



Configuring On-Demand Routing

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The On-Demand Routing feature provides IP routing for stub sites, with minimum cost. The cost of a general, dynamic routing protocol is avoided without incurring the configuration and management burden of static routing.

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 for Configuring On-Demand Routing](#)” section on page 13.

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 Configuring On-Demand Routing

Cisco Discovery Protocol must be enabled.

Restrictions for Configuring On-Demand Routing

No IP routing protocol can be configured on the stub router.

Information About On-Demand Routing

To configure on-demand routing, you should understand the following concepts:

- [Benefits of On-Demand Routing, page 2](#)
- [Stub Networks, page 2](#)
- [Overview of On-Demand Routing, page 3](#)

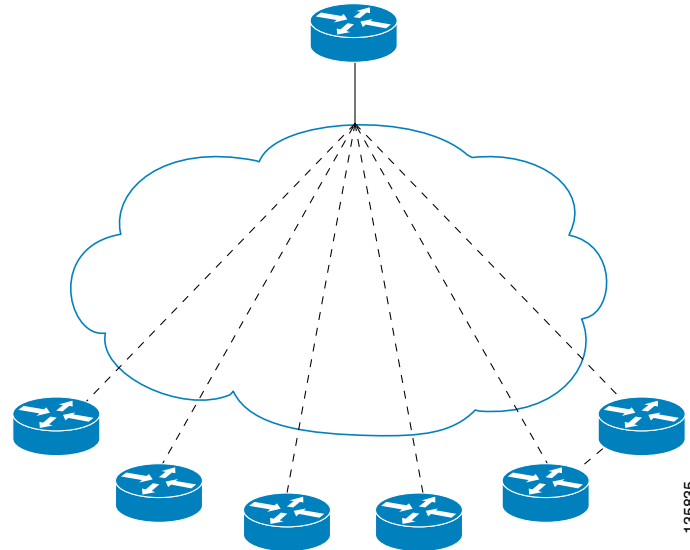
Benefits of On-Demand Routing

This module describes how to configure On-Demand Routing (ODR). The ODR feature provides IP routing for stub sites, with minimum cost. The cost of a general, dynamic routing protocol is avoided without incurring the configuration and management burden of static routing.

Stub Networks

A stub router can be considered a spoke router in a hub-and-spoke network topology—as shown in [Figure 1](#)—where the only router to which the spoke is adjacent is the hub router. In such a network topology, the IP routing information required to represent this topology is fairly simple. These stub routers commonly have a WAN connection to the hub router, and a small number of LAN network segments (stub networks) are directly connected to the stub router. These stub networks might consist only of end systems and the stub router, and therefore do not require the stub router to learn any dynamic IP routing information.

Figure 1 Hub-And-Spoke Network Topology Example



Overview of On-Demand Routing

ODR allows you to easily install IP stub networks where the hubs dynamically maintain routes to the stub networks. This installation is accomplished without requiring the configuration of an IP routing protocol on the stubs. In fact, from the standpoint of ODR, a router is automatically considered to be a stub when no IP routing protocols have been configured.

A stub router that supports the ODR feature advertises IP prefixes corresponding to the IP networks configured on all directly connected interfaces. If the interface has multiple logical IP networks configured, only the primary IP network is advertised through ODR. Because ODR advertises IP prefixes and not simply IP network numbers, ODR is able to carry variable-length subnet mask (VLSM) information.

Once ODR is enabled on a hub router, the hub router begins installing stub network routes in the IP forwarding table. The hub router also can be configured to redistribute these routes into any configured dynamic IP routing protocols.

ODR uses the Cisco Discovery Protocol to carry minimal routing information between the hub and stub routers. The stub routers send IP prefixes to the hub router. The hub router provides default route information to the stub routers, thereby eliminating the need to configure a default route on each stub router.

How to Configure On-Demand Routing

This section contains the following tasks:

- [Enabling ODR, page 4](#) (required)
- [Disabling the Propagation of ODR Stub Routing Information, page 4](#) (optional)
- [Disabling the Propagation of ODR Stub Routing Information on a Specified Interface, page 5](#) (optional)
- [Filtering ODR Information, page 6](#) (optional)

- [Redistributing ODR Information into the Dynamic Routing Protocol of the Hub, page 7](#) (optional)
- [Reconfiguring Cisco Discovery Protocol or ODR Timers, page 8](#) (optional)
- [Using Dialer Map Statements to Direct Cisco Discovery Protocol Broadcast Packets, page 9](#) (optional)

Enabling ODR

Once ODR is enabled on a hub router, the hub router begins installing stub network routes in the IP forwarding table. The hub router also can be configured to redistribute these routes into any configured dynamic IP routing protocols.

