

Inverse RS-FEC Sublayer Overview

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Previous Work

- [nicholl_3cn_01b_181211.pdf](#) ([nicholl_3ck_01a_0119.pdf](#)), proposes a baseline for CGMII extender (not adopted)
- [nicholl_3cn_01a_190207.pdf](#), proposes an Inverse RS-FEC sublayer architecture and describes why it is preferred over CGMII extender
- [nicholl_3ct_01a_0319.pdf](#), contains adopted 802.3ct baseline for Inverse RS-FEC sublayer
- [nicholl_3ck_01_0519.pdf](#), contains proposed baseline for 4-lane Interleaved 100G FEC, which shows example use case(s) involving Inverse RS-FEC sublayer

Introduction

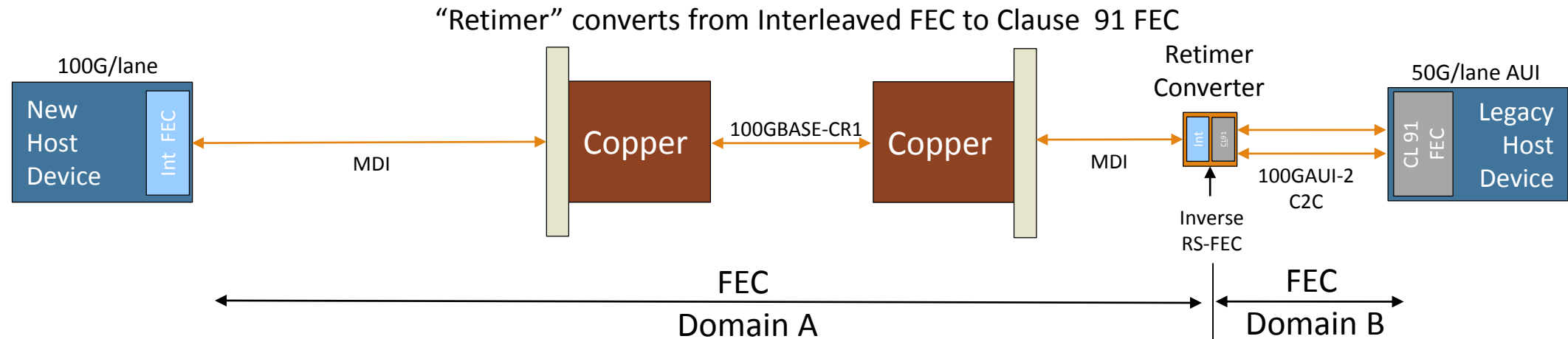
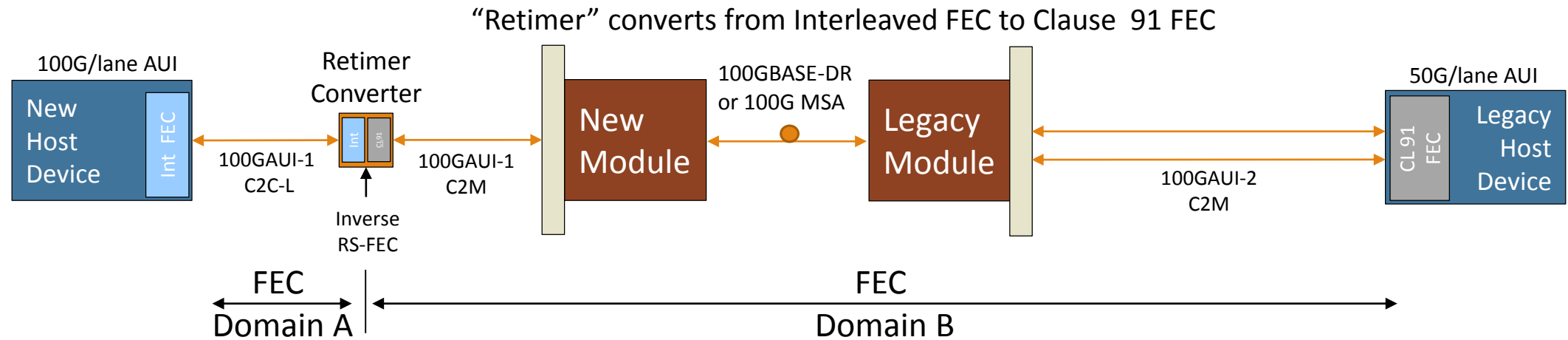
- **Several contributions have studied the RS(544,514) FEC performance for KR/CR 100G including analysis of several options for Interleaved 100G FEC:**
 - [anslow_3ck_01_1118.pdf](#)
 - [anslow_3ck_01_0319.pdf](#)
 - [anslow_3ck_adhoc_01_041019.pdf](#)
- **Several contributions have suggested constraining the DFE tap weights and enhancements in the PMA sublayer to improve the performance:**
 - [lyubomirsky_3ck_01a_0319.pdf](#)
 - [lu_3ck_01_0319.pdf](#)
 - [zhuang_3ck_adhoc_01_050819.pdf](#)
- **This presentation does not pre-judge any decision to use Interleaved 100G FEC for P802.3ck KR1/CR1/C2C-L**
 - Rather, this presentation simply illustrates a method (if it is needed by the group) to convert between interleaved and non-interleaved FEC

Why would we need Inverse RS-FEC?

