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.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on May 19, 2017.

Copyright Notice

Copyright (c) 2016 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust’s Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must...
include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Scope of RFC 6040 ........................................ 2
2. Terminology .................................................. 2
3. IP-in-IP Tunnels with Tightly Coupled Shim Headers ...... 2
4. Specific Updates to Existing RFCs .......................... 3
5. IANA Considerations (to be removed by RFC Editor) ....... 4
6. Security Considerations ...................................... 4
7. Comments Solicited .......................................... 4
8. Normative References ........................................ 4
Author’s Address ..................................................... 6

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:

- L2TPv2 [RFC2661], L2TPv3 [RFC3931]
- GRE [RFC1701], [RFC2784], [RFC7637]
- PPTP [RFC2637]
- GTP [GTPv1], [GTPv1-U], [GTPv2-C]
- 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 and NVGRE are not under the control of the IETF, but the present specification is provided so that the authors of any future update to these specifications 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.pdat

4. Specific Updates to Existing RFCs

- L2TPv2 [RFC2661], L2TPv3 [RFC3931]
- GRE [RFC1701],
5. IANA Considerations (to be removed by RFC Editor)

This memo includes no request to IANA.

6. Security Considerations

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

7. 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.

8. Normative References


Author’s Address

Bob Briscoe
Simula Research Laboratory
UK

EMail: ietf@bobbriscoe.net
URI: http://bobbriscoe.net/