



IS-IS Commands

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address-family (IS-IS)

To enter address family configuration mode for configuring Intermediate System-to-Intermediate System (IS-IS) routing that use standard IP Version 4 (IPv4) and IP Version 6 (IPv6) address prefixes, use the **address-family** command in or interface configuration mode. To disable support for an address family, use the **no** form of this command.

address-family { **ipv4** | **ipv6** } { **unicast** | **multicast** }

| | | |
|---------------------------|--|---------------------------------------|
| Syntax Description | ipv4 | Specifies IPv4 address prefixes. |
| | ipv6 | Specifies IPv6 address prefixes. |
| | unicast | Specifies unicast address prefixes. |
| | multicast | Specifies multicast address prefixes. |
| Command Default | An address family is not specified. The default subaddress family (SAFI) is unicast. | |
| Command Modes | Interface configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | <p>Use the address family command to place the router or interface in address family configuration mode. In router address family configuration mode, you can configure routing that uses standard IPv4 or IPv6 address prefixes. An address family must be specified in interface configuration mode. In interface address family configuration mode, you can alter interface parameters for IPv4 or IPv6.</p> <p>You must specify an address family in order to configure parameters that pertain to a single address family.</p> | |
| Task ID | Task ID | Operations |
| | isis | read, write |

Examples

The following example shows how to configure the IS-IS router process with IPv4 unicast address prefixes:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# interface HundredGigE 0/1/0/0
RP/0/(config-isis-if)# address-family ipv4 unicast
RP/0/(config-isis-if-af)#
```

address-family multicast topology (IS-IS)

To enable a multicast topology when configuring Intermediate System-to-Intermediate System (IS-IS) routing (or to place a given topology within the IS-IS interface), use the **address-family multicast topology** command with either IPv4 or IPv6 address prefix in the appropriate configuration mode. To disable a multicast topology in IS-IS, use the **no** form of this command.

```
address-family { ipv4 | ipv6 } [ maximum prefix prefix-limit ]
no address-family
```

Syntax Description

| | |
|-----------------------|---|
| ipv4 | Specifies IPv4 address prefixes. |
| ipv6 | Specifies IPv6 address prefixes. |
| topology | Specifies the name of the topology. |
| maximum prefix | Specifies maximum number of prefixes that a routing table can have. |
| <i>prefix-limit</i> | Maximum number of prefixes. Range is from 32 to 2,000,000. |

Command Default

An address family for multicast topology is not specified. The default subaddress family (SAFI) is unicast.

Command Modes

Router configuration
Interface configuration

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

authentication-check disable

To suppress Intermediate System-to-Intermediate System (IS-IS) authentication check, use the **authentication-check disable** command in configuration mode. To remove this function, use the **no** form of this command.

authentication-check disable
no authentication-check disable

| | | |
|-----------------|---------------------------------|------------------------------|
| Command Default | Authentication check is enabled | |
| Command Modes | | |
| Command History | Release | Modification |
| | Release 7.7.1 | This command was introduced. |
| Task ID | Task ID | Operations |
| | isis | read, write |

Examples

The following example shows how to disable authentication check for IS-IS.

```
Router# configure
Router(config)# router isis 1
Router(config)# authentication-check disable
Router(config)# commit
```

circuit-type

To configure the type of adjacency used for the Intermediate System-to-Intermediate System (IS-IS) protocol, use the **circuit-type** command in interface configuration mode. To reset the circuit type to Level 1 and Level 2, use the **no** form of this command.

circuit-type { **level-1** | **level-1-2** | **level-2-only** }
no circuit-type

| Syntax Description | <table> <tr> <td>level-1</td><td>Establishes only Level 1 adjacencies over an interface.</td></tr> <tr> <td>level-1-2</td><td>Establishes both Level 1 and Level 2 adjacencies, if possible.</td></tr> <tr> <td>level-2-only</td><td>Establishes only Level 2 adjacencies over an interface.</td></tr> </table> | level-1 | Establishes only Level 1 adjacencies over an interface. | level-1-2 | Establishes both Level 1 and Level 2 adjacencies, if possible. | level-2-only | Establishes only Level 2 adjacencies over an interface. |
|---------------------------|---|----------------|---|------------------|--|---------------------|---|
| level-1 | Establishes only Level 1 adjacencies over an interface. | | | | | | |
| level-1-2 | Establishes both Level 1 and Level 2 adjacencies, if possible. | | | | | | |
| level-2-only | Establishes only Level 2 adjacencies over an interface. | | | | | | |
| Command Default | Default adjacency types are Level 1 and Level 2 adjacencies. | | | | | | |
| Command Modes | Interface configuration | | | | | | |
| Usage Guidelines | Adjacencies may not be established even if allowed by the circuit-type command. The proper way to establish adjacencies is to configure a router as a Level 1, Level 1 and Level 2, or Level 2-only system using the IS type command. Only on networking devices that are between areas (Level 1 and Level 2 networking devices) should you configure some interfaces to be Level 2-only to prevent wasting bandwidth by sending out unused Level 1 hello packets. Remember that on point-to-point interfaces, the Level 1 and Level 2 hello packets are in the same packet. | | | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write | | |
| Task ID | Operations | | | | | | |
| isis | read, write | | | | | | |
| Examples | <p>The following example shows how to configure a Level 1 adjacency with its neighbor on GigabitEthernet interface 0/2/0/0 and Level 2 adjacencies with all Level 2-capable routers on GigabitEthernet interface 0/5/0/2:</p> <pre>RP/0//CPU0:router(config)# router isis isp RP/0//CPU0:router(config-isis)# is-type level-1-2 RP/0//CPU0:router(config-isis)# interface GigabitEthernet 0/2/0/0 RP/0//CPU0:router(config-isis-if)# circuit-type level-1 RP/0//CPU0:router(config-isis-if)# exit RP/0//CPU0:router(config-isis)# interface GigabitEthernet 0/5/0/2 RP/0//CPU0:router(config-isis-if)# circuit-type level-2-only</pre> <p>In this example, only Level 2 adjacencies are established because the is-type command is configured:</p> <pre>RP/0//CPU0:router(config)# router isis isp</pre> | | | | | | |

```
RP/0//CPU0:router(config-isis)# is-type level-2-only  
RP/0//CPU0:router(config-isis)# interface GigabitEthernet 0/2/0/0  
RP/0//CPU0:router(config-isis-if)# circuit-type level-1-2
```

Related Commands

| Command | Description |
|---------|--|
| IS type | Configures the routing level for an instance of the IS-IS routing process. |
| Net | Configures an IS-IS NET for the routing process. |

clear isis process

To clear the link-state packet (LSP) database and adjacency database sessions for an Intermediate System-to-Intermediate System (IS-IS) instance or all IS-IS instances, use the **clear isis process** command in .

clear isis [**instance** *instance-id*] **process**

Syntax Description

instance *instance-id* (Optional) Specifies IS-IS sessions for the specified IS-IS instance only.

- The *instance-id* argument is the instance identifier (alphanumeric) defined by the **router isis** command.

Command Default

No default behavior or values

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

Use the **clear isis process** command without any keyword to clear all the IS-IS instances. Add the **instance** *instance-id* keyword and argument to clear the specified IS-IS instance.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows the IS-IS LSP database and adjacency sessions being cleared for instance 1:

```
RP/0/# clear isis instance 1 process
```


clear isis route

To clear the Intermediate System-to-Intermediate System (IS-IS) routes in a topology, use the **clear isis route** command in .

clear isis [**instance** *instance-id*] {**afi-all** | **ipv4** | **ipv6**} {**unicast** | **multicast** | **safi-all**} [**topology** *topo-name*] **route**

| Syntax Description | instance <i>instance-id</i> (Optional) Specifies IS-IS sessions for the specified IS-IS instance only. <ul style="list-style-type: none">The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
|----------------------------------|--|
| afi-all | Specifies IP Version 4 (IPv4) and IP Version 6 (IPv6) address prefixes. |
| ipv4 | Specifies IPv4 address prefixes. |
| ipv6 | Specifies IPv6 address prefixes. |
| unicast | Specifies unicast address prefixes. |
| multicast | Specifies multicast address prefixes. |
| safi-all | Specifies all secondary address prefixes. |
| topology <i>topo-name</i> | (Optional) Specifies topology table information and name of the topology table. |

| | |
|-----------------|------------------------------|
| Command Default | No default behavior or value |
|-----------------|------------------------------|

| |
|---------------|
| Command Modes |
|---------------|

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| | |
|------------------|--|
| Usage Guidelines | Use the clear isis route command to clear the routes from the specified topology or all routes in all topologies if no topology is specified. |
|------------------|--|

| Task ID | Task ID | Operations |
|---------|----------------|----------------|
| | isis | execute |
| | rib | read, write |
| | basic-services | read, write |

| |
|----------|
| Examples |
|----------|

The following example shows how to clear the routes with IPv4 unicast address prefixes:

clear isis route

```
RP/0/# clear isis ipv4 unicast route
```

clear isis statistics

To clear the Intermediate System-to-Intermediate System (IS-IS) statistics, use the **clear isis statistics** command in .

clear isis [**instance** *instance-id*] **statistics** [*type interface-path-id*]

| | |
|---------------------------|---|
| Syntax Description | <p>instance <i>instance-id</i> (Optional) Clears IS-IS sessions for the specified IS-IS instance only.</p> <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| | <p><i>type</i> Interface type. For more information, use the question mark (?) online help function.</p> |
| | <p><i>interface-path-id</i> Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p> |

Command Default No default behavior or values

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Use the **clear isis statistics** command to clear the information displayed by the **show isis statistics** command.

| Task ID | Task ID | Operations |
|---------|----------------|----------------|
| | isis | execute |
| | rib | read, write |
| | basic-services | read, write |

Examples

The following example shows the IS-IS statistics for a specified interface being cleared:

```
RP/0/# clear isis instance 23 statistics
```

csnp-interval

To configure the interval at which periodic complete sequence number PDU (CSNP) packets are sent on broadcast interfaces, use the **csnp-interval** command in interface configuration mode. To restore the default value, use the **no** form of this command.

csnp-interval *seconds* [**level** { **1** | **2** }]

| | | |
|---------------------------|---|------------------------------|
| Syntax Description | <p><i>seconds</i> Interval (in seconds) of time between transmission of CSNPs on multiaccess networks. This interval applies only for the designated router. Range is 0 to 65535 seconds.</p> <p>level { 1 2 } (Optional) Specifies the interval of time between transmission of CSNPs for Level 1 or Level 2 independently.</p> | |
| Command Default | <p><i>seconds</i> : 10 seconds</p> <p>Both Level 1 and Level 2 are configured if no level is specified.</p> | |
| Command Modes | Interface configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | <p>The csnp-interval command applies only to the designated router (DR) for a specified interface. Only DRs send CSNP packets to maintain database synchronization. The CSNP interval can be configured independently for Level 1 and Level 2.</p> <p>Use of the csnp-interval command on point-to-point subinterfaces makes sense only in combination with the IS-IS mesh-group feature.</p> | |
| Task ID | Task ID | Operations |
| | isis | execute |
| | rib | read, write |
| | basic-services | read, write |
| Examples | <p>The following example shows how to set the CSNP interval for Level 1 to 30 seconds:</p> <pre>RP/0/(config)# router isis isp RP/0/(config-isis)# interface HundredGigE 0/0/2/0 RP/0/(config-isis-if)# csnp-interval 30 level 1</pre> | |

default-information originate (IS-IS)

To generate a default route into an Intermediate System-to-Intermediate System (IS-IS) routing domain, use the **default-information originate** command in address family configuration mode. To remove the **default-information originate** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

default-information originate [{ **external** | **route-policy** *route-policy-name* }]

| | | |
|---------------------------|--------------------------|---|
| Syntax Description | external | (Optional) Enables default route to be originated as an external route. |
| | route-policy | (Optional) Defines the conditions for the default route. |
| | <i>route-policy-name</i> | (Optional) Name for the route policy. |

Command Default A default route is not generated into an IS-IS routing domain.

Command Modes Address family configuration

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines If a router configured with the **default-information originate** command has a route to 0.0.0.0 in the routing table, IS-IS originates an advertisement for 0.0.0.0 in its link-state packets (LSPs).

Without a route policy, the default is advertised only in Level 2 LSPs. For Level 1 routing, there is another process to find the default route, which is to look for the closest Level 1 and Level 2 router. The closest Level 1 and Level 2 router can be found by looking at the attached-bit (ATT) in Level 1 LSPs.

A route policy can be used for two purposes:

- To make the router generate the default route in its Level 1 LSPs.
- To advertise 0.0.0.0/0 conditionally.

| | | |
|----------------|----------------|-------------------|
| Task ID | Task ID | Operations |
| | isis | read, write |

Examples

The following example shows how to generate a default external route into an IS-IS domain:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# address-family ipv4 unicast
RP/0/(config-isis-af)# default-information originate
```

default-information originate (IS-IS)

fast-reroute per-link (IS-IS)

To enable IP fast reroute (IPFRR) loop-free alternate (LFA) prefix independent per-link computation, use the **fast-reroute per-link** command in interface address family configuration mode. To disable this feature, use the **no** form of this command.

fast-reroute per-link [{ **exclude** **interface** *type interface-path-id* | **level** { **1** | **2** } | **lfa-candidate** **interface** *type interface-path-id* }]

| Syntax Description | | |
|--------------------------|-------------|--|
| exclude | | Specifies fast-reroute (FRR) loop-free alternate (LFA) computation exclusion information |
| level {1 2} | | Configures FRR LFA computation for one level only. |
| lfa-candidate | | Specifies FRR LFA computation candidate information |
| interface | | Specifies an interface that needs to be either excluded from FRR LFA computation (when used with exclude keyword) or to be included to LFA candidate list in FRR LFA computation (when used with the lfa-candidate keyword). |
| <i>type</i> | | Interface type. For more information, use the question mark (?) online help function. |
| <i>interface-path-id</i> | | Physical interface or virtual interface. |
| | Note | Use the show interfaces command to see a list of all interfaces currently configured on the router. |
| | | For more information about the syntax for the router, use the question mark (?) online help function. |

Command Default IP fast-reroute LFA per-link computation is disabled.

Command Modes Interface address family configuration

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operation |
|---------|---------|----------------|
| | isis | read, write |

This example shows how to configure per-link fast-reroute LFA computation for the IPv4 unicast topology at Level 1:

```
RP/0/ (config) # router isis isp
```

```
RP/0/(config-isis)# interface HundredGigE 0/3/0/0  
RP/0/(config-isis-if)# address-family ipv4 unicast  
RP/0/(config-isis-if-af)# fast-reroute per-link level 1
```


fast-reroute per-prefix (IS-IS)

To enable IP fast reroute (IPFRR) loop-free alternate (LFA) prefix dependent computation, use the **fast-reroute per-prefix** command in interface address family configuration mode. LFA is supported only on Enhanced Ethernet line card. To disable this feature, use the **no** form of this command.

```
fast-reroute per-prefix [{ exclude interface type interface-path-id | level { 1 | 2 } |
lfa-candidate interface type interface-path-id | remote-lfa { maximum-metric metric-value
| tunnel mpls-ldp } prefix-list prefix-list-name [ level { 1 | 2 } ] ]]
```

| | | | |
|--------------------|---|--|---|
| Syntax Description | exclude | Specifies fast-reroute (FRR) loop-free alternate (LFA) computation exclusion information | |
| | level {1 2} | Configures FRR LFA computation for one level only. | |
| | lfa-candidate | Specifies FRR LFA computation candidate information | |
| | interface | Specifies an interface that needs to be either excluded from FRR LFA computation (when used with exclude keyword) or to be included to LFA candidate list in FRR LFA computation (when used with the lfa-candidate keyword). | |
| | type | Interface type. For more information, use the question mark (?) online help function. | |
| | interface-path-id | Physical interface or virtual interface. | |
| | | Note | Use the show interfaces command to see a list of all interfaces currently configured on the router. |
| | | | For more information about the syntax for the router, use the question mark (?) online help function. |
| | | remote-lfa | Enable remote LFA related configuration. |
| | prefix-list prefix-list-name | Filter PQ node router ID based on prefix list. | |
| Command Default | IP fast-reroute LFA per-prefix computation is disabled. | | |
| Command Modes | Interface address family configuration | | |
| Command History | Release | Modification | |
| | Release 7.0.12 | This command was introduced. | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | |

Task ID**Task ID Operation**

| | |
|------|----------------|
| isis | read, write |
|------|----------------|

This example shows how to configure per-prefix fast-reroute LFA computation for the IPv4 unicast topology at Level 1:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# interface HundredGigE 0/3/0/0
RP/0/(config-isis-if)# address-family ipv4 unicast
RP/0/(config-isis-if-af)# fast-reroute per-prefix level 1
```

This example shows how to configure per-prefix remote-lfa prefix list. The prefix-list option filters PQ node router ID based on prefix list.

```
RP/0/RP0/CPU0:router(config-isis-af)# fast-reroute per-prefix remote-lfa prefix-list
```

fast-reroute per-link priority-limit (IS-IS)

To enable the IP fast reroute (IPFRR) loop-free alternate (LFA) prefix independent per-link computation, use the **fast-reroute per-link priority-limit** command in address family configuration mode. To disable this feature, use the **no** form of this command.

fast-reroute per-link priority-limit { **critical** | **high** | **medium** } **level** { **1** | **2** }

| | | |
|---------------------------|---|---|
| Syntax Description | critical | Enables LFA omputation for critical priority prefixes only. |
| | high | Enables LFA computation for for criticaland high priority prefixes. |
| | medium | Enables LFA computation for for critical, high, and medium priority prefixes. |
| | level {1 2} | Sets priority-limit for routing Level 1 or Level 2 independently. |
| Command Default | Fast-reroute per link priority limit LFA computation is disabled. | |
| Command Modes | IPv4 unicast address family configuration | |
| | IPv6 unicast address family configuration | |
| | IPv4 multicast address family configuration | |
| | IPv6 multicast address family configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | No specific guidelines impact the use of this command. | |
| Task ID | Task ID | Operations |
| | isis | read, write |

This example shows how to configure fast-reroute prefix independent per-link computation for critical priority prefixes for level 1 only:

```
RP/0/#configure
RP/0/(config)#router isis isp_lfa
RP/0/(config-isis)#address-family ipv4
RP/0/(config-isis-af)#fast-reroute per-link priority-limit critical level 1
```

fast-reroute per-prefix load-sharing disable (IS-IS)

To disable load sharing prefixes across multiple backups, use the **fast-reroute per-prefix load-sharing disable** command in IPv4 address family configuration mode. To disable this feature, use the **no** form of this command.

fast-reroute per-prefix load-sharing disable

| | |
|---------------------------|--|
| Syntax Description | level Disables load-sharing for Level 1 or Level 2 independently. {1 2} |
|---------------------------|--|

| | |
|------------------------|--------------------------|
| Command Default | Load sharing is enabled. |
|------------------------|--------------------------|

| | |
|----------------------|--|
| Command Modes | IPv4 unicast address family configuration IPv4 multicast address family configuration |
|----------------------|--|

| | |
|------------------------|--|
| Command History | Release Modification |
| | Release 7.0.12 This command was introduced. |

| | |
|-------------------------|--|
| Usage Guidelines | No specific guidelines impact the use of this command. |
|-------------------------|--|

| | |
|----------------|----------------------------------|
| Task ID | Task ID Operations |
| | isis read, write |

This example shows how to disable load-sharing prefixes across multiple backups for level 1 routes:

```
RP/0/#configure
RP/0/(config)#router isis isp_lfa
RP/0/(config-isis)#address-family ipv4
RP/0/(config-isis-af)#fast-reroute per-prefix load-sharing disable level 1
```

fast-reroute per-prefix tiebreaker (IS-IS)

To configure tie-breaker for multiple backups, use the **fast-reroute per-prefix tiebreaker** command in IPv4 address family configuration mode. To disable tie-breaker configuration, use the **no** form of this command.

fast-reroute per-prefix tiebreaker [**downstream** | **lc-disjoint** | **lowest-backup-metric** | **node-protecting** | **primary-path** | **secondary-path**] **index** *index_number* **level** { **1** | **2** }

| Syntax Description | <table> <tr> <td>downstream</td><td>Configures to prefer backup path via downstream node, in case of tie-breaker.</td></tr> <tr> <td>lc-disjoint</td><td>Configures to prefer Prefer line card disjoint backup path.</td></tr> <tr> <td>lowest-backup-metric</td><td>Configures to prefer backup path with lowest total metric.</td></tr> <tr> <td>node-protecting</td><td>Configures to prefer node protecting backup path.</td></tr> <tr> <td>primary-path</td><td>Configures to prefer backup path from ECMP set.</td></tr> <tr> <td>secondary-path</td><td>Configures to prefer non-ECMP backup path.</td></tr> <tr> <td>index</td><td>Sets preference order among tie-breakers.</td></tr> <tr> <td><i>index_number</i></td><td>Value for the index. Range is 1-255.</td></tr> <tr> <td>level {1 2}</td><td>Configures tiebreaker for Level 1 or Level 2 independently.</td></tr> </table> | downstream | Configures to prefer backup path via downstream node, in case of tie-breaker. | lc-disjoint | Configures to prefer Prefer line card disjoint backup path. | lowest-backup-metric | Configures to prefer backup path with lowest total metric. | node-protecting | Configures to prefer node protecting backup path. | primary-path | Configures to prefer backup path from ECMP set. | secondary-path | Configures to prefer non-ECMP backup path. | index | Sets preference order among tie-breakers. | <i>index_number</i> | Value for the index. Range is 1-255. | level {1 2} | Configures tiebreaker for Level 1 or Level 2 independently. |
|-----------------------------|--|-------------------|---|--------------------|---|-----------------------------|--|------------------------|---|---------------------|---|-----------------------|--|--------------|---|---------------------|--------------------------------------|----------------------|---|
| downstream | Configures to prefer backup path via downstream node, in case of tie-breaker. | | | | | | | | | | | | | | | | | | |
| lc-disjoint | Configures to prefer Prefer line card disjoint backup path. | | | | | | | | | | | | | | | | | | |
| lowest-backup-metric | Configures to prefer backup path with lowest total metric. | | | | | | | | | | | | | | | | | | |
| node-protecting | Configures to prefer node protecting backup path. | | | | | | | | | | | | | | | | | | |
| primary-path | Configures to prefer backup path from ECMP set. | | | | | | | | | | | | | | | | | | |
| secondary-path | Configures to prefer non-ECMP backup path. | | | | | | | | | | | | | | | | | | |
| index | Sets preference order among tie-breakers. | | | | | | | | | | | | | | | | | | |
| <i>index_number</i> | Value for the index. Range is 1-255. | | | | | | | | | | | | | | | | | | |
| level {1 2} | Configures tiebreaker for Level 1 or Level 2 independently. | | | | | | | | | | | | | | | | | | |
| Command Default | Tie-breaker for multiple backups is not configured. | | | | | | | | | | | | | | | | | | |
| Command Modes | IPv4 unicast address family configuration IPv4 multicast address family configuration | | | | | | | | | | | | | | | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. | | | | | | | | | | | | | | |
| Release | Modification | | | | | | | | | | | | | | | | | | |
| Release 7.0.12 | This command was introduced. | | | | | | | | | | | | | | | | | | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | | | | | | | | | | | | | | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write | | | | | | | | | | | | | | |
| Task ID | Operations | | | | | | | | | | | | | | | | | | |
| isis | read, write | | | | | | | | | | | | | | | | | | |

This example shows how to configure preference of backup path via downstream node in case of a tie-breaker for selection of backup path from multiple backup paths:

```
RP/0/#configure
RP/0/(config)#router isis isp_lfa
RP/0/(config-isis)#address-family ipv4
RP/0/(config-isis-af)#fast-reroute per-prefix tiebreaker downstream index 255
```

hello-interval (IS-IS)

To specify the length of time between consecutive hello packets sent by the Intermediate System-to-Intermediate System (IS-IS) protocol software, use the **hello-interval** command in interface configuration mode. To restore the default value, use the **no** form of this command.

hello-interval *seconds* [**level** { **1** | **2** }]

Syntax Description

| | |
|--------------------------------------|--|
| <i>seconds</i> | Integer value (in seconds) for the length of time between consecutive hello packets. By default, a value three times the hello interval <i>seconds</i> is advertised as the <i>hold time</i> in the hello packets sent. (That multiplier of three can be changed by using the hello-multiplier command.) With smaller hello intervals, topological changes are detected more quickly, but there is more routing traffic. Range is 1 to 65535 seconds. |
| level { 1 2 } | (Optional) Specifies the hello interval for Level 1 and Level 2 independently. For broadcast interfaces only. |

Command Default

seconds : 10 seconds

Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Interface configuration

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

The hello interval can be configured independently for Level 1 and Level 2, except on serial point-to-point interfaces. (Because only a single type of hello packet is sent on serial links, it is independent of Level 1 or Level 2.) Configuring Level 1 and Level 2 independently is used on LAN interfaces.



Note A shorter hello interval gives quicker convergence, but increases bandwidth and CPU usage. It might also add to instability in the network.

A slower hello interval saves bandwidth and CPU. Especially when used in combination with a higher hello multiplier, this strategy may increase overall network stability.

For point-to-point links, IS-IS sends only a single hello for Level 1 and Level 2, making the **level** keyword meaningless on point-to-point links. To modify hello parameters for a point-to-point interface, omit the **level** keyword.



Note Currently, a user can configure an aggressive hello-interval (lower than the default of 10 seconds for peer-to-peer session). But, if NSR or NSF is configured, the default hello interval has to be used so that the sessions do not run into the risk of flapping during switchover.

Using LAN adjacencies in high availability (HA) scenarios is not recommended, since there is no designated intermediate system (DIS) redundancy in the protocol and traffic will either drop or be rerouted temporarily during DIS re-election.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to configure HundredGigE 0/6/0/0 to advertise hello packets every 5 seconds for Level 1 topology routes. This situation causes more traffic than configuring a longer interval, but topological changes are detected more quickly.

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# interface HundredGigE 0/6/0/0  
RP/0/(config-isis-if)# hello-interval 5 level 1
```

hello-multiplier

To specify the number of Intermediate System-to-Intermediate System (IS-IS) hello packets a neighbor must miss before the router should declare the adjacency as down, use the **hello-multiplier** command in interface configuration mode. To restore the default value, use the **no** form of this command.

hello-multiplier *multiplier* [**level** { **1** | **2** }]

Syntax Description

| | |
|--------------------------------------|---|
| <i>multiplier</i> | Advertised hold time in IS-IS hello packets is set to the hello multiplier times the hello interval. Range is 3 to 1000. Neighbors declare an adjacency to this down router after not having received any IS-IS hello packets during the advertised hold time. The hold time (and thus the hello multiplier and the hello interval) can be set on an individual interface basis, and can be different between different networking devices in one area. Using a smaller hello multiplier gives faster convergence, but can result in more routing instability. Increase the hello multiplier to a larger value to help network stability when needed. Never configure a hello multiplier to a value lower than the default value of 3. |
| level { 1 2 } | (Optional) Specifies the hello multiplier independently for Level 1 or Level 2 adjacencies. |

Command Default

multiplier : 3
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Interface configuration

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

The “holding time” carried in an IS-IS hello packet determines how long a neighbor waits for another hello packet before declaring the neighbor to be down. This time determines how quickly a failed link or neighbor is detected so that routes can be recalculated.

