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TRILL: Vendor Specific TRILL Channel Protocol
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Abstract

The IETF TRILL (TRAnsparent Interconnection of Lots of Links) protocol is implemented by devices called TRILL switches or RBridges (Routing Bridges). TRILL includes a general mechanism, called RBridge Channel, for the transmission of typed messages between RBridges in the same campus and between RBridges and end stations on the same link. This document specifies how to send vendor specific messages over the RBridge Channel facility.

Status of This Memo

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1. Introduction

The IETF TRILL (TRAnsparent Interconnection of Lots of Links) protocol [[RFC6325](#)] is implemented by devices called TRILL switches or R Bridges. It provides efficient least cost transparent frame routing in multi-hop networks with arbitrary topologies and link technologies, using link-state routing and a hop count. Links between TRILL switches can be arbitrary technology and, in general, the TRILL way to address or specify a TRILL switch (R Bridge) in the interior of a TRILL campus is by its TRILL provided nickname [[RFC6325](#)] [[ClearCorrect](#)].

The TRILL protocol includes an R Bridge Channel facility [[RFCchannel](#)] to support typed message transmission between R Bridges in the same campus and between R Bridges and end stations on the same link. This document specifies a method of sending messages specific to a particular organization, indicated by OUI (Organizationally Unique Identifier [[RFC5342](#)]), over the R Bridge Channel facility.

Such organization specific messages can be used for vendor specific diagnostic or experimental messages.

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 acronyms defined in [[RFC6325](#)] supplemented by the following additional acronym:

OUI - Organizationally Unique Identifier [[RFC5342](#)]

TRILL switch - An alternative term for an R Bridge

2. Vendor Channel Packet Format

The general structure of an RBridge Channel packet on a link between RBridges (TRILL switches) is shown in Figure 1 below. When an RBridge Channel message is sent between an RBridge and an end station on the same link, in either direction, the TRILL Header is omitted. The type of RBridge Channel packet is given by a Protocol field in the RBridge Channel Header which indicates how to interpret the Channel Protocol Specific Payload. See [[RFCchannel](#)].

Frame Structure

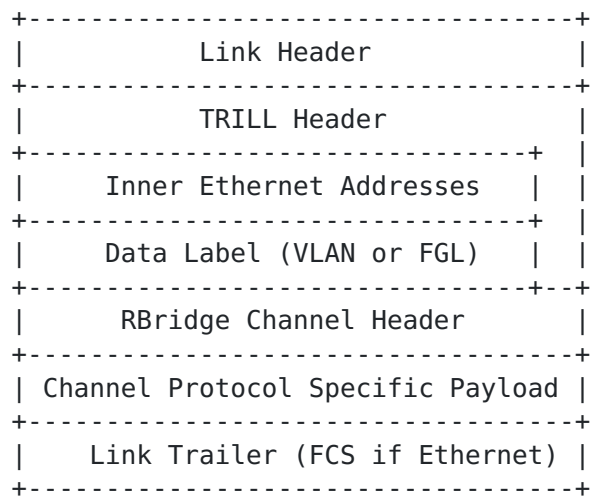


Figure 1. RBridge Channel Packet Structure

Figure 2 below expands the RBridge Channel Header and Channel Protocol Specific Payload above for the case of the Vendor Specific RBridge Channel Tunnel Protocol.

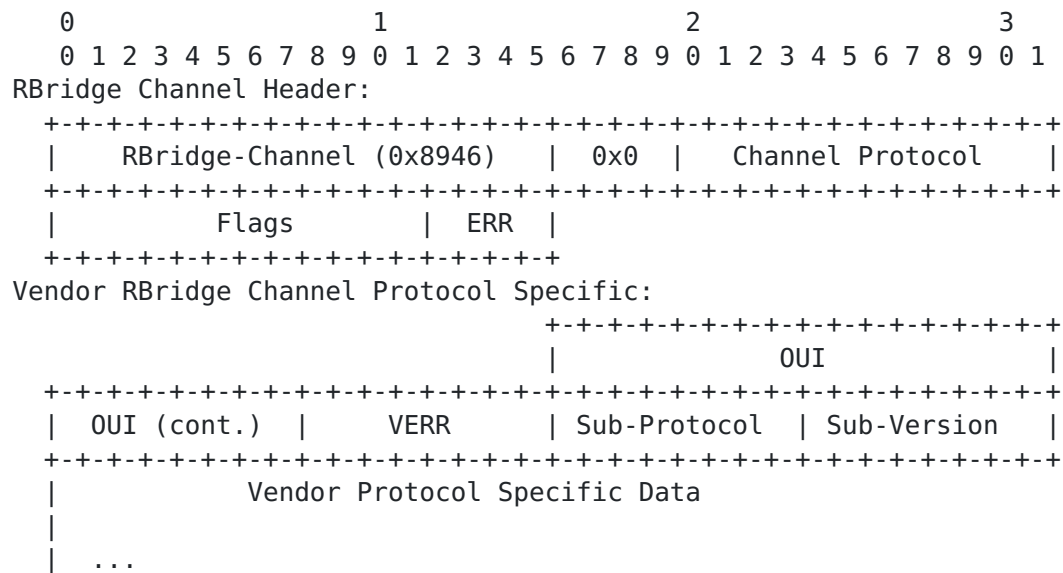


Figure 2. Channel Tunnel Message Structure

The fields in Figure 2 related to the Vendor RBridge Channel Protocol are as follows:

Channel Protocol: The RBridge Channel Protocol value allocated for Vendor Channel (see [Section 4](#)).

OUI: The field indicates the vendor specifying the particular use or uses of the Vendor Channel. The vendor to whom the OUI in this field has been allocated is in charge of specifying Vendor Channel messages using their OUI.

