



## Multicast Live-Live

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The Multicast Live-Live feature delivers two multicast streams with the same content over diverse paths in the network. This functionality reduces packet loss due to network failures on any one of the paths.

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for Multicast Live-Live

- The Multicast Live-Live feature requires multitopology Interior Gateway Protocol (IGP) support.

## Restrictions for Multicast Live-Live

- Multicast traffic splitting and merging is the responsibility of the application. Applications that use multicast technology include video conferencing, corporate communications, distance learning, and distribution of software, stock quotes, and news.
- Multicast Live-Live is supported for the IPv4 multicast address family.
- Multicast Live-Live is supported for global Virtual Routing and Forwarding (VRF).
- Multicast Live-Live is supported for Protocol Independent Multicast Source-Specific Multicast (PIM-SSM) mode and PIM Sparse Mode (PIM-SM).
- Multicast Live-Live is supported for the Intermediate System-to-Intermediate System (IS-IS) IGP.

## Information About Multicast Live-Live

### Overview of Multicast Live-Live

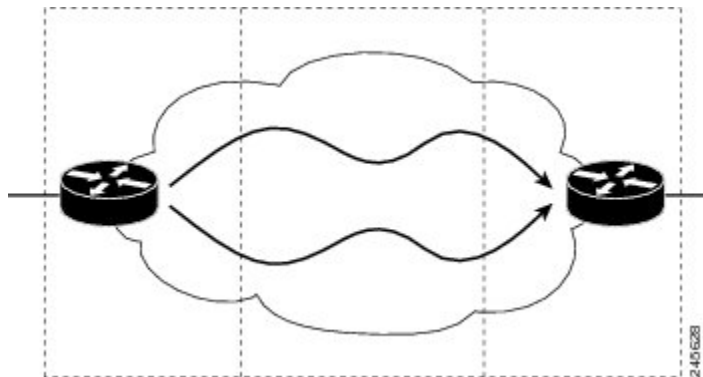
This feature delivers two multicast streams with the same content over diverse paths in the network. This functionality reduces packet loss due to network failures on any one of the paths. The feature uses multitopology IGP technology in order to deliver the two streams over diverse paths.

The Multicast Live-Live feature can be divided into three distinct processes as shown in the figure. The processes are visually separated by vertical lines in the figure.

- The first process consists of splitting the multicast stream into dual streams. The splitting is performed by the application.
- The second process consists of transmitting the dual streams over the network. Topology selection for transmitting these dual streams can be done in two different ways:
  - Multicast topology selection by group range: This action allows multicast Reverse Path Forwarding (RPF) lookups to perform the RPF check against more than one RPF topology.
  - Multicast topology selection by source prefix: This action allows the replication of routes from more than one (unicast) topology into multicast topology.

- The third process consists of merging the streams that have been split. The merging is performed by the application.

**Figure 1: Overview of Multicast Live-Live**



# How to Configure Multicast Live-Live

## Configuring a Multicast Topology

Perform this task to configure a multicast topology.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip multicast-routing**
4. **ip multicast rpf multitopology**
5. **global-address-family ipv4 multicast**
6. **topology { base | topology-name }**
7. Repeat Step 6 to configure another global topology instance.
8. **exit**
9. **interface type number**
10. **ip address ip-address mask [secondary [vrf vrf-name]]**
11. **ip pim sparse-dense-mode**
12. **ip router isis**
13. **topology ipv4 [multicast | unicast] { topology-name [disable] | base}**
14. **exit**
15. Repeat Steps 9 through 14 for each interface to be configured.
16. **end**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ip multicast-routing</b>  <b>Example:</b> Device(config)# ip multicast-routing	Enables IP multicast routing.
<b>Step 4</b>	<b>ip multicast rpf mult topology</b>  <b>Example:</b> Device(config)# ip multicast rpf mult topology	Enables multicast RPF lookup in multiple topologies.
<b>Step 5</b>	<b>global-address-family ipv4 multicast</b>  <b>Example:</b> Device(config)# global-address-family ipv4 multicast	Enters global address family configuration mode to configure a topology.
<b>Step 6</b>	<b>topology { base   topology-name }</b>  <b>Example:</b> Device(config-af)# topology live-A	Configures a global topology instance.
<b>Step 7</b>	Repeat Step 6 to configure another global topology instance.	--
<b>Step 8</b>	<b>exit</b>  <b>Example:</b> Device(config-af)# exit	Exits global address family configuration mode and returns to global configuration mode.
<b>Step 9</b>	<b>interface type number</b>  <b>Example:</b> Device(config)# interface GigabitEthernet 1/0	Enters interface configuration mode for the specified interface type and number.

	Command or Action	Purpose
<b>Step 10</b>	<b>ip address</b> <i>ip-address</i> <i>mask</i> [ <b>secondary</b> [ <i>vrf vrf-name</i> ]]  <b>Example:</b>  Device(config-if)# ip address 10.1.1.1 255.255.255.0	Sets a primary or secondary IP address for an interface.
<b>Step 11</b>	<b>ip pim sparse-dense-mode</b>  <b>Example:</b>  Device(config-if)# ip pim sparse-dense-mode	Enables PIM sparse dense mode on the interface.
<b>Step 12</b>	<b>ip router isis</b>  <b>Example:</b>  Device(config-if)# ip router isis	Configures an Intermediate System-to-Intermediate System (IS-IS) routing process for IP on the interface.
<b>Step 13</b>	<b>topology ipv4</b> [ <b>multicast</b>   <b>unicast</b> ] { <i>topology-name</i> [ <b>disable</b> ]   <b>base</b> }  <b>Example:</b>  Device(config-if)# topology ipv4 multicast live-A	Configures a topology instance on an interface.
<b>Step 14</b>	<b>exit</b>  <b>Example:</b>  Device(config-if)# exit	Exits interface configuration mode and returns to global configuration mode.
<b>Step 15</b>	Repeat Steps 9 through 14 for each interface to be configured.	--
<b>Step 16</b>	<b>end</b>  <b>Example:</b>  Device(config)# end	Ends the current configuration session and returns to privileged EXEC mode.

## Enabling a Multicast Topology Under IGP

Perform this task to enable a multicast topology under IGP.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router isis**
4. **net *netl***
5. **metric-style wide [transition] [level-1 | level-2 | level-1-2]**
6. **address-family ipv4 multicast**
7. **topology *topology-name* tid *number***
8. **end**
9. **configure terminal**
10. **ip multicast topology {multicast | unicast} *topology-name* tid *topology-number***
11. Repeat Step 10 to assign an additional multicast identifier to a topology.
12. **ip multicast rpf select topology {multicast | unicast} *topology-name* *access-list-number***
13. Repeat Step 12 to specify an additional topology for an RPF lookup.
14. **ip access-list {standard | extended} {access-list-name | *access-list-number* }**
15. **permit *protocol* {{ *source-addr* *source-wildcard* } | object-group *object-group-name* | any | host { *address* | *name* }} {destination-addr *destination-wildcard* } | object-group *object-group-name* | any | host {*address* | *name* }}**
16. Repeat Steps 14 and 15 to enumerate an additional (S,G) mroute entry if required.
17. **end**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>router isis</b>  <b>Example:</b> Device(config)# router isis	Enables the IS-IS routing protocol and specifies an IS-IS process.

	Command or Action	Purpose
<b>Step 4</b>	<b>net</b> <i>net1</i>  <b>Example:</b> Device(config-router)# net 49.1234.1234.1234.00	Configures an IS-IS network entity (NET) for the routing process.
<b>Step 5</b>	<b>metric-style wide [transition] [level-1   level-2   level-1-2]</b>  <b>Example:</b> Device(config-router)# metric-style wide	Configures a device running IS-IS so that it generates and accepts only new-style type, length, value objects (TLVs).
<b>Step 6</b>	<b>address-family ipv4 multicast</b>  <b>Example:</b> Device(config-router)# address-family ipv4 multicast	Enters router address family configuration mode under IS-IS router configuration mode.
<b>Step 7</b>	<b>topology topology-name tid number</b>  <b>Example:</b> Device(config-router-af)# topology live-A tid 10	Enables a multicast topology under IGP.
<b>Step 8</b>	<b>end</b>  <b>Example:</b> Device(config-router-af-topology)# exit	Returns to privileged EXEC mode.
<b>Step 9</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 10</b>	<b>ip multicast topology {multicast   unicast} topology-name tid topology-number</b>  <b>Example:</b> Device(config)# ip multicast topology multicast live-A tid 100	Assigns a multicast topology identifier to a topology.
<b>Step 11</b>	Repeat Step 10 to assign an additional multicast identifier to a topology.	--
<b>Step 12</b>	<b>ip multicast rpf select topology {multicast   unicast} topology-name access-list-number</b>	Associates a multicast topology with a multicast group that has a specific (S,G) mroute entry. The notation of (S,G), pronounced "S comma G,"

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>Device(config)# ip multicast rpf select topology multicast live-A 111</pre>	enumerates a shortest path tree where S is the IP address of the source and G is the multicast group address.
<b>Step 13</b>	Repeat Step 12 to specify an additional topology for an RPF lookup.	--
<b>Step 14</b>	<p><b>ip access-list {standard   extended} {access-list-name   access-list-number }</b></p> <p><b>Example:</b></p> <pre>Device(config)# ip access-list extended 111</pre>	Specifies a (S,G) mroute entry using IP access list.
<b>Step 15</b>	<p><b>permit protocol {{ source-addr source-wildcard }   object-group object-group-name   any   host { address   name }} {destination-addr destination-wildcard }   object-group object-group-name   any   host {address   name }}</b></p> <p><b>Example:</b></p> <pre>Device(config-ext-nacl)# permit ip any 225.1.1.1 0.0.0.0</pre>	Set conditions in the named IP access list that will permit (S,G) mroute entry multicast packets.
<b>Step 16</b>	Repeat Steps 14 and 15 to enumerate an additional (S,G) mroute entry if required.	--
<b>Step 17</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config-ext-nacl)# end</pre>	Returns to privileged EXEC mode.

## Verifying the Configuration of Multicast Live-Live

Perform this task to verify the configuration of the Multicast Live-Live feature.

### SUMMARY STEPS

1. **enable**
2. **show ip multicast topology [ {multicast | unicast} topology-name ]**



## DETAILED STEPS

**Step 1**     **enable**  
Enables privileged EXEC mode.

- Enter your password if prompted.

Device> **enable**

**Step 2**     **show ip multicast topology** [{**multicast** | **unicast**} *topology-name*]  
Enter the **show ip multicast topology** command to display multicast topology information:

**Example:**

```
Device# show ip multicast topology multicast live-A
Topology: ipv4 multicast live-A
TID: 1
   Extended IP ACL: 101
Associated VPN VRF is IPv4 default
```

# Configuration Examples for Multicast Live-Live

## Example Configuring Multicast Live-Live

The following example shows how to configure the Multicast Live-Live feature. In the example, two multicast topologies are enabled under IGP, the multicast topologies are assigned a topology identifier, and each multicast topology identifier is associated with a multicast group that has a specific (S,G) mroute entry.

```
ip multicast-routing
! Enable multi-topology mode
ip multicast rpf multitopology
! Create 2 IPv4 multicast topologies
global-address-family ipv4 multicast
  topology live-A
  topology live-B
interface GigabitEthernet 1/0
 ip address 10.1.1.1 255.255.255.0
 ip pim sparse-dense-mode
 ip router isis
 topology ipv4 multicast live-A
interface GigabitEthernet 2/0
 ip address 2.2.2.2 255.255.255.0
 ip pim sparse-dense-mode
 ip router isis
 topology ipv4 multicast live-B
router isis
 net 49.1234.1234.1234.00
 metric-style wide
 address-family ipv4 multicast
 ! CLIs to enable 2 multicast topologies under IGP
 topology live-A tid 10
 topology live-B tid 20
! CLIs to assign multicast tid to topology
ip multicast topology multicast live-A tid 100
ip multicast topology multicast live-B tid 200
```

```

! CLIs to specify topology for RPF lookup
ip multicast rpf select topology multicast live-A 111
ip multicast rpf select topology multicast live-B 122
! Use IP access-list extended to specify (S, G)
ip access-list extended 111
 permit ip any 225.1.1.1 0.0.0.0
ip access-list extended 122
 permit ip any 239.1.1.1 0.0.0.0

```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Overview of the IP multicast technology area	<a href="#">“IP Multicast Technology Overview”</a>
Concepts, tasks, and examples for configuring an IP multicast network using PIM	<a href="#">“Configuring a Basic IP Multicast Network”</a>
IP multicast commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples	<a href="#">Cisco IOS IP Multicast Command Reference</a>

### Standards

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

### MIBs

MIB	MIBs Link
No new or modified MIBs are supported.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFC	Title
No new or modified RFCs are supported, and support for existing standards has not been modified.	--

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Multicast Live-Live

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for Multicast Live-Live**

Feature Name	Releases	Feature Information
Multicast Live-Live	Cisco IOS XE Release 3.2S 15.2(3)T	The Multicast Live-Live feature delivers two multicast streams with the same content over diverse paths in the network. This functionality reduces packet loss due to network failures on any one of the paths.  The following commands were introduced or modified: <b>debug ip multicast topology</b> , <b>ip multicast rpf select topology</b> , <b>ip multicast topology</b> , <b>show ip multicast topology</b> .