Use the **hello-multiplier** command in circumstances where hello packets are lost frequently and IS-IS adjacencies are failing unnecessarily. You can raise the hello multiplier and lower the hello interval ([hello-interval \(IS-IS\), on page 22](#) command) correspondingly to make the hello protocol more reliable without increasing the time required to detect a link failure.

On point-to-point links, there is only one hello for both Level 1 and Level 2. Separate Level 1 and Level 2 hello packets are also sent over nonbroadcast multiaccess (NBMA) networks in multipoint mode, such as X.25, Frame Relay, and ATM.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how the network administrator wants to increase network stability by making sure an adjacency goes down only when many (ten) hello packets are missed. The total time to detect link failure is 60 seconds. This strategy ensures that the network remains stable, even when the link is fully congested.

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# interface HundredGigE 0/2/0/1  
RP/0/(config-isis-if)# hello-interval 6  
RP/0/(config-isis-if)# hello-multiplier 10
```

hello-padding

To configure padding on Intermediate System-to-Intermediate System (IS-IS) hello protocol data units (IIH PDUs) for all IS-IS interfaces on the router, use the **hello-padding** command in interface configuration mode and process configuration mode. To suppress padding, use the **no** form of this command.

hello-padding { **adaptive** | **always** | **disable** | **sometimes** }

[**level** { **1** | **2** }]

Syntax Description

| | |
|--------------------------------------|--|
| adaptive | Enable hello-padding till neighbor confirms adjacency up. |
| always | Always enable hello-padding. |
| disable | Suppresses hello-padding. |
| sometimes | Enables hello-padding during adjacency formation only. |
| level { 1 2 } | (Optional) Specifies hello padding for Level 1 or Level 2 independently. |

Command Default

Hello padding is enabled.

Command Modes

Interface configuration and IS-IS process configuration

Command History

| Release | Modification |
|----------------|--|
| Release 7.0.12 | This command was introduced. |
| Release 7.10.1 | This command was extended to IS-IS process configuration mode. |

Usage Guidelines

You might want to suppress hello padding to conserve network resources. The lower the circuit speed, the higher the percentage of padding overhead. Before suppressing the hello padding, you should know your physical and data link layer configurations and have control over them, and also know your router configuration at the network layer.

For point-to-point links, IS-IS sends only a single hello for Level 1 and Level 2, making the **level** keyword meaningless on point-to-point links. To modify hello parameters for a point-to-point interface, omit the **level** keyword.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to suppress IS-IS hello padding over local area network (LAN) circuits for interface HundredGigE 0/2/0/1:

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# interface HundredGigE 0/2/0/1  
RP/0/(config-isis-if)# hello-padding disable
```

The following example shows how to suppress IS-IS hello padding at the process level:

```
Router (config)#router isis 100  
Router (config-isis)#hello-padding disable  
Router (config)#commit
```

hello-password

To configure the authentication password for an Intermediate System-to-Intermediate System (IS-IS) interface, use the **hello-password** command in interface configuration mode. To disable authentication, use the **no** form of this command.

hello-password [{ **hmac-md5** | **text** }] [{ **clear** | **encrypted** }] *password* [**level** { **1** | **2** }] [**send-only**]

| | | |
|---------------------------|---|---|
| Syntax Description | hmac-md5 | (Optional) Specifies that the password use HMAC-MD5 authentication. |
| | text | (Optional) Specifies that the password use clear text password authentication. |
| | clear | (Optional) Specifies that the password be unencrypted. |
| | encrypted | (Optional) Specifies that the password be encrypted using a two-way algorithm. |
| | <i>password</i> | Authentication password you assign for an interface. |
| | level { 1 2 } | (Optional) Specifies whether the password is for a Level 1 or a Level 2 protocol data unit (PDU). |
| | send-only | (Optional) Specifies that the password applies only to protocol data units (PDUs) that are being sent and does not apply to PDUs that are being received. |
| Command Default | Both Level 1 and Level 2 are configured if no level is specified. <i>password</i> : encrypted text | |
| Command Modes | Interface configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | When a text password is configured, it is exchanged as clear text. Therefore, the hello-password command provides limited security. | |
| | When an hmac-md5 password is configured, the password is never sent over the network and is instead used to calculate a cryptographic checksum to ensure the integrity of the exchanged data. | |
| | For point-to-point links, IS-IS sends only a single hello for Level 1 and Level 2, making the level keyword meaningless on point-to-point links. To modify hello parameters for a point-to-point interface, omit the level keyword. | |
| Task ID | Task ID | Operations |
| | isis | read, write |

Examples

The following example shows how to configure a password with HMAC-MD5 authentication for hello packets running on HundredGigE 0/2/0/3 interface:

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# interface HundredGigE 0/2/0/3  
RP/0/(config-isis-if)# hello-password hmac-md5 clear mypassword
```

hello-password keychain

To configure the authentication password keychain for an Intermediate System-to-Intermediate System (IS-IS) interface, use the **hello-password keychain** command in interface configuration mode. To disable the authentication password keychain, use the **no** form of this command.

hello-password keychain *keychain-name* [**level** { **1** | **2** }] [**send-only**]

| | |
|---------------------------|---|
| Syntax Description | keychain Keyword that specifies the keychain to be configured. An authentication password keychain is a sequence of keys that are collectively managed and used for authenticating a peer-to-peer group. |
| | <i>keychain-name</i> Specifies the name of the keychain. |
| | level { 1 2 } (Optional) Specifies whether the keychain is for a Level 1 or a Level 2 protocol data unit (PDU). |
| | send-only (Optional) Specifies that the keychain applies only to protocol data units (PDUs) that are being sent and does not apply to PDUs that are being received. |

Command Default Both Level 1 and Level 2 are configured if no level is specified.
password: encrypted text

Command Modes Interface configuration

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Specify a keychain to enable keychain authentication between two IS-IS peers. Use the **keychain** *keychain-name* keyword and argument to implement hitless key rollover for authentication.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read, write |

Examples The following example shows how to configure a password keychain for level 1, send only authentication on a HundredGigE:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# interface HundredGigE 0/1/0/0
RP/0/(config-isis-if)# hello-password keychain mykeychain level 1 send-only
```

interface (IS-IS)

To configure the Intermediate System-to-Intermediate System (IS-IS) protocol on an interface, use the **interface** command in . To disable IS-IS routing for interfaces, use the **no** form of this command.

interface *type interface-path-id*

| | | |
|---------------------------|---|--|
| Syntax Description | <i>type</i> | Interface type. For more information, use the question mark (?) online help function. |
| | <i>interface-path-id</i> | Physical interface or virtual interface. |
| | Note | Use the show interfaces command to see a list of all interfaces currently configured on the router. |
| | | For more information about the syntax for the router, use the question mark (?) online help function. |
| Command Default | No interfaces are specified. | |
| Command Modes | | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | An address family must be established on the IS-IS interface before the interface is enabled for IS-IS protocol operation. | |
| Task ID | Task ID | Operations |
| | isis | read, write |
| Examples | <p>The following example shows how to enable an IS-IS multitopology configuration for IPv4 on HundredGigE interface 0/3/0/0:</p> <pre> RP/0/(config)# router isis isp RP/0/(config-isis)# net 49.0000.0000.0001.00 RP/0/(config-isis)# interface HundredGigE 0/3/0/0 RP/0/(config-isis-if)# address-family ipv4 unicast RP/0/(config-isis-if-af)# metric-style wide level 1 ! RP/0/(config)# interface HundredGigE 0/3/0/0 RP/0/(config-if)# ipv4 address 2001::1/64 </pre> | |

is-type

To configure the routing level for an Intermediate System-to-Intermediate System (IS-IS) area, use the **is-type** command in . To set the routing level to the default level, use the **no** form of this command.

is-type { **level-1** | **level-1-2** | **level-2-only** }

| | | |
|---------------------------|---------------------|--|
| Syntax Description | level-1 | Specifies that the router perform only Level 1 (intra-area) routing. This router learns only about destinations inside its area. Level 2 (interarea) routing is performed by the closest Level 1-2 router. |
| | level-1-2 | Specifies that the router perform both Level 1 and Level 2 routing. |
| | level-2-only | Specifies that the routing process acts as a Level 2 (interarea) router only. This router is part of the backbone, and does not communicate with Level 1-only routers in its own area. |

Command Default Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

When the router is configured with Level 1 routing only, this router learns about destinations only inside its area. Level 2 (interarea) routing is performed by the closest Level 1-2 router.

When the router is configured with Level 2 routing only, this router is part of the backbone, and does not communicate with Level 1 routers in its own area.

The router has one link-state packet database (LSDB) for destinations inside the area (Level 1 routing) and runs a shortest path first (SPF) calculation to discover the area topology. It also has another LSDB with link-state packets (LSPs) of all other backbone (Level 2) routers, and runs another SPF calculation to discover the topology of the backbone and the existence of all other areas.

We highly recommend that you configure the type of an IS-IS routing process to establish the proper level of adjacencies. If there is only one area in the network, there is no need to run both Level 1 and Level 2 routing algorithms.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to specify that the router is part of the backbone and that it does not communicate with Level 1-only routers:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# is-type level-2-only
```


iid disable

To suppress instance-ID TLV for `hello` and `lsp` packets when multiple IS-IS instances are configured in a router, use the **iid disable** command in process configuration mode.

To remove this function, use the **no** form of this command.

iid disable

Syntax Description

This command has no keywords or arguments.

Command Default

Sending or receiving is enabled.

Command Modes

IS-IS process configuration

Command History

Release

Modification

Release 7.10.1

The command was introduced.

Usage Guidelines

Each IS-IS instance has a unique instance-ID set, the TLV of which is sent in the **hello** and **lsp** packets.

Task ID

Task ID

Operations

isis read,
write

Examples

The following example shows how to suppress instance ID TLV at the IS-IS process configuration level:

```
Router(config-isis)#iid disable
Router(config-isis)#commit
```

log adjacency changes (IS-IS)

To cause an IS-IS instance to generate a log message when an Intermediate System-to-Intermediate System (IS-IS) adjacency changes state (up or down), use the **log adjacency changes** command in router configuration mode. To restore the default value, use the **no** form of this command.

log adjacency changes

Command Default

No IS-IS instance log messages are generated.

Command Modes

Router configuration

Usage Guidelines

Use the **log adjacency changes** command to monitor IS-IS adjacency state changes; it may be very useful when you are monitoring large networks. Messages are logged using the system error message facility. Messages can be in either of two forms:

```
%ISIS-4-ADJCHANGE: Adjacency to 0001.0000.0008 (Gi 0/2/1/0) (L2) Up, new adjacency
%ISIS-4-ADJCHANGE: Adjacency to router-gsr8 (Gi /2/1/0) (L1) Down, Holdtime expired
```

Using the **no** form of the command removes the specified command from the configuration file and restores the system to its default condition with respect to the command.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to configure the router to log adjacency changes:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# log adjacency changes
```

Related Commands

| Command | Description |
|----------------|--|
| logging | Logs messages to a syslog server host. |

log pdu drops

To log Intermediate System-to-Intermediate System (IS-IS) protocol data units (PDUs) that are dropped, use the **log pdu drops** command in . To disable this function, use the **no** form of this command.

log pdu drops

Command Default

PDU logging is disabled.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

Use the **log pdu drops** command to monitor a network when IS-IS PDUs are suspected of being dropped. The reason for the PDU being dropped and current PDU drop statistics are recorded.

The following are examples of PDU logging output:

```
%ISIS-4-ERR_LSP_INPUT_Q_OVERFLOW - An incoming LSP or SNP pdu was dropped because the input
queue was full
%ISIS-3-ERR_SEND_PAK - The process encountered a software-error while sending the IS-IS
packet
```

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to enable PDU logging:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# log pdu drops
```

lsp-gen-interval

To customize IS-IS throttling of link-state packet (LSP) generation, use the **lsp-gen-interval** command in . To restore the default value, use the **no** form of this command.

lsp-gen-interval [**initial-wait** *initial*] [**secondary-wait** *secondary*] [**maximum-wait** *maximum*] [**level** { **1** | **2** }]

| | | |
|---------------------------|--|--|
| Syntax Description | initial-wait <i>initial</i> | Specifies the initial LSP generation delay (in milliseconds). Range is 0 to 120000 milliseconds. |
| | secondary-wait <i>secondary</i> | Specifies the hold time between the first and second LSP generation (in milliseconds). Range is 1 to 120000 milliseconds. |
| | maximum-wait <i>maximum</i> | Specifies the maximum interval (in milliseconds) between two consecutive occurrences of an LSP being generated. Range is 1 to 120000 milliseconds. |
| | level { 1 2 } | (Optional) Specifies the LSP time interval for Level 1 or Level 2 independently. |

| | |
|------------------------|---|
| Command Default | initial-wait <i>initial</i> : 50 milliseconds |
| | secondary-wait <i>secondary</i> : 200 milliseconds |
| | maximum-wait <i>maximum</i> : 5000 milliseconds |

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines During prolonged periods of network instability, repeated recalculation of LSPs can cause increased CPU load on the local router. Further, the flooding of these recalculated LSPs to the other Intermediate Systems in the network causes increased traffic and can result in other routers having to spend more time running route calculations.

Use the **lsp-gen-interval** command to reduce the rate of LSP generation during periods of instability in the network. This command can help to reduce CPU load on the router and to reduce the number of LSP transmissions to its IS-IS neighbors.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read, write |

Examples

The following example shows how to set the maximum interval between two consecutive occurrences of an LSP to 15 milliseconds and the initial LSP generation delta to 5 milliseconds:

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# lsp-gen-interval maximum-wait 15 initial-wait 5
```

lsp-mtu

To set the maximum transmission unit (MTU) size of Intermediate System-to-Intermediate System (IS-IS) link-state packets (LSPs), use the **lsp-mtu** command in . To restore the default, use the **no** form of this command.

lsp-mtu *bytes* [**level** { **1** | **2** }]

Syntax Description

bytes Maximum packet size in bytes. The number of bytes must be less than or equal to the smallest MTU of any link in the network. Range is from 128 to 4352 bytes.

Note Range is 128 to 8979 bytes from Release 6.6.3 onwards.

level { **1** | **2** } (Optional) Specifies routing Level 1 or Level 2 independently.

Command Default

Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

Under normal conditions, the default MTU size should be sufficient. However, if the MTU size of a link is less than 1500 bytes, the LSP MTU size must be lowered accordingly on each router in the network. If this action is not taken, routing becomes unpredictable.

This guideline applies to all Cisco networking devices in a network. If any link in the network has a reduced MTU size, all devices must be changed, not just the devices directly connected to the link.



Note Do not set the **lsp-mtu** command (network layer) to a value greater than the link MTU size that is set with the **mtu** command (physical layer).

To be certain about a link MTU size, use the [show isis interface, on page 93](#) command to display the value.

Examples

The following example shows how to set the MTU size to 1300 bytes:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# lsp-mtu 1300
```

lsp-password

To configure the link-state packet (LSP) authentication password, use the **lsp-password** command in . To remove the **lsp-password** command from the configuration file and disable link-state packet authentication, use the **no** form of this command.

lsp-password [{ [{ **hmac-md5** | **text** }] [{ **clear** | **encrypted** }] *password* | **keychain** *keychain-name* }] [**level** { **1** | **2** }] [**send-only**] [**snp send-only**] [**enable-poi**]

Syntax Description

| | |
|--------------------------------------|---|
| hmac-md5 | Specifies that the password uses HMAC-MD5 authentication. |
| text | Specifies that the password uses clear text password authentication. |
| clear | Specifies that the password be unencrypted. |
| encrypted | Specifies that the password be encrypted using a two-way algorithm. |
| <i>password</i> | Authentication password you assign. |
| keychain | (Optional) Specifies a keychain. |
| <i>keychain-name</i> | Name of the keychain. |
| level { 1 2 } | (Optional) Specifies the password for Level 1 or Level 2 independently. |
| send-only | (Optional) Adds passwords to LSP and sequence number protocol (SNP) data units when they are sent. Does not check for authentication in received LSPs or sequence number PDUs (SNPs). |
| snp send-only | (Optional) Adds passwords to SNP data units when they are sent. Does not check for authentication in received SNPs. This option is available when the text keyword is specified. |
| enable-poi | The enable-poi keyword inserts the purge originator identification (POI), if you are using cryptographic authentication. If you are not using cryptographic authentication, then the POI is inserted by default. |

Command Default

Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

When a **text** password is configured, it is exchanged as clear text. Therefore, the **lsp-password** command provides limited security.

When an **HMAC-MD5** password is configured, the password is never sent over the network and is instead used to calculate a cryptographic checksum to ensure the integrity of the exchanged data.

The recommended password configuration is that both incoming and outgoing SNPs be authenticated.



Note To disable SNP password checking, the **snp send-only** keywords must be specified in the **lsp-password** command.

To configure an additional password, use the **lsp-password accept** command.

Specify a key chain to enable key chain authentication between two IS-IS peers. Use the **keychain** *keychain-name* keyword and argument to implement hitless key rollover for authentication.

Task ID

| Task ID | Operations |
|---------|------------|
|---------|------------|

| | |
|------|----------------|
| isis | read, write |
|------|----------------|

Examples

The following example shows how to configure separate Level 1 and Level 2 LSP and SNP passwords, one with HMAC-MD5 authentication and encryption and one with clear text password authentication and no encryption:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# lsp-password hmac-md5 clear password1 level 1
RP/0/(config-isis)# lsp-password text clear password2 level 2
```

lsp-refresh-interval

To set the time between regeneration of link-state packets (LSPs) that contain different sequence numbers, use the **lsp-refresh-interval** command in . To restore the default refresh interval, use the **no** form of this command.

lsp-refresh-interval *seconds* [**level** { **1** | **2** }]

| | | |
|---------------------------|--------------------------------------|--|
| Syntax Description | <i>seconds</i> | Refresh interval (in seconds). Range is 1 to 65535 seconds. |
| | level { 1 2 } | (Optional) Specifies routing Level 1 or Level 2 independently. |

| | |
|------------------------|---|
| Command Default | <i>seconds</i> : 900 seconds (15 minutes) |
| | Both Level 1 and Level 2 are configured if no level is specified. |

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | The refresh interval determines the rate at which the software periodically sends the route topology information that it originates. This behavior is done to keep the information from becoming too old. By default, the refresh interval is 900 seconds (15 minutes). |
|-------------------------|---|

LSPs must be refreshed periodically before their lifetimes expire. The refresh interval must be less than the LSP lifetime specified with this router command. Reducing the refresh interval reduces the amount of time that undetected link-state database corruption can persist at the cost of increased link utilization. (This event is extremely unlikely, however, because there are other safeguards against corruption.) Increasing the interval reduces the link utilization caused by the flooding of refreshed packets (although this utilization is very small).

