

## Multicast Q&A

Q. What is Source Specific Multicast?

A. Source Specific Multicast (SSM) is a paradigm shift for IP Multicast that enables data forwarding based on both Group and Source addresses. The Source address is now also used to decide forwarding of the data as well as the Group address. This unique S,G is known within SSM as a channel. SSM also removes address allocation problems as the source address makes each channel unique. SSM requires that the host be aware of the source as well as the group it desires data from and a method to signal this S,G requirement to the router.

Q. Is SSM currently available?

A. SSM is currently available with IGMPv3, IGMPv3 lite, or URL Rendezvous Directory (URD).

Q. What is IGMPv3 lite?

A. IGMPv3 lite is a daemon created by Talarian, then Whitbarn, which operates on a host to enable an SSM application to send an S,G join even while using a IGMP version 2 protocol stack.

Q. What is URL Rendezvous Directory?

A. URL rendezvous directory (URD) is a method in which the router intercepts an HTTP string, including S,G information. If a \*,g join is sent within a minute of the interception, then the router initiates a S,G join.

Q. Where are Multicast addresses available?

A. <http://www.iana.org/cgi-bin/multicast.pl>

IANA will need convincing that GLOP or SSM will not fulfil your applications requirements

Q. What addresses should customers use?

A.

- Inter-domain Multicast: RFC3180 GLOP addresses
- Intra-domain Multicast: RFC2365 Admin scoped addresses

Q. Can dynamic Multicast addresses be assigned within my domain?

A. Yes. Group addresses can be leased with protocol called MADCAP RFC 2730. This is similar to DHCP. Microsoft implemented Madcap in Windows 2000.

Q. Does Multicast support Network Address Translation?

A. Cisco supports Source address translation with Multicast Network Address Translation (NAT):

[http://www.cisco.com/warp/public/105/multicast\\_nat.html](http://www.cisco.com/warp/public/105/multicast_nat.html)

Q. What management options are available for a multicast network?

A. Network node manager multicast is a multicast management product from HP:

<http://www.openview.hp.com/products/mcast/index.html>



Q. Does Cisco support Multicast Open Shortest Path First?

A. No, Multicast Open Shortest Path First (MOSPF) does not scale. It actually runs a Dijkstra algorithm for each multicast distribution tree (group); therefore, there is a potential for running thousands of OSPF processes on the router. It might work for a few groups, but due to the inherent limitations of MOSPF, Cisco chose to pursue Protocol Independent Multicast (PIM).

Q. Does Cisco support Distance Vector Multicast Routing Protocol?

A. No, Distance Vector Multicast Routing Protocol (DVMRP) does not scale. It is a 'RIP' like protocol which has a maximum metric of 31. DVMRP is also a Dense Mode protocol. Cisco does inter-operate with DVMRP.

Q. Is PIM a standard?

A. There are two versions of PIM:

- Version 1: RFC 2117 followed by RFC2362 (experimental)
- Version 2: draft form

Cisco recommends Version 2, which is available in Cisco IOS Software Release 12.0 and all subsequent releases.

<http://www.ietf.org/rfc/rfc2362.txt>

<http://www.ietf.org/internet-drafts/draft-ietf-pim-sm-v2-new-07.txt>

Q. Should I use PIM Sparse Mode or Dense Mode?

A. Cisco recommends PIM Sparse Mode (SM). Cisco also recommends PIM SSM for one-to-many applications, but Bi-Dir for many-to-many applications.

Q. What is Sparse-Dense?

A. Sparse-Dense is an interface configuration that allows both DM groups and SM groups to flow across that interface. It is normally only applied when Auto-RP is used to send RP information.

Q. What is Bi-Dir?

A. Bi-Dir is a tree that flows in both directions, as opposed to other Multicast protocols that have trees rooted at either the Source or at an RP. Bi-dir is recommended for many-to-many applications, because the amount of state required to be kept by the router is not related to the number of sources.

Q. Where should the RP be placed?

A. Generally, RP placement is not an issue, as the default behavior of PIM SM is to switch over to the Shortest Path tree when the first packet is received by the last hop router. The RP is therefore not normally within the data path and is not a limiting factor.

Q. What are the options for RP mapping?

A.

