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                                                         April 23, 2015

                              BFD Stability
                    draft-ashesh-bfd-stability-02.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>.

Status of This Memo

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Table of Contents

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.

```
     0                   1                   2                   3
     0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |    Auth Type   |    Auth Len    |   Auth Key ID  |   Reserved   |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                        Sequence Number                        |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                      Reserved for Future                      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                      Reserved for Future                      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
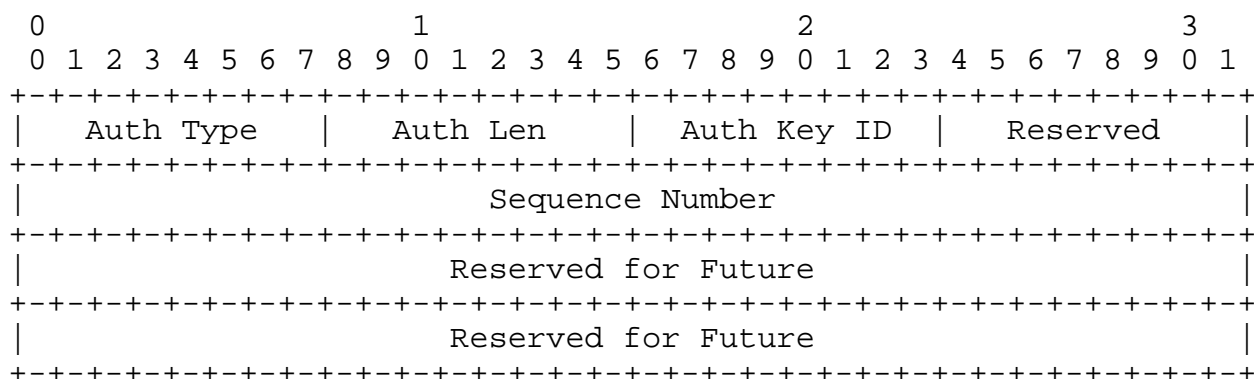
where:

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 achive 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 conributed to this document.

7. Normative References

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