**Internet Group Management Protocol**

From Wikipedia, the free encyclopedia

[Jump to navigation](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#mw-head) [Jump to search](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#searchInput)

|  |
| --- |
| [**Internet protocol suite**](https://en.wikipedia.org/wiki/Internet_protocol_suite) |
| [**Application layer**](https://en.wikipedia.org/wiki/Application_layer) |
| * [BGP](https://en.wikipedia.org/wiki/Border_Gateway_Protocol) * [DHCP](https://en.wikipedia.org/wiki/Dynamic_Host_Configuration_Protocol) * [DNS](https://en.wikipedia.org/wiki/Domain_Name_System) * [FTP](https://en.wikipedia.org/wiki/File_Transfer_Protocol) * [HTTP](https://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol) * [HTTPS](https://en.wikipedia.org/wiki/HTTPS) * [IMAP](https://en.wikipedia.org/wiki/Internet_Message_Access_Protocol) * [LDAP](https://en.wikipedia.org/wiki/Lightweight_Directory_Access_Protocol) * [MGCP](https://en.wikipedia.org/wiki/Media_Gateway_Control_Protocol) * [MQTT](https://en.wikipedia.org/wiki/MQTT) * [NNTP](https://en.wikipedia.org/wiki/Network_News_Transfer_Protocol) * [NTP](https://en.wikipedia.org/wiki/Network_Time_Protocol) * [POP](https://en.wikipedia.org/wiki/Post_Office_Protocol) * [PTP](https://en.wikipedia.org/wiki/Precision_Time_Protocol) * [ONC/RPC](https://en.wikipedia.org/wiki/Open_Network_Computing_Remote_Procedure_Call) * [RTP](https://en.wikipedia.org/wiki/Real-time_Transport_Protocol) * [RTSP](https://en.wikipedia.org/wiki/Real_Time_Streaming_Protocol) * [RIP](https://en.wikipedia.org/wiki/Routing_Information_Protocol) * [SIP](https://en.wikipedia.org/wiki/Session_Initiation_Protocol) * [SMTP](https://en.wikipedia.org/wiki/Simple_Mail_Transfer_Protocol) * [SNMP](https://en.wikipedia.org/wiki/Simple_Network_Management_Protocol) * [SSH](https://en.wikipedia.org/wiki/Secure_Shell) * [Telnet](https://en.wikipedia.org/wiki/Telnet) * [TLS/SSL](https://en.wikipedia.org/wiki/Transport_Layer_Security) * [XMPP](https://en.wikipedia.org/wiki/XMPP) * [*more...*](https://en.wikipedia.org/wiki/Category:Application_layer_protocols) |
| [**Transport layer**](https://en.wikipedia.org/wiki/Transport_layer) |
| * [TCP](https://en.wikipedia.org/wiki/Transmission_Control_Protocol) * [UDP](https://en.wikipedia.org/wiki/User_Datagram_Protocol) * [DCCP](https://en.wikipedia.org/wiki/Datagram_Congestion_Control_Protocol) * [SCTP](https://en.wikipedia.org/wiki/Stream_Control_Transmission_Protocol) * [RSVP](https://en.wikipedia.org/wiki/Resource_Reservation_Protocol) * [*more...*](https://en.wikipedia.org/wiki/Category:Transport_layer_protocols) |
| [**Internet layer**](https://en.wikipedia.org/wiki/Internet_layer) |
| * [IP](https://en.wikipedia.org/wiki/Internet_Protocol)   + [IPv4](https://en.wikipedia.org/wiki/IPv4)   + [IPv6](https://en.wikipedia.org/wiki/IPv6) * [ICMP](https://en.wikipedia.org/wiki/Internet_Control_Message_Protocol) * [ICMPv6](https://en.wikipedia.org/wiki/Internet_Control_Message_Protocol_for_IPv6) * [ECN](https://en.wikipedia.org/wiki/Explicit_Congestion_Notification) * IGMP * [IPsec](https://en.wikipedia.org/wiki/IPsec) * [*more...*](https://en.wikipedia.org/wiki/Category:Internet_layer_protocols) |
| [**Link layer**](https://en.wikipedia.org/wiki/Link_layer) |
| * [ARP](https://en.wikipedia.org/wiki/Address_Resolution_Protocol) * [NDP](https://en.wikipedia.org/wiki/Neighbor_Discovery_Protocol) * [OSPF](https://en.wikipedia.org/wiki/Open_Shortest_Path_First) * [Tunnels](https://en.wikipedia.org/wiki/Tunneling_protocol)   + [L2TP](https://en.wikipedia.org/wiki/Layer_2_Tunneling_Protocol) * [PPP](https://en.wikipedia.org/wiki/Point-to-Point_Protocol) * [MAC](https://en.wikipedia.org/wiki/Medium_access_control)   + [Ethernet](https://en.wikipedia.org/wiki/Ethernet)   + [Wi-Fi](https://en.wikipedia.org/wiki/Wi-Fi)   + [DSL](https://en.wikipedia.org/wiki/Digital_subscriber_line)   + [ISDN](https://en.wikipedia.org/wiki/Integrated_Services_Digital_Network)   + [FDDI](https://en.wikipedia.org/wiki/Fiber_Distributed_Data_Interface) * [*more...*](https://en.wikipedia.org/wiki/Category:Link_protocols) |
| * [v](https://en.wikipedia.org/wiki/Template:IPstack) * [t](https://en.wikipedia.org/wiki/Template_talk:IPstack) * [e](https://en.wikipedia.org/w/index.php?title=Template:IPstack&action=edit) |

