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**IEEE 802.3**

**Backplane Ethernet Study Group**

**Agenda and General Information**

Lake Buena Vista, FL

March 16, 2004



# Agenda

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- Welcome and Introductions
- Approve meeting minutes
- Goals for this Meeting
- Reflector and Web
- Ground Rules
- IEEE
  - Structure
  - Bylaws and Rules
  - Call for Patents
  - IEEE Standards Process
- Presentations
- Future Meetings
- Motion Madness



# Goals for this Meeting

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- Hear presentations
  - 11 technical presentations
  - support, refine, and possibly augment objectives
- Address comments on the PAR, 5 Criteria, and Objectives.
- Seek 802.3 approval of PAR, 5 Criteria, and Objectives.



# Reflector and Web

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- To subscribe to the Backplane Ethernet Study Group reflector send an email to:

*[majordomo@ieee.org](mailto:majordomo@ieee.org)*

with the following in the body of the message:

***[subscribe stds-802-3-blade <your email address>](#)***

- Ethernet Backplane Study Group web page URL:  
***<http://www.ieee802.org/3/bladesg/>***

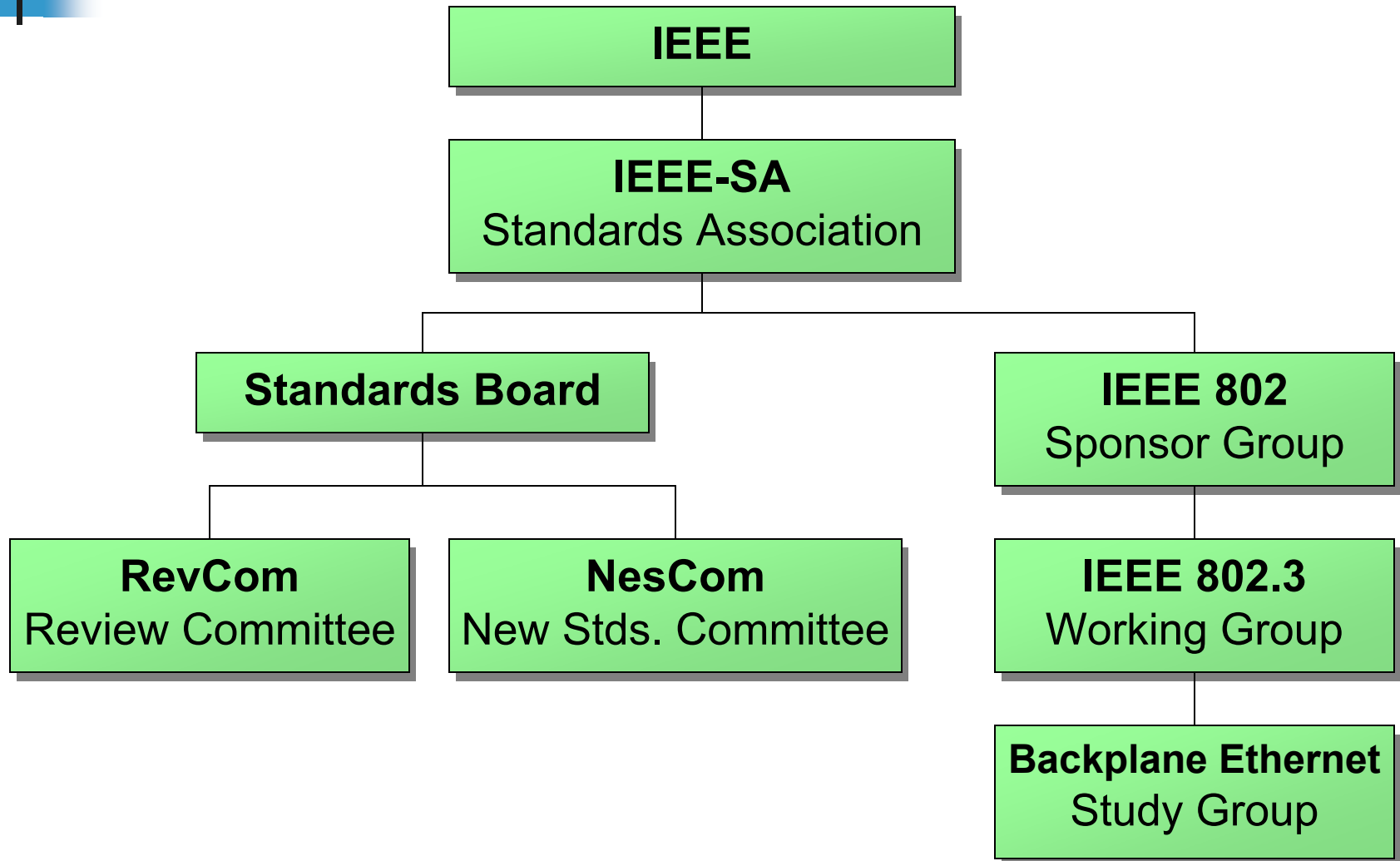


# Ground Rules

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- 802.3 Rules apply
  - Foundation based upon Robert's Rules of Order
- Anyone in the room may speak
- Anyone in the room may vote
- **RESPECT**... give it, get it
- NO product pitches
- NO corporate pitches
- NO prices!!!
  - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

# IEEE Structure





# Bylaws and Rules

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- Bylaws of the IEEE Standards Association (IEEE-SA):  
