ip sap listen

To enable the Cisco IOS software to listen to session directory announcements, use the **ip sap listen** command in interface configuration mode. To disable the function, use the **no** form of this command.

ip sap listen

no ip sap listen

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1	The **ip sdr listen** command was introduced.
12.2	The **ip sdr listen** command was replaced by the **ip sap listen** command.

Usage Guidelines

Cisco IOS software can receive and store Session Description Protocol (SDP) and Session Announcement Protocol (SAP) session announcements.

SAP is a protocol used to announce multicast multimedia conferences and other multicast sessions, and it is used to communicate session setup information to prospective participants. A SAP announcer periodically sends an announcement packet to a well-known multicast address and port. The announcement is sent via multicast with the same scope as the session it is announcing to ensure that the recipients of the announcement can also be recipients of the session the announcement describes. SAP should be used for sessions of public interest where participants are not known in advance.

When the **ip sap listen** command is configured on an interface, the well-known session directory groups on that interface can receive and store session announcements. Each announcer listens to other announcements in order to determine the total number of sessions being announced on a particular group, and the interfaces are put into the outgoing interface list for the IP SAP group. The announcements can be displayed with the **show ip sap** command. The **ip multicast rate-limit** command uses stored session announcements. To configure the period of time after which received announcements will expire, use the **ip sap cache-timeout** command.

When the **no ip multicast routing** command is configured, announcements are only stored if they are received on an interface configured with the **ip sap listen** command. When a system is configured as a multicast router, it is sufficient to configure the **ip sap listen** command on only a single multicast-enabled interface. The well-known session directory groups are handled as local joined groups after the **ip sap listen** command is first configured. (See the L flag of the **show ip mroute** command.) This configuration causes announcements received from all multicast-enabled interfaces to be routed and stored within the system.

Examples

The following example shows how to enable a router to listen to session directory announcements:

```
ip routing

interface loopback 0
ip address 10.0.0.51 255.255.255.0
ip pim sparse-dense mode
ip sap listen
```

Related Commands

Command	Description
clear ip sap	Deletes a SAP cache entry or the entire SAP cache.
ip multicast rate-limit	Controls the rate a sender from the source list can send to a multicast group in the group list.
ip sap cache-timeout	Limits how long a SAP cache entry stays active in the cache.
show ip sap	Displays the SAP cache.

ip sdr cache-timeout

The **ip sdr cache-timeout** command is replaced by the **ip sap cache-timeout** command. See the description of the **ip sap cache-timeout** command in this chapter for more information.

ip sdr listen

The **ip sdr listen** command is replaced by the **ip sap listen** command. See the description of the **ip sap listen** command in this chapter for more information.

ip urd

To enable interception of TCP packets sent to the reserved URL Rendezvous Directory (URD) port 465 on an interface and processing of URD channel subscription reports, use the **ip urd** command in interface configuration mode. To disable URD on an interface, use the **no** form of this command.

ip urd [**proxy**]

no ip urd [**proxy**]

Syntax Description

proxy	(Optional) Allows an interface to accept URL requests from any TCP connection sent to that interface. If the **proxy** keyword is not configured, the interface will accept URL requests from TCP connections only if the requests originated from directly connected hosts. The **proxy** option must be enabled on an interface if it is unnumbered or if it has downstream routers configured with Internet Group Managment Protocol (IGMP) proxy routing. To prevent users on the backbone from creating URD state on your router, do not enable the **proxy** option on a backbone interface of your router.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.1(3)T	This command was introduced.

Usage Guidelines

To use this command, you must first define a Source Specific Multicast (SSM) range of IP addresses using the **ip pim ssm** global configuration command. When URD is enabled, it is supported in the SSM range of addresses only. We recommend that you not enable URD on backbone interfaces, but only on interfaces connecting to hosts.

URD functionality is available for multicast process switching, fast switching, and distributed fast-switching paths.

Examples

The following example shows how to configure URD on Ethernet interface 3/3:

```
interface ethernet 3/3
ip urd
```

Related Commands

Command	Description
ip pim ssm	Defines the SSM range of IP multicast addresses.

show frame-relay ip rtp header-compression

To show Frame Relay Real-Time Transport Protocol (RTP) header compression statistics, use the **show frame-relay ip rtp header-compression** command in EXEC mode.

show frame-relay ip rtp header-compression [**interface** *type number*]

Syntax Description

interface *type number*	(Optional) Interface type and number.

Command Modes

EXEC

Command History

Release	Modification
11.3	This command was introduced.

Examples

The following is sample output from the **show frame-relay ip rtp header-compression** command:

```
Router# show frame-relay ip rtp header-compression

DLCI 17  Link/Destination info: ip 165.3.3.2
  Interface Serial0:
    Rcvd:    0 total, 0 compressed, 0 errors
             0 dropped, 0 buffer copies, 0 buffer failures
    Sent:    6000 total, 5998 compressed,
             227922 bytes saved, 251918 bytes sent
             1.90 efficiency improvement factor
    Connect: 16 rx slots, 16 tx slots, 2 long searches, 2 misses
             99% hit ratio, five minute miss rate 0 misses/sec, 0 max
```

Table 3 describes the significant fields shown in the display.

Table 3 show frame-relay ip rtp header-compression Field Descriptions

Field	Description
Interface Serial0	Type and number of the interface.
Rcvd: total	Number of packets received on the interface.
compressed	Number of packets with compressed header.
errors	Number of errors.
dropped	Number of dropped packets.
buffer copies	Number of buffers that were copied.
buffer failures	Number of failures in allocating buffers.
Sent: total	Total number of packets sent.
compressed	Number of packets sent with compressed header.
bytes saved	Total savings in bytes due to compression.
bytes sent	Total bytes sent after compression.

Table 3 show frame-relay ip rtp header-compression Field Descriptions (continued)

Field	Description
efficiency improvement factor	Compression efficiency.
Connect: rx slots	Total number of receive slots.
tx slots	Total number of transmit slots.
long searches	Searches that needed more than one lookup.
misses	Number of new states that were created.
hit ratio	Number of times existing states were revised.
five minute miss rate	Average miss rate.
max	Maximum miss rate.

Related Commands

Command	Description
frame-relay ip rtp compression-connections	Specifies maximum number of RTP header compression connections on a Frame Relay interface.
frame-relay ip rtp header-compression	Enables RTP header compression for all Frame Relay maps on a physical interface.
frame-relay map ip compress	Enables both RTP and TCP header compression on a link.
frame-relay map ip nocompress	Disables both RTP and TCP header compression on a link.
frame-relay map ip rtp header-compression	Enables RTP header compression per DLCI.
show ip rtp header-compression	Displays RTP header compression statistics.

show ip dvmrp route

To display the contents of the Distance Vector Multicast Routing Protocol (DVMRP) routing table, use the **show ip dvmrp route** command in EXEC mode.

show ip dvmrp route [*name* | *ip-address* | *type number*]

Syntax Description

name | *ip-address*	(Optional) Name or IP address of an entry in the DVMRP routing table.
type number	(Optional) Interface type and number.

Command Modes

EXEC

Command History

Release	Modification
10.3	This command was introduced.

Examples

The following is sample output of the **show ip dvmrp route** command:

```
Router# show ip dvmrp route

DVMRP Routing Table - 1 entry
171.68.0.0/16 [100/11] uptime 07:55:50, expires 00:02:52
    via 137.39.3.93, Tunnel3
```

Table 4 describes the significant fields shown in the display.

Table 4 show ip dvmrp route Field Descriptions

Field	Description
1 entry	Number of entries in the DMVRP routing table.
171.68.0.0/16	Source network.
[100/11]	Administrative distance/metric.
uptime	How long (in hours, minutes, and seconds) that the route has been in the DVMRP routing table.
expires	How long (in hours, minutes, and seconds) until the entry is removed from the DVMRP routing table.
via 137.39.3.93	Next hop router to the source network.
Tunnel3	Interface to the source network.

Related Commands

Command	Description
ip dvmrp accept-filter	Configures an acceptance filter for incoming DVMRP reports.

show ip igmp groups

To display the multicast groups with receivers that are directly connected to the router and that were learned through Internet Group Management Protocol (IGMP), use the **show ip igmp groups** command in EXEC mode.

show ip igmp groups [*group-name* | *group-address* | *type number*] [**detail**]

Syntax Description

group-name	(Optional) Name of the multicast group, as defined in the Domain Name System (DNS) hosts table.
group-address	(Optional) Address of the multicast group. This is a multicast IP address in four-part, dotted notation.
type	(Optional) Interface type.
number	(Optional) Interface number.
detail	(Optional) Provides a detailed description of the sources known through IGMP Version 3 (IGMPv3), IGMP v3lite, or URL Rendezvous Directory (URD).

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.1(3)T	Fields were added to the output of this command to support the Source Specific Multicast (SSM) feature.
12.1(5)T	The **detail** keyword was added.

Usage Guidelines

If you omit all optional arguments and keywords, the **show ip igmp groups** command displays by group address, interface type, and interface number all directly connected multicast groups.