The **Internet Group Management Protocol** (**IGMP**) is a [communications protocol](https://en.wikipedia.org/wiki/Communications_protocol) used by [hosts](https://en.wikipedia.org/wiki/Host_(network)) and adjacent [routers](https://en.wikipedia.org/wiki/Router_(computing)) on [IPv4 networks](https://en.wikipedia.org/wiki/IPv4_network) to establish multicast group memberships. IGMP is an integral part of [IP multicast](https://en.wikipedia.org/wiki/IP_multicast).

IGMP can be used for one-to-many networking applications such as online [streaming video](https://en.wikipedia.org/wiki/Streaming_video) and [gaming](https://en.wikipedia.org/wiki/Online_game), and allows more efficient use of resources when supporting these types of applications.

IGMP is used on [IPv4](https://en.wikipedia.org/wiki/IPv4) networks. Multicast management on [IPv6](https://en.wikipedia.org/wiki/IPv6) networks is handled by [Multicast Listener Discovery](https://en.wikipedia.org/wiki/Multicast_Listener_Discovery) (MLD) which is a part of [ICMPv6](https://en.wikipedia.org/wiki/ICMPv6) in contrast to IGMP's bare IP encapsulation.

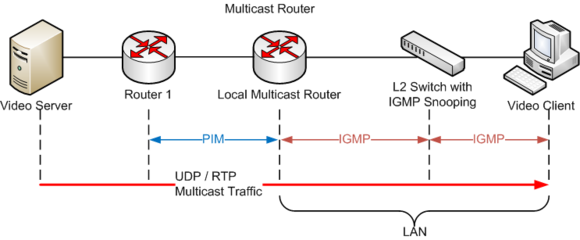


**Contents**

* [1 Architecture](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#Architecture)
* [2 Versions](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#Versions)
* [3 Messages](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#Messages)
  + [3.1 IGMPv2 messages](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#IGMPv2_messages)
  + [3.2 IGMPv3 membership query](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#IGMPv3_membership_query)
* [4 Implementations](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#Implementations)
* [5 See also](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#See_also)
* [6 Notes](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#Notes)
* [7 References](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#References)

**Architecture**

A network designed to deliver a multicast service using IGMP might use this basic architecture:

[](https://en.wikipedia.org/wiki/File:IGMP_basic_architecture.png)

IGMP operates between a host and a local multicast router. [Switches](https://en.wikipedia.org/wiki/Network_switch) featuring [IGMP snooping](https://en.wikipedia.org/wiki/IGMP_snooping) derive useful information by observing these IGMP transactions. [Protocol Independent Multicast](https://en.wikipedia.org/wiki/Protocol_Independent_Multicast) (PIM) is then used between the local and remote multicast routers, to direct multicast traffic from hosts sending multicasts to hosts that have registered through IGMP to receive them.

