



OSPFv2 Local RIB

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With the OSPFv2 Local RIB feature, each OSPF protocol instance has its own local Routing Information Base (RIB). The OSPF local RIB serves as the primary state for OSPF SPF route computation. The global RIB is not updated with intermediate results during the SPF. Instead, the global RIB is updated only when routes are added, deleted, or changed, thereby reducing global RIB computation. This reduced update activity may result in fewer dropped packets.

This feature is enabled by default and does not need to be configured. This document describes some optional configuration tasks to modify how the global and local RIBs function, although it is recommended to keep the default settings.

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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. An account on Cisco.com is not required.

Prerequisites for OSPFv2 Local RIB

Before this feature is configured, the OSPF routing protocol must be configured.



Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Restrictions for OSPFv2 Local RIB

This feature is available only for IP Version 4 networks.

Information About OSPFv2 Local RIB

- [Function of the OSPF Local RIB, page 2](#)

Function of the OSPF Local RIB

A router that is running OSPFv2 maintains a local RIB in which it stores all routes to destinations that it has learned from its neighbors. At the end of each SPF, OSPF attempts to install the best (that is, the least-cost) routes to a destination present in the local RIB into the global IPv4 routing table. The global RIB will be updated only when routes are added, deleted, or changed. Routes in the local RIB and Forwarding Information Base (FIB) will not compute when intermediate results are computed during SPF, resulting in fewer dropped packets in some circumstances.

By default, OSPF installs discard routes to null0 for any area range (internal) or summary-address (external) prefixes that it advertises to other routers. Installation of a discard route can prevent routing loops in cases where portions of a summary do not have a more specific route in the RIB. Normally, internal discard routes are installed with an administrative distance of 110, while external discard routes have an administrative distance of 254.

There may be rare circumstances, however, when some other values are needed. For example, if one OSPF process installs a route that exactly matches an area range configured on another OSPF process, the internal discard routes for the second OSPF process could be given a higher (less desirable) administrative distance.

By default, the contents of the global RIB are used to compute inter-area summaries, NSSA translation, and forwarding addresses for type-5 and type-7 LSAs. Each of these functions can be configured to use the contents of the OSPF local RIB instead of the global RIB for their computation. Using the local RIB for the computation may be slightly faster in some circumstances, but because the local RIB has information for only a particular instance of OSPF, using it for the computation may yield incorrect results. Potential problems that may occur include routing loops and black-hole routes.

How to Configure the OSPFv2 Local RIB Feature

Although it is recommended to keep the default settings for the commands described in the following sections, it is optional to change the defaults settings. This section describes the following optional tasks:

- [Changing the Default Local RIB Criteria, page 3](#)
- [Changing the Administrative Distance for Discard Routes, page 4](#)

Changing the Default Local RIB Criteria



Note

It is recommended that you not change the default values because they are conservative and preserve the current global RIB behavior.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id* [**vrf** *vpn-name*]
4. **local-rib-criteria** [**forwarding-address**] [**inter-area-summary**] [**nssa-translation**]
5. **end**
6. **show ip ospf** *process-id* **rib** [**redistribution**] [*network-prefix*] [*network-mask*] [**detail**]

DETAILED STEPS

| Command or Action | Purpose |
|---|---|
| <p>Step 1 enable</p> <p>Example:</p> <pre>Router> enable</pre> | <p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted. |
| <p>Step 2 configure terminal</p> <p>Example:</p> <pre>Router# configure terminal</pre> | <p>Enters global configuration mode.</p> |
| <p>Step 3 router ospf <i>process-id</i> [vrf <i>vpn-name</i>]</p> <p>Example:</p> <pre>Router(config)# router ospf 23</pre> | <p>Configures an OSPFv2 routing process and enters router configuration mode.</p> |
| <p>Step 4 local-rib-criteria [forwarding-address] [inter-area-summary] [nssa-translation]</p> <p>Example:</p> <pre>Router(config-router)# local-rib-criteria forwarding-address</pre> | <p>Specifies that the OSPF local RIB will be used for route validation.</p> |

| Command or Action | Purpose |
|---|--|
| Step 5 <code>end</code> Example: <pre>Router(config-router)# end</pre> | Returns to privileged EXEC mode. |
| Step 6 <code>show ip ospf process-id rib [redistribution] [network-prefix] [network-mask] [detail]</code> Example: <pre>Router# show ip ospf 23 rib</pre> | Displays information for the OSPF local RIB or locally redistributed routes. |

Changing the Administrative Distance for Discard Routes



Note

It is recommended to keep the default settings, but you can follow the steps in this section to change the administrative distance for discard routes.

SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `router ospf process-id [vrf vpn-name]`
4. `discard-route [external [distance]] [internal [distance]]`
5. `end`
6. `show ip route [ip-address [mask] [longer-prefixes] | protocol [process-id] | list [access-list-number | access-list-name] | static download]`

DETAILED STEPS

| Command or Action | Purpose |
|--|--|
| Step 1 <code>enable</code> Example: <pre>Router> enable</pre> | Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted. |

| Command or Action | Purpose |
|--|---|
| <p>Step 2 <code>configure terminal</code></p> <p>Example:</p> <pre>Router# configure terminal</pre> | <p>Enters global configuration mode.</p> |
| <p>Step 3 <code>router ospf process-id [vrf vpn-name]</code></p> <p>Example:</p> <pre>Router(config)# router ospf 23</pre> | <p>Configures an OSPFv2 routing process and enters router configuration mode.</p> |
| <p>Step 4 <code>discard-route [external [distance]] [internal [distance]]</code></p> <p>Example:</p> <pre>Router(config-router)# discard-route external 150</pre> | <p>Reinstalls either an external or internal discard route that was previously removed.</p> <p>Note You can now specify the administrative distance for internal and external discard routes.</p> |
| <p>Step 5 <code>end</code></p> <p>Example:</p> <pre>Router(config-router)# end</pre> | <p>Returns to privileged EXEC mode.</p> |
| <p>Step 6 <code>show ip route [ip-address [mask] [longer-prefixes] protocol [process-id] list [access-list-number access-list-name] static download]</code></p> <p>Example:</p> <pre>Router# show ip route ospf 23</pre> | <p>Displays the current state of the routing table.</p> <p>Note Entering the <code>show ip route</code> command will verify the changed administrative distance values for external and internal discard routes.</p> |

Examples

The sample output displayed for the `show ip route` command confirms that the administrative distance for the IP route 192.168.0.0 255.255.255.0 is 110.

```
Router# show ip route 192.168.0.0 255.255.255.0
```

```
Routing entry for 192.168.0.0/24
Known via "ospf 1", distance 110, metric 0, type intra area
Routing Descriptor Blocks:
* directly connected, via Null0
  Route metric is 0, traffic share count is 1
```

- [Troubleshooting Tips, page 6](#)

Troubleshooting Tips

You can research the output from the **debug ip ospf rib** command to learn about the function of the local RIB and the interaction between the route redistribution process and the global RIB. For example, you can learn why the routes that OSPF placed in the global RIB are not the same ones that you anticipated.

Configuration Examples for the OSPFv2 Local RIB Feature

- [Example: Changing the Default Local RIB Criteria, page 6](#)
- [Example: Changing the Administrative Distance for Discard Routes, page 6](#)

Example: Changing the Default Local RIB Criteria

In the following example, the **local-rib-criteria** command is entered without any keywords to specify that the local RIB will be used as criteria for all of the following options: forwarding address, inter-area summary, and NSSA translation.

```
router ospf 1
router-id 10.0.0.6
local-rib-criteria
```

Example: Changing the Administrative Distance for Discard Routes

In the following example, the administrative distance for external and internal discard routes is set to 25 and 30, respectively.

```
router ospf 1
router-id 10.0.0.6
log-adjacency-changes
discard-route external 25 internal 30
area 4 range 10.2.0.0 255.255.0.0
summary-address 192.168.130.2 255.255.255.0
redistribute static subnets
network 192.168.129.2 0.255.255.255 area 0
network 192.168.130.12 0.255.255.255 area 0
```

The output from the **show ip route** command verifies that the administrative distance for the internal route 10.2.0.0/16 is set to 30.

```
Router# show ip route 10.2.0.0 255.255.0.0
Routing entry for 10.2.0.0/16
Known via "ospf 1", distance 30, metric 1, type intra area
Routing Descriptor Blocks:
* directly connected, via Null0
  Route metric is 1, traffic share count is 1
```

The output from the **show ip route** command verifies that the administrative distance for the external route 192.168.130.2/24 is set to 25.

```
Router# show ip route 192.168.130.2 255.255.255.0
Routing entry for 192.168.130.2/24
Known via "ospf 1", distance 25, metric 20, type intra area
Routing Descriptor Blocks:
* directly connected, via Null0
  Route metric is 20, traffic share count is 1
```

Additional References

The following sections provide references related to the OSPFv2 Local RIB feature.

Related Documents

| Related Topic | Document Title |
|--------------------------|---|
| OSPF commands | <i>Cisco IOS IP Routing: OSPF Command Reference</i> |
| OSPF configuration tasks | "Configuring OSPF" |

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 by this feature, and support for existing MIBs has not been modified by this feature. | 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 |
|------|-------|
| None | -- |

Technical Assistance

| Description | Link |
|---|---|
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Feature Information for the OSPFv2 Local RIB Feature

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.

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Table 1 *Feature Information for the OSPFv2 Local RIB Feature*

| Feature Name | Releases | Feature Information |
|------------------|--|---|
| OSPFv2 Local RIB | 12.4(15)T 12.2(33)SRC 12.2(33)SB 15.0(1)SY Cisco IOS Release 15.1(1)SG | <p>With the OSPFv2 Local RIB feature, each OSPF protocol instance has its own local Routing Information Base (RIB). The OSPF local RIB serves as the primary state for OSPF SPF route computation. The global RIB is not updated with intermediate results during the SPF. Instead, the global RIB is updated only when routes are added, deleted, or changed, thereby reducing global RIB computation. This reduced update activity may result in fewer dropped packets.</p> <p>This feature is enabled by default and does not need to be configured. This document describes some optional configuration tasks to modify how the global and local RIBs function, although it is recommended to keep the default settings.</p> <p>The following commands were introduced or modified: debug ip ospf rib, discard-route, local-rib-criteria, show ip ospf rib.</p> |

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