10GbE Serial Technology Proposal

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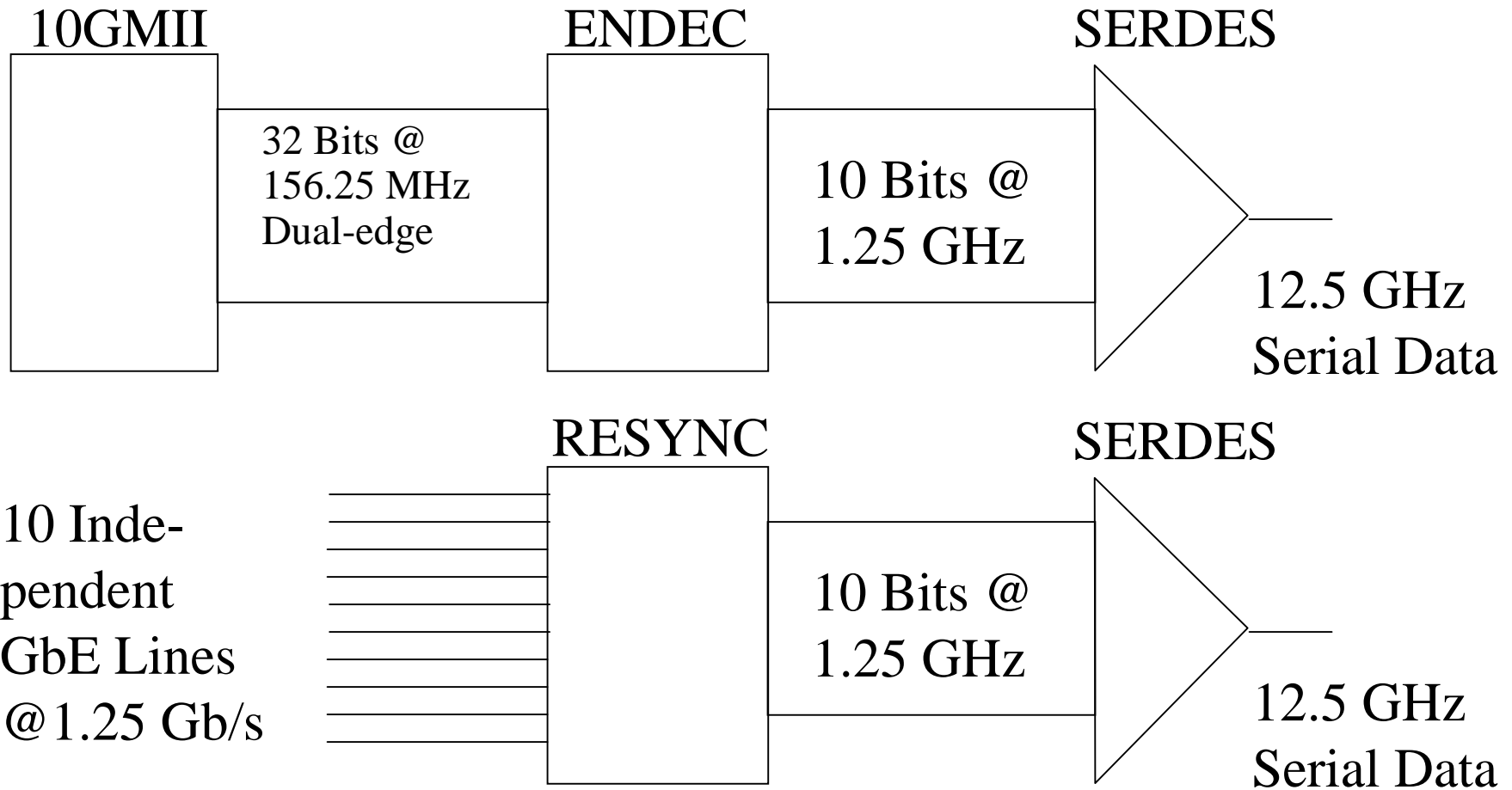*Vitesse Semiconductor Corporation*

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Proposed 10GbE Standard Interfaces

❐ 32 Bit Bus@156.25 MHz Dual-Edge

- – Wide, Low Speed
- – Simple CMOS I/F
- – No Data Skew Concerns

❐ Ten Bit Interface (TBI)

- – Standard, Familiar I/F
- – Existing Technology Absorbs Data Skew
- – Multi-Purpose (SerDes & Mux/Demux) - Broader Market, Lower Cost

❐ Serial Optical (12.5 Gb/s)

- – Achievable Today
- – Major Industry Drive To Lower Cost Of Optics
- – Point-To-Point - No Central Timing Constraints

10GbE Interface Definitions

10GMII   **ENDEC**   **SERDES**

32 Bits @
156.25 MHz
Dual-edge

10 Bits @
1.25 GHz

12.5 GHz
Serial Data

RESYNC   **SERDES**

10 Inde-
pendent
GbE Lines
@1.25 Gb/s

10 Bits @
1.25 GHz

12.5 GHz
Serial Data

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PHY Comparison (W/O Optics)

Coding	8B/10B	Scrambling	Scramb +FEC
Data Rate	12.5	10.0	10.0 + ?
Edge Density	Highest	Lower	Lower
DC Balance	Short Term	Long Term	Long Term
Gate Count	Low	Low	High
Power	Low	Low	High
Latency	Low	Low	Higher
Synchron	Fastest	Slower	Slowest

Comparison: 4 x 2.5   vs   10 x 1.25

Feature	4 x 2.5	10 x 1.25
10 Gb/s Link	4 Serial Streams	10-bit bus
Single Ser/Des	Hard/Hard	Easier/Easier
8B/10B Coding	Requires Striping	Simple, Ideal Fit
Scrambling	Even	Even
Optical Link	Soon (WDM)	Now (Parallel Links)
Multi-Vendor	Not Yet	Yes
CMOS EnDec	Yes (.18um)	Yes (.35um)
ASIC Integratable	Later	Now

4 x 2.5:
  WDM-Oriented
  4 Separate Streams, Not A Bus
  Not Intended To Connect To A SerDes
10 x 1.25:
  Easiest To Connect To A SerDes
  Straightforward 8B/10B @ 12.5 Gb/s
  Can Be Implemented As Synchronous Bus

In Conclusion

❒ We Believe At Least Two, If Not Three I/Fs Should Be Defined

❒ 32-Bit Bus Plus Control Bits Are A Natural Fit

❒ Consider Carefully The Nature Of 4 x 2.5 vs 1 x 10 Gb/s W/TBI

– Really Is 4 Separate Streams vs One Serial Stream From Synchronous Bus

❒ On 8B/10B vs Scrambling

– We Can Support Either One

– Mainly Affects Optical Component And Media Mfrs

– We Need To Hear More From Them

❒ Excellent Timing Between Standardization Process And Broad Product Availability

❒ 10 GbE Should And Ultimately Will Be <u>Optimized</u>, Not <u>Compromised</u>

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