

400G System Use Cases

400 Gb/s Ethernet Task Force

802.3 Plenary Session

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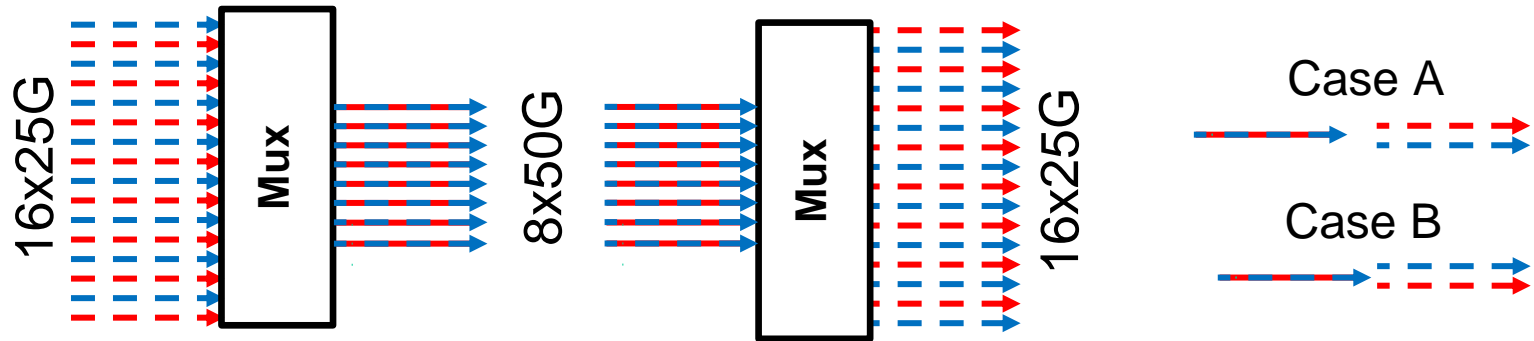
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Observations

- Current break-out application examples:
 - 4x10GbE over 4x10G 40GbE I/O
 - 10x10GbE over 10x10G 100GbE I/O
 - 4x25GbE over 4x25G 100GbE I/O
- Characteristic:
 - Break-out lane rate = I/O lane rate
- 400GbE I/O will have break-out application with same characteristic:
 - 16x25GbE over 16x25G 400GbE I/O
- Break-out applications with other characteristics should be considered as part of the 400GbE logic specifications
- BTI:
http://www.ieee802.org/3/bs/public/15_01/big_ticket_items_3bs_01_0115.pdf#page=4

16x25G to 8x50G Mux Ex. BTI Issues



■ Implications for lanes

- 50G lanes
 - NRZ: Bit time re-ordering
 - PAM-4: Bit encoding differences
- 25G lanes
 - Physical lane re-ordering

■ Implications for 400GbE

- Correlation of FEC corrected error statistics with physical lane implementation
 - Preservation of lane FEC block grouping like in 802.3bj
- ## ■ Implication for 25GbE
- Port re-ordering

I/O Lanes per Break-out Lane

Break-out Lane Rate	CDAUI-16 (16 I/O lanes)	CDAUI-8 (8 I/O lanes)	<i>CDAUI-4 (future) (4 I/O lanes)</i>
25GbE	1	1/2	1/4
<i>50GbE (future)</i>	2	1	1/2
100GbE	4	2	1
<i>200GbE (future)</i>	8	4	2

4x100GbE over 16x25G & 8x50G 400GbE I/O

- Simple mapping rule example approach
 - 25G I/O
 - $L(0+N), L(1+N), L(2+N), L(3+N) \rightarrow 100\text{GbE}$
 $\{N = 0, 4, 8, 12\}$
 - Ex. $L0, L1, L2, L3 \rightarrow 100\text{GbE}$
 - 50G I/O
 - $L(0+N), L(1+N) \rightarrow 100\text{GbE}$
 $\{N = 0, 2, 4, 6, 8, 10, 12, 14\}$
 - Ex. $L0, L1 \rightarrow 100\text{GbE}$
- Can be informative to make support optional

8x50GbE over 16x25G & 8x50G 400GbE I/O

- Approach: Simple mapping rule
 - 25G I/O
 - $L(0+N), L(1+N) \rightarrow 50\text{GbE}$
 $\{N = 0, 2, 4, 6, 8, 10, 12, 14\}$
 - Ex. $L0, L1 \rightarrow 50\text{GbE}$
 - 50G I/O
 - $L(0+N) \rightarrow 50\text{GbE}$
 $\{N = 0 \rightarrow 15\}$
 - Ex. $L0 \rightarrow 50\text{GbE}$
- Can be informative to make support optional
- Important to recognize that future 50GbE will use 50G I/O specified in 802.3bs

16x25GbE over 8x50G 400GbE I/O

- Approach 1: MLG
- Approach 2: Flex Ethernet
- Approach 3: Simple mapping rule if CDAUI-8 uses PAM-4
 - 25GbE L0 (even) → 50G PAM-4 LSB
 - 25GbE L1 (odd) → 50G PAM-4 MSB
 - This is not a general mapping like MLG or FlexE, since each 25GbE pair mapped to a 50G stream has to be synchronous between the odd and even streams.
 - The eight sets of 25GbE odd/even pairs can be asynchronous with respect to each other.
 - Odd and even incoming 25GbE stream pairs can be synchronized by standard idle insertion and deletion.
- Can be informative to make support optional

400GbE ASIC Use Case Example

- ASIC characteristics
 - 6.4T (2x today's 3.2T ASICs)
 - 128x50G PAM-4 I/O
- Supported MACs
 - 16x 400GbE
 - 32x 200GbE
 - 64x 100GbE
 - 128x 50GbE
 - 256x 25GbE (with caveats)
- Request that 802.3bs Task Force consider the implications and simple mapping rules to enable all anticipated 400GbE ASIC use cases

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Thank you