FGL in TRILL Header

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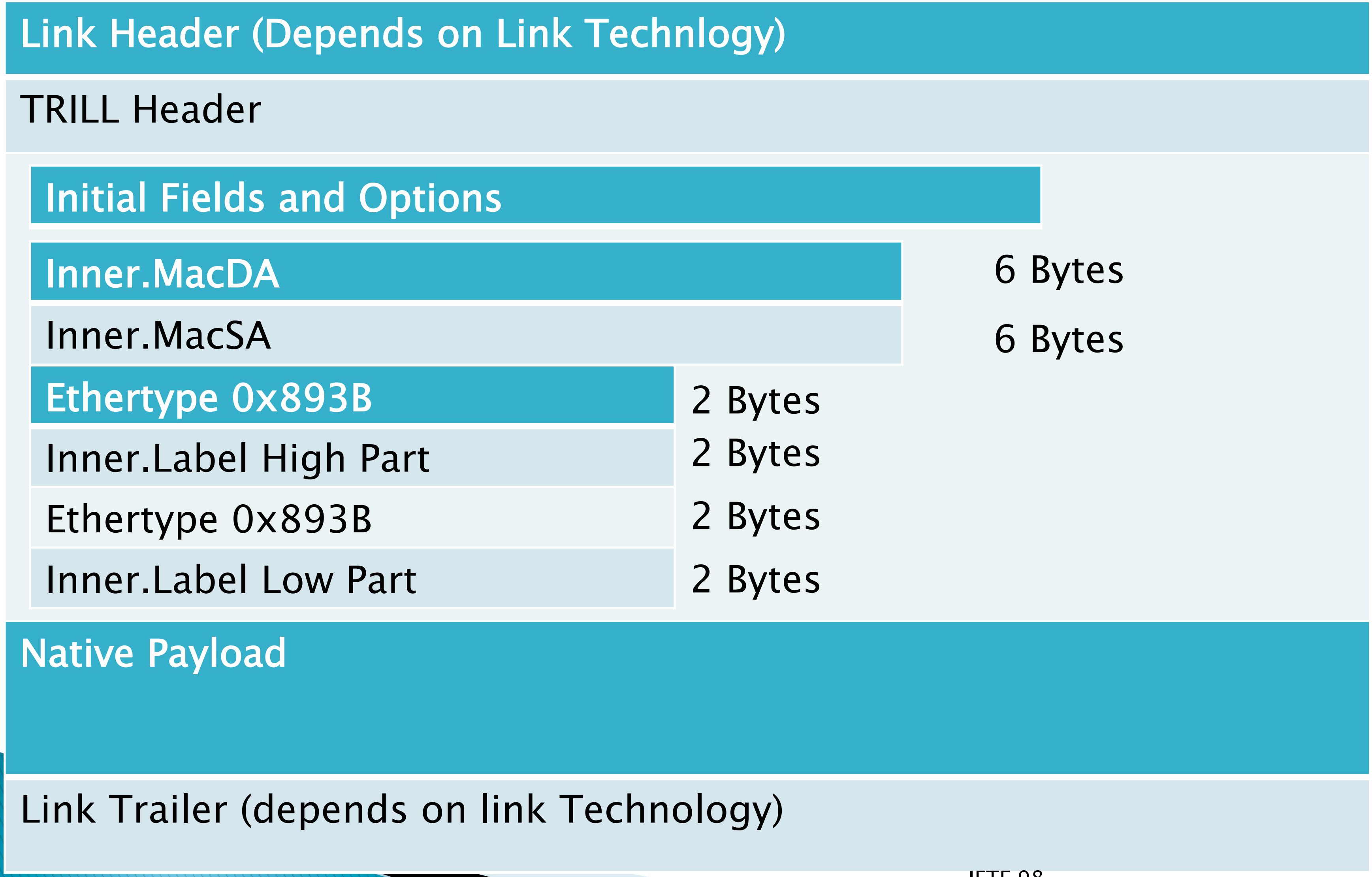
Overview

- This presentation covers three problems as follows.
  - Making FGL contiguous against discontiguous as in present RFC.
  - Eliminating 32 bits of Ethertype space in FGL for more useful purpose.
  - Bringing FGL into TRILL header as against inner header
- This documents proposes changes in FGL packet structure that is described in the subsequent sections of this document.

