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IGMP Basics

25 · *Tuesday* · *DEC 2012*
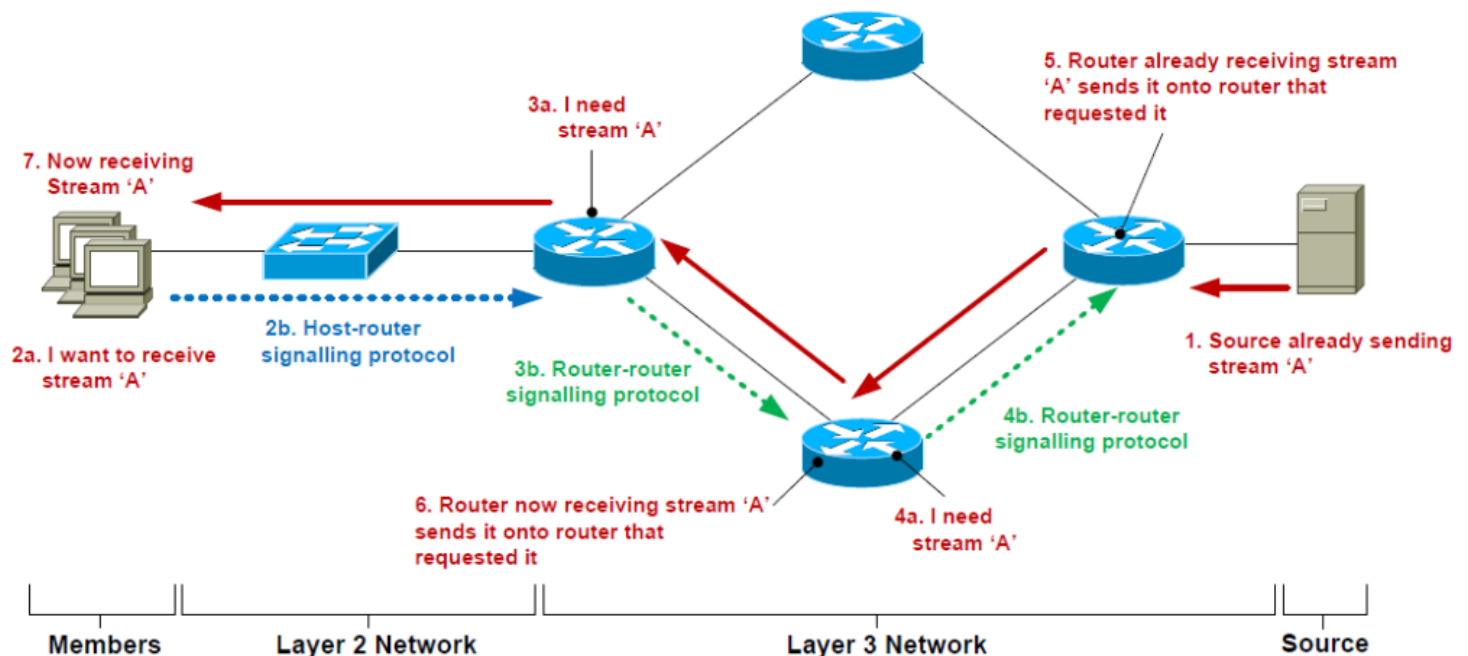
POSTED BY NAYARASI IN MULTICAST

≈ **2 COMMENTS**

Tags
IGMP, IGMPv2, IGMPv3

Internet Group Management Protocol (IGMP) used by a **Host** to notify the local **Router** that it wishes to receive (or stop receiving) multicast traffic for a given group address. Below diagram shows a basic multicast service model. IGMP's functionality is shown in item 2.b in the diagram.

