Report
on the
July 5-8, 1999
MEETING OF THE 802.3 HIGH SPEED STUDY GROUP
Montreal, Canada

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Objectives For The Week

< Complete the OBJECTIVES for the HSSG
< Improve understanding of TECHNICAL PROPOSALS
Presentations (1 of 10)

< Alan Flatman
  < Fiber base survey extrapolated to YE 2000
  < Segmented by Fiber type (62.5, 50, SMF)
  < Large proportion of campus backbone < 750 m
  < Large proportion of building backbone < 300 m

< Atikem Haile-Mariam
  < MAN Long Haul data: much proprietary difficult to piece story together
  < Introduction of “Profit Centered” fiber
  < RBOCs carry far more data than CLECs; trend will continue
  < Majority of data on the CLECS
  < 10 to 20 km typical for CLEC Rings
  < CO to drop min: 186 ft; ~Mean 10,000 ft; Max 114,000 ft
  < Therefore, need a -> need 3 to 4 km objective

< Ed Chang
  < Use TIA 2.2 bandwidths, longer distance calculations presented
Presentations (2 of 10)

< Mike Hackert
  < More detailed discussion of history and scope of TIA 2.2

< Zinan Chen
  < Bandwidth growth curves for Ethernet (et al) to show need
  < LAN growth at 19% AGR; MAN & WAN at 38% AGR
  < Most OC-x not growing, sans 10 Gig; 10 Gig port projections (Nortel alone)
  < “Magic time to unify local, metro, and wide area....”

< Howard Frazier
  < Recommendations for common MII, PMD and Mgmt I/F’s
  < Description of delimiters; special characters; levels; etc.
Presentations (3 of 10)

< Paul Bottorff
  < 3 types of media: dark fiber; dark wavelengths; lit OC-192 (which is frequency sensitive)
  < Description of DWDM Network
  < Analysis of time dependencies
  < Summary: support OC-192

< Kamran Azadet
  < FEC used to dramatically improve BER with low overhead
  < FEC definitions; examples (e.g. Hamming; Reed-Solomon)
  < Benefit analysis

< Ed Chang
  < BER analysis supporting need for 10e-13
Presentations (4 of 10)

< Dai Young Kim
  < New code scheme: MB810;
  < Advantages: ~2x spectrum BW vs 8B10B or has 2X the BW capability; Run Length 7: Alternating Sum Variable (ASV) = 5; DSV 6
  < Encoder chip in design now; expect ~10k GATES to implement

< Norival Figueira
  < 2 Polynomial scrambler; how encoding is done
  < Explanation of error duplication; why it isn’t a problem
  < How detection works;
  < Probability of error is 8.4 x 10e-11

< Al Widmer
  < Discussion of error correction over 8B/10B
  < Requires 17 bits per EC segment
  < Works best with 4 byte boundaries
Presentations (5 of 10)

< Al Widmer
  < Discussion of 16B/18B Code (v 8B/10 B)
  < Comma spread over 2 bytes; Larger running disparity; takes longer to detect
  < Run length is 7 (v 5); Maximum Digital Sum is 12
  < Low freq time constants have to be increased by 2.25
  < No data control characters
  < A 16/18 can be developed preserving 8B/10B characteristics

< Paul Kolesar
  < Review of fiber standards activities (High B/W 850 going frwd)
  < 850 nm power budget
  < Comparison to 980 nm and 1300 nm
  < IEC safety limits MAY increase
  < New 850 nm receivers fast enough to support 10 gig.
  < Flip chip not a problem for detectors
  < 980 test equipment not common
  < 980 would have large inertia to overcome (e.g. stds; fiber mfgs)
Presentations (6 of 10)

< Mark Donhowe
< Evaluation Gore, multimode, VCSELs with Lucent HBW fiber
< Demonstrated 300 meters at 12.5 GBd; 400 meters at 10 GBd

< Georgio Giaretta
< Compare solutions for MMF (Serial; WDM; PAM)
< **Modal noise** previously no problem due to low coherence sources; low coherence becoming more of a problem as we move to DFB and single mode VCSELs
< Restricted, small, center launch can overcome modal noise via reduced fiber system loss

< Richard Kriese
< **Parallel components available today**; used by other standards; multiple sources
< **Relative cost curve at short distances are competitive**
< Currently lowest cost option; long term may not be.
Presentations (7 of 10)

