

# Agenda and General Information

IEEE 802.3  
Next Generation  
100Gb/s Optical Ethernet Study Group

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Applied Micro  
Waikoloa, Hawaii USA – 13<>15-March-2012

# Agenda

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- *Appointment of Recording Secretary*
- Welcome and Introductions
- ~~Approve Minutes of November Meeting~~
- Approve Agenda
- Goals for this meeting
- Reflector and Web
- Ground Rules
- IEEE
  - Structure
  - Bylaws and Rules
  - Call for Patents
  - IEEE Standards Process
- Liaisons and Communications
- Presentations
- Motions and Closing Business
- Future Meetings

# Study Group Decorum



- Photography or recording by permission only (5.3.3.4)
- Cell phone ringers off
- Press (i.e., anyone reporting publicly on this meeting) are to announce their presence (2008 SASB Op Manual 5.3.3.5)
- Wear your badges at all times in meeting areas
  - Help the hotel security staff improve the general security of the meeting rooms
  - **PCs HAVE BEEN STOLEN** at previous meetings
  - **DO NOT** assume that meeting areas are secure
- Please observe proper decorum in meetings (enforcement procedures)

# Goals for the meeting

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- Presentation of Material
  - Establish Objectives (MMF, SMF or both?)
    - Justify Objectives meet 5 criteria
- Motion requesting SG extension
- Lay groundwork for Minneapolis

# Reflector and Web

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- To subscribe to the *Next Generation 100Gb/s Optical Ethernet* reflector, send an email to: [ListServ@ieee.org](mailto:ListServ@ieee.org)

with the following in the body of the message (do not include “<>”):

**subscribe** stds-802-3-100GNGOPTX <yourfirstname> <yourlastname>  
**end**

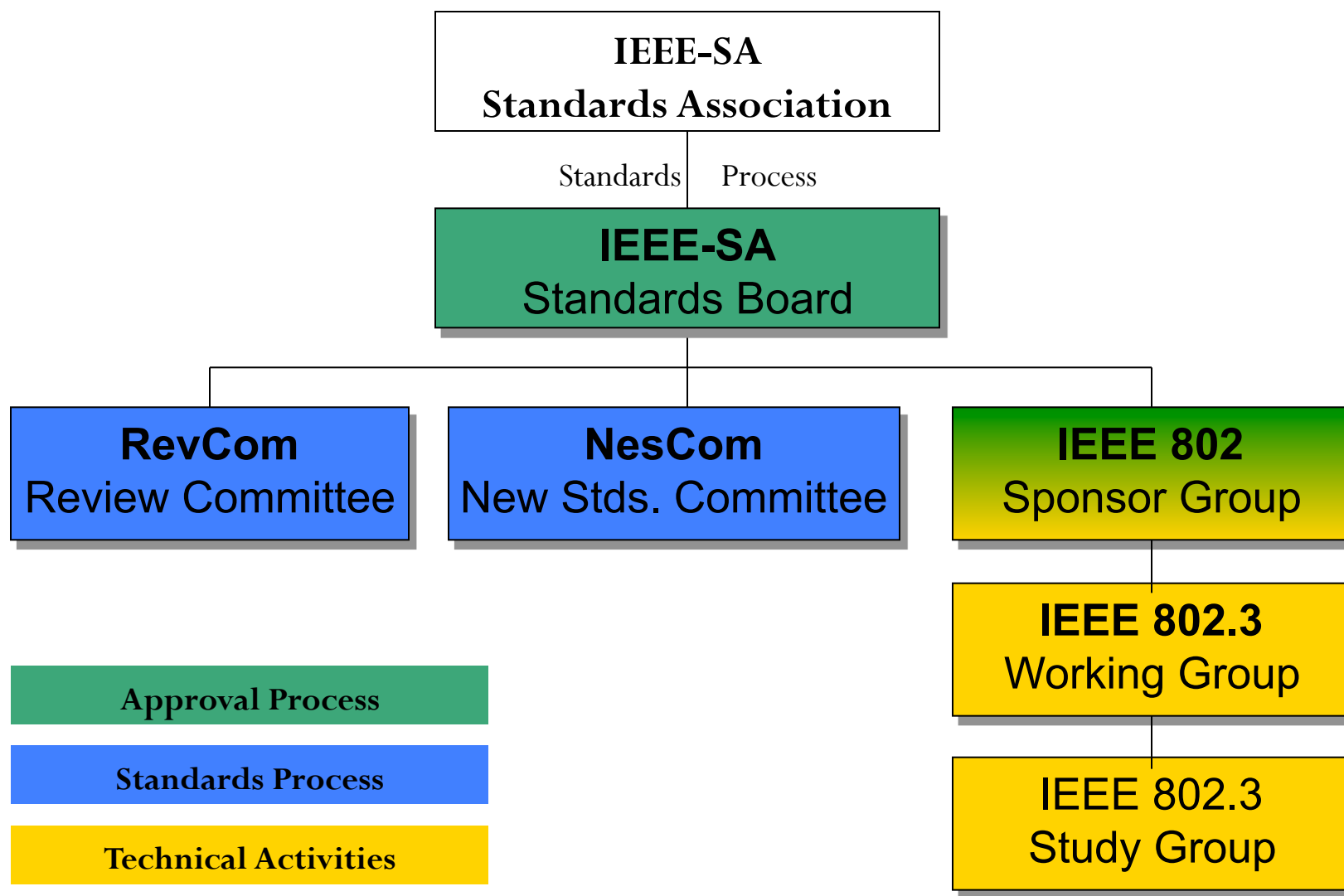
- Send *Next Generation 100Gb/s Optical Ethernet* reflector messages to:  
**STDS-802-3-100GNGOPTX@LISTSERV.IEEE.ORG**
- Study Group web page URL:  
**<http://www.ieee802.org/3/100GNGOPTX/index.html>**