IGMP operates on the [network layer](https://en.wikipedia.org/wiki/Network_layer), just the same as other network management protocols like [ICMP](https://en.wikipedia.org/wiki/Internet_Control_Message_Protocol).[[1]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-Forouzan_2012-1)

The IGMP protocol is implemented on a particular host and within a [router](https://en.wikipedia.org/wiki/Router_(computing)). A host requests membership to a group through its local router while a router listens for these requests and periodically sends out subscription queries. A single router per subnet is elected to perform this querying function. Some [multilayer switches](https://en.wikipedia.org/wiki/Multilayer_switch) include an IGMP querier capability to allow their IGMP snooping features to work in the absence of an IP multicast capability in the larger network.

IGMP is vulnerable to some attacks,[[2]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-2)[[3]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-3)[[4]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-4)[[5]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-5) and firewalls commonly allow the user to disable it if not needed.

**Versions**

There are three versions of IGMP.[[6]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-Cisco_Multicast-6) IGMPv1 is defined by [RFC](https://en.wikipedia.org/wiki/RFC_(identifier)) [1112](https://tools.ietf.org/html/rfc1112), IGMPv2 is defined by [RFC](https://en.wikipedia.org/wiki/RFC_(identifier)) [2236](https://tools.ietf.org/html/rfc2236) and IGMPv3 was initially defined by [RFC](https://en.wikipedia.org/wiki/RFC_(identifier)) [3376](https://tools.ietf.org/html/rfc3376) and has been updated by [RFC](https://en.wikipedia.org/wiki/RFC_(identifier)) [4604](https://tools.ietf.org/html/rfc4604) which defines both IGMPv3 and MLDv2. IGMPv2 improves IGMPv1 by adding the ability for a host to signal desire to leave a multicast group. IGMPv3 improves IGMPv2 by supporting [source-specific multicast](https://en.wikipedia.org/wiki/Source-specific_multicast)[[7]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-7) and introduces membership report aggregation.

These versions are backwards compatible. A router supporting IGMPv3 can support clients running IGMPv1, IGMPv2 and IGMPv3. IGMPv1 uses a query-response model. Queries are sent to 224.0.0.1. Membership reports are sent to the group's multicast address. IGMPv2 accelerates the process of leaving a group and adjusts other timeouts. Leave-group messages are sent to 224.0.0.2. A group-specific query is introduced. Group-specific queries are sent to the group's multicast address. A means for routers to select an IGMP querier for the network is introduced. IGMPv3 introduces [source-specific multicast](https://en.wikipedia.org/wiki/Source-specific_multicast) capability. Membership reports are sent to 224.0.0.22.

**Messages**

There are several types of IGMP messages:

General membership queries

Sent by multicast routers to determine which multicast addresses are of interest to systems attached to the network(s) they serve to refresh the group membership state for all systems on its network.

Group-specific membership queries

Used for determining the reception state for a particular multicast address

Group-and-source-specific queries

Allow the router to determine if any systems desire reception of messages sent to a multicast group from a source address specified in a list of unicast addresses

Membership reports

Sent by multicast receivers in response to a membership query or asynchronously when first registering for a multicast group

Leave group messages

Sent by multicast receivers when specified multicast transmissions are no longer needed at the receiver

IGMP messages are carried in bare IP packets with [IP protocol number](https://en.wikipedia.org/wiki/List_of_IP_protocol_numbers) 2.[[8]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-RFC_3376-8):§4 Similar to the [Internet Control Message Protocol](https://en.wikipedia.org/wiki/Internet_Control_Message_Protocol), there is no [transport layer](https://en.wikipedia.org/wiki/Transport_layer) used with IGMP messaging.