<http://standards.ieee.org/sa/sa-bylaws.pdf>
- Bylaws of the IEEE-SA Standards Board:  
<http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf>
- IEEE LAN/MAN Standards Committee (LMSC)  
Operating Rules:  
<http://www.ieee802.org/rules.pdf>
- IEEE 802.3 Working Group Operating Rules:  
<http://www.ieee802.org/3/rules/>



# IEEE-SA Standards Board Bylaws on Patents in Standards

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## 6. Patents

IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard. This assurance shall be provided without coercion and prior to approval of the standard (or reaffirmation when a patent becomes known after initial approval of the standard). This assurance shall be a letter that is in the form of either

a) A general disclaimer to the effect that the patentee will not enforce any of its present or future patent(s) whose use would be required to implement the proposed IEEE standard against any person or entity using the patent(s) to comply with the standard or

b) A statement that a license will be made available without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination

This assurance shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal and is irrevocable during that period.

Approved by IEEE-SA Standards Board – December 2002





# Inappropriate Topics for IEEE WG Meetings

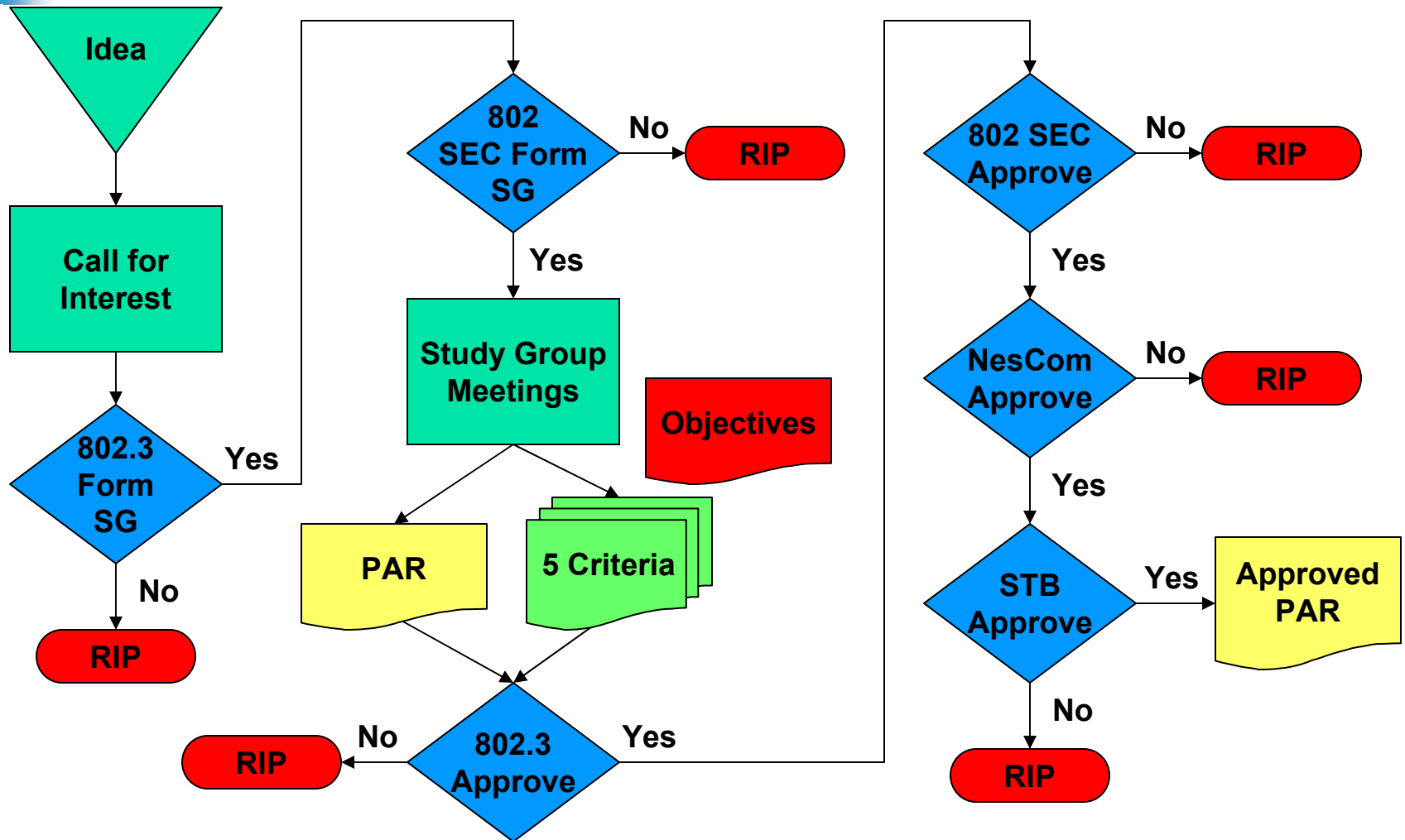
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- Don't discuss licensing terms or conditions
- Don't discuss product pricing, territorial restrictions or market share
- Don't discuss ongoing litigation or threatened litigation
- Don't be silent if inappropriate topics are discussed... do formally object.