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read, write |

Examples

The following example shows how to change the LSP refresh interval to 10,800 seconds (3 hours):

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# lsp-refresh-interval 10800
```

maximum-paths (IS-IS)

To configure the maximum number of parallel routes that an IP routing protocol will install in the routing table, use the **maximum-paths** command in address family configuration mode. To remove the **maximum-paths** command from the configuration file and restore the system to its default condition with respect to the routing protocol, use the **no** form of this command.

maximum-paths *maximum*

| Syntax Description | <i>maximum</i> Maximum number of parallel routes that IS-IS can install in a routing table. Range is 1 to 64 | | | | |
|---------------------------|---|---------|--------------|----------------|------------------------------|
| Command Default | No default Command | | | | |
| Command Modes | Address family configuration | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write |
| Task ID | Operations | | | | |
| isis | read, write | | | | |
| Examples | <p>The following example shows how to allow a maximum of 16 paths to a destination:</p> <pre>RP/0/(config)# router isis isp RP/0/(config-isis)# address-family ipv4 unicast RP/0/(config-isis-af)# maximum-paths 16</pre> | | | | |

maximum-redistributed-prefixes (IS-IS)

To specify an upper limit on the number of redistributed prefixes (subject to summarization) that the Intermediate System-to-Intermediate System (IS-IS) protocol advertises, use the **maximum-redistributed-prefixes** command in address family mode. To disable this feature, use the **no** form of this command.

maximum-redistributed-prefixes *maximum* [**level** { **1** | **2** }]

| | | |
|---------------------------|---|---|
| Syntax Description | <i>maximum</i> | Maximum number of redistributed prefixes advertised. Range is 1 to 28000. |
| | level { 1 2 } | (Optional) Specifies maximum prefixes for Level 1 or Level 2. |
| Command Default | <i>maximum</i> : 10000 level : 1-2 | |
| Command Modes | Address family configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | Use the maximum-redistributed-prefixes command to prevent a misconfiguration from resulting in redistribution of excess prefixes. If IS-IS encounters more than the maximum number of prefixes, it sets a bi-state alarm. If the number of to-be-redistributed prefixes drops back to the maximum or lower—either through reconfiguration or a change in the redistribution source—IS-IS clears the alarm. | |
| Task ID | Task ID | Operations |
| | isis | read, write |
| Examples | The following example shows how to specify the number of redistributed prefixes at 5000 for Level 2: <pre>RP/0/RP0/CPU0:router(config)# router isis isp RP/0/RP0/CPU0:router(config-isis)# address-family ipv4 unicast RP/0/RP0/CPU0:router(config-isis-af)# maximum-redistributed-prefixes 5000 level 2</pre> | |

max-lsp-lifetime

To set the maximum time that link-state packets (LSPs) persist without being refreshed, use the **max-lsp-lifetime** command in . To restore the default time, use the **no** form of this command.

max-lsp-lifetime *seconds* [**level** { **1** | **2** }]

| Syntax Description | <div> <i>seconds</i> Lifetime (in seconds) of the LSP. Range from 1 to 65535 seconds. </div> <div> level { 1 2 } (Optional) Specifies routing Level 1 or Level 2 independently. </div> | | | | |
|---------------------------|--|---------|--------------|----------------|------------------------------|
| Command Default | <i>seconds</i> : 1200 seconds (20 minutes) Both Level 1 and Level 2 are configured if no level is specified. | | | | |
| Command Modes | | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | You might need to adjust the maximum LSP lifetime if you change the LSP refresh interval with the lsp-refresh-interval command. The maximum LSP lifetime must be greater than the LSP refresh interval. | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write |
| Task ID | Operations | | | | |
| isis | read, write | | | | |
| Examples | <p>The following example shows how to set the maximum time that the LSP persists to 11,000 seconds (more than 3 hours):</p> <pre>RP/0/(config)# router isis isp RP/0/(config-isis)# max-lsp-lifetime 11000</pre> | | | | |

metric (IS-IS)

To configure the metric for an Intermediate System-to-Intermediate System (IS-IS) interface, use the **metric** command in address family or interface address family configuration mode. To restore the default metric value, use the **no** form of this command.

metric { *default-metric* | **maximum** } [**level** { **1** | **2** }]

Syntax Description

| | |
|--------------------------------------|--|
| <i>default-metric</i> | Metric assigned to the link and used to calculate the cost from each other router using the links in the network to other destinations. Range is 1 to 63 for narrow metric and 1 to 16777214 for wide metric. |
| Note | Setting the default metric under address family results in setting the same metric for all interfaces that is associated with the address family. Setting a metric value under an interface overrides the default metric |
| maximum | Specifies maximum wide metric. All routers exclude this link from their shortest path first (SPF). |
| level { 1 2 } | (Optional) Specifies the SPF calculation for Level 1 or Level 2 independently. |

Command Default

default-metric : Default is 10.
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Address family configuration
Interface address family configuration

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

Specifying the **level** keyword resets the metric only for the specified level. We highly recommend that you configure metrics on all interfaces.

Set the default metric under address family to set the same metric for all interfaces that is associated with the address family. Set a metric value under an interface to override the default metric.

We highly recommend that you configure metrics on all interfaces.

Metrics of more than 63 cannot be used with narrow metric style.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to configure HundredGigE interface with a default link-state metric cost of 15 for Level 1:

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# interface HundredGigE0/1/0/1  
RP/0/(config-isis-if)# address-family ipv4 unicast  
RP/0/(config-isis-if-af)# metric 15 level 1
```

The following example shows how to configure a metric cost of 15 for all interfaces under address family IPv4 unicast for level 2:

```
RP/0/# configure  
RP/0/(config)# router isis isp  
RP/0/(config-isis)# address-family ipv4 unicast  
RP/0/(config-isis-af)# metric 15 level 2
```

metric-style wide

To configure the Intermediate System-to-Intermediate System (IS-IS) software to generate and accept only new-style type, length, and value (TLV) objects, use the **metric-style wide** command in address family configuration mode. To remove the **metric-style wide** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

metric-style wide [**transition**] [**level** { **1** | **2** }]

| | | | |
|---------------------------|---|-----------------|---|
| Syntax Description | <table> <tr> <td data-bbox="332 560 527 604">transition</td><td data-bbox="527 560 1481 646">(Optional) Instructs the router to generate and accept both old-style and new-style TLV objects. It generates only new-style TLV objects.</td></tr> </table> | transition | (Optional) Instructs the router to generate and accept both old-style and new-style TLV objects. It generates only new-style TLV objects. |
| transition | (Optional) Instructs the router to generate and accept both old-style and new-style TLV objects. It generates only new-style TLV objects. | | |
| | <table> <tr> <td data-bbox="332 646 527 703">level { 1 2 }</td><td data-bbox="527 646 1481 703">(Optional) Specifies routing Level 1 or Level 2 independently.</td></tr> </table> | level { 1 2 } | (Optional) Specifies routing Level 1 or Level 2 independently. |
| level { 1 2 } | (Optional) Specifies routing Level 1 or Level 2 independently. | | |

| | |
|------------------------|---|
| Command Default | <p>Old-style TLV lengths are generated, if this command is not configured.</p> <p>Both Level 1 and Level 2 are configured if no level is specified.</p> |
|------------------------|---|

| | |
|----------------------|------------------------------|
| Command Modes | Address family configuration |
|----------------------|------------------------------|

| Command History | <table> <tr> <th data-bbox="332 915 527 959">Release</th><th data-bbox="527 915 844 959">Modification</th></tr> <tr> <td data-bbox="332 959 527 1010">Release 7.0.12</td><td data-bbox="527 959 844 1010">This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
|------------------------|---|---------|--------------|----------------|------------------------------|
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |

| | |
|-------------------------|--|
| Usage Guidelines | <p>IS-IS traffic engineering extensions include new-style TLV objects with wider metric fields than old-style TLV objects. If you enter the metric-style wide command, a router generates and accepts only new-style TLV objects. Therefore, the router uses less memory and fewer other resources rather than generating both old-style and new-style TLV objects.</p> |
|-------------------------|--|

To perform MPLS traffic engineering, a router needs to generate new-style TLV objects.



| | |
|-------------|--|
| Note | <p>This discussion of metric styles and transition strategies is oriented toward traffic engineering deployment. Other commands and models might be appropriate if the new-style TLV objects are desired for other reasons. For example, a network may require wider metrics, but might not use traffic engineering.</p> |
|-------------|--|

| Task ID | <table> <tr> <th data-bbox="332 1472 430 1516">Task ID</th><th data-bbox="430 1472 547 1516">Operations</th></tr> <tr> <td data-bbox="332 1516 430 1646">isis</td><td data-bbox="430 1516 547 1646">read, write</td></tr> </table> | Task ID | Operations | isis | read, write |
|----------------|--|---------|------------|------|----------------|
| Task ID | Operations | | | | |
| isis | read, write | | | | |

| | |
|-----------------|--|
| Examples | <p>The following example shows how to configure a router to generate and accept only new-style TLV objects on Level 1:</p> |
|-----------------|--|

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# address-family ipv4 unicast
```



```
RP/0/RSP0RP0/CPU0:router(config-isis-af)# metric-style wide level 1
```

mpls ldp auto-config

To enable Label Distribution Protocol (LDP) Interior Gateway Protocol (IGP) interface auto-configuration, use the **mpls ldp auto-config** command in IPv4 address family configuration mode. To disable LDP IGP auto-configuration, use the **no** form of this command.

mpls ldp auto-config

| | |
|---------------------------|--|
| Syntax Description | This command has no keywords or arguments. |
|---------------------------|--|

| | |
|------------------------|---|
| Command Default | LDP IGP auto-configuration is disabled. |
|------------------------|---|

| | |
|----------------------|-----------------------------------|
| Command Modes | IPv4 address family configuration |
|----------------------|-----------------------------------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | Use the mpls ldp auto-config command to automatically configure LDP on a set of interfaces associated with a specified IGP instance. Further, LDP IGP auto-configuration provides a means to block LDP from being enabled on a specified interface. If you do not want an IS-IS interface to have LDP enabled, use the igp auto-config disable command. |
|-------------------------|---|

| | | |
|----------------|----------------|-------------------|
| Task ID | Task ID | Operations |
| | isis | read, write |


| | |
|-----------------|---|
| Examples | The following example shows how to enable LDP IGP auto-configuration: |
|-----------------|---|

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# address-family ipv4 unicast
RP/0/(config-isis-af)# mpls ldp auto-config
```

mpls ldp sync (IS-IS)

To configure Label Distribution Protocol (LDP) IS-IS synchronization, use the **mpls ldp sync** command in interface address family configuration mode. To disable LDP synchronization, use the **no** form of this command.

mpls ldp sync [level { 1 | 2 }]

| | |
|---|---|
| Syntax Description | level { 1 2 } (Optional) Sets LDP synchronization for the specified level. |
| Command Default | If a level is not specified, LDP synchronization is set for both levels. |
| Command Modes | Interface address family configuration |
| Command History | Release Modification |
| | Release 7.0.12 This command was introduced. |
| Usage Guidelines | <p>MPLS VPN traffic forwarded using LDP labels can be dropped in the following instances:</p> <ul style="list-style-type: none"> • A new link is introduced in the network and IS-IS has converged before LDP establishes labels. • An existing LDP session goes down while IS-IS adjacency is intact over the link. <p>In both instances, outbound LDP labels are not available for forwarding MPLS traffic. LDP IS-IS synchronization addresses the traffic drop. When the mpls ldp sync command is configured, IS-IS advertises the maximum possible link metric until LDP has converged over the link. The link is less preferred and least used in forwarding MPLS traffic. When LDP establishes the session and exchanges labels, IS-IS advertises the regular metric over the link.</p> |
|  | |
| Note | IS-IS advertises the maximum metric –1 (16777214) if wide metrics are configured since the maximum wide metric is specifically used for link exclusion from the shortest path first algorithm (SPF) (RFC 3784). However, the maximum narrow metric is unaffected by this definition. |

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | isis | read, write |

Examples

The following example shows how to enable LDP IS-IS synchronization:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# interface HundredGigE 0/3/0/0
RP/0/(config-isis-if)# address-family ipv4 unicast
RP/0/(config-isis-if-af)# mpls ldp sync
```

mpls traffic-eng (IS-IS)

To configure a router running the Intermediate System-to-Intermediate System (IS-IS) protocol to flood Multiprotocol Label Switching traffic engineering (MPLS TE) link information into the indicated IS-IS level, use the **mpls traffic-eng** command in IPv4 address family configuration mode. To disable this feature, use the **no** form of this command.

mpls traffic-eng { **level-1** | **level-1-2** | **level-2-only** }

| Syntax Description | <table> <tr> <td>level-1</td><td>Specifies routing level 1.</td></tr> <tr> <td>level-1-2</td><td>Specifies routing levels 1 and 2.</td></tr> <tr> <td>level-2-only</td><td>Specifies routing level 2.</td></tr> </table> | level-1 | Specifies routing level 1. | level-1-2 | Specifies routing levels 1 and 2. | level-2-only | Specifies routing level 2. |
|---------------------------|---|----------------|----------------------------|------------------|-----------------------------------|---------------------|----------------------------|
| level-1 | Specifies routing level 1. | | | | | | |
| level-1-2 | Specifies routing levels 1 and 2. | | | | | | |
| level-2-only | Specifies routing level 2. | | | | | | |
| Command Default | Flooding is disabled. | | | | | | |
| Command Modes | IPv4 address family configuration | | | | | | |
| Usage Guidelines | Use the mpls traffic-eng command, which is part of the routing protocol tree, to flood link resource information (such as available bandwidth) for appropriately configured links in the link-state packet (LSP) of the router. | | | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write | | |
| Task ID | Operations | | | | | | |
| isis | read, write | | | | | | |
| Examples | <p>The following example shows how to turn on MPLS traffic engineering for IS-IS level 1:</p> <pre>Router(config)# router isis isp Router(config-isis)# address-family ipv4 unicast Router(config-isis-af)# mpls traffic-eng level-1</pre> | | | | | | |

mpls traffic-eng router-id (IS-IS)

To specify the Multiprotocol Label Switching traffic engineering (MPLS TE) router identifier for the node, use the **mpls traffic-eng router-id** command in IPv4 address family configuration mode. To disable this feature, use the **no** form of this command.

mpls traffic-eng router-id { *ip-address* | *type* *interface-path-id* }

| | | |
|---------------------------|--------------------------|--|
| Syntax Description | <i>ip-address</i> | IP address in four-part, dotted-decimal notation. |
| | <i>type</i> | Interface type. For more information, use the question mark (?) online help function. |
| | <i>interface-path-id</i> | Physical interface or virtual interface. |
| | Note | Use the show interfaces command to see a list of all interfaces currently configured on the router. |
| | | For more information about the syntax for the router, use the question mark (?) online help function. |

Command Default Global router identifier is used.

Command Modes IPv4 address family configuration

Usage Guidelines The identifier of the router acts as a stable IP address for the traffic engineering configuration. This IP address is flooded to all nodes. For all traffic engineering tunnels originating at other nodes and ending at this node, you must set the tunnel destination to the traffic engineering router ID of the destination node, because that is the address used by the traffic engineering topology database at the tunnel head for its path calculation.



Note We recommend that loopback interfaces be used for MPLS TE, because they are more stable than physical interfaces.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | isis | read, write |

Examples

The following example shows how to specify the traffic engineering router identifier as the IP address associated with loopback interface 0:

```
Router(config)# router isis isp
Router(config-isis)# address-family ipv4 unicast
Router(config-isis-af)# mpls traffic-eng router-id Loopback0
```

net

To configure an Intermediate System-to-Intermediate System (IS-IS) network entity title (NET) for the routing instance, use the **net** command in router configuration mode. To remove the **net** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

net *network-entity-title*

Syntax Description

network-entity-title NET that specifies the area address and the system ID for an ISIS routing process.

Command Default

No NET is configured. The IS-IS instance is not operational, because a NET is mandatory.

Command Modes

Router configuration

Usage Guidelines

Under most circumstances, one and only one NET should be configured.

A NET is a network service access point (NSAP) where the last byte is always 0. On a Cisco router running IS-IS, a NET can be 8 to 20 bytes in length. The last byte is always the n-selector and must be 0. The n-selector indicates to which transport entity the packet is sent. An n-selector of 0 indicates no transport entity and means that the packet is for the routing software of the system.

The six bytes directly preceding the n-selector are the system ID. The system ID length is a fixed size and cannot be changed. The system ID must be unique throughout each area (Level 1) and throughout the backbone (Level 2).

All bytes preceding the system ID are the area ID.

A maximum of three NETs for each router is allowed. In rare circumstances, it is possible to configure two or three NETs. In such a case, the area this router is in has three area addresses. Only one area still exists, but it has more area addresses.

Configuring multiple NETs can be temporarily useful in network reconfiguration in which multiple areas are merged, or in which one area is split into more areas. Multiple area addresses enable you to renumber an area individually as needed.

Task ID

Task ID Operations

| | |
|------|----------------|
| isis | read, write |
|------|----------------|

Examples

The following example shows how to configure a router with NET area ID 47.0004.004d.0001 and system ID 0001.0c11.1110:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# net 47.0004.004d.0001.0001.0c11.1110.00
```

Related Commands

| Command | Description |
|---|--|
| log adjacency changes (IS-IS), on page 35 | Configures the routing level for an instance of the IS-IS routing process. |
| router isis, on page 63 | Enables the IS-IS routing protocol and specifies an IS-IS instance. |

nsf (IS-IS)

To enable nonstop forwarding (NSF) on the next restart, use the **nsf** command in . To restore the default setting, use the **no** form of this command.

nsf { **cisco** | **ietf** }

Syntax Description

| | |
|--------------|---|
| cisco | Specifies Cisco-proprietary NSF restart. |
| ietf | Specifies Internet Engineering Task Force (IETF) NSF restart. |

Command Default

NSF is disabled.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

NSF allows an Intermediate System-to-Intermediate System (IS-IS) instance to restart using checkpointed adjacency and link-state packet (LSP) information, and to perform restart with no impact on its neighbor routers. In other words, there is no impact on other routers in the network due to the destruction and recreation of adjacencies and the system LSP.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to enable Cisco proprietary NSF:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# nsf cisco
```


passive (IS-IS)

To suppress Intermediate System-to-Intermediate System (IS-IS) packets from being transmitted to the interface and received packets from being processed on the interface, use the **passive** command in interface configuration mode. To restore IS-IS packets coming to an interface, use the **no** form of this command.

passive

| | |
|------------------------|----------------------|
| Command Default | Interface is active. |
|------------------------|----------------------|

| | |
|----------------------|-------------------------|
| Command Modes | Interface configuration |
|----------------------|-------------------------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |

| | |
|-------------------------|--|
| Usage Guidelines | No specific guidelines impact the use of this command. |
|-------------------------|--|

| | | |
|----------------|----------------|-------------------|
| Task ID | Task ID | Operations |
| | isis | read, write |

| | |
|-----------------|---|
| Examples | The following example shows how to configure the router to suppress IS-IS packets on GigabitEthernet interface 0/1/0/1: |
|-----------------|---|

```
RP/0/ (config) # router isis isp
RP/0/ (config-isis) # interface GigabitEthernet 0/1/0/1
RP/0/ (config-isis-if) # passive
```

point-to-point

To configure a network of only two networking devices that use broadcast media and the integrated Intermediate System-to-Intermediate System (IS-IS) routing protocol to function as a point-to-point link instead of a broadcast link, use the **point-to-point** command in interface configuration mode. To disable the point-to-point usage, use the **no** form of this command.

point-to-point

| | | |
|---------------------------|---|------------------------------|
| Syntax Description | This command has no keywords or arguments. | |
| Command Default | Interface is treated as broadcast if connected to broadcast media. | |
| Command Modes | Interface configuration | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | Use the point-to-point command only on broadcast media in a network with two networking devices. The command causes the system to issue packets point-to-point rather than as broadcasts. Configure the command on both networking devices in the network. | |
| Task ID | Task ID | Operations |
| | isis | read, write |
| Examples | <p>The following example shows how to configure a 10-Gb Ethernet interface to act as a point-to-point interface:</p> <pre>RP/0/(config)# router isis isp RP/0/(config-isis)# interface HundredGigE 0/6/0/0 RP/0/(config-isis-if)# point-to-point</pre> | |

redistribute (IS-IS)

To redistribute routes from one routing protocol into Intermediate System-to-Intermediate System (IS-IS), use the **redistribute** command in address family configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition in which the software does not redistribute routes, use the **no** form of this command.

Border Gateway Protocol (BGP)

```
redistribute bgp process-id [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

Connected Routes

```
redistribute connected [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

Intermediate System-to-Intermediate System (IS-IS)

```
redistribute isis process-id [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name] [down-flag-clear]
```

Open Shortest Path First (OSPF)

```
redistribute ospf process-id [{ level-1 | level-2 | level-1-2 }] [match { external [{ 1 | 2 }] | internal | nssa-external [{ 1 | 2 }] }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

Open Shortest Path First Version 3 (OSPFv3)

```
redistribute ospfv3 process-id [{ level-1 | level-2 | level-1-2 }] [match { external [{ 1 | 2 }] | internal | nssa-external [{ 1 | 2 }] }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

Static Routes

```
redistribute static [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { 1 | { internal | external | rib-metric-as-external } | 2 | rib-metric-as-internal } }] [route-policy route-policy-name]
```

RIP

```
redistribute rip [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

Subscriber Routes

```
redistribute subscriber [{ level-1 | level-2 | level-1-2 }] [metric metric-value] [metric-type { internal | external | rib-metric-as-external | rib-metric-as-internal }] [route-policy route-policy-name]
```

| Syntax Description | | |
|--------------------|--|--|
| | <i>process-id</i> | <p>For the bgp keyword, an autonomous system number has the following ranges:</p> <ul style="list-style-type: none"> • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535. • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295. • Range for 4-byte Autonomous system numbers (ASNs) in asdot format is 1.0 to 65535.65535. <p>For the isis keyword, an IS-IS instance identifier from which routes are to be redistributed.</p> <p>For the ospf keyword, an OSPF process name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.</p> <p>For the ospfv3 keyword, an OSPFv3 process name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.</p> |
| | level-1 | (Optional) Specifies that redistributed routes are advertised in the Level-1 LSP of the router. |
| | level-1-2 | (Optional) Specifies that redistributed routes are advertised in the Level-1-2 LSP of the router. |
| | level-2 | (Optional) Specifies that redistributed routes are advertised in the Level-2 LSP of the router. |
| | metric <i>metric-value</i> | (Optional) Specifies the metric used for the redistributed route. Range is 0 to 16777215. The <i>metric-value</i> must be consistent with the IS-IS metric style of the area and topology into which the routes are being redistributed. |
| | metric-type { internal external } | (Optional) Specifies the external link type associated with the route advertised into the ISIS routing domain. It can be one of two four values: |
| | metric-type { internal external rib-metric-as-external rib-metric-as-internal } | <ul style="list-style-type: none"> • external • internal –Use the internal keyword to set IS-IS internal metric-type. • external –Use the external keyword to set IS-IS external metric-type • rib-metric-as-external–Use the rib-metric-as-external keyword to use RIB metric and set IS-IS external metric-type • rib-metric-as-internal–Use the rib-metric-as-internal keyword to use RIB metric and set IS-IS internal metric-type <p>Any route with an internal metric (however large the metric is) is preferred over a route with external metric (however small the metric is).</p> <p>Use the rib-metric-as-external and rib-metric-as-internal keywords to preserve RIB metrics when redistributing routes from another IS-IS router instance or another protocol.</p> |

| | |
|---|--|
| route-policy <i>route-policy-name</i> | (Optional) Specifies the identifier of a configured policy. A policy is used to filter the importation of routes from this source routing protocol to IS-IS. |
| match { internal external [1 2] nssa-external [1 2] } | <p>(Optional) Specifies the criteria by which OSPF routes are redistributed into other routing domains. It can be one or more of the following:</p> <ul style="list-style-type: none"> • internal —Routes that are internal to a specific autonomous system (intra- and interarea OSPF routes). • external [1 2]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 external routes. • nssa-external [1 2]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 not-so-stubby area (NSSA) external routes. <p>For the external and nssa-external options, if a type is not specified, then both Type 1 and Type 2 are assumed.</p> |
| down-flag-clear | (Optional) Specifies that routes redistributed from another IS-IS instance should be advertised with the up/down bit set to zero. This is contrary to the behavior specified by RFC 5305 and RFC 7775 and can lead to route loops. |

Command Default

Level 2 is configured if no level is specified.

metric-type: internal

match : If no match keyword is specified, all OSPF routes are redistributed.

Command Modes

Address family configuration

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

Note When redistributing routes (into IS-IS) using both command keywords for setting or matching of attributes and a route policy, the routes are run through the route policy first, followed by the keyword matching and setting.

Use the **redistribute** command to control the redistribution of routes between separate IS-IS instances. To control the propagation of routes between the levels of a single IS-IS instance, use the propagate level command.

Only IPv4 OSPF addresses can be redistributed into IS-IS IPv4 address families and only IPv6 OSPFv3 prefixes can be distributed into IS-IS IPv6 address families.

Examples

In this example, IS-IS instance isp_A readvertises all of the routes of IS-IS instance isp_B in Level 2 LSP. Note that the **level-2** keyword affects which levels instance isp_A advertises the routes in and has no impact on which routes from instance isp_B are advertised. (Any Level 1 routes from IS-IS instance isp_B are included in the redistribution.)

```
RP/0/RSP0RP0/CPU0:router(config)# router isis isp_A
RP/0/RSP0RP0/CPU0:router(config-isis)# net 49.1234.2222.2222.00
RP/0/RSP0RP0/CPU0:router(config-isis)# address-family ipv4 unicast
RP/0/RSP0RP0/CPU0:router(config-isis-af)# redistribute isis isp_B level-2
!
RP/0/RSP0RP0/CPU0:router(config)# router isis isp_B
RP/0/RSP0RP0/CPU0:router(config-isis)# is-type level 1
RP/0/RSP0RP0/CPU0:router(config-isis)# net 49.4567.2222.2222.00
RP/0/RSP0RP0/CPU0:router(config-isis)# address-family ipv4 unicast
```

router isis

To enable the Intermediate System-to-Intermediate System (IS-IS) routing protocol and to specify an IS-IS instance, use the **router isis** command in `mode`. To disable IS-IS routing, use the **no** form of this command.

router isis *instance-id*

Syntax Description

instance-id Name of the routing process. Maximum number of characters is 40.