There are 3 versions (IGMP v1, IGMP v2 & IGMP v3) available. The most common version of deployment is IGMP v2. Once you enable PIM on a layer 3 interface it will automatically enable IGMPv2 on that interface. If a host want to join for a particular multicast group, they will send a IGMP Membership report to 224.0.0.2 (all-routers in local subnet) & first hop router will get it. When another host in the same network requesting same group, layer 2 switch will suppress that request. You can disable this feature by using "no ip igmp snooping report-suppression" command if needed.
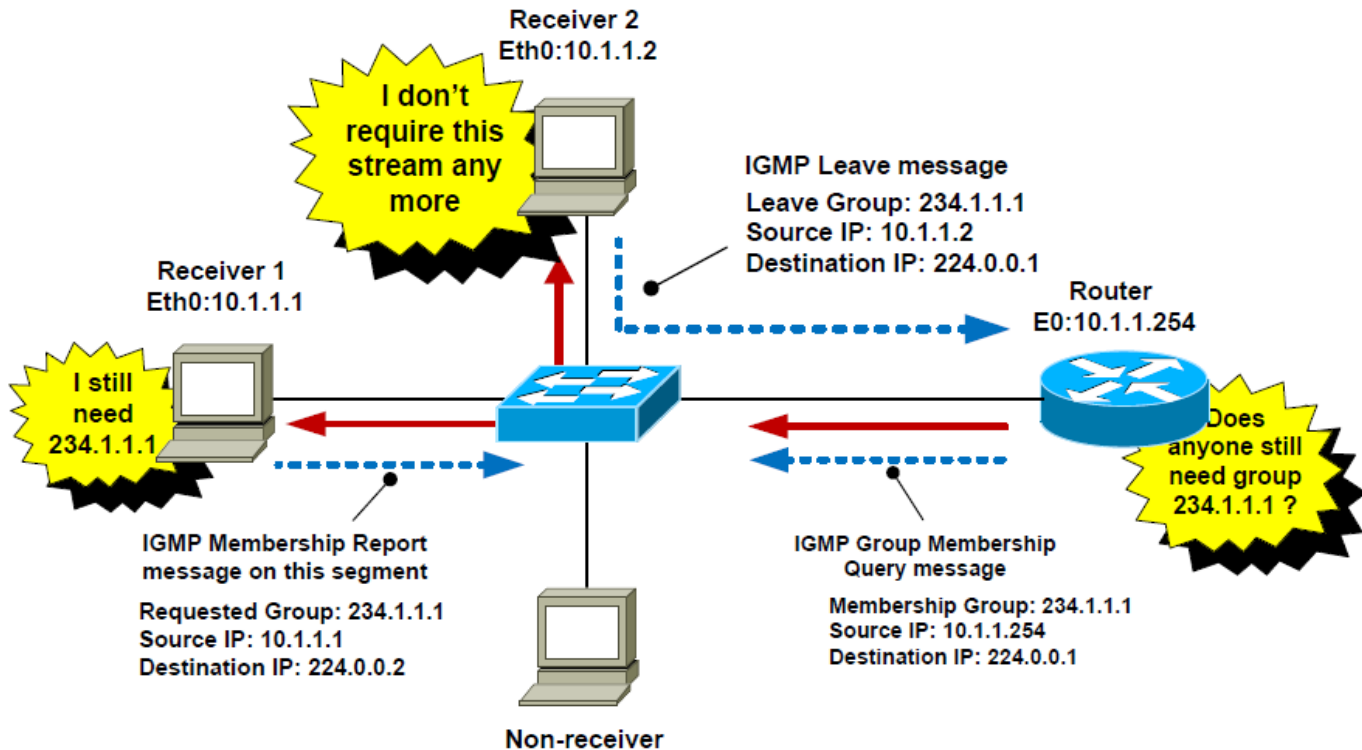
IGMPv2 – Joining a Group
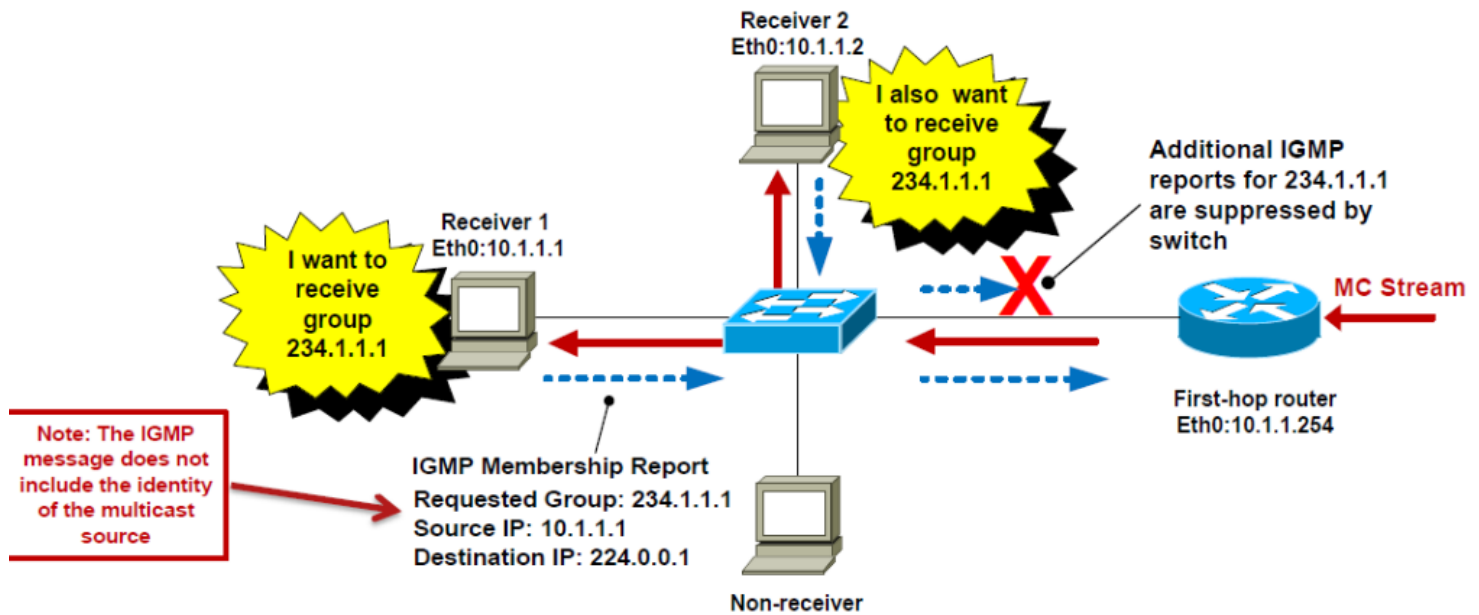
Normally (without IGMP snooping) a switch will forward a multicast frame to all switch ports (except incoming port). IGMP snooping allows the switch to send multicast frames only to those receivers that join a particular group by listening for report/leave messages from the hosts. By default this feature is enabled on a layer 2 switch. If you want to enable is only on particular VLAN you can disable it globally & configure "*ip igmp snooping vlan vlan-id*" with required vlan-id.