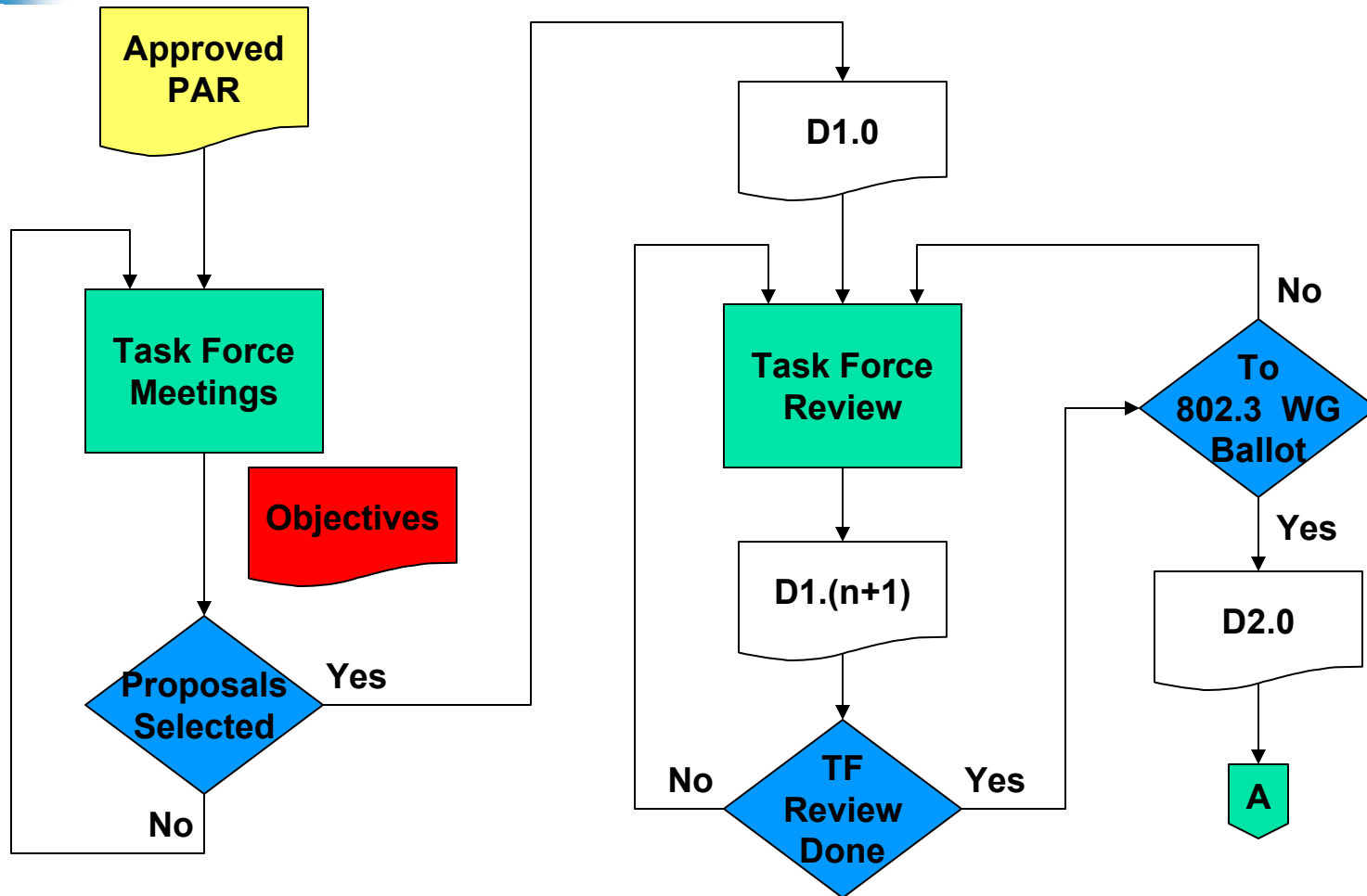
**If you have questions, contact the IEEE Patent Committee Administrator at [patcom@ieee.org](mailto:patcom@ieee.org)**