Examples

The following is sample output from the **show ip igmp groups** command:

```
Router# show ip igmp groups

IGMP Connected Group Membership
Group Address     Interface         Uptime      Expires     Last Reporter
239.255.255.254   Ethernet3/1       1w0d        00:02:19    172.21.200.159
224.0.1.40        Ethernet3/1       1w0d        00:02:15    172.21.200.1
224.0.1.40        Ethernet3/3       1w0d        never       171.69.214.251
224.0.1.1         Ethernet3/1       1w0d        00:02:11    172.21.200.11
224.9.9.2         Ethernet3/1       1w0d        00:02:10    172.21.200.155
232.1.1.1         Ethernet3/1       5d21h       stopped     172.21.200.206
```

The following is sample output from the **show ip igmp groups** command with the *group-address* argument and **detail** keyword:

```
Router# show ip igmp groups 232.1.1.1 detail
```

```
Interface:      Ethernet3/2
Group:          232.1.1.1
Uptime:         01:58:28
Group mode:     INCLUDE
Last reporter:  10.0.119.133
CSR Grp Exp:    00:02:38
Group source list: (C - Cisco Src Report, U - URD, R - Remote)
  Source Address   Uptime    v3 Exp    CSR Exp   Fwd  Flags
  171.69.214.1     01:58:28  stopped   00:02:31  Yes  C
```

Table 5 describes the significant fields shown in the displays.

Table 5 show ip igmp groups Field Descriptions

Field	Description
Group Address	Address of the multicast group.
Interface	Interface through which the group is reachable.
Uptime	How long (in weeks, days, hours, minutes, and seconds) this multicast group has been known.
Expires	How long (in hours, minutes, and seconds) until the entry expires. If an entry expires, then it will (for a short period) show the word “now” before it is removed. The word “never” indicates that the entry will not time out, because a local receiver is on this router for this entry. The word “stopped” indicates that timing out of this entry is not determined by this expire timer. If the router is in INCLUDE mode for a group, then the whole group entry will time out after the last source entry has timed out (unless the mode is changed to EXCLUDE mode before it times out).
Last Reporter	Last host to report being a member of the multicast group. Both IGMP v3lite and URD require a v2-report.
Group mode:	Can be either INCLUDE or EXCLUDE. The group mode is based on the type of membership reports received on the interface for the group. In the output for the **show ip igmp groups detail** command, the EXCLUDE mode also shows the “Expires:” field for the group entry (not shown in the output).
CSR Grp Exp	This field is shown for multicast groups in the Source Specific Multicast (SSM) range. It indicates the time (in hours, minutes, and seconds) since the last received group membership report was received. Cisco IOS software needs to use these reports for the operation of URD and IGMP v3lite, but they do not indicate group membership by themselves.
Group source list:	Provides details of which sources have been requested by the multicast group.
Source Address	IP address of the source.
Uptime	Indicates the time since the source state was created.

Table 5 show ip igmp groups Field Descriptions (continued)

Field	Description
v3 Exp	Indicates the time (in hours, minutes, and seconds) until the membership for the source will time out according to IGMP operations. The word “stopped” is shown if no member uses IGMPv3 (but only IGMP v3lite or URD).
CSR Exp	Indicates the time (in hours, minutes, and seconds) until the membership for the source will time out according to IGMP v3lite or URD reports. The word “stopped” is shown if members use only IGMPv3.
Fwd	Indicates whether the router is forwarding multicast traffic due to this entry.
Flags	Information about the entry. The Remote flag indicates that an IGMPv3 report has been received by this source. The C flag indicates that an IGMP v3lite or URD report was received by this source. The U flag indicates that a URD report was received for this source.

Related Commands

Command	Description
ip igmp query-interval	Configures the frequency at which the Cisco IOS software sends IGMP host query messages.

show ip igmp interface

To display multicast-related information about an interface, use the **show ip igmp interface** command in EXEC mode.

show ip igmp interface [*type number*]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If you omit the optional arguments, the **show ip igmp interface** command displays information about all interfaces.

This command also displays information about dynamically learned Distance Vector Multicast Routing Protocol (DVMRP) routers on the interface.

Examples

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

```
Router# show ip igmp interface

Ethernet0 is up, line protocol is up
  Internet address is 198.92.37.6, subnet mask is 255.255.255.0
  IGMP is enabled on interface
  IGMP query interval is 60 seconds
  Inbound IGMP access group is not set
  Multicast routing is enabled on interface
  Multicast TTL threshold is 0
  Multicast designated router (DR) is 198.92.37.33
  No multicast groups joined
Ethernet1 is up, line protocol is up
  Internet address is 198.92.36.129, subnet mask is 255.255.255.0
  IGMP is enabled on interface
  IGMP query interval is 60 seconds
  Inbound IGMP access group is not set
  Multicast routing is enabled on interface
  Multicast TTL threshold is 0
  Multicast designated router (DR) is 198.92.36.131
  Multicast groups joined: 225.2.2.2 226.2.2.2
```

```
Tunnel0 is up, line protocol is up
  Internet address is 10.1.37.2, subnet mask is 255.255.0.0
  IGMP is enabled on interface
  IGMP query interval is 60 seconds
  Inbound IGMP access group is not set
  Multicast routing is enabled on interface
  Multicast TTL threshold is 0
  No multicast groups joined
```

Table 6 describes the significant fields shown in the display.

Table 6 show ip igmp interface Field Descriptions

Field	Description
Ethernet0 is up, line protocol is up	Interface type, number, and status.
Internet address is... subnet mask is...	Internet address of the interface and subnet mask being applied to the interface, as specified with the **ip address** command.
IGMP is enabled on interface	Indicates whether IGMP has been enabled on the interface with the **ip pim** command.
IGMP query interval is 60 seconds	Interval at which the Cisco IOS software sends Protocol Independent Multicast (PIM) router query messages, as specified with the **ip igmp query-interval** command.
Inbound IGMP access group is not set	Indicates whether an IGMP access group has been configured with the **ip igmp access-group** command.
Multicast routing is enabled on interface	Indicates whether multicast routing has been enabled on the interface with the **ip pim** command.
Multicast TTL threshold is 0	Packet time-to-threshold, as specified with the **ip multicast ttl-threshold** command.
Multicast designated router (DR) is...	IP address of the designated router for this LAN segment (subnet).
No multicast groups joined	Indicates whether this interface is a member of any multicast groups and, if so, lists the IP addresses of the groups.

Related Commands

Command	Description
ip address	Sets a primary or secondary IP address for an interface.
ip igmp access-group	Controls the multicast groups that hosts on the subnet serviced by an interface can join.
ip igmp query-interval	Configures the frequency at which the Cisco IOS software sends IGMP host query messages.
ip multicast ttl-threshold	Configures the TTL threshold of packets being forwarded out an interface.
ip pim	Enables PIM on an interface.

show ip mcache

To display the contents of the IP fast-switching cache, use the **show ip mcache** command in EXEC mode.

show ip mcache [*group-address* | *group-name*] [*source-address* | *source-name*]

Syntax Description

group-address | *group-name*	(Optional) Displays the fast-switching cache for the single group. Can be either a Class D IP address or a Domain Name System (DNS) name.
source-address | *source-name*	(Optional) If the source address or name is also specified, displays a single multicast cache entry. Can be either a unicast IP address or a DNS name.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.

Examples

The following is sample output from the **show ip mcache** command. This entry shows a specific source (wrn-source 204.62.246.73) sending to the World Radio Network group (224.2.143.24).

```
Router# show ip mcache wrn wrn-source

IP Multicast Fast-Switching Cache
(204.62.246.73/32, 224.2.143.24), Fddi0, Last used: 00:00:00
  Ethernet0       MAC Header: 01005E028F1800000C1883D30800
  Ethernet1       MAC Header: 01005E028F1800000C1883D60800
  Ethernet2       MAC Header: 01005E028F1800000C1883D40800
  Ethernet3       MAC Header: 01005E028F1800000C1883D70800
```

The following is sample output from the **show ip mcache** command when multicast distributed switching (MDS) is in effect.

```
Router# show ip mcache

IP Multicast Fast-Switching Cache
(*, 224.2.170.73), Fddi3/0/0, Last used: mds
  Tunnel3         MAC Header: 5000602F9C150000603E473F60AAAA030000000800 (Fddi3/0/0)
  Tunnel0         MAC Header: 5000602F9C150000603E473F60AAAA030000000800 (Fddi3/0/0)
  Tunnel1         MAC Header: 5000602F9C150000603E473F60AAAA030000000800 (Fddi3/0/0)
```

Table 7 describes the significant fields shown in the display.

Table 7 show ip mcache Field Descriptions

Field	Description
204.62.246.73/32 and *	Source address. The asterisk (*) refers to all source addresses.
224.2.143.24 and 224.2.170.73	Destination address.

Table 7 show ip mcache Field Descriptions (continued)

Field	Description
Fddi0	Incoming or expected interface on which the packet should be received.
Last used:	Latest time the entry was accessed for a packet that was successfully fast switched. The word “Semi-fast” indicates that the first part of the outgoing interface list is fast switched and the rest of the list is process level switched.
Ethernet0 MAC Header:	Outgoing interface list and respective MAC header that is used when rewriting the packet for output. If the interface is a tunnel, the MAC header will show the real next hop MAC header and then, in parentheses, the real interface name.

show ip mpacket

To display the contents of the circular cache-header buffer, use the **show ip mpacket** command in EXEC mode.

show ip mpacket [*group-address* | *group-name*] [*source-address* | *source-name*] [**detail**]

Syntax Description

group-address | *group-name*	(Optional) Displays cache headers matching the specified group address or group name.
source-address | *source-name*	(Optional) Displays cache headers matching the specified source address or source name.
detail	(Optional) In addition to the summary information, displays the rest of the IP header fields on an additional line, plus the first 8 bytes after the IP header (usually the User Datagram Protocol [UDP] port numbers).

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command is only applicable when the **ip multicast cache-headers** command is in effect.