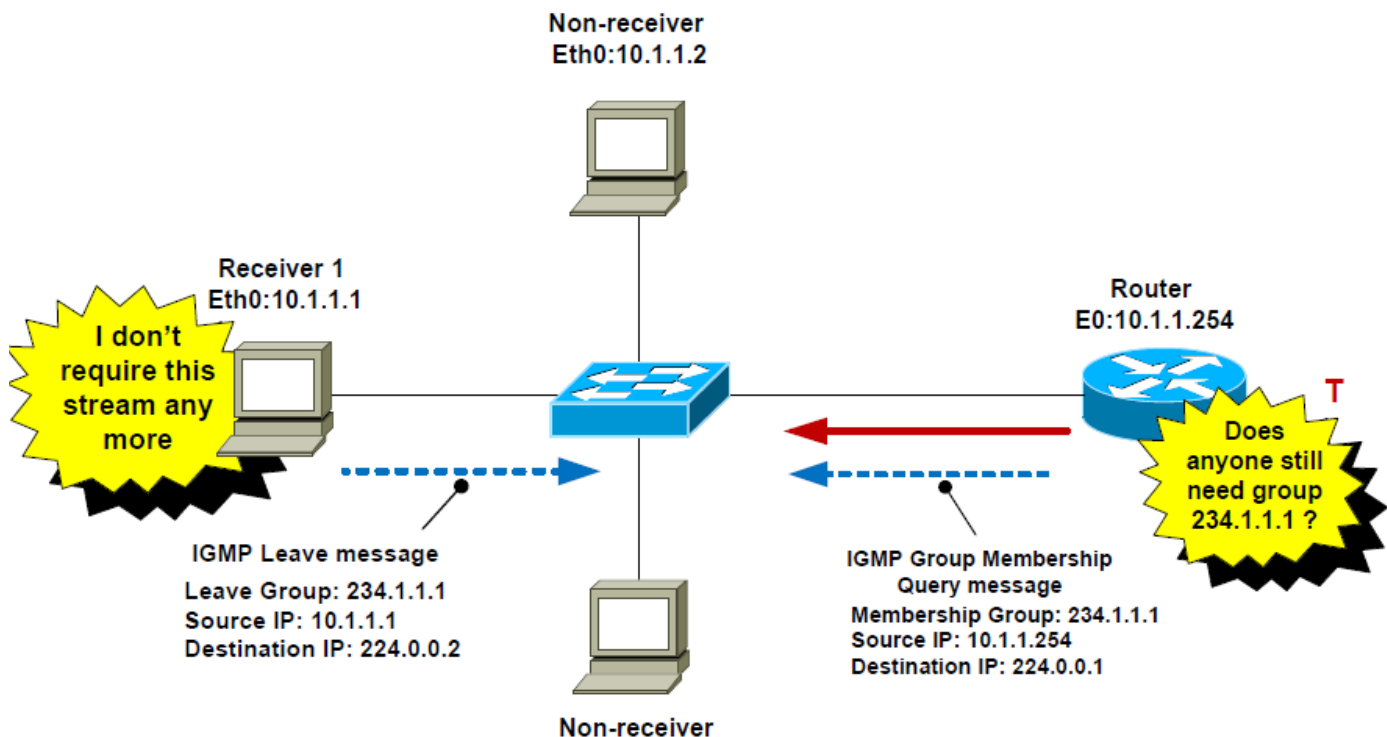
When a client want to leave the group they will send a "IGMP Leave Msg" to 224.0.0.2 (& first hop router will get it). Then router will query "IGMP Query Msg" to 224.0.0.1 (All-Host multicast address). As long as at least one client is in this group, switch will forward IGMP Membership report back to first hop router. In IGMP v2.0 you can configure fast-leaving feature by using "*ip igmp snooping vlan <vlan-id> immediate-leave*". In this way switch will immediately remove the port from multicast forwarding table