Approved by IEEE-SA Standards Board – December 2002

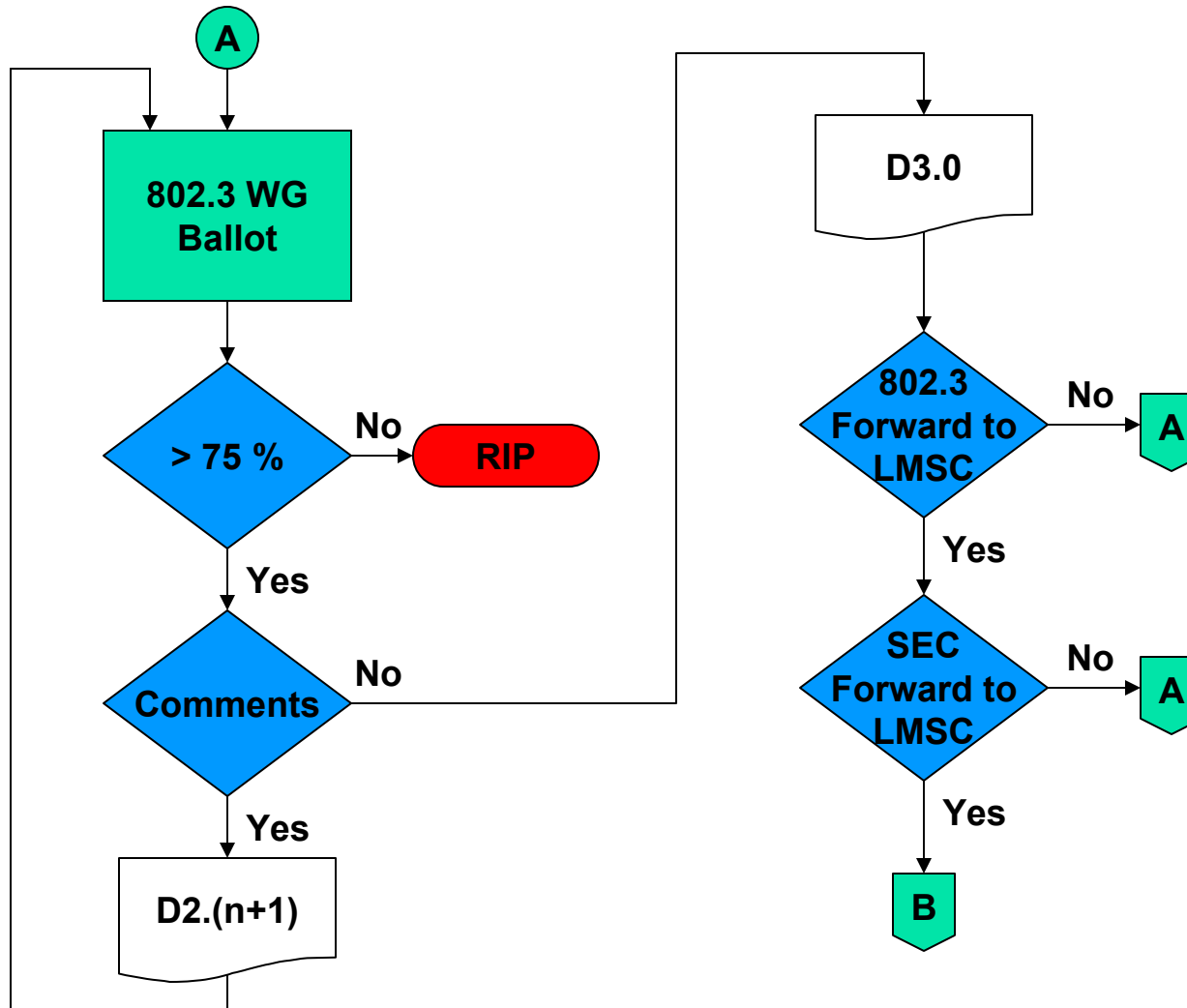