Each time this command is entered, a new buffer is allocated. The summary display (when the **detail** keyword is omitted) shows the IP packet identifier, time-to-live (TTL), source and destination IP addresses, and a local time stamp when the packet was received.

The two arguments and one keyword can be used in the same command in any combination.

Examples

The following is sample output of the **show ip mpacket** command with the *group-name* argument:

```
Router # show ip mpacket smallgroup

IP Multicast Header Cache - entry count:6, next index: 7
Key: id/ttl timestamp (name) source group

D782/117 206416.908 (ABC-xy.company.com) 198.15.228.10 224.5.6.7
7302/113 206417.908 (school.edu) 147.12.2.17 224.5.6.7
6CB2/114 206417.412 (MSSRS.company.com) 154.2.19.40 224.5.6.7
D782/117 206417.868 (ABC-xy.company.com) 198.15.228.10 224.5.6.7
E2E9/123 206418.488 (Newman.com) 211.1.8.10 224.5.6.7
1CA7/127 206418.544 (teller.company.com) 192.4.6.10 224.5.6.7
```

Table 8 describes the significant fields shown in the display.

Table 8 show ip mpacket Field Descriptions

Field	Description
entry count	Number of packets cached (one packet for each line in the display). The cache has lines numbered from 0 to 1024.
next index	The index for the next element in the cache.
id	Identification number of the IP packet.
ttl	Current TTL of the packet.
timestamp	Time stamp sequence number of the packet.
(name)	Domain Name System (DNS) name of the source sending to the group. Name appears in parentheses.
source	IP address of the source sending to the group.
group	Multicast group address that the packet is sent to. In this example, the group address is the group name “smallgroup.”

Related Commands

Command	Description
ip multicast cache-headers	Allocates a circular buffer to store IP multicast packet headers that the router receives.

show ip mroute

To display the contents of the IP multicast routing table, use the **show ip mroute** command in EXEC mode.

show ip mroute [*group-address* | *group-name*] [*source-address* | *source-name*] [*type number*] [**summary**] [**count**] [**active** *kbps*]

Syntax Description

group-address | *group-name*	(Optional) IP address or name multicast group as defined in the Domain Name System (DNS) hosts table.
source-address | *source-name*	(Optional) IP address or name of a multicast source.
type number	(Optional) Interface type and number.
summary	(Optional) Displays a one-line, abbreviated summary of each entry in the IP multicast routing table.
count	(Optional) Displays statistics about the group and source, including number of packets, packets per second, average packet size, and bytes per second.
active *kbps*	(Optional) Displays the rate that active sources are sending to multicast groups. Active sources are those sending at the *kbps* value or higher. The *kbps* argument defaults to 4 kbps.

Defaults

The **show ip mroute** command displays all groups and sources.

The **show ip mroute active** command displays all sources sending at a rate greater than or equal to 4 kbps.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.0(5)T	The H flag for Multicast Multilayer Switching (MMLS) was added in the output display.
12.1(3)T	The U, s, and I flags for Source Specific Multicast (SSM) were added in the output display.

Usage Guidelines

If you omit all optional arguments and keywords, the **show ip mroute** command displays all entries in the IP multicast routing table.

The Cisco IOS software populates the multicast routing table by creating (S, G) entries from (*, G) entries. The asterisk (*) refers to all source addresses, the “S” refers to a single source address, and the “G” is the destination multicast group address. In creating (S, G) entries, the software uses the best path to that destination group found in the unicast routing table (that is, through Reverse Path Forwarding [RPF]).

The output for the **show ip mroute** command with the **active** keyword will display either positive or negative numbers for the rate pps. The router displays negative numbers when RPF packets fail or when the router observes RPF packtets with an empty OIF list. This type of activity may indicate a multicast routing problem.

Examples

The following is sample output from the **show ip mroute** command for a router operating in dense mode. This output displays the contents of the IP multicast routing table for the multicast group named cbone-audio.

```
Router# show ip mroute cbone-audio

IP Multicast Routing Table
Flags: D - Dense, S - Sparse, C - Connected, L - Local, P - Pruned
       R - RP-bit set, F - Register flag, T - SPT-bit set
Timers: Uptime/Expires
Interface state: Interface, Next-Hop, State/Mode

(*, 224.0.255.1), uptime 0:57:31, expires 0:02:59, RP is 0.0.0.0, flags: DC
  Incoming interface: Null, RPF neighbor 0.0.0.0, Dvmrp
  Outgoing interface list:
    Ethernet0, Forward/Dense, 0:57:31/0:02:52
    Tunnel0, Forward/Dense, 0:56:55/0:01:28

(198.92.37.100/32, 224.0.255.1), uptime 20:20:00, expires 0:02:55, flags: C
  Incoming interface: Tunnel0, RPF neighbor 10.20.37.33, Dvmrp
  Outgoing interface list:
    Ethernet0, Forward/Dense, 20:20:00/0:02:52
```

The following is sample output from the **show ip mroute** command for a router operating in sparse mode:

```
Router# show ip mroute

IP Multicast Routing Table
Flags: D - Dense, S - Sparse, C - Connected, L - Local, P - Pruned
       R - RP-bit set, F - Register flag, T - SPT-bit set
Timers: Uptime/Expires
Interface state: Interface, Next-Hop, State/Mode

(*, 224.0.255.3), uptime 5:29:15, RP is 198.92.37.2, flags: SC
  Incoming interface: Tunnel0, RPF neighbor 10.3.35.1, Dvmrp
  Outgoing interface list:
    Ethernet0, Forward/Sparse, 5:29:15/0:02:57

(198.92.46.0/24, 224.0.255.3), uptime 5:29:15, expires 0:02:59, flags: C
  Incoming interface: Tunnel0, RPF neighbor 10.3.35.1
  Outgoing interface list:
    Ethernet0, Forward/Sparse, 5:29:15/0:02:57
```

The following is sample output from the **show ip mroute** command that shows the virtual circuit descriptor (VCD) value, because an ATM interface with PIM multipoint signalling is enabled:

```
Router# show ip mroute 224.1.1.1

IP Multicast Routing Table
Flags:D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C -
Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J -
Join SPT, M - MSDP created entry, X - Proxy Join Timer Running, A - Advertised via MSDP, U
- URD, I - Received Source Specific Host Report
Outgoing interface flags:H - Hardware switched
Timers:Uptime/Expires
```

```
Interface state:Interface, Next-Hop or VCD, State/Mode

(*, 224.1.1.1), 00:03:57/00:02:54, RP 130.4.101.1, flags: SJ
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    ATM0/0, VCD 14, Forward/Sparse, 00:03:57/00:02:53
```

The following is sample output from the **show ip mroute** command with the **summary** keyword:

```
Router# show ip mroute summary

IP Multicast Routing Table
Flags:D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C -
Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J -
Join SPT, M - MSDP created entry, X - Proxy Join Timer Running, A - Advertised via MSDP, U
- URD, I - Received Source Specific Host Report
Outgoing interface flags:H - Hardware switched
Timers:Uptime/Expires
Interface state:Interface, Next-Hop or VCD, State/Mode

(*, 224.255.255.255), 2d16h/00:02:30, RP 171.69.10.13, flags: SJPC

(*, 224.2.127.253), 00:58:18/00:02:00, RP 171.69.10.13, flags: SJC

(*, 224.1.127.255), 00:58:21/00:02:03, RP 171.69.10.13, flags: SJC

(*, 224.2.127.254), 2d16h/00:00:00, RP 171.69.10.13, flags: SJCL
  (128.9.160.67/32, 224.2.127.254), 00:02:46/00:00:12, flags: CLJT
  (129.48.244.217/32, 224.2.127.254), 00:02:15/00:00:40, flags: CLJT
  (130.207.8.33/32, 224.2.127.254), 00:00:25/00:02:32, flags: CLJT
  (131.243.2.62/32, 224.2.127.254), 00:00:51/00:02:03, flags: CLJT
  (140.173.8.3/32, 224.2.127.254), 00:00:26/00:02:33, flags: CLJT
  (171.69.60.189/32, 224.2.127.254), 00:03:47/00:00:46, flags: CLJT
```

The following is sample output from the **show ip mroute** command with the **active** keyword:

```
Router# show ip mroute active

Active IP Multicast Sources - sending >= 4 kbps

Group: 224.2.127.254, (sdr.cisco.com)
   Source: 146.137.28.69 (mbone.ipd.anl.gov)
     Rate: 1 pps/4 kbps(1sec), 4 kbps(last 1 secs), 4 kbps(life avg)

Group: 224.2.201.241, ACM 97
   Source: 130.129.52.160 (webcast3-e1.acm97.interop.net)
     Rate: 9 pps/93 kbps(1sec), 145 kbps(last 20 secs), 85 kbps(life avg)

Group: 224.2.207.215, ACM 97
   Source: 130.129.52.160 (webcast3-e1.acm97.interop.net)
     Rate: 3 pps/31 kbps(1sec), 63 kbps(last 19 secs), 65 kbps(life avg)
```

