400GbE PCS 2-Way FEC Interleave

IEEE P802.3bs 400 Gb/s Ethernet Task Force

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Introduction

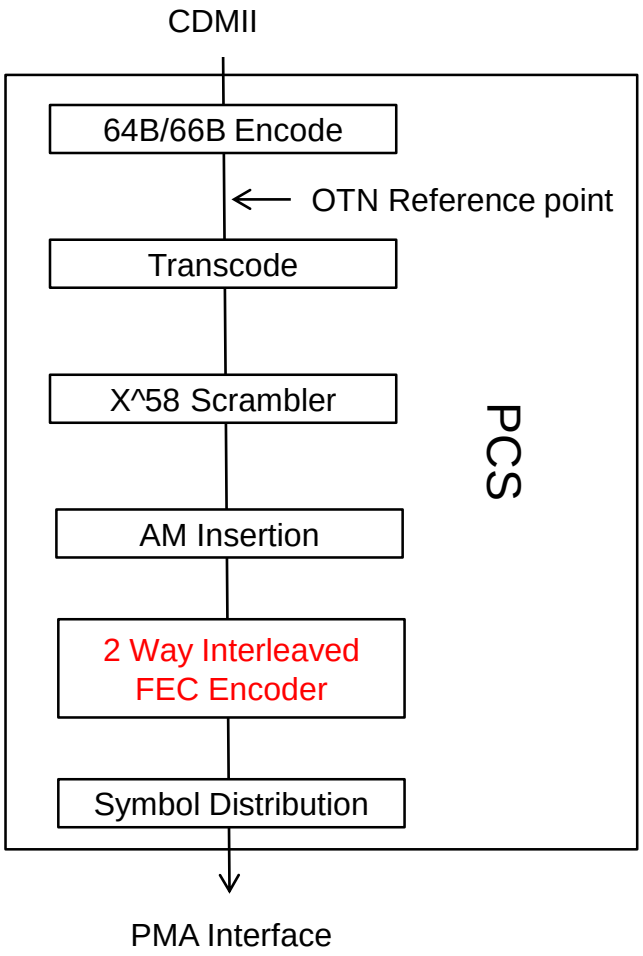
- This presentation proposes that we adopt symbol interleaving of two codewords to form the PCS lanes

Two Codeword Interleaving

- In anslow_3bs_03_0915 it is shown that interleaving two codewords gets us additional gain and prevents the error flaring when we assume an error propagation probability of 0.75 (option 8 & 8a)
- In bliss_3bs_01_0915 multiple possible two codeword interleaving mechanisms are shown and evaluated
- At this point the authors believe that symbol interleaving of two FEC codewords to form the 16 PCS lanes is the right compromise for this project, and that we need more time to evaluate the optimum mechanism for striping the two symbols across the PCS lanes

Proposed TX PCS Data Flow

- 64B/66B encode based on clause 82
- Transcode to 256B/257B based on clause 91
- Scrambler is moved to after the Transcoding to simplify the flow
- FEC Encoder is RS(544,514,10)
  - All FEC processing is as in clause 91, including error correction and detection modes
  - Two codewords (aka 2x200G) are interleaved on multiple RS symbol basis before distribution to the PCS lanes (details TBD)
- Location of the OTN reference point is as shown and adopted in the January meeting
- Support for any logical lane on any physical lane



Note: Updated and with more detail from what was adopted in dambrosia_3bs_02b_0115.pdf

Summary

- Symbol interleaving of two FEC codewords to form the 16 PCS lanes is the right compromise for this project
  - It strikes the right balance between added complexity and low latency while not placing error propagation restrictions on the CDAUI-8 interfaces
- This still supports bit multiplexing in the PMA, no need to block multiplex in the PMA
- Details of exactly how to stripe data into the codewords and onto PCS lanes is still being discussed and optimized
  - This is a simply optimization of how bits show up on the wire

- **We will propose the following motion in the task force meeting: Move to adopt symbol interleaving from two FEC codewords as the basis for forming the 16 PCS lanes**

Thanks!