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TRILL: Address Flush Message
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Abstract

The TRILL (TRansparent Interconnection of Lots of Links) protocol, by default, learns end station addresses from observing the data plane. In particular, it learns local MAC addresses and edge switch port of attachment from the receipt of local data frames and learns remote MAC addresses and edge switch of attachment from the decapsulation of remotely sourced TRILL Data packets.

This document specifies a message by which an originating TRILL switch can explicitly request other TRILL switches to flush certain MAC reachability learned through the decapsulation of TRILL Data packets. This is a supplement to the TRILL automatic address forgetting and can assist in achieving more rapid convergence in case of topology or configuration change.

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1. Introduction

Edge TRILL (Transparent Interconnection of Lots of Links) switches [RFC6325] [RFC7780], also called edge RBridges, by default learn end station MAC address reachability from observing the data plane. On receipt of a native frame from an end station, they would learn the local MAC address attachment of the source end station. And on egressing (decapsulating) a remotely originated TRILL Data packet, they learn the remote MAC address and remote attachment TRILL switch. Such learning is all scoped by data label (VLAN or Fine Grained Label [RFC7172]).

TRILL has mechanisms for timing out such learning and appropriately clearing it based on some network connectivity and configuration changes; however, there are circumstances under which it would be helpful for a TRILL switch to be able to explicitly flush (purge) certain learned end station reachability information in remote RBridges to achieve more rapid convergence. For example, in the case of topology change or reconfiguration in a bridged network attached to multiple edge RBridges. Section 6.2 of [RFC4762] is another example of use of such a mechanism.

A TRILL switch R1 can easily flush any locally learned addresses it wants. This document specifies an RBridge Channel protocol [RFC7178] message to request flushing address information learned from decapsulating at remote RBridges.

1.1 Terminology and Acronyms

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].

This document uses the terms and acronyms defined in [RFC6325] and [RFC7978] as well as the following:

Data Label - VLAN or FGL.

Edge TRILL switch - A TRILL switch attached to one or more links that provide end station service.

FGL - Fine Grained Label [RFC7172].

Management VLAN - A VLAN in which all TRILL switches in a campus indicate interest so that multi-destination TRILL Data packets, including RBridge Channel messages [RFC7978], sent with that VLAN as the Inner.VLAN will be delivered to all TRILL switches in the campus. Usually no end station service is offered in the

Management VLAN.

RBridge - An alternative name for a TRILL switch.

TRILL switch - A device implementing the TRILL protocol.

2. Address Flush Message Details

The Address Flush message is an RBridge Channel protocol message [RFC7178].

The general structure of an RBridge Channel packet on a link between TRILL switches is shown in Figure 1 below. The Protocol field in the RBridge Channel Header gives the type of RBridge Channel packet that indicates how to interpret the Channel Protocol Specific Payload [RFC7178].

```
                +-----------------------------------+
                |            Link Header            |
                +-----------------------------------+
                |            TRILL Header           |
                +-----------------------------------+
                |     Inner Ethernet Addresses      |
                +-----------------------------------+
                |     Data Label (VLAN or FGL)      |
                +-----------------------------------+
                |      RBridge Channel Header       |
                +-----------------------------------+
                | Channel Protocol Specific Payload |
                +-----------------------------------+
                |    Link Trailer (FCS if Ethernet) |
                +-----------------------------------+
```

Figure 1. RBridge Channel Protocol Message Structure

An Address Flush RBridge Channel message by default applies to addresses within the Data Label that appears right after the Inner Ethernet Addresses. Address Flush protocol messages are usually sent as multi-destination packets (TRILL Header M bit equal to one) so as to reach all TRILL switches offering end station service in the VLAN or FGL specified by that Data Label. Such messages SHOULD be sent at priority 6 since they are important control messages but lower priority than control messages that establish or maintain adjacency.

