       Propagating Explicit Congestion Notification Across IP Tunnel Headers
                        Separated by a Shim
                   draft-briscoe-tsvwg-rfc6040bis-01

Abstract

   RFC 6040 on "Tunnelling of Explicit Congestion Notification" made the
   rules for propagation of ECN consistent for all forms of IP in IP
   tunnel. This specification extends the scope of RFC 6040 to include
   tunnels where two IP headers are separated by a shim header that
   cannot stand alone.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on January 9, 2017.

Table of Contents

1. Scope of RFC 6040

RFC 6040 on "Tunnelling of Explicit Congestion Notification"
[RFC6040] made the rules for propagation of Explicit Congestion
Notification (ECN [RFC3168]) consistent for all forms of IP in IP
tunnel. The scope of RFC 6040 was stated as

   "...ECN field processing at encapsulation and decapsulation for
   any IP-in-IP tunnelling, whether IPsec or non-IPsec tunnels. It
   applies irrespective of whether IPv4 or IPv6 is used for either
   the inner or outer headers. ..."

A common pattern for many tunnelling protocols is to encapsulate an
inner IP header with shim header(s) then an outer IP header. To
clear up confusion, this specification clarifies that the scope of
RFC 6040 includes any IP-in-IP tunnel, including those with shim
header(s) between the IP headers.

2. Terminology

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].

3. IP-in-IP Tunnels with Tightly Coupled Shim Headers

In many cases the shim header(s) and the outer IP header are always
added (or removed) as part of the same process. We call this a
tightly coupled shim header. Processing the shim and outer together
is often necessary because the shim(s) are not sufficient for packet
forwarding in their own right; not unless complemented by an outer
header.

For all such tightly coupled shim headers, the rules in [RFC6040] for
propagating the ECN field SHOULD be applied directly between the
inner and outer IP headers. This specification therefore updates the
following specifications of tightly coupled shim headers by adding
that RFC 6040 SHOULD apply when the shim header is used between IP
headers:

o L2TPv2 [RFC2661], L2TPv3 [RFC3931]

o GRE [RFC1701], [RFC2784]

o PPTP [RFC2637]

o GTP [GTPv1], [GTPv1-U], [GTPv2-C]

o VXLAN [RFC7348].

Geneve [I-D.ietf-nvo3-geneve] and Generic UDP Encapsulation (GUE)
[I-D.ietf-nvo3-gue] are also tightly coupled shim headers, but their
specifications already refer to RFC 6040 for ECN encapsulation.

The above is written as a 'SHOULD' not a 'MUST' to allow for the
possibility that the structure of some pre-existing tunnel
implementations might make it hard to predict what other headers will
be added or removed subsequently.

Although the definition of the various GTP shim headers is under the
control of the 3GPP, it is hard to determine whether the 3GPP or the
IETF controls standardization of the _process_ of adding both a GTP
and an IP header to an inner IP header. Nonetheless, the present
specification is provided so that the 3GPP can refer to it from any
of its own specifications of GTP and IP header processing.

Similarly, VXLAN is not under the control of the IETF, but the
present specification is provided so that the authors of any future
update to the VXLAN specification can refer to it.

More generally, whatever form IP-in-IP tunnelling takes, the ECN
field SHOULD be propagated according to the rules in RFC 6040
wherever possible. Otherwise [I-D.ietf-tsvwg-ecn-encap-guidelines]
gives more general guidance on how to propagate ECN to and from
protocols that encapsulate IP.

4. IANA Considerations (to be removed by RFC Editor)

This memo includes no request to IANA.

5. Security Considerations

   The Security Considerations in RFC 6040 apply equally to the wider
   scope defined by the present specification.

6. Comments Solicited

   Comments and questions are encouraged and very welcome. They can be
   addressed to the IETF Transport Area working group mailing list
   <tsvwg@ietf.org>, and/or to the authors.

7. Normative References

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