

Routing Working Group
Internet-Draft
Intended status: Standards Track
Expires: April 23, 2015

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October 20, 2014

BFD Stability
draft-ashesh-bfd-stability-01.txt

Abstract

This document describes extensions to the Bidirectional Forwarding Detection (BFD) protocol to measure BFD stability. Specifically, it describes a mechanism for detection of BFD frame loss.

Requirements Language

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 <xref target="RFC2119">RFC 2119</xref>.

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1. Introduction

The Bidirectional Forwarding Detection (BFD) protocol operates by transmitting and receiving control frames, generally at high frequency, over the datapath being monitored. In order to prevent significant data loss due to a datapath failure, the tolerance for lost or delayed frames (the Detection Time as described in RFC 5880) is set to the smallest feasible value.

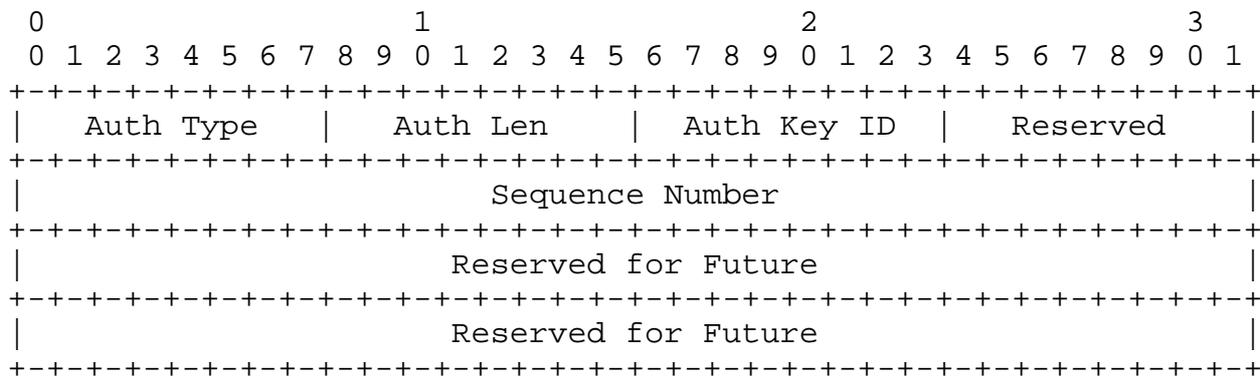
This document proposes a mechanism to detect lost frames in a BFD session in addition to the datapath fault detection mechanisms of BFD. Such a mechanism presents significant value with the ability to measure the stability of BFD sessions and provides data to the operators.

2. BFD Null-Authentication TLV

The functionality proposed for BFD stability measurement is achieved by appending the Null-Authentication TLV to the BFD control frame.

The Null-Authentication TLV (called 0-Auth in this document) extends the existing BFD Authentication TLV structure by adding a new Auth-

Type of <IANA Assigned>. This TLV carries the Sequence Number for frame loss measurement.



where:

Auth Type: The Authentication Type, which in this case is <IANA assigned> (Null Authentication).

Auth Len: The length of the Authentication Section, in bytes. Set to 12.

Auth Key ID: The Authentication Key ID in use for this packet. This MUST be set to zero on transmit, and ignored on receipt.

Reserved: This byte MUST be set to zero on transmit, and ignored on receipt.

Reserved for Future: For future extensions. MUST be set to 0 if not used.

Sequence Number: This indicates the sequence number for this packet and MUST be present in every 0-Auth TLV. This value is incremented by 1 for every frame transmitted while the session state is UP. A value of 0 indicates a request by sender to reset the sequence number correlation logic at the receiver. The first frame transmitted by the sender MAY set this field to 0.

3. Theory of Operations

This mechanism allows operator to measure the loss of BFD CC frames.

This measurement counts the number of BFD control frames missed at the receiver due to a transient change in the network such as congestion. Frame-loss is detected by comparing the Sequence Number field in the 0-Auth TLV in successive BFD CC frames. The Sequence

Number in each successive control frame generated on a BFD session by the transmitter is incremented by one.

The first BFD Loss-Delay TLV processed by the receiver that has a non-zero sequence number is used for bootstrapping the logic. Each successive frame after this is expected to have a Sequence Number that is one greater than the Sequence Number in the previous frame.

4. IANA Requirements

IANA is requested to assign new Auth-Type for the Null-Authentication TLV for BFD Stability Measurement. The following number is suggested.

Value Meaning

6 Null-Authentication TLV

5. Security Consideration

Since this method uses an authentication TLV to achieve the functionality, usage of this TLV will prevent the use of other authentication TLVs.

6. Acknowledgements

Nobo Akiya, Jeffery Haas, Peng Fan, Dileep Singh, Basil Saji, Sagar Soni and Mallik Mudigonda also contributed to this document.

7. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC5880] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD)", RFC 5880, June 2010.

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