802.3 Working Group

10 Gig Ethernet Call for Interest

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Jonathan Thatcher

Picolight Incorporated
jonathan@picolight.com
303.530.3189 x238

Why Jonathan, why?
We barely finished 802.3z!

- Because I'm a masochist?
- Because I miss late night dinner meetings with David Cunningham?
- ...and early breakfast meetings with Geoff?
- Because I'm just a "standards groupie?"

!NOT!

Really, Why?

- Observe increasing industry interest in use of IP in the LAN...MAN...RAN....
- See strong pull for other 10 Gig solutions
  - High BW interconnects for GbE; FC; Terabit Routers; Clusters; NGIO; FIO; OIF....
- Desire to avoid proliferation of custom, non-interoperable solutions
- Believe in the 802.3 standards process

Why Now?

- Existence proof for optical physical layer
  - Parallel; OC-192
- New options on the immediate horizon
  - Coarse WDM; Special encoding
- Timing decision tightly linked to objectives
  - Without objectives, it is impossible to determine appropriate timing
  - Need a study group to determine objectives

10 GE Scope Assumptions

- Primarily a PHY layer activity
  - Minimal to no changes required in MAC
  - Changes to PMA driven by PMD requirements
  - Need for a new MII
  - Potential for new distance objectives
    - 2 - 100 meters
    - 2 - 10 km
    - 2 - 100 km

Physical Possibilities

- **General Methods**
  - Straight Serial
  - WDM / CWDM
  - Parallel
  - Optical Encoding
- **Wavelengths**
  - 850
  - 1300
  - 1550
- **Laser Safety**
  - Inherently Safe
  - Sequencing (e.g. OFC)
  - Fiber Splicing
- **Fibers**
  - Existing Infrastructure
  - New MMF
  - POF
- **Is 10 Gig really 10?**

Total Options? Matrix Multiply

- Base Speeds [1.25; 2.5; 5; 10] X
- Wavelengths [850; 1300; 1550] X
- Number of colors [1; 4; ...] X
- Number of fibers [2; 4; 8; ...] X
- Coding [8b/10b; 16b/18b; Compress...] X
- Fiber Type [SMF; 50; 62.5; POF] X
- Other Apps [FC; NGIO; FIO; SONET; ...]

Do you remember?

Top 10 Reasons For 1.25 Gb/s (10X)

1. I have 10 fingers and 10 toes...
2. My customers can only multiply/divide by 10
3. 10 is different (everyone else uses factors of 2/4/8); FC has already done 1.063 Gb/s
4. 802.3 wants to go faster than 802.12
5 ...and faster than SONET at 1.24 Gb/s
6. Some technology will have no problem doing it
7. Some company can demonstrate that they already can
8. We want to level the playing field
9. We need to delay until we make money on the 100 Mb/s version
10. Well, we have always done it that way

The more things change...

Top 10 Reasons For 12.5 Gb/s (10X)

1. I have 10 fingers and 10 toes...
2. My customers can only multiply/divide by 10
3. 10 is different (everyone else uses factors of 2/4/8); FC is working on 2X and 4X (at these speeds, FC will be toast)
4. 802.3 wants to go faster than Token-Ring (can you imagine a 10 Gig TR?)
5 ...and faster than SONET at OC-192.
6. Some technology will have no problem doing it
7. Some company can demonstrate that they already can
8. We want to level the playing field
9. We need to delay until we make money on the 1000 Mb/s version
10. Well, we have always done it that way

1999 Potential Schedule

- **March -- Create Study Group**
  - **Initial presentations**
  - **Some scheduling discussions**
- **May -- Interim I**
  - **Set S.G. scope; objectives & plan**
  - **Identify ad-hoc groups; organize**
- **July -- Present Tutorial**
  - **Report and iterate**
- **Sept -- Interim II**
  - **Refine market requirements**
  - **Initial draft of PAR / 5 criteria / objectives**
- **Nov -- Advance to task force**
  - **Complete down-select of options**
  - **Finalize PAR / 5 criteria / objectives**
  - **Establish Task Force schedule**
  - **(Likely to see independent creation of marketing organization)**