The following is sample output from the **show ip mroute** command with the **active** keyword. However, this sample shows negative numbers for the rate pps. The router displays negative numbers when RPF packets fail or for RPF packets with an empty OIF list. The question marks that follow the group and source IP addresses indicate that the domain name could not be resolved.

```
Router# show ip mroute active
Active IP Multicast Sources - sending >= 4 kbps
Group: 239.254.1.0, (?)
   Source: 126.32.1.51 (?)
     Rate: -3373 pps/964 kbps(1sec), 964 kbps(last 0 secs), 163 kbps(life avg)

Group: 239.254.1.1, (?)
   Source: 126.32.1.52 (?)
     Rate: -3373 pps/964 kbps(1sec), 964 kbps(last 0 secs), 163 kbps(life avg)

Group: 239.254.1.2, (?)
   Source: 126.32.1.53 (?)
     Rate: -3832 pps/964 kbps(1sec), 964 kbps(last 0 secs), 162 kbps(life avg)

Group: 239.254.1.4, (?)
   Source: 126.32.65.51 (?)
     Rate: -2579 pps/807 kbps(1sec), 0 kbps(last 10 secs), 141 kbps(life avg)

Group: 239.254.1.5, (?)
   Source: 126.32.65.52 (?)
     Rate: 3061 pps/1420 kbps(1sec), 0 kbps(last 10 secs), 247 kbps(life avg)

Group: 239.254.1.6, (?)
   Source: 126.32.65.53 (?)
     Rate: -2356 pps/807 kbps(1sec), 0 kbps(last 10 secs), 141 kbps(life avg)
```

The following is sample output from the **show ip mroute** command for a router supporting SSM services:

```
Router# show ip mroute 232.6.6.6

IP Multicast Routing Table
Flags:D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C -
Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J -
Join SPT, M - MSDP created entry, X - Proxy Join Timer Running, A - Advertised via MSDP, U
- URD, I - Received Source Specific Host Report
Outgoing interface flags:H - Hardware switched
Timers:Uptime/Expires
Interface state:Interface, Next-Hop or VCD, State/Mode

(*, 232.6.6.6), 00:01:20/00:02:59, RP 0.0.0.0, flags:sSJP
  Incoming interface:Null, RPF nbr 0.0.0.0
  Outgoing interface list:Null

(2.2.2.2, 232.6.6.6), 00:01:20/00:02:59, flags:CTI
  Incoming interface:Ethernet3/3, RPF nbr 0.0.0.0
  Outgoing interface list:
    Ethernet3/1, Forward/Sparse-Dense, 00:00:36/00:02:35
```

Table 9 describes the significant fields shown in the displays.

Table 9 show ip mroute Field Descriptions

Field	Description
Flags:	Provides information about the entry.
D - Dense	Entry is operating in dense mode.
S - Sparse	Entry is operating in sparse mode.
B - Bidir Group	Indicates that a multicast group is operating in bidirectional mode.
s - SSM Group	Indicates that a multicast group is within the SSM range of IP addresses. This flag is reset if the SSM range changes.
C - Connected	A member of the multicast group is present on the directly connected interface.
L - Local	The router itself is a member of the multicast group. Groups are joined locally by the **ip igmp join-group** command (for the configured group), the **ip sap listen** command (for the well-known session directory groups), and rendezvous point (RP) mapping (for the well-known groups 224.0.1.39 and 224.0.1.40). Locally joined groups are not fast switched.
P - Pruned	Route has been pruned. The Cisco IOS software keeps this information so that a downstream member can join the source.
R - RP-bit set	Indicates that the (S, G) entry is pointing toward the RP. This is typically prune state along the shared tree for a particular source.
F - Register flag	Indicates that the software is registering for a multicast source.
T - SPT-bit set	Indicates that packets have been received on the shortest path source tree.

Table 9 show ip mroute Field Descriptions (continued)

Field	Description

J - Join SPT	For (*, G) entries, indicates that the rate of traffic flowing down the shared tree is exceeding the SPT-Threshold set for the group. (The default SPT-Threshold setting is 0 kbps.) When the J - Join shortest path tree (SPT) flag is set, the next (S, G) packet received down the shared tree triggers an (S, G) join in the direction of the source, thereby causing the router to join the source tree.
	
	For (S, G) entries, indicates that the entry was created because the SPT-Threshold for the group was exceeded. When the J - Join SPT flag is set for (S, G) entries, the router monitors the traffic rate on the source tree and attempts to switch back to the shared tree for this source if the traffic rate on the source tree falls below the SPT-Threshold of the group for more than 1 minute.
	
	Note The router measures the traffic rate on the shared tree and compares the measured rate to the SPT-Threshold of the group once every second. If the traffic rate exceeds the SPT-Threshold, the J - Join SPT flag is set on the (*, G) entry until the next measurement of the traffic rate. The flag is cleared when the next packet arrives on the shared tree and a new measurement interval is started.
	
	If the default SPT-Threshold value of 0 kbps is used for the group, the J - Join SPT flag is always set on (*, G) entries and is never cleared. When the default SPT-Threshold value is used, the router immediately switches to the shortest path source tree when traffic from a new source is received.

M - MSDP created entry	Indicates that a (*, G) entry was learned through a Multicast Source Discovery Protocol (MSDP) peer. This flag is only applicable for a rendezvous point (RP) running MSDP.
X - Proxy Join Timer Running	Indicates that the proxy join timer is running. This flag is only set for (S, G) entries of an RP or “turnaround” router. A “turnaround” router is located at the intersection of a shared path (*, G) tree and the shortest path from the source to the RP.
A - Advertised via MSDP	Indicates that an (S, G) entry was advertised through an MSDP peer. This flag is only applicable for an RP running MSDP.
U - URD	Indicates that a URL Rendezvous Directory (URD) channel subscription report was received for the (S, G) entry.
I - Received Source Specific Host Report	Indicates that an (S, G) entry was created by an (S, G) report. This (S, G) report could have been created by Internet Group Management Protocol Version 3 (IGMPv3), URD, or IGMP v3lite. This flag is only set on the designated router (DR).
Outgoing interface flags:	Provides information about the entry.
H - Hardware switched	Indicates that a Multicast Multilayer Switching (MMLS) forwarding path has been established for this entry.

Table 9 show ip mroute Field Descriptions (continued)

Field	Description
Timers:Uptime/Expires	"Uptime" indicates per interface how long (in hours, minutes, and seconds) the entry has been in the IP multicast routing table. "Expires" indicates per interface how long (in hours, minutes, and seconds) until the entry will be removed from the IP multicast routing table.
Interface state:	Indicates the state of the incoming or outgoing interface.
Interface	Indicates the type and number of the interface listed in the incoming or outgoing interface list.
Next-Hop or VCD	"Next-hop" specifies the IP address of the downstream neighbor. "VCD" specifies the virtual circuit descriptor number. "VCD0" means the group is using the static map virtual circuit.
State/Mode	"State" indicates that packets will either be forwarded, pruned, or null on the interface depending on whether there are restrictions due to access lists or a Time To Live (TTL) threshold. "Mode" indicates whether the interface is operating in dense, sparse, or sparse-dense mode.
(*, 224.0.255.1) and (198.92.37.100/32, 224.0.255.1)	Entry in the IP multicast routing table. The entry consists of the IP address of the source router followed by the IP address of the multicast group. An asterisk (*) in place of the source router indicates all sources. Entries in the first format are referred to as (*, G) or "star comma G" entries. Entries in the second format are referred to as (S, G) or "S comma G" entries. (*, G) entries are used to build (S, G) entries.
RP	Address of the RP router. For routers and access servers operating in sparse mode, this address is always 0.0.0.0.
flags:	Information about the entry.
Incoming interface:	Expected interface for a multicast packet from the source. If the packet is not received on this interface, it is discarded.
RPF neighbor or RPF nbr	IP address of the upstream router to the source. Tunneling indicates that this router is sending data to the RP encapsulated in register packets. The hexadecimal number in parentheses indicates to which RP it is registering. Each bit indicates a different RP if multiple RPs per group are used. If an asterisk (*) appears after the IP address in this field, the RPF neighbor has been learned through an assert.
Dvmrp	Indicates if the RPF information is obtained from the Distance Vector Multicast Routing Protocol (DVMRP) routing table. If "Mroute" is displayed, the RPF information is obtained from the static mroutes configuration.
Outgoing interface list:	Interfaces through which packets will be forwarded. When the **ip pim nbma-mode** command is enabled on the interface, the IP address of the Protocol Independent Multicast (PIM) neighbor is also displayed.

The following is sample output from the **show ip mroute** command with the **count** keyword:

```
Router# show ip mroute count

IP Multicast Statistics
4045 routes using 2280688 bytes of memory
41 groups, 97.65 average sources per group
Forwarding Counts:Pkt Count/Pkts per second/Avg Pkt Size/Kilobits per second
Other counts:Total/RPF failed/Other drops(OIF-null, rate-limit etc)

Group:239.0.18.1, Source count:200, Packets forwarded:348232, Packets received:348551
  RP-tree:Forwarding:12/0/218/0, Other:12/0/0
  Source:10.1.1.1/32, Forwarding:1763/1/776/9, Other:1764/0/1
  Source:10.1.1.2/32, Forwarding:1763/1/777/9, Other:1764/0/1
  Source:10.1.1.3/32, Forwarding:1763/1/783/10, Other:1764/0/1
  Source:10.1.1.4/32, Forwarding:1762/1/789/10, Other:1763/0/1
  Source:10.1.1.5/32, Forwarding:1762/1/768/10, Other:1763/0/1
  Source:10.1.1.6/32, Forwarding:1793/1/778/10, Other:1794/0/1
  Source:10.1.1.7/32, Forwarding:1793/1/763/10, Other:1794/0/1
  Source:10.1.1.8/32, Forwarding:1793/1/785/10, Other:1794/0/1
  Source:10.1.1.9/32, Forwarding:1793/1/764/9, Other:1794/0/1
  Source:10.1.1.10/32, Forwarding:1791/1/774/10, Other:1792/0/1
  Source:10.1.2.1/32, Forwarding:1689/1/780/10, Other:1691/0/2
  Source:10.1.2.2/32, Forwarding:1689/1/782/10, Other:1691/0/2
  Source:10.1.2.3/32, Forwarding:1689/1/776/9, Other:1691/0/2
.
.
.

Group:239.0.18.132, Source count:0, Packets forwarded:8810, Packets received:8810
  RP-tree:Forwarding:8810/7/780/49, Other:8810/0/0

Group:239.0.17.132, Source count:0, Packets forwarded:704491, Packets received:704491
  RP-tree:Forwarding:704491/639/782/4009, Other:704491/0/0

Group:239.0.17.133, Source count:0, Packets forwarded:704441, Packets received:704441
  RP-tree:Forwarding:704441/639/782/3988, Other:704441/0/0

Group:239.0.18.133, Source count:0, Packets forwarded:8810, Packets received:8810
  RP-tree:Forwarding:8810/8/786/49, Other:8810/0/0

Group:239.0.18.193, Source count:0, Packets forwarded:0, Packets received:0

Group:239.0.17.193, Source count:0, Packets forwarded:0, Packets received:0

Group:239.0.18.134, Source count:0, Packets forwarded:8803, Packets received:8803
  RP-tree:Forwarding:8803/8/774/49, Other:8803/0/0
```

Note The RP-tree: field is displayed only for non-Source Specific Multicast (SSM) groups that have a (*, G) entry and a positive packet received count.