IGMPv2 – Maintaining a Group

Receiver 2
Eth0:10.1.1.2

I don't require this stream any more

IGMP Leave message
Leave Group: 234.1.1.1
Source IP: 10.1.1.2
Destination IP: 224.0.0.1

Receiver 1
Eth0:10.1.1.1

Router
E0:10.1.1.254

I still need 234.1.1.1

Does anyone still need group 234.1.1.1 ?

IGMP Membership Report message on this segment

Requested Group: 234.1.1.1
Source IP: 10.1.1.1
Destination IP: 224.0.0.2

IGMP Group Membership Query message

Membership Group: 234.1.1.1
Source IP: 10.1.1.254
Destination IP: 224.0.0.1

Non-receiver

If no users join for the multicast group, router will not get any response & it will wait for 3 x query interval to decide no users require this multicast stream any longer. Then it will pass that info to upstream routers to stop forwarding multicast traffic to that group.

IGMPv2 – Leaving a Group

Non-receiver
Eth0:10.1.1.2

Receiver 1
Eth0:10.1.1.1

Router
E0:10.1.1.254

I don't require this stream any more

Does anyone still need group 234.1.1.1 ?

IGMP Leave message

Leave Group: 234.1.1.1
Source IP: 10.1.1.1
Destination IP: 224.0.0.2

IGMP Group Membership Query message

Membership Group: 234.1.1.1
Source IP: 10.1.1.254
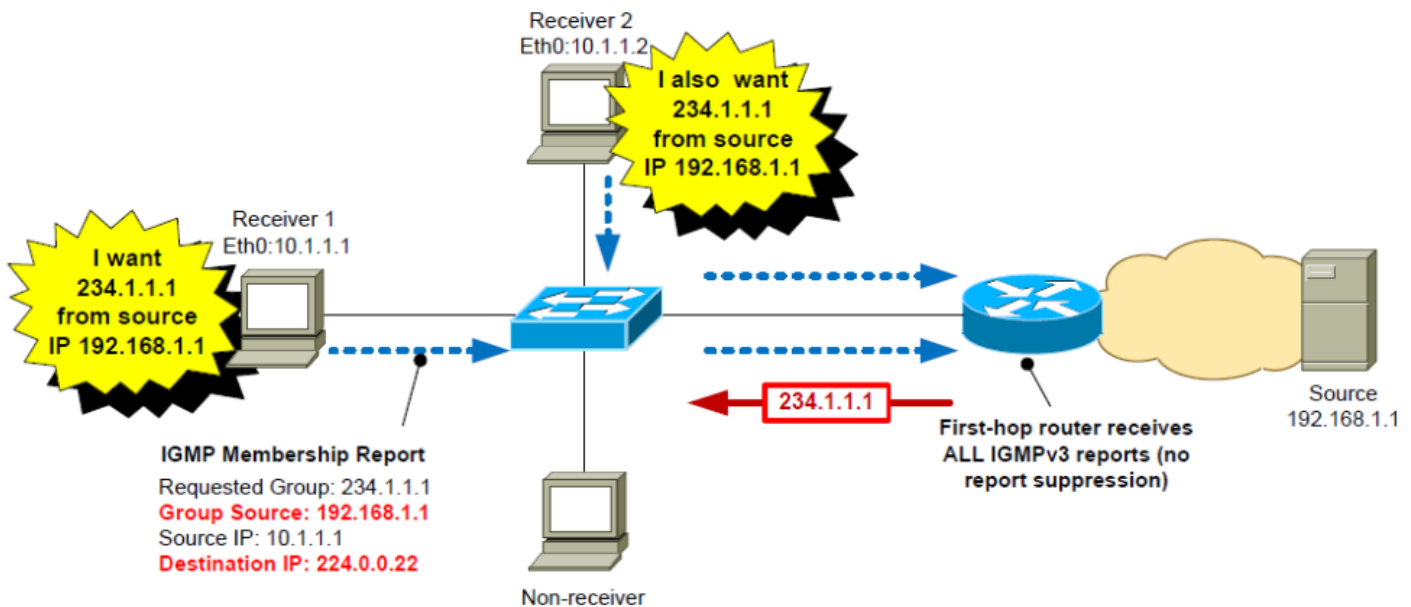Destination IP: 224.0.0.1