Command Default

An IS-IS routing protocol is not enabled.

Command Modes

Usage Guidelines

Use the **router isis** command to create an IS-IS routing process. An appropriate network entity title (NET) must be configured to specify the address of the area (Level 1) and system ID of the router. Routing must be enabled on one or more interfaces before adjacencies may be established and dynamic routing is possible.

Multiple IS-IS processes can be configured. Up to eight processes are configurable. A maximum of five IS-IS instances on a system are supported.

Task ID

Task Operations

isis read,
write

Examples

The following example shows how to configure IS-IS for IP routing:

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# net 49.0001.0000.0001.00
```

Related Commands

| Command | Description |
|---------------------------------|--|
| net, on page 54 | Configures an IS-IS NET for the routing process. |

set-overload-bit

To configure the router to signal other routers not to use it as an intermediate hop in their shortest path first (SPF) calculations, use the **set-overload-bit** command in . To remove the designation, use the **no** form of this command.

set-overload-bit [**on-startup** { *delay* | **wait-for-bgp** }] [**level** { **1** | **2** }] [**advertise** { **external** | **interlevel** }]

| Syntax Description | | |
|--|------------|---|
| on-startup | (Optional) | Sets the overload bit only temporarily after reboot. |
| <i>delay</i> | (Optional) | Time (in seconds) to advertise when the router is overloaded after reboot. Range is 5 to 86400 seconds (86400 seconds = 1 day). |
| wait-for-bgp | (Optional) | Sets the overload bit on startup until the Border Gateway Protocol (BGP) signals converge or time out. |
| level { 1 2 } | (Optional) | Specifies the overload bit for Level 1 or Level 2 independently. |
| advertise { external interlevel } | (Optional) | Sets the overload bit set if the router advertises the following types of IP prefixes: <ul style="list-style-type: none"> • external—If overload-bit set advertises IP prefixes learned from other protocols • interlevel— If overload-bit set advertise IP prefixes learned from another ISI S level |

Command Default The overload bit is not set.
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines

Use the **set-overload-bit** command to force the router to set the overload bit in its nonpseudonode link-state packets (LSPs). Normally the setting of the overload bit is allowed only when a router experiences problems. For example, when a router is experiencing a memory shortage, the reason might be that the link-state database is not complete, resulting in an incomplete or inaccurate routing table. If the overload bit is set in the LSPs of the unreliable router, other routers can ignore the router in their SPF calculations until it has recovered from its problems. The result is that no paths through the unreliable router are seen by other routers in the Intermediate System-to-Intermediate System (IS-IS) area. However, IP prefixes directly connected to this router are still reachable.

The **set-overload-bit** command can be useful when you want to connect a router to an IS-IS network, but do not want real traffic flowing through it under any circumstances.

Routers with overload bit set are:

- A test router in the lab, connected to a production network.
- A router configured as an LSP flooding server, for example, on a nonbroadcast multiaccess (NBMA) network, in combination with the mesh group feature.

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | isis | read, write |

Examples

The following example shows how to configure the overload bit:

```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# set-overload-bit
```

show isis

The **show isis** command displays general information about an IS-IS instance and protocol operation. If the instance ID is not specified, the command shows information about all IS-IS instances.

show isis [**instance** *instance-id*]

Syntax Description

instance *instance-id* (Optional) Displays the IS-IS adjacencies for the specified IS-IS instance only.

Note The instance-id argument is the instance identifier (alphanumeric) defined by the **router isis** command.

Command Default

No instance ID specified displays IS-IS adjacencies for all the IS-IS instances.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

For each instance, the first line of output lists the IS-IS instance ID with the following lines identifying the IS-IS system ID, supported levels (level 1, level 2, or level-1-2), configured area addresses, active area addresses, status (enabled or not) and type (Cisco or IETF) of nonstop forwarding (NSF), and the mode in which the last IS-IS process startup occurred.

Next, the status of each configured address family (or just IPv4 unicast if none are configured) is summarized. For each level (level 1 or level 2), the metric style (narrow or wide) generated and accepted is listed along with the status of incremental shortest path first (iSPF) computation (enabled or not). Then redistributed protocols are listed, followed by the administrative distance applied to the redistributed routes.

Finally, the running state (active, passive, or disabled) and configuration state (active or disabled) of each IS-IS interface is listed.

Task ID

Task Operations ID

| | |
|------|------|
| isis | read |
|------|------|

Examples

The following is sample output from the **show isis** command:

```
RP/0/# show isis
Wed Aug 20 23:54:55.043 PST DST

IS-IS Router: lab
  System Id: 0000.0000.0002
  IS Levels: level-2-only
  Manual area address(es):
    49.1122
  Routing for area address(es):
    49.1122
  Non-stop forwarding: Disabled
```

```

Most recent startup mode: Cold Restart
Topologies supported by IS-IS:
  IPv4 Unicast
    Level-2
      Metric style (generate/accept): Narrow/Narrow
      Metric: 10
      ISPF status: Disabled
      No protocols redistributed
      Distance: 115
  Interfaces supported by IS-IS:
    Loopback0 is running passively (passive in configuration)
    POS0/1/0/2 is running actively (active in configuration)
    POS0/1/0/3 is running actively (active in configuration)

```

This table describes the significant fields shown in the display.

Table 1: show isis Field Descriptions

| Field | Description |
|--------------------------------|---|
| IS-IS Router | IS-IS instance ID. |
| System Id | IS-IS system ID. |
| IS Levels | Supported levels for the instance. |
| Manual area address(es) | Domain and area. |
| Routing for area address(es): | Configured area addresses and active area addresses. |
| Non-stop forwarding | Status (enabled or not) and type (Cisco or IETF) of nonstop forwarding (NSF). |
| Most recent startup mode | The mode in which the last IS-IS process startup occurred. |
| Topologies supported by IS-IS | The summary of the status of each configured address family (or just IPv4 unicast if none are configured). |
| Redistributed protocols | List of redistributed protocols, followed by the administrative distance applied to the redistributed routes. |
| Metric style (generate/accept) | The status of each configured address family (or just IPv4 unicast if none are configured) is summarized. For each level (level 1 or level 2), the metric style (narrow or wide) generated and accepted is listed along with the status of incremental shortest path first (iSPF) computation (enabled or not). |
| Interfaces supported by IS-IS | The running state (active, passive, or disabled) and configuration state (active or disabled) of each IS-IS interface. |

show isis adjacency

To display Intermediate System-to-Intermediate System (IS-IS) adjacencies, use the **show isis adjacency** command in .

show isis [**instance** *instance-id*] **adjacency** [**level** {**1** | **2**}] [**type** *interface-path-id*] [**detail**] [**systemid** *system-id*]

| | | |
|---------------------------|--------------------------------------|---|
| Syntax Description | instance <i>instance-id</i> | (Optional) Displays the IS-IS adjacencies for the specified IS-IS instance only. • The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| | level { 1 2 } | (Optional) Displays the IS-IS adjacencies for Level 1 or Level 2 independently. |
| | type | Interface type. For more information, use the question mark (?) online help function. |
| | interface-path-id | Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function. |
| | detail | (Optional) Displays neighbor IP addresses and active topologies. |
| | systemid <i>system-id</i> | (Optional) Displays the information for the specified router only. |
| | | |

Command Default No instance ID specified displays IS-IS adjacencies for all the IS-IS instances.
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read |

Examples

The following is sample output from the **show isis adjacency** command:

```
RP/0/# show isis adjacency
```

IS-IS p Level-1 adjacencies:

| System Id | Interface | SNPA | State | Hold | Changed | NSF | BFD |
|-----------|-----------|----------------|-------|------|----------|---------|------|
| 12a4 | PO0/1/0/1 | *PtoP* | Up | 23 | 00:00:06 | Capable | Init |
| 12a4 | Gi0/6/0/2 | 0004.2893.f2f6 | Up | 56 | 00:04:01 | Capable | Up |

Total adjacency count: 2

IS-IS p Level-2 adjacencies:

| System Id | Interface | SNPA | State | Hold | Changed | NSF | BFD |
|-----------|-----------|----------------|-------|------|----------|---------|------|
| 12a4 | PO0/1/0/1 | *PtoP* | Up | 23 | 00:00:06 | Capable | None |
| 12a4 | Gi0/6/0/2 | 0004.2893.f2f6 | Up | 26 | 00:00:13 | Capable | Init |

Total adjacency count: 2

This table describes the significant fields shown in the display.

Table 2: show isis adjacency Field Descriptions

| Field | Description |
|-----------|---|
| Level-1 | Level 1 adjacencies. |
| Level-2 | Level 2 adjacencies. |
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or the hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| Interface | Interface used to reach the neighbor. |
| SNPA | Data-link address (also known as the Subnetwork Point of Attachment [SNPA]) of the neighbor. |
| State | Adjacency state of the neighboring interface. Valid states are Down, Init, and Up. |
| Holdtime | Hold time of the neighbor. |
| Changed | Time the neighbor has been up (in hours:minutes:seconds). |
| NSF | Specifies whether the neighbor can adhere to the IETF-NSF restart mechanism. |
| BFD | Specifies the Bidirectional Forwarding Detection (BFD) status for the interface. Valid status are: <ul style="list-style-type: none"> • None—BFD is not configured. • Init—BFD session is not up. One reason is that other side is not yet enabled. • Up—BFD session has been established. • Down—BFD session holdtime expired. |

show isis adjacency-log

To display the Intermediate System-to-Intermediate System (IS-IS) adjacency log, use the **show isis adjacency-log** command in .

show isis adjacency-log [**level** {**1** | **2**}] [{**last number** | **first number**}]

| | | |
|---------------------------|--------------------------------------|--|
| Syntax Description | level { 1 2 } | (Optional) Displays the IS-IS adjacency log for Level 1 or Level 2 independently. |
| | last number | (Optional) Specifies that the output is restricted to the last <i>number</i> of entries. Range is 1 to 100. |
| | first number | (Optional) Specifies that the output is restricted to the first <i>number</i> of entries. Range is 1 to 100. |

Command Default No default behavior or values

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis adjacency-log** command:

```
RP/0/# show isis adjacency-log

IS-IS 10 Level 1 Adjacency log
When      System      Interface      State      Details
4d00h     12a1               PO0/5/0/0     d -> i
4d00h     12a1               PO0/5/0/0     i -> u     New adjacency
                                         IPv4 Unicast Up
4d00h     12a1               Gi0/6/0/0     d -> u     New adjacency
4d00h     12a1               Gi0/6/0/0     u -> d     Interface state
down
3d17h     12a1               Gi0/6/0/0     d -> u     New adjacency
3d17h     12a1               Gi0/6/0/0     u -> d     Interface state
down
01:44:07  12a1               Gi0/6/0/0     d -> u     New adjacency

IS-IS 10 Level 2 Adjacency log
When      System      Interface      State      Details
4d00h     12a1               PO0/5/0/0     d -> i
4d00h     12a1               PO0/5/0/0     i -> u     New adjacency
                                         IPv4 Unicast Up
```

```

4d00h          12a1          Gi0/6/0/0          d -> u  New adjacency
4d00h          12a1          Gi0/6/0/0          u -> d  Interface state
down
3d17h          12a1          Gi0/6/0/0          d -> u  New adjacency
3d17h          12a1          Gi0/6/0/0          u -> d  Interface state
down
01:44:07       12a1          Gi0/6/0/0          d -> u  New adjacency

```

This table describes the significant fields shown in the display.

Table 3: show isis adjacency-log Field Descriptions

| Field | Description |
|-----------|--|
| When | Elapsed time (in hh:mm:ss) since the event was logged. |
| System | System ID of the adjacent router. |
| Interface | Specific interface involved in the adjacency change. |
| State | State transition for the logged event. |
| Details | Description of the adjacency change. |

show isis checkpoint adjacency

To display the Intermediate System-to-Intermediate System (IS-IS) checkpoint adjacency database, use the **show isis checkpoint adjacency** command in .

show isis [**instance** *instance-id*] **checkpoint adjacency**

| | |
|---------------------------|--|
| Syntax Description | <p>instance <i>instance-id</i> (Optional) Displays the IS-IS checkpoint adjacencies for the specified IS-IS instance only.</p> <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
|---------------------------|--|

Command Default No instance ID specified displays IS-IS checkpoint adjacencies for all the IS-IS instances.

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Use the **show isis checkpoint adjacency** command to display the checkpointed adjacencies. With this information you can restore the adjacency database during a Cisco proprietary nonstop forwarding (NSF) restart. This command, with the **show isis adjacency** command, can be used to verify the consistency of the two databases.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read |

Examples

The following is sample output from the **show isis checkpoint adjacency** command:

```
RP/0/# show
isis
checkpoint
adjacency
```

| Interface | Level | System ID | State | Circuit ID | Chkpt ID |
|-----------|-------|-------------|-------|-------------------|----------|
| Gi3/0/0/1 | 1 | router-gsr8 | Up | 0001.0000.0008.04 | 80011fec |
| Gi0/4/0/1 | 1 | router-gsr9 | Up | 0001.0000.0006.01 | 80011fd8 |
| Gi3/0/0/1 | 2 | router-gsr8 | Up | 0001.0000.0008.04 | 80011fc4 |

This table describes the significant fields shown in the display.

Table 4: show isis checkpoint adjacency Field Descriptions

| Field | Description |
|------------|--|
| Interface | Interface used to reach the neighbor. |
| Level | Lists either routers with Level 1 or Level 2 adjacency configured. |
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| State | State of the neighboring interface. |
| Circuit ID | Unique ID issued to a circuit at its creation. |
| Chkpt ID | Unique ID issued to the checkpoint at its creation. |

show isis checkpoint interface

To display the Intermediate System-to-Intermediate System (IS-IS) checkpoint interfaces, use the **show isis checkpoint interface** command in .

show isis checkpoint interface

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

| Task ID | Operations |
|---------|------------|
| isis | read |

Examples

The following is sample output from the **show isis checkpoint interface** command:

```
RP/0/# show isis checkpoint interface

IS-IS 10 checkpoint interface
Interface      Index  CircNum  DIS Areas  Chkpt ID
PO0/5/0/0      0      0        NONE      80002fe8
Gi0/6/0/0      1      3        L1L2      80002fd0
```

This table describes the significant fields shown in the display.

Table 5: show isis checkpoint interface Field Descriptions

| Field | Description |
|-----------|---|
| Interface | Interface used to reach the neighbor. |
| Index | Interface index assigned to an interface upon its creation. |
| CircNum | Unique ID issued to a circuit internally. |
| DIS Areas | Designated Intermediate System area. |
| Chkpt ID | Unique ID issued to the checkpoint at its creation. |

show isis checkpoint lsp

To display the Intermediate System-to-Intermediate System (IS-IS) checkpoint link-state packet (LSP) protocol data unit (PDU) identifier database, use the **show isis checkpoint lsp** command in .

show isis [**instance** *instance-id*] **checkpoint lsp**

| Syntax Description | instance <i>instance-id</i> (Optional) Displays the IS-IS checkpoint LSPs for the specified instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. | | | | |
|---------------------------|--|---------|--------------|----------------|------------------------------|
| Command Default | No instance ID specified displays IS-IS checkpoint LSPs for all the IS-IS instances. | | | | |
| Command Modes | | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | The checkpointed LSPs displayed by this command are used to restore the LSP database during a Cisco-proprietary nonstop forwarding (NSF) restart. The show isis checkpoint lsp command, with the show isis database command, may be used to verify the consistency of the two databases. | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read</td></tr> </table> | Task ID | Operations | isis | read |
| Task ID | Operations | | | | |
| isis | read | | | | |

Examples

The following is sample output from the **show isis checkpoint lsp** command:

```
RP/0/#
show isis checkpoint lsp

Level  LSPID                Chkpt ID
1      router-gsr6.00-00    80011f9c
1      router-gsr6.01-00    80011f88
1      router-gsr8.00-00    80011f74
1      router-gsr9.00-00    80011f60
2      router-gsr6.00-00    80011f4c
2      router-gsr6.01-00    80011f38
2      router-gsr8.00-00    80011f24
2      router-gsr9.00-00    80011f10
Total LSP count: 8 (L1: 4, L2 4, local L1: 2, local L2 2)
```

This table describes the significant fields shown in the display.

Table 6: show isis checkpoint lsp Field Descriptions

| Field | Description |
|----------|---|
| Level | Routers with Level 1 or Level 2 adjacency configured. |
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is 0 zero, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| Chkpt ID | Unique ID issued to the checkpoint at its creation. |

show isis database

To display the Intermediate System-to-Intermediate System (IS-IS) link-state packet (LSP) database, use the **show isis database** command in .

show isis [**instance** *instance-id*] **database** [**level** {**1** | **2**}] [**update**] [**summary**] [**detail**] [**verbose**] [**{*lsp-id}**]

| | | |
|---------------------------|--------------------------------------|---|
| Syntax Description | instance <i>instance-id</i> | (Optional) Displays the IS-IS LSP database for the specified instance only. • The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| | level { 1 2 } | (Optional) Displays the IS-IS LSP database for Level 1 or Level 2 independently. |
| | update | (Optional) Displays contents of LSP database managed by update thread. |
| | summary | (Optional) Displays the LSP ID number, sequence number, checksum, hold time, and bit information. |
| | detail | (Optional) Displays the contents of each LSP. |
| | verbose | (Optional) Displays the contents of each LSP. |
| | * <i>lsp-id</i> | (Optional) LSP protocol data units (PDUs) identifier. Displays the contents of a single LSP by its ID number or may contain an * as a wildcard character. |

Command Default No instance ID specified displays the IS-IS LSP database for all the IS-IS instances.
Both Level 1 and Level 2 is configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Each of the options for the **show isis database** command can be entered in an arbitrary string within the same command entry. For example, the following are both valid command specifications and provide the same output: **show isis database detail level 2** and **show isis database level 2 detail** .

The **summary** keyword used with this command allows you to filter through a large IS-IS database and quickly identify problematic areas.

| Task ID | Task | Operations |
|----------------|-------------|-------------------|
| | ID | |
| | isis | read |

Examples

The following is sample output from the **show isis database** command with no keywords specified:

```
RP/0/# show isis database
```

```
IS-IS Area a1 (Level-1) Link State Database
```

| LSPID | LSP Seq Num | LSP Checksum | LSP Holdtime | ATT/P/OL |
|-------------------|--------------|--------------|--------------|----------|
| router-gsr6.00-00 | * 0x00000016 | 0x62c8 | 896 | 0/0/0 |
| router-gsr6.01-00 | * 0x0000000f | 0x56d9 | 902 | 0/0/0 |
| router-gsr8.00-00 | 0x00000019 | 0x4b6d | 1015 | 0/0/0 |
| router-gsr9.00-00 | 0x00000016 | 0x33b7 | 957 | 0/0/0 |

```
Total LSP count: 4 (L1: 4, L2 0, local L1: 2, local L2 0)
```

The following sample output shows the remaining lifetime value that is received in LSP database. The received value is shown in the output under the **Rcvd** field.

```
RP/0/0/CPU0:ios#show isis database
Thu Dec 14 16:03:45.131 EST
```

```
IS-IS 100 (Level-1) Link State Database
```

| LSPID | LSP Seq Num | LSP Checksum | LSP Holdtime/ Rcvd | ATT/P/OL |
|-----------------------|-------------|--------------|---------------------------|----------|
| 1111.1111.1111.00-00* | 0x0073000e | 0x0001 | 1002/* | 1/0/1 |
| 1111.1111.1112.00-00 | 0x0073004a | 0x0001 | 1195/59 | 1/0/1 |
| 1111.1111.1112.01-00 | 0x007300b8 | 0x0001 | 1178/59 | 0/0/1 |
| 1111.1111.1112.03-00 | 0x007300b6 | 0x0001 | 1179/59 | 0/0/1 |
| 1111.1111.1113.00-00 | 0x0073000d | 0x0001 | 533/1200 | 1/0/1 |

```
Total Level-1 LSP count: 5      Local Level-1 LSP count: 1
```

This table describes the significant fields shown in the display.

Table 7: show isis database Field Descriptions

| Field | Description |
|--------------|--|
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is 0, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| LSP Seq Num | Sequence number for the LSP that allows other systems to determine if they have received the latest information from the source. |
| LSP Checksum | Checksum of the entire LSP packet. |
| LSP Holdtime | Time the LSP remains valid (in seconds). An LSP hold time of 0 indicates that this LSP was purged and is being removed from the link-state database (LSDB) of all routers. The value indicates how long the purged LSP stays in the LSDB before being completely removed. |

| Field | Description |
|----------|---|
| ATT/P/OL | <p>ATT—Attach bit. This bit indicates that the router is also a Level 2 router, and it can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point to a default route to the closest Level 2 router.</p> <p>P—P bit. Detects if the intermediate system is area partition repair capable. Cisco and other vendors do not support area partition repair.</p> <p>OL—Overload bit. Determines if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router.</p> |

The following is sample output from the **show isis database** command with the **summary** keyword:

RP/0/# **show isis database summary**

```

IS-IS 10 Database Summary for all LSPs
                                Active          Purged          All
                                L1    L2    Total    L1    L2    Total    L1    L2    Total
-----
Fragment 0 Counts
  Router LSPs:      1      1      2      0      0      0      1      1      2
  Pseudo-node LSPs: 0      0      0      0      0      0      0      0      0
  All LSPs:         1      1      2      0      0      0      1      1      2
Per Topology
  IPv4 Unicast
    ATT bit set LSPs: 0      0      0      0      0      0      0      0      0
    OVL bit set LSPs: 0      0      0      0      0      0      0      0      0
All Fragment Counts
  Router LSPs:      1      1      2      0      0      0      1      1      2
  Pseudo-node LSPs: 0      0      0      0      0      0      0      0      0
  All LSPs:         1      1      2      0      0      0      1      1      2

```

This table describes the significant fields shown in the display.

Table 8: show isis database summary Field Descriptions

| Field | Description |
|-------------------|---|
| Router LSPs: | Active, purged, and total LSPs associated with routers. |
| Pseudo-node LSPs: | Active, purged, and total LSPs associated with pseudonodes. |
| All LSPs: | Total active and purged LSPs. |
| ATT bit set LSPs | Attach bit (ATT). Indicates that the router is also a Level 2 router, and it can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point to a default route to the closest Level 2 router. |
| OVL bit set LSPs | Overload bit. Indicates if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router. |

The following is sample output from the **show isis database** command with the **detail verbose** keyword specified:

```
RP/0/# show isis instance isp database detail verbose

IS-IS isp test (Level-1) Link State Database
  LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
  router-5router1.00-00  0x00000003  * 0x00000d44  0x8074460  0x7e2c 457 535
  0/0/0
    Area Address: 4900
  Area Address: 01
    NLPID: 0xcc
  NLPID: Hostname: router-50x8e
    IP Address: 172.1.1.5
    MetricMT: 0 IP 172.3.55.0/24Standard (IPv4 Unicast)
    Metric: 10 IP 172.6.1.0/24
  MT: IPv6 Unicast 0/0/0
  MT: IPv4 Multicast Metric: 10 IP 172.7.0.0/240
    Metric: 10 IS router-11.00
    Metric: 10 IS router-11.01
  MT: IPv6 Multicast router-11.00-00 * 0x0000000b 0x8074460
    1161 0/0/0
  Hostname: Area Address: 49router1
    NLPID: 0xcc
    Hostname: router-11
  IP Address: 192.168.0.145
  IP IPv6 Address: 172.1.11.1192:168::145 MetricRouter ID: 0 IP
172192.1168.1110.0/24145
  Metric: 10 IP 172IS-Extended router1.016.1.0/24
  Metric: 10 IP 172IS-Extended router2.007.0.0/24
  Metric: 10 IS routerIS-11Extended router2.0100
  Metric: 10 IS router-5.00
  router-11.01-00 * 0x00000001 0x80770ec 457 0/0/0
  Metric: 0 IS router-11.00
  Metric: 0 IS router-5.00
  Affinity: 0x00000000
  Interface IP Address: 10.3.11.145
  Neighbor IP Address: 10.3.11.143
  Physical BW: 155520 kbits/sec
  Total LSP count: 3 (L1: 3, L2 0, local L1: 2, local L2 0)
  Reservable Global pool BW: 0 kbits/sec
  Global Pool BW Unreserved:
IS-IS isp (Level-2) Link State Database
  LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
  router-5.00-00  0x00000005  0x807997c  457 0/0/0
    [0]: 0 kbits/sec [1]: 0 kbits/sec
    [2]: 0 kbits/sec [3]: 0 kbits/sec
    [4]: 0 kbits/sec [5]: 0 kbits/sec
    [6]: 0 kbits/sec [7]: 0 kbits/sec
  MPLS SRLG: Area Address: 49router2.00
  Interface IP Address: 10.3.11.145
  Neighbor IP Address: 10.3.11.143
    NLPIDFlags: 0xcc0x1 HostnameSRLGs: router-5IP Address[0]: 172.6.10,
[1.5]: 20
  Metric: 0 10 IP 172IP-Extended 10.3.5511.0/24
  Metric: 10 IP 172IP-Extended 192.1686.10.0145/2432
  Metric: 10 IS routerMT (IPv6 Unicast) IS-11Extended router1.0001
  Metric: 10 IP 172.1.0.0MT (IPv6 Unicast) IPv6 192:168::145/24128
  Metric: 10 IS routerMT (IPv4 Multicast) IS-11Extended router1.01
  Metric: 10 IP 172.8.111.0/24

  router-11.00-00 * 0x0000000d 0x807997c 1184 0/0/0
```



```

Area Address: 49
NLPID:      0xcc
Hostname:   router-11
IP Address: 172.28.111.111
Metric: 0   IP 172.8.111.0/24
Metric: 10  IP 172.6.1.0/24
Metric: 10  IP 172MT (IPv4 Multicast) IP-Extended 192.7168.0./
Metric: 10  IS router-11.01
Metric: 10  IS router-5.00
Metric: 10  IP 172.3.55.0MT (IPv6 Multicast) IPv6 192:168::145/24.01-00
0x00000013e 0x80770ec 0x3309 457 1159 0/0/0
Metric: 0   IS routerIS-11Extended router1.00
Metric: 0   IS routerIS-5Extended router2.00

Total LSP count: 3 (L1: 0, L2 3, local L1: 0, local L2 2)

```

As the output shows, besides the information displayed with the **show isis database** command, the command with the **detail verbose** keyword displays the contents of each LSP.

Table 9: show isis instance isp database detail Field Descriptions

| Field | Description |
|--------------|--|
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is 0, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| LSP Seq Num | Sequence number for the LSP that allows other systems to determine if they have received the latest information from the source. |
| LSP Checksum | Checksum of the entire LSP packet. |
| LSP Holdtime | Amount of time the LSP remains valid (in seconds). An LSP hold time of 0 indicates that this LSP was purged and is being removed from the link-state database (LSDB) of all routers. The value indicates how long the purged LSP stays in the LSDB before being completely removed. |

| Field | Description |
|--------------|---|
| ATT/P/OL | <p>ATT—Attach bit. This bit indicates that the router is also a Level 2 router, and it can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point to a default route to the closest Level 2 router.</p> <p>P—P bit. Detects if the intermediate system is area partition repair capable. Cisco and other vendors do not support area partition repair.</p> <p>OL—Overload bit. Determines if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router.</p> |
| Area Address | Reachable area addresses from the router. For Level 1 LSPs, these are the area addresses configured manually on the originating router. For Level 2 LSPs, these are all the area addresses for the area this route belongs to. |
| NLPID | Network Layer Protocol Identifier. |
| Hostname | Hostname of the node. |
| IP Address: | Address of the node. |
| Metric | IS-IS metric for the cost of the adjacency between the originating router and the advertised neighbor, or the metric of the cost to get from the advertising router to the advertised destination (which can be an IP address, an end system (ES), or a Connectionless Network Service (CLNS) prefix). |

The following is additional sample output from the **show isis database detail** command. This is a Level 2 LSP. The area address 39.0001 is the address of the area in which the router resides.

```
RP/0/RSP0/CPU0:router# show isis database level 2 detail

IS-IS Level-2 Link State Database
LSPID          LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
0000.0C00.1111.00-00* 0x00000006  0x4DB3       1194          0/0/0
  Area Address: 39.0001
    NLPID:      0x81 0xCC
    IP Address: 172.18.1.17
    Metric: 10  IS 0000.0C00.1111.09
    Metric: 10  IS 0000.0C00.1111.08
    Metric: 10  IP 172.17.4.0 255.255.255.0
    Metric: 10  IP 172.18.8.0 255.255.255.0
    Metric: 0   IP-External 10.0.0.0 255.0.0.0
```

The IP entries are the directly connected IP subnets the router is advertising (with associated metrics). The IP-External entry is a redistributed route.

Table 10: show isis database level 2 detail Field Descriptions

| Field | Description |
|--------------|--|
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is 0, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| LSP Seq Num | Sequence number for the LSP that allows other systems to determine if they have received the latest information from the source. |
| LSP Checksum | Checksum of the entire LSP packet. |
| LSP Holdtime | Time the LSP remains valid (in seconds). An LSP hold time of 0 indicates that this LSP was purged and is being removed from the link-state database (LSDB) of all routers. The value indicates how long the purged LSP stays in the LSDB before being completely removed. |
| ATT/P/OL | <p>ATT—Attach bit. This bit indicates that the router is also a Level 2 router, and it can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point to a default route to the closest Level 2 router.</p> <p>P—P bit. Detects if the intermediate system is area partition repair capable. Cisco and other vendors do not support area partition repair.</p> <p>OL—Overload bit. Determines if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router.</p> |
| Area Address | Reachable area addresses from the router. For Level 1 LSPs, these are the area addresses configured manually on the originating router. For Level 2 LSPs, these are all the area addresses for the area to which this route belongs. |
| NLPID | Network Layer Protocol Identifier. |
| Hostname | Hostname of the node. |
| IP Address: | IP address of the node. |
| Metric: | IS-IS metric for the cost of the adjacency between the originating router and the advertised neighbor, or the metric of the cost to get from the advertising router to the advertised destination (which can be an IP address, an end system (ES), or a Connectionless Network Service (CLNS) prefix). |

Table 11: show isis database verbose Field Descriptions

| Field | Description |
|--------------|---|
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is zero, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| LSP Seq Num | Sequence number for the LSP that allows other systems to determine if they have received the latest information from the source. |
| LSP Checksum | Checksum of the entire LSP packet. |
| LSP Holdtime | Time the LSP remains valid (in seconds). An LSP hold time of zero indicates that this LSP was purged and is being removed from the link-state database (LSDB) of all routers. The value indicates how long the purged LSP stays in the LSDB before being completely removed. |
| ATT/P/OL | <p>ATT—Attach bit. This bit indicates that the router is also a Level 2 router, and it can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point to a default route to the closest Level 2 router.</p> <p>P—P bit. Detects if the intermediate system is area partition repair capable. Cisco and other vendors do not support area partition repair.</p> <p>OL—Overload bit. Determines if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router.</p> |
| Area Address | Reachable area addresses from the router. For Level 1 LSPs, these are the area addresses configured manually on the originating router. For Level 2 LSPs, these are all the area addresses for the area to which this route belongs. |
| NLPID | Network Layer Protocol Identifier. |
| Hostname | Hostname of the node. |
| IP Address | IP address of the node. |
| Metric | IS-IS metric for the cost of the adjacency between the originating router and the advertised neighbor, or the metric of the cost to get from the advertising router to the advertised destination (which can be an IP address, an end system (ES), or a Connectionless Network Service (CLNS) prefix). |

| Field | Description |
|----------------------|---|
| MPLS SRLG | MPLS SRLG TLV information per neighbor, identified by hostname or system ID. |
| Interface IP Address | Local interface IP address. |
| Neighbor IP Address | Remote interface IP address. |
| Flags | Flags carried in SRLG TLV. The Least Significant Bit (LSB) is set if the interface is numbered. |
| SRLGs | SRLG values. |

This is the sample output from the **show isis database verbose** command. The output shows IPv4 adjacency segment ID (SID), prefix (node) SID, and Segment Routing Global Block (SRGB) values.

RP/0/ **show isis database verbose**

Fri May 2 17:53:44.575 PDT

IS-IS DEFAULT (Level-1) Link State Database

```

LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
pl.00-00              0x00000080   0x4780        1044          1/0/0
  Area Address: 49.0001
  NLPID:         0xcc
  NLPID:         0x8e
  MT:            Standard (IPv4 Unicast)
  MT:            IPv6 Unicast
  Hostname:      pl
  IP Address:    172.16.255.101
  IPv6 Address:  2001:db8::ff:101
  Router Cap:    172.16.255.101, D:0, S:0
    Segment Routing: I:1 V:0, SRGB Base: 16000 Range: 7999
  Metric: 10     IS-Extended p2.00
    Interface IP Address: 172.16.2.4
    Neighbor IP Address: 172.16.2.5
    ADJ-SID: F:0 B:0 weight:0 Adjacency-sid:24002
  Metric: 10     IS-Extended pe1.00
    Interface IP Address: 172.16.1.1
    Neighbor IP Address: 172.16.1.0
    ADJ-SID: F:0 B:0 weight:0 Adjacency-sid:24003
  Metric: 10     IP-Extended 172.16.1.0/31
  Metric: 10     IP-Extended 172.16.2.2/31
  Metric: 10     IP-Extended 172.16.2.4/31
  Metric: 10     IP-Extended-Interarea 172.16.255.2/32
    Admin. Tag: 255
    Prefix-SID Index: 42, R:1 N:0 P:1
  Metric: 0      IP-Extended 172.16.255.101/32
    Prefix-SID Index: 141, R:0 N:0 P:0
  Metric: 10     MT (IPv6 Unicast) IS-Extended p2.00
  Metric: 10     MT (IPv6 Unicast) IS-Extended pe1.00
  Metric: 10     MT (IPv6 Unicast) IPv6 2001:db8::1:0/127
  Metric: 10     MT (IPv6 Unicast) IPv6 2001:db8::2:2/127
  Metric: 10     MT (IPv6 Unicast) IPv6 2001:db8::2:4/127
  Metric: 10     MT (IPv6 Unicast) IPv6-Interarea 2001:db8::ff:2/128
    Admin. Tag: 255
  Metric: 0      MT (IPv6 Unicast) IPv6 2001:db8::ff:101/128

```

show isis database-log

To display the entries in the Intermediate System-to-Intermediate System (IS-IS) database log, use the **show isis database-log** command in .

show isis database-log [**level** {**1** | **2**}] [{**last** *number* | **first** *number*}]

| | | |
|---------------------------|--------------------------------------|---|
| Syntax Description | level { 1 2 } | (Optional) Displays the database log for Level 1 or Level 2 independently. |
| | last <i>number</i> | (Optional) Specifies that the output be restricted to the last <i>number</i> of entries. Range is 1 to 1000. |
| | first <i>number</i> | (Optional) Specifies that the output be restricted to the first <i>number</i> of entries. Range is 1 to 1000. |

Command Default Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis database-log** command:

```
RP/0/# show isis database-log
```

```
IS-IS 10 Level 1 Link State Database Log

              New LSP
WHEN      LSPID      Op  Seq Num  Holdtime OL  Old LSP
              Seq Num  Holdtime OL
01:17:19  12b1.03-00  REP 0x00000003 1200    0 0x00000002 340    0
001:06:20 12b1.00-00  REP 0x000001d8 1200    0 0x000001d7 375    0
01:06:00  12b1.03-00  REP 0x00000004 1200    0 0x00000003 520    0
01:05:46  12a1.00-00  REP 0x000001fc 1200    0 0x000001fb 425    0
00:55:01  12b1.00-00  REP 0x000001d9 1200    0 0x000001d8 520    0
00:53:39  12b1.03-00  REP 0x00000005 1200    0 0x00000004 459    0
00:53:19  12a1.00-00  REP 0x000001fd 1200    0 0x000001fc 453    0
00:42:12  12b1.00-00  REP 0x000001da 1200    0 0x000001d9 431    0
00:39:56  12b1.03-00  REP 0x00000006 1200    0 0x00000005 376    0
00:38:54  12a1.00-00  REP 0x000001fe 1200    0 0x000001fd 334    0
00:29:10  12b1.00-00  REP 0x000001db 1200    0 0x000001da 418    0
00:27:22  12b1.03-00  REP 0x00000007 1200    0 0x00000006 446    0
00:25:10  12a1.00-00  REP 0x000001ff 1200    0 0x000001fe 375    0
00:17:04  12b1.00-00  REP 0x000001dc 1200    0 0x000001db 473
```

This table describes the significant fields shown in the display.

Table 12: show isis database-log Field Descriptions

| Field | Description |
|----------|---|
| WHEN | Elapsed time (in hh:mm:ss) since the event was logged. |
| LSPID | <p>LSP identifier. The first six octets form the system ID of the router that originated the LSP.</p> <p>The next octet is the pseudonode ID. When this byte is 0 zero, the LSP describes links from the system. When it is nonzero, the LSP is a so-called nonpseudonode LSP. This is similar to a router link-state advertisement (LSA) in the Open Shortest Path First (OSPF) protocol. The LSP describes the state of the originating router.</p> <p>For each LAN, the designated router for that LAN creates and floods a pseudonode LSP, describing all systems attached to that LAN.</p> <p>The last octet is the LSP number. If there is more data than can fit in a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the LSP was originated by the system on which this command is issued.</p> |
| New LSP | New router or pseudonode appearing in the topology. |
| Old LSP | Old router or pseudonode leaving the topology. |
| Op | Operation on the database: inserted (INS) or replaced (REP). |
| Seq Num | Sequence number for the LSP that allows other systems to determine if they have received the latest information from the source. |
| Holdtime | Time the LSP remains valid (in seconds). An LSP hold time of 0 indicates that this LSP was purged and is being removed from the link-state database (LSDB) of all routers. The value indicates how long the purged LSP stays in the LSDB before being completely removed. |
| OL | Overload bit. Determines if the IS is congested. If the Overload bit is set, other routers do not use this system as a transit router when calculating routers. Only packets for destinations directly connected to the overloaded router are sent to this router. |

show isis fast-reroute

To display per-prefix LFA information, use the **show isis fast-reroute** command in .

show isis fast-reroute

A.B.C.D/length | **detail** | **summary** | **sr-only**

| Syntax Description | <i>A.B.C.D/length</i> Network to show per-prefix LFA information. |
|--------------------|---|
| detail | Use to display tiebreaker information about the backup. |
| summary | Use to display the number of prefixes having protection per priority. |
| sr-only | Use to display SR-labeled prefixes only. |

Command Default None

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

The following is sample output from **show isis fast-reroute** command that displays per-prefix LFA information:

```
RP/0/# show isis fast-reroute 10.1.6.0/24

L1 10.1.6.0/24 [20/115]
    via 10.3.7.47, POS0/3/0/1, router2
    FRR backup via 10.1.7.145, GigabitEthernet0/1/0/3, router3
```

The following is sample output from **show isis fast-reroute detail** command that displays tie-breaker information about the backup:

```
RP/0/# show isis fast-reroute 10.1.6.0/24 detail

L1 10.1.6.0/24 [20/115] low priority
    via 10.3.7.47, POS0/3/0/1, router2
    FRR backup via 10.1.7.145, HundredGigE 0/1/0/3, router3
    P: No, TM: 30, LC: Yes, NP: No, D: No
    src router2.00-00, 192.168.0.47
    L2 adv [20] native, propagated
```

The following is sample output from **show isis fast-reroute summary** command that displays the number of prefixes having protection per priority:


```
RP/0/#show isis fast-reroute summary
IS-IS frr IPv4 Unicast FRR summary
```

| | | Critical Priority | High Priority | Medium Priority | Low Priority | Total |
|--------------------------|-------|----------------------|------------------|--------------------|-----------------|-------|
| Prefixes reachable in L1 | | | | | | |
| All paths protected | 0 | 0 | 2 | | 8 | 10 |
| Some paths protected | 0 | 0 | 1 | | 3 | 4 |
| Unprotected | 0 | 0 | 1 | | 3 | |
| Protection coverage | 0.00% | 0.00% | 75.00% | 78.57% | 77.78% | |
| Prefixes reachable in L2 | | | | | | |
| All paths protected | 0 | 0 | 0 | | 0 | 0 |
| Some paths protected | 0 | 0 | 1 | | 0 | 1 |
| Unprotected | 0 | 0 | 0 | | 0 | |
| Protection coverage | 0.00% | 0.00% | 100.00% | 0.00% | 100.00% | |

The following is sample output from **show isis fast-reroute sr-only** command that displays fast-reroute repair paths for prefixes associated with a segment routing prefix SID:

```
RP/0/#show isis fast-reroute sr-only
IS-IS 1 IPv4 Unicast FRR backups
```

```
Codes: L1 - level 1, L2 - level 2, ia - interarea (leaked into level 1)
       df - level 1 default (closest attached router), su - summary null
       C - connected, S - static, R - RIP, B - BGP, O - OSPF
       E - EIGRP, A - access/subscriber, M - mobile, a - application
       i - IS-IS (redistributed from another instance)
       D - Downstream, LC - Line card disjoint, NP - Node protecting
       P - Primary path, SRLG - SRLG disjoint, TM - Total metric via backup

Maximum parallel path count: 8

L2 20.1.0.101/32 [10/115]
   via 10.1.1.101, GigabitEthernet0/0/0/2, r101, SRGB Base: 16000, Weight: 0
   Backup path: TI-LFA (link), via 10.4.1.103, GigabitEthernet0/0/0/1 r103, SRGB Base:
16000, Weight: 0
     P node: r103.00 [20.1.0.103], Label: ImpNull
     Q node: r102.00 [20.1.0.102], Label: 24001
     Prefix label: 16101
     Backup-src: r101.00
L2 20.1.0.102/32 [30/115]
   via 10.1.1.101, GigabitEthernet0/0/0/2, r101, SRGB Base: 16000, Weight: 0
   Backup path: TI-LFA (link), via 10.4.1.103, GigabitEthernet0/0/0/1 r103, SRGB Base:
16000, Weight: 0
     P node: r103.00 [20.1.0.103], Label: ImpNull
     Q node: r102.00 [20.1.0.102], Label: 24001
     Prefix label: ImpNull
     Backup-src: r102.00
L2 20.1.0.103/32 [20/115]
   via 10.4.1.103, GigabitEthernet0/0/0/1, r103, SRGB Base: 16000, Weight: 0
   Backup path: TI-LFA (link), via 10.1.1.101, GigabitEthernet0/0/0/2 r101, SRGB Base:
16000, Weight: 0
     P node: r102.00 [20.1.0.102], Label: 16102
     Q node: r103.00 [20.1.0.103], Label: 24001
```

```
Prefix label: ImpNull  
Backup-src: r103.00
```

show isis hostname

To display the entries in the Intermediate System-to-Intermediate System (IS-IS) router name-to-system ID mapping table, use the **show isis hostname** command in .

show isis [**instance** *instance-id*] **hostname**

| Syntax Description | <p>instance <i>instance-id</i> (Optional) Displays the IS-IS router name-to-system ID mapping table for the specified IS-IS instance only.</p> <p>The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command.</p> | | | | |
|---------------------------|---|---------|--------------|----------------|------------------------------|
| Command Default | No instance ID specified displays the IS-IS router name-to-system ID mapping table for all the IS-IS instances. | | | | |
| Command Modes | | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | The show isis hostname command does not display entries if the dynamic hostnames are disabled. | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read</td></tr> </table> | Task ID | Operations | isis | read |
| Task ID | Operations | | | | |
| isis | read | | | | |

Examples

The following is sample output from the **show isis hostname** command with the **instance** and *instance-id* values specified:

```
RP/0/# show isis instance isp hostname

ISIS isp hostnames
  Level  System ID      Dynamic Hostname
  1      0001.0000.0005  router
  2      * 0001.0000.0011  router-11
```

This table describes the significant fields shown in the display.

Table 13: show isis instance isp hostname Field Descriptions

| Field | Description |
|-----------|--|
| Level | IS-IS level of the router. |
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |

| Field | Description |
|------------------|-------------------------|
| Dynamic Hostname | Hostname of the router. |
| * | Local router. |

show isis interface

To display information about the Intermediate System-to-Intermediate System (IS-IS) interfaces, use the **show isis interface** command in .

show isis interface [{*type interface-path-id* | **level** {**1** | **2**}}] [**brief**]

| | | |
|---------------------------|--------------------------------------|--|
| Syntax Description | type | Interface type. For more information, use the question mark (?) online help function. |
| | interface-path-id | Physical interface or virtual interface. |
| | Note | Use the show interfaces command to see a list of all interfaces currently configured on the router. |
| | | For more information about the syntax for the router, use the question mark (?) online help function. |
| | level { 1 2 } | (Optional) Displays IS-IS interface information for Level 1 or Level 2 independently. |
| | brief | (Optional) Displays brief interface output. |

Command Default Displays all IS-IS interfaces.

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|----------------|----------------|-------------------|
| | isis | read |

Examples

The following is sample output from the **show isis interface** command:

```
RP/0/#show isis interface
0/3/0/2
tenGigE 0/3/0/2 Enabled
Adjacency Formation: Enabled
Prefix Advertisement: Enabled
BFD: Disabled
BFD Min Interval: 150
BFD Multiplier: 3

Circuit Type: level-2-only
Media Type: P2P
Circuit Number: 0
Extended Circuit Number: 67111168
```

```

Next P2P IIH in:          4 s
LSP Rexmit Queue Size:    0

Level-2
  Adjacency Count:        1
  LSP Pacing Interval:    33 ms
  PSNP Entry Queue Size:  0

CLNS I/O
  Protocol State:         Up
  MTU:                    4469

IPv4 Unicast Topology:    Enabled
  Adjacency Formation:    Running
  Prefix Advertisement:   Running
  Metric (L1/L2):         10/100
  MPLS LDP Sync (L1/L2):  Disabled/Disabled
IPv6 Unicast Topology:    Disabled (Not cfg on the intf)

IPv4 Address Family:      Enabled
  Protocol State:         Up
  Forwarding Address(es): 10.3.10.143
  Global Prefix(es):      10.3.10.0/24
IPv6 Address Family:      Disabled (No topology enabled which uses IPv6)