Table 10 describes the significant fields shown in the display.

Table 10 show ip mroute count Field Descriptions

Field	Description
Group:	Summary statistics for traffic on an IP multicast group G. This row is displayed only for non-SSM groups.
Forwarding Counts:	Statistics on the packets that are received and forwarded to at least one interface. **Note** There is no specific command to clear only the forwarding counters; you can clear only the actual multicast forwarding state with the **clear ip mroute** command. Issuing this command will cause interruption of traffic forwarding.
Pkt Count/	Total number of packets received and forwarded since the multicast forwarding state to which this counter applies was created.
Pkts per second/	Number of packets received and forwarded per second. On an IP multicast fast-switching platform, this number is the number of packets during the last second. Other platforms may use a different approach to calculate this number. Please refer to the platform documentation for more information.
Avg Pkt Size/	Total number of bytes divided by the total number of packets for this multicast forwarding state. There is no direct display for the total number of bytes. You can calculate the total number of bytes by multiplying the average packet size by the packet count.
Kilobits per second	Bytes per second divided by packets per second divided by 1000. On an IP multicast fast switching platform, the number of packets per second is the number of packets during the last second. Other platforms may use a different approach to calculate this number. Please refer to the platform documentation for more information.
Other counts:	Statistics on the received packets. These counters include statistics about the packets received and forwarded and packets received but not forwarded.
Total/	Total number of packets received.
RPF failed/	Number of packets not forwarded due to a failed RPF or acceptance check (when bidir-PIM is configured).
Other drops(OIF-null, rate-limit etc)	Number of packets not forwarded for reasons other than an RPF or acceptance check (such as the OIF list was empty or because the packets were discarded because of a configuration, such as **ip multicast rate-limit**, was enabled).
Group:	Summary information about counters for (*, G) and the range of (S, G) states for one particular group G. The following RP-tree: and Source: output fields contain information about the individual states belonging to this group. **Note** For SSM range groups, the Group: displays are statistical. All SSM range (S, G) states are individual, unrelated SSM channels.

Table 10 show ip mroute count Field Descriptions (continued)

Field	Description
Source count:	Number of (S, G) states for this group G. Individual (S, G) counters are detailed in the Source: output field rows.
Packets forwarded:	The sum of the packets detailed in the Forwarding Counts: fields for this IP multicast group G. This field is the sum of the RP-tree and all Source: fields for this group G.
Packets received:	The sum of packets detailed in the Other counts fields for this IP multicast group G. This field is the sum of the Other count: Pkt Count fields of the RP-tree: and Source: rows for this group G.
RP-tree:	Counters for the (*, G) state of this group G. These counters are displayed only for groups that have a forwarding mode that do not forward packets on the shared tree. These (*,G) groups are bidir-PIM and PIM-SM groups. There are no RP-tree displays for PIM-DM and SSM range groups.
Source:	Counters for an individual (S, G) state of this group G. There are no (S, G) states for bidir-PIM groups.

Related Commands

Command	Description
ip multicast-routing	Enables IP multicast routing or multicast distributed switching.
ip pim	Enables PIM on an interface.
ip pim ssm	Defines the SSM range of IP multicast addresses.

show ip pim bsr-router

To display the bootstrap router (BSR) information, use the **show ip pim bsr-router** command in user EXEC or privileged EXEC mode.

show ip pim [**vrf** *vrf-name*] **bsr-router**

Syntax Description

vrf *vrf-name*	(Optional) Displays BSR information for the Multicast VPN (MVPN) routing and forwarding (MVRF) instance specified for the *vrf-name* argument.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3 T	This command was introduced.
12.0(23)S	The **vrf** keyword and *vrf-name* argument were added.
12.2(13)T	The **vrf** keyword and *vrf-name* argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The output includes elected BSR information and information about the locally configured candidate rendezvous point (RP) advertisement.

Examples

The following is sample output from the **show ip pim bsr-router** command:

```
Router# show ip pim bsr-router

PIMv2 Bootstrap information
This system is the Bootstrap Router (BSR)
  BSR address: 172.16.143.28
  Uptime: 04:37:59, BSR Priority: 4, Hash mask length: 30
  Next bootstrap message in 00:00:03 seconds

Next Cand_RP_advertisement in 00:00:03 seconds.
  RP: 172.16.143.28(Ethernet0), Group acl: 6
```

Table 11 describes the significant fields shown in the display.

Table 11 show ip pim bsr-router Field Descriptions

Field	Description
BSR address	IP address of the BSR.
Uptime	Length of time that this router has been up (in hours, minutes, and seconds).
BSR Priority	Priority as configured in the **ip pim bsr-candidate** command.
Hash mask length	Length of a mask (32 bits maximum) that is to be ANDed with the group address before the hash function is called. This value is configured in the **ip pim bsr-candidate** command.
Next bootstrap message in	Time (in hours, minutes, and seconds) in which the next bootstrap message is due from this BSR.
Next Cand_RP_advertisement in	Time (in hours, minutes, and seconds) in which the next candidate RP advertisement will be sent.
RP	List of IP addresses of RPs.
Group acl	Standard IP access list number that defines the group prefixes that are advertised in association with the RP address. This value is configured in the **ip pim rp-candidate** command.

Related Commands

Command	Description
ip pim bsr-candidate	Configures the router to announce its candidacy as a BSR.
ip pim rp-candidate	Configures the router to advertise itself as a PIM Version 2 candidate RP to the BSR.
show ip pim rp	Displays active RPs that are cached with associated multicast routing entries.
show ip pim rp-hash	Displays which RP is being selected for a specified group.

show ip pim interface

To display information about interfaces configured for Protocol Independent Multicast (PIM), use the **show ip pim interface** command in user EXEC or privileged EXEC mode.

show ip pim [**vrf** *vrf-name*] **interface** [*interface-type interface-number*] [**df** | **count**] [*rp-address*] [**detail**] [**stats**]

Syntax Description

vrf	(Optional) Supports the multicast VPN routing and forwarding (VRF) instance. A space is not required between the values.
vrf-name	(Optional) Name assigned to the VRF.
interface-type interface-number	(Optional) Interface type and number. A space is not required between the values.
df	(Optional) When bidirectional PIM (bidir-PIM) is used, displays the IP address of the elected designated forwarder (DF) for each rendezvous point (RP) of an interface.
count	(Optional) Specifies the number of packets received and sent out the interface.
rp-address	(Optional) RP IP address.
detail	(Optional) Displays PIM details of each interface.
stats	(Optional) Displays multicast PIM interface octet counts.

Defaults

If no interface is specified, all interfaces are displayed.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
11.2(11)GS	This command was integrated into Cisco IOS Release 11.2(11)GS.
12.0(5)T	The flag “H” was added in the output display to indicate that an outgoing interface is hardware-switched in the case of IP multicast Multilayer Switching (MMLS).
12.0(18)ST	This command was integrated into Cisco IOS Release 12.0(18)ST.
12.1(2)T	The **df** keyword and *rp-address* argument were added.
12.1(5)T	The **detail** keyword was added.
12.0(22)S	The command output changed to show when the query interval is set to milliseconds.
12.0(23)S	The **vrf** keyword and *vrf-name* argument were added.
12.2(13)T	The **vrf** keyword and *vrf-name* argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(31)S	The **stats** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command works only on interfaces that are configured for PIM.

Use the **show ip pim interface count** command to display switching counts for Multicast Distributed Switching (MDS) and other fast-switching statistics.