# Ground Rules

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- Based upon IEEE 802.3 Rules
  - 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 – Do unto others...
- NO product pitches
- NO corporate pitches
- NO prices!!!
  - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

# IEEE Structure



# Important Bylaws and Rules

- **IEEE-SA Operations Manual**  
<http://standards.ieee.org/sa/sa-om.pdf>
- **IEEE-SA Standards Board Bylaws**  
<http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf>
- **IEEE-SA Standards Board Operations Manual**  
<http://standards.ieee.org/guides/opman/sb-om.pdf>
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Policies and Procedures**  
<http://standards.ieee.org/about/sasb/audcom/pnp/LMSC.pdf>
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Operations Manual**  
[http://www.ieee802.org/PNP/2010-07/IEEE\\_802\\_LMSC\\_OM\\_approved\\_100716.pdf](http://www.ieee802.org/PNP/2010-07/IEEE_802_LMSC_OM_approved_100716.pdf)
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Working Group (WG) Policies and Procedures**  
[http://www.ieee802.org/PNP/2010-07/IEEE\\_802\\_LMSC\\_WG\\_PandP\\_approved\\_100716.pdf](http://www.ieee802.org/PNP/2010-07/IEEE_802_LMSC_WG_PandP_approved_100716.pdf)
- **IEEE 802.3 Working Group Operating Rules**  
[http://ieee802.org/3/rules/P802\\_3\\_rules.pdf](http://ieee802.org/3/rules/P802_3_rules.pdf)