- Del Hanson
  - Case for 980 nm solutions; improved power budget
  - Comparison of 850 v 1300 nm (Rx Sensitivity; Eye Safety)
  - Transparent substrate helps with packaging using flip chip
  - Advantages of device characteristics (current; voltage)
  - Potential interoperability with 1300 nm

- David Cunningham
  - Theoretical analysis of PAM / T-Wave Optical Systems
  - Issues: Power Penalty; RIN; Non-linearity; Modal Noise
  - May require coding-gain techniques to overcome penalties.
Presentations (8 of 10)

< Brian Lemoff
  < Update on WWDM Proposal
  < Low cost because: no new fiber; slower lasers
  < Propose LX style (could be either SM or MM)
  < Some experimental results (e.g. channel cross talk)
  < Review of laser safety calculations
  < Link budget (derived down from eye safety limit) -> margin

< Jaime E. Kardontchik
  < Review of Architecture: 1000BASE-T PCS + 4 WDM
  < 1.25 GBd line rate
  < Scrambling; PAM-5; Coding gain by FEC
Presentations (9 of 10)

< Martin Nuss
  < Serial is good
  < Use scrambling (chip cost is low)
  < Recommended PHY Interfaces: 32 bit to PMA; 1 bit to PMD
  < Scrambling Alternatives (A**-like; SDL-like; ...)
  < WAN Architectures (Dark Fiber; WDM; SONET)

< Fred Weniger
  < Group should seriously consider a 10 bit interface
  < 10 independent 802.3z lines @ 1.25 GBd
  < Comparision of 8B/10B : Scrambling : Scrambling with FEC
Presentations (10 of 10)

< AD-HOC Reports
  < Copper: Objectives for 10 meter motion w/ 2 presentations....
  < Media Reference: Review of 11801 Revision and ability to influence future direction
  < Survey: Ready to go out; goal 100 to 300 sites surveyed
  < Speed: Only 1 speed; either 10.000 or 9.58464; can’t resolve by 75% vote
  < Distance: Multiple options to be presented to group, in sequence as prioritized by ad-hoc “Chicago Rules” voting.

< In support of Copper Objectives Motions
  < Drew Plant

  < Rich Taborek
    < Pluggable MAS PHY using common coding with optics
HSSG Objectives Passed (1 of 2)

- Preserve the 802.3/Ethernet frame format at the MAC Client service interface. (acclamation)
- Meet 802 Functional Requirements, with the possible exception of Hamming Distance. (Y: 63 N: 2 A: 16)
- Preserve minimum and maximum FrameSize of current 802.3 Std. (acclamation)
- Support full-duplex operation only. (acclamation)
- Support star-wired local area networks using point-to-point links and structured cabling topologies. (Y: 55 N: 11 A: 17)
- Specify an optional Media Independent Interface. (Y: 52 N: 0 A: 6)
- Support proposed standard P802.3ad, Link Aggregation (“Link Aggravation”; acclamation)
- Select only one of 10.000 Gb/s or 9.58464 Gb/s to standardize as the MAC/PLS data rate (For: 113; Against: 3; Abstain: 10)
HSSG Objectives Passed (2 of 2)

- Support fiber media selected from the second edition of ISO/IEC 11801 (802.3 to work with SC25/WG3 to develop appropriate specifications for any new fiber media). For: 119; Against: 0; Abstain: 1
- Provide a family of Physical Layer specifications which support a link distance of:
  - At least 2 km over SMF (For: 105; Against: 0; Abstain: 0)
  - At least 10 km over SMF (For: 93; Against: 5; Abstain: 7)
  - At least 100 m over installed MMF (For: 73; Against: 13; Abstain: 21)
  - At least 300 m over MMF (For: 83; Against: 3; Abstain: 12)
  - At least 40 km over SMF (For: 68; Against: 4; Abstain:
HSSG Motion 1

In response to the motion passed in the HSSG, requests that the 802.3 Chair sign an appropriate letter addressed to 802.3 members that enlisted their support in administering a cabling survey developed within the HSSG to support 802.3 standards effort.

(Supported in HSSG: For 71; Against: 3; Abstain: 9)

Passed by voice vote

Moved: Jonathan Thatcher (for HSSG)

Procedural
HSSG Motion 2

- Request 802.3 extend the HSSG charter until November, 1999.
- Passed by voice vote
- Moved by Jonathan Thatcher for HSSG
- Procedural
HSSG Action 1

< Schedule an interim meeting for Jan, 2000

< Note: Texas Instruments has volunteered to host this meeting in Dallas, Texas.