Examples

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

```
Router# show ip pim interface

Address          Interface                Ver/   Nbr    Query  DR     DR
                                          Mode   Count  Intvl  Prior
10.1.0.1         GigabitEthernet0/0       v2/SD  0      30     1      10.1.0.1
10.6.0.1         GigabitEthernet0/1       v2/SD  1      30     1      10.6.0.2
10.2.0.1         ATM1/0.1                 v2/SD  1      30     1      0.0.0.0
```

The following is sample output from the **show ip pim interface** command when an interface is specified:

```
Router# show ip pim interface Ethernet1/0

Address          Interface                Ver/   Nbr    Query  DR     DR
                                          Mode   Count  Intvl  Prior
172.16.1.4       Ethernet1/0              v2/S   1      100 ms 1      172.16.1.4
```

The following is sample output from the **show ip pim interface** command when the **count** keyword is specified:

```
Router# show ip pim interface count

Address          Interface          FS  Mpackets In/Out
172.16.121.35    Ethernet0          *   548305239/13744856
172.16.121.35    Serial0.33         *   8256/67052912
192.168.12.73    Serial0.1719       *   219444/862191
```

The following is sample output from the **show ip pim interface** command when the **count** keyword is specified and IP MMLS is enabled. The example lists the PIM interfaces that are fast switched and process switched, and the packet counts for these interfaces. The H flag is added to interfaces where IP MMLS is enabled.

```
Router# show ip pim interface count

States: FS - Fast Switched, H - Hardware Switched
Address          Interface          FS  Mpackets In/Out
192.168.10.2       Vlan10             * H 40886/0
192.168.11.2       Vlan11             * H 0/40554
192.168.12.2       Vlan12             * H 0/40554
192.168.23.2       Vlan23             *   0/0
192.168.24.2       Vlan24             *   0/0
```

The following is sample output from the **show ip pim interface** command when the **stats** keyword is specified:

```
Router# show ip pim interface stats
```

```
Interface         Mpackets In     Mpackets Out         Octets In        Octets Out

Loopback0                   0                0                  0                 0
Loopback1                   0                0                  0                 0
Ethernet0/0                 0                0                  0                 0
Ethernet0/3                 0                0                  0                 0
Ethernet1/1                 0                0                  0                 0
```

For all of the count descriptions, a packet is counted as a multicast packet if either of the following two conditions are met:

- The IP address contained in the IP header of the packet specifies a multicast (class D) IP address
- The IP address contained in the IP header of the packet specifies an IP address located on this router and the packet contains an encapsulated packet for which the IP header of the encapsulated packet specifies a multicast (class D) IP address.

Table 12 describes the significant fields shown in the display.

Table 12 show ip pim interface stats Field Descriptions

Field	Description
Mpackets In	The number of multicast packets received on each interface listed in the output.
Mpackets Out	The number of multicast packets sent on each interface listed in the output.
Octets In	Cumulative byte count for data bytes (including IP header bytes) contained within multicast packets received on each interface listed in the output.
Octets Out	Cumulative byte count for data bytes (including IP header bytes) contained within multicast packets sent on each interface listed in the output.

The following are two sample outputs from the **show ip pim interface** command when the **df** keyword is specified:

```
Router# show ip pim interface df

Interface          RP               DF Winner        Metric          Uptime
Ethernet3/3        10.10.0.2        10.4.0.2         0               00:03:49
                   10.10.0.3        10.4.0.3         0               00:01:49
                   10.10.0.5        10.4.0.4         409600          00:01:49
Ethernet3/4        10.10.0.2        10.5.0.2         0               00:03:49
                   10.10.0.3        10.5.0.2         409600          00:02:32
                   10.10.0.5        10.5.0.2         435200          00:02:16
Loopback0          10.10.0.2        10.10.0.2        0               00:03:49
                   10.10.0.3        10.10.0.2        409600          00:02:32
                   10.10.0.5        10.10.0.2        435200          00:02:16

Router# show ip pim interface Ethernet3/3 df 10.10.0.3

Designated Forwarder election for Ethernet3/3, 10.4.0.2, RP 10.10.0.3
  State                          Non-DF
  Offer count is                 0
  Current DF ip address          10.4.0.3
  DF winner up time              00:02:33
  Last winner metric preference  0
  Last winner metric             0
```

Table 13 describes the significant fields shown in the displays.

Table 13 show ip pim interface Field Descriptions

Field	Description
Address	Interface IP address of the next hop router.
Interface	Interface type and number that is configured to run PIM.
Ver/Mode	PIM version and multicast mode in which the Cisco IOS software is operating.
Nbr Count	Number of PIM neighbors that have been discovered through this interface. If the Neighbor Count is 1 for a DVMRP tunnel, the neighbor is active (receiving probes and reports).
Query Interval	Frequency, in seconds, of PIM hello messages, as set by the **ip pim query-interval** interface configuration command. The default is 30 seconds.
DR	IP address of the designated router (DR) on a network. **Note** Point-to-point interfaces do not have designated routers, so the IP address would be shown as 0.0.0.0.
FS	An asterisk (*) in this column indicates that fast switching is enabled.
Mpackets In/Out	Number of packets into and out of the interface since the router has been up.
RP	IP address of the RP.
DF Winner	IP address of the elected DF.
Metric	Unicast routing metric to the RP announced by the DF.
Uptime	Length of time the RP has been up, in days and hours. If less than 1 day, time is shown in hours:minutes:seconds.
State	Indicates whether the specified interface is an elected DF.
Offer count is	Number of PIM DF election offer messages that the router has sent out the interface during the current election interval.
Current DF ip address	IP address of the current DF.
DF winner up time	Length of time the current DF has been up, in days and hours. If less than 1 day, time is shown in hours:minutes:seconds.
Last winner metric preference	The preference value used for selecting the unicast routing metric to the RP announced by the DF.
Last winner metric	Unicast routing metric to the RP announced by the DF.

The following is sample output from the **show ip pim interface** command with the **detail** keyword for Fast Ethernet interface 0/1:

```
Router# show ip pim interface fastethernet 0/1 detail

FastEthernet0/1 is up, line protocol is up
  Internet address is 172.16.8.1/24
  Multicast switching:process
  Multicast packets in/out:0/0
  Multicast boundary:not set
  Multicast TTL threshold:0
  PIM:enabled
    PIM version:2, mode:dense
    PIM DR:172.16.8.1 (this system)
    PIM neighbor count:0
    PIM Hello/Query interval:30 seconds
   PIM State-Refresh processing:enabled
```

```
  PIM State-Refresh origination:enabled, interval:60 seconds
  PIM NBMA mode:disabled
  PIM ATM multipoint signalling:disabled
  PIM domain border:disabled
Multicast Tagswitching:disabled
```

Table 14 describes the significant fields shown in the display.

Table 14 show ip pim interface detail Field Descriptions

Field	Description
Internet address	IP address of the specified interface.
Multicast switching:	The type of multicast switching enabled on the interface: process, fast, or distributed.
Multicast boundary:	Indicates whether an administratively scoped boundary is configured.
Multicast TTL threshold:	The time-to-live (TTL) threshold of multicast packets being forwarded out the interface.
PIM:	Indicates whether PIM is enabled or disabled.
PIM version:	Indicates whether PIM version 1 or version 2 is configured.
PIM mode:	Indicates whether PIM sparse mode, dense mode, or sparse-dense mode is configured.
PIM DR:	The IP address of the DR.
PIM State-Refresh processing:	Indicates whether the processing of PIM state refresh control messages is enabled.
PIM State-Refresh origination:	Indicates whether the origination of the PIM state refresh control messages is enabled.
interval:	Indicates the configured interval for the origination of the PIM state refresh control messages. The available interval range is from 4 to 100 seconds.
PIM NBMA mode:	Indicates whether the interface is enabled for nonbroadcast multiaccess (NBMA) mode.
PIM ATM multipoint signalling:	Indicates whether the interface is enabled for ATM multipoint signaling.
PIM domain border:	Indicates whether the interface is enabled as a PIM domain border.
Multicast Tagswitching:	Indicates whether multicast tag switching is enabled.

Related Commands

Command	Description
ip pim	Enables PIM on an interface.
ip pim query-interval	Configures the frequency of PIM router query messages.
ip pim state-refresh disable	Disables the processing and forwarding of PIM dense mode state refresh control messages on a PIM router.
ip pim state-refresh origination-interval	Configures the origination of and the interval for PIM dense mode state refresh control messages on a PIM router.
show ip pim neighbor	Displays information about PIM neighbors.

show ip pim neighbor

To list the Protocol Independent Multicast (PIM) neighbors discovered by the Cisco IOS software, use the **show ip pim neighbor** command in user EXEC or privileged EXEC mode.

show ip pim [**vrf** *vrf-name*] **neighbor** [*interface-type interface-number*]

Syntax Description

vrf	(Optional) Supports the multicast VPN routing and forwarding (VRF) instance.
vrf-name	(Optional) Name assigned to the VRF.
interface-type	(Optional) Interface type.
interface-number	(Optional) Interface number.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.0(22)S	The command output was updated to display the PIM protocol version.
12.0(23)S	The **vrf** keyword and *vrf-name* argument were added.
12.2(13)T	The **vrf** keyword and *vrf-name* argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines

Use this command to determine which routers on the LAN are configured for PIM.

Examples

The following is sample output from the **show ip pim neighbor** command:

```
Router# show ip pim neighbor

PIM Neighbor Table
Neighbor          Interface                Uptime/Expires Ver  DR
Address                                                       Prio/Mode
126.1.33.11       GigabitEthernet2/1     1d11h/00:00:02   v2   N / DR
126.1.34.12       GigabitEthernet2/1     1d11h/00:00:02   v2   N / DR
126.104.20.56     Serial4/1/0/1:0.104    1d11h/00:00:02   v2   1 / S
126.105.20.58     Serial4/1/0/2:0.105    1d00h/00:01:31   v2   1 / S
```

Table 15 describes the significant fields shown in the display.

Table 15 show ip pim neighbor Field Descriptions

Field	Description
Neighbor Address	IP address of the PIM neighbor.
Interface	Interface type and number on which the neighbor is reachable.

