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An Interface Identifier (ID) Hello Option for PIM

Abstract

This document defines a new PIM Hello option to advertise an Interface Identifier that can be used by PIM protocols to uniquely identify an interface of a neighboring router.

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 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc6395.

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1. Introduction

This document defines a new option for use in PIM Hello messages [RFC4601] to carry an Interface Identifier. A router generates identifiers for each of its PIM-enabled interfaces such that each interface has a different identifier. The identifiers can optionally be generated such that they are unique within, e.g., an administrative domain.

An example where this Interface Identifier can be used is with PIM over Reliable Transport (PORT) [PIM-PORT], where a single Transport connection is used between two routers that have multiple interfaces connecting them. If these interfaces have unnumbered or IPv6 link-local addresses, the Interface Identifier included in the PORT Join/Prune message will identify with which interface the message is associated. For PORT, the Router Identifier is not needed, and it can be set to zero.

All multi-byte integers in this specification are transmitted in network byte order (i.e., most significant byte first).

1.1. Requirements Notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

2. Interface Identifier Option

The Interface Identifier option is used to identify the interface of a neighboring router through which a PIM Hello [RFC4601] was sent. This allows PIM protocols to refer to, or identify, a particular interface on a neighboring router.

The Interface Identifier option need only be included in PIM Hello messages if the router supports protocols that require it. An implementation MAY choose to always include it. The usage of the Interface Identifier and the uniqueness requirements are left to the specifications of the PIM protocols that implement it. It is assumed that different protocols have different minimum requirements for stability and uniqueness of the Interface Identifier but that they have no maximum requirement. When specified, these protocols should indicate what their minimum requirements are.

The Interface Identifier consists of 64 bits. The lower 32 bits form a Local Interface Identifier, and the high 32 bits form a Router Identifier.

2.1. Local Interface Identifier

The 32-bit Local Interface Identifier is selected such that it is unique among the router's PIM-enabled interfaces. That is, there MUST NOT be two PIM interfaces with the same Local Interface Identifier. While an interface is up, the Identifier MUST always be the same once it has been allocated. If an interface goes down and comes up, the router SHOULD use the same Identifier. If a node goes down and comes up again, the Identifier for each interface MAY change. Many systems make use of an ifIndex [RFC2863] as a Local Interface Identifier.

The Local Interface Identifier MUST be non-zero. The reason for this is that some protocols may have messages that optionally reference an Interface Identifier, and they may use the value of 0 to show that no Interface Identifier is being referenced. Note that the value of 0 is not a valid ifIndex as defined in [RFC2863].

2.2. Router Identifier

The 32-bit Router Identifier may be used to uniquely identify the router. The requirements for the scope in which the Router Identifier needs to be unique depend on the protocols that utilize it. It may need to be unique within some administrative domain, or it may possibly be globally unique.

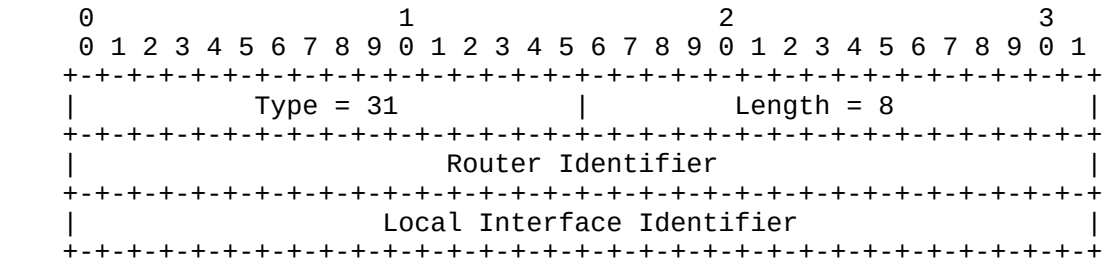
A router implementation selects a Router Identifier according to a configured policy that defines the uniqueness scope. Thus, an implementation MAY be configured to choose an IPv4 unicast address assigned to the router as the Router Identifier, but the implementation MUST allow the identifier to be configured manually.

Protocols such as BGP [RFC4271] and OSPFv2 [RFC2328] are other protocols that make use of 32-bit identifiers for routers. Provided that the stability and uniqueness requirements of the protocols that make use of the Router Identifier are met, an implementation MAY use the same identifier used by other protocols.

The value 0 has a special meaning for the Router Identifier. It means that no Router Identifier is used. If a router only supports protocols that require the Interface Identifier to be unique for one router (only making use of the Local Interface Identifier), then the implementation MAY set the Router Identifier to zero.

3. Message Format

Option Type: Interface Identifier



Allocated Hello Type values can be found in [HELLO-OPT].

Length: In bytes for the value part of the Type/Length/Value encoding. The Interface Identifier will be 8 bytes long.

Router Identifier: The Router Identifier is a 4-byte identifier uniquely identifying the router within some scope. It MAY be 0 when no protocols require a Router Identifier. The field MUST contain a valid Router Identifier or the value zero.

Local Interface Identifier: The Local Interface Identifier is a 4-byte identifier that is unique among all PIM-enabled interfaces on a router.

4. Security Considerations

The Interface Identifier is included in PIM Hello messages. See [RFC4601] for security considerations regarding PIM Hello messages. In particular, PIM Hello messages may be forged and include an arbitrary Interface Identifier, or the Interface Identifier may be intentionally omitted. The effects of this depend on how the Interface Identifier is used by other protocols.

5. IANA Considerations

IANA has assigned the value 31 for the Interface ID PIM-Hello option defined in this document.

6. Acknowledgments

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7. References

7.1. Normative References

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7.2. Informative References

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[PIM-PORT] Farinacci, D., Wijnands, IJ., Venaas, S., and M. Napierala, "A Reliable Transport Mechanism for PIM", Work in Progress, August 2011.

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[RFC4271] Rekhter, Y., Li, T., and S. Hares, "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, January 2006.

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