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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 (LCCs) 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

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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:

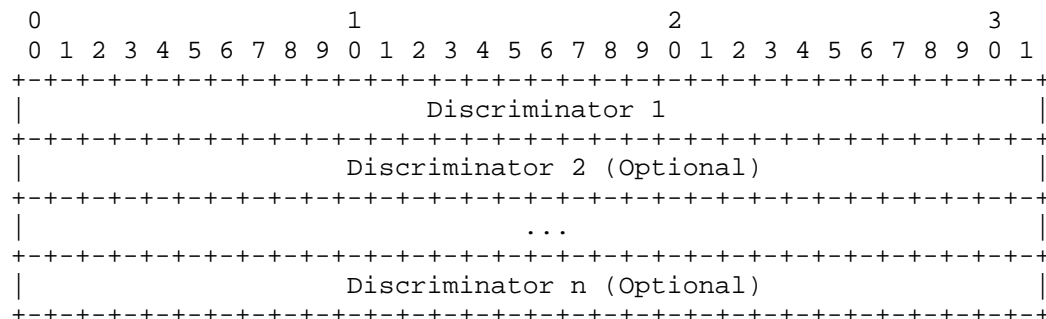
S-BFD Target Discriminator ID (ICRQ, ICRP, OCRQ, OCRP):

	No. of octets
+-----+ Discriminator Value(s) : +-----+	4/Discriminator

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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