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BFD Encapsulated in Large Packets
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Abstract

The Bidirectional Forwarding Detection (BFD) protocol is commonly used to verify connectivity between two systems. BFD packets are typically very small. It is desirable in some circumstances to know that not only is the path between two systems reachable, but also that it is capable of carrying a payload of a particular size. This document discusses thoughts on how to implement such a mechanism using BFD in Asynchronous mode.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [[RFC2119](#)] only when they appear in all upper case. They may also appear in lower or mixed case as English words, without normative meaning.

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[1.](#) Introduction

The Bidirectional Forwarding Detection (BFD) [[RFC5880](#)] protocol is commonly used to verify connectivity between two systems. However, some applications may require that the Path MTU [[RFC1191](#)] between those two systems meets a certain minimum criteria. When the Path MTU decreases below the minimum threshold, those applications may wish to consider the path unusable.

BFD may be encapsulated in a number of transport protocols. An example of this is single-hop BFD [[RFC5881](#)]. In that case, the link MTU configuration is typically enough to guarantee communication between the two systems for that size MTU. BFD Echo mode ([Section 6.4 of \[RFC5880\]](#)) is sufficient to permit verification of the Path MTU of such directly connected systems. Previous proposals ([\[I-D.haas-xiao-bfd-echo-path-mtu\]](#)) have been made for testing Path

MTU for such directly connected systems. However, in the case of multi-hop BFD [[RFC5883](#)], this guarantee does not hold.

The encapsulation of BFD in multi-hop sessions is a simple UDP packet. The BFD elements of procedure ([Section 6.8.6 of \[RFC5880\]](#))

covers validating the BFD payload. However, the specification is silent on the length of the encapsulation that is carrying the BFD PDU. While it is most common that the transport protocol payload (i.e. UDP) length is the exact size of the BFD PDU, this is not required by the elements of procedure. This leads to the possibility that the transport protocol length may be larger than the contained BFD PDU.

[2.](#) BFD Encapsulated in Large Packets

Support for BFD between two systems is typically configured, even if the actual session may be dynamically created by a client protocol. A new BFD variable is defined in this document:

`bfd.PaddedPduSize`

The BFD transport protocol payload size is increased to this value. The contents of this additional payload MUST be zero. The minimum size of this variable MUST NOT be smaller than permitted by the element of BFD procedure; 24 or 26 - see [Section 6.8.6 of \[RFC5880\]](#).

The Don't Fragment bit ([Section 2.3 of \[RFC0791\]](#)) of the IP payload, when using IPv4 encapsulation, MUST be set.

[3.](#) Implementation and Deployment Considerations

While this document proposes no change to the BFD protocol, implementations may not permit arbitrarily padded transport PDUs to carry BFD packets. While [Section 6 of \[RFC5880\]](#) warns against excessive pedantry, implementations may not work with this mechanism without additional support. Additional changes to the base BFD protocol may be required to permit negotiation of this functionality and the padding value.

It is also worthy of note that even if an implementation can function with larger transport PDUs, that additional packet size may have

impact on BFD scaling.

This mechanism also can be applied to other forms of BFD, including S-BFD [[RFC7880](#)].

[4.](#) Security Considerations

This document does not change the underlying security considerations of the BFD protocol or its encapsulations.

[5.](#) IANA Considerations

This document introduces no additional considerations to IANA.

[6.](#) References

[6.1.](#) Normative References

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6.2. Informative References

- [I-D.haas-xiao-bfd-echo-path-mtu]
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