LSP transmit timer expires in 0 ms
LSP transmission is idle
Can send up to 9 back-to-back LSPs in the next 0 ms

```

This table describes the significant fields shown in the display.

Table 14: show isis interface Field Descriptions

| Field | Description |
|--------------------------|--|
| HundredGigE 0/6/0/0 | Status of the interface, either enabled or disabled. |
| Adjacency formation: | Status of adjacency formation, either enabled or disabled. |
| Prefix Advertisement: | Status of advertising connected prefixes, either enabled or disabled. |
| BFD: | Status of Bidirectional Forwarding Detection (BFD), either enabled or disabled. |
| BFD Min Interval: | BFD minimum interval. |
| BFD Multiplier: | BFD multiplier. |
| Circuit Type: | Levels the interface is running on (circuit-type configuration) which may be a subset of levels on the router. |
| Media Type: | Media type on which IS-IS is running. |
| Circuit Number: | Unique ID assigned to a circuit internally (8-bit integer). |
| Extended Circuit Number: | Valid only for point-to-point interfaces (32-bit integer). |
| LSP Rexmit Queue Size: | Number of LSPs pending retransmission on the interface. |

| Field | Description |
|-------------------------------|--|
| Adjacency Count: | Number of adjacencies formed with a neighboring router that supports the same set of protocols. |
| PSNP Entry Queue Size: | Number of SNP entries pending inclusion in the next PSNP. |
| LAN ID: | ID of the LAN. |
| Priority (Local/DIS): | Priority of this interface or priority of the Designated Intermediate System. |
| Next LAN IIH in: | Time (in seconds) in which the next LAN hello message is sent. |
| LSP Pacing Interval: | Interval at which the link-state packet (LSP) transmission rate (and by implication the reception rate of other systems) is to be reduced. |
| Protocol State: | Running state of the protocol (up or down). |
| MTU: | Link maximum transmission unit (MTU). |
| SNPA: | Data-link address (also known as the Subnetwork Point of Attachment [SNPA]) of the neighbor. |
| All Level-n ISs: | Status of interface membership in Layer 2 multicast group. The status options are Yes or reason for not being a member of the multicast group. |
| IPv4 Unicast Topology: | Status of the topology, either enabled or disabled. |
| Adjacency Formation: | Status of adjacency formation. The status options are Running or a reason for not being ready to form adjacencies. |
| Prefix Advertisement: | Status of advertising prefixes, either enabled or disabled. |
| Metric (L1/L2): | IS-IS metric for the cost of the adjacency between the originating router and the advertised neighbor, or the metric of the cost to get from the advertising router to the advertised destination (which can be an IP address, an end system (ES), or a connectionless network service (CLNS) prefix). |
| MPLS LDP Sync (L1/L2) | Status of LDP IS-IS synchronization, either enabled or disabled. When enabled, the state of synchronization (Sync Status) is additionally displayed as either achieved or not achieved. |
| IPv4 Address Family: | Status of the address family, either enabled or disabled. |
| Protocol State: | State of the protocol. |
| Forwarding Address(es): | Addresses on this interface used by the neighbor for next-hop forwarding. |
| Global Prefix(es): | Prefixes for this interface included in the LSP. |
| LSP transmit timer expires in | LSP transmission expiration timer interval (in milliseconds). |

| Field | Description |
|---------------------|--|
| LSP transmission is | State of LSP transmission. Valid states are: <ul style="list-style-type: none"> • idle • in progress • requested • requested and in progress |

The following is sample output from the **show isis interface** command with the **brief** keyword:

```
RP/0/0/CPU0:router# show isis interface brief
```

| Interface | All OK | Adjs L1 L2 | Adj Topos Run/Cfg | Adv Topos Run/Cfg | CLNS | MTU | Prio L1 L2 |
|-----------|-----------|---------------|----------------------|----------------------|------|------|---------------|
| PO0/5/0/0 | Yes | 1 1 | 1/1 | 1/1 | Up | 4469 | - - |
| Gi0/6/0/0 | Yes | 1* 1* | 1/1 | 1/1 | Up | 1497 | 64 64 |

This table describes the significant fields shown in the display.

Table 15: show isis interface brief Field Descriptions

| Field | Description |
|-------------------|--|
| Interface | Name of the interface. |
| All OK | Everything is working as expected for this interface. |
| Adjs L1 L2 | Number of L1 and L2 adjacencies over this interface. |
| Adj Topos Run/Cfg | Number of topologies that participate in forming adjacencies. Number of topologies that were configured to participate in forming adjacencies. |
| Adv Topos Run/Cfg | Number of topologies that participate in advertising prefixes. Number of topologies that were configured to participate in advertising prefixes. |
| CLNS | Status of the Connectionless Network Service. Status options are Up or Down. |
| MTU | Maximum transfer unit size for the interface. |
| Prio L1 L2 | Interface L1 priority. Interface L2 priority. |

show isis lsp-log

To display link-state packet (LSP) log information, use the **show isis lsp-log** command in .

show isis [**instance** *instance-id*] **lsp-log** [**level** {**1** | **2**}] [{**last** *number* | **first** *number*}]

| | | |
|---------------------------|--------------------------------------|--|
| Syntax Description | instance <i>instance-id</i> | (Optional) Displays the LSP log information for the specified IS-IS instance only. • The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| | level { 1 2 } | (Optional) Displays the Intermediate System-to-Intermediate System (IS-IS) link-state database for Level 1 or Level 2 independently. |
| | last <i>number</i> | (Optional) Specifies that the output be restricted to the last <i>number</i> of entries. Range is 1 to 20. |
| | first <i>number</i> | (Optional) Specifies that the output be restricted to the first <i>number</i> of entries. Range is 1 to 20. |

Command Default No instance ID specified displays the LSP log information for all the IS-IS instances.
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task | Operations |
|----------------|-------------|-------------------|
| | ID | |
| | isis | read |

Examples

The following is sample output from the **show isis lsp-log** command with the **instance** and *instance-id* values specified:

```
RP/0/# show isis instance isp lsp-log

ISIS isp Level 1 LSP log
  When      Count      Interface      Triggers
00:02:36    1
00:02:31    1          LSPREGEN
00:02:26    1      PO4/1      DELADJ
00:02:24    1      PO4/1      NEWADJ
00:02:23    1      Gi5/0      DIS
00:01:27    1       Lo0      IPDOWN
00:01:12    1       Lo0      IPUP
```

```

ISIS isip Level 2 LSP log
  When      Count      Interface      Triggers
00:02:36    1
00:02:30    1          LSPREGEN
00:02:26    1      PO4/1      DELADJ
00:02:24    1      PO4/1      NEWADJ
00:02:23    1      Gi5/0      DIS
00:02:21    1          AREASET
00:01:27    1      Lo0        IPDOWN
00:01:12    1      Lo0        IPUP

```

This table describes the significant fields shown in the display.

Table 16: show isis instance isip lsp-log Field Descriptions

| Field | Description |
|-----------|--|
| Level | IS-IS level of the router. |
| When | How long ago (in hh:mm:ss) an LSP rebuild occurred. The last 20 occurrences are logged. |
| Count | Number of events that triggered this LSP run. When there is a topology change, often multiple LSPs are received in a short period. A router waits 5 seconds before running a full LSP, so it can include all new information. This count denotes the number of events (such as receiving new LSPs) that occurred while the router was waiting its 5 seconds before running full LSP. |
| Interface | Interface that corresponds to the triggered reasons for the LSP rebuild. |

| Field | Description |
|----------|---|
| Triggers | <p>A list of all reasons that triggered an LSP rebuild. The triggers are:</p> <ul style="list-style-type: none">• AREASET—area set changed• ATTACHFLAG—bit attached• CLEAR—clear command• CONFIG—configuration change• DELADJ—adjacency deleted• DIS—DIS changed• IFDOWN—interface down• IPADDRCHG—IP address change• IPDEFORIG—IP def-orig• IPDOWN—connected IP down• IFDOWN—interface down• IPEXT—external IP• IPIA—nterarea IP• IPUP—connected IP up• LSPDBOL—LSPDBOL bit• LSPREGEN—LSP regeneration• NEWADJ— new adjacency |

show isis mesh-group

To display Intermediate System-to-Intermediate System (IS-IS) mesh group information, use the **show isis mesh-group** command in .

show isis [**instance** *instance-id*] **mesh-group**

| | |
|--------------------|---|
| Syntax Description | <div><div>instance <i>instance-id</i></div><div>(Optional) Displays the mesh group information for the specified IS-IS instance only.</div><div><ul style="list-style-type: none">The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command.</div></div> |
|--------------------|---|

| | |
|-----------------|---|
| Command Default | No instance ID specified displays the IS-IS mesh group information for all the IS-IS instances. |
|-----------------|---|

Command Modes

| Command History | <table><tr><th>Release</th><th>Modification</th></tr><tr><td>Release 7.0.12</td><td>This command was introduced.</td></tr></table> | Release | Modification | Release 7.0.12 | This command was introduced. |
|-----------------|--|---------|--------------|----------------|------------------------------|
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |

| | |
|------------------|--|
| Usage Guidelines | No specific guidelines impact the use of this command. |
|------------------|--|

| Task ID | <table><tr><th>Task ID</th><th>Operations</th></tr><tr><td>isis</td><td>read</td></tr></table> | Task ID | Operations | isis | read |
|---------|--|---------|------------|------|------|
| Task ID | Operations | | | | |
| isis | read | | | | |

Examples

The following is sample output from the **show isis mesh-group** command with the **instance** and *instance-id* values specified:

```
RP/0/# show isis instance isp mesh-group

ISIS isp Mesh Groups

Mesh group 6:
HundredGigE 0/4/0/1
```

This table describes the significant fields shown in the display.

Table 17: show isis instance isp mesh-group Field Descriptions

| Field | Description |
|------------------------|---|
| Mesh group | Mesh group number to which this interface is a member. A mesh group optimizes link-state packet (LSP) flooding in nonbroadcast multiaccess (NBMA) networks with highly meshed, point-to-point topologies. LSPs that are first received on interfaces that are part of a mesh group are flooded to all interfaces except those in the same mesh group. |
| GigabitEthernet0/4/0/1 | Interface belonging to mesh group 6. |

show isis mpls traffic-eng adjacency-log

To display a log of Multiprotocol Label Switching traffic engineering (MPLS TE) adjacency changes for an Intermediate System-to-Intermediate System (IS-IS) instance, use the **show isis mpls traffic-eng adjacency-log** command in .

show isis [**instance** *instance-id*] **mpls traffic-eng adjacency-log** [{**last** *number* | **first** *number*}]

Syntax Description

instance *instance-id* (Optional) Displays the MPLS TE adjacency changes for the specified IS-IS instance only.

- The *instance-id* argument is the instance identifier (alphanumeric) defined by the **router isis** command.

last *number* (Optional) Specifies that the output is restricted to last *number* of entries. Range is 1 to 20.

first *number* (Optional) Specifies that the output is restricted to first *number* of entries. Range is 1 to 20.

Command Default

No instance ID specified displays MPLS TE adjacency changes for all the IS-IS instances.

Command Modes

Command History

Release

Release 7.0.12

Modification

This command was introduced.

Usage Guidelines

Use the **show isis mpls traffic-eng adjacency-log** command to display the status of MPLS TE adjacencies.

Task ID

Task ID Operations

isis read

Examples

The following is sample output from the **show isis mpls traffic-eng adjacency-log** command with the **instance** and *instance-id* values specified:

```
RP/0/# show isis instance isp mpls traffic-eng adjacency-log

IS-IS isp Level-2 MPLS Traffic Engineering adjacency log
When      Neighbor ID      IP Address      Interface Status
00:03:36  router-6         172.17.1.6     PO0/3/0/1 Up
00:03:36  router-6         172.17.1.6     PO0/3/0/1 Down
00:02:38  router-6         172.17.1.6     PO0/3/0/1 Up
```

This table describes the significant fields shown in the display.

Table 18: show isis instance isp mpls traffic-eng adjacency-log Field Descriptions

| Field | Description |
|-------------|---|
| When | Time (in hh:mm:ss) since the entry was recorded in the log. |
| Neighbor ID | Identification value of the neighbor. |
| IP Address | Neighbor IP Version 4 (IPv4) address. |
| Interface | Interface from which a neighbor is learned. |
| Status | Up (active) or Down (disconnected). |

Related Commands

| Command | Description |
|--|---|
| show isis mpls traffic-eng advertisements, on page 104 | Displays the last flooded record from MPLS traffic engineering. |

show isis mpls traffic-eng advertisements

To display the latest flooded record from Multiprotocol Label Switching traffic engineering (MPLS TE) for an Intermediate System-to-Intermediate System (IS-IS) instance, use the **show isis mpls traffic-eng advertisements** command in .

show isis [*instance instance-id*] **mpls traffic-eng advertisements**

| | |
|---------------------------|---|
| Syntax Description | instance <i>instance-id</i> (Optional) Displays the latest flooded record from MPLS TE for the specified IS-IS instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
|---------------------------|---|

| | |
|------------------------|---|
| Command Default | No instance ID specified displays the latest flooded record from MPLS TE for all the IS-IS instances. |
|------------------------|---|

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

| | |
|-------------------------|---|
| Usage Guidelines | Use the show isis mpls traffic-eng advertisements command to verify that MPLS TE is flooding its record and that the bandwidths are correct. |
|-------------------------|---|

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis mpls traffic-eng advertisements** command with the **instance** and *instance-id* values specified:

```
RP/0/# show isis instance isp mpls traffic-eng advertisements

ISIS isp Level-2 MPLS Traffic Engineering advertisements
  System ID: router-9
  Router ID: 172.18.0.9
  Link Count: 1
  Link[0]
    Neighbor System ID: router-gsr6 (P2P link)
    Interface IP address: 172.18.0.9
    Neighbor IP Address: 172.18.0.6
    Admin. Weight: 0
    Physical BW: 155520000 bits/sec
    Reservable BW global: 10000000 bits/sec
    Reservable BW sub: 0 bits/sec
    Global pool BW unreserved:
      [0]: 10000000 bits/sec, [1]: 10000000 bits/sec
      [2]: 10000000 bits/sec, [3]: 10000000 bits/sec
      [4]: 10000000 bits/sec, [5]: 10000000 bits/sec
```



```

[6]: 10000000 bits/sec, [7]: 10000000 bits/sec
Sub pool BW unreserved:
[0]: 0 bits/sec, [1]: 0 bits/sec
[2]: 0 bits/sec, [3]: 0 bits/sec
[4]: 0 bits/sec, [5]: 0 bits/sec
[6]: 0 bits/sec, [7]: 0 bits/sec
Affinity Bits: 0x00000000

```

This table describes the significant fields shown in the display.

Table 19: show isis instance isp mpls traffic-eng advertisements Field Descriptions

| Field | Description |
|---------------------------|--|
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or if the hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| Router ID | MPLS TE router ID. |
| Link Count | Number of links that MPLS TE advertised. |
| Neighbor System ID | System ID of a neighbor number in an area. The six bytes directly preceding the n-selector are the system ID. The system ID length is a fixed size and cannot be changed. The system ID must be unique throughout each area (Level 1) and throughout the backbone (Level 2). In an IS-IS routing domain, each router is represented by a 6-byte hexadecimal system ID. When network administrators maintain and troubleshoot networking devices, they must know the router name and corresponding system ID. |
| Interface IP address | IP address of the interface. |
| Neighbor IP Address | IP address of the neighbor. |
| Admin. Weight | Administrative weight associated with this link. |
| Physical BW | Link bandwidth capacity (in bits per second). |
| Reservable BW | Reservable bandwidth on this link. |
| Global pool BW unreserved | Unreserved bandwidth that is available in the global pool. |
| Sub pool BW unreserved | Amount of unreserved bandwidth that is available in the subpool. |
| Affinity Bits | Link attribute flags being flooded. Bits are MPLS-TE specific. |

Related Commands

| Command | Description |
|--|--|
| show isis mpls traffic-eng adjacency-log , on page 102 | Displays a log of MPLS TE adjacency changes for IS-IS. |

show isis mpls traffic-eng tunnel

To display Multiprotocol Label Switching traffic engineering (MPLS TE) tunnel information for an Intermediate System-to-Intermediate System (IS-IS) instance, use the **show isis mpls traffic-eng tunnel** command in .

show isis [**instance** *instance-id*] **mpls traffic-eng tunnel**

| | |
|---------------------------|---|
| Syntax Description | instance <i>instance-id</i> (Optional) Displays the MPLS TE tunnel information for the specified IS-IS instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
|---------------------------|---|

| | |
|------------------------|---|
| Command Default | No instance ID specified displays the MPLS TE tunnel information for all the IS-IS instances. |
|------------------------|---|

Command Modes

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Use the **show isis** command to find the current status of MPLS TE tunnels. Tunnels are used in IS-IS next-hop calculations.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis mpls traffic-eng tunnel** command:

```
RP/0/# show isis mpls traffic-eng tunnel

ISIS isp Level-2 MPLS Traffic Engineering tunnels
System Id      Tunnel Name    Bandwidth    Nexthop      Metric      Mode
router-6       tu0           100000       172.18.1.6   0           Relative
```

This table describes the significant fields shown in the display.

Table 20: show isis mpls traffic-eng tunnel Field Descriptions

| Field | Description |
|-----------|--|
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |

| Field | Description |
|-------------|--|
| Tunnel Name | Name of the MPLS TE tunnel interface. |
| Bandwidth | MPLS TE-specified tunnel bandwidth of the tunnel. |
| Nexthop | MPLS TE destination IP address of the tunnel. |
| Metric | MPLS TE metric of the tunnel. |
| Mode | MPLS TE metric mode of the tunnel. It can be relative or absolute. |

show isis neighbors

To display information about Intermediate System-to-Intermediate System (IS-IS) neighbors, use the **show isis neighbors** command in .

show isis [**instance** *instance-id*] **neighbors** [{*type interface-path-id* | **summary**}] [**detail**] [**systemid** *system-id*]

Syntax Description

| | |
|------------------------------------|---|
| instance <i>instance-id</i> | (Optional) Displays the IS-IS neighbor information for the specified IS-IS instance only. • The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| type | Interface type. For more information, use the question mark (?) online help function. |
| interface-path-id | Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function. |
| summary | (Optional) Displays neighbor status count for each level. |
| detail | (Optional) Displays additional details. |
| systemid <i>system-id</i> | (Optional) Displays the information for the specified neighbor only. |

Command Default

No instance ID specified displays neighbor information for all the IS-IS instances.
Both Level 1 and Level 2 are configured if no level is specified.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

| Task ID | Operations |
|---------|------------|
| isis | read |

Examples

The following is sample output from the **show isis neighbors** command with the **instance** and *instance-id* values specified:

```

Total neighbor count: 3
RP/0/RSP0RP0/CPU0:router# show isis instance isp neighbors detail

IS-IS isp neighbors:
System Id      Interface      SNPA          State Holdtime Type IETF-NSF
e222e          Gi0/1/0/0      *PtoP*        Up    23      L1    Capable
  Area Address(es): 00
  IPv4 Address(es): 10.1.0.45*
  IPv6 Address(es): fe80::212:daff:fe6b:68a8*
  Topologies: 'IPv4 Unicast' 'IPv6 Unicast'
  Uptime: 01:09:44
  IPFRR: LFA Neighbor: elise
    LFA IPv4 address: 10.100.1.2
    LFA Router address: 192.168.0.45
e333e LFA Interface: Gi0/1/0/0.1      0012.da6b.68a8 Up    8      L1    Capable 1
e333e          Gi0/1/0/0.1      0012.da6b.68a8 Up    8      L1    Capable
  Area Address(es): 00
  IPv4 Address(es): 10.100.1.2*
  Topologies: 'IPv4 Unicast'
  Uptime: 01:09:46
  IPFRR: LFA Neighbor: elise
    LFA IPv4 address: 10.1.0.45
    LFA Router address: 192.168.0.45
    LFA Interface: Gi0/1/0/0
m44i          Gi0/1/0/1      0012.da62.e0a8 Up    7      L1    Capable
  Area Address(es): 00 11
  IPv4 Address(es): 10.1.2.47*
  IPv6 Address(es): fe80::212:daff:fe62:e0a8*
  Topologies: 'IPv4 Unicast' 'IPv6 Unicast'
  Uptime: 01:09:33

Total neighbor count: 3

```

This table describes the significant fields shown in the display.

Table 21: show isis instance isp neighbors Field Descriptions

| Field | Description |
|------------------|--|
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| Interface | Interface through which the neighbor is reachable. |
| SNPA | Data-link address (also known as the Subnetwork Point of Attachment [SNPA]) of the neighbor. |
| State | Adjacency state of the neighboring interface. Valid states are: Down, Init, and Up. |
| Holdtime | Hold time of the neighbor. |
| Type | Type of adjacency. |
| IETF-NSF | Specifies whether the neighbor can adhere to the IETF-NSF restart mechanism. Valid states are Capable and Unable. |
| Area Address(es) | Number of area addresses on this router. |

| Field | Description |
|---------------------|--|
| IPv4 Address(es) | IPv4 addresses configured on this router. |
| Topologies | Address and subaddress families for which IS-IS is configured. |
| Uptime | Time (in hh:mm:ss) that the neighbor has been up. |
| IPFRR: LFA Neighbor | IP fast reroute (IPFRR) loop-free alternate (LFA) neighbor. |
| LFA IPv4 address: | Address of the LFA. |
| LFA Interface: | LFA interface. |

The following is sample output from the **show isis neighbors** command with the **summary** keyword specified:

```
RP/0/# show isis instance isp neighbors summary

ISIS isp neighbor summary:
  State      L1      L2      L1L2
  Up         0        0        2
  Init       0        0        0
  Failed     0        0        0
```

This table describes the significant fields shown in the display.

Table 22: show isis neighbors summary Field Descriptions

| Field | Description |
|-------|--|
| State | State of the neighbor is up, initialized, or failed. |
| L1 | Number of Level 1 neighbors. |
| L2 | Number of Level 2 neighbors. |
| L1L2 | Number of Level 1 and 2 neighbors. |

show isis protocol

To display summary information about an Intermediate System-to-Intermediate System (IS-IS) instance, use the **show isis protocol** command in .

show isis [**instance** *instance-id*] **protocol**

| Syntax Description | instance <i>instance-id</i> (Optional) Displays the IS-IS adjacencies for the specified IS-IS instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. | | | | |
|---------------------------|--|---------|--------------|----------------|------------------------------|
| Command Default | No instance ID specified displays IS-IS adjacencies for all the IS-IS instances. | | | | |
| Command Modes | | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | No specific guidelines impact the use of this command. | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read</td></tr> </table> | Task ID | Operations | isis | read |
| Task ID | Operations | | | | |
| isis | read | | | | |

Examples

The following is sample output from the **show isis protocol** command:

```
RP/0/# show isis protocol

IS-IS Router: isp
System Id: 0001.0000.0011
IS Levels: level-1-2
Manual area address(es):
    49

Routing for area address(es):
    49
Non-stop forwarding: Cisco Proprietary NSF Restart enabled
Process startup mode: Cold Restart
Topologies supported by IS-IS:
    IPv4 Unicast
        Level-1 iSPF status: Dormant (awaiting initial convergence)
        Level-2 iSPF status: Dormant (awaiting initial convergence)
        No protocols redistributed
        Distance: 115
Interfaces supported by IS-IS:
    Loopback0 is running passively (passive in configuration)
    GigabitEthernet 0/4/0/1 is running actively (active in configuration)
    GigabitEthernet 0/5/0/1 is running actively (active in configuration)
```

This table describes the significant fields shown in the display.

Table 23: show isis protocol Field Descriptions

| Field | Description |
|-----------------------------|---|
| System ID: | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| IS Levels: | IS-IS level of the router. |
| Manual area address(es) | Area addresses that are manually configured. |
| Routing for areaaddress(es) | Area addresses for which this router provides the routing. |
| Non-stop forwarding: | Status and name of nonstop forwarding (NSF). |
| Process startup mode: | Mode in which the last process startup occurred. Valid modes are: <ul style="list-style-type: none"> • Cisco Proprietary NSF Restart • IETF NSF Restart • Cold Restart |
| iSPF status: | State of incremental shortest path first (iSPF) configuration for this IS-IS instance. Four states exist: Disabled if iSPF has not been configured but is awaiting a full SPF to compile the topology for use by the iSPF algorithm. Dormant if iSPF has been configured but is awaiting initial convergence before initializing. Awake if iSPF has been configured but is awaiting a full SPF to compile the topology for use by the iSPF algorithm. Active if IS-IS is ready to consider using the iSPF algorithm whenever a new route calculation needs to be run. |
| No protocols redistributed: | No redistributed protocol information exists to be displayed. |
| Distance: | Administrative distance for this protocol. |

show isis route

To display IP reachability information for an Intermediate System-to-Intermediate System (IS-IS) instance, use the **show isis route** command in .