# Guidelines for IEEE-SA Meetings

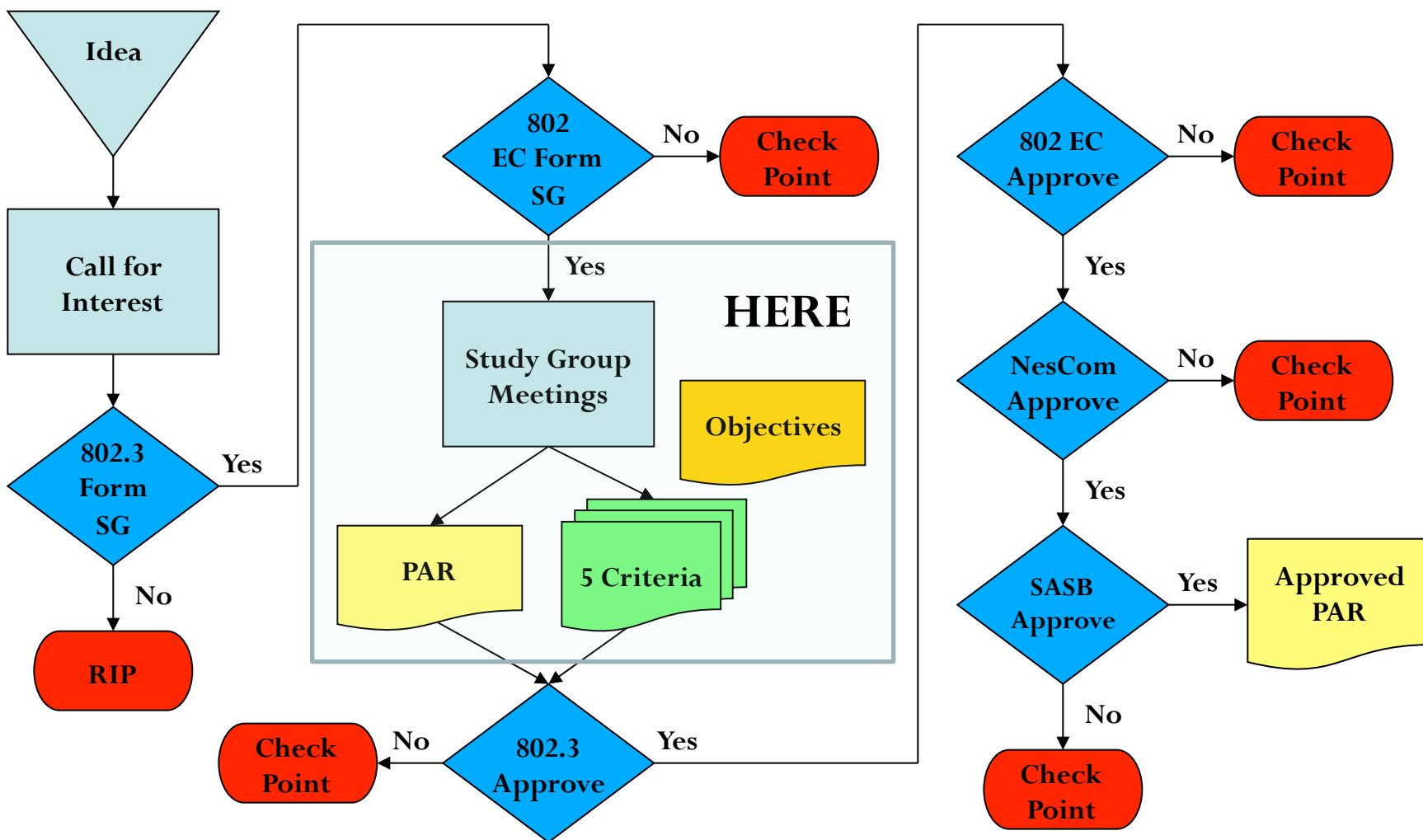
- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
- **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
- **Don't discuss specific license rates, terms, or conditions.**
  - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
    - Technical considerations remain primary focus
- **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
- **Don't discuss the status or substance of ongoing or threatened litigation.**
- **Don't be silent if inappropriate topics are discussed... do formally object.**

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If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at [patcom@ieee.org](mailto:patcom@ieee.org) or visit <http://standards.ieee.org/about/sasb/patcom/index.html>

See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and “Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association’s Antitrust and Competition Policy” for more details.

