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V. Govindan
C. Pignataro
Cisco

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Advertising Seamless Bidirectional Forwarding Detection (S-BFD) Discriminators in the Layer Two Tunneling Protocol Version 3 (L2TPv3)

Abstract

This document defines a new Attribute-Value Pair (AVP) that allows L2TP Control Connection Endpoints (LCCEs) to advertise one or more Seamless Bidirectional Forwarding Detection (S-BFD) Discriminator values using the Layer Two Tunneling Protocol version 3 (L2TPv3).

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 http://www.rfc-editor.org/info/rfc7886.

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1. Introduction

[RFC7880] defines a simplified mechanism to use Bidirectional Forwarding Detection (BFD) [RFC5880], referred to as Seamless Bidirectional Forwarding Detection (S-BFD). The S-BFD mechanism depends on network nodes knowing the BFD Discriminators that each node in the network has reserved for this purpose. S-BFD requires the usage of unique discriminators within an administrative domain. The use of the Layer Two Tunneling Protocol version 3 (L2TPv3) [RFC3931] is one possible means of advertising these discriminators.

This document specifies the encoding to be used when S-BFD Discriminators are advertised using L2TPv3.

1.1. Terminology

The reader is expected to be very familiar with the terminology and protocol constructs defined in S-BFD (see Section 2 of [RFC7880]) and L2TPv3 (see Section 1.3 of [RFC3931]).

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 RFC 2119 [RFC2119].

2. S-BFD Target Discriminator ID AVP

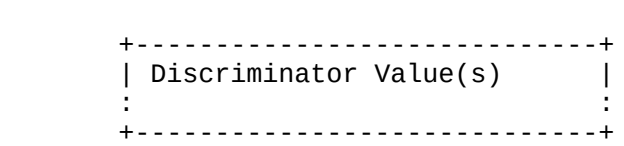
The S-BFD Target Discriminator Identifier (ID) Attribute Value Pair (AVP) is exchanged using the ICRQ (Incoming-Call-Request), ICRP (Incoming-Call-Reply), OCRQ (Outgoing-Call-Request), and OCRP (Outgoing-Call-Reply) control messages during session negotiation.

2.1. Encoding Format

The S-BFD Target Discriminator ID AVP, Attribute Type 102, is an identifier used to advertise the S-BFD target discriminator(s) supported by an L2TP Control Connection Endpoint (LCCE) for the S-BFD reflector operation. This AVP indicates that the advertiser implements an S-BFD reflector supporting the specified target discriminator(s) and is ready for S-BFD reflector operation. The receiving LCCE MAY use this AVP if it wants to monitor connectivity to the advertising LCCE using S-BFD.

The Attribute Value field for this AVP has the following format:

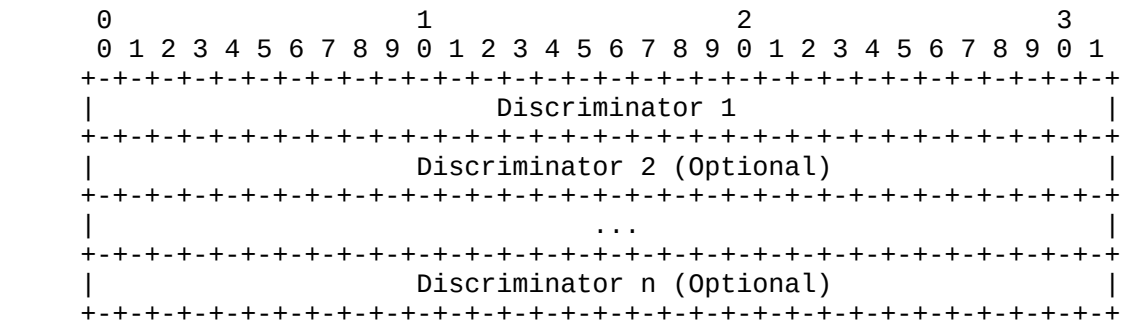
S-BFD Target Discriminator ID (ICRQ, ICRP, OCRQ, OCRP):



An LCCE MAY include the S-BFD Target Discriminator ID AVP advertisement in an L2TP control message (ICRQ, ICRP, OCRQ, OCRP) [RFC3931]. If the other LCCE does not wish to monitor connectivity using S-BFD, it MAY safely discard this AVP without affecting the rest of session negotiation. While [RFC7880] concerns itself with the advertisement of only one discriminator unless the mapping of discriminators to entities is specified, the AVP encoding allows the specification of an arbitrary number of S-BFD Discriminators (at least one) for extensibility.

When an LCCE uses the S-BFD Target Discriminator ID AVP advertisement, multiple S-BFD Discriminators MAY be included, and at least one S-BFD Discriminator MUST be included. When one S-BFD Discriminator is advertised, such an S-BFD Discriminator is associated with the L2TPv3 session. When multiple S-BFD Discriminators are advertised, how a given discriminator is mapped to a specific use case is out of scope for this document.

The S-BFD Target Discriminator ID AVP allows for advertising at least one S-BFD Discriminator value:



The M bit of the L2TP control message (ICRQ, ICRP, OCRQ, OCRP) [RFC3931] MUST NOT be set inside the S-BFD Target Discriminator ID AVP.

3. IANA Considerations

IANA maintains the "Control Message Attribute Value Pairs" sub-registry as per [RFC3438]. IANA has assigned the following value to the S-BFD Target Discriminator ID:

Control Message Attribute Value Pairs

Attribute Type	Description
102	S-BFD Target Discriminator ID

4. Security Considerations

Security concerns for L2TP are addressed in [RFC3931]. The introduction of the S-BFD Target Discriminator ID AVP advertisement introduces no new security risks for L2TP.

Advertising the S-BFD Discriminators makes it possible for attackers to initiate S-BFD sessions using the advertised information. The vulnerabilities this poses and how to mitigate them are discussed in the Security Considerations section of [RFC7880].

5. References

5.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <http://www.rfc-editor.org/info/rfc2119>.

[RFC3438] Townsley, W., "Layer Two Tunneling Protocol (L2TP) Internet Assigned Numbers Authority (IANA) Considerations Update", BCP 68, RFC 3438, DOI 10.17487/RFC3438, December 2002, <http://www.rfc-editor.org/info/rfc3438>.

[RFC3931] Lau, J., Ed., Townsley, M., Ed., and I. Goyret, Ed., "Layer Two Tunneling Protocol - Version 3 (L2TPv3)", RFC 3931, DOI 10.17487/RFC3931, March 2005, <http://www.rfc-editor.org/info/rfc3931>.

[RFC7880] Pignataro, C., Ward, D., Akiya, N., Bhatia, M., and S. Pallagatti, "Seamless Bidirectional Forwarding Detection (S-BFD)", RFC 7880, DOI 10.17487/RFC7880, July 2016, <http://www.rfc-editor.org/info/rfc7880>.

5.2. Informative References

[RFC5880] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD)", RFC 5880, DOI 10.17487/RFC5880, June 2010, <http://www.rfc-editor.org/info/rfc5880>.

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Contributors

Mallik Mudigonda
Cisco Systems, Inc.

Email: mmudigon@cisco.com

Authors' Addresses

Vengada Prasad Govindan
Cisco Systems, Inc.

Email: venggovi@cisco.com

Carlos Pignataro
Cisco Systems, Inc.

Email: cpignata@cisco.com