```
show isis [instance instance-id] [{ipv4|ipv6|afi-all}] [{unicast|multicast [topology {alltopo-name}]  
|safi-all}] route [{ip-address mask|ip-address/length [longer-prefixes]}] [summary] [multicast-intact]  
[backup] [detail] [sr-only]
```

| Syntax | Description |
|------------------------------------|--|
| instance <i>instance-id</i> | (Optional) Displays the IP reachability information for the specified IS-IS instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| ipv4 | (Optional) Specifies IP Version 4 address prefixes. |
| ipv6 | (Optional) Specifies IP Version 6 address prefixes. |
| afi-all | (Optional) Specifies all address prefixes. |
| unicast | (Optional) Specifies unicast address prefixes. |
| multicast | (Optional) Specifies multicast address prefixes. |
| topology | (Optional) Specifies IS-IS paths to intermediate systems. |
| all | (Optional) Specifies all topologies. |
| topology <i>topo-name</i> | (Optional) Specifies topology table information and name of the topology table. |
| safi-all | (Optional) Specifies all secondary address prefixes. |
| <i>ip-address</i> | (Optional) Network IP address about which routing information should be displayed. |
| <i>mask</i> | (Optional) Network mask specified in either of two ways: <ul style="list-style-type: none"> Network mask can be a four-part, dotted decimal address. For example, 255.0.0.0 indicates that each bit equal to 1 means the corresponding address bit is a network address. Network mask can be indicated as a slash (/) and number. For example, /8 indicates that the first 8 bits of the mask are ones, and the corresponding bits of the address are the network address. |
| <i>/ length</i> | (Optional) Length of the IP prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value. Range is 0 to 32. |
| longer-prefixes | (Optional) Displays route and more-specific routes. |
| summary | (Optional) Displays topology summary information. |

| | |
|-------------------------|--|
| multicast-intact | (Optional) Displays multicast intact information for this entry. |
| systemid | (Optional) Displays multicast information by system ID. |
| backup | (Optional) Displays backup information for this entry. |
| detail | (Optional) Displays link-state packet (LSP) details. |
| sr-only | (Optional) Displays SR-labeled prefixes only. |

Command Default No instance ID specified displays the IP reachability information for all the IS-IS instances.

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines No specific guidelines impact the use of this command.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis route** command:

```
RP/0/RSP0RP0/CPU0:router# show isis route

IS-IS isp IPv4 Unicast routes
Codes: L1 - level 1, L2 - level 2, ia - interarea (leaked into level 1)
df - level 1 default (closest attached router), su - summary null
C - connected, S - static, R - RIP, B - BGP, O - OSPF
i - IS-IS (redistributed from another instance)

Maximum parallel path count: 8

L2 10.76.240.6/32 [4/115]
via 10.76.245.252, SRP0/1/0/2, isp2
via 10.76.246.252, SRP0/1/0/0, isp2
C 10.76.240.7/32
is directly connected, Loopback0
L2 10.76.240.9/32 [256/115]
via 10.76.249.2, HundredGigE 0/3/0/0, isp3
L2 10.76.240.10/32 [296/115]
via 10.76.249.2, HundredGigE 0/3/0/0, isp3
C 10.76.245.0/24
is directly connected, SRP0/1/0/2
C 10.76.246.0/24
is directly connected, SRP0/1/0/0
C 10.76.249.0/26
is directly connected, HundredGigE 0/3/0/0
L2 10.101.10.0/24 [296/115]
via 10.76.249.2, HundredGigE 0/3/0/0, isp3
```

This table describes the significant fields shown in the display.

Table 24: show isis route ipv4 unicast Field Descriptions

| Field | Description |
|-----------------------|--|
| C172.18.0.0/24 | Connected route for HundredGigE interface 0/5/0/0. |
| C 172.19.1.0/24 | Connected route for HundredGigE interface 0/4/0/1. |
| L1 172.35.0.0/24 [10] | Level 1 route to network 172.35.0.0/24. |
| C 172.18.0/24 | Connected route for loopback interface 0. |

This is sample output from the **show isis route** command with **detail** keyword that shows prefix segment ID (SID) and Segment Routing Global Block (SRGB) values:

```
Sun May  4 13:05:11.073 PDT

L2 172.16.255.2/32 [10/115] medium priority
    via 172.16.2.2, HundredGigE 0/0/0/1, pe2 tag 255, SRGB Base: 16000, Weight: 0
    src pe2.00-00, 172.16.255.2, tag 255, prefix-SID index 42, R:0 N:0 P:0
    L1 adv [10] native, propagated, interarea, tag 255, prefix-SID index 42, R:0
    N:0 P:0
```

This is sample output from the **show isis route** command with **sr-only** keyword that shows only routes associated with a segment routing prefix SID:

```
RP/0/RP0/CPU0:router# show isis route sr-only

IS-IS 1 IPv4 Unicast routes

Codes: L1 - level 1, L2 - level 2, ia - interarea (leaked into level 1)
       df - level 1 default (closest attached router), su - summary null
       C - connected, S - static, R - RIP, B - BGP, O - OSPF
       A - access/subscriber, M - mobile, a - application
       i - IS-IS (redistributed from another instance)

Maximum parallel path count: 8

C 20.1.0.100/32
    is directly connected, Loopback0
L2 20.1.0.101/32 [10/115]
    via 10.1.1.101, GigabitEthernet0/0/0/2, r101, SRGB Base: 16000, Weight: 0
L2 20.1.0.102/32 [30/115]
    via 10.1.1.101, GigabitEthernet0/0/0/2, r101, SRGB Base: 16000, Weight: 0
L2 20.1.0.103/32 [20/115]
    via 10.4.1.103, GigabitEthernet0/0/0/1, r103, SRGB Base: 16000, Weight: 0
```

show isis spf-log

To display how often and why the router has run a full shortest path first (SPF) calculation, use the **show isis spf-log** command in .

```
show isis [instance instance-id] [{ipv4 | ipv6 | afi-all}] [{unicast | multicast [topology {all | topo-name}] | safi-all}] spf-log [level {1 | 2}] [{ispf | fspf | prc | nhc}] [{detail | verbose | plfrr | ppfrr}] [{last number | first number}]
```

| Syntax Description | | |
|---|------------|--|
| instance <i>instance-id</i> | (Optional) | Displays the IS-IS SPF log for the specified IS-IS instance only. |
| ipv4 | (Optional) | Specifies IP Version 4 address prefixes. |
| ipv6 | (Optional) | Specifies IP Version 6 address prefixes. |
| afi-all | (Optional) | Specifies all address prefixes. |
| unicast | (Optional) | Specifies unicast address prefixes. |
| multicast | (Optional) | Specifies multicast address prefixes. |
| topology all <i>topo-name</i> | (Optional) | Specifies topology table information for all topologies or for the specified topology table (<i>topo-name</i>). |
| safi-all | (Optional) | Specifies all secondary address prefixes. |
| level { 1 2 } | (Optional) | Displays the IS-IS SPF log for Level 1 or Level 2 independently. |
| ispf | (Optional) | Specifies incremental SPF entries only. |
| fspf | (Optional) | Specifies full SPF entries only. |
| prc | (Optional) | Specifies partial route calculations only. |
| nhc | (Optional) | Specifies next-hop route calculations only. |
| plfrr | (Optional) | Specifies per link fast-reroute calculations only. |
| ppfrr | (Optional) | Specifies per prefix fast-reroute calculations only. |
| detail | (Optional) | Specifies detailed output. Includes a breakdown of the time taken to perform the calculation and changes resulting from the calculation. |
| verbose | (Optional) | Specifies verbose output. |
| last <i>number</i> | (Optional) | Specifies that the output is restricted to the last <i>number</i> of entries. Range is 1 to 210. |
| first <i>number</i> | (Optional) | Specifies that the output is restricted to the first <i>number</i> of entries. Range is 1 to 210. |

Command Default No instance ID specified displays IS-IS adjacencies for all the IS-IS instances.

Both Level 1 and Level 2 are configured if no level is specified.

Displays all types of route calculation (not just fspf, ispf and prc).

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

| Task ID | Operations |
|---------|------------|
| isis | read |

Examples

The following is sample output from the **show isis spf-log** command:

```
RP/0/# show isis spf-log

IS-IS 1 Level 1 IPv4 Unicast Route Calculation Log
      Time  Total Trig
Timestamp  Type (ms)  Nodes Count First Trigger LSP Triggers
-----
--- Thurs Aug 19 2004 ---
12:00:50.787 FSPF 1    1    3  ensoft-grs7.00-00 LSPHEADER TLVCODE
12:00:52.846 FSPF 1    1    1  ensoft-grs7.00-00 LSPHEADER
12:00:56.049 FSPF 1    1    1  ensoft-grs7.00-00 TLVCODE
12:01:02.620 FSPF 1    1    2  ensoft-grs7.00-00 NEWADJ LINKTLV

IS-IS 1 Level 1 IPv4 Unicast Route Calculation Log
      Time  Total Trig
Timestamp  Type (ms)  Nodes Count First Trigger LSP Triggers
-----
--- Mon Aug 19 2004 ---
12:00:50.790 FSPF 0    1    4  ensoft-grs7.00-00 LSPHEADER TLVCODE
12:00:54.043 FSPF 1    1    2  ensoft-grs7.00-00 NEWADJ LSPHEADER
12:00:55.922 FSPF 1    2    1  ensoft-grs7.00-00 NEWLSPO
12:00:56.724 FSPF 1   13    1  ensoft-grs7.00-00 NEWLSPO
```

This table describes the significant fields shown in the display.

Table 25: show isis spf-log ipv4 unicast Field Descriptions

| Field | Description |
|-----------|---|
| Level | IS-IS level of the router. |
| Timestamp | Time when the SPF calculation started. |
| Duration | Number of milliseconds taken to complete this SPF run. Elapsed time is wall clock time, not CPU time. |

| Field | Description |
|-------------------|---|
| Nodes | Number of routers and pseudonodes (LANs) that make up the topology calculated in this SPF run. |
| Trig Count | Number of events that triggered this SPF run. When there is a topology change, often multiple link-state packets (LSPs) are received in a short time. Depending on the configuration of the spf-interval command, a router may wait for a fixed period of time before running a router calculation. This count denotes the number of triggering events that occurred while the router was waiting to run the calculation. For a full description of the triggering events, see <i>List of Triggers</i> . |
| First Trigger LSP | LSP ID stored by the router whenever a full SPF calculation is triggered by the arrival of a new LSP. The LSP ID can suggest the source of routing instability in an area. If multiple LSPs are causing an SPF run, only the LSP ID of the first received LSP is remembered. |
| Triggers | List of all reasons that triggered a full SPF calculation. For a list of possible triggers, see <i>List of Triggers</i> . |

This table lists triggers of a full SPF calculation.

Table 26: List of Triggers

| Trigger | Description |
|---------------|---|
| PERIODIC | Runs a full SPF calculation every 15 minutes. |
| NEWLEVEL | Configured new level (using is-type) on this router. |
| RTCLEARED | Cleared IS-IS topology on the router. |
| MAXPATHCHANGE | Changed IP maximum parallel path. |
| NEWMETRIC | Changed link metric. |
| ATTACHFLAG | Changed Level 2 Attach bit. |
| ADMINDIST | Configured another administrative distance for the IS-IS instance on this router. |
| NEWADJ | Created a new adjacency to another router. |
| DELADJ | Deleted adjacency. |
| BACKUP | Installed backup route. |
| SEEDISPF | Seed incremental SPF. |
| NEXTHOP | Changed IP next-hop address. |
| NEWLSP0 | New LSP 0 appeared in the topology. |
| LSPEXPIRED | Some LSP in the link-state database (LSDB) has expired. |
| LSPHEADER | Changed important LSP header fields. |

| Trigger | Description |
|------------|--|
| TLVCODE | Type, length, and value (TLV) objects code mismatch, indicating that different TLV objects are included in the newest version of an LSP. |
| LINKTV | Changed Link TLV content. |
| PREFIXTLV | Changed Prefix TLV content. |
| AREAADDRTL | Changed Area address TLV content. |
| IP ADDRTL | Changed IP address TLV content. |
| TUNNEL | Changed RRR tunnel. |

The following is sample output from the **show isis spf-log** command with the **first** keyword specified:

```
RP/0/RP0/CPU0:router# show isis spf-log first 2

IISIS isp Level 1 IPv4 Unicast Route Calculation Log
      Time  Total Trig
Timestamp  Type (ms)  Nodes Count First Trigger LSP  Triggers
Mon Aug 16 2004
19:25:35.140 FSPF 1    1    1          12a5.00-00 NEWLSP0
19:25:35.646 FSPF 1    1    1          12a5.00-00 NEWADJ

IISIS isp Level 2 IPv4 Unicast Route Calculation Log
      Time  Total Trig
Timestamp  Type (ms)  Nodes Count First Trigger LSP  Triggers
Mon Aug 16 2004
19:25:35.139 FSPF 1    1    1          12a5.00-00 NEWLSP0
19:25:35.347 FSPF 1    1    2          12a5.00-00 NEWSADJ TLVCODE
```

This table describes the significant fields shown in the display.

Table 27: show isis spf-log first Field Descriptions

| Field | Description |
|-----------|--|
| Level | IS-IS level of the router. |
| Timestamp | Time at which the SPF calculation started. |
| Type | Type of route calculation. The possible types are incremental SPF (iSPF), full SPF (FSPF), or partial route calculation (PRC). |
| Time (ms) | Number of milliseconds taken to complete this SPF run. Elapsed time is wall clock time, not CPU time. |
| Nodes | Number of routers and pseudonodes (LANs) that make up the topology calculated in this SPF run. |

| Field | Description |
|-------------------|---|
| Trig Count | Number of events that triggered this SPF run. When there is a topology change, often multiple link-state packets (LSPs) are received in a short time. Depending on the configuration of the spf-interval command, a router may wait for a fixed period of time before running a router calculation. This count denotes the number of triggering events that occurred while the router was waiting to run the calculation. For a full description of the triggering events, see <i>List of Triggers</i> . |
| First Trigger LSP | LSP ID stored by the router whenever a full SPF calculation is triggered by the arrival of a new LSP. The LSP ID can suggest the source of routing instability in an area. If multiple LSPs are causing an SPF run, only the LSP ID of the first received LSP is remembered. |
| Triggers | List of all reasons that triggered a full SPF calculation. For a list of possible triggers, see <i>List of Triggers</i> . |

The following is sample output from the **show isis spf-log** command with the **detail** keyword specified:

```
RP/0/RP0/CPU0:router# show isis spf-log detail

IISIS isp Level 1 IPv4 Unicast Route Calculation Log
      Time      Total Trig
Timestamp  Type (ms)  Nodes Count First Trigger LSP  Triggers
Mon Aug 16 2004
19:25:35.140 FSPF 1    1    1          12a5.00-00 NEWLSP0
Delay:          51ms (since first trigger)
SPT Calculation
  CPU Time:      0ms
  Real Time:     0ms
Prefix Updates
  CPU Time:      1ms
  Real Time:     1ms
New LSP Arrivals: 0
Next Wait Interval: 200ms

Results
      Reach Unreach Total
Nodes:      1      0      1
Prefixes (Items)
  Critical Priority: 0      0      0
  High Priority:    0      0      0
  Medium Priority   0      0      0
  Low Priority      0      0      0
All Priorities    0      0      0
Prefixes (Routes)
  Critical Priority: 0      -      0
  High Priority:    0      -      0
  Medium Priority   0      -      0
  Low Priority:    0      -      0
All Priorities    0      -      0
```


This table describes the significant fields shown in the display.

Table 28: show isis spf-log detail Field Descriptions

| Field | Description |
|-------------------|---|
| Level | IS-IS level of the router. |
| Timestamp | Time at which the SPF calculation started. |
| Type | Type of route calculation. The possible types are incremental SPF (iSPF), full SPF (FSPF), or partial route calculation (PRC). |
| Time (ms) | Number of milliseconds taken to complete this SPF run. Elapsed time is wall clock time, not CPU time. |
| Nodes | Number of routers and pseudonodes (LANs) that make up the topology calculated in this SPF run. |
| Trig Count | Number of events that triggered this SPF run. When there is a topology change, often multiple link-state packets (LSPs) are received in a short time. Depending on the configuration of the spf-interval command, a router may wait for a fixed period of time before running a router calculation. This count denotes the number of triggering events that occurred while the router was waiting to run the calculation. For a full description of the triggering events, see <i>List of Triggers</i> . |
| First Trigger LSP | LSP ID stored by the router whenever a full SPF calculation is triggered by the arrival of a new LSP. The LSP ID can suggest the source of routing instability in an area. If multiple LSPs are causing an SPF run, only the LSP ID of the first received LSP is remembered. |
| Triggers | List of all reasons that triggered a full SPF calculation. For a list of possible triggers, see <i>List of Triggers</i> . |
| Delay | Two different delays exist: <ol style="list-style-type: none"> 1. The delay between the time when the route calculation was first triggered and the time when it was run. 2. The delay between the end of the last route calculation and the start of this one. This is used to verify that the SPF-interval timers are working correctly, and is only reported for calculations after the first delay. |
| CPU Time | Two different CPU times exist: <ol style="list-style-type: none"> 1. CPU time (in milliseconds) taken to calculate the shortest path tree (SPT). 2. CPU time (in milliseconds) taken to perform the prefix updates. |
| Real Time | Two different real times exist: <ol style="list-style-type: none"> 1. Real time (in milliseconds) taken to calculate the shortest path tree (SPT). 2. Real time (in milliseconds) taken to perform the prefix updates. |

| Field | Description |
|--------------------|---|
| New LSP Arrivals | Number of LSP arrivals since the start of this route calculation. |
| Next Wait Interval | Enforced delay until the next route calculation can be run, based on the spf-interval command configuration. |
| Reach | Number of reachable nodes or prefixes. |
| Unreach | Number of unreachable nodes or prefixes. |
| Total | Total number of nodes or prefixes at various priorities. |

show isis statistics

To display Intermediate System-to-Intermediate System (IS-IS) traffic counters, use the **show isis statistics** command in .

show isis [**instance** *instance-id*] **statistics** [*type interface-path-id*]

| Syntax Description | instance <i>instance-id</i> (Optional) Displays the IS-IS traffic statistics for the specified IS-IS instance only. <ul style="list-style-type: none">The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
|--------------------------|---|
| <i>type</i> | Interface type. For more information, use the question mark (?) online help function. |
| <i>interface-path-id</i> | Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function. |

Command Default No instance ID specified displays IS-IS traffic statistics for all the IS-IS instances.
IS-IS traffic statistics are displayed for all interfaces.

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines The **show isis statistics** command displays IS-IS traffic counters for the specified interface or all traffic counters if no interface is specified.

| Task ID | Task ID | Operations |
|---------|---------|------------|
| | isis | read |

Examples

The following is sample output from the **show isis statistics** command that shows all traffic counters:

```
RP/0/#show isis statistics
IS-IS isp statistics:
  Fast PSNP cache (hits/tries): 164115/301454
  Fast CSNP cache (hits/tries): 41828/43302
  Fast CSNP cache updates: 2750
  LSP checksum errors received: 0
  LSP Dropped: 1441
  SNP Dropped: 1958
  UPD Max Queue size: 2431
```

show isis statistics

```

Average transmit times and rate:
Hello:      0 s,      987947 ns,      4/s
CSNP:       0 s,     1452987 ns,      0/s
PSNP:       0 s,     1331690 ns,      0/s
LSP:        0 s,     1530018 ns,      1/s
Average process times and rate:
Hello:      0 s,      874584 ns,      41/s
CSNP:       0 s,      917925 ns,      29/s
PSNP:       0 s,     1405458 ns,      0/s
LSP:        0 s,     4352850 ns,      0/s
Level-1:
LSPs sourced (new/refresh): 3376/2754
Level-1::LSPs sourced (new/refresh)SPF calculations      : 3376/2754520   ISPF
calculations      IPv4 Unicast: OSPF calculations Next Hop Calculations      :
5200ISPF calculations      Partial Route Calculations : 0
      NextIPFRR R-hop Calculations      SPF calculations      : 0
      Partial Route Calculations IPFRR Parallel calculations: 0
IPv6 Unicast
      SPF calculations      : 527
      ISPF calculations      : 0
      Next Hop Calculations : 13
      Partial Route Calculations : 1
Level-2:
LSPs sourced (new/refresh): 4255/3332
IPv4 Unicast
      SPF calculations      : 432
      ISPF calculations      : 0
      Next Hop Calculations : 8
      LSPs sourced (new/refresh)Partial Route Calculations: 4255/33320LSPs sourced
(new/refresh)IPFRR R-SPF calculations      : 4255/33320
      IPFRR Parallel calculations: 0
IPv4 IPv6 Unicast
      SPF calculations      : 432444
      ISPF calculations      : 0
      Next-hop Next Hop Calculations      : 882
      Partial Route Calculations : 01      Interface GigabitEthernet0/1/0/1.1:
Level-1 Hellos (sent/rcvd): 22398/25633
Level-1 DR Elections      : 66
Level-1 LSPs (sent/rcvd)  : 246/7077
Level-1 CSNPs (sent/rcvd) : 0/33269
Level-1 PSNPs (sent/rcvd) : 22/0
Level-1 LSP Flooding Duplicates : 25129
Level-2 Hellos (sent/rcvd): 22393/67043
Level-2 DR Elections      : 55
Level-2 LSPs (sent/rcvd)  : 265/437
Level-2 CSNPs (sent/rcvd) : 0/86750
Level-2 PSNPs (sent/rcvd) : 0/0
Level-2 LSP Flooding Duplicates : 78690

```

This table describes the significant fields shown in the display.

Table 29: show isis statistics Field Descriptions

| Field | Description |
|------------------------------|--|
| Fast PSNP cache (hits/tries) | Number of successful lookups (hits) along with the number of lookup attempts (tries). To save time or processing power when receiving multiple copies of the same LSP, IS-IS attempts to look up incoming LSPs to see if they have been received recently. |

| Field | Description |
|--|--|
| Fast CSNP cache (hits/tries): | Number of successful lookups (hits) along with the number of lookup attempts (tries). To reduce CSNP construction time, IS-IS maintains a cache of CSNPs and attempts to look up CSNP in this cache before transmission on the interface. |
| Fast CSNP cache updates: | Number of times the CSNP cache has been updated since the last clearing of statistics. The cache is updated on LSP addition or removal from the database. |
| LSP checksum errors received: | Number of internal checksum errors received in LSPs. |
| IIH (LSP/SNP) dropped: | Number of hello, LSP, and SNP messages dropped. |
| IIH (UPD) Max Queue size: | Maximum number of queued packets. |
| Average transmit times and rate: | Average time taken to transmit the pdu type across all interfaces and the corresponding rate at which the pdu type is being transmitted. |
| Average process times and rate: | Average time taken to process an incoming pdu type across all interfaces and the corresponding rate at which the pdu type is being received. |
| LSPs sourced (new/refresh): | Number of LSPs this IS-IS instance has created or refreshed. To find more details on these LSPs, use the show isis lsp-log command. |
| SPF calculations: | Number of shortest path first (SPF) calculations. SPF calculations are performed only when the topology changes. They are not performed when external routes change. The interval at which SPF calculations are performed is configured using the spf-interval command. |
| iSPF calculations: | Number of incremental shortest path first (iSPF) calculations. iSPF calculations are performed only when iSPF has been configured in the isis address family configuration submenu. |
| Partial Route Calculations: | Number of partial route calculations (PRCs). PRCs are processor intensive. Therefore, it may be useful to limit their number, especially how often a PRC is done, especially on slower networking devices. Increasing the PRC interval reduces the processor load on the router, but might slow the rate of convergence. The interval at which PRC calculations are performed is configured using the spf-interval command. |
| Level-(1/2) (LSPs/CSNPs/PSNPs/Hellos) (sent/rcvd): | Number of LSPs, Complete Sequence Number Packets (CSNPs), Partial Sequence Number Packets (PSNPs), and hello packets sent or received on this interface. |
| PTP Hellos (sent/rcvd): | Point-to-point (PTP) hellos sent and received. |
| LSP Retransmissions: | Total number of retransmissions on each IS-IS LSP on a point-to-point interface. The LSP retransmission interval can be configured using the retransmit-throttle-interval command. |
| Level-(1.2) DRElections: | Total number of Designated Intermediate System elections that have taken place. These counts are maintained on an individual level basis. |

| Field | Description |
|--------------------------|---|
| LSP Flooding Duplicates: | Number of duplicate LSPs filtered from flooding to the neighbor. In case of parallel interfaces to the same neighbor, IS-IS optimizes the flooding by avoiding sending the same LSP copy on other interfaces. |

show isis topology

To display a list of connected Intermediate System-to-Intermediate System (IS-IS) routers in all areas, use the **show isis topology** command in .

```
show isis [instance instance-id] [{ipv4 | ipv6 | afi-all}] [{unicast | multicast [topology {all | topo-name}] | safi-all}] [summary | level {1 | 2} [multicast-intact] [systemid system-id] [detail]
```

| Syntax Description | |
|------------------------------------|--|
| instance <i>instance-id</i> | (Optional) Displays the IS-IS topology for the specified IS-IS instance only. <ul style="list-style-type: none"> The <i>instance-id</i> argument is the instance identifier (alphanumeric) defined by the router isis command. |
| ipv4 | (Optional) Specifies IP Version 4 address prefixes. |
| ipv6 | (Optional) Specifies IP Version 6 address prefixes. |
| afi-all | (Optional) Specifies all address prefixes. |
| unicast | (Optional) Specifies unicast address prefixes. |
| multicast | (Optional) Specifies multicast address prefixes. |
| topology <i>topo-name</i> | (Optional) Specifies topology table information and name of the topology table. |
| safi-all | (Optional) Specifies all secondary address prefixes. |
| summary | (Optional) Displays a brief list of the IS-IS topology. |
| level { 1 2 } | (Optional) Displays the IS-IS link-state topology for Level 1 or Level 2 independently. |
| multicast-intact | (Optional) Displays multicast intact information on the IS-IS topology. |
| systemid <i>system-id</i> | (Optional) Displays the information for the specified router only. |
| detail | (Optional) Displays detailed information on the IS-IS topology. |

Command Default No instance ID specified displays a list of connected routers in all areas for all the IS-IS instances. Both Level 1 and Level 2 is configured if no level is specified.

Command Modes

| Command History | Release | Modification |
|-----------------|----------------|------------------------------|
| | Release 7.0.12 | This command was introduced. |

Usage Guidelines Use the **show isis topology** command to verify the presence and connectivity among all routers in all areas.

Task ID

Task ID Operations

isis read

Examples

The following is sample output from the **show isis topology** command:

```
RP/0/# show isis topology

IS-IS isp paths to (Level-1) routers
System Id      Metric  Next-hop Interface  SNPA
ensoft-5       10      ensoft-5   PO0/4/0/1        *PtoP*
ensoft-5       10      ensoft-5   Gi0/5/0/0        0003.6cff.0680
ensoft-11      --

IS-IS isp paths to (Level-2) routers
System Id      Metric  Next-hop Interface  SNPA
ensoft-5       10      ensoft-5   PO0/4/0/1        *PtoP*
ensoft-5       10      ensoft-5   Gi0/5/0/0        0003.6cff.0680
ensoft-11      --
```

This table describes the significant fields shown in the display.

Table 30: show isis topology ipv4 unicast Field Descriptions

| Field | Description |
|-----------|--|
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| Metric | Metric assigned to the link and used to calculate the cost from each router using the links in the network to other destinations. Range is 1 to 16777214. Default is 1 to 63 for narrow metric and 1 to 16777214 for wide metric. 0 is set internally if no metric has been specified by the user. |
| Next-hop | Address of the next-hop. |
| Interface | Interface used to reach the neighbor. |
| SNPA | Data-link address (also known as the Subnetwork Point of Attachment [SNPA]) of the neighbor. |

The following is sample output from the **show isis topology** command with the **summary** keyword specified:

```
RP/0/# show isis topology summary

IS-IS 10 IS Topology Summary IPv4 Unicast
              L1                      L2
              Reach UnReach Total    Reach UnReach Total
              -----
Router nodes:    1      1      2      1      1      2
Pseudo nodes:    0      0      0      0      0      0

Total nodes:     1      1      2      1      1      2
```


This table describes the significant fields shown in the display.

Table 31: show isis topology summary Field Descriptions

| Field | Description |
|---------|---|
| L1/L2 | IS-IS level of the router. |
| Reach | Number of router nodes or pseudonodes that are reachable. |
| UnReach | Number of router nodes or pseudonodes that are unreachable. |
| Total | Total number of reachable and unreachable nodes. |

show protocols (IS-IS)

To group a number of protocol show commands according to the specified address family, use the **show protocols** command in .

show protocols [{**afi-all** | **ipv4** | **ipv6**}] [{**allprotocol**}]

Syntax Description

afi-all (Optional) Specifies all address families.

ipv4 (Optional) Specifies an IPv4 address family.

ipv6 (Optional) Specifies an IPv6 address family.

all (Optional) Specifies all protocols for a given address family.

protocol (Optional) Specifies a routing protocol. For the IPv4 address family, the options are:

- **bgp**
- **isis**
- **ospf**
- **rip**

For the IPv6 address family, the options are:

- **bgp**
- **isis**
- **ospfv3**

Command Default

If no address family is specified, the default is IPv4.

Command Modes

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

If IPv6 is enabled on an IS-IS instance, the instance is displayed in the **show protocols ipv6** command output. IPv4 IS-IS instances are displayed in the **show protocols ipv4** command output.

When using the **show protocols** command with the **ipv6** or **ipv4** keyword, you get all routing instances in that particular address family—not only IS-IS instances.

Task ID

| Task ID | Operations |
|---------|------------|
| isis | read |

| Task ID | Operations |
|---------|------------|
| rib | read |

Examples

The following example shows the output for the **show protocols** command :

```
RP/0/# show protocols ipv4

IS-IS Router: uut
System Id: 0000.0000.12a8
IS Levels: level-1-2
Manual area address(es):
  49.1515.1515
Routing for area address(es):
  49.1515.1515
Non-stop forwarding: Disabled
Most recent startup mode: Cold Restart
Topologies supported by IS-IS:
  IPv4 Unicast
    Level-1
      Metric style (generate/accept): Narrow/Narrow
      ISPF status: Disabled
    Level-2
      Metric style (generate/accept): Narrow/Narrow
      ISPF status: Disabled
  Redistributing:
    static
    Distance: 115
  IPv6 Unicast
    Level-1
      ISPF status: Disabled
    Level-2
      ISPF status: Disabled
    No protocols redistributed
    Distance: 45
Interfaces supported by IS-IS:
  GigabitEthernet 0/6/0/0 is running actively (active in configuration)
```

This table describes the significant fields shown in the display.

Table 32: show protocols ipv4 Field Descriptions

| Field | Description |
|------------------------------|--|
| System ID | Dynamic hostname of the system. The hostname is specified using the hostname command. If the dynamic hostname is not known or hostname dynamic disable command has been executed, the 6-octet system ID is used. |
| IS Levels | IS-IS level of the router. |
| Manual area address(es) | Area addresses configured manually on the originating router. |
| Routing for area address(es) | Area addresses for which this router provides the routing. |

| Field | Description |
|-------------------------------|--|
| Non-stop forwarding | Status and name of NSF. |
| Most recent startup mode | Mode in which the most recent startup was performed. |
| Topologies supported by IS-IS | Address and subaddress family IS-IS are configured. |
| Metric style | Type, length, and value (TLV) objects accepted by IS-IS. To configure this value, see the metric-style wide, on page 48 command. |
| ISPF status | State of iSPF configuration for this IS-IS instance. Four states exist: <ul style="list-style-type: none"> • Disabled if iSPF has not been configured but is awaiting a full SPF to compile the topology for use by the iSPF algorithm. • Dormant if iSPF has been configured but is awaiting initial convergence before initializing. • Awake if iSPF has been configured but is awaiting a full SPF to compile the topology for use by the iSPF algorithm. • Active if IS-IS is ready to consider using the iSPF algorithm whenever a new route calculation needs to be run. |
| Redistributing | IS-IS is configured to redistribute IP static routes into Level 1 or Level 2. The redistribute command is used to configure redistribution. |
| Distance | Administrative distance. |
| Interfaces supported by IS-IS | Interfaces and their states currently supported by IS-IS. Both operational and configuration status are displayed. |

The following example shows how to disable the IPv4 address family, with no output shown for IS-IS IPv4 instances from the **show protocols ipv4** command:

```
RP/0/# configure
RP/0/(config)# router isis uut
RP/0/(config-isis)# no address-family ipv4 unicast
RP/0/(config-isis)# commit

RP/0/# show protocols ipv4
```

single-topology

To configure the link topology for IP Version 4 (IPv4) when IP Version 6 (IPv6) is configured, use the **single-topology** command in address family configuration mode. To remove the **single-topology** command from the configuration file and restore the system to its default condition, use the **no** form of this command.

single-topology

| Command Default | Performs in multitopology mode in which independent topologies for IPv4 and IPv6 are running in a single area or domain. | | | | |
|-------------------------|--|---------|--------------|----------------|------------------------------|
| Command Modes | IPv6 address family configuration | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | <p>Use the single-topology command to allow Intermediate System-to-Intermediate System (IS-IS) for IPv6 to be configured on interfaces along with an IPv4 network protocol. All interfaces must be configured with the identical set of network protocols, and all routers in the IS-IS area (for Level 1 routing) or the domain (for Level 2 routing) must support the identical set of network layer protocols on all interfaces.</p> <p>When single-topology support for IPv6 is being used, only old-style type, length, and value (TLV) objects may be used and a single shortest path (SPF) individual level is used to compute IPv4 (if configured) and IPv6 routes. The use of a single SPF means that both IPv4 IS-IS and IPv6 IS-IS routing protocols must share a network topology.</p> <p>To allow link information to be shared between IPv4 and IPv6, you must configure the single-topology command for an address family. In single-topology IPv6 mode, the configured metric is always the same for both IPv4 and IPv6.</p> | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write |
| Task ID | Operations | | | | |
| isis | read, write | | | | |
| Examples | <p>The following example shows how to enable single-topology mode for IPv6:</p> <pre>RP/0/(config)# router isis isp RP/0/(config-isis)# net 49.0000.0000.0001.00 RP/0/(config-isis)# address-family ipv6 unicast RP/0/(config-isis-af)# single-topology</pre> | | | | |

snmp-server traps isis

To enable the Simple Network Management Protocol (SNMP) server notifications (traps) available for IS-IS, use the **snmp-server traps isis** command in . To disable all available SNMP notifications, use the **no** form of this command.

```
snmp-server traps isis { all | traps set }
```

| Syntax Description | all | Specifies all IS-IS SNMP server traps. |
|--------------------|---|--|
| | traps set | Specify any set of trap names. |
| Command Default | SNMP server traps notification is disabled. | |
| Command Modes | | |
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |
| Usage Guidelines | No specific guidelines impact the use of this command. | |
| Task ID | Task ID | Operations |
| | isis | read, write |
| Examples | The following examples show how to enable all SNMP server traps available for isis: | |

```
RP/0/(config)# snmp-server traps isis?
```

| | |
|--------------------------------|--------------------------------|
| adjacency-change | isisAdjacencyChange |
| all | Enable all IS-IS traps |
| area-mismatch | isisAreaMismatch |
| attempt-to-exceed-max-sequence | isisAttemptToExceedMaxSequence |
| authentication-failure | isisAuthenticationFailure |
| authentication-type-failure | isisAuthenticationTypeFailure |
| corrupted-lsp-detected | isisCorruptedLSPDetected |
| database-overload | isisDatabaseOverload |
| id-len-mismatch | isisIDLenMismatch |
| lsp-error-detected | isisLSPErrorDetected |
| lsp-too-large-to-propagate | isisLSPTooLargeToPropagate |
| manual-address-drops | isisManualAddressDrops |
| max-area-addresses-mismatch | isisMaxAreaAddressesMismatch |
| orig-lsp-buff-size-mismatch | isisOrigLSPBuffSizeMismatch |
| own-lsp-purge | isisOwnLSPPurge |
| protocols-supported-mismatch | isisProtocolsSupportedMismatch |
| rejected-adjacency | isisRejectedAdjacency |
| sequence-number-skip | isisSequenceNumberSkip |

```
version-skew                isisVersionSkew  
RP/0/(config)#snmp-server traps isis all
```

The following example shows how to enable area-mismatch lsp-error-detected trap:

```
RP/0/(config)# snmp-server traps isis area-mismatch lsp-error-detected
```

spf-interval

To customize IS-IS throttling of shortest path first (SPF) calculations, use the **spf-interval** command in address family configuration mode. To restore default values, use the **no** form of this command.

```
spf-interval [{ initial-wait initial | secondary-wait secondary | maximum-wait maximum }]
. . . [ level { 1 | 2 } ]
```

Syntax Description

| | |
|--|--|
| initial-wait <i>initial</i> | Initial SPF calculation delay (in milliseconds) after a topology change. Range is 0 to 120000. |
| secondary-wait <i>secondary</i> | Hold time between the first and second SPF calculations (in milliseconds). Range is 0 to 120000. |
| maximum-wait <i>maximum</i> | Maximum interval (in milliseconds) between two consecutive SPF calculations. Range is 0 to 120000. |
| level { 1 2 } | (Optional) Enables the SPF interval configuration for Level 1 or Level 2 independently. |

Command Default

initial-wait *initial* : 50 milliseconds
secondary-wait *secondary* : 200 milliseconds
maximum-wait *maximum* : 5000 milliseconds

Command Modes

Address family configuration

Command History

| Release | Modification |
|----------------|------------------------------|
| Release 7.0.12 | This command was introduced. |

Usage Guidelines

SPF calculations are performed only when the topology changes. They are not performed when external routes change.

Use the **spf-interval** command to control how often the software can perform the SPF calculation. The SPF calculation is processor intensive. Therefore, it may be useful to limit how often this calculation is done, especially when the area is large and the topology changes often. Increasing the SPF interval reduces the processor load of the router, but potentially slows the rate of convergence.

Task ID

| Task ID | Operations |
|---------|----------------|
| isis | read, write |

Examples

The following example shows how to set the initial SPF calculation delay to 10 milliseconds and the maximum interval between two consecutive SPF calculations to 5000 milliseconds:


```
RP/0/(config)# router isis isp  
RP/0/(config-isis)# address-family ipv4 unicast  
RP/0/(config-isis-af)# spf-interval initial-wait 10 maximum-wait 5000
```

spf-interval ietf

To set an shortest path first (SPF) interval in IS-IS for SPF calculations, use the **spf-interval ietf** command in the System Admin Config mode. Use the **no** form of this command to enable the fabric bundle port.

spf-interval ietf [{ **initial-wait** *msec* | **short-wait** *msec* | **long-wait** *msec* | **learn-interval** *msec* | **holddown-interval** *msec* }] [**level** { **1** | **2** }]

| | | |
|---------------------------|---|--|
| Syntax Description | spf-interval | Specifies the number of seconds between two consecutive SPF calculations. |
| | ietf | Specifies Internet Engineering Task Force (IETF) RFC standard 8405. |
| | initial-wait <i>msec</i> | Initial SPF calculation delay before running a route calculation. The initial-wait must be less than or equal to short-wait. Range is 0 to 120000. The default value is 50 milliseconds. |
| | short-wait <i>msec</i> | Short SPF calculation delay before running a route calculation. The short-wait must be less than or equal to long-wait. Range is 0 to 120000. The default value is 200 milliseconds. |
| | long-wait <i>msec</i> | Long SPF calculation delay before running a route calculation. Range is 0 to 120000. The default value is 5000 milliseconds. |
| | learn-interval <i>msec</i> | Time To Learn interval for running a route calculation. The learn-interval must be less than or equal to holddown-interval. Range is 0 to 120000. The default value is 500 milliseconds. |
| | holddown-interval <i>msec</i> | Hold-down interval for running a route calculation. Range is 0 to 120000. The default value is 10000 milliseconds. |
| | level { 1 2 } | (Optional) Enables the SPF interval configuration for Level 1 or Level 2 independently. |
| Command Default | None | |
| Command Modes | System Admin Config mode | |
| Command History | Release | Modification |
| | Release 7.7.1 | This command was introduced. |
| Usage Guidelines | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. | |
| | SPF calculations are performed only when the topology changes. They are not performed when external routes change. | |

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | is-is | read, write |

Example

The following example shows how to configure IETF to set an SPF interval in IS-IS for SPF calculations.

```
Router# configure
Router(config)# router isis isp
Router(config-isis)# address-family ipv4 unicast
Router(config-isis-af)# spf-interval ietf?
initial-wait    Initial delay before running a route calculation [50]
short-wait      Short delay before running a route calculation [200]
long-wait       Long delay before running a route calculation [5000]
learn-interval  Time To Learn interval for running a route calculation [500]
holddown-interval Holddown interval for running a route calculation [10000]
level           Set SPF interval for one level only
Router(config-isis-af)# spf-interval ietf
Router(config-isis-af)# commit
```

The following **show** command displays the output with the new spf-interval algorithm. The output displays the actual delay taken to compute the SPF.

```
Router# show isis ipv4 spf-log last 5 detail
IS-IS 1 Level 2 IPv4 Unicast Route Calculation Log
Time Total Trig.
Timestamp Type (ms) Nodes Count First Trigger LSP Triggers
-----
--- Wed Mar 16 2022 ---
15:31:49.763 FSPF 1 6 3 tb5-r4.00-00 LINKBAD PREFIXBAD
Delay: 101ms (since first trigger)
261177ms (since end of last calculation)
Trigger Link: tb5-r2.00
Trigger Prefix: 34.1.24.0/24
New LSP Arrivals: 0
SR uloop: No
Next Wait Interval: 200ms
RIB Batches: 1 (0 critical, 0 high, 0 medium, 1 low)
Timings (ms): +--Total--+
Real CPU
SPT Calculation: 1 1
Route Update: 0 0
-----
```

spf prefix-priority (IS-IS)

To assign a priority to an ISIS prefix for customizing the RIB update sequence, use the **spf prefix-priority** command in address family configuration mode. To restore default values, use the **no** form of this command.

```
spf prefix-priority [ level { 1 | 2 } ] { critical | high | medium } { access-list-name | tag tag }
```

| Syntax Description | <p>level { 1 2 } (Optional) Enables the assignment of a priority to Level 1 or Level 2 independently.</p> <p>critical Assigns a critical priority.</p> <p>high Assigns a high priority.</p> <p>medium Assigns a medium priority.</p> <p><i>access-list-name</i> Name of an access list.</p> <p>tag tag Specifies a tag to indicate priority. The <i>tag</i> argument range is 1 to 4294967295.</p> | | | | |
|---------------------------|---|---------|--------------|----------------|------------------------------|
| Command Default | By default, IPv4 prefixes with a length of 32 and IPv6 prefixes with a length of 128 are given medium priority. The remaining prefixes are given low priority. | | | | |
| Command Modes | Address family configuration | | | | |
| Command History | <table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.12</td><td>This command was introduced.</td></tr> </table> | Release | Modification | Release 7.0.12 | This command was introduced. |
| Release | Modification | | | | |
| Release 7.0.12 | This command was introduced. | | | | |
| Usage Guidelines | <p>Use the spf prefix-priority command to change the sequence of prefix updates to the RIB after an SPF is run. ISIS installs prefixes in the RIB according to the following priority order:</p> <p>Critical > High > Medium > Low</p> <p>The spf prefix-priority command supports prefix lists for the first three priorities. The unmatched prefixes are updated with low priority.</p> <p>If a spf prefix-priority is specified, the default behavior of prioritizing either length 32 or 128 prefixes for IPv4 or IPv6, respectively, as medium is disabled.</p> | | | | |
| Task ID | <table> <tr> <th>Task ID</th><th>Operations</th></tr> <tr> <td>isis</td><td>read, write</td></tr> </table> | Task ID | Operations | isis | read, write |
| Task ID | Operations | | | | |
| isis | read, write | | | | |
| Examples | <p>The following example shows how to set the prefix priorities:</p> <pre>RP/0/ (config) # ipv4 prefix-list isis-critical-acl RP/0/ (config-ipv4_pfx) # 10 permit 0.0.0.0/0 eq 32</pre> | | | | |

```
!  
RP/0/(config)# ipv4 prefix-list isis-med-acl  
RP/0/(config-ipv4_pfx)# 10 permit 0.0.0.0/0 eq 29  
!  
RP/0/(config)# ipv4 prefix-list isis-high-acl  
RP/0/(config-ipv4_pfx)# 10 permit 0.0.0.0/0 eq 30  
!  
RP/0/(config)# router isis ring  
RP/0/(config-isis)# address-family ipv4 unicast  
RP/0/(config-isis-af)# spf prefix-priority critical isis-critical-acl  
RP/0/(config-isis-af)# spf prefix-priority high isis-high-acl  
RP/0/(config-isis-af)# spf prefix-priority medium isis-med-acl
```

summary-prefix (IS-IS)

To create aggregate addresses for the Intermediate System-to-Intermediate System (IS-IS) protocol, use the **summary-prefix** command in address family configuration mode. To restore the default behavior, use the **no** form of this command.

| | | |
|---------------------------|------------------------|--|
| Syntax Description | address | Summary address designated for a range of IPv4 addresses. The <i>address</i> argument must be in four-part, dotted-decimal notation. |
| | / prefix-length | Length of the IPv4 or IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value. |
| | ipv6-prefix | Summary prefix designated for a range of IPv6 prefixes. The <i>ipv6-prefix</i> argument must be in the form documented in RFC 2373, in which the address is specified in hexadecimal using 16-bit values between colons. |
| | level { 1 2 } | (Optional) Redistributes routes into Level 1 or Level 2 and summarizes them with the configured address and mask value. |
| | tag tag | Sets a tag value. The value range is 1- 4294967295. |

| | |
|------------------------|---|
| Command Default | All redistributed routes are advertised individually. |
| | Both Level 1 and Level 2 are configured if no level is specified. |

| | |
|----------------------|------------------------------|
| Command Modes | Address family configuration |
|----------------------|------------------------------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | Release 7.0.12 | This command was introduced. |

| | |
|-------------------------|--|
| Usage Guidelines | Multiple groups of addresses can be summarized for a given level. Routes learned from other routing protocols can also be summarized. The metric used to advertise the summary is the smallest metric of all the more-specific routes. Use the summary-prefix command to help reduce the size of the routing table. |
|-------------------------|--|

This command also reduces the size of the link-state packets (LSPs) and thus the link-state database. It also helps ensure stability, because a summary advertisement depends on many more specific routes. If one more-specific route flaps, in most cases, this flap does not cause a flap of the summary advertisement.

The drawback of summary addresses is that other routes might have less information to calculate the most optimal routing table for all individual destinations.



| | |
|-------------|---|
| Note | When IS-IS advertises a summary prefix, it automatically inserts the summary prefix into the IP routing table but labels it as a “discard” route entry. Any packet that matches the entry is discarded to prevent routing loops. When IS-IS stops advertising the summary prefix, the routing table entry is removed. |
|-------------|---|

| Task ID | Task ID | Operations |
|---------|---------|----------------|
| | isis | read, write |

Examples

The following example shows how to redistribute Open Shortest Path First (OSPF) routes into IS-IS:

The following example shows how to redistribute Open Shortest Path First (OSPF) routes into IS-IS. In the OSPF routing table, IPv6 routes exist for 3ffe:f000:0001:0000::/64, 3ffe:f000:0002:0000::/64, 3ffe:f000:0003:0000::/64, and so on. This example shows only 3ffe:f000::/24 advertised into IPv6 IS-IS Level 2.

```
RP/0/(config)# router isis isp
RP/0/(config-isis)# address-family ipv4 ipv6 unicast
RP/0/(config-isis-af)# redistribute ospf ospfv3 2 level-2
RP/0/(config-isis-af)# summary-prefix 10.10.10.10 3ffe:f000::/24 level-2
RP/0/(config-isis-af)# summary-prefix 10.10.10.10 3ffe:f000::/24 tag
```

