IPv4 Multicast

Layer 2 Addressing

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239.142.57.6

01-00-5E-0E-39-06

00000001 00000000 01011110 00111001 00000110

Group Ranges

224.0.0.0/24 Local network control
224.0.1.0/24 Internetwork control
232.0.0.0/8 Source-specific
233.0.0.0/8 GLOP (RFC 3180)
239.0.0.0/8 Admin-scoped

Common Groups

224.0.0.1 All hosts
224.0.0.2 All routers
224.0.1.39 Cisco RP Announce
224.0.1.40 Cisco RP Discovery

Terms

Internet Group Management Protocol (IGMP)
Hosts send IGMP requests to local routers to join multicast groups

IGMP Configuration

IGMP Support
Router(config-if)# ip igmp [version <#>]

IGMP Snooping
Switch(config)# ip igmp snooping

Protocol Independent Multicast (PIM)

Dense Mode
The initial tree encompasses all multicast routers; after a period of time, routers without IGMP members prune back branches

Sparse Mode
The tree is grown from a central rendezvous point out to the multicast source and recipients

Sparse-Dense Mode
Allows a PIM-enabled interface to function in either sparse or dense mode per group

PIMv1
Provides automatic RP discovery with Auto-RP (Cisco proprietary)

PIMv2
Automatic RP discovery is accomplished by the bootstrap router (BSR) method (standard)

PIM Configuration

ip multicast-routing
interface FastEthernet0/0
ip pim {sparse-mode | dense-mode | sparse-dense-mode}
ip pim version {1 | 2}

RP Configuration

Manual
ip pim rp-address <IP>

Auto-RP Mapping Agent
ip pim send-rp-discovery scope <TTL>

Auto-RP Candidate
ip pim send-rp-announce <interface>

BSR Candidate
ip pim bsr-candidate <interface>

BSR RP Candidate
ip pim rp-candidate <interface>

PIM Troubleshooting

show ip mroute
show ip pim interface
show ip pim neighbor
show ip pim rp [mapping]
show ip rpf <IP>

Terminology

Reverse Path Forwarding (RPF)
Verifies that multicast traffic travels in the reverse direction of unicast traffic, away from the tree root

Cisco Group Management Protocol (CGMP)
A proprietary protocol used by switches to obtain multicast membership information for end hosts (deprecated)

Distribution Trees

Source-Rooted
Provides the shortest paths from the source to receivers

IGMP

IGMPv1
Original IGMP specification

IGMPv2
Adds support for dynamic leave requests and querier election to original IGMP

IGMPv3
Adds multicast source filtering to v2

IGMP Snooping
A switch passively inspects IGMP requests to determine which hosts should receive multicast traffic

IGMP Troubleshooting

show ip igmp
show ip igmp group
show ip igmp interface
show ip igmp snooping
ip igmp join-group

IGMP Support
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IGMP Snooping
Switch(config)# ip igmp snooping

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