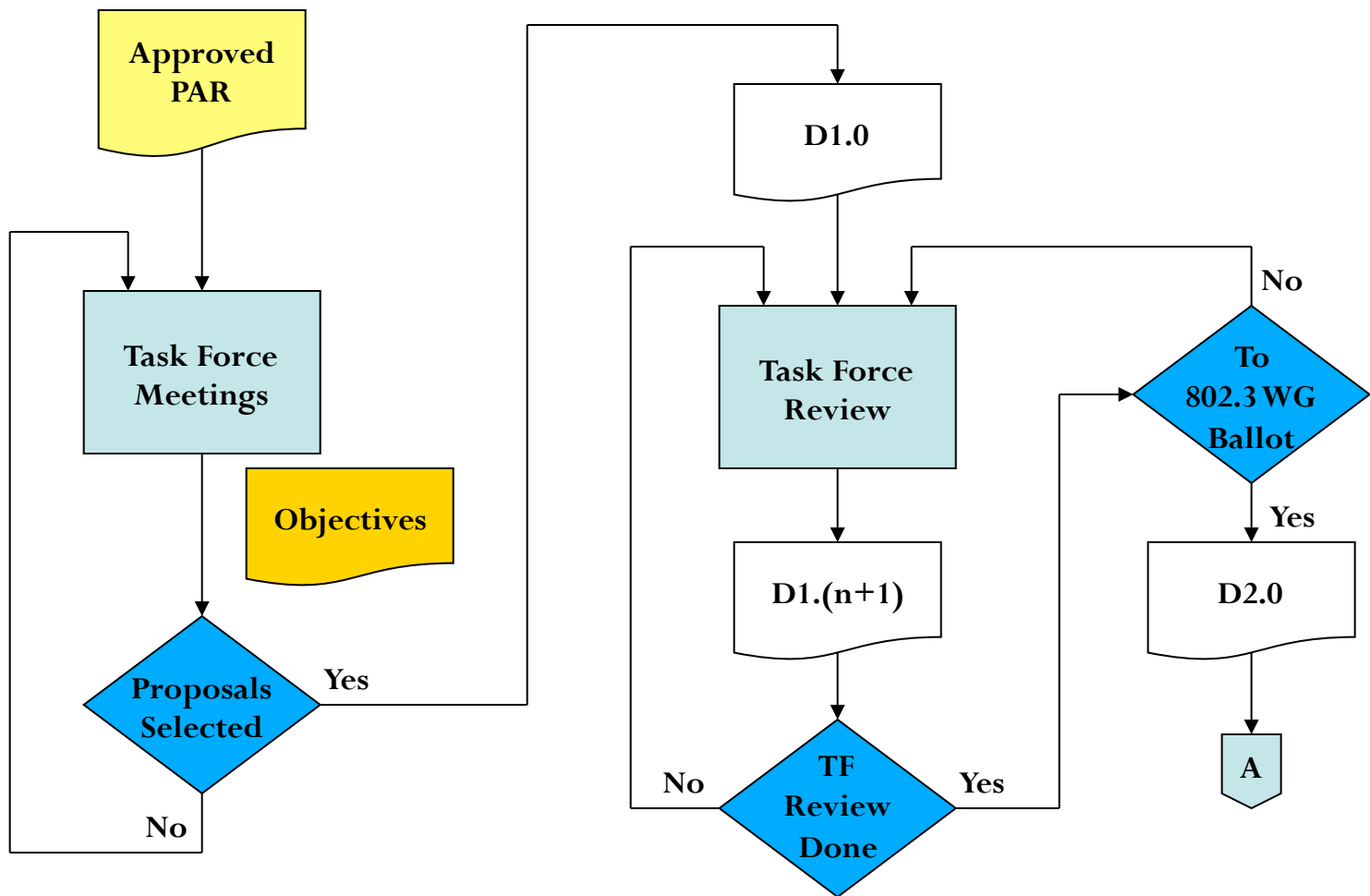
This slide set is available  
at <https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.ppt>