To enable ODR on a hub router, perform the steps in this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router odr**

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	router odr Example: Router(config)# router odr	Enables ODR on a Cisco router, and places the router in router configuration mode.

Disabling the Propagation of ODR Stub Routing Information

ODR uses Cisco Discovery Protocol to carry minimal routing information between the hub and stub routers, allowing stub routers to send IP prefixes to the hub router. Perform the steps in this task to disable the propagation of ODR stub routing information by disabling CDP.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **no cdp run**

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 run Example: Router(config)# no cdp run	Disables Cisco Discovery Protocol.

Disabling the Propagation of ODR Stub Routing Information on a Specified Interface

On stub routers that support the ODR feature, the stub router advertises IP prefixes corresponding to the IP networks configured on all directly connected interfaces. Perform the steps in this task to disable the propagation of ODR stub routing information on a specified interface.

SUMMARY STEPS

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

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.

	Command or Action	Purpose
Step 3	interface <i>type number [name-tag]</i> Example: Router(config)# interface Ethernet 0/0	Configures an interface type and enters interface configuration mode.
Step 4	no cdp enable Example: Router(config-if)# no cdp enable	Disables Cisco Discovery Protocol on an interface.

Filtering ODR Information

To filter ODR information, perform the steps in this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **access-list** *access-list-number* {deny | permit} *source* [*source-wildcard*] [log]
4. **access-list** *access-list-number* {deny | permit} *source* [*source-wildcard*] [log]
5. **access-list** *access-list-number* {deny | permit} *source* [*source-wildcard*] [log]
6. **router odr**
7. **distribute-list** [[*access-list-number* | *name*] | [**route-map** *map-tag*]] **in** [*interface-type* | *interface-number*]

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	access-list <i>access-list-number</i> {deny permit} <i>source</i> [<i>source-wildcard</i>] [log] Example: Router(config)# access-list 101 permit 10.48.0.3	Access-list 101 permits the IP address 10.48.0.3.
Step 4	access-list <i>access-list-number</i> {deny permit} <i>source</i> [<i>source-wildcard</i>] [log] Example: Router(config)# access-list 101 deny 10.48.0.0 0.0.255.255	Access-list 101 denies the IP address 10.48.0.0 0.0.255.255.
Step 5	access-list <i>access-list-number</i> {deny permit} <i>source</i> [<i>source-wildcard</i>] [log] Example: Router(config)# access-list 101 permit 10.0.0.0 0.255.255.255	Access-list 101 permits the IP address 10.0.0.0 0.255.255.255.
Step 6	router odr Example: Router(config)# router odr	Enables ODR, and enters router configuration mode.
Step 7	distribute-list [[<i>access-list-number</i> <i>name</i>] [<i>route-map map-tag</i>]] in [<i>interface-type</i> <i>interface-number</i>] Example: Router(config-router)# distribute-list 101 in	Filters ODR information on the hub router.

Redistributing ODR Information into the Dynamic Routing Protocol of the Hub

The exact command syntax needed to redistribute ODR information into the dynamic routing protocol of the hub depends upon the routing protocol into which ODR is being redistributed. See the “Redistributing Routing Information” section in the “[Configuring IP Routing Protocol-Independent Features](#)” module for further information.

Reconfiguring Cisco Discovery Protocol or ODR Timers

By default, Cisco Discovery Protocol sends updates every 60 seconds. This update interval may not be frequent enough to provide fast reconvergence of IP routes on the hub router side of the network. A faster reconvergence rate may be necessary if the stub connects to one of several hub routers via asynchronous interfaces such as modem lines.

ODR expects to receive periodic Cisco Discovery Protocol updates containing IP prefix information. When ODR fails to receive such updates for routes that it has installed in the routing table, these ODR routes are first marked invalid and eventually removed from the routing table. (By default, ODR routes are marked invalid after 180 seconds and are removed from the routing table after 240 seconds.) These defaults are based on the default Cisco Discovery Protocol update interval. Configuration changes made to either the Cisco Discovery Protocol or ODR timers should be reflected through changes made to both.

To reconfigure Cisco Discovery Protocol or ODR timers, perform the steps in this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cdp timer** *seconds*
4. **router odr**
5. **timers basic** *update invalid holddown flush [sleeptime]*

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 timer <i>seconds</i> Example: Router(config)# cdp timer 80	Specifies how often the Cisco IOS software sends Cisco Discovery Protocol updates.

	Command or Action	Purpose
Step 4	<code>router odr</code> Example: Router(config)# <code>router odr</code>	Enables ODR, and enters router configuration mode.
Step 5	<code>timers basic update invalid holddown flush [sleeptime]</code> Example: Router(config-router)# <code>timers basic 5 15 15 30</code>	Adjusts ODR network timers.

