



Using Cisco Discovery Protocol

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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 by discovering these devices, determining how they are configured, 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).

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the “[Feature Information for Using Cisco Discovery Protocol](#)” section on page 17.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

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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

To use Cisco Discovery Protocol, you should understand the following concepts:

- [VLAN Trunking Protocol, page 2](#)
- [Type-Length-Value Fields, page 2](#)
- [Cisco Discovery Protocol, page 3](#)
- [Benefits of Cisco Discovery Protocol, page 4](#)

VLAN Trunking Protocol

VLAN Trunking Protocol (VTP) is a discovery technique that is used by switches. A switch advertises its management domain on its trunk ports, its configuration revision number, and its known VLANs and their specific parameters. A VTP domain is made up of a single device or interconnected devices that share the same VTP domain name. A switch can be in 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. [Table 1](#) summarizes the TLV definitions.

Table 1 *Type-Length-Value Definitions for Cisco Discovery Protocol v2*

TLV	Definition
Device-ID TLV	Identifies the device name in the form of a character string.
Address TLV	Contains the network addresses of both receiving and sending devices.
Port-ID TLV	Identifies the port on which a Cisco Discovery Protocol packet is sent.
Capabilities TLV	Identifies the device type, which indicates the functional capability of the device; for example, a switch.
Version TLV	Contains information about the software release that is running on the device.

Table 1 **Type-Length-Value Definitions for Cisco Discovery Protocol v2 (continued)**

TLV	Definition
Platform TLV	Identifies the hardware platform of the device; for example, Cisco 4500.
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, Eth 1/0.
VTP Management Domain TLV	Advertises the system's configured VTP management domain name. Used by network operators to verify VTP domain configuration in adjacent network nodes.
Native VLAN TLV	Indicates, per interface, the assumed VLAN for untagged packets on the interface. Cisco Discovery Protocol learns the native VLAN for an interface. This field is implemented only for interfaces that support the IEEE 802.1Q protocol.
Full/Half Duplex TLV	Indicates the duplex configuration of the Cisco Discovery Protocol broadcast interface. Used by network operators to diagnose connectivity problems between adjacent network devices.

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. It is enabled by default. Each device configured for Cisco Discovery Protocol advertises at least one address at which it 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 the 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 the Cisco IOS software are sent by default every 60 seconds on interfaces that support SNAP headers. Cisco devices never forward Cisco Discovery Protocol packets. Each Cisco device that supports Cisco Discovery Protocol stores the information it receives in a table. Information in the table is refreshed each 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 by the type of device and the version of the operating system running on it. Following is some of the information that Cisco Discovery Protocol can learn:

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

- VTP domain
- Native VLAN

Cisco Discovery Protocol Version 2 provides more intelligent device tracking features than those available in version 1. One feature 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.

Cisco IOS Cisco Discovery Protocol **show** commands can provide 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 SNMP allows network management applications to learn the device type and the SNMP agent address of neighboring devices and to send SNMP queries to those devices.

The SNMP management application learns protocol addresses and types of neighboring devices by retrieving the Cisco Discovery Protocol tables from SNMP agents in 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 the CISCO-CDP-MIB.

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

In Cisco IOS Release 12.2(8)T Cisco Discovery Protocol and On-Demand Routing (ODR) support was added 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 command 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. For details on configuring ODR, see

http://www.cisco.com/en/US/docs/ios/iproute_odr/configuration/guide/ird_odrconf.html.

Cisco Discovery Protocol Support in IPv6

Cisco Discovery Protocol in IPv6 functions the same as 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.

