



# IS-IS User Guide

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# 1. Introduction

IS-IS, or Intermediate System to Intermediate System, is an open standard routing protocol. ISO published the standard as a way to route datagrams as part of their OSI stack. IETF later republished the standard, and added IP route support.

It is a link-state routing protocol, similar to OSPF. It forms neighbor adjacencies, has areas, exchanges link-state packets, builds a link-state database and runs the Dijkstra SPF algorithm to find the best path to each destination, which is installed in the routing table.

## 1.1. Segment Routing

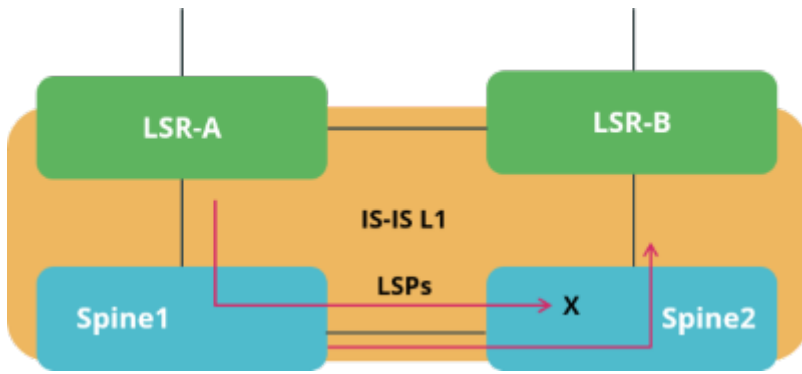
IS-IS in RBFS supports segment routing based on RFC 8667. IS-IS segment routing extensions allow to advertise labels with prefixes. RBFS currently supports the following IS-IS segment routing features:

- MPLS data plane
- IPv4 prefixes (TLV 135) and IPv6 prefixes (TLV 236)
- Prefix SID with node flag (Node SID) on loopback interface
- Anycast SID
- A single global SRGB block
- Adjacency SIDs

## 1.2. IS-IS Flood Filter Configuration

In IS-IS, by default all routers flood link-state packets, so that all routers will have a complete topology view. IS-IS flood filters allow to modify this behaviour and limit the exchange of LSPs. For example, if two spine routers in a spine/leaf fabric are symmetrically connected to two upstream label-switch routers (LSR) like shown in the figure below, you can use a flood filter to not advertise LSPs learned from LSR A back to the LSR B via the second spine switch.

The flooding filter configuration is part of the global configuration hierarchy and therefore you can configure filtering globally, i.e. not per instance, so that the filter configurations can be reused across instances.



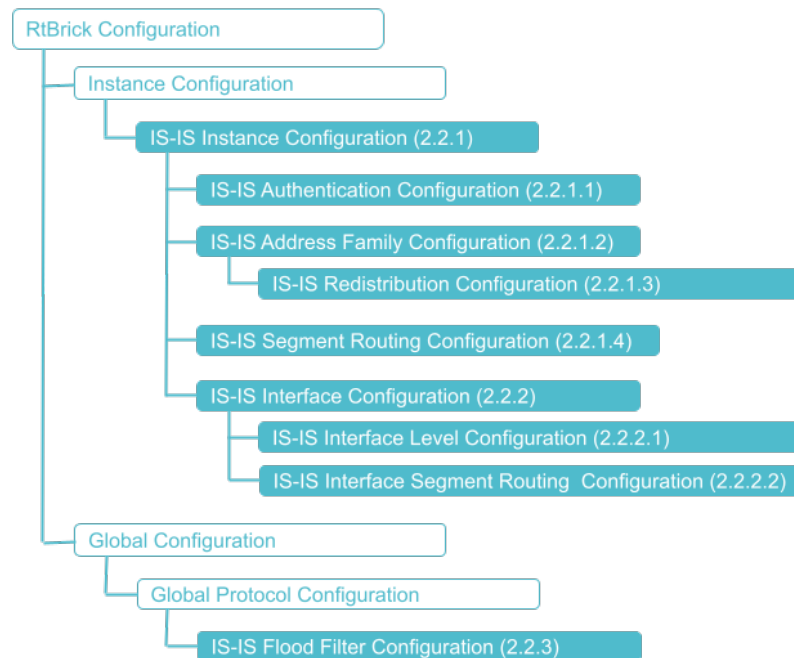
### 1.3. Supported Platforms

Not all features are necessarily supported on each hardware platform. Refer to the *Platform Guide* for the features and the sub-features that are or are not supported by each platform.

## 2. IS-IS Configuration

### 2.1. Configuration Hierarchy

The diagram below illustrates the IS-IS configuration hierarchy.



### 2.2. Configuration Syntax and Commands

The following sections describe the IS-IS configuration syntax and commands.

#### 2.2.1. Instance Configuration

The instance configuration hierarchy includes parameters that are required for or used by IS-IS.

Syntax:

**set instance** <instance-name> **protocol isis** <attribute> <value>

Attribute	Description
<name>	Name of the IS-IS instance
area <area>	IS-IS area-address. The area can be represented in 1, 3, 5, 13 bytes format.
authentication <...>	Specifies the authentication scheme for IS-IS. Refer to section 2.2.1.1 for the IS-IS authentication configuration details.

Attribute	Description
holding-time <holding-time>	<p>Specifies how long a neighbor should consider this routing device to be operative without receiving another hello packet.</p> <p>Default value: 30 seconds</p> <p>Range: 1 through 3,180 seconds</p>
hostname <hostname>	Specifies the hostname mapped to the system identifier.
ignore-attached-bit [true/false]	This configuration allows you to enable the routing device to ignore the attached bit on incoming Level 1 link-state PDUs. If the attached bit is ignored, no default route, which points to the routing device which has set the attached bit, is installed.
interface <...>	Name of the interface. Refer to section 2.2.2 for the interface configuration details.
ipv6-disable [true/false]	Specifies whether the ipv6-disable configuration is enabled or not. When you set this value to "true", it indicates that IPv6 configuration is disabled.
[level-1/level-2] address-family <...>	Protocol ISIS level-1/level-2 address-family configuration. Refer to section 2.2.1.2 for the address family configuration details.
lsp-lifetime <lsp-lifetime>	IS-IS link-state PDUs maximum lifetime, default 65535 seconds
multipath <multipath>	Load sharing among multiple ISIS paths, default 256
no-mpls-transit-path [true/false]	When set to true, IS-IS will not install segment routing transit path, default false
overload [true/false]	When set to true, IS-IS overload bit is set, default false
router-id <router-id>	ISIS router identifier (ipv4 format: A.B.C.D)
system-id <system-id>	Specifies the system ID of the device.