Nevertheless:

- There are provisions for optionally indicating the Data Label(s) to be flushed for cases where the Address Flush message is sent over a Management VLAN or the like.
- An Address Flush message can be sent unicast, if it is desired to clear addresses at one TRILL switch only.

2.1 VLAN Block Only Case

Figure 2 below expands the RBridge Channel Header and Channel Protocol Specific Payload from Figure 1 for the case of the VLAN only based Address Flush message. This form of the Address Flush message is optimized for flushing MAC addressed based on nickname and blocks of VLANs.

```
    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
RBridge Channel Header:
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |    RBridge-Channel (0x8946)   |  0x0  | Channel Protocol = TBD |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |          Flags        |  ERR  |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
Address Flush Protocol Specific:
   +-+-+-+-+-+-+-+-+
   | K-nicks       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | Nickname 1                    | Nickname 2                    |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | Nickname ...                  | Nickname K-nicks              |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | K-VLBs        |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | RESV  | Start.VLAN 1          | RESV  | End.VLAN 1            |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | RESV  | Start.VLAN 2          | RESV  | End.VLAN 2            |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | RESV  | Start.VLAN ...        | RESV  | End.VLAN ...          |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   | RESV  | Start.VLAN K-VLBs     | RESV  | End.VLAN K-VLBs       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 2. Address Flush Message - VLAN Case

The fields in Figure 2 related to the Address Flush message are as follows:

Channel Protocol: The RBridge Channel Protocol value allocated for Address Flush (see Section 3).

K-nicks: K-nicks is the number of nicknames listed as an unsigned integer. If this is zero, the ingress nickname in the TRILL Header [RFC6325] is considered to be the only nickname to which the message applies. If non-zero, it given the number of nicknames listed right after K-nicks to which the message applies and, in this non-zero case, the flush does not apply to the ingress nickname in the TRILL Header unless it is also listed. The messages flushes address learning due to egressing TRILL Data packets that had an ingress nickname to which the message applies.

Nickname: A listed nickname to which it is intended that the Address Flush message apply. If an unknown or reserved nickname occurs in the list, it is ignored but the address flush operation is still executed with the other nicknames. If an incorrect nickname occurs in the list, so some address learning is flushed that should not have been flush, the network will still operate correctly but will be less efficient as the incorrectly flushed learning is re-learned.

K-VLBs: K-VLBs is the number of VLAN blocks present as an unsigned integer. If this byte is zero, the message is the more general format specified in Section 2.2. If it is non-zero, it gives the number of blocks of VLANs present.

RESV: 4 reserved bits. MUST be sent as zero and ignored on receipt.

Start.VLAN, End.VLAN: These 12-bit fields give the beginning and ending VLAN IDs of a block of VLANs. The block includes both the starting and ending values so a block of size one is indicated by setting End.VLAN equal to Start.VLAN. If Start.VLAN is 0x000, it is treated as if it was 0x001. If End.VLAN is 0xFFF, it is treated as if it was 0xFFE. If End.VLAN is smaller than Start.VLAN, considering both as unsigned integers, that VLAN block is ignored but the address flush operation is still executed with other VLAN blocks in the message.

This message flushes all addresses in an applicable VLAN learned from egressing TRILL Data packets with an applicable nickname as ingress. To flush addresses for all VLANs, it is easy to specify a block covering all valid VLAN IDs, this is, from 0x001 to 0xFFE.

2.2 Extensible Case

A more general form of the Address Flush message is provided to support flushing by FGL and more efficient encodings of VLANs and FGLs where using a set of contiguous blocks if cumbersome. It also supports optionally specifying the MAC addresses to clear. This form is extensible.

It is indicated by a zero in the byte shown in Figure 2 as "K-VLBs" followed by other information encoded as TLVs.