Table 15 show ip pim neighbor Field Descriptions (continued)

Field	Description
Uptime/Expires	Uptime shows how long (in hours:minutes:seconds) the entry has been in the PIM neighbor table. Expires shows how long (in hours:minutes:seconds or in milliseconds) until the entry will be removed from the IP multicast routing table.
Ver	PIM protocol version.
DR Prio/Mode	Priority and mode of the designated router (DR). Possible modes are S (state refresh capable), B (bidirectional PIM capable), and N (neighbor doesn't include the DR-Priority Option in its Hello messages).

Related Commands

Command	Description
ip pim state-refresh disable	Disables the processing and forwarding of PIM dense mode state refresh control messages on a PIM router.
ip pim state-refresh origination-interval	Configures the origination of and the interval for the PIM dense mode state refresh control messages on a PIM router.
show ip pim interface	Displays information about interfaces configured for PIM.

show ip pim rp

To display active rendezvous points (RPs) that are cached with associated multicast routing entries, use the **show ip pim rp** command in EXEC mode.

show ip pim rp [**mapping** | [**elected** | **in-use**] | **metric**] [*rp-address*]

Syntax Description

mapping	(Optional) Displays all group-to-RP mappings of which the router is aware (either configured or learned from Auto-RP).
elected	(Optional) Displays only the elected Auto RPs.
in-use	(Optional) Displays the learned RPs in use.
metric	(Optional) Displays the unicast routing metric to the RPs configured statically or learned via Auto-RP or the bootstrap router (BSR).
rp-address	(Optional) RP IP address.

Defaults

If no RP is specified, all active RPs are displayed.

Command Modes

EXEC

Command History

Release	Modification
10.2	This command was introduced.
12.1(2)T	The **metric** keyword and *rp-address* argument were added.

Usage Guidelines

The Protocol Independent Multicast (PIM) version known for an RP influences the type of PIM register messages (version 1 or version 2) that the router sends when acting as the designated router (DR) for an active source. If an RP is statically configured, the PIM version of the RP is not set and the router, if required to send register packets, first tries to send PIM version 2 register packets. If that fails, the router sends PIM version 1 register packets.

The version of the RP displayed in the **show ip pim rp** command output can change according to the operations of the router. When the group is created, the version shown is for the RP in the RP mapping cache. Later, the version displayed by this command may change. If this router is acting as a DR for an active source, the router sends PIM register messages. The PIM register messages are answered by the RP with PIM register stop messages. The router learns from these PIM register stop messages the actual PIM version of the RP. Once the actual PIM version of the RP is learned, this command displays only this version. If the router is not acting as a DR for active sources on this group, then the version shown for the RP of the group does not change. In this case, the PIM version of the RP is irrelevant to the router because the version of the RP influences only the PIM register messages that this router must send.

When you enter the **show ip pim rp mapping** command, the version of the RP displayed in the output is determined only by the method through which an RP is learned. If the RP is learned from Auto-RP then the RP displayed is either “v1” or “v2, v1.” If the RP is learned from a static RP definition, the RP version is undetermined and no RP version is displayed in the output. If the RP is learned from the BSR, the RP version displayed is “v2.”

Use the **elected** keyword on an Auto-RP Mapping Agent to limit the output to only the elected RPs that the mapping agent will advertise to all other routers in the network via Auto-RP. This is useful when comparing the output of the **show ip pim rp mapping** command on non mapping agent routers with the output of the **show ip pim rp mapping elected** command on a mapping agent to verify that the Group-to-RP mapping information is consistent.

Examples

The following is sample output from the **show ip pim rp** command:

```
Router# show ip pim rp

Group:227.7.7.7, RP:10.10.0.2, v2, v1, next RP-reachable in 00:00:48
```

The following is sample output from the **show ip pim rp** command when the **mapping** keyword is specified:

```
Router# show ip pim rp mapping

PIM Group-to-RP Mappings
This system is an RP (Auto-RP)
This system is an RP-mapping agent

Group(s) 227.0.0.0/8
  RP 10.10.0.2 (?), v2v1, bidir
    Info source:10.10.0.2 (?), via Auto-RP
         Uptime:00:01:42, expires:00:00:32
Group(s) 228.0.0.0/8
  RP 10.10.0.3 (?), v2v1, bidir
    Info source:10.10.0.3 (?), via Auto-RP
         Uptime:00:01:26, expires:00:00:34
Group(s) 229.0.0.0/8
  RP 10.10.0.5 (mcast1.cisco.com), v2v1, bidir
    Info source:10.10.0.5 (mcast1.cisco.com), via Auto-RP
         Uptime:00:00:52, expires:00:00:37
Group(s) (-)230.0.0.0/8
  RP 10.10.0.5 (mcast1.cisco.com), v2v1, bidir
    Info source:10.10.0.5 (mcast1.cisco.com), via Auto-RP
         Uptime:00:00:52, expires:00:00:37
```

The following is sample output from the **show ip pim rp** command when the **metric** keyword is specified:

```
Router# show ip pim rp metric

RP Address      Metric Pref    Metric       Flags   RPF Type    Interface
10.10.0.2       0              0              L     unicast     Loopback0
10.10.0.3       90             409600         L     unicast     Ethernet3/3
10.10.0.5       90             435200         L     unicast     Ethernet3/3
```

Table 16 describes the significant fields shown in the displays.

Table 16 show ip pim rp Field Descriptions

Field	Description
Group	Address of the multicast group about which to display RP information.
RP	Address of the RP for that group.
v2	Indicates that the RP is running PIM version 2.
v1	Indicates the RP is running PIM version 1.

Table 16 show ip pim rp Field Descriptions (continued)

Field	Description
next RP-reachable in...	Indicates the time the next RP-reachable message will be sent. Time is expressed in hours:minutes:seconds.
bidir	Indicates that the RP is operating in bidirectional mode.
Info source	RP mapping agent that advertised the mapping.
(?)	Indicates that no Domain Name System (DNS) name has been specified.
via Auto-RP	Indicates that RP was learned via Auto-RP.
Uptime	Length of time the RP has been up (in days and hours). If less than 1 day, time is expressed in hours:minutes:seconds.
expires	Time in (hours: minutes: and seconds) in which the entry will expire.
Metric Pref	The preference value used for selecting the unicast routing metric to the RP announced by the designated forwarder (DF).
Metric	Unicast routing metric to the RP announced by the DF.
Flags	Indicates the flags set for the specified RP. The following are descriptions of possible flags: • C—RP is configured. • L—RP learned via Auto-RP or the BSR.
RPF Type	Routing table from which this route was obtained, either unicast, Distance Vector Multicast Routing Protocol (DVMRP), or static mroute.
Interface	Interface type and number that is configured to run PIM.

show ip pim rp-hash

To display which rendezvous point (RP) is being selected for a specified group, use the **show ip pim rp-hash** command in EXEC mode.

show ip pim rp-hash {*group-address* | *group-name*}

Syntax Description

group-address | *group-name*	Displays the RP information for the specified group address or name as defined in the Domain Name System (DNS) hosts table.

Command Modes

EXEC

Command History

Release	Modification
11.3 T	This command was introduced.

Usage Guidelines

This command displays which RP was selected for the group specified. It also shows whether this RP was selected by Auto-RP or the PIM version 2 bootstrap mechanism.

Examples

The following is sample output from the **show ip pim rp-hash** command with the group address 239.1.1.1 specified:

```
Router# show ip pim rp-hash 239.1.1.1

RP 172.21.24.12 (mt1-47a.cisco.com), v2
    Info source: 172.21.24.12 (mt1-47a.cisco.com), via bootstrap
         Uptime: 05:15:33, expires: 00:02:01
```

Table 17 describes the significant fields shown in the display.

Table 17 show ip pim rp-hash Field Descriptions

Field	Description
RP 172.21.24.12 (mt1-47a.cisco.com), v2	Address of the RP for the group specified (239.1.1.1). Within parentheses is the Domain Name System (DNS) name of the RP. If the address of the RP is not registered in the DNS, a question mark (?) is displayed. PIM version 2 configured.
Info source: 172.21.24.12 (mt1-47a.cisco.com), via bootstrap	Indicates from which system the router learned this RP information, along with the DNS name of the source. RP was selected by the bootstrap mechanism. In this case, the BSR is also the RP.

Table 17 show ip pim rp-hash Field Descriptions (continued)

Field	Description
Uptime	Length of time (in hours, minutes, and seconds) that the router has known about this RP.
expires	Time (in hours, minutes, and seconds) after which the information about this RP expires. If the router does not receive any refresh messages in this time, it will discard information about this RP.

show ip pim vc

To display ATM virtual circuit (VC) status information for multipoint VCs opened by Protocol Independent Multicast (PIM), use the **show ip pim vc** command in EXEC mode.

show ip pim vc [*group-address* | *group-name*] [*type number*]

Syntax Description

group-address | *group-name*	(Optional) IP multicast group or name. Displays only the single group.
type number	(Optional) Interface type and number. Displays only the single ATM interface.

Defaults

Displays VC status information for all ATM interfaces.

Command Modes

EXEC

Command History

Release	Modification
11.3	This command was introduced.

Examples

The following is sample output for the **show ip pim vc** command:

```
Router# show ip pim vc

IP Multicast ATM VC Status
ATM0/0 VC count is 5, max is 200
Group            VCD   Interface    Leaf Count  Rate
224.2.2.2        26    ATM0/0       1           0 pps
224.1.1.1        28    ATM0/0       1           0 pps
224.4.4.4        32    ATM0/0       2           0 pps
224.5.5.5        35    ATM0/0       1           0 pps
```

Table 18 describes the significant fields shown in the display.