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 managing Cisco devices by discovering them and how they are configured
- Assists with troubleshooting TLV fields

- Functions with SNMP to learn SNMP agent addresses and to send SNMP queries

How to Use Cisco Discovery Protocol

To configure Cisco Discovery Protocol, perform the following optional tasks:

- [Disabling and Enabling Cisco Discovery Protocol on a Supported Device, page 5](#)
- [Disabling and Enabling Cisco Discovery Protocol on a Supported Interface, page 7](#)
- [Setting the Transmission Timer and Hold Time, page 10](#)
- [Disabling and Reenabling Cisco Discovery Protocol Version-2 Advertisements, page 11](#)
- [Monitoring and Maintaining Cisco Discovery Protocol, page 13](#)

Disabling and Enabling Cisco Discovery Protocol on a Supported Device

Perform the following tasks to disable and enable Cisco Discovery Protocol on a supported device:

- [Disabling Cisco Discovery Protocol on a Supported Device, page 5](#)
- [Enabling Cisco Discovery Protocol on a Supported Device, page 6](#)

Disabling Cisco Discovery Protocol on a Supported Device

Perform this task to disable Cisco Discovery Protocol a on Cisco device.

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	no cdp run Example: Router(config)# no cdp run	Disables Cisco Discovery Protocol on a supported device.
Step 4	end Example: Router(config)# end	Returns the command-line interface (CLI) to privileged EXEC mode.

Enabling Cisco Discovery Protocol on a Supported Device

Perform this task to enable Cisco Discovery Protocol on a Cisco device.

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	cdp run Example: Router(config)# cdp run	Enables Cisco Discovery Protocol on a supported device.
Step 4	end Example: Router(config)# end	Returns the CLI to privileged EXEC mode.

Disabling and Enabling Cisco Discovery Protocol on a Supported Interface

Cisco Discovery Protocol is enabled by default on supported interfaces on a Cisco device. To disable or reenables Cisco Discovery Protocol on an interface, perform these tasks:

- [Disabling Cisco Discovery Protocol on a Supported Interface, page 7](#)
- [Enabling Cisco Discovery Protocol on a Supported Interface, page 9](#)

Disabling Cisco Discovery Protocol on a Supported Interface

Perform this task to disable Cisco Discovery Protocol on a supported interface.


Note

If the encapsulation for an interface is changed, it reenables CDP on that interface, even if CDP is previously disabled. For example, when interface encapsulation changes from PPP to HDLC, CDP becomes active even if it is explicitly disabled with the **no CDP run** command on that interface. This behavior is by design. The encapsulation change, changes the layer 2 protocol configured for that interface and resets the interface configuration to its default CDP state of enabled, assuming CDP 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
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> [<i>name-tag</i>] Example: Router(config)# interface ethernet 0/1	Configures Ethernet interface 0/1 and places the CLI in interface configuration mode. Note If the encapsulation for an interface is changed, it reenables CDP on that interface, even if CDP is previously disabled.
Step 4	cdp enable Example: Router(config-if)# cdp enable	Enables Cisco Discovery Protocol on Ethernet interface 0/1.
Step 5	end Example: Router(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	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	cdp timer seconds Example: Router(config)# cdp timer 30	Specifies 30 seconds as the frequency of transmission of Cisco Discovery Protocol packets.
Step 4	cdp holdtime seconds Example: Router(config)# cdp holdtime 90	Specifies 90 seconds as the amount of time a receiving device should hold information before discarding it.
Step 5	end Example: Router(config)# end	Returns the CLI to 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 reenale this broadcasting, perform these tasks.

- [Disabling Cisco Discovery Protocol Version-2 Advertisements, page 11](#)
- [Enabling Cisco Discovery Protocol Version-2 Advertisements, page 12](#)

Disabling Cisco Discovery Protocol Version-2 Advertisements

Perform this task to disable 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
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	no cdp advertise-v2 Example: Router(config)# no cdp advertise-v2	Disables the broadcasting of Cisco Discovery Protocol version 2 advertisements.
Step 4	end Example: Router(config)# end	Returns the CLI to privileged EXEC mode.

Enabling Cisco Discovery Protocol Version-2 Advertisements

Perform this task to enable 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
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	cdp advertise-v2 Example: Router(config)# cdp advertise-v2	Enables the broadcasting of Cisco Discovery Protocol version 2 advertisements.
Step 4	end Example: Router(config)# end	Returns the CLI to privileged EXEC mode.