# Overview of IEEE 802.3 Standards Process (1/5)- Study Group Phase

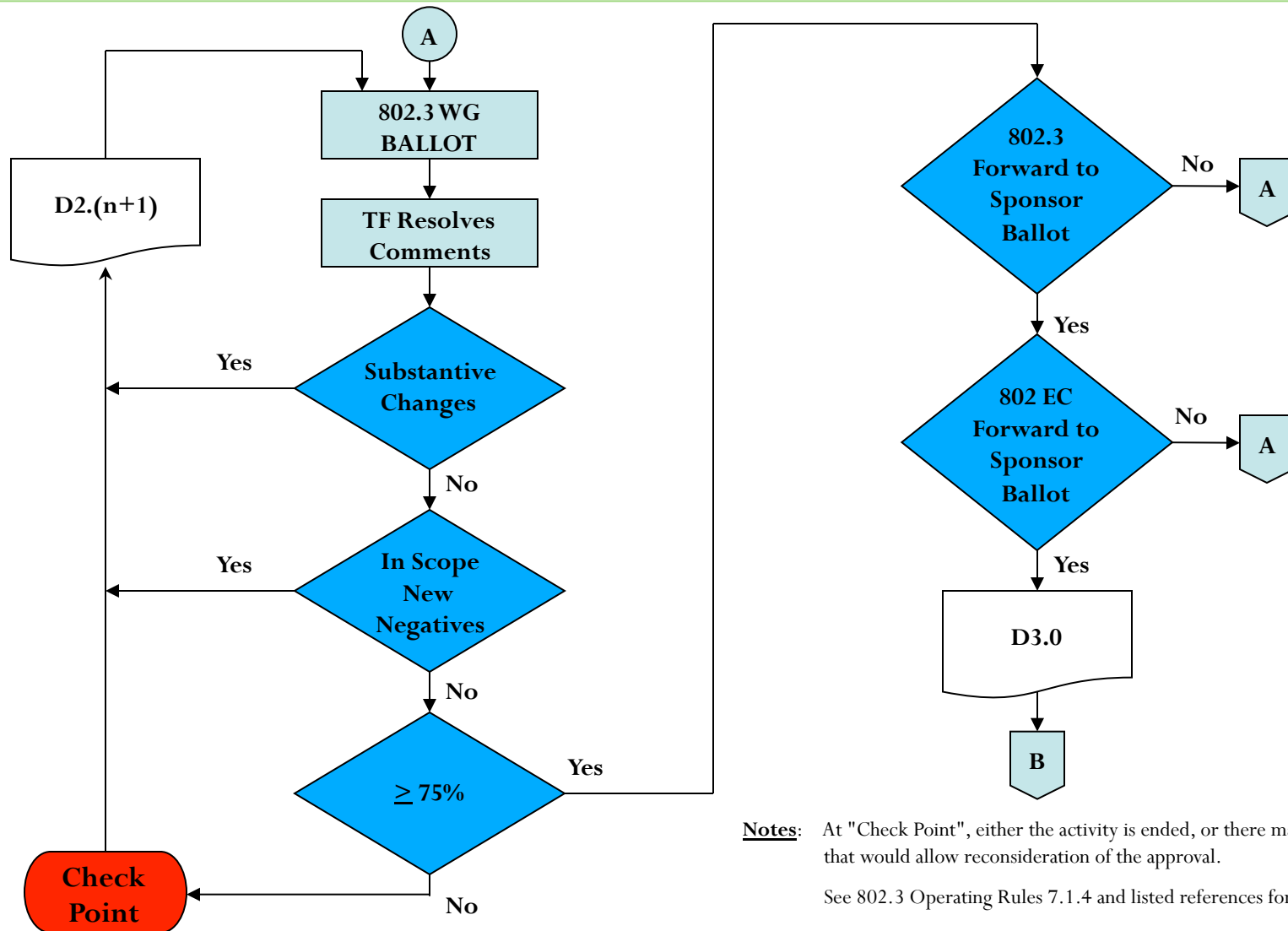


Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

# Overview of IEEE 802.3 Standards Process (2/5) – Task Force Comment Phase

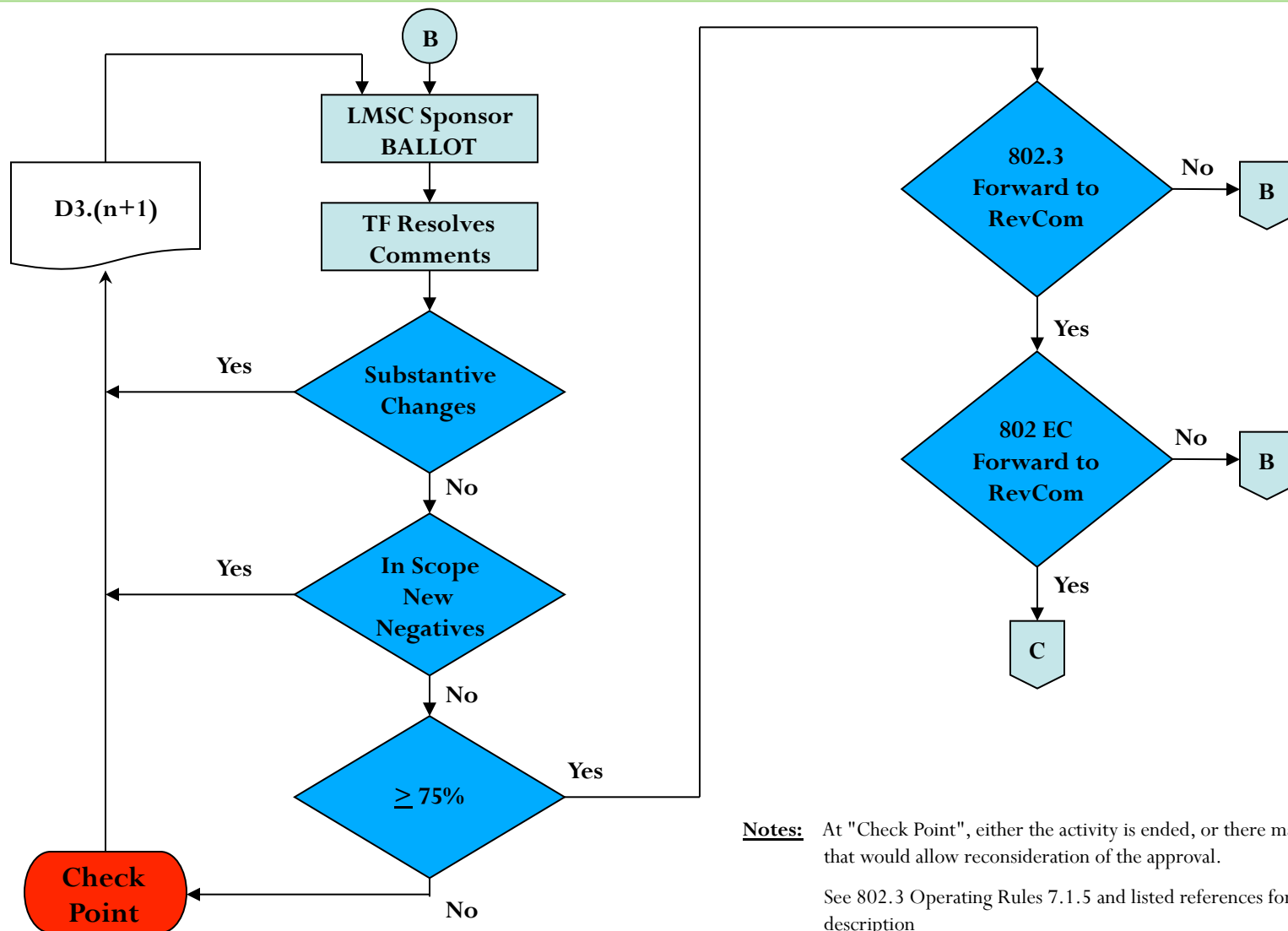


# Overview of IEEE 802.3 Standards Process (3/5) – Working Group Ballot Phase



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.  
See 802.3 Operating Rules 7.1.4 and listed references for complete description

