IEEE P802.3ap Task Force

Closing Plenary Meeting Report

Portland, OR

July 15, 2004

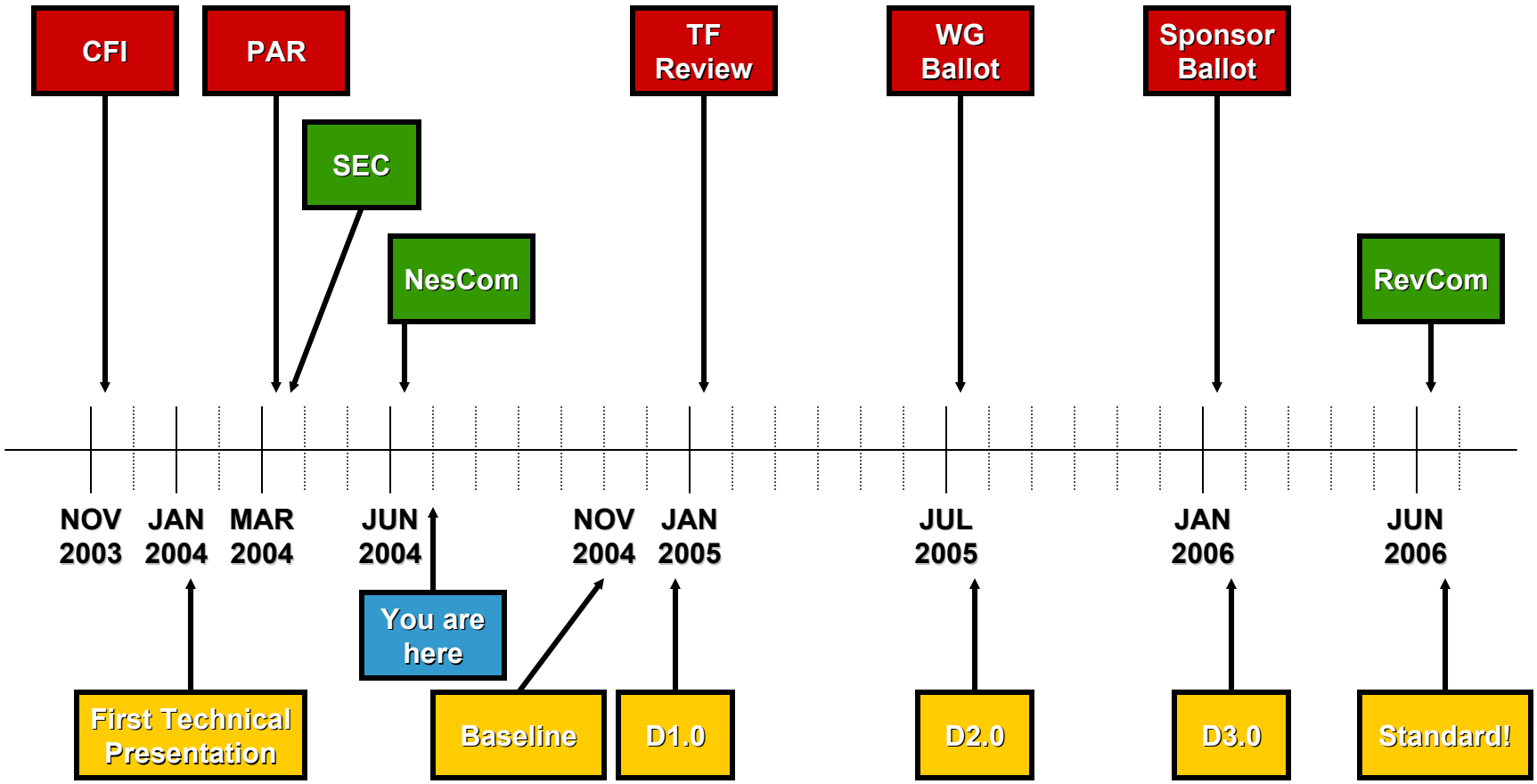
Plan for the Week

- Hear presentations
  - 28 technical presentations
  - Topics:
    - Backplane Channel Model
    - Auto-Negotiation
    - Test Methodology
    - 10Gb/s serial PHY
- Build confidence in proposed channel limits (and identify areas where corrections are required).
- Identify candidate architectures for 10Gb/s Serial PHY and Auto-Negotiation.