**IGMPv2 messages**

|  |  |  |  |
| --- | --- | --- | --- |
| IGMPv2 packet structure[[9]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-RFC_2236-9):§2 | | | |
| **bit offset** | **0–7** | **8–15** | **16–31** |
| **0** | Type | Max Resp Time | Checksum |
| **32** | Group Address | | | |

Where:

Type

Indicates the message type as follows

|  |  |
| --- | --- |
| IGMP message type values | |
| **Message** | **Type value** |
| Membership Query | 0x11 |
| IGMPv1 Membership Report | 0x12 |
| IGMPv2 Membership Report | 0x16 |
| IGMPv3 Membership Report | 0x22 |
| Leave Group | 0x17 |

Max Resp Time

Specifies the required responsiveness of replies to a Membership Query (0x11). This field is meaningful only in Membership Query; in other messages it is set to 0 and ignored by the receiver. The field specifies time in units of 0.1 second (a field vale of 10 specifies 1 second). Larger values reduce IGMP traffic burstiness and smaller values improve protocol responsiveness when the last host leaves a group.[[9]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-RFC_2236-9):§2.2

Group Address

This is the multicast address being queried when sending a Group-Specific or Group-and-Source-Specific Query. The field is zeroed when sending a General Query.

The message is sent using the following IP destination addresses:

|  |  |
| --- | --- |
| IGMPv2 destination address[[9]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-RFC_2236-9):§9 | |
| **Message Type** | **Multicast Address** |
| General Query | All hosts (224.0.0.1) |
| Group-Specific Query | The group being queried |
| Membership Report (all IGMP versions) | The group being reported |
| Leave Group | All routers (224.0.0.2) |

**IGMPv3 membership query**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IGMPv3 membership query[[8]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-RFC_3376-8):§4.1 | | | | | |
| **bit offset** | **0–3** | **4** | **5–7** | **8–15** | **16–31** |
| **0** | Type = 0x11 | | | Max Resp Code | Checksum |
| **32** | Group Address | | | | |
| **64** | Resv | S | QRV | QQIC | Number of Sources (N) |
| **96** | Source Address [1] | | | | |
| **128** | Source Address [2] | | | | |
|  | . . . | | | | |
|  | Source Address [N] | | | | |

Where:

Max Resp Code

This field specifies the maximum time (in 1/10 second increments) allowed before sending a responding report. If the number is below 128, the value is used directly. If the value is 128 or more, it is interpreted as an exponent and mantissa.

Checksum

This is the 16-bit one's complement of the one's complement sum of the entire IGMP message.

Group Address

This is the multicast address being queried when sending a Group-Specific or Group-and-Source-Specific Query. The field is zeroed when sending a General Query.

Resv

This field is reserved. It should be zeroed when sent and ignored when received.

S (Suppress Router-side Processing) Flag

When this flag is set, it indicates to receiving routers that they are to suppress the normal timer updates.

QRV (Querier's Robustness Variable)

If this is non-zero, it contains the Robustness Variable value used by the sender of the query. Routers should update their Robustness Variable to match the most recently received query unless the value is zero.

QQIC (Querier's Query Interval Code)

This code is used to specify the Query Interval value (in seconds) used by the querier. If the number is below 128, the value is used directly. If the value is 128 or more, it is interpreted as an exponent and mantissa.

Number of Sources (N)

This field specifies the number of source addresses present in the query. For General and Group-Specific Queries, this value is zero. For Group-and-Source-Specific Queries, this value is non-zero, but limited by the network's MTU.

Source Address [i]

The Source Address [i] fields are a vector of n IP unicast addresses, where n is the value in the Number of Sources (N) field.

