

TRILL Link Protocols

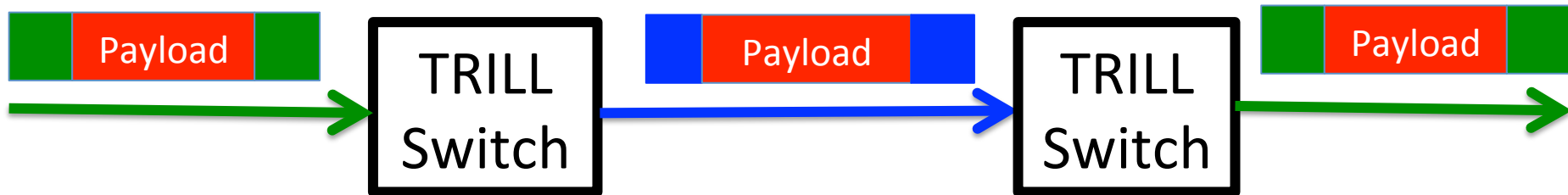
Donald Eastlake

Huawei Technologies

d3e3e3@gmail.com

TRILL Switches Are Routers

- A TRILL switch forwarding a TRILL data packet logically discards the link header/trailer of the received packet, figures out which port(s) to forward it on, and adds the appropriate link header/trail on the sent packet, depending on the link technology.



- Forwarding a TRILL Data packet from a green technology link to a blue technology link and back.