Monitoring and Maintaining Cisco Discovery Protocol

To monitor and maintain Cisco Discovery Protocol on your device, perform the following steps. This task and all steps are optional, and you do not have to perform the steps in the sequence shown.

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	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	clear cdp counters Example: Router# clear cdp counters	Resets the traffic counters to zero.
Step 3	clear cdp table Example: Router# clear cdp table	Deletes the Cisco Discovery Protocol table of information about neighbors.
Step 4	show cdp Example: Router# show cdp	Displays the interval between advertisements, the number of seconds the advertisement is valid for a given port, and the version of the advertisement.
Step 5	show cdp entry <i>device-name</i> [protocol version] Example: Router# show cdp entry device-name protocol	Displays information about a specific neighbor. Display can be limited to protocol or version information.
Step 6	show cdp interface [<i>type number</i>] Example: Router# show cdp interface	Displays information about interfaces on which Cisco Discovery Protocol is enabled.
Step 7	show cdp neighbors [<i>type number</i>] [detail] Example: Router# show cdp neighbors	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. Issuing the detail keyword displays information about the native VLAN ID, the duplex mode, and the VTP domain name associated with neighbor devices.
Step 8	show cdp traffic Example: Router# show cdp traffic	Displays Cisco Discovery Protocol counters, including the number of packets sent and received and checksum errors.
Step 9	show debugging Example: Router# show debugging	Displays information about the types of debugging that are enabled for the router.

Configuration Examples for Using Cisco Discovery Protocol

The following examples show how to set transmission timer and hold time values and show commands you can issue to monitor and maintain Cisco Discovery Protocol.

- [Setting the Transmission Timer and Hold Time: Example, page 15](#)
- [Monitoring and Maintaining Cisco Discovery Protocol: Example, page 15](#)

Setting the Transmission Timer and Hold Time: Example

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

```
cdp timer 30
end
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 issued to show that the update is effective:

```
cdp holdtime 90
end
show cdp interface
Serial0 is up, line protocol is up
Encapsulation is HDLC
Sending CDP packets every 30 seconds
Holdtime is 90 seconds
```

Monitoring and Maintaining Cisco Discovery Protocol: Example

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

```
Router# show cdp
```

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

```
Router# 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

```
Router# show cdp neighbors detail
```

```
-----
Device ID: C2950-1
Entry address(es):
```

Additional References

```

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
.
.
.

Router# 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

The following sections provide references related to Using Cisco Discovery Protocol.

Related Documents

Related Topic	Document Title
Cisco IOS Cisco Discovery Protocol commands	Cisco IOS Network Management Command Reference
Configuring SNMP Support	“Configuring SNMP Support” module
Debugging commands	Cisco IOS Debug Command Reference
Configuring On-Demand Routing	“Configuring On-Demand Routing” module

Standards

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

MIBs

MIB	MIBs Link
<ul style="list-style-type: none"> 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: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	—

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>	http://www.cisco.com/techsupport

Feature Information for Using Cisco Discovery Protocol

[Table 2](#) lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Release 10.3 or a later release appear in the table.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

[Table 2](#) lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 2 Feature Information for Configuring Cisco Discovery Protocol

Feature Name	Releases	Feature Information
Configuring Cisco Discovery Protocol	10.3, 11.2(1) 12.2(8)T	<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>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> • VLAN Trunking Protocol, page 2 • Type-Length-Value Fields, page 2 • Cisco Discovery Protocol, page 3 • Using Cisco Discovery Protocol with SNMP, page 4 • Cisco Discovery Protocol and On-Demand Routing Support for ATM PVCs, page 4 • Cisco Discovery Protocol Support in IPv6, page 4 • Benefits of Cisco Discovery Protocol, page 4 • How to Use Cisco Discovery Protocol, page 5

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