VERR: Vendor Channel Error. See [Section 3](#).

Sub-Protocol: Actually, the vendor specifying their use of the Vendor Channel can do whatever they want with the bits after the VERR field. But it is strongly recommended that they use the sub-protocol / sub-version fields so that multiple and evolving uses can be specified based on a single OUI.

Sub-Version: See explanation above of the Sub-Protocol field. This field is provided to indicate the version of the particular vendor's Sub-Protocol.

3. Vendor Channel Errors

The VERR field values from 0x0 through 0xF inclusive are reserved for specification by the IETF. See [Section 4](#). All other non-zero values of VERR are available for whatever use the vendor specifies except that a Vendor Channel implementation MUST NOT send a Vendor Channel Error in response to a Vendor Channel message with a non-zero VERR field.

The IETF specified VERR values thus far are as follows:

0. The VERR field is zero in Vendor Channel messages unless the the Vendor Channel packet is reporting an error.
1. The value one indicate that the OUI field value is unknown. If an RBridge implements the Vendor Channel facility and receives a Vendor Channel packet with a zero VERR field and an OUI field it does not recognize and the SL flag is zero in the RBridge Channel Header, it MUST set the VERR field to the value one and returns the packet as described in [Section 3.1](#).
2. The value two indicates that the Sub-Protocol field value is unknown. If an RBridge implements the Vendor Channel facility and receives a Vendor Channel packet with a zero VERR field and zero SL flag in the RBridge Channel Header, an OUI that it implements, but a Sub-Protocol fields value it does not recongize, it SHOULD set the VERR field to the value two and returns the packet as described in [Section 3.1](#).
3. The value three indicates that the Sub-Version field value is unknown. If an RBridge implements the Vendor RBridge Channel facility and receives a Vendor Channel packet with a zero VERR field and zero SL flag in the RBridge Channel Header, an OUI and Sub-Protocol that it implements, but a Sub-Version fields value it does not recongize, it SHOULD set the VERR field to the value three and returns the packet as described in [Section 3.1](#).

3.1 Sending an Error Response

The IETF specified Vendor Channel error response are sent in response to a received RBridge Channel packet by setting the VERR field as specified above and modifying the packet as specified below.

The RBridge Channel Header is modified by setting the SL flag. (The ERR field will be zero because, if it was non-zero, the packet would have been handled at the RBridge Channel rather than being passed down to the Vendor Channel level.)

- o If Vendor Channel message was sent between RBridges, the TRILL Header is modified by clearing the M bit, setting the egress nickname to the ingress nickname as received, and setting the ingress nickname to a nickname held by the TRILL switch sending the error packet.
- o If Vendor Channel message was sent between an RBridge and an end station in either direction, the outer MAC addresses are modified by setting the Outer.MacDA to the Outer.MacSA as received, and the Outer.MacSA is set to the MAC address of the port of the TRILL switch or end station sending the error packet.
- o The priority of the error response message MAY be reduced from the priority of the Vendor Channel message causing the error, unless it was already minimum priority, and MAY set the Drop Eligibility Indicator bit in an error response. (Priorities are ordered from highest to lowest as 7, 6, 5, 4, 3, 2, 0, and 1. See [Section 4.1.1](#), [RFC6325].)

It is generally anticipated that the entire packet in which an error was detected would be sent back, modified as above, so that, for example, error responses could more easily be matched with messages sent; however, this is really up to the vendor specifying how their Vendor RBridge Channel messages are to be used.

4. IANA Considerations

IANA is requested to allocate TBD for Vendor Specific RBridge Channel Protocol from the range of RBridge Channel protocols allocated by Standards Action.

IANA is requested to establish a "Vendor RBridge Channel Error Codes" registry with initial entries as follows:

Code	Description	Reference
----	-----	-----
0	No error	This document
1	Unknown OUI	This document
2	Unknown Sub-Protocol	This document
3	Unknown Sub-Version	This document
0x04-0x0F	Allocated by Standards Action	-
0x10-0xFF	Reserved for vendor use	This document

5. Security Considerations

See [[RFC6325](#)] for general TRILL Security Considerations.

See [[RFCchannel](#)] for general RBridge Channel Security Considerations.

The Vendor Specific RBridge Channel Protocol provides no security assurances or features. Any needed security could be provided by fields or processing within the Vendor Protocol Specific Data, which is outside the scope of this document. Alternatively, use of Vendor Channel could be nested inside the RBridge Channel Tunnel Protocol [[RFCtunnel](#)] which can provide some security services.

Normative References

- [RFC2119] - Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC5342] - Eastlake 3rd, D., "IANA Considerations and IETF Protocol Usage for IEEE 802 Parameters", [BCP 141](#), [RFC 5342](#), September 2008.
- [RFC6325] - Perlman, R., D. Eastlake, D. Dutt, S. Gai, and A. Ghanwani, "RBridges: Base Protocol Specification", [RFC 6325](#), July 2011.
- [RFCchannel] - D. Eastlake, V. Manral, L. Yizhou, S. Aldrin, D. Ward, "TRILL: RBridge Channel Support", [draft-ietf-trill-rbridge-channel-08.txt](#), in RFC Editor's queue.
- [ClearCorrect] - Eastlake, D., M. Zhang, A. Ghanwani, V. Manral, A. Banerjee, "TRILL: Clarifications, Corrections, and Updates", [draft-ietf-trill-clear-correct](#), work in progress.

Informative References

- [RFCtunnel] - Eastlake, D., ... "TRILL: Channel Tunnel", [draft-eastlake-trill-channel-tunnel](#), work in progress.

Acknowledgements

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

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