Accomplishments

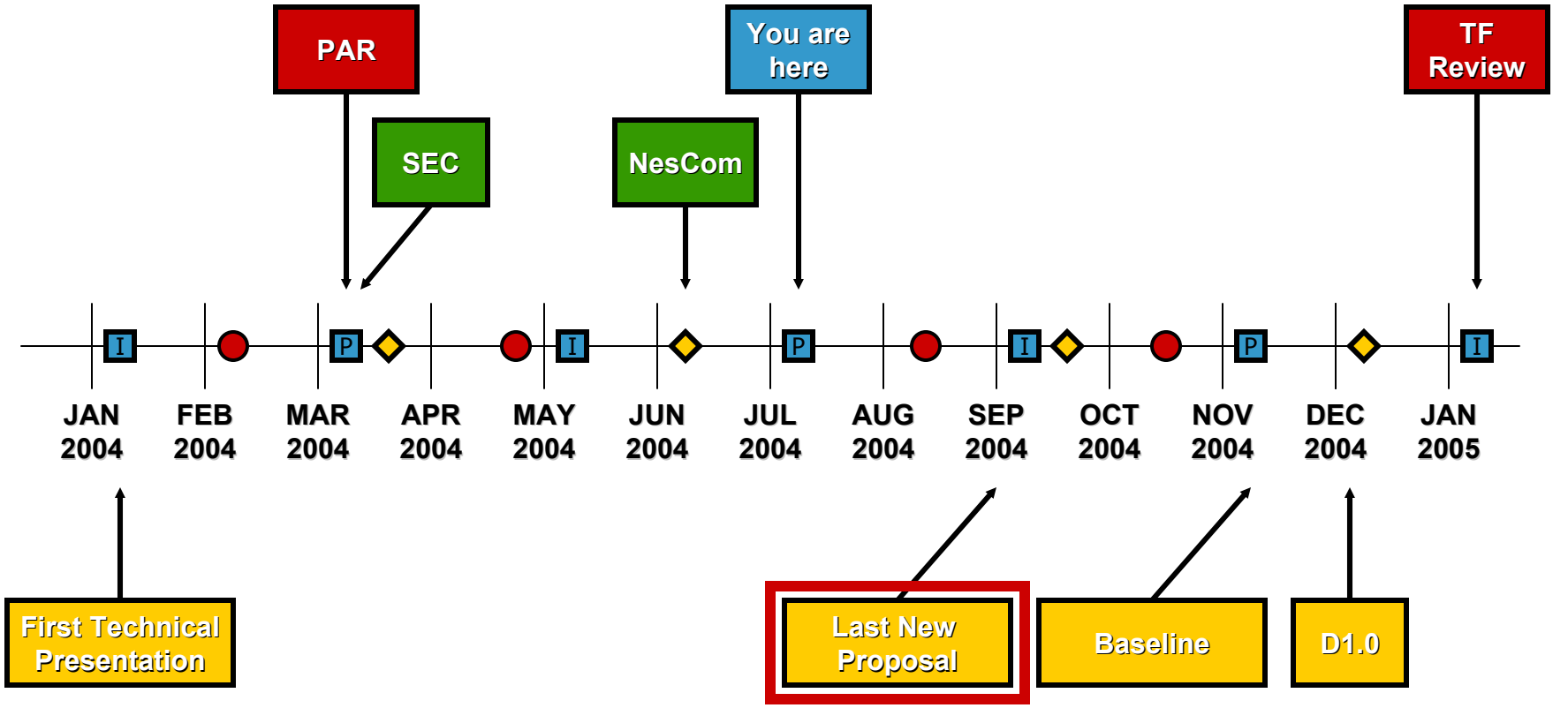
- Adopted a timeline.
- Presentations.
- Adopted definition of “improved FR-4”
- Identified additional points of agreement on auto-negotiation.
- Signaling Ad Hoc group will be formed to create a framework for comparison of various signaling techniques.

IEEE P802.3ap Timeline



Approved by Task Force (July 2004)

Timeline Detail



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Presentations (1/2)

Mandich	System Vendor Requirements for 10Gb/s Backplane
Goergen	Backplane Channel Ad Hoc Recommendations
Goergen	FR-4 Definition III
Goergen	Channel Compliance to Proposed: Test Cards
Moore	Specifying a Channel Through Impulse Response
Peters	AdvancedTCA channel data and comparisons to proposed channel model
Anderson	S-params for IEEE Channel Ad Hoc
Seemann	Further Channel Model Data
McCallum	A Migration Path from 6.25Gb/s Operation to 10Gb/s Operation
Kim	Compatibility Negotiation Considerations
Szczepanek	Serdes Compatible FLP AN Proposal
Ghiasi	Serdes Compatible Auto-Negotiation for Backplane Ethernet
Ganga	802.3ap Auto-Negotiation with Clause 28 State Machines

Presentations (2/2)

Kim	New Base Page/Selector Field Proposal
Moore	Receiver Testing Using Interference Tolerance Measurements
Waschura	Thoughts on testing of devices with 10^-15 confidence using test times historically used for 10^-12.
Altmann	Power & Complexity Discussion Guidelines
Anderson	Signaling Analysis Using IEEE Channel Ad Hoc Templates
Abler	PAM-4 versus NRZ Signaling: "Basic Theory"
Liu	A Comparison of NRZ and PAM-4 Using the IEEE Channel Model
Warke	A Study of NRZ Signaling Over Proposed IEEE Ethernet Backplane
Brunn	Edge-Equalized NRZ
Brink	Comparison of PAM-4 and NRZ signaling based on measurements from a dual-mode device
Brink	Proposal for 10Gb/s single-lane PHY based on PAM-4 signaling
Sinsky	10Gb/s Duobinary Signaling over Electrical Backplanes
Barazande-Pour	Crosstalk and Receiver Equalization for 10G Serial Ethernet
Von Herzen	Some Applications for Backplane Ethernet

Channel Model (TF Motion)

- Move to adopt the Dk/Df values defined in goergen_01_0704, (pdf) page 5, as the minimum definition of “Improved FR-4” with modification to temperature tolerance from “0 to 55°C” to “0 to 70°C.” Reference goergen_01_0704, goergen_01_0504, and goergen_02_0304.