- **An Inverse RS-FEC sublayer would allow conversion between Clause 91 RS(544,514) FEC and a new Interleaved 100G FEC**
 - CL91 FEC is already defined for a subset of 100G PMDs and electrical interfaces (AUIs)
 - If new Interleaved 100G FEC is required in components that use P802.3ck 100 Gb/s lanes over KR1/CR1 and/or C2C-L (i.e. long-reach) interfaces, then a method is needed to convert between the FECs

100GbE Example Use Cases – With Inverse RS-FEC

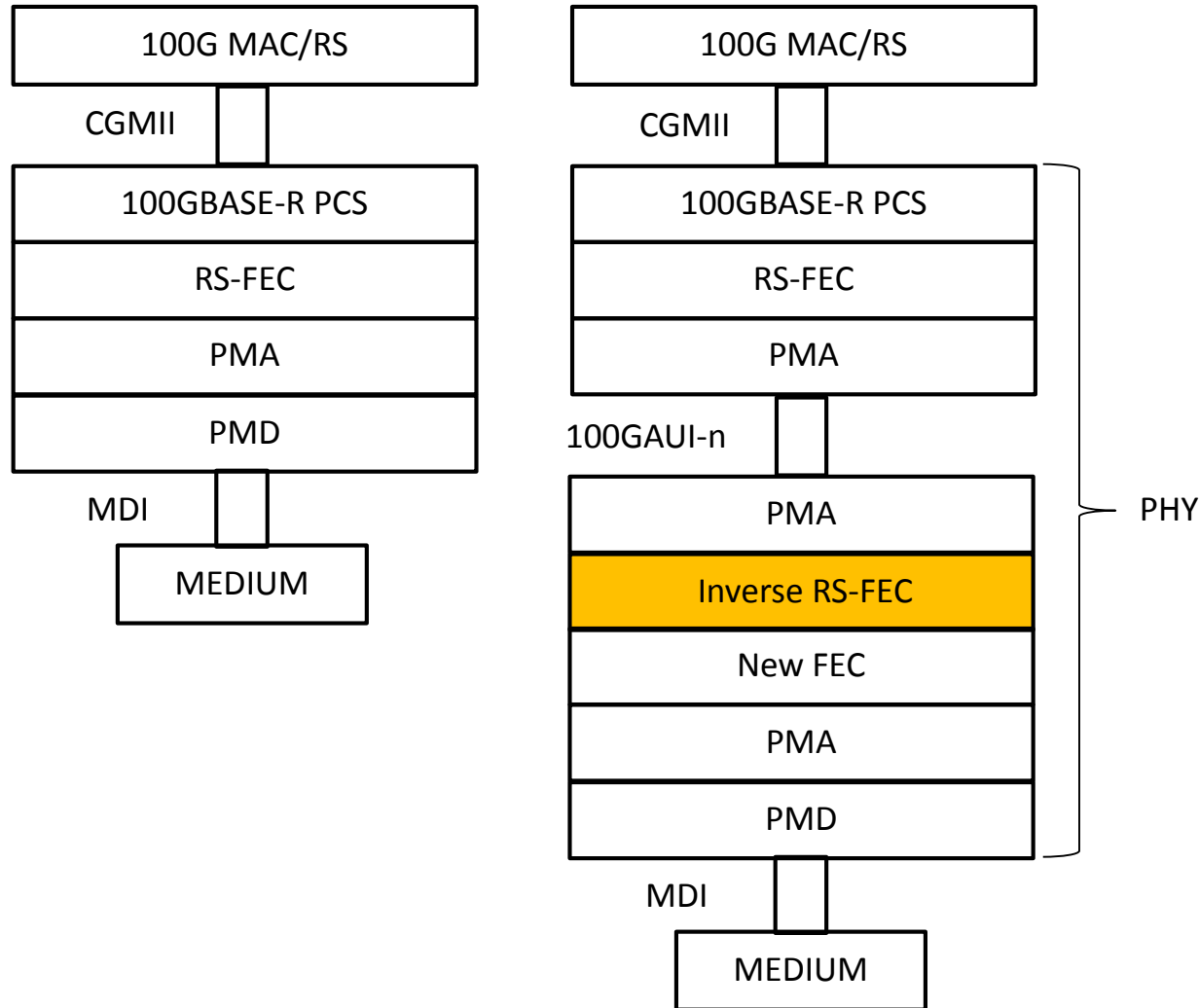
- An Inverse RS-FEC sublayer (proposed in 802.3ct) can be used for these scenarios



Why Inverse RSFEC Sublayer and not CGMII Extender?