FGL, Present Frame Structure



Link Header (Depends on Link Technology)

TRILL Header

Initial Fields and Options

Inner.MacDA	6 Bytes
Inner.MacSA	6 Bytes
Ethertype 0x893B	2 Bytes
Inner.Label High Part	2 Bytes
Ethertype 0x893B	2 Bytes
Inner.Label Low Part	2 Bytes

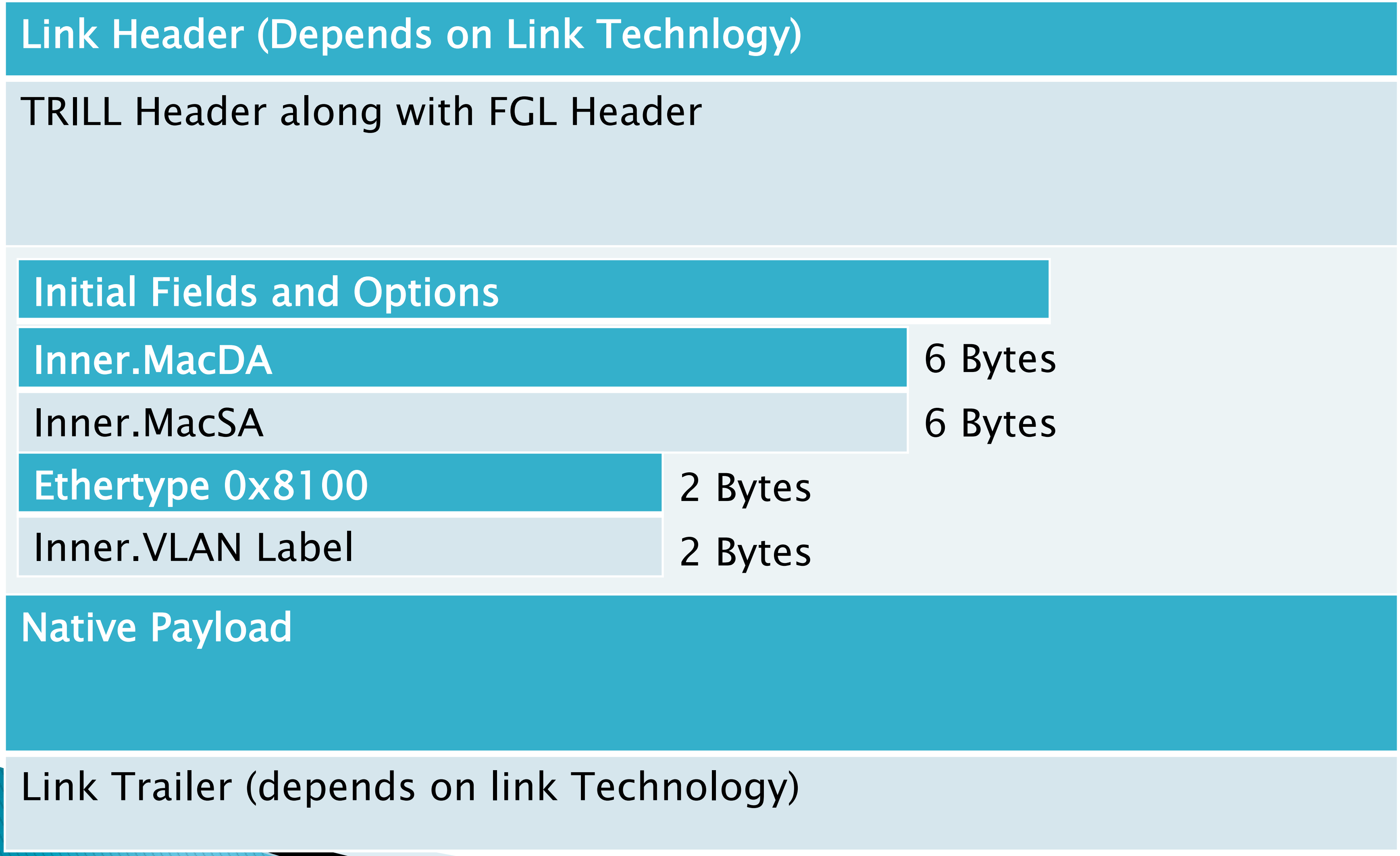
Native Payload

Link Trailer (depends on link Technology)

FGL, Present Frame Structure

- FGL is divided into two parts, 12 bit higher order and 12 bit lower order part, which sometimes is confusing
- Use of two copies of Ethertype is also little bit confusing
- FGL is added or removed in the original frame’s space, which causes overhead in processing on the Edge RBridges.

FGL, Proposed Frame Structure



Link Header (Depends on Link Technlogy)

TRILL Header along with FGL Header

Initial Fields and Options

Inner.MacDA 6 Bytes

Inner.MacSA 6 Bytes

Ethertype 0x8100 2 Bytes

Inner.VLAN Label 2 Bytes

Native Payload

Link Trailer (depends on link Technology)