# IEEE Standards Process



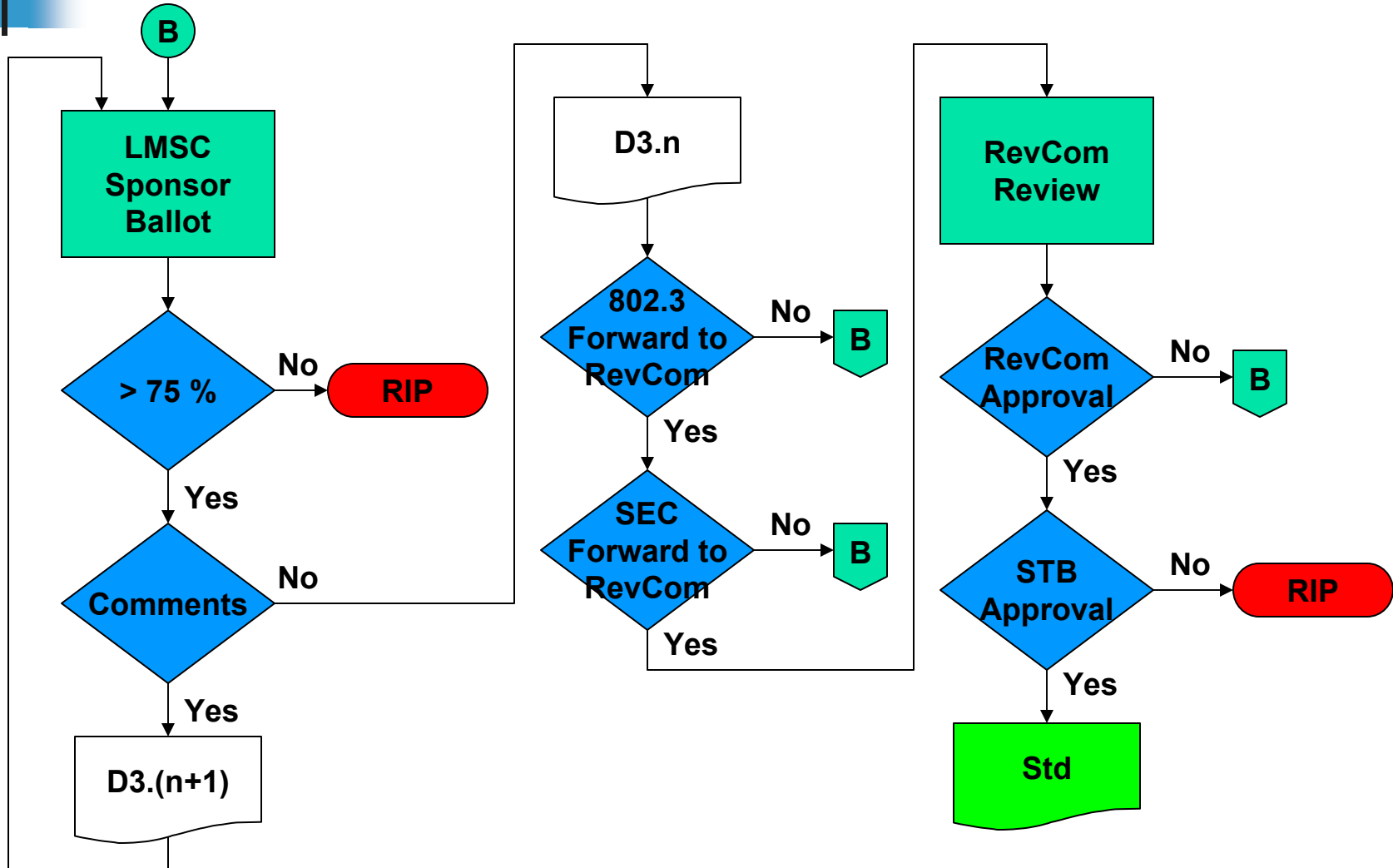
# IEEE Standards Process (cont.)