Using Dialer Map Statements to Direct Cisco Discovery Protocol Broadcast Packets

For interfaces that specify dialer mappings, Cisco Discovery Protocol packets will make use of dialer map configuration statements that pertain to the IP protocol. Because Cisco Discovery Protocol packets are always broadcast packets, these dialer map statements must handle broadcast packets, typically through use of the **dialer map** command with the **broadcast** keyword. The **dialer string** command in interface configuration mode may also be used.

On dial-on-demand (DDR) routing interfaces, certain kinds of packets can be classified as interesting. These interesting packets can cause a DDR connection to be made or cause the idle timer of a DDR interface to be reset. For the purposes of DDR classification, Cisco Discovery Protocol packets are considered uninteresting. This classification occurs even while Cisco Discovery Protocol is making use of dialer map statements for IP, where IP packets are classified as interesting.

The following task describes how to use dialer map statements to direct Cisco Discovery Protocol broadcast packets:

SUMMARY STEPS

1. **enable**
 2. **configure terminal**
 3. **interface** *type number* [*name-tag*]
 4. **dialer map** *protocol-keyword protocol-next-hop-address* [**broadcast** | **class** *dialer-map-class-name* | **modem-script** *modem-regular-expression* | **vrf** *vrf-name* | **name** *host-name* | **spc** | **speed** **56** | **speed** **64** | **system-script** *system-regular-expression* | *dial-string[:isdn-subaddress]*]
- or
- dialer string** *dial-string[:isdn-subaddress]*

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 async 1	Configures an interface type, and enters interface configuration mode.
Step 4	dialer map <i>protocol-keyword protocol-next-hop-address</i> [broadcast class <i>dialer-map-class-name</i> modem-script <i>modem-regular-expression</i> vrf <i>vrf-name</i> name <i>host-name</i> spc speed 56 speed 64 system-script <i>system-regular-expression</i> <i>dial-string[:isdn-subaddress]</i>] or dialer string <i>dial-string[:isdn-subaddress]</i> Example: Router(config)# dialer map ip 172.19.2.5 speed 56	Configures an asynchronous interface to call multiple sites or to receive calls from multiple sites. Specifies the string (telephone number) to be called for interfaces calling a single site.

Configuration Examples for On-Demand Routing

This section provides the following ODR configuration examples:

- [Enabling ODR and Filtering ODR Information: Example, page 10](#)
- [Disabling ODR on a Specified Interface: Example, page 11](#)

Enabling ODR and Filtering ODR Information: Example

The following example shows how to enable ODR on a Cisco router and enable filtering of ODR information. The configuration example for filtering ODR information causes the hub router to accept only advertisements for IP prefixes about (or subnets of) the Class C network 192.168.1.0:

```
Router(config)# access-list 101 permit ip host 10.0.0.1 192.168.1.0 0.0.0.255
Router(config)# access-list 101 permit ip 10.0.10.2 255.0.0.0 192.168.2.0 0.0.0.255
Router(config)# router odr
Router(config-router)# distribute-list 101 in
Router(config-router)# exit
```

Disabling ODR on a Specified Interface: Example

The following example shows how to disable ODR on an interface:

```
Router# configure terminal
Router(config)# interface Ethernet 0/0
Router(config-if)# no cdp enable
```

Additional References

The following sections provide references related to the ODR feature.

Related Documents

Related Topic	Document Title
Redistributing ODR information into the dynamic routing protocol of the hub.	“Redistributing Routing Information” section in the “ Configuring IP Routing Protocol-Independent Features ” chapter of the <i>Cisco IOS IP Routing Protocols Configuration Guide</i>
Cisco Discovery Protocol features	“ Using Cisco Discovery Protocol ” chapter of the <i>Cisco IOS Network Management Configuration Guide</i>
ODR commands	“ On-Demand Routing Commands ” chapter of the <i>Cisco IOS IP Routing Protocols Command Reference</i>

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	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 by this feature, and support for existing RFCs has not been modified by this feature.	—

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 Configuring On-Demand Routing

Table 1 lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Release 12.2(1) or a later release appear in the table.

For information on a feature in this technology that is not documented here, see the *Cisco IOS IP Routing Protocols Configuration Guide*.

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 1 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 1 Feature Information for Configuring On-Demand Routing

Feature Name	Releases	Feature Information
On-Demand Routing	10.0 12.2(1) 12.2(2)T	The On-Demand Routing (ODR) feature provides IP routing for stub sites, with minimum overhead. This entire document provides information about this feature:

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