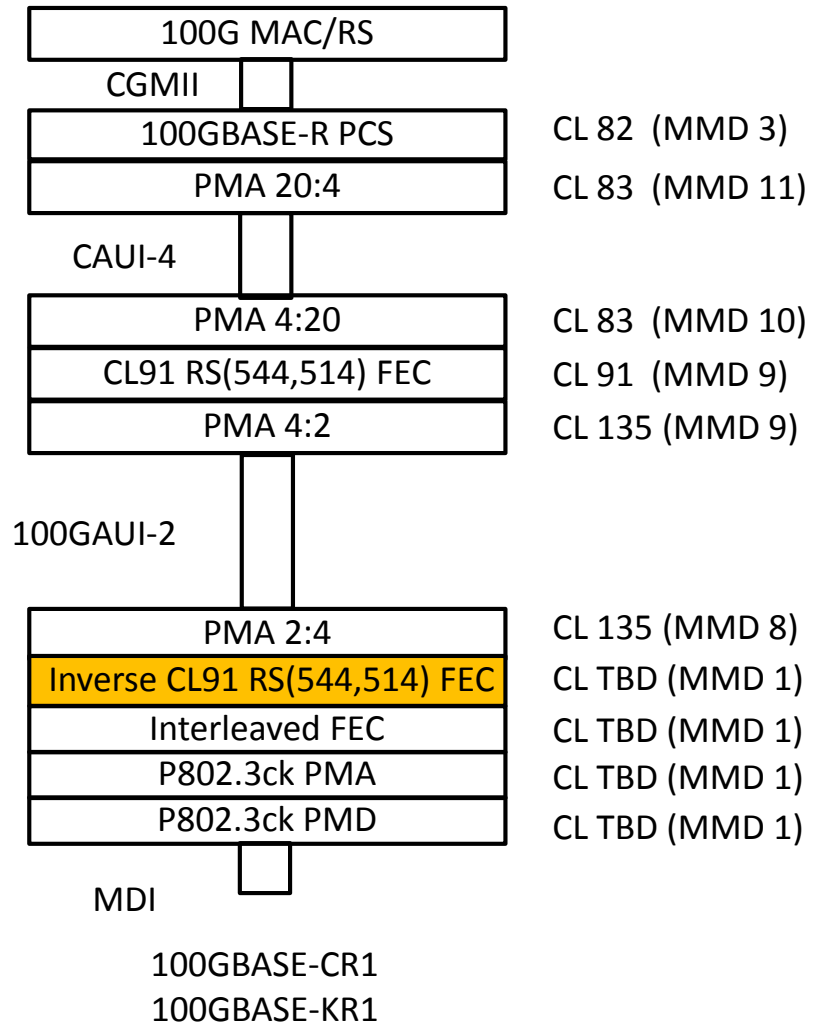
- Recall previously ([nicholl_3ck_01a_0119.pdf](#)) that a CGMII Extender proposal was presented to P802.3ck
- After thorough analysis a simplified approach was adopted for P802.3ct ([nicholl_3ct_01a_0319.pdf](#))
 - It is not necessary to terminate the PCS, only the FEC needs to be terminated
 - This resulted in the Inverse RSFEC Sublayer
 - Extensive background on the decision is found in [nicholl_3cn_01a_190207.pdf](#)
 - A major consideration was that in the 100G architecture the PCS and FEC are separate sublayers that may be connected across a physically instantiated AUI
 - This makes it difficult to map all of the functionality into a single DTE XS sublayer with a single MDIO MMD

Architectural Positioning of Inverse RS-FEC Sublayer



- The optional Inverse RS-FEC sublayer “undoes” the RS-FEC sublayer, allowing a new FEC sublayer to be inserted further down the stack
- The P802.3ct proposal is to only support the RS(544,514) FEC encoder/decoder option in Clause 91
 - See [nicholl_3ct_01a_0319.pdf](#)

Inverse RS(544,514) FEC Sublayer for P802.3ck



- Inverse RS(544,514) FEC sublayer “undoes” the CL91 RS(544,514) FEC sublayer, allowing proposed Interleaved FEC sublayer to be inserted further down the stack