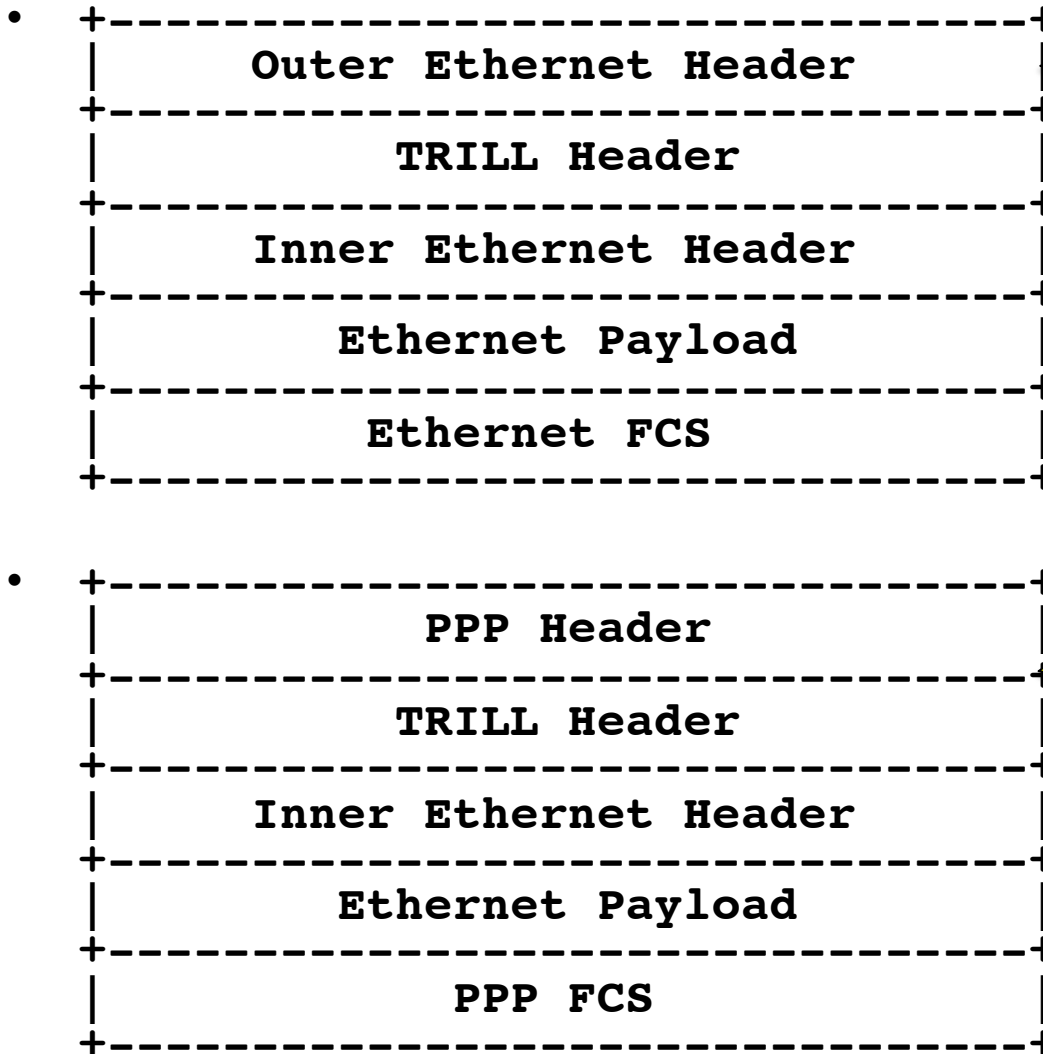
TRILL Link Protocols

- A TRILL link protocol specification needs to:
 - **Get a TRILL packet from one TRILL switch port to another TRILL switch port(s) on the link.**
 - Specify one variation for interoperability.
 - Distinguish between TRILL Data packets and TRILL IS-IS packets.
 - If the link can have more than two ports on it, provide the address of the destination port(s).
 - Maybe other stuff depending on link technology.

TRILL Link Protocols

- From the beginning (RFC 6325), the TRILL protocol specifications have been clear that,
 - while you have Ethernet over TRILL,
 - you do NOT always have TRILL over Ethernet.
- Note that use of the protocol on a link to transport TRILL packets between TRILL switches has almost no effect on scaling. Bandwidth, delay, loss rate, ... are all more important than protocol.

From RFC 6325

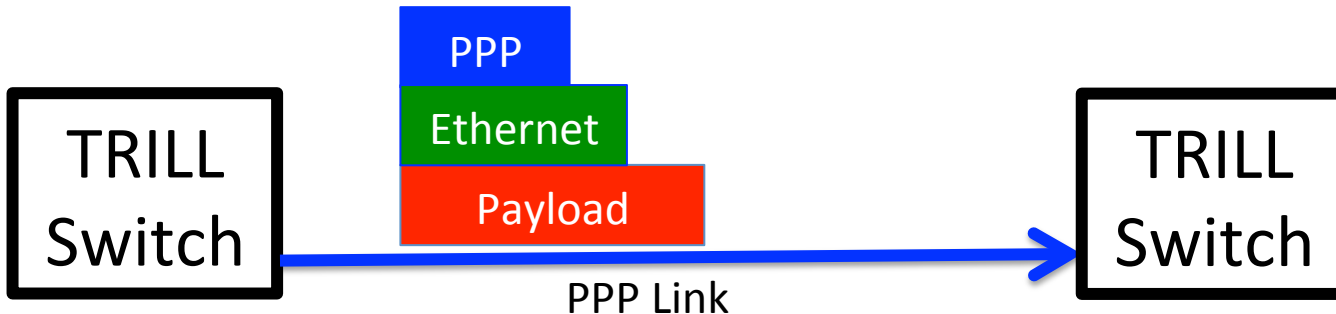


TRILL over Ethernet:
Ethernet Header before TRILL Header

TRILL over PPP:
NO Ethernet Header before TRILL Header

TRILL Link Protocols

- Could you do TRILL over **Ethernet** over **PPP**? Of course. **Ethernet** over **PPP** is specified.



- But the extra **Ethernet** header you have stuck in is useless. It gets thrown away, along with the **PPP** Header, at the destination TRILL switch port. If the **PPP** source port has no address, you have to make up fake MAC addresses to put in the useless Ethernet header.