It is unreasonable to project further until the S.G. objectives are in place

Objective

- Formally establish if there is sufficient interest for an 802.3 project
- If so, do what it takes to get 802.3 to charter a Study Group

Goal for Breakout Sessions

- This is not a task force
  - Will not do task force business
- This is not a study group
  - Will not do study group business
- These are 802.3 work group sessions
  - **Will inform and enable 802.3 members to make a decision on a motion to recommend the creation of a 10 Gigabit Ethernet S.G.**

Secondary Goals

- Achieve basic understanding of
  - the potential **scope**
  - the potential **time line**
  - the **markets** and **applications**
  - the current **technical capabilities**
  - the technical **issues**
  - the technical **options**

Setting the "Order of the Day"
Rules of Engagement

1. **No marketing presentations will be tolerated.**
2. **No discussion of prices will be tolerated.** Ratios and trends can be shown based on a normalized axis with no numbers.
3. Topics should support the assertion(s): **"this is (or is not) the appropriate time to initiate a 10 Gigabit Ethernet standards activity."**

Rules of Engagement (continued)
Supporting Topics

3.1. Topics that define and bound the work effort (e.g. objective recommendations)

3.2. Topics that identify key work items and issues

3.3. Topics regarding related activities in other standards and industry forums

3.4. Topics that relate to the "5 Criteria"

- **3.4.1. Broad Market Potential**
- **3.4.2. Compatibility with IEEE Standard 802.3**
- **3.4.3. Distinct Identity**
- **3.4.4. Technical Feasibility**
- **3.4.5. Economic Feasibility**

3.5. Topics relating to potential applications (see Criteria # 1)

3.6. Topics that help identify the timeliness of the project (e.g., when will the market(s) be ready; when will the technology be ready)

3.7 Topics that are otherwise consistent with the goals and objectives of the sessions.

Adopt "Order of the Day"

- It is moved that 802.3 adopt the "Order of the Day (with rules of engagement)" as the modus operandi for this week's presentations and discussions for "10 Gigabit Ethernet."
  - Yes:
  - No:
  - Abstain:

Agenda (1 of 2)

General Introduction

- Jonathan Thatcher Picolight Introductions; Review "Order of Day"

Market / Applications

- Bruce Tolley 3COM Market Requirements
- *Bert Armijo Nortel Applications: enterprise & carrier scenarios*
- Paul Bottorff Nortel Scope & Objectives for 10GE
- Drew Perkins Lightera Terabit switch application of 10 Gig (Wed)
- Drew Perkins Lightera Optical Internetworking Forum (OIF) point of view on 10 Gig (Wed)

Upper Layer Protocol

- Steve Haddock Extreme Requirements for speed insensitive MAC

General Technology

- Ben Yu 3COM Technologies for 10 Gig Ethernet
- Rich Taborek Transcendata Multilevel Analog Signaling

Agenda (2 of 2)

High Speed Electronics

- Rich Dugan HP Comparison of 2.5 Gb/s and 10 Gb/s SERDES: Analysis & Measurement
- Fred Wennigar Vitesse 10 Gig serial (OC-192) tech. roadmap
- Rob Hadaway Nortel SiGe: overview of current technology capability
- Bill Woodruff GIGA Current capabilities of serial 10 Gig devices

Optics

- Del Hanson HP Comparison of Alternatives to Implement 10 GbE Optical Links
- Dave Dolfi, HP 10 Gb/s Wide WDM Transceivers (SpectraLAN) at 850 nm and 1300 nm
- Schelto Van Doorn Siemens 10 Gig status and technology
- Ed Cornejo Lucent Optical 10 Gig Serial PMD Recommendations
- Paul Kolesar Lucent Viable PMDs for 10 G Ethernet

Discussion

Miscellaneous Information

- Presentations can be found at:
  http://grouper.ieee.org/groups/802/3/10G_study/public/index.html