

AM0 SELECTION in 802.3by

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BACKGROUND

- January 2015 (baden_3by_01b_0115.pdf):
- **PCS and FEC Baseline Approved** (Y: 62 , N: 3 , A: 16)
 - CWMs are used for RS FEC locking
 - Constructed from concatenation of CL82 **40G** AM0, AM1, AM2, AM3
- March Plenary 2015 (*slavick_3by_01a_0315.pdf*):
- **Amendment proposed and accepted** (Y: 25 , N: 8 , A: 44):
 - Change AM0 to 100G AM0 from 40G AM0
 - CWMs are used for RS FEC locking
 - Constructed from concatenation of CL82 **100G** AM0, and CL82 40G, AM1, AM2, AM3
- 1. Estimated savings of 10K gates **per PHY**.
 - “Implementations doing 400GE, 100GE and 4x25GE use the same logic to align to the codeword, saving ~10k gates”
 - “For EEE use same AM0 RAMs as 100GE with a codeword spacing of 1 instead of 2 to provide the highest frequency of markers as possible. 100G provides markers every 100ns while 25G would be 200ns.”

TALKING POINTS

- **The predicted area savings can be improved.**
 - This presentation will demonstrate that the cost per 25G PHY is on the order of 1K gates in total.
- **Both 1K and 10K gates are insignificant for a 35M gates NIC or a 1B gate Switch.**
- **IEEE Task Forces does not have time to consider miniscule savings of even 10K gates on such devices.**
- **The following addresses each of the items listed as justifications for this change:**
 1. *Estimated savings of 10K gates per PHY.*
 - *“Implementations doing 400GE, 100GE and 4x25GE use the same logic to align to the code-word, saving ~10k gates”*
 - The logic which implements the “parallel test and detect” mechanism is required on each lane of a 100G port.
 - That logic may be optimized for the specific pattern (“comparing to a constant is cheaper than to a programmable value”).
 - Out of the 12 nibbles, or 48 bits, that are validated when testing for an AM0 match, only 21 bits differ between the 100G AM0 and the 40G AM0.
 - Therefore, only 21 – 2 to 1 muxes (3 gates each) are needed to select between a 40G and a 100G AM0 compare.
 - For 48 “parallel and test” mechanisms, the total difference is less than 1K gates (984)
 - See following page for details and summary.
 2. *“For EEE use same AM0 RAMs as 100GE with a code-word spacing of 1 instead of 2 to provide the highest frequency of markers as possible. 100G provides markers every 100ns while 25G would be 200ns.”*
 - It can be shown that the same AM0 format can be used for ‘normal’ vs. ‘rapid’ CWMs
 1. http://www.ieee802.org/3/by/public/adhoc/architecture/cober_050615_25GE_adhoc.pdf
 2. http://www.ieee802.org/3/by/public/adhoc/architecture/wertheim_050615_25GE_adhoc.pdf

MORE AND SUMMARY.

- **AM0 from 40G MLD running at 25G line rate reduces confusion:**
 - **AM0 from 100G MLD is the CW boundary definition for 100G FECs.**
- **PUT THE AM0 BACK TO THE 40G FORMAT**
 - **The area cost is negligible.**
 - **No effect on EEE**

THANK YOU!