Non-receiver

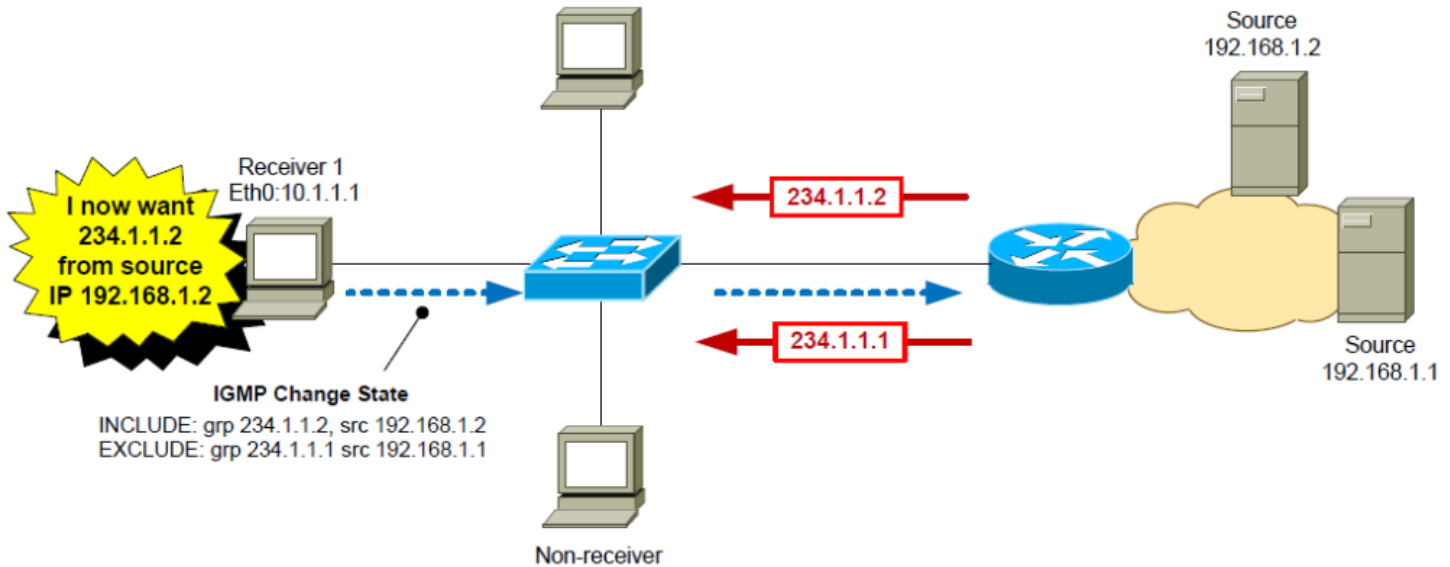Compare to IGMPv2, IGMPv3 has following advantages.

1. Hosts can join one group and leave another in the same transaction. IGMPv2 requires separate report/leave messages.
2. Reduces the likelyhood of multicast group being spoofed by a rogue source.
3. Eliminates overlapping multicast addresses.
4. First-hop router immediately knows the source address, so no need for RP (Rendezvous Point) – can use PIM-SSM.

Following shows IGMPv3 operation. In IGMPv3 all host membership reports send to 224.0.0.22 (IGMPv3 routers multicast address). There is no report-suppression in IGMPv3.

IGMPv3 – Joining a Group

Receiver 2
Eth0:10.1.1.2

I also want
234.1.1.1
from source
IP 192.168.1.1

Receiver 1
Eth0:10.1.1.1

I want
234.1.1.1
from source
IP 192.168.1.1

234.1.1.1

First-hop router receives
ALL IGMPv3 reports (no
report suppression)

Source
192.168.1.1

IGMP Membership Report
Requested Group: 234.1.1.1
Group Source: 192.168.1.1
Source IP: 10.1.1.1
Destination IP: 224.0.0.22

Non-receiver

IGMPv3 – Changing a Group

You can find more details about from here. I used the above diagrams from the CiscoLive pdf (listed in item 2 here) presentation material.

1. Catalyst 3560 Software Configuration Guide, Release 12.2(52)SE
2. BRKMPL-1261 IP Multicast – Concepts, Design and Troubleshooting

When it comes to Wireless environment WLC does the IGMP functionality of a layer 2 switch for its wireless clients.(ie keeping track of which AP/wireless clients require what multicast group traffic). Below shows the IGMP specific configs in a WLC (Controller -> Multicast section)

Related Posts

1. Test Yourself- Basic Multicast
2. Configuring Multicast on WLC
3. Wireless Multicast is not working – Why ?
4. Understanding "VideoStream" feature
5. Multicast Address Allocation

thoughts on "IGMP Basics"

1. *said:*Dean Reading

   October 15, 2018 at 11:16 pm

   In the image "IGMPv2 – Joining a Group", my understanding is that the Destination IP should be 224.0.0.2 (not 224.0.0.1). Is that right?

   REPLY

   - *said:***nayarasi**

     October 26, 2018 at 11:53 pm

     Yes, you are right. I think it is a mistake in the diagram. (those are CL preso as it is)

     Thanks for pointing it out though

     Rasika

     REPLY

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