



## Unidirectional Link Routing Commands

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Use the commands in this chapter to configure and monitor unidirectional link routing. For configuration information and examples of unidirectional link routing, refer to the “Configuring Unidirectional Link Routing” chapter of the *Cisco IOS IP and IP Routing Configuration Guide*.

# ip igmp helper-address (UDL)

To configure Internet Group Management Protocol (IGMP) helping as required for IGMP unidirectional link routing (UDLR), use the **ip igmp helper-address (UDL)** interface configuration command. To disable such report forwarding, use the **no** form of this command.

**ip igmp helper-address udl** *type number*

**no ip igmp helper-address**

Syntax Description	<b>udl</b> <i>type number</i>	Interface type and number of unidirectional interface.				
Defaults	No forwarding occurs.					
Command Modes	Interface configuration					
Command History	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Release</th> <th style="text-align: left;">Modification</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black;">12.0(3)T</td> <td style="border-bottom: 1px solid black;">This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	12.0(3)T	This command was introduced.	
Release	Modification					
12.0(3)T	This command was introduced.					
Usage Guidelines	This command is required on a downstream router on each interface connected to a potential multicast receiver. The command allows the downstream router to helper IGMP reports received from hosts to an upstream router connected to a unidirectional link associated with the configured <i>type</i> and <i>number</i> arguments.					
Examples	<p>The following example configures a helper address on a downstream router:</p> <pre>ip multicast-routing ! ! Interface that receiver is attached to, configure for IGMP reports to be ! helpered for the unidirectional interface. ! interface ethernet 0 description Forward IGMP reports from this interface to UDL querier ip address 14.0.0.2 255.0.0.0 ip pim sparse-dense-mode ip igmp helper-address udl serial 0</pre>					
Related Commands	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Command</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black;"><b>ip igmp unidirectional-link</b></td> <td style="border-bottom: 1px solid black;">Configures an interface to be unidirectional and enables it for IGMP UDLR.</td> </tr> </tbody> </table>	Command	Description	<b>ip igmp unidirectional-link</b>	Configures an interface to be unidirectional and enables it for IGMP UDLR.	
Command	Description					
<b>ip igmp unidirectional-link</b>	Configures an interface to be unidirectional and enables it for IGMP UDLR.					

# ip igmp unidirectional-link

To configure an interface to be unidirectional and enable it for Internet Group Management Protocol (IGMP) unidirectional link routing (UDLR), use the **ip igmp unidirectional-link** interface configuration command. To disable the unidirectional link, use the **no** form of this command.

**ip igmp unidirectional-link**

**no ip igmp unidirectional-link**

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**Syntax Description** This command has no arguments or keywords.

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**Defaults** No unidirectional link routing occurs.

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**Command Modes** Interface configuration

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Release	Modification
12.0(3)T	This command was introduced.

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**Usage Guidelines** One example of when you might configure this command is if you have traffic traveling via a satellite. If you have a small number of receivers, another way to achieve UDLR is to configure a UDLR tunnel. See the **tunnel udlr receive-only** and **tunnel udlr send-only** commands.

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**Examples** The following example configures an upstream router with UDLR on serial interface 0:

```
ip multicast-routing
!
! Unidirectional link
!
interface serial 0
 description Unidirectional to downlink-rtr
 ip address 10.0.0.1 255.0.0.0
 ip pim sparse-dense-mode
 ip igmp unidirectional-link
 no keepalive
```

Related Commands	Command	Description
	<b>ip igmp helper-address (UDL)</b>	Configures IGMP helpering as required for IGMP UDLR.
	<b>ip multicast default-rpf-distance</b>	Changes the distance given to the default RPF interface when configuring IGMP unidirectional link routing.
	<b>show ip igmp udldr</b>	Displays UDLR information for directly connected multicast groups on interfaces that have a unidirectional link helper address configured.
	<b>tunnel udldr receive-only</b>	Configures a unidirectional, GRE tunnel to act as a back channel that can receive messages, when another interface is configured for UDLR to send messages.
	<b>tunnel udldr send-only</b>	Configures a unidirectional, GRE tunnel to act as a back channel that can send messages, when another interface is configured for UDLR to receive messages.

# ip multicast default-rpf-distance

When configuring Internet Group Management Protocol (IGMP) unidirectional link routing, to change the distance given to the default Reverse Path Forwarding (RPF) interface, use the **ip multicast default-rpf-distance** global configuration command. To restore the default value, use the **no** form of this command.

**ip multicast default-rpf-distance** *distance*

**no ip multicast default-rpf-distance**

<b>Syntax Description</b>	<i>distance</i>	Distance given to the default RPF interface. The default value is 15.
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<b>Defaults</b>	The distance default value is 15.
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<b>Command Modes</b>	Global configuration
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<b>Command History</b>	Release	Modification
	12.0(3)T	This command was introduced.