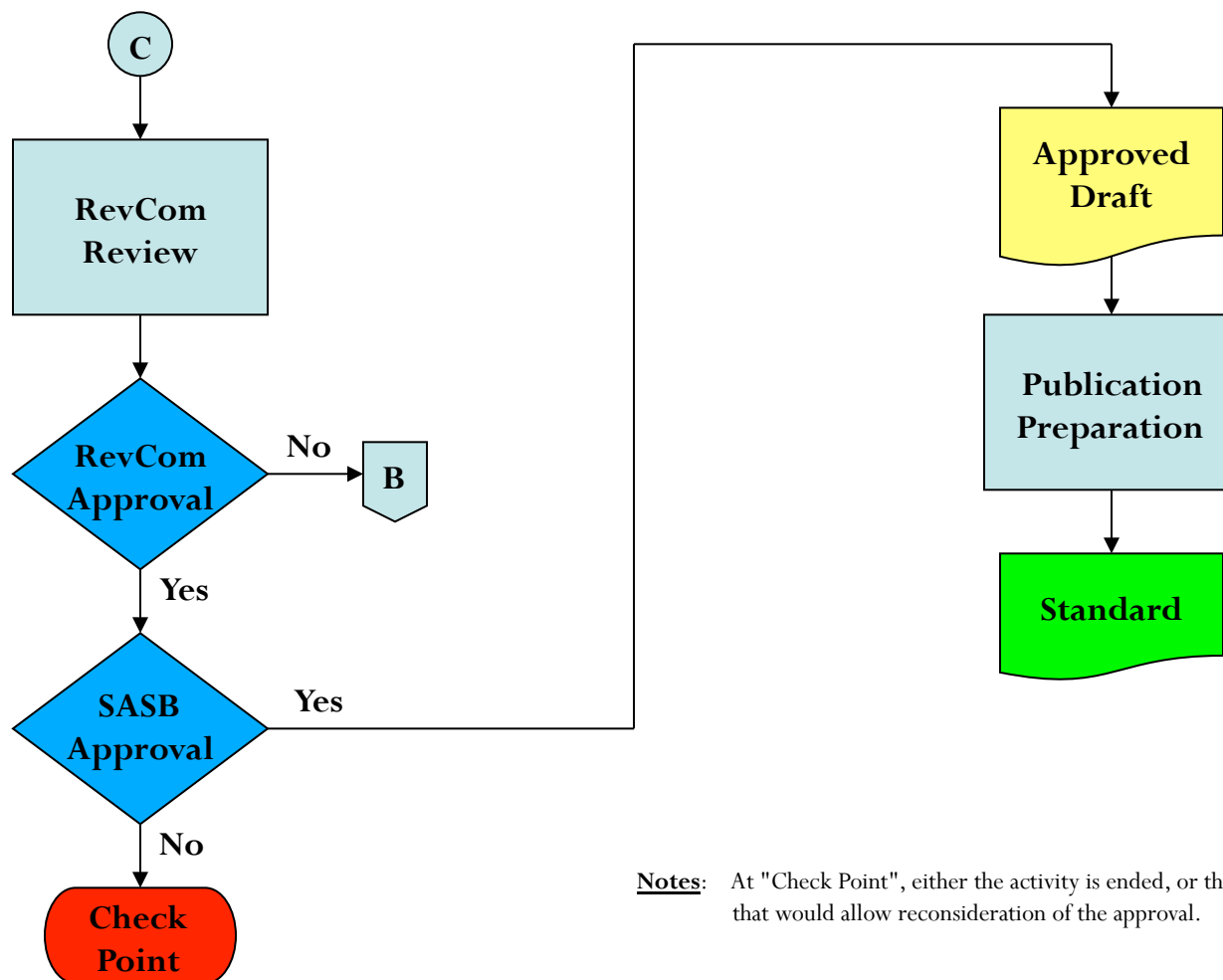
# Overview of IEEE 802.3 Standards Process (4/5)- Sponsor Ballot Phase