- *Static*: configured on all routers; operates in SM
- *Auto-RP*: requires candidate RPs and Mapping agents to be configured; uses two dense mode groups, so Sparse-Dense is configured on all interfaces
- *BSR*: defined in the PIM version2 standard; cannot use with administratively scoped addresses



Q. What is Anycast RP?

A. Anycast is a term from IPv6 that refers to an address that is shared by devices performing the same function. This allows routing to the closest device. There are no defined Anycast addresses in IPv4. To perform this function within IPv4 a unicast host address (/32 mask) is assigned and then is duplicated on the devices that are to be RPs:

For additional information, please visit:

[http://www.cisco.com/univercd/cc/td/doc/cisintwk/intsolns/mcst\\_sol/anycast.htm](http://www.cisco.com/univercd/cc/td/doc/cisintwk/intsolns/mcst_sol/anycast.htm)

Q. Can I use Hot Standby Router Protocol for Multicast?

A. Hot Standby Router Protocol (HSRP) is designed for host in last hop networks, in order to have a failover for Unicast routing. It is not generally recommended to use HSRP for IP multicast routing.

For additional information, please visit:

<http://www.cisco.com/warp/public/619/hsrpmcast.html>

Q. How does HSRP interact with Cisco Group Management Protocol?

A. Unicast flooding can occur in certain topologies if HSRP and Cisco Group Management Protocol (CGMP) leave processing are both in use.

When CGMP leave processing is configured, HSRP frames are intercepted by the switch, it is then identified as none IGMP and forwarded only to router ports. If there is a topology with cascaded switch and no router attached, then it is possible that the HSRP packets will not be seen. Therefore, the correct MAC address learned this will lead to Unicast flooding.

Q. What is the difference between ip igmp join-group and the ip igmp static-group?

A. The join-group command forces the router to respond as a host on its own interface. This is process switched. The static-group command causes the router to put the interface permanently in the OIF list. This is not process switched.

Q. Does Cisco IOS Firewall support IP Multicast?

A. Firewalls do not currently support IP multicast. Tunnelling is the only available method of passing data through a firewall.

Q. How do I prevent a state explosion with IPTV?

A. Each IPTV client provides feedback to the same group on which it receives data; therefore, each client becomes a source and may have a corresponding S,G entry.

The client must be prevented from sourcing data to the group address in order to mitigate this issue.

Q. Can IP Multicast be load-balanced?

A. IP Multicast uses the RPF check to ensure that the data has arrived via the most efficient path. The RPF check chooses only one interface for incoming data for a particular source; therefore, per flow multicast can be load balanced. If packet load balancing is required, then a Unicast tunnel must be created between both ends of the lines for which load balancing is required.

Q. What is Pragmatic General Multicast?

A. Pragmatic General Multicast (PGM) is a method for reliable multicast. IP multicast uses UDP, not TCP, and is inherently unreliable. PGM performs the same function as TCP, while using negative, rather than positive acknowledgements. This prevents ACK implosion, when large numbers of receivers reply.

Cisco offers PGM router assist, enhancing the scalability of PGM by reducing the number of Nacks generated in the vent of packets loss and ensuring only those links that need to receive the re-transmission do.

Q. What is Multiprotocol Border Gateway Protocol?

A. RFC 2283 Multiprotocol Border Gateway Protocol (MBGP) is a BGP extension BGP that allows additional RIBs to be created for protocols other than Unicast IP. This is important to Service Providers who may not have PIM on all interfaces. RPF failures are likely to occur in a topology that has partial PIM configuration.

Static Mroutes used to be a requirement in order to ensure that only RPF failures did not occur due to this partial configuration. MBGP allows a separate IP multicast RIB for RPF lookups

Q. What does the “ip pim dense-mode proxy-register” command do?

A. “IP pim dense-mode proxy -register” enables the registration of multicast traffic from inside a PIM-DM domain, which has no concept of registration, to RP on an PIM-SM domain. This command should be configured on the bordering interface leading to the PIM-DM domain.

Q. What is Reverse Path forwarding?

A. Reverse Path Forwarding (RPF) provides loop avoidance. It is an algorithm used to forward multicast packets.

RPF rules:

- If a router receives a datagram on an interface that it uses to send unicast packets to the source of that packet, then the packet has arrived on the RPF interface.
- If the packet arrives on the RPF interface, a router forwards the packet out the interfaces that are present in the outgoing interface list of a multicast routing table entry.
- If the packet does not arrive on the RPF interface, the packet is silently discarded.

Q. How does RPF work for Shared trees?

The RPF check is conducted differently for data flowing via the shared tree, which is routed at the RP, not the Source. In this instance, the RPF is successful when data arrives at the interface that it would use to reach the RP.



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