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A. Farrel
Juniper Networks
S. Bryant
Cisco Systems
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Retiring TLVs from the Associated Channel Header of the MPLS Generic Associated Channel

Abstract

The MPLS Generic Associated Channel (G-ACh) is a generalization of the applicability of the pseudowire (PW) Associated Channel Header (ACH). RFC 5586 defines the concept of TLV constructs that can be carried in messages on the G-ACh by placing them in the ACH between the fixed header fields and the G-ACh message. These TLVs are called ACH TLVs

No Associated Channel Type yet defined uses an ACH TLV. Furthermore, it is believed that handling TLVs in hardware introduces significant problems to the fast path, and since G-ACh messages are intended to be processed substantially in hardware, the use of ACH TLVs is undesirable.

This document updates RFC 5586 by retiring ACH TLVs and removing the associated registry.

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction and Scope

RFC 4385 [RFC4385] says that if the first nibble of a PW packet carried over an MPLS network has a value of 1, then the packet starts with a specific header format called the Pseudowire Associated Channel Header (PWACH) or more generally known as the ACH. This mechanism creates an Associated Channel that is a message channel associated with a specific pseudowire (PW).

The applicability of the ACH is generalized in RFC 5586 [RFC5586] to define the MPLS Generic Associated Channel (G-ACh). This creates a common encapsulation header for control channel messages associated with MPLS Sections, Label Switching Paths (LSPs), and PWs.

As part of making the ACH fully generic, RFC 5586 defines ACH TLV constructs. According to RFC 5586:

In some applications of the generalized associated control channel, it is necessary to include one or more ACH TLVs to provide additional context information to the G-ACh packet.

RFC 5586 goes on to say:

If the G-ACh message MAY be preceded by one or more ACH TLVs, then this MUST be explicitly specified in the definition of an ACH Channel Type.

However, at the time of writing, of the 18 ACH Channel Types defined, none allows the use of ACH TLVs [IANA-ACH]. At the time of writing, there are no unexpired Internet-Drafts that utilize ACH TLVs.

Furthermore, G-ACh packets are intended to be substantially processed in hardware; however, processing TLVs in hardware can be difficult because of the unpredictable formats and lengths that they introduce to the normal ACH format.

This document states that ACH TLVs, as specified in RFC 5586, are not useful and might be harmful. It updates RFC 5586 by deprecating the ACH TLV and updating the associated IANA registries as described in Section 4 of this document. This document makes no comment about the use of TLVs in other places. In particular, proposals to use TLVs within ACH messages or as an appendage to ACH messages, are not in scope of this document.

1.1. Specification of Requirements

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 [RFC2119].

2. Update to RFC 5586

Section 3 of RFC 5586 is deleted.

References to ACH TLVs in Section 4 of RFC 5586 should also be disregarded. Note that the text in Section 4 currently uses phrases like "ACH TLV(s), if present" so, with the removal of Section 3 that used to define ACH TLVs, they will not be present.

3. Implication for the ACH

A G-ACh message **MUST NOT** be preceded by an ACH TLV.

4. IANA Considerations

This document details two changes to the IANA registries.

4.1. Associated Channel Header TLV Registry

The "Pseudowire Name Spaces (PWE3)" registry has a subregistry called the "Associated Channel Header TLV Registry". IANA has entirely deleted this subregistry but has left a tombstone record in the top-level list of registries that says:

Associated Channel Header TLV Registry (DELETED)

Reference
[RFC5586] [RFC7026]

4.2. Pseudowire Associated Channel Types Registry

The "Pseudowire Name Spaces (PWE3)" registry has a subregistry called the "Pseudowire Associated Channel Types" registry. This subregistry previously included a column marked "TLV Follows". IANA has entirely deleted this column leaving no record.

5. Manageability Considerations

This document will have no impact on network or device manageability because there are no ACH Types that allow the use of TLVs. The document removes a feature that might have been used to enhance management messages, and especially Operations, Management, and Administration (OAM) messages. However, given the considerable experience in defining MPLS OAM messages in the last few years, it would appear that this feature is not useful.

It is possible that packet sniffers that have already been implemented will look for ACH TLVs. The deletion of the construct will not have a negative impact.

6. Security Considerations

Deleting the ACH TLV has a marginal positive effect on security because it removes a feature that might have been used as an attack vector to carry false information or to bloat G-ACh messages.

On the other hand, it had been suggested that the ACH TLV could have been used to carry security parameters to secure the messages on the G-ACh in a generic way. However, no mechanisms have been proposed at the time of writing, and it has generally been considered that it is the responsibility of the specification that defines G-ACh messages to consider the security requirements of those messages that may be different for the different applications.

Otherwise, this document has no implications for security.

7. Acknowledgements

Thanks to Eric Osborne, Thomas Morin, Lizhong Jin, Greg Mirsky, Jia He, and Pearl Liang for suggestions to improve the text.

8. References

8.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [RFC4385] Bryant, S., Swallow, G., Martini, L., and D. McPherson, "Pseudowire Emulation Edge-to-Edge (PWE3) Control Word for Use over an MPLS PSN", RFC 4385, February 2006.
- [RFC5586] Bocci, M., Ed., Vigoureux, M., Ed., and S. Bryant, Ed., "MPLS Generic Associated Channel", RFC 5586, June 2009.

8.2. Informative References

- [IANA-ACH] "Pseudowire Associated Channel Types", IANA, <<http://www.iana.org/assignments/pwe3-parameters>>

Authors' Addresses

Adrian Farrel
Juniper Networks
EMail: adrian@olddog.co.uk

Stewart Bryant
Cisco Systems
EMail: stbryant@cisco.com