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

See 802.3 Operating Rules 7.1.5 and listed references for complete description

# Overview of IEEE 802.3 Standards Process (5/5) – Final Approvals / Standard Release



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

# The Study Group

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- Normal function is to draft a complete PAR and Five Criteria Response
- Provide a plenary week tutorial to the LMSC <if appropriate>.
- Gain approval at the WG 802.3, 802 SEC, IEEE NesCom and IEEE-SA Standards 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
- Consensus (>75%) required to move forward
  
- Not a goal – choosing a solution.

# Request for Formation of Study Group (as per July 2011 Plenary Motion)

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Move the IEEE 802.3 Working Group  
authorizes the formation of a study group  
for “***Next Generation 100 Gigabit Optical  
Ethernet***”



# Development of Objectives

## Example # 1 – IEEE P802.3ba Objectives

- Support full-duplex operation only
- Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
- Preserve minimum and maximum FrameSize of current 802.3 standard
- Support a BER better than or equal to  $10^{-12}$  at the MAC/PLS service interface
- Provide appropriate support for OTN
- Support a MAC data rate of 40 Gb/s
- Provide Physical Layer specifications which support 40 Gb/s operation over:
  - at least 10km on SMF
  - at least 100m on OM3 MMF
  - at least 7m over a copper cable assembly
  - at least 1m over a backplane
- Support a MAC data rate of 100 Gb/s
- Provide Physical Layer specifications which support 100 Gb/s operation over:
  - at least 40km on SMF
  - at least 10km on SMF
  - at least 100m on OM3 MMF
  - at least 7m over a copper cable assembly

# Development of Objectives

## Example # 2 – IEEE P802.3bg Objectives

- Preserve the IEEE 802.3 / Ethernet frame format utilizing the IEEE 802.3 MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support a BER better than or equal to  $10^{-12}$  at the MAC/PLS service interface
- Support a MAC data rate of 40 Gb/s
- Use the 40GBASE-R PCS and PMA
- Use only existing electrical and logical interfaces from IEEE Std 802.3 as modified by IEEE P802.3ba
- Provide Physical Layer specification which support 40 Gb/s operation over at least 2 km on SMF.
- Provide optical compatibility with existing carrier 40Gb/s client interfaces (OTU3/STM-256/OC-768/40G POS).

# Development of Objectives

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## Example # 3 – IEEE P802.3bj Objectives

- Support full-duplex operation only
- Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
- Preserve minimum and maximum FrameSize of current 802.3 standard
- Support a BER of better than or equal to  $10^{-12}$  at the MAC/PLS service interface
- Define a 4-lane 100 Gb/s backplane PHY for operation over links consistent with copper traces on “improved FR-4” (as defined by IEEE P802.3ap or better materials to be defined by the Task Force) with lengths up to at least 1m.
- Define a 4-lane 100 Gb/s PHY for operation over links consistent with copper twin-axial cables with lengths up to at least 5m.

# Project Documentation

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- PAR
  - Title – What are we calling this project?
  - Scope – What is the focus of the project?
  - Purpose – Why do we want to do this?
- 5 Criteria
  - Broad Market Potential
  - Compatibility with IEEE Std. 802.3
  - Distinct Identity
  - Technical Feasibility
  - Economic Feasibility

# Liaisons and Communications

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- **Joint P802.3bj/100G Optical SG Joint Session**
  