



Configuring On-Demand Routing

This chapter describes how to configure On-Demand Routing (ODR). For a complete description of the ODR commands in this chapter, refer to the “On-Demand Routing Commands” chapter of the *Cisco IOS IP and IP Routing Command Reference* publication. To locate documentation of other commands in this chapter, use the command reference master index or search online.

ODR is a feature that provides IP routing for stub sites, with minimum overhead. The overhead of a general, dynamic routing protocol is avoided without incurring the configuration and management overhead of static routing.

A *stub router* can be thought of as a spoke router in a hub-and-spoke network topology, 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 thus do not require the stub router to learn any dynamic IP routing information.

To identify the hardware platform or software image information associated with a feature, use the Feature Navigator on Cisco.com to search for information about the feature or refer to the software release notes for a specific release. For more information, see the “Identifying Supported Platforms” section in the “Using Cisco IOS Software” chapter in this book.

On-Demand Routing Configuration Task List

To configure ODR, perform the tasks described in the following sections. The tasks in the first section are required; the tasks in the remaining sections are optional:

- Enabling ODR (Required)
- Filtering ODR Information (Optional)
- Redistributing ODR Information into the Dynamic Routing Protocol of the Hub (Optional)
- Reconfiguring CDP or ODR Timers (Optional)
- Using ODR with Dialer Mappings (Optional)

Enabling ODR

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.

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. 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.

To enable ODR, use the following command in global configuration mode:

| Command | Purpose |
|-----------------------------------|--------------------------------|
| Router(config)# router odr | Enables ODR on the hub router. |

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.

On the stub router, no IP routing protocol must be configured. In fact, from the standpoint of ODR, a router is automatically considered to be a stub when no IP routing protocols have been configured.

ODR uses the Cisco Discovery Protocol (CDP) 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.

Using the **no cdp run** global configuration command disables the propagation of ODR stub routing information entirely. Using the **no cdp enable** interface configuration command disables the propagation of ODR information on a particular interface.

Filtering ODR Information

The hub router will attempt to populate the IP routing table with ODR routes as they are learned dynamically from stub routers. The IP next hop for these routes is the IP address of the neighboring router as advertised through CDP.

Use IP filtering to limit the network prefixes that the hub router will permit to be learned dynamically through ODR.

To filter ODR information, use the following command in router configuration mode:

| Command | Purpose |
|---|--|
| Router(config-router)# distribute-list <i>access-list-number</i> <i>access-list-name</i> prefix <i>list-name</i> { in out } [<i>interface-type</i> <i>interface-number</i>] | Filters ODR information on the hub router. |

For example, the following configuration causes the hub router to only accept advertisements for IP prefixes about (or subnets of) the Class C network 1982.168.1.0:

```
Router(config)# access-list 101 permit ip any 192.168.1.0 0.0.0.255
Router(config)# !
Router(config)# router odr
Router(config)# distribute-list 101 in
Router(config)# end
```

Redistributing ODR Information into the Dynamic Routing Protocol of the Hub

This task may be performed by using the **redistribute** router configuration command. The exact syntax depends upon the routing protocol into which ODR is being redistributed.

See the “Redistribute Routing Information” section in the “Configuring IP Routing Protocol-Independent Features” chapter.

Reconfiguring CDP or ODR Timers

By default, CDP sends updates every 60 seconds. This update interval may not be frequent enough to provide speedy 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 CDP 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 CDP update interval. Configuration changes made to either the CDP or ODR timers should be reflected through changes made to both.

To configure CDP or ODR timers, use the following commands beginning in global configuration mode:

| | Command | Purpose |
|---------------|---|--|
| Step 1 | Router(config)# cdp timer <i>seconds</i> | Changes the rate at which CDP updates are sent. |
| Step 2 | Router(config)# router odr | Enables ODR. |
| Step 3 | Router(config-router)# timers basic <i>update invalid holddown flush [sleeptime]</i> | Changes the rate at which ODR routes are expired from the routing table. |

Other CDP features are described in the *Cisco IOS Configuration Fundamentals Configuration Guide*, in the “Monitoring the Router and Network” chapter.

Using ODR with Dialer Mappings

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

On DDR 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, CDP packets are considered uninteresting. This classification occurs even while CDP is making use of dialer map statements for IP, where IP packets are classified as interesting.