<b>Usage Guidelines</b>	<p>This command is optional. If you want to receive all multicast traffic from all sources on the unidirectional link, as long as 15 is the lowest distance, you need not change the value of 15.</p> <p>The default RPF interface is selected when an IGMP Query is received on a unidirectional link and indicates to the router all sources will RPF to the unidirectional link interface.</p> <p>Any explicit sources learned by routing protocols will take preference as long as their distance is less than the <i>distance</i> argument configured with the <b>ip multicast default-rpf-distance</b> command.</p> <p>You might consider changing the default value for one of the following reasons:</p> <ul style="list-style-type: none"> <li>To make IGMP prefer the unidirectional link, configure a value less than existing routing protocols.</li> <li>If you want to receive multicast packets from sources on interfaces other than the UDL interface, configure a value greater than existing routing protocols' distances to make IGMP prefer the non-unidirectional link.</li> </ul>
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<b>Examples</b>	The following example configures a distance of 20:
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```
ip multicast default-rpf-distance 20
```

<b>Related Commands</b>	Command	Description
	<b>ip igmp unidirectional-link</b>	Configures an interface to be unidirectional and enables it for IGMP UDLR.

# show ip igmp udlr

To display unidirectional link routing (UDLR) information for directly connected multicast groups on interfaces that have a unidirectional link helper address configured, use the **show ip igmp udlr** EXEC command.

**show ip igmp udlr** [*group-name-or-address* | *type number*]

Syntax Description		
	<i>group-name-or-address</i>	(Optional) Name or address of the multicast group for which to show UDLR information.
	<i>type number</i>	(Optional) Interface type and number for which to show UDLR information.

**Command Modes** EXEC

Command History	Release	Modification
	12.0(3)T	This command was introduced.

**Usage Guidelines**

This command displays which groups are being forwarded and received over the unidirectional link.

On the upstream router, this command shows which interface is a UDL interface and which IP multicast groups are being forwarded out that interface. The UDL Reporter is the IP address of the downstream interface on the receiving router. If there is more than one downstream router, this field shows which downstream router forwarded the IGMP host report to the upstream router over the ground-based network. This report is forwarded over the unidirectional link so that all downstream routers know which groups have already have been requested by other downstream routers, so that additional IGMP host reports are suppressed.

On the downstream router, this command (the Interface field) shows which local interface an IGMP host report (from a directly connected host for a specific group) was received on. The UDL Reporter is the IP address of the router that had forwarded the IGMP host report to the upstream router over the ground-based network. The UDL Interfaces column shows the interface on which IP multicast packets are being received.

**Examples** The following is sample output of the **show ip igmp udlr** command on an upstream router:

```
upstream-rtr# show ip igmp udlr

IGMP UDLR Status, UDL Interfaces: Serial0
Group Address   Interface      UDL Reporter   Reporter Expires
224.2.127.254   Serial0       10.0.0.2       00:02:12
224.0.1.40      Serial0       10.0.0.2       00:02:11
225.7.7.7       Serial0       10.0.0.2       00:02:15
```

The following is sample output of the **show ip igmp udlr** command on a downstream router:

```
downstream-rtr# show ip igmp udlr
```

```
IGMP UDLR Status, UDL Interfaces: Serial0
Group Address  Interface      UDL Reporter    Reporter Expires
224.2.127.254  Serial0        10.0.0.2        00:02:49
224.0.1.40     Serial0        10.0.0.2        00:02:48
225.7.7.7      Serial0        10.0.0.2        00:02:52
```

Table 122 describes the significant fields in the first display.

**Table 122** *show ip igmp udlr* Field Descriptions

Field	Description
Group Address	All groups helped by the reporter on the interface.
Interface	Interface type and number to which the group is connected.
UDL Reporter	IP address of the router on the UDL network that is IGMP helping for the group.
Reporter Expires	How soon the reporter will become inactive, in hours:minutes:seconds. This can occur under the following conditions: <ul style="list-style-type: none"> <li>• The reporter has gone down.</li> <li>• The link or network to the reporter has gone down.</li> <li>• The group member attached to the reporter has left the group.</li> </ul>

# tunnel udldr receive-only

To configure a unidirectional, generic routing encapsulation (GRE) tunnel to act as a back channel that can receive messages, when another interface is configured for unidirectional link routing (UDLR) to send messages, use the **tunnel udldr receive-only** interface configuration command. To remove the tunnel, use the **no** form of this command.

**tunnel udldr receive-only** *type number*

**no tunnel udldr receive-only** *type number*

<b>Syntax Description</b>	<i>type number</i>	Interface type and number. Make this <i>type</i> and <i>number</i> match the unidirectional send-only interface type and number specified by the <b>interface</b> command. Thus, when packets are received over the tunnel, the upper layer protocols will believe the packets are received over the unidirectional send-only interface.
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<b>Defaults</b>	No UDLR tunnel is configured.
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.0(3)T	This command was introduced.

<b>Usage Guidelines</b>	<p>Use this command to configure a router that has a unidirectional interface with send-only capabilities. One example of when you might configure this command is if you have traffic traveling via a satellite. The <i>type</i> and <i>number</i> arguments must match the send-only interface type and number specified by the <b>interface</b> command.</p> <p>You must configure the <b>tunnel udldr send-only</b> command at the opposite end of the tunnel.</p> <p>If you have a large number of receivers, you should configure UDLR by an alternative means: IGMP UDLR. See the <b>ip igmp unidirectional-link</b> command.</p>
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<b>Examples</b>	<p>In the following example, Router A (the upstream router) is configured with OSPF and PIM. Serial interface 0 has send-only capability. Therefore, the UDLR tunnel is configured as receive only, and points to Serial 0.</p>
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### Router A

