perform the following steps.

### 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
<p><b>Step 1</b> <code>enable</code></p> <p><b>Example:</b> Device&gt; enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
<p><b>Step 2</b> <code>clear cdp counters</code></p> <p><b>Example:</b> Device# clear cdp counters</p>	<p>Resets the traffic counters to zero.</p>
<p><b>Step 3</b> <code>clear cdp table</code></p> <p><b>Example:</b> Device# clear cdp table</p>	<p>Deletes the Cisco Discovery Protocol table.</p>
<p><b>Step 4</b> <code>show cdp</code></p> <p><b>Example:</b> Device# show cdp</p>	<p>Displays the interval between advertisements, the hold time, and the version of the advertisement.</p>
<p><b>Step 5</b> <code>show cdp entry device-name [protocol   version]</code></p> <p><b>Example:</b> Device# show cdp entry device-name protocol</p>	<p>Displays information about a specific neighbor.</p> <ul style="list-style-type: none"> <li>The output can be limited to protocol or version information.</li> </ul> <p><b>Note</b> Enter * for the device name to show all Cisco Discovery Protocol neighbor entries.</p>
<p><b>Step 6</b> <code>show cdp interface [type number]</code></p> <p><b>Example:</b> Device# show cdp interface</p>	<p>Displays information about interfaces on which Cisco Discovery Protocol is enabled.</p>
<p><b>Step 7</b> <code>show cdp neighbors [type number] [detail]</code></p> <p><b>Example:</b> Device# show cdp neighbors</p>	<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 number of 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>Issuing the <b>detail</b> keyword displays information about the native VLAN ID, the duplex mode, and the VTP domain name associated with neighbor devices.</li> </ul>





```

.
.
.
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

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Cisco IOS XE Cisco Discovery Protocol commands	<a href="#">Cisco IOS Cisco Discovery Protocol Command Reference</a>
Debugging commands	<ul style="list-style-type: none"> <li>• <a href="#">Cisco IOS Debug Command Reference - Commands A to C</a></li> <li>• <a href="#">Cisco IOS Debug Command Reference, Commands E through H</a></li> <li>• <a href="#">Cisco IOS Debug Command Reference Commands I through L</a></li> <li>• <a href="#">Cisco IOS Debug Command Reference, Commands M through R</a></li> <li>• <a href="#">Cisco IOS Debug Command Reference Commands S through Z</a></li> </ul>
Configuring SNMP support	<a href="#">Configuring SNMP Support</a>
Configuring On-Demand Routing	<a href="#">Configuring On-Demand Routing</a>

### Standards

Standard	Title
IEEE 802.1Q	<a href="#">Virtual LANS</a>



**MIBs**

MIB	MIBs Link
<ul style="list-style-type: none"> <li>CISCO-CDP MIB</li> </ul>	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 Configuring 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 2** Feature Information for Configuring Cisco Discovery Protocol

Feature Name	Releases	Feature Information
Configuring Cisco Discovery Protocol	Cisco IOS XE Release 2.1	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.  In Cisco IOS XE Release 2.1, this feature was introduced on Cisco ASR 1000 Series Aggregation Services Router .

Feature Name	Releases	Feature Information
Duplication Location Reporting Issue	Cisco IOS XE Release 3.2.0SG	The Duplication Location Reporting Issue feature allows only one wired switch to report the location information.
Propagation of Location Information over Cisco Discovery Protocol	Cisco IOS XE Release 3.2.0SG	<p>The Propagation of Location Information over Cisco Discovery Protocol ensures that location information is transmitted from wired switches over Cisco Discovery Protocol to the attached end devices.</p> <p>The following commands were introduced or modified: <b>cdp tlv</b>, <b>debug cdp events</b>, <b>show cdp tlv</b>.</p>

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