

Internet Engineering Task Force (IETF)
Request for Comments: 9436
Obsoletes: 8736
Updates: 3973, 5015, 5059, 6754, 7761,
8364
Category: Standards Track
ISSN: 2070-1721

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August 2023

PIM Message Type Space Extension and Reserved Bits

Abstract

The PIM version 2 messages share a common message header format. The common header definition contains eight reserved bits. This document specifies how these bits may be used by individual message types and extends the PIM type space.

This document updates RFCs 7761 and 3973 by defining the use of the Reserved field in the PIM common header. This document further updates RFCs 7761 and 3973, along with RFCs 5015, 5059, 6754, and 8364, by specifying the use of the bits for each PIM message.

This document obsoletes RFC 8736.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at <https://www.rfc-editor.org/info/rfc9436>.

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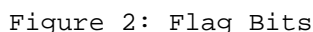
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When defining flag bits, it is helpful to have a well-defined way of referring to a particular bit. The most significant of the flag bits, the bit immediately following the Type field, is referred to as bit 7. The least significant, the bit right in front of the Checksum field, is referred to as bit 0. This is shown in the diagram below.



PIM message type 4 (Bootstrap) [RFC5059] defines flag bit 7 as No-Forward. The usage of the bit is defined in that document. The remaining flag bits are unassigned.

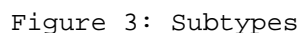
PIM message type 10 (DF Election) [RFC5015] specifies that the four most significant flag bits (bits 4-7) are to be used as a subtype. The usage of those bits is defined in that document. The remaining flag bits are unassigned.

PIM message type 12 (PIM Flooding Mechanism) [RFC8364] defines flag bit 7 as No-Forward. The usage of the bit is defined in that document. The remaining flag bits are unassigned.

These types and the corresponding flag bits are defined in Section 5.

This document extends types 13, 14, and 15 such that each becomes 16 new types, resulting in 48 types available for future PIM extensions. This extension is achieved by defining a Subtype field (see Figure 3) using the four most significant flag bits (bits 4-7). The notation `type.subtype` is used to reference the new extended types. The remaining four flag bits (bits 0-3, abbreviated as FB below) are to be defined by each extended type.

Each of the extended types is represented by the eight bits resulting from the concatenation of the Type and Subtype fields. No relationship is expected or implied between extended type messages with a common Type field.



This document clarifies the use of the flag bits in the common PIM

header, and it extends the PIM type space. As such, there is no impact on security or changes to the considerations in [RFC7761] and [RFC3973].

7. IANA Considerations

This document updates the "PIM Message Types" registry to indicate which flag bits are defined for use by each of the PIM message types and changes their registration status to Unassigned except where the bits have already been specified, as shown in Table 1. The registration policy remains IETF Review [RFC8126]. Assignments to this registry MUST define any non-default usage (see Section 4) of the flag bits in addition to the type.

Extended type 15.15 is Reserved [RFC8126] for future extensions.

Because this document obsoletes [RFC8736], IANA has changed the references to [RFC8736] in the registry to point to this document instead.

The updated "PIM Message Types" registry is shown below.

Type	Name	Flag Bits	Reference
0	Hello	0-7: Unassigned	[RFC3973] [RFC7761]
1	Register	0-7: Unassigned	[RFC7761]
2	Register Stop	0-7: Unassigned	[RFC7761]
3	Join/Prune	0-7: Unassigned	[RFC3973] [RFC7761]
4	Bootstrap	0-6: Unassigned 7: No-Forward	[RFC5059] [RFC7761] [RFC5059]
5	Assert	0-7: Unassigned	[RFC3973] [RFC7761]
6	Graft	0-7: Unassigned	[RFC3973]
7	Graft-Ack	0-7: Unassigned	[RFC3973]
8	Candidate RP Advertisement	0-7: Unassigned	[RFC7761]
9	State Refresh	0-7: Unassigned	[RFC3973]
10	DF Election	0-3: Unassigned 4-7: Subtype	[RFC5015] [RFC5015]
11	ECMP Redirect	0-7: Unassigned	[RFC6754]
12	PIM Flooding Mechanism	0-6: Unassigned 7: No-Forward	[RFC8364] [RFC8364]
13.0-15.14	Unassigned	0-3: Unassigned	
15.15	Reserved	0-3: Reserved	RFC 9436

Table 1: Updated PIM Message Types Registry

The unassigned types above, as explained in Section 5, use the extended type notation of type.subtype. Each extended type only has 4 flag bits available. New extended message types should be assigned consecutively, starting with 13.0, then 13.1, etc.

8. References

8.1. Normative References

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8.2. Informative References

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