```
       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
    RBridge Channel Header:
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       |    RBridge-Channel (0x8946)   |  0x0  | Channel Protocol = TBD |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       |          Flags        |  ERR  |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    Address Flush Protocol Specific:
       +-+-+-+-+-+-+-+-+
       | K-nicks       |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       | Nickname 1                    | Nickname 2                    |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       | Nickname ...                  | Nickname K-nicks              |
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
       | 0             |  TLVs ...
       +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+...
```

Figure 3. Address Flush Message - Extensible Case

Channel Protocol, K-nicks, Nickname: These fields are as specified in Section 2.1.

TLVs: If the byte immediately before the TLVs field, which is the byte labeled "K-VLBs" in Figure 2, is zero, as shown in Figure 3, the remainder of the message consists of TLVs encoded as shown in Figure 4.

```
             0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
            | Type          | Length        | Value
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

Figure 4. Type, Length, Value

Type: The 8-bit TLV type as shown in the table below. See subsections of this Section 2.2 for details on each type assigned below. If the type is reserved or not known by a receiving RBridge, that receiving RBridge ignores the value and can easily skip to the next TLV by use of the Length byte. There is no provision for a list of VLAN IDs TLV as there are few enough of them that an arbitrary subset of VLAN IDs can be represented as a bit map.

Type	Description	Reference
0	Reserved	[this document]
1	Blocks of VLANs	[this document]
2	Bit Map of VLANs	[this document]
3	Blocks of FGLs	[this document]
4	List of FGLs	[this document]
5	Bit Map of FGLs	[this document]
6	All Data Labels	[this document]
7	MAC Address List	[this document]
8	MAC Address Blocks	[this document]
9-254	Unassigned	
255	Reserved	[this document]

RBridges that implement the Address Flush message

Length: The 8-bit unsigned integer length of the remaining information in the TLV after the length byte. The length MUST NOT imply that the value extends beyond the end of RBridge Channel Protocol Specific Payload area. If it does, the Address Flush message is corrupt and MUST be ignored.

Value: Depends on the TLV type.

The TLVs in an extensible Address Flush message are parsed with types unknown by the receiving RBridge ignored.

All RBridges implementing the Address Flush RBridge Channel message MUST implement types 1 and 2, the VLAN types, and type 6, which indicates addresses are to be flushed for all Data Labels.

RBridges that implement FGL ingress/egress MUST implement types 3, 4, and 5, the FGL types. (An RBridge that is merely FGL safe [RFC7172], but cannot egress FGL TRILL Data packets, SHOULD ignore the FGL types as it will not learn any FGL scoped MAC addresses from the data plane.)

RBridges SHOULD implement types 7 and 8 so that specific MAC addresses can be flushed. If they do not, the effect will be to flush all MAC addresses for the indicated Data Labels, which will be inefficient as those not intended to be flushed will have to be re-learned.

The parsing of the TLVs by a receiving RBridge results in three items of information: a flag indicating whether one or more type 6 TLVs (All Data Labels) were encountered; a set of Data Labels and blocks of data labels compiled from VLAN and/or FGL specifying TLVs in the message; and, if the MAC address TLV types are implemented, a set of MAC addresses and blocks of MAC addresses compiled from MAC address specifying TLVs in the message. If the set of MAC addresses and blocks of MAC address is null, the address flush message applies to all MAC addresses. If the flag indicating the presence of an All Data Labels TLV is true, then the address flush message applies to all

Data Labels and the set of Data Labels and block of Data labels specified has no effect. If the flag indicating the presence of an All Data Labels TLV is false, then the address flush messages applies to the set of Data Labels and blocks of Data Labels; if that set is null, the address flush message does nothing.

2.2.1 Blocks of VLANs

If the TLV Type is 1, the value is a list of blocks of VLANs as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 1      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| RESV  | Start.VLAN 1          | RESV  | End.VLAN 1            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| RESV  | Start.VLAN 2          | RESV  | End.VLAN 2            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| RESV  | Start.VLAN ...        | RESV  | End.VLAN ...          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The meaning of Start.VLAN and End.VLAN is as specified in Section 2.1. Length MUST be a multiple of 4. If Length is not a multiple of 4, the TLV is corrupt and the Address Flush message MUST be ignored.