TRILL Link Protocols

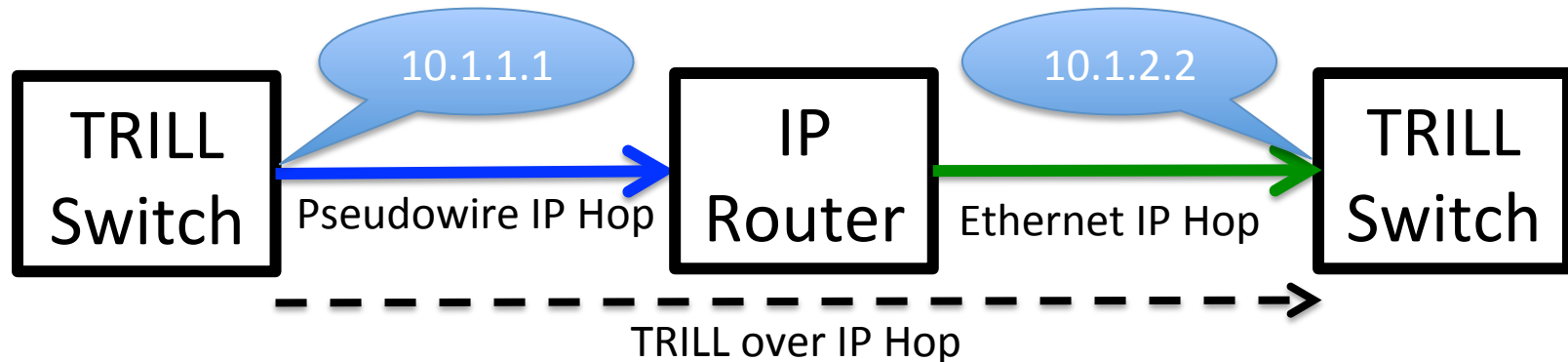
- Similarly, TRILL over a point-to-point pseudowire [RFC 7173] is NOT specified as TRILL over Ethernet over pseudowire. Since there are only two ports on such a link, MAC addresses would be just useless baggage.
- TRILL over pseudowire is specified as TRILL over PPP over pseudowire because using the PPP codepoints was a convenient way to indicate if the TRILL packet was data or IS-IS.

The IP Link Protocol

- What about TRILL over IP?
 - (Use of IP does not necessarily imply long distance. You can have a local IP core and long distance carrier Ethernet, for example.)
- As with any other Link protocol, its purpose is just to get a TRILL packet from one TRILL switch port to another.
- The source TRILL switch IP port and the destination TRILL switch IP port(s) have IP addresses which are provided by an IP Header.

The IP Link Protocol (cont.)

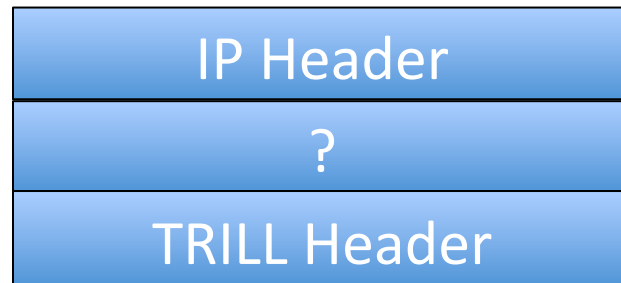
- The IP Link will be one TRILL hop but may be composed of multiple IP hops.



- Each IP hop composing the TRILL hop is over some lower layer, possibly different for each hop, and all irrelevant to TRILL.

The IP Link Protocol (cont.)

- So you have an IP header and a TRILL header.



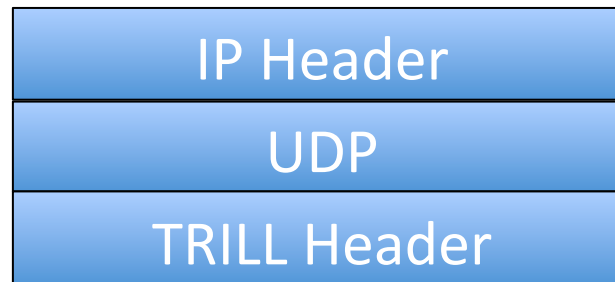
- You still need something in between to distinguish data from IS-IS (unless you use up two IP Protocol number and never care about problems with middle boxes due to unknown IP Protocol numbers).

The IP Link Protocol (cont.)

- You could do TRILL over Ethernet over IP but
 - You would be adding useless MAC addresses that would be thrown away by the next TRILL switch in the path.
 - If the initial TRILL switch port has no address (e.g., PPP), then you have to make up these useless MAC addresses.
 - It would be inconsistent with the standardized method of doing TRILL over PPP and TRILL over pseudowire.

The IP Link Protocol (cont.)

- A reasonable choice seems to be UDP.
 - Destination port values for TRILL Data and IS-IS.
 - Source port can be used for entropy.
 - An example of getting two ports and using them to distinguish data from control packets is CAPWAP.



END