# IEEE Standards Process (cont.)



# IEEE Standards Process (cont.)





# Study Group

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- Function is to draft a PAR and 5 Criteria
- Gain approval at WG 802.3, 802 SEC, IEEE NesCom and IEEE Stds. Board
- SG only exists for 6 months
  - Extensions can be requested... voted on by 802.3, ratified by SEC
- Development of Objectives helps set the goals for the Task Force
- Developing consensus
  - Education helps build consensus
  - Consensus (> 75%) required to move forward

## ■ Title

- Information technology -- Telecommunications and information exchange between systems -- Local and metropolitan area networks -- specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Ethernet Operation Over Electrical Backplanes

## ■ Scope

- The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to specify operation at 1000 Mb/s and 10 Gb/s across an electrical backplane leveraging the existing MAC.

## ■ Purpose

- The purpose of this project is to provide standards based Ethernet interconnection of server and telecommunication blades over a modular platform backplane. Industry trends for LAN, SAN and other applications are migrating to backplane interconnects, and this project will optimize Ethernet operation for backplanes



# Broad Market Potential

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**Broad set(s) of applications**

**Multiple vendors, multiple users**

**Balanced cost (LAN vs. attached stations)**

- **Ethernet has become widely deployed as a preferred backplane solution. Examples include Modular Servers and Enterprise and Telecom Network Equipment. Quantitative presentations have been made to the 802.3 Backplane Ethernet Study Group indicating significant market opportunities for these applications.**
- **Rapid growth of network and internet traffic is driving the need for higher performance over backplanes. Currently, IEEE 802.3 does not address this application with a formal standard.**
- **156 participants attended the Ethernet Over Backplane call-for-interest, representing at least 33 companies, and indicated that they plan to participate in the standardization of Ethernet Over Backplane. This level of commitment indicates that a standard will be developed by a large group of vendors and users.**
- **A standardized Ethernet interface on blades will maintain the balanced cost for backplane applications.**





# Compatibility with IEEE Std. 802.3

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**Conformance with CSMA/CD MAC, PLS**

**Conformance with 802.2**

**Conformance with 802**

- **The proposed standard will conform to the 802.3 MAC, and therefore will be consistent with 802.1D, 802.1Q, and relevant portions of 802.1f.**
- **As was the case in previous 802.3 standards, new physical layers will be defined.**
- **The proposed standard will conform to the 802.3 MAC Client Interface, which supports 802.2 LLC.**
- **The proposed standard will conform to the 802.1 Architecture, Management and Interworking.**
- **The proposed standard will define a set of systems management objects which are compatible with OSI and SNMP system management standards.**
- **The proposed standard will conform to the requirements of IEEE Std 802-2001.**



# Distinct Identity

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**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 a single PHY for each speed of 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.**



# Technical Feasibility

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**Demonstrated system feasibility**

**Proven technology, reasonable testing**

**Confidence in reliability**

- **Ethernet MAC and interfaces are being used in backplane applications today.**
- **Technical presentations, given to the Backplane Ethernet Study Group, have demonstrated the feasibility of using copper backplane topologies at data rates up to 10 Gb/s per lane using available technologies. Other organizations are developing specifications for backplane applications for similar data rates.**
- **The principle of extending higher speeds to copper media has been well established by previous work within 802.3. The Backplane Ethernet work will build on this experience.**
- **Vendors of higher speed components are building reliable products which operate at data rates up to 10 Gb/s per lane on backplanes, and meet worldwide regulatory and operational requirements.**



# Economic Feasibility

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**Cost factors known, reliable data**

**Reasonable cost for performance**

**Total installation costs considered**

- **The component costs will benefit from cost reduction associated with Moore's Law. Further integration of functionality will reduce cost.**
- **Costs for backplanes based on available materials and components are well known and reasonable.**
- **Ethernet backplane standardization will increase deployment and diversity of supply base to further reduce cost.**
- **Ethernet IP re-use will lower implementation cost.**
- **System design, installation and maintenance costs are minimized by utilizing Ethernet system architecture, management, and software.**



# Backplane Ethernet Objectives

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- **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.**
- **Define a single lane 1 Gb/s PHY that would support links consistent with lengths up to at least 1m of improved FR-4.**
- **Define a single lane 10 Gb/s PHY that would support links consistent with lengths up to at least 1m of improved FR-4.**
- **Consider auto-negotiation.**
- **Support BER of 1E-12.**
- **Meet CISPR/FCC Class A.**



# Motion #1 (from January 2004 interim)

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- Move that the BESG adopt the 5 Criteria as contained within this document.
  