2.2.2 Bit Map of VLANs

If the TLV Type is 2, the value is a bit map of VLANs as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 2      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| RESV  | Start.VLAN            | Bits...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

The value portion of the TLV begins with two bytes having the 12-bit starting VLAN ID right justified (the top 4 bits are as specified in Section 2.1 RESV). This is followed by bytes with one bit per VLAN ID. The high order bit of the first byte is for VLAN N, the next to the highest order bit is for VLAN N+1, the low order bit of the first byte is for VLAN N+7, the high order bit of the second byte, if there is a second byte, is for VLAN N+8, and so on. If that bit is a one, the Address Flush message applies to that VLAN. If that bit is a zero, then addresses that have been learned in that VLAN are not flushed. Note that Length MUST be at least 2. If Length is 0 or 1 the TLV is corrupt and the Address Flush message MUST be ignored.

VLAN IDs do not wrap around. If there are enough bytes so that some bits correspond to VLAN ID 0xFFF or higher, those bits are ignored but the message is still processed for bits corresponding to valid VLAN IDs.

2.2.3 Blocks of FGLs

If the TLV Type is 3, the value is a list of blocks of FGLs as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 3      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Start.FGL 1                                   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| End.FGL 1                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Start.FGL 2                                   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| End.FGL 2                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Start.FGL ...                                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| End.FGL ...                                   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The TLV value consists of sets of Start.FGL and End.FGL numbers. The Address Flush information applies to the FGLs in that range, inclusive. A single FGL is indicated by setting both Start.FGL and End.FGL to the same value. If End.FGL is less than Start.FGL, considering them as unsigned integers, that block is ignored but the Address Flush message is still processed for any other blocks present. For this Type, Length MUST be a multiple of 6; if it is not, the TLV is corrupt and the Address Flush message MUST be discarded if the receiving RBridge implements Type 3.

2.2.4 list of FGLs

If the TLV Type is 4, the value is a list of FGLs as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 4      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| FGL 1                                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| FGL 2                                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| FGL ...                                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The TLV value consists of FGL numbers each in 3 bytes. The Address Flush message applies to those FGLs. For this Type, Length MUST be a multiple of 3; if it is not, the TLV is corrupt and the address flush Message MUST be discarded if the receiving RBridge implements Type 4.

