BIER-TE Encapsulation and Extension

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Overview

- All the details in the drafts are our best guessed what would best work.
- Propose an enhanced version of encapsulation fo r BIER packets to support both BIER and BIER-TE.
  - Based on RFC8296, proposes to make it as a”V2”. But should make it an alternative?
- Also support for control word to allow BIER could be used in DetNet.
- This is just one choice. We’re open for others.

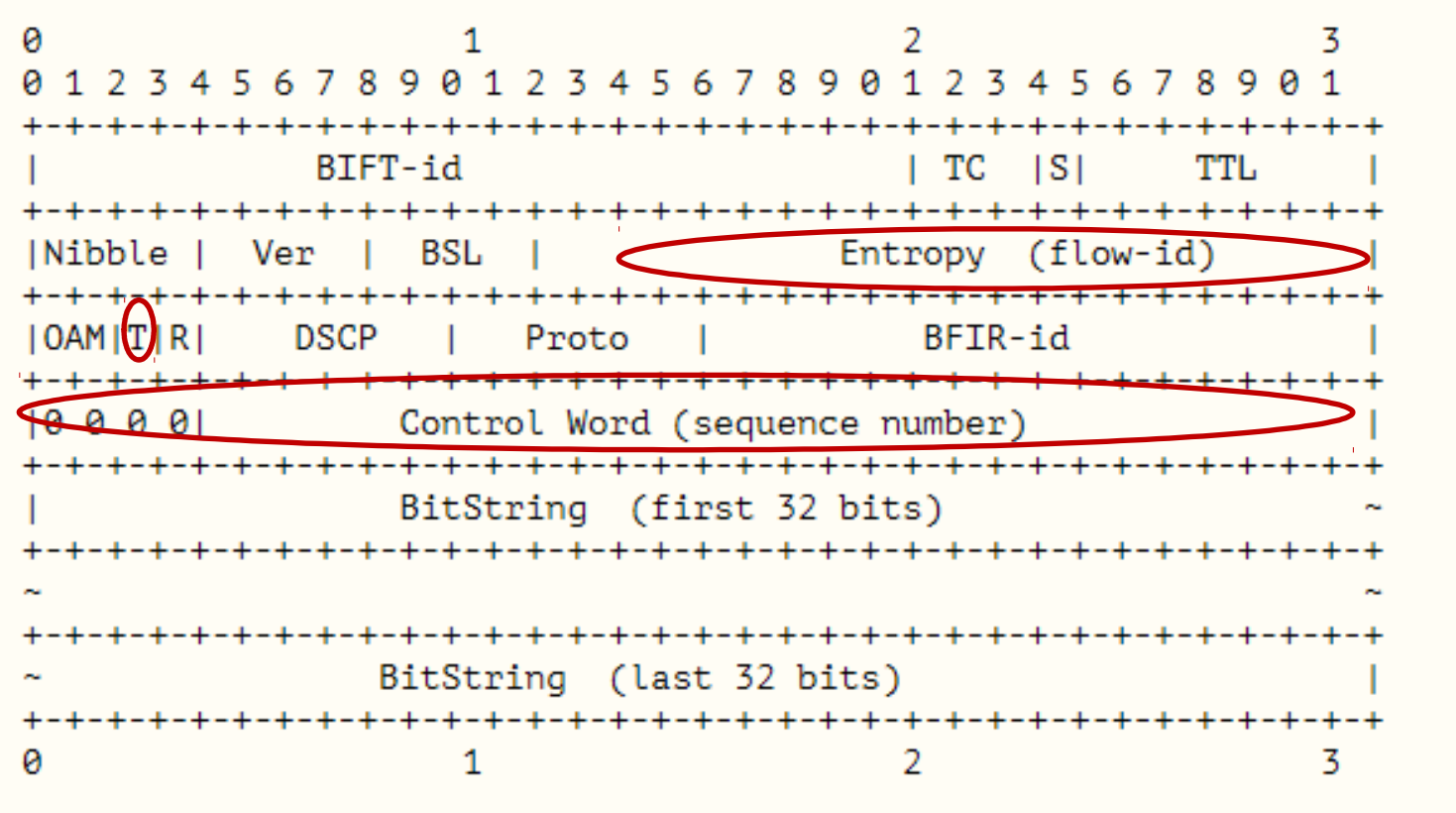
Simultaneous support for BIER and BIER-TE

- Architecturally, every domain SHOULD only us e a single Type of BIER, BIER or BIER-TE, by ad ditional signaling.
- In the presence of BIER and BIER-TE together i n the network, the risk of misconfiguration will increase.
- Thus, we propose to include one bit in the pac ket header to explicitly indicate the BIER type: BIER or BIER-TE.