- Moved – John D’Ambrosia
- Second – Schelto Van Doorn
- All Voters
  - Yes – 32
  - No – 1
  - Abstain – 5
- 802.3 Voters
  - Yes – 13
  - No – 0
  - Abstain - 2
- MOTION PASSES

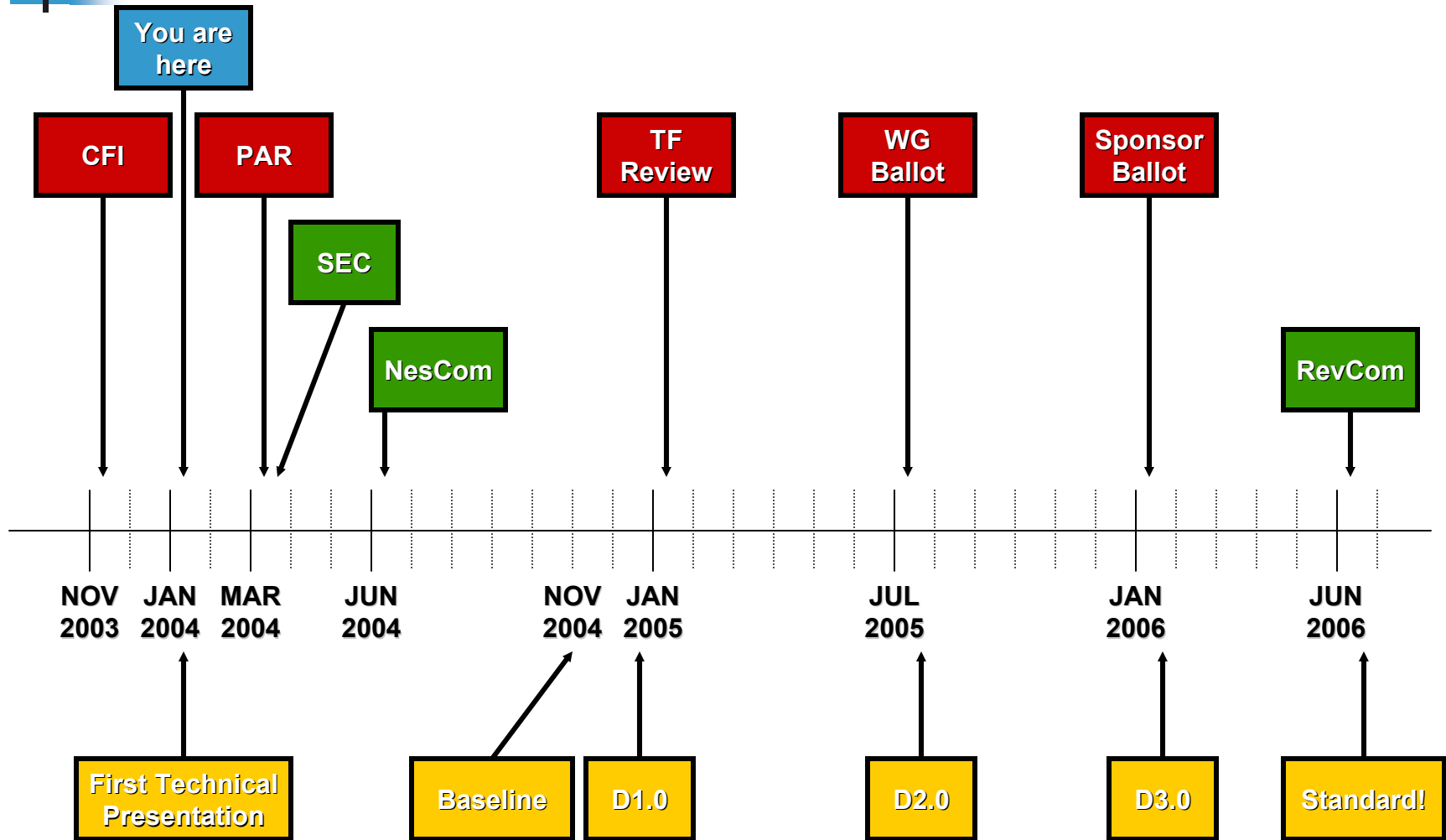


## Motion #2 (from January 2004 interim)

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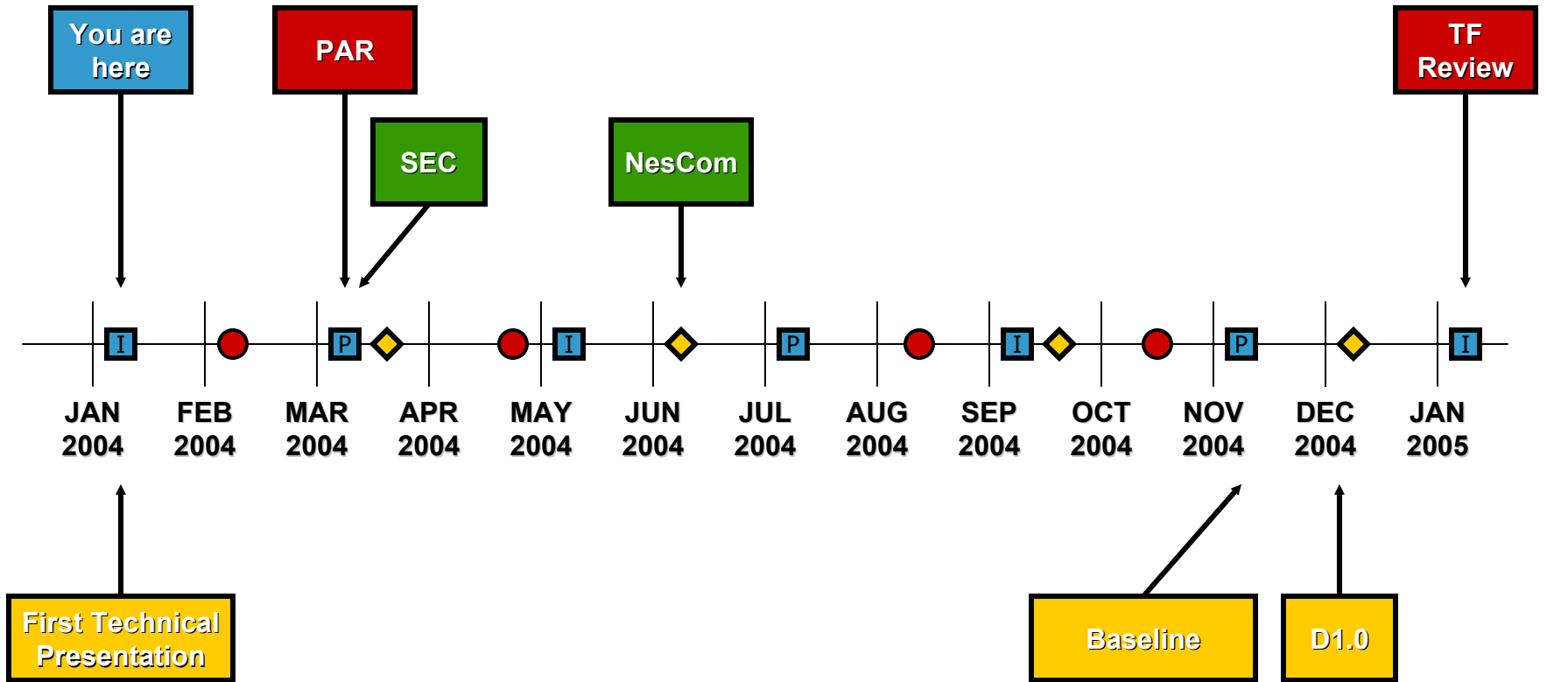
- Move that the BESG forward the PAR, 5 Criteria, and Objectives to 802.3 for consideration at the March Plenary.
  
- Moved – Brad Booth
- Second – John Stonick
- All Voters
  - Yes – 29
  - No – 0
  - Abstain – 3
- 802.3 Voters
  - Yes – 15
  - No – 0
  - Abstain - 2
- MOTION PASSES

# Possible Backplane Ethernet Timeline





# Timeline Detail



- PAR Submission Deadline
- ◆ Standards Board Meeting
- Meeting (P = Plenary, I = Interim)



# Presentations

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- Michael Altmann, “10 GbE Serial PHY Requirements”
- John D’Ambrosia, “Relative Cost for Backplanes and Blades”
- Mike Oltmanns, “Next Generation System Costs: A True Look”
- Joel Goergen, “Channel Model Criteria”
- Tom Palkert, “Ethernet over Backplane System Requirements”
- Bill Hoppin, “Market Drivers and Cost Considerations in Support of 40 inch average grade FR4 backplane links at 10Gb/s per lane”
- Luke Chang, “1/10Gbps Autonegotiation Schemes”
- Gopal Hegde, “Case for Enhancing Ethernet Capabilities for Backplane Fabric Interconnects”
- Manoj Wadekar, “Throughput & Latency Control in Ethernet Backplane Interconnects”
- John D’Ambrosia, “Developing a Channel Model to Include Variance”
- Stephen Anderson, “Comparison of PAM-4 and NRZ Signaling”



# Future Meetings

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- May 2004 Interim:
  - Week of the 24th
  - Long Beach/Monterey, CA
  - Co-located with 10GBASE-T, ...
  
- July 2004 Plenary
  - Week of the 12th
  - Portland, OR
  - Portland Hilton



# Adjourn

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Thank You!