2.2.5 Big Map of FGLs

If the TLV Type is 5, the value is a bit map of FGLs as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 5      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Start.FGL                                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Bits...
+-+-+-+-+-+-+-+-
```

The TLV value consists of three bytes with the 24-bit starting FGL value N. This is followed by bytes with one bit per FGL. The high order bit of the first byte is for FGL N, the next to the highest order bit is for FGL N+1, the low order bit of the first byte is for FGL N+7, the high order bit of the second byte, if there is a second byte, is for FGL N+8, and so on. If that bit is a one, the Address Flush message applies to that FGL. If that bit is a zero, then addresses that have been learned in that FGL are not flushed. Note that Length MUST be at least 3. If Length is 0, 1, or 2 for a Type 5 TLV, the TLV is corrupt and the Address Flush message MUST be discarded. FGLs do not wrap around. If there are enough bytes so that some bits correspond to an FGL higher than 0xFFFFFF, those bits are ignored but the message is still processed for bits corresponding to valid FGLs.

2.2.6 All Data Labels

If the TLV Type is 6, the value is null as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 6      | Length = 0    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

This type is used when a RBridge want to withdraw all Address for all the Data Labels (all VLANs and FGLs), Length MUST be zero. If Length is any other value, the TLV is corrupt and the Address Flush message MUST be ignored.

2.2.7 MAC Address List

If the TLV Type is 7, the value is a list of MAC addresses as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 7      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC 1 upper half                                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC 1 lower half                                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC 2 upper half                                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC 2 lower half                                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC ... upper half                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC ... lower half                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The TLV value consists of a list of 48-bit MAC addresses. Length MUST be a multiple of 6. If it is not, the TLV is corrupt and the Address Flush message MUST be ignored if the receiving RBridge implements Type 7.

2.2.8 MAC Address Blocks

If the TLV Type is 8, the value is a list of blocks of MAC addresses as follows:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type = 7      | Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start 1 upper half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start 1 lower half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end 1 upper half                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end 1 lower half                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start 2 upper half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start 2 lower half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end 2 upper half                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end 2 lower half                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start ... upper half                      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.start ... lower half                      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end ... upper half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| MAC.end ... lower half                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The TLV value consists of sets of Start.MAC and End.MAC numbers. The Address Flush information applies to the 48-bit MAC Addresses in that range, inclusive. A single MAC Address is indicated by setting both Start.MAC and End.MAC to the same value. If End.MAC is less than Start.MAC, considering them as unsigned integers, that block is ignored but the Address Flush message is still processed for any other blocks present. For this Type, Length MUST be a multiple of 12; if it is not, the TLV is corrupt and the Address Flush message MUST be discarded if the receiving RBridge implements Type 7.

3. IANA Considerations

Two IANA actions are requested as follows:

3.1 Address Flush RBridge Channel Protocol Number

IANA is requested to assign TBD as the Address Flush RBridge Channel Protocol number from the range of RBridge Channel protocols allocated by Standards Action [RFC7178].

The added RBridge Channel protocols registry entry on the TRILL Parameters web page is as follows:

Protocol	Description	Reference
TBD	Address Flush	[this document]

3.2 TRILL Address Flush TLV Types

IANA is requested to create a TRILL Address Flush TLV Types registry on the TRILL Parameters web page indented right after the RBridge Channel Protocols registry. Registry headers are as below. The initial entries are as in the table in Section 2.2 above.

Registry: TRILL Address Flush TLV Types
Registration Procedures: IETF Review
Reference: [this document]

4. Security Considerations

The Address Flush RBridge Channel Protocol provides no security assurances or features. However, the Address Flush protocol messages can be secured by use of the RBridge Channel Header Extension [RFC7978].

See [RFC7178] for general RBridge Channel Security Considerations.

See [RFC6325] for general TRILL Security Considerations.

Normative References

[RFC2119] - Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC6325] - Perlman, R., D. Eastlake, D. Dutt, S. Gai, and A. Ghanwani, "RBridges: Base Protocol Specification", RFC 6325, July 2011.

[RFC7172] - Eastlake 3rd, D., Zhang, M., Agarwal, P., Perlman, R., and D. Dutt, "Transparent Interconnection of Lots of Links (TRILL): Fine-Grained Labeling", RFC 7172, DOI 10.17487/RFC7172, May 2014, <http://www.rfc-editor.org/info/rfc7172>.

[RFC7178] - Eastlake 3rd, D., Manral, V., Li, Y., Aldrin, S., and D. Ward, "Transparent Interconnection of Lots of Links (TRILL): RBridge Channel Support", RFC 7178, DOI 10.17487/RFC7178, May 2014, <http://www.rfc-editor.org/info/rfc7178>.

[RFC7780] - Eastlake 3rd, D., Zhang, M., Perlman, R., Banerjee, A., Ghanwani, A., and S. Gupta, "Transparent Interconnection of Lots of Links (TRILL): Clarifications, Corrections, and Updates", RFC 7780, DOI 10.17487/RFC7780, February 2016, <http://www.rfc-editor.org/info/rfc7780>.

[RFC7978] - Eastlake 3rd, D., Umair, M., and Y. Li, "Transparent Interconnection of Lots of Links (TRILL): RBridge Channel Header Extension", RFC 7978, DOI 10.17487/RFC7978, September 2016, <http://www.rfc-editor.org/info/rfc7978>.

Informative References

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The document was prepared in raw nroff. All macros used were defined within the source file.

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