  Passed (All: 41/0/6, 802.3: 14/0/6)

Auto-Negotiation (TF Motions)

- Clause 45 Register Set and Clause 45 MDIO interface be adopted.

  Passed (All: 35/0/15, 802.3: 16/0/5)

- Auto-negotiation at a minimum include port-type (e.g. 1G 1 lane, 10G 4 lane, 10G 1 lane) negotiation and any parameter exchange required to select the proper PMA.

  Passed (All: 39/0/8, 802.3: 19/0/4)

- Auto-negotiation not be restricted to existing base page definitions.

  Passed (All: 34/0/11, 802.3: 17/0/6)

Auto-Negotiation (Additional Poll)

- Straw Poll: Auto-Negotiation Signaling / Methodology Proposals
  - Option A - Prefer [Clause 28, SSP - modified link pulse].
  - Option B - Prefer [Clause 37, Serdes – 8B/10B].
  - Option C - Prefer a solution, and other than presented.
  - Option D - Prefer a solution, and I do not care which.
- Results:
  - Option A – 18
  - Option B – 11
  - Option C – 2
  - Option D – 5

Signaling

- Three signaling methods being considered for the 10G serial backplane PHY:
  - NRZ
  - PAM-4
  - Duobinary

New Objective (TF Motion)

May interim

- Move to augment the existing 802.3ap objectives to include defining a 4-lane 10Gb/s PHY for operation over the 802.3ap channel model. Add the following bullet to the objectives:
  - Define a 4-lane 10Gb/s PHY for operation over the 802.3ap channel model.

  Passed (All: 32/10/3, 802.3: 11/1/1)

This week

- Modify "Distinct Identity" criteria, bullet #2, to:
  - The standard will define at most one single lane PHY for 1Gb/s, at most one single lane 10Gb/s PHY, and at most one four-lane 10Gb/s PHY.

  Passed (All: 40/0/4, 802.3: 23/0/1)
- Move that the IEEE P802.3ap Task Force request approval of the amended 5 criteria and objectives, as shown in agenda_01_0704, by the 802.3 WG and request that the 802.3 WG forward the 5 Criteria to the 802 SEC for approval.

  Passed (All: 37/0/0, 802.3: 20/0/0)

IEEE P802.3ap Objectives

- Preserve the 802.3/Ethernet frame format at the MAC Client service interface.
- Preserve min. and max. frame size of current 802.3 Std.
- Support existing media independent interfaces.
- Support operation over a single lane across 2 connectors over copper traces on improved FR-4 for links consistent with lengths up to at least 1m.
  - Define a 1 Gb/s PHY
  - Define a 10 Gb/s PHY
- Define a 4-lane 10Gb/s PHY for operation over the 802.3ap channel model.
- Consider auto-negotiation.
- Support BER of 10^-12 or better.
- Meet CISPR/FCC Class A.

Distinct Identity (original)

Substantially different from other 802 and 802.3 specifications

One unique solution for problem

Easy for document reader to select relevant spec.

- **The current 802.3 specification does not explicitly cover backplane transmission. XAUI is for chip-to-chip applications. 10GBASE-CX4 is for box-to-box (cabling) applications. 1000BASE-X has no electrical specification, and 1000BASE-CX is specified for coaxial cable.**
- **The standard will define at most one PHY for 1Gb/s operation and at most one PHY for 10Gb/s operation.**
- **The specification will be done in a format consistent with the IEEE document requirements thus making it easy for implementers to understand and design to.**
- **The proposed specification will use copper media similar to other high speed networking technologies (Fibre Channel, IB4X) but does so with the IEEE 802.3 MAC as the over-riding layer which will result in higher compatibility and lower cost for Ethernet systems.**

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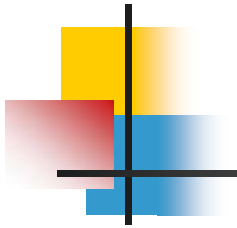
Motion

- Move that 802.3 approve the amended Backplane Ethernet 5 Criteria (Distinct Identity) and objectives.

- TECHNICAL (75%)
- Moved – A. Healey on behalf of the Task Force
- Second – N/A
- 802.3 Voters (Y/N/A): 56/0/3
- MOTION PASSES

Future Meetings

- September 2004 Interim
  - ???
- November 2004 Plenary
  - Week of November 14.
  - San Antonio, TX
  - Hyatt Regency



Thank You!