Inverse RS-FEC Sublayer Functional Block Diagram

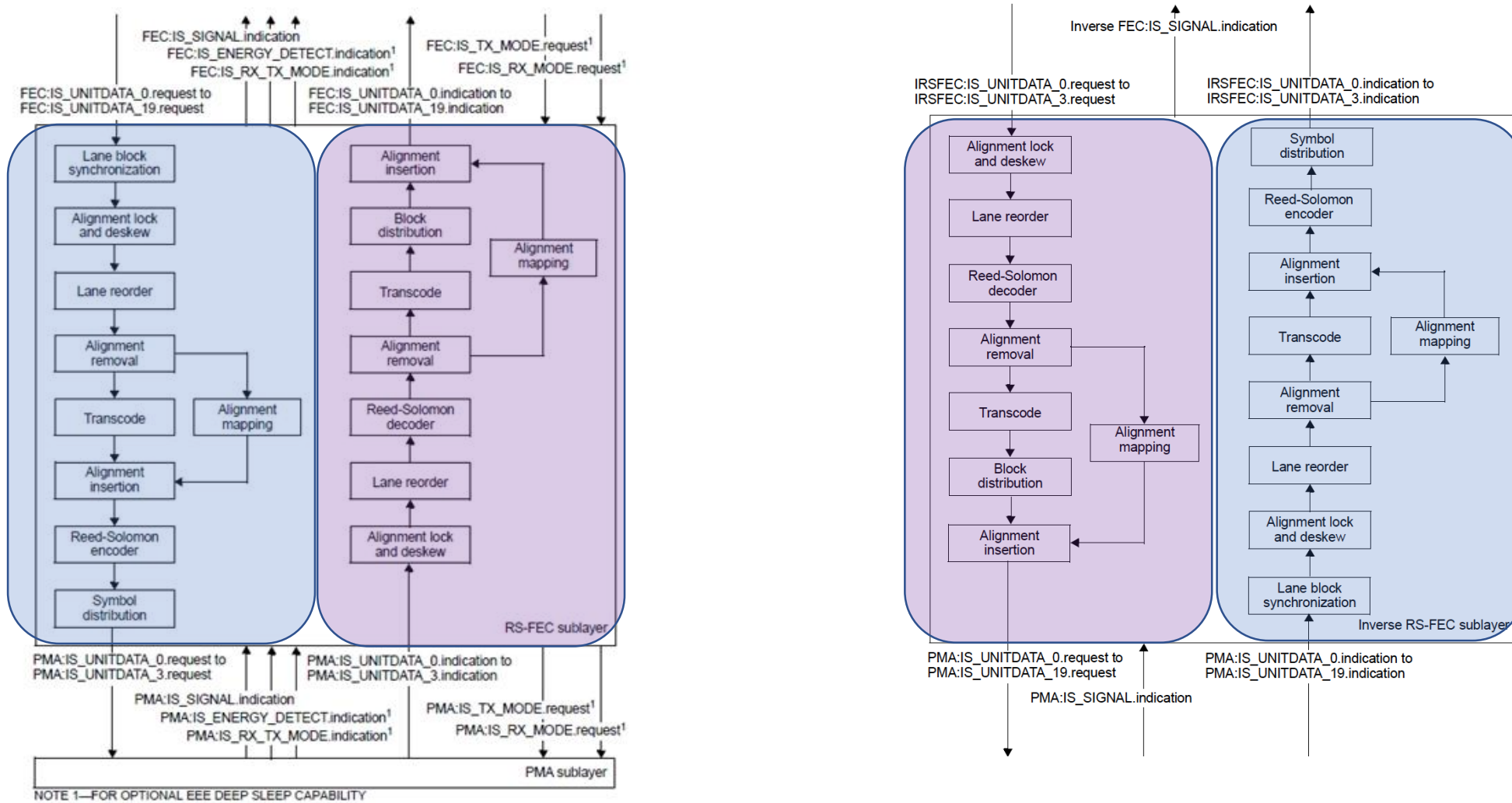


Figure 91-2—Functional block diagram

Pointer to P802.3ct Inverse RS-FEC Sublayer Clause

- **The P802.3ct editorial team is working on draft clauses, including one for Inverse RS-FEC sublayer**
 - Currently, these have not yet been released to the Task Force
 - In the meantime, [nicholl_3ct_01a_0319.pdf](#) contains the adopted 802.3ct baseline for Inverse RS-FEC sublayer

Summary

- **This presentation provided an overview of Inverse RS-FEC**
- **If P802.3ck defines a new interleaved FEC sublayer, then the Inverse RS-FEC sublayer being defined in P802.3ct could be adopted for use in P802.3ck**

Thank You!