**Implementations**

The [FreeBSD](https://en.wikipedia.org/wiki/FreeBSD),[[note 1]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-10) [Linux](https://en.wikipedia.org/wiki/Linux)[[note 2]](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol#cite_note-11) and [Windows](https://en.wikipedia.org/wiki/Microsoft_Windows) [operating systems](https://en.wikipedia.org/wiki/Operating_system) support IGMP at the host side.

**See also**

* [Internet Group Management Protocol with Access Control](https://en.wikipedia.org/wiki/Internet_Group_Management_Protocol_with_Access_Control)

**Notes**

 IGMPv3 was added to FreeBSD in version 8.0.

* 1.  IGMPv3 was added in the Linux 2.5 kernel series.

**References**

 *Forouzan, Behrouz A. (2012). Data Communications and Networking (5th ed.). New York, NY: McGraw-Hill. p. 658.* [*ISBN*](https://en.wikipedia.org/wiki/ISBN_(identifier))[*0073376221*](https://en.wikipedia.org/wiki/Special:BookSources/0073376221)*.*

  Spoofed [IGMP report denial of service](http://www.securityfocus.com/bid/5020/info) vulnerability.

  [*"Fragmented IGMP Packet May Promote "Denial of Service" Attack"*](https://web.archive.org/web/20050213091318/http:/support.microsoft.com/default.aspx?scid=kb;en-us;238329&sd=tech)*. Dec 20, 2004. Archived from* [*the original*](http://support.microsoft.com/default.aspx?scid=kb;en-us;238329&sd=tech) *on 2005-12-13.*

  [IGMP Security Problem Statement and Requirements](http://www.securemulticast.org/GSEC/gsec3_ietf53_SecureIGMP1.pdf#search=%22igmp%20attacks%22) [Archived](https://web.archive.org/web/20061013122139/http:/www.securemulticast.org/GSEC/gsec3_ietf53_SecureIGMP1.pdf) 2006-10-13 at the [Wayback Machine](https://en.wikipedia.org/wiki/Wayback_Machine).

  [*"Vulnerability in TCP/IP Could Allow Denial of Service (MS06-007, 913446))"*](https://web.archive.org/web/20070205172614/https:/www.microsoft.com/technet/security/Bulletin/MS06-007.mspx)*. February 14, 2006. Archived from* [*the original*](http://www.microsoft.com/technet/security/Bulletin/MS06-007.mspx) *on 2007-02-05.*

  [*IP Multicast Routing Configuration Guide*](https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst3750x_3560x/software/release/15-2_2_e/multicast/configuration_guide/b_mc_1522e_3750x_3560x_cg/b_mc_3750x_3560x_chapter_011.html)*,* [*Cisco*](https://en.wikipedia.org/wiki/Cisco)*, pp. 25–28, retrieved 2017-05-27*

  [*"Internet Group Management Protocol Overview"*](https://web.archive.org/web/20101110115314/http:/www.javvin.com/protocolIGMP.html)*. Javvin. Archived from* [*the original*](http://www.javvin.com/protocolIGMP.html) *on 2010-11-10. Retrieved 2010-11-18.*

  [*Internet Group Management Protocol, Version 3*](https://tools.ietf.org/html/rfc3376)*.* [*doi*](https://en.wikipedia.org/wiki/Doi_(identifier))*:*[*10.17487/RFC3376*](https://doi.org/10.17487%2FRFC3376)*.* [*RFC*](https://en.wikipedia.org/wiki/RFC_(identifier))[*3376*](https://tools.ietf.org/html/rfc3376)*.*

 [*Internet Group Management Protocol, Version 2*](https://tools.ietf.org/html/rfc2236)*.* [*doi*](https://en.wikipedia.org/wiki/Doi_(identifier))*:*[*10.17487/RFC2236*](https://doi.org/10.17487%2FRFC2236)*.* [*RFC*](https://en.wikipedia.org/wiki/RFC_(identifier))[*2236*](https://tools.ietf.org/html/rfc2236)*.*