FGL, Proposed Frame Structure

- TRILL Header with FGL Information

TRILL Header

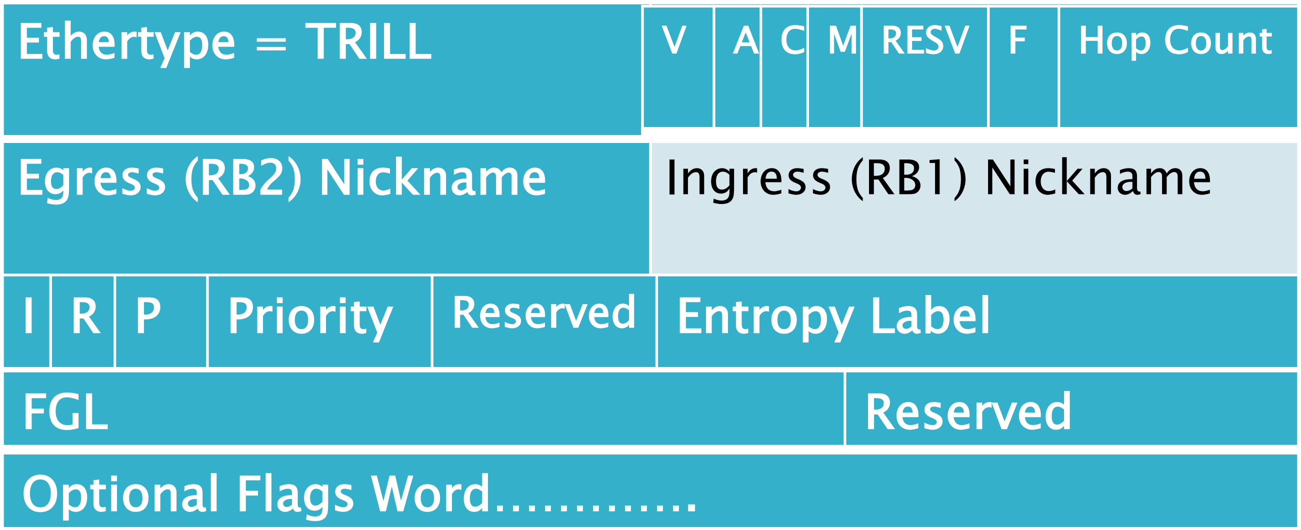
<table>
<tr><td>Ethertype = TRILL</td><td>V</td><td>A</td><td>C</td><td>M</td><td>RESV</td><td>F</td><td>Hop Count</td></tr>
<tr><td>Egress (RB2) Nickname</td><td colspan="7">Ingress (RB1) Nickname</td></tr>
<tr><td colspan="8">Optional Flags Word.............</td></tr>
</table>

FGL Header

<table>
<tr><td>I</td><td>R</td><td>P</td><td>Priority</td><td>Reserved</td><td colspan="2">Entropy Label</td></tr>
<tr><td colspan="6">FGL</td><td>Reserved</td></tr>
</table>

FGL, Proposed Frame Structure

FGL inside TRILL Header



Ethertype = TRILL | V | A | C | M | RESV | F | Hop Count

Egress (RB2) Nickname | Ingress (RB1) Nickname

I | R | P | Priority | Reserved | Entropy Label

FGL | Reserved

Optional Flags Word.............

TRILL Header with FGL Information

- TRILL Header part is the same as described in RFC7780, with few changes in it, version field should be a new value, when this field is set to a new value, then TRILL Header follows a FGL Header.
- FGL Header is described as below
  - I Bit, is a 1 bit field, when set indicates valid FGL is present.
  - R bit, 1 bit field which is reserved

TRILL Header with FGL Information

- P field is a 2 bit field, whose value provides information on next field, i.e priority field

Priority Field:

Value 0 of P-field indicates that priority field is copied from inner VLAN header, which is a 4 bit field, hence, 4 Most significant bits will be used for priority, 4 least significant bits should be set to Zero and ignored while doing packet forwarding decision.

TRILL Header with FGL Information

Value 1 of P-field indicates that priority field is copied from inner MPLS header's EXP bits, which is a 3 bit field, hence, 3 Most significant bits will be used for priority, 5 least significant bits should be set to Zero and ignored while doing packet forwarding decision.

Value 2 of P-field indicates that priority field is copied from inner IPv4 header's ToS/DSCP field, and hence all 8 bits will be used while taking forwarding decision.

Value 3 of P-field indicates that priority filed is copied from inner IPv6 Header's Traffic Class field, and hence all 8 bits will be used while taking forwarding decisions.

TRILL Header with FGL Information

- *Entropy Label*

Entropy Label is a 16 bit field which is calculated based on hash generated by inner Packet’s Layer2 Address or Layer3 Address or Layer4 Address or combination of all the above.

This is used to do load distribution of data on ECMP of core RBridges without doing deep packet inspection.

TRILL Header with FGL Information

- ***FGL***

Fine grained Label, is a 24 bit label which indicates the broadcast segment to which frame belongs

- ***Reserved fields***

Reserved for future purposes.

Uses of new proposed FGL

- With the proposed FGL implementation we can achieve some of the requirements as below

1) With Entropy label, load distribution can be easily done on ECMP in core RBridges.
2) Achieving of QoS in TRILL can be done based on customers requirements (either to use VLAN header of layer3 header on inner frame for QoS)
3) Achieving of different modes of services easily, like VLAN-Based service instance, VLAN Bundle Service Instance, VLAN-Aware Bundle Service instance etc…

Next Step

- Comments on proposed Idea is welcome