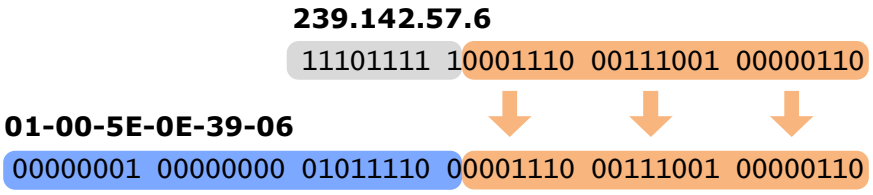
IPv4 Multicast

packetlife.net

Layer 2 Addressing



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)

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}
```

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

Distribution Trees

Shared
A common set of links which carry all multicast traffic; statically configured

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
```

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>
```