```
ip multicast-routing
!
! Serial0 has send-only capability
!
interface serial 0
 encapsulation hdlc
```

```

ip address 10.1.0.1 255.255.0.0
ip pim sparse-dense-mode
!
! Configure tunnel as receive-only UDLR tunnel.
!
interface tunnel 0
 tunnel source ethernet 0
 tunnel destination <downstream-router>
 tunnel udlr receive-only serial 0
!
! Configure OSPF.
!
router ospf <pid>
 network 10.0.0.0 0.255.255.255 area 0

```

Router B (the downstream router) is configured with OSPF and PIM. Serial interface 1 has receive-only capability. Therefore, the UDLR tunnel is configured as send-only, and points to Serial 1.

### Router B

```

ip multicast-routing
!
! Serial1 has receive-only capability
!
interface serial 1
 encapsulation hdlc
 ip address 10.1.0.2 255.255.0.0
 ip pim sparse-dense-mode

!
! Configure tunnel as send-only UDLR tunnel.
!
interface tunnel 0
 tunnel source ethernet 0
 tunnel destination <upstream-router>
 tunnel udlr send-only serial 1
!
! Configure OSPF.
!
router ospf <pid>
 network 10.0.0.0 0.255.255.255 area 0

```

### Related Commands

Command	Description
<b>interface</b>	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
<b>interface tunnel</b>	Configures a tunnel interface.
<b>ip igmp unidirectional-link</b>	Configures an interface to be unidirectional and enables it for IGMP UDLR.
<b>tunnel udlr send-only</b>	Configures a unidirectional, GRE tunnel to act as a back channel that can send messages, when another interface is configured for UDLR to receive messages.

## tunnel udlr send-only

To configure a unidirectional, generic routing encapsulation (GRE) tunnel to act as a back channel that can send messages, when another interface is configured for unidirectional link routing (UDLR) to receive messages, use the **tunnel udlr send-only** interface configuration command. To remove the tunnel, use the **no** form of this command.

**tunnel udlr send-only** *type number*

**no tunnel udlr send-only** *type number*

<b>Syntax Description</b>	<i>type number</i>	Interface type and number. Make this <i>type</i> and <i>number</i> match the unidirectional receive-only interface type and number specified by the <b>interface</b> command. Thus, when packets are sent by upper layer protocols over the interface, they will be redirected and sent over this GRE tunnel.
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<b>Defaults</b>	No UDLR tunnel is configured.
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.0(3)T	This command was introduced.

<b>Usage Guidelines</b>	Use this command to configure a router that has a unidirectional interface with receive-only capabilities. The UDLR tunnel will act as a back channel. One example of when you might configure this command is if you have traffic traveling via a satellite.
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The *type* and *number* arguments must match the receive-only interface type and number specified by the **interface** command.

You must configure the **tunnel udlr receive-only** command at the opposite end of the tunnel.

<b>Examples</b>	In the following example, Router A (the upstream router) is configured with OSPF and PIM. Serial interface 0 has send-only capability. Therefore, the UDLR tunnel is configured as receive only, and points to Serial 0.
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**Router A**

```

ip multicast-routing
!
! Serial0 has send-only capability
!
interface serial 0
 encapsulation hdlc
 ip address 10.1.0.1 255.255.0.0
 ip pim sparse-dense-mode
!
! Configure tunnel as receive-only UDLR tunnel.
!
interface tunnel 0
 tunnel source ethernet 0
 tunnel destination <downstream-router>
 tunnel udlr receive-only serial 0

```

Router B (the downstream router) is configured with OSPF and PIM. Serial interface 1 has receive-only capability. Therefore, the UDLR tunnel is configured as send-only, and points to Serial 1.

**Router B**

```

ip multicast-routing
!
! Serial1 has receive-only capability
!
interface serial 1
 encapsulation hdlc
 ip address 10.1.0.2 255.255.0.0
 ip pim sparse-dense-mode
!
! Configure tunnel as send-only UDLR tunnel.
!
interface tunnel 0
 tunnel source ethernet 0
 tunnel destination <upstream-router>
 tunnel udlr send-only serial 1

```

**Related Commands**

Command	Description
<b>interface</b>	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
<b>interface tunnel</b>	Configures a tunnel interface.
<b>ip igmp unidirectional-link</b>	Configures an interface to be unidirectional and enables it for IGMP UDLR.
<b>tunnel udlr receive-only</b>	Configures a unidirectional, GRE tunnel to act as a back channel that can receive messages, when another interface is configured for UDLR to send messages.

■ tunnel udlr send-only