Support for DetNet

- This proposal adds a “control word” to the header to allow BIE R/BIER-TE used as a DetNet Data Plane, [I-D.ietf-detnet-dp-so l].
- It is allowed to correct reordering and discover packet loss wh en used in resilient dual-path transmission in DetNet.
- The control word is a 32-bit field.
  - For detnet, it is 28 bits of sequence number plus 4 bits 0 pr oceeding it.
- We think this overhead is acceptable. Do you?
  - If not, an option could be using one bit to indicate if this field exists.
- DetNet also needs a Flow-id. This could be achieved by reusin g the Entropy field.

Packet Format



- T: Indicates BIER or BIER-TE packet.
- Entropy: unmodified. But can be re-used as flow-id in DetNet case.
- Control Word: The control word in the terminology of MPLS pseudowires (where it originates f rom) is the full 32 bits. For detnet, the current target is 28 bits of sequence number and 4 bits 0 preceeding it

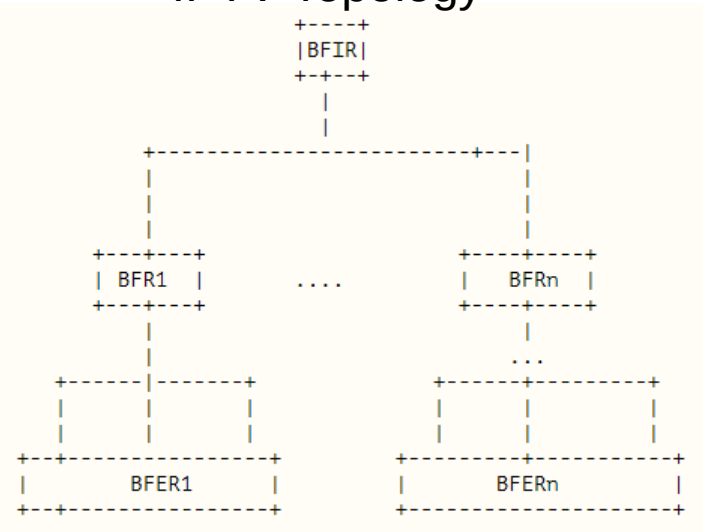
BIER-TE based resilience operations

- One option: Using <BFIR-id, entropy> to distinguish different disjoint paths from the BFIR through the BIER-TE domain towards the same set of BFERs.
- Alternative: Embedded into BIER-TE itself by adding to BIER-TE forwarding functions new adjacency types for duplication with sequence-number generation and duplicate- elimination.

BSL Consideration

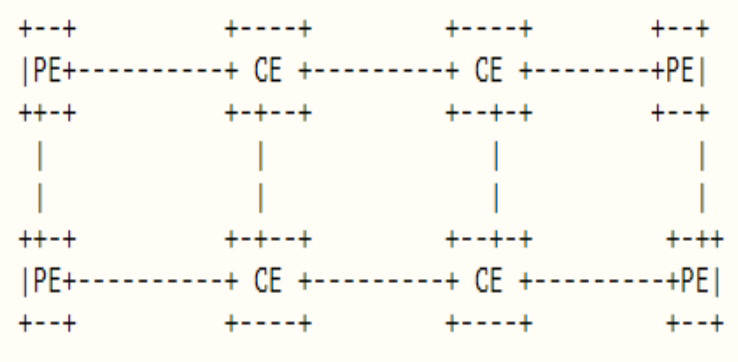
- BIER-TE consumes more BitPositions than BIER.
- In BIER-TE, the BSL limits the size of the topology towards BFER and the alt ernative paths that can be explicitly be engineered to reach the BFER.
- But still some ways could be applied to reduce the number of bits for inter mediate hops in BIER-TE.

IPTV Topology



- BRF1 to BFRn can share one bit
- 3 ways from BFR1 to BFER1 can be assigned with different bits,
- But the 3 bits can be reused in the group from BFRn to BFERn, and other groups in between which shares the same topology.

Multicast in L3VPN



- Each area is allocated with one ore more SIs depending on the BFER numbers.
- 4 additional bits are used in each SI: bia, bib, bea, beb: bit ingress a, bit ingress b, bit egress a, bit egress b.
- For BIER-TE forwarding of a packet to the BFERs across vpn sites. a BFIR would create one copy for each SI.
- Two unicast legs: 1) BFIR to ingress edge and 2) core to egress area edge

Next Step

- Should we use this “v2” encapsulation to solve BIFT-ID assignment issue? e.g., BIFT-ID for non-mpls.
- Seeking for suggestions on the follow-up.