Table 18 show ip pim vc Field Descriptions

Field	Description
ATM0/0	ATM slot and port number on the interface.
VC count	Number of VCs opened by PIM.
max	Maximum number of VCs that PIM is allowed to open, as configured by the **ip pim vc-count** command.
Group	IP address of the multicast group to which the router is multicasting.
VCD	Virtual circuit descriptor.
Interface	Outgoing interface.

Table 18 show ip pim vc Field Descriptions (continued)

Field	Description
Leaf Count	Number of routers that have joined the group and are a member of that multipoint VC.
Rate	Rate (in packets per second) as configured by the **ip pim minimum-vc-rate** command.

Related Commands

Command	Description
ip pim multipoint-signalling	Enables PIM to open ATM multipoint switched VCs for each multicast group that a receiver joins.

show ip rpf

To display how IP multicast routing does Reverse Path Forwarding (RPF), use the **show ip rpf** command in EXEC mode.

show ip rpf {*source-address* | *source-name*} [**metric**]

Syntax Description

source-address | *source-name*	Displays the RPF information for the specified source address or name.
metric	(Optional) Displays the unicast routing metric.

Defaults

If no source is specified, all sources are displayed.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.1(2)T	The **metric** keyword was added.

Usage Guidelines

The router can reverse path forward from multiple routing tables (that is, the unicast routing table, Distance Vector Multicast Routing Protocol (DVMRP) routing table, or static mroutes). This command tells you from where the information is retrieved.

Examples

The following is sample output of the **show ip rpf** command:

```
Router# show ip rpf 171.69.10.13

RPF information for sj-eng-mbone.cisco.com (171.69.10.13)
  RPF interface: BRI0
  RPF neighbor: eng-isdn-pri3.cisco.com (171.69.121.10)
  RPF route/mask: 171.69.0.0/255.255.0.0
  RPF type: unicast
  RPF recursion count: 0
  Doing distance-preferred lookups across tables
```

The following is sample output of the **show ip rpf** command when the **metric** keyword is specified:

```
Router# show ip rpf 171.69.10.13 metric

RPF information for sj-eng-mbone.cisco.com (171.69.10.13)
  RPF interface: BRI0
  RPF neighbor: eng-isdn-pri3.cisco.com (171.69.121.10)
  RPF route/mask: 171.69.0.0/255.255.0.0
  RPF type: unicast
  RPF recursion count: 0
  Doing distance-preferred lookups across tables
  Metric preference: 110
  Metric: 11
```

Table 19 describes the significant fields shown in the display.

Table 19 show ip rpf Field Descriptions

Field	Description
RPF information for <host name (source address)>	Host name and source address that this information concerns.
RPF interface	For the given source, interface from which the router expects to get packets.
RPF neighbor	For given source, neighbor from which the router expects to get packets.
RPF route/mask	Route number and mask that matched against this source.
RPF type	Routing table from which this route was obtained, either unicast, DVMRP, or static mroutes.
RPF recursion count	Indicates the number of times the route is recursively resolved.
Doing distance-preferred...	Indicates whether RPF was determined based on distance or length of mask.
Metric preference	The preference value used for selecting the unicast routing metric to the RP announced by the designated forwarder (DF).
Metric	Unicast routing metric to the RP announced by the DF.

show ip rtp header-compression

To show Real-Time Transport Protocol (RTP) header compression statistics, use the **show ip rtp header-compression** command in EXEC mode.

show ip rtp header-compression [*type number*] [**detail**]

Syntax Description

type number	(Optional) Interface type and number.
detail	(Optional) Displays details of each connection.

Command Modes

EXEC

Command History

Release	Modification
11.3	This command was introduced.
12.1(5)T	The command output was modified to include information related to the Distributed Compressed Real-Time Transport Protocol (dCRTP) feature.

Usage Guidelines

The **detail** keyword is not available with the **show ip rtp header-compression** command on a Route Switch Processor (RSP). However, the **detail** keyword is available with the **show ip rtp header-compression** command on a Versatile Interface Processor (VIP). Enter the **show ip rtp header-compression** *type number* **detail** command on a VIP to retrieve detailed information regarding RTP header compression on a specific interface.

Examples

The following is sample output from the **show ip rtp header-compression** command:

```
Router# show ip rtp header-compression

RTP/UDP/IP header compression statistics:
 Interface Serial1:
  Rcvd: 0 total, 0 compressed, 0 errors
     0 dropped, 0 buffer copies, 0 buffer failures
  Sent: 430 total 429 compressed,
     15122 bytes saved, 139318 bytes sent
     1.10 efficiency improvement factor
  Connect: 16 rx slots, 16 tx slots, 1 long searches, 1 misses
     99% hit ratio, five minute miss rate 0 misses/sec, 0 max.
```

Table 20 describes the significant fields shown in the display.

Table 20 show ip rtp header-compression Field Descriptions

Field	Description
Interface Serial1	Type and number of interface.
Rcvd: total	Number of packets received on the interface.
compressed	Number of packets with compressed header.

Table 20 show ip rtp header-compression Field Descriptions (continued)

Field	Description
errors	Number of errors.
dropped	Number of dropped packets.
buffer copies	Number of buffers that were copied.
buffer failures	Number of failures in allocating buffers.
Sent: total	Total number of packets sent.
compressed	Number of packets sent with compressed header.
bytes saved	Total savings in bytes due to compression.
bytes sent	Total bytes sent after compression.
efficiency improvement factor	Compression efficiency.
Connect: rx slots	Total number of receive slots.
tx slots	Total number of transmit slots.
long searches	Searches that needed more than one lookup.
misses	Number of new states that were created.
hit ratio	Number of times existing states were revised.
five minute miss rate	Average miss rate.
max.	Maximum miss rate.

Related Commands

Command	Description
ip rtp header-compression	Enables RTP header compression.
ip rtp compression-connections	Specifies the total number of RTP header compression connections supported on the interface.

show ip sap

To display the Session Announcement Protocol (SAP) cache, use the **show ip sap** command in EXEC mode.

show ip sap [*group-address* | **"***session-name***"** | **detail**]

Syntax Description

group-address	(Optional) Displays the sessions defining the specified multicast group address.
"*session-name***"**	(Optional) Displays the single session in detail format. The session name is enclosed in quotation marks (**" "**) that the user must enter.
detail	(Optional) Displays all sessions in detail format.

Command Modes

EXEC

Command History

Release	Modification
11.1	The **show ip sdr** command was introduced.
12.2	The **show ip sdr** command was replaced by the **show ip sap** command.

Usage Guidelines

If the router is configured to be a member of multicast group 224.2.127.254 (the default session directory group), it will cache SAP announcements.

If no arguments or keywords are used with this command, the system displays a sorted list of session names.

Examples

The following is sample output of the **show ip sap** command for a session using multicast group 224.2.197.250:

```
Router# show ip sap 224.2.197.250

SAP Cache - 198 entries
Session Name: The Sample Channel
   Description: This broadcast is brought to you courtesy of Sample Research Center.
   Group: 0.0.0.0, ttl: 0, Contiguous allocation: 1
   Lifetime: from 10:00:00 PDT Jul 4 1999 until 10:00:00 PDT Aug 1 1999
   Uptime: 4d05h, Last Heard: 00:01:40
   Announcement source: 128.102.84.134
   Created by: sample 3136541828 3139561476 IN IP4 128.102.84.134
   Phone number: Sample Digital Video Lab (555) 555-5555
   Email: Sample Digital Video Lab <sample@email.com>
   URL: http://sample.com/
   Media: audio 20890 RTP/AVP 0
     Media group: 224.2.197.250, ttl: 127
     Attribute: ptime:40
   Media: video 62806 RTP/AVP 31
     Media group: 224.2.190.243, ttl: 127
```

Table 21 describes the significant fields shown in the display.

Table 21 show ip sap Field Descriptions

Field	Description
SAP Cache - <x> entries	Number of entries (sessions) in the cache.
Session Name:	Name of session.
Decription:	Description of the session. Individual media may have their own Description field.
Group:	IP multicast group addresses used for this session. The 0.0.0.0 IP address is displayed if individual media define separate multicast groups.
ttl:	The time-to-live (TTL) value associated with the multicast groups.
Contiguous Allocation:	Number of continuously ascending IP multicast group addresses allocated to this session.
Lifetime:	Period of time during which this session is presumed to carry traffic in the network.
Uptime:	How long (in hours, minutes, and seconds) this announcement has been stored.
Last Heard:	How long ago (in hours, minutes, and seconds) this announcement was last heard. This time is always less than the timeout value configured using the **sap cache-timeout** command.
Announcement source:	IP address of the host from which this session announcement was received.
Created by:	Information for identifying and tracking the session announcement.
Phone number:	Telephone number of the person or entity responsible for the session.
Email:	E-mail address of the person or entity responsible for the session.
URL:	URL for the location where further information about this session can be found.
Media:	Indicates the media type (audio, video, or data), transport port that the media stream is sent to, transport protocol used for these media (common values are User Datagram Protocol [UDP] and Real-Time Transport Protocol [RTP]/AVP), and list of media formats that each media instance can use. The first media format is the default format. Format identifiers are specific to the transport protocol used.
Media group:	Indicates the IP multicast group address over which the media instance is sent.
Attribute:	Indicates attributes specific to each media instance.

Related Commands

Command	Description
clear ip sap	Deletes a SAP cache entry or the entire SAP cache.
ip sap cache-timeout	Limits how long a SAP cache entry stays active in the cache.
ip sap listen	Enables the Cisco IOS software to listen to session directory announcements.

show ip sdr

The **show ip sdr** command is replaced by the **show ip sap** command. See the description of the **show ip sap** command in this chapter for more information.