#### Example: IS-IS Instance Configuration

```

{
  "rtbrick-config:instance": [
    {
      "name": "default",
      "protocol": {
        "isis": {
          "system-id": "1000.9900.0001",
          "overload": "false",
          "holding-time": 100,
          "area": "49.0001/24",
          "hostname": "spine1",
          "router-id": "10.99.0.1",
          "authentication": {
            "level-1": {
              "check": "enable"
            }
          }
        }
      }
    }
  ]
}

```

### 2.2.1.1. IS-IS Authentication Configuration

#### Syntax:

**set instance** <instance-name> **protocol isis authentication** [**level-1** | **level-2**] <attribute> <value>

Attribute	Description
check [disable / enable]	Specifies an authentication check to reject PDUs that do not match the type or key requirements. You can enable or disable the authentication check.
key-id1 <key-id1> / key-id2 <key-id2>	The key ID allows you to specify the key identifiers for level-1/level-2 authentication.
key1-encrypted-text <key1-encrypted-text> / key2-encrypted-text <key2-encrypted-text>	Authentication key1 and key 2 encrypted text
key1-plain-text <key1-plain-text> / key2-plain-text <key2-plain-text>	The level-1/level-2 authentication keys specify the authentication keys (passwords) that are used by the neighboring routing devices to verify the authenticity of packets sent from this interface. For the key to work, you also must include the authentication-type statement.



Attribute	Description
type	<p>Enables you to specify the authentication scheme for IS-IS. If you enable authentication, you must specify a password by including the authentication-key statement.</p> <p>The following authentication types are supported:</p> <ul style="list-style-type: none"> <li>• clear_text</li> <li>• md5</li> <li>• sha1</li> </ul>

```

{
  "ietf-restconf:data": {
    "rtbrick-config:instance": [
      {
        "name": "default",
        "protocol": {
          "isis": {
            <...>
            "authentication": {
              "level-1": {
                "type": "md5",
                "key1-encrypted-text":
"$239928e897b1f0fb3a97ed426db21aba36ca48479744a7c71255ee2c4e747e859"
              }
            },
            "interface": [
              {
                "name": "if1-0/0/1/0",
                "type": "point-to-point",
                "level-1": {
                  "snp-authentication": "enable",
                  "hello-authentication": "disable",
                  "metric": 10
                },
                "level-2": {
                  "snp-authentication": "enable",
                  "hello-authentication": "disable",
                  "metric": 10
                }
              },
              <...>
            ]
          }
        }
      }
    ]
  }
}

```

### 2.2.1.2. IS-IS Address-Family Configuration

The address-family command allows you to enable the address families that IS-IS will route and configure settings that are specific to that address family.

**Syntax:**

**set instance** <instance-name> **protocol isis** [**level-1** | **level-2**] **address-family** <attribute> <value>

Attribute	Description
<afi>	Address family identifier (AFI). Supported values: ipv4, ipv6
<safi>	Subsequent address family identifier (SAFI). Supported values: unicast or labeled-unicast

**2.2.1.3. Configuring Route Redistribution****Syntax:**

**set instance** <instance-name> **protocol isis** [**level-1** | **level-2**] **address-family** <afi> <safi> **redistribute** <attribute> <value>

Attribute	Description
<afi>	Address family identifier (AFI). Supported values: ipv4, ipv6
<safi>	Subsequent address family identifier (SAFI). Supported values: unicast or labeled-unicast
redistribute <protocol>	Specifies the source from which the routes are to be redistributed from. The available options are bgp, ospf, direct, and static.
redistribute <protocol> <policy>	Specifies the name of the policy map. The redistribute attach point allows routes from other sources to be advertised by IS-IS. Policy can be applied only to the routes that are redistributed from other sources to IS-IS. The support for inter-level leaking through policy is unavailable.

Example: IS-IS address-family configuration

```

{
  "rtbrick-config:isis": {
    "system-id": "1000.9900.0001",
    "area": "49.0001/24",
    "hostname": "spine1",
    "interface": [
      {
        "name": "if1-0/0/2/0",
        "type": "point-to-point",
        "level-1": {
          "metric": 1000
        }
      }
    ],
    "level-1": {
      "address-family": [
        {
          "afi": "ipv4",
          "safi": "labeled-unicast",
          "redistribute": [
            {
              "source": "bgp"
              "policy": "filter-link-address"
            }
          ]
        }
      ]
    }
  }
}

```

### 2.2.1.4. Segment Routing Configuration

#### Syntax:

**set instance** <instance-name> **protocol isis segment-routing** <attribute> <value>

Attribute	Description
srgb base <srgb base>	Specifies the segment routing global block (SRGB) in source packet routing. SRGB is used for prefix SIDs. Supported MPLS label values are 0 - 1048575. The reserved MPLS label range is 0 - 15. In RBFS, BGP uses the label range 20000 - 100000. It is recommended to assign label values outside of these reserved ranges to avoid conflicts.
srgb range <srgb range>	IS-IS system range of labels from the base label.

Attribute	Description
srlb base <srlb base>	Specifies the segment routing local block (SRLB) in source packet routing. SRLB is used for adjacency SIDs. Supported MPLS label values are 0 - 1048575. The reserved MPLS label range is 0 - 15. In RBFS, BGP uses the label range 20000 - 100000. It is recommended to assign label values outside of these reserved ranges to avoid conflicts.
srlb range <srlb range>	IS-IS system range of labels from the base label.

### Example: IS-IS Segment Routing Configuration

```
{
  "rtbrick-config:isis": {
    segment-routing: {
      "srgb": {
        "base": 5000,
        "range": 1000
      }
      "srlb": {
        "base": 5000,
        "range": 1000,
      }
    }
  }
}
```

## 2.2.2. Configuring IS-IS Interface

By default, there are no interfaces associated with IS-IS. You must configure at least one IS-IS interface for IS-IS adjacency formation.

### Syntax:

**set instance** <instance> **protocol isis interface** <name> <attribute> <value>

Attribute	Description
<name>	Specifies the name of the IS-IS interface.
bfd admin-status [true / false]	Specifies the BFD admin status.
bfd profile <profile>	Specifies the BFD profile name
flood-filter <flood-filter>	Specifies the IS-IS flood filter name
level-1 / level-2	Specify IS-IS interface level configuration. Refer to section 2.2.2.1 for the IS-IS interface level configuration details.

Attribute	Description
lsp-interval <lsp-interval>	IS-IS system interface LSP interval, default 100
passive [true / false]	Enable interface in passive mode, default false
system-id <system-id>	Interface level system id
type [loopback / none / point-to-point]	Specifies the type of the IS-IS system interface

### Example 1: IS-IS Interface Configuration

```
{
  "rtbrick-config:isis": {
    "interface": [
      {
        "name": "ifl-0/0/1/0",
        "lsp-interval": 200,
        "bfd": {
          "admin-status": "true"
        }
      }
    ]
  }
}
```

### Example 2: IS-IS Interface Level Flood Filter Configuration

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifl-0/0/1/0",
      "flood-filter": "spine1_lsrl_flood_filter"
    }
  ]
}
```

## 2.2.2.1. IS-IS Interface Level Configuration

### Syntax:

**set instance** <instance> **protocol isis interface** <name> [**level-1** | **level-2**] <attribute> <value>

Attribute	Description
adjacency-disable [true/false]	Specify the level-1/level-2 adjacency on an interface, default false
hello-authentication [disable/enable]	Authentication on hello packets

Attribute	Description
metric <metric>	Level-1/Level-2 metric on an interface, default 1000000
snp-authentication [enable/disable]	Authentication on CSNP/PSNP packets

### Example: IS-IS Interface Level Configuration

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifl-0/0/1/0",
      "lsp-interval": 200,
      "level-1": {
        "snp-authentication": "enable",
        "hello-authentication": "enable",
        "metric": 1000,
        "adjacency-disable": "false"
      }
    }
  ]
}
```

## 2.2.2.2. Interface-level Segment Routing Configuration

### Syntax:

**set instance** <instance> **protocol isis interface** <name> **segment-routing** <attribute> <value>

Attribute	Description
segment-routing [ipv4 / ipv6] anycast-index <anycast-index>	Anycast index segment-ID. The prefix SIDs and anycast SIDs are applied on loopback interface only.
segment-routing [ipv4 / ipv6] index <index>	Prefix index segment ID.
segment-routing point-to-point [ipv4 / ipv6] adjacency-index <adjacency-index>	Adjacency index segment-ID. The adjacency SIDs are applied on active IS-IS interfaces on which adjacencies are established.

Example 1: IS-IS Interface Level Segment Routing Configuration for Prefix and Anycast SID

```
"rtbrick-config:instance": [  
  {  
    "name": "default",  
    "protocol": {  
      "isis": {  
        "interface": [  
          {  
            "name": "lo-0/0/0",  
            "segment-routing": {  
              "ipv4": {  
                "index": 100  
              },  
              "ipv6": {  
                "index": 200  
              }  
            }  
          },  
          {  
            "name": "lo-0/0/1",  
            "segment-routing": {  
              "ipv4": {  
                "anycast-index": 110  
              },  
              "ipv6": {  
                "anycast-index": 210  
              }  
            }  
          }  
        ]  
      }  
    }  
  ]  
}
```

Example 2: IS-IS Interface Level Segment Routing Configuration for Adjacency SID

```

{
  "rtbrick-config:isis": {
    "interface": [
      {
        "name": "ifp-0/0/1/0",
        "type": "point-to-point",
        "segment-routing": {
          "point-to-point": {
            "ipv4": {
              "adjacency-index": 241
            },
            "ipv6": {
              "adjacency-index": 261
            }
          }
        }
      }
    ]
  }
}

```

## 2.2.3. IS-IS Global Configuration

### 2.2.3.1. IS-IS Flood Filter Configuration

#### Syntax:

**set global protocol isis flood-filter** <filter-name> <ordinal> <attribute> <value>

Attribute	Description
<filter-name>	Filter-name which binds a flooding filter to an IS-IS interface
<ordinal>	Number to filter rule
action [block/flood]	Action required to flood or not
ordinal-name <ordinal-name>	Name for the filter rule
system-id <system-id>	IS-IS instance system-id
system-id-mask <system-id-mask>	System ID mask on which the filter should match

Example: IS-IS Flood Filter Configuration



```
{
  "rtbrick-config:flood-filter": [
    {
      "filter-name": "spine1_lsrl_flood_filter",
      "ordinal": 1,
      "ordinal-name": "spine1",
      "system-id": "1920.0100.4001",
      "action": "flood"
    }
  ]
}
```

## 3. Operational Commands

### 3.1. IS-IS Show Commands

The IS-IS show commands provide detailed information about the IS-IS protocol operation and IS-IS routes.

#### 3.1.1. IS-IS Overview

**Syntax:**

**show isis overview**

Option	Description
-	Without any option, this command displays a summary of all the IS-IS instances

Example: Summary view of all the IS-IS instances

```

supervisor@rtbrick>LEAF01: op> show isis overview
Instance: default
  System ID: 1921.6800.1002
  System hostname: No hostname configured
  Areas: 49.0001/24
  Neighbor hold time: 30 sec
  LSP life time: 65535 se
  Overload bit set: False
  SRGB base: not defined
  SRGB range: not defined
  SRGB label values: not defined
  SRLB base: not defined
  SRLB range: not defined
  SRLB label values: not defined
  Authentication: Level 1: none, Level 2: none

```

#### 3.1.2. IS-IS Interface

**Syntax:**

**show isis interface <option>**

Option	Description
-	Without any option, this command displays a summary of all the IS-IS interfaces
instance	Displays IS-IS interface information for an instance

Option	Description
statistics	Displays IS-IS interface statistics information
detail	Displays detailed information for all interfaces

### Example 1: Summary view of the IS-IS interfaces

```

supervisor@rtbrick>LEAF01: op> show isis interface
Instance: default
  Interface          Level  Adjacencies  Metric  Type
Passive
  lo-0/0/4/1         1      0    1000000  loopback      True
  memif-0/1/2/12     1      0    1000000  point-to-point False
  memif-0/1/6/16     1      0    1000000  point-to-point False

```

### Example 2: Detailed view of the IS-IS Interface

```

supervisor@rtbrick>LEAF01: op> show isis interface detail
Instance: default
  Interface: lo-0/0/0/0, Level: 1
  Type: loopback, Passive: True
  Metric: 1000000
  Adjacencies: 0
  CNSP: In: 0 Out: 0 Success: 0 Fail: 0
  PSNP: In: 0 Out: 0 Success: 0 Fail: 0
  LSP: In: 0 Out: 0 Success: 0 Fail: 0 In Purge: 0 In Auth Fail: 0
  IIH: In: 0 Out: 0
Instance: default
  Interface: hostif-0/0/0/0, Level: 1
  Type: point-to-point, Passive: False
  Metric: 1000000
  Adjacencies: 1
  CNSP: In: 3020 Out: 3020 Success: 3020 Fail: 0
  PSNP: In: 2 Out: 2 Success: 2 Fail: 0
  LSP: In: 2 Out: 2 Success: 2 Fail: 0 In Purge: 0 In Auth Fail: 0
  IIH: In: 5589 Out: 5600
supervisor@S1-STD-7-7001>bm01-tst.fsn.rtbrick.net: op>

```

### Example 3: Summary view of the IS-IS interfaces for a specific instance

```

supervisor@rtbrick>LEAF01: op> show isis interface instance default
Instance: default
  Interface          Level  Adjacencies  Metric  Type
Passive
  lo-0/0/4/1         1      0    1000000  loopback      True
  memif-0/1/2/12     1      0    1000000  point-to-point False
  memif-0/1/6/16     1      0    1000000  point-to-point False

```

### Example 4: Summary view of the IS-IS interfaces for a specific interface

```

supervisor@rtbrick>LEAF01: op> show isis interface memif-0/1/6/16
Instance: default
  Interface: memif-0/1/6/16, Level: 1
    Type: point-to-point, Passive: False
    Metric: 1000000
    Adjacencies: 1
    CNSP: In: 24 Out: 34 Success: 24 Fail: 0
    PSNP: In: 8 Out: 10 Success: 5 Fail: 1
    LSP: In: 14 Out: 11 Success: 11 Fail: 2 In Purge: 0 In Auth Fail: 2
    IIH: In: 121 Out: 163

```

### Example 5: Summary view of the IS-IS interface statistics

```

supervisor@rtbrick>LEAF01: op> show isis interface statistics
Instance: default
  Interface      Level  CSNP In  CSNP Out  CSNP Fail  PSNP In  PSNP Out  PSNP
Fail  LSP In  LSP Out  LSP Fail  IIH In  IIH Out
  lo-0/0/4/1      1      0      0      0      0      0      0
0      0      0      0
  memif-0/1/2/12  1      32     32      0      9      6      1
9      10     0     117    138
  memif-0/1/6/16  1      22     32      0      6      6      1
9      8      0     115    138
supervisor@rtbrick>LEAF01: op>

```

## 3.1.3. IS-IS Neighbor

### Syntax:

**show isis neighbor** <option>

Option	Description
-	Without any option, this command displays a summary of all the IS-IS neighbors
detail	Displays detailed information for IS-IS neighbor
instance	Displays IS-IS neighbor information for an instance

### Example 1: Summary view of the IS-IS neighbor

```

supervisor@rtbrick>LEAF01: op> show isis neighbor
Instance: default
  Interface      System          Level  State  Type  Up since
Expires
  memif-0/1/2/12  1920.0100.4002.00 L1    Up     P2P   Mon Nov 02
06:18:36      in 28s 228094us
  memif-0/1/6/16  1920.0000.0006.00 L1    Up     P2P   Mon Nov 02
06:18:30      in 24s 420225us

```

## Example 2: Detailed view of the IS-IS neighbor

```

supervisor@rtbrick>LEAF01: op> show isis neighbor detail
Instance: ip2vrf
  System: isr6, Interface: hostif-0/0/2/0
  State: Up, Level: L1, Adjacency type: P2P
  Holding time: 30.0s, Expiry time: in 25s 332949us
  Local IPv4 address: 16.0.1.1, Remote IPv4 address: 16.0.1.6
  Local IPv6 address: fe80::7846:27ff:fec0:2, Remote IPv6 address:
fe80::7816:69ff:fec0:0
  IPv4 Adjacency SID: 11116, IPv6 Adjacency SID: 11117
  Up since: Wed Feb 16 04:46:25 GMT +0000 2022, Last down reason: Admin
reset
  Last transition: 2022-02-16T04:46:25.300144+0000, Number of transitions:
14
  Error counters:
    Level mismatch: 0, Area mismatch: 0, System ID: 0, Subnet mismatch: 0
    Hold timeout: 3, Neighbor down: 0, Interface down: 0, Admin reset: 1
    Interface configuration: 0, Area configuration: 0, Other: 0

```

## Example 3: Summary view of the IS-IS neighbor for the specified instance

```

supervisor@rtbrick>LEAF01: op> show isis neighbor instance default
Instance: default
  Interface          System          Level  State  Type  Up since
Expires
  memif-0/1/2/12    1920.0100.4002.00 L1    Up     P2P   Mon Nov 02
06:18:36          in 28s 678329us
  memif-0/1/6/16    1920.0000.0006.00 L1    Up     P2P   Mon Nov 02
06:18:30          in 28s 88085us
supervisor@rtbrick>LEAF01: op>

```

## Example 4: Detailed view of the IS-IS neighbor for the specified instance

```

supervisor@rtbrick>LEAF01: op> show isis neighbor instance default detail
Instance: default
  System: 1920.0100.4002.00, Interface: memif-0/1/2/12
  State: Up, Level: L1, Adjacency type: P2P
  Holding time: 30.0s, Expiry time: in 21s 706586us
  Local IPv4 address: 10.4.12.0, Remote IPv4 address: 10.4.12.1
  Local IPv6 address: fe80::7801:49ff:fe60:102, Remote IPv6 address:
fe80::7816:7bff:fe60:201
  Up since: Mon Nov 02 06:18:36 GMT +0000 2020, Last down reason: NA
  Last transition: 2020-11-02T06:18:36.947601+0000, Number of transitions:
2
  Error counters:
  Level mismatch: 0, Area mismatch: 0, System ID: 0, Subnet mismatch: 0
  Hold timeout: 0, Neighbor down: 0, Interface down: 0, Admin reset: 0
  Interface configuration: 0, Area configuration: 0, Other: 0
  System: 1920.0000.0006.00, Interface: memif-0/1/6/16
  State: Up, Level: L1, Adjacency type: P2P
  Holding time: 30.0s, Expiry time: in 22s 832756us
  Local IPv4 address: 10.0.16.0, Remote IPv4 address: 10.0.16.1
  Local IPv6 address: fe80::7801:49ff:fe60:106, Remote IPv6 address:
fe80::785c:e4ff:fe60:601
  Up since: Mon Nov 02 06:18:30 GMT +0000 2020, Last down reason: NA
  Last transition: 2020-11-02T06:18:30.356111+0000, Number of transitions:
2
  Error counters:
  Level mismatch: 0, Area mismatch: 0, System ID: 0, Subnet mismatch: 0
  Hold timeout: 0, Neighbor down: 0, Interface down: 0, Admin reset: 0
  Interface configuration: 0, Area configuration: 0, Other: 0
supervisor@rtbrick>LEAF01: op>

```

### 3.1.4. IS-IS Hostname

#### Syntax:

#### show isis hostname

Option	Description
-	Without any option, this command displays a summary of all the IS-IS dynamic hostnames

#### Example: Summary view of IS-IS hostnames

```

supervisor@rtbrick>LEAF01: op> show isis hostname
Instance      System-ID      Hostname
default      1920.0100.4001  spine1
supervisor@rtbrick>LEAF01: op>

```

### 3.1.5. IS-IS Database

#### Syntax:

**show isis database** <option>

Option	Description
-	Without any option, this command displays all the IS-IS databases
detail	Displays detailed information for IS-IS database
instance	Displays IS-IS database information for an instance
lsp <lsp-id>	Displays a summary of IS-IS database for the specified LSP ID. This command includes an option for entering the system ID part either by hostname or by ID.
[level-1/level-2] lsp	Displays a summary of IS-IS database LSP information for specified level
system <system-id>	Displays a summary of IS-IS database for all LSPs from a system
[level-1/level-2] system	Displays a summary of IS-IS database for all LSPs from a system on the specified level.
[level-1/level-2] detail	Displays detailed information for the specified level

#### Example 1: Summary view of the IS-IS Database

```

supervisor@rtbrick>LEAF01: op> show isis database
Instance: default, Level: 1
  LSP ID                Sequence      Checksum      Lifetime
Overload   Attached
  1921.6800.1002.00-00   0x3          0x9561        65535
0          0
  1921.6800.1005.00-00   0x2          0x499b        65535
0          0
Instance: default, Level: 2
  LSP ID                Sequence      Checksum      Lifetime
Overload   Attached
  1921.6800.1002.00-00   0x4          0x531a        65535
0          0

```

#### Example 2: Summary view of the IS-IS database for the specified LSP

```

supervisor@rtbrick>LEAF01: op> show isis database lsp 1920.0100.4001.00-00
Instance: default, Level: 1
  LSP ID: 1920.0100.4001.00-00
  Interface:
  LSP Header:
  Sequence: 0xc

```

```

Checksum: 0x9c74
Remaining lifetime: 65535 seconds
Flags: Attached: 0, Overload: 0
Packet:
Length: 168 bytes
Last received time: 2020-11-02T06:46:46.473726+0000
Expiry: expires in 17h 52m 34s 950743us
Dynamic Hostname TLV: spine1
Protocols Supported TLVs:
Network layer protocol ID: IPv6
Network layer protocol ID: IPv4
Area Address TLVs:
Area address: 49.0001
Authentication TLV:
Value: 77b259cb36930819b0abb6120ceee2fd
IS Reachability TLVs:
IS neighbor: 1920.0000.0006.00
IS neighbor: 1920.0100.4002.00
IPv4 Reachability TLVs:
IPv4 prefix: 10.0.16.0/31                Metric: 1000000    Internal
Up
IPv4 prefix: 10.4.12.0/31                Metric: 1000000    Internal
Up
IPv4 prefix: 192.1.4.1/32                Metric: 1000000    Internal
Up  SID: 1  Flags: Node
IPv6 Reachability TLVs:
IPv6 prefix: 192:1:4::1/128             Metric: 1000000    Internal
Up
Segment Routing TLVs:
SRGB: Base: 10000, Range: 2000
Instance: default, Level: 2
LSP ID: 1920.0100.4001.00-00
Interface:
LSP Header:
Sequence: 0x12
Checksum: 0x6407
Remaining lifetime: 65535 seconds
Flags: Attached: 0, Overload: 0
Packet:
Length: 247 bytes
Last received time: 2020-11-02T06:47:06.466723+0000
Expiry: expires in 17h 52m 54s 889789us
Dynamic Hostname TLV: spine1
Protocols Supported TLVs:
Network layer protocol ID: IPv6
Network layer protocol ID: IPv4
Area Address TLVs:
Area address: 49.0001
Authentication TLV:
none
IS Reachability TLVs:
IPv4 Reachability TLVs:
IPv4 prefix: 10.0.16.0/31                Metric: 1000000    Internal
Up
IPv4 prefix: 10.0.27.0/31                Metric: 2000000    Internal
Up
IPv4 prefix: 10.0.68.0/31                Metric: 2000000    Internal
Up

```



```

IPv4 prefix: 10.0.69.0/31          Metric: 2000000  Internal
Up
IPv4 prefix: 10.4.12.0/31         Metric: 1000000  Internal
Up
IPv4 prefix: 192.0.0.6/32         Metric: 2000000  Internal
Up  SID: 6  Flags: Re-advertisement, Node
IPv4 prefix: 192.1.4.1/32         Metric: 1000000  Internal
Up  SID: 1  Flags: Re-advertisement, Node
IPv4 prefix: 192.1.4.2/32         Metric: 2000000  Internal
Up  SID: 2  Flags: Re-advertisement, Node
IPv6 Reachability TLVs:
IPv6 prefix: 192:1:4::1/128      Metric: 1000000  Internal
Up
IPv6 prefix: 192:1:4::2/128      Metric: 2000000  Internal
Up
Segment Routing TLVs:
SRGB: Base: 10000, Range: 2000
supervisor@rtbrick>LEAF01: op>

```

### Example 3: Detailed view of the IS-IS database for level-1

```

supervisor@rtbrick>LEAF01: op> show isis database level-1 detail
Instance: default, Level: 1
LSP ID: 1920.0100.4001.00-00
Interface:
LSP Header:
Sequence: 0xc
Checksum: 0x9c74
Remaining lifetime: 65535 seconds
Flags: Attached: 0, Overload: 0
Packet:
Length: 168 bytes
Last received time: 2020-11-02T06:46:46.473726+0000
Expiry: expires in 17h 50m 31s 759013us
Dynamic Hostname TLV: spinel
Protocols Supported TLVs:
Network layer protocol ID: IPv6
Network layer protocol ID: IPv4
Area Address TLVs:
Area address: 49.0001
Authentication TLV:
Value: 77b259cb36930819b0abb6120ceee2fd
IS Reachability TLVs:
IS neighbor: 1920.0000.0006.00
IS neighbor: 1920.0100.4002.00
IPv4 Reachability TLVs:
IPv4 prefix: 10.0.16.0/31          Metric: 1000000  Internal
Up
IPv4 prefix: 10.4.12.0/31         Metric: 1000000  Internal
Up
IPv4 prefix: 192.1.4.1/32         Metric: 1000000  Internal
Up  SID: 1  Flags: Node
IPv6 Reachability TLVs:
IPv6 prefix: 192:1:4::1/128      Metric: 1000000  Internal
Up
Segment Routing TLVs:

```

```

SRGB: Base: 10000, Range: 2000
LSP ID: 1920.0100.4002.00-00
Interface: memif-0/1/2/12
LSP Header:
Sequence: 0x9
Checksum: 0x89a6
Remaining lifetime: 65534 seconds
Flags: Attached: 0, Overload: 0
Packet:
Length: 149 bytes
Last received time: 2020-11-02T06:45:59.814186+0000
Expiry: expires in 17h 49m 44s 99010us
Dynamic Hostname TLV: none
Protocols Supported TLVs:
Network layer protocol ID: IPv6
Network layer protocol ID: IPv4
Area Address TLVs:
Area address: 49.0001
Authentication TLV:
Value: 5892f2d37d7f23abcfcb48466276659c
IS Reachability TLVs:
IS neighbor: 1920.0100.4001.00
IPv4 Reachability TLVs:
IPv4 prefix: 10.0.27.0/31                Metric: 1000000    Internal
Up
IPv4 prefix: 10.4.12.0/31                Metric: 1000000    Internal
Up
IPv4 prefix: 192.1.4.2/32                Metric: 1000000    Internal
Up  SID: 2    Flags: Node
IPv6 Reachability TLVs:
IPv6 prefix: 192:1:4::2/128             Metric: 1000000    Internal
Up
Segment Routing TLVs:
SRGB: Base: 70000, Range: 2000
supervisor@rtbrick>LEAF01: op>

```

Example 4: Summary view of the IS-IS database for the specified instance

```

supervisor@rtbrick>LEAF01: op> show isis database instance default
Instance: default, Level: 1
  LSP ID                Sequence      Checksum      Lifetime
Overload  Attached
  1921.6800.1002.00-00   0x3          0x9561        65535
0          0
  1921.6800.1005.00-00   0x2          0x499b        65535
0          0
Instance: default, Level: 2
  LSP ID                Sequence      Checksum      Lifetime
Overload  Attached
  1921.6800.1002.00-00   0x4          0x531a        65535
0          0

```

Example 5: Summary view of the IS-IS database for the specified instance and LSP

```

supervisor@rtbrick>LEAF01: op> show isis database instance default lsp
1920.0100.4001.00-00
Instance: default, Level: 1
  LSP ID: 1920.0100.4001.00-00
    Interface:
    LSP Header:
    Sequence: 0xc
    Checksum: 0x9c74
    Remaining lifetime: 65535 seconds
    Flags: Attached: 0, Overload: 0
    Packet:
    Length: 168 bytes
    Last received time: 2020-11-02T06:46:46.473726+0000
    Expiry: expires in 17h 52m 34s 950743us
    Dynamic Hostname TLV: spine1
    Protocols Supported TLVs:
    Network layer protocol ID: IPv6
    Network layer protocol ID: IPv4
    Area Address TLVs:
    Area address: 49.0001
    Authentication TLV:
    Value: 77b259cb36930819b0abb6120ceee2fd
    IS Reachability TLVs:
    IS neighbor: 1920.0000.0006.00
    IS neighbor: 1920.0100.4002.00
    IPv4 Reachability TLVs:
    IPv4 prefix: 10.0.16.0/31                               Metric: 1000000   Internal
Up
    IPv4 prefix: 10.4.12.0/31                               Metric: 1000000   Internal
Up
    IPv4 prefix: 192.1.4.1/32                               Metric: 1000000   Internal
Up
    SID: 1   Flags: Node
    IPv6 Reachability TLVs:
    IPv6 prefix: 192:1:4::1/128                             Metric: 1000000   Internal
Up
    Segment Routing TLVs:
    SRGB: Base: 10000, Range: 2000
Instance: default, Level: 2
  LSP ID: 1920.0100.4001.00-00
    Interface:
    LSP Header:
    Sequence: 0x12
    Checksum: 0x6407
    Remaining lifetime: 65535 seconds
    Flags: Attached: 0, Overload: 0
    Packet:
    Length: 247 bytes
    Last received time: 2020-11-02T06:47:06.466723+0000
    Expiry: expires in 17h 52m 54s 889789us
    Dynamic Hostname TLV: spine1
    Protocols Supported TLVs:
    Network layer protocol ID: IPv6
    Network layer protocol ID: IPv4
    Area Address TLVs:
    Area address: 49.0001
    Authentication TLV:
    none
    IS Reachability TLVs:

```

```

IPv4 Reachability TLVs:
Up IPv4 prefix: 10.0.16.0/31 Metric: 1000000 Internal
Up IPv4 prefix: 10.0.27.0/31 Metric: 2000000 Internal
Up IPv4 prefix: 10.0.68.0/31 Metric: 2000000 Internal
Up IPv4 prefix: 10.0.69.0/31 Metric: 2000000 Internal
Up IPv4 prefix: 10.4.12.0/31 Metric: 1000000 Internal
Up IPv4 prefix: 192.0.0.6/32 Metric: 2000000 Internal
Up SID: 6 Flags: Re-advertisement, Node
IPv4 prefix: 192.1.4.1/32 Metric: 1000000 Internal
Up SID: 1 Flags: Re-advertisement, Node
IPv4 prefix: 192.1.4.2/32 Metric: 2000000 Internal
Up SID: 2 Flags: Re-advertisement, Node
IPv6 Reachability TLVs:
Up IPv6 prefix: 192:1:4::1/128 Metric: 1000000 Internal
Up IPv6 prefix: 192:1:4::2/128 Metric: 2000000 Internal
Up
Segment Routing TLVs:
SRGB: Base: 10000, Range: 2000
supervisor@rtbrick>LEAF01: op>

```

### 3.1.6. IS-IS Route

#### Syntax:

**show isis route** <option>

Option	Description
-	Without any option, this command displays a summary of the IS-IS route information
instance	Displays IS-IS route information for an instance
<afi> <safi>	Routing information for the specified AFI/SAFI. Supported SAFI values are 'unicast' and 'labeled-unicast'.

Example 1: Summary view of the IS-IS routes

```

supervisor@rtbrick>LEAF01: op> show isis route
Instance: default, AFI: ipv4, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  10.0.16.0/31          1    1000000  Internal      n/a
local
  10.0.27.0/31          1    2000000  Internal      10.4.12.1
memif-0/1/2/12
  10.0.68.0/31          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  10.0.69.0/31          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  10.4.12.0/31          1    1000000  Internal      n/a
local
  192.0.0.6/32          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  192.1.4.1/32          1    1000000  Internal      n/a
local
  192.1.4.2/32          1    2000000  Internal      10.4.12.1
memif-0/1/2/12
Instance: default, AFI: ipv4, SAFI: labeled-unicast
  Prefix                Level  Metric  SID Index      Next Hop
Interface              Label
  192.0.0.6/32          1    2000000          6    10.0.16.1
memif-0/1/6/16          10006
  192.1.4.2/32          1    2000000          2    10.4.12.1
memif-0/1/2/12          10002
Instance: default, AFI: ipv6, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  192:1:4::1/128        1    1000000  Internal      n/a
local
  192:1:4::2/128        1    2000000  Internal
fe80::7816:7bff:fe60:201 memif-0/1/2/12

```

Example 2: Summary view of the IS-IS routes for the specified instance

```

supervisor@rtbrick>LEAF01: op> show isis route instance default
Instance: default, AFI: ipv4, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  10.0.16.0/31          1    1000000  Internal       n/a
local
  10.0.27.0/31          1    2000000  Internal       10.4.12.1
memif-0/1/2/12
  10.0.68.0/31          1    2000000  Internal       10.0.16.1
memif-0/1/6/16
  10.0.69.0/31          1    2000000  Internal       10.0.16.1
memif-0/1/6/16
  10.4.12.0/31          1    1000000  Internal       n/a
local
  192.0.0.6/32          1    2000000  Internal       10.0.16.1
memif-0/1/6/16
  192.1.4.1/32          1    1000000  Internal       n/a
local
  192.1.4.2/32          1    2000000  Internal       10.4.12.1
memif-0/1/2/12
Instance: default, AFI: ipv4, SAFI: labeled-unicast
  Prefix                Level  Metric  SID Index      Next Hop
Interface              Label
  192.0.0.6/32          1    2000000          6    10.0.16.1
memif-0/1/6/16         10006
  192.1.4.2/32          1    2000000          2    10.4.12.1
memif-0/1/2/12         10002
Instance: default, AFI: ipv6, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  192:1:4::1/128        1    1000000  Internal       n/a
local
  192:1:4::2/128        1    2000000  Internal
fe80::7816:7bff:fe60:201 memif-0/1/2/12

```

Example 3: Summary view of the IS-IS routes for the specified instance and address family (IPv4 unicast).

```

supervisor@rtbrick>LEAF01: op> show isis route instance default ipv4 unicast
Instance: default, AFI: ipv4, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  10.0.16.0/31          1    1000000  Internal      n/a
local
  10.0.27.0/31          1    2000000  Internal      10.4.12.1
memif-0/1/2/12
  10.0.68.0/31          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  10.0.69.0/31          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  10.4.12.0/31          1    1000000  Internal      n/a
local
  192.0.0.6/32          1    2000000  Internal      10.0.16.1
memif-0/1/6/16
  192.1.4.1/32          1    1000000  Internal      n/a
local
  192.1.4.2/32          1    2000000  Internal      10.4.12.1
memif-0/1/2/12
supervisor@rtbrick>LEAF01: op>

```

Example 4: Summary view of the IS-IS routes for the specified instance and address family (IPv4 labeled-unicast).

```

supervisor@rtbrick>LEAF01: op> show isis route instance default ipv4 labeled-
unicast
Instance: default, AFI: ipv4, SAFI: labeled-unicast
  Prefix                Level  Metric  SID Index      Next Hop
Interface              Label
  192.0.0.6/32          1    2000000        6    10.0.16.1
memif-0/1/6/16         10006
  192.1.4.2/32          1    2000000        2    10.4.12.1
memif-0/1/2/12         10002

```

Example 5: Summary view of the IS-IS routes for the specified instance and address family (IPv6 unicast).

```

supervisor@rtbrick>LEAF01: op> show isis route instance default ipv6 unicast
Instance: default, AFI: ipv6, SAFI: unicast
  Prefix                Level  Metric  Type           Next Hop
Interface
  192:1:4::1/128        1    1000000  Internal      n/a
local
  192:1:4::2/128        1    2000000  Internal
fe80::7816:7bff:fe60:201 memif-0/1/2/12

```

### 3.1.7. IS-IS Segment Routing

#### Syntax:

**show isis segment-routing** <option>

Option	Description
global-block	Displays Segment routing global block (SRGB) information
global-block instance <instance>	Displays Segment routing global block (SRGB) information for the specified instance
label-binding	Displays the IS-IS segment routing label bindings information
label-binding instance <instance>	Displays the IS-IS segment routing label bindings for the specified instance
prefix-segment	Displays the IS-IS prefix segments information
prefix-segment <instance>	Displays the IS-IS prefix segments for the specified instance
adjacency-segment	Displays the IS-IS segment routing adjacency SIDs

## Example 1: Summary view of the IS-IS segment routing global block

```

supervisor@rtbrick>LEAF01: op> show isis segment-routing global-block
Instance: default, Level: 1
  System          SRGB Base   SRGB Range
  isr1             1000        1000
  isr2             2000        1000
  isr5             5000        1000
  isr6             6000        1000
Instance: default, Level: 2
  System          SRGB Base   SRGB Range
  isr2             2000        1000
  isr3             3000        1000
  isr4             4000        1000
  isr5             5000        1000

```

## Example 2: Summary view of the IS-IS segment routing label binding



```

supervisor@rtbrick>LEAF01: op> show isis segment-routing label-binding
Instance: default, Level: 1
  System          Prefix          Range  SID
Flags
  isr1            10.1.1.0/24    3      10
None
  isr2            20.1.1.0/24    3      20
None
Instance: default, Level: 2
  System          Prefix          Range  SID
Flags
  isr2            10.1.1.0/24    3      10
Re-advertisement
  isr5            10.1.1.0/24    3      10
Re-advertisement
  isr5            20.1.1.0/24    3      20
Re-advertisement

```

### Example 3: Summary view of the IS-IS segment routing prefix segment

```

supervisor@rtbrick>LEAF01: op> show isis segment-routing prefix-segment
Instance: default, Level: 1
  System          Prefix          SID
Flags
  isr1            192.168.1.1/32  100
Node
  isr1            192:168:1::1/128 102
Node
  isr2            192.168.1.2/32  200
Node
  isr2            192:168:1::2/128 202
Node
Instance: default, Level: 2
  System          Prefix          SID
Flags
  isr2            192.168.1.1/32  100
Re-advertisement, Node
  isr2            192.168.1.2/32  200
Node
  isr2            192.168.1.5/32  500
Re-advertisement, Node
  isr2            192.168.1.6/32  600
Re-advertisement, Node
  isr2            192:168:1::1/128 102
Re-advertisement, Node

```

### Example 4: Summary view of the IS-IS segment routing adjacency-segment

```

supervisor@rtbrick>LEAF01: op> show isis segment-routing adjacency-segment
Instance: ip2vrf, Level: 1
  System          Label  Flags
  isr1            11116  Value, Local, Persistent
  isr1            11117  Ipv6 Encapsulation, Value, Local,
Persistent
  isr2            11112  Value, Local, Persistent
Instance: ip2vrf, Level: 2
  System          Label  Flags

```

### 3.1.8. IS-IS SPF

#### Syntax:

**show isis spf** <option>

Option	Description
result	Displays a summary of the IS-IS SPF results
result <instance>	Displays a summary of the IS-IS SPF results for the specified instance
result [level-1/level2]	Displays a summary of the IS-IS SPF results for the specified level.

#### Example 1: Summary view of the IS-IS SPF result

```

supervisor@rtbrick>LEAF01: op> show isis spf result
Instance: default, Level: 1
  Destination Node      Metric      Neighbor Node      Interface
Nexthop  Address
  1920.0000.0006.00      1000000      1920.0000.0006.00  memif-0/1/6/16
IPv4      10.0.16.1
                                           1920.0000.0006.00  memif-0/1/6/16
IPv6      fe80::785c:e4ff:fe60:601
  1920.0100.4001.00      0
  1920.0100.4002.00      1000000      1920.0100.4002.00  memif-0/1/2/12
IPv6      fe80::7816:7bff:fe60:201
                                           1920.0100.4002.00  memif-0/1/2/12
IPv4      10.4.12.1
Instance: default, Level: 2
  Destination Node      Metric      Neighbor Node      Interface
Nexthop  Address
  1920.0100.4001.00      0
supervisor@rtbrick>LEAF01: op>

```

#### Example 2: Summary view of the IS-IS SPF result for level-1

```

supervisor@rtbrick>LEAF01: op> show isis spf result level-1
Instance: default, Level: 1
  Destination Node      Metric      Neighbor Node      Interface
  Nexthop  Address
  1920.0000.0006.00    1000000    1920.0000.0006.00  memif-0/1/6/16
IPv4      10.0.16.1
                                           1920.0000.0006.00  memif-0/1/6/16

IPv6      fe80::785c:e4ff:fe60:601
  1920.0100.4001.00          0          local
  1920.0100.4002.00    1000000    1920.0100.4002.00  memif-0/1/2/12
IPv6      fe80::7816:7bff:fe60:201
                                           1920.0100.4002.00  memif-0/1/2/12

IPv4      10.4.12.1
supervisor@rtbrick>LEAF01: op>

```

### Example 3: Summary view of the IS-IS SPF result for level-2

```

supervisor@rtbrick>LEAF01: op> show isis spf result level-2
Instance: default, Level: 2
  Destination Node      Metric      Neighbor Node      Interface
  Nexthop  Address
  1920.0100.4001.00          0          local
supervisor@rtbrick>LEAF01: op>

```

### Example 4: Summary view of the IS-IS SPF result of a specific instance for level-1

```

supervisor@rtbrick>LEAF01: op> show isis spf result instance default level-1
Instance: default, Level: 1
  Destination Node      Metric      Neighbor Node      Interface
  Nexthop  Address
  1920.0000.0006.00    1000000    1920.0000.0006.00  memif-0/1/6/16
IPv4      10.0.16.1
                                           1920.0000.0006.00  memif-0/1/6/16

IPv6      fe80::785c:e4ff:fe60:601
  1920.0100.4001.00          0          local
  1920.0100.4002.00    1000000    1920.0100.4002.00  memif-0/1/2/12
IPv6      fe80::7816:7bff:fe60:201
                                           1920.0100.4002.00  memif-0/1/2/12

IPv4      10.4.12.1
supervisor@rtbrick>LEAF01: op>

```

### Example 5: Summary view of the IS-IS SPF result of a specific instance for level-2

```

supervisor@rtbrick>LEAF01: op> show isis spf result instance default level-2
Instance: default, Level: 2
  Destination Node      Metric      Neighbor Node      Interface
  Nexthop  Address
  1920.0100.4001.00          0          local
supervisor@rtbrick>LEAF01: op>

```

## 3.2. IS-IS Clear Commands

Clear commands allow to reset operational states.

### 3.2.1. IS-IS Interface

**Syntax:**

**clear isis interface** <option> ...

Option	Description
statistics	Clears the statistics of all IS-IS interfaces.

Example: The example below shows how to clear IS-IS interface statistics.

```
supervisor@rtbrick>LEAF01: op> clear isis interface statistics
```

### 3.2.2. IS-IS Neighbor

**Syntax:**

**clear isis neighbor** <option> ...

Option	Description
neighbor	Clears neighbors of the default instance
neighbor instance <instance_name>	Clears neighbors of the specified instance
neighbor instance <instance_name> interface <interface- name>	Clears the specified interface of a specified neighbor instance

Example: The example below shows how to clear neighbors of the specified instance

```
supervisor@rtbrick>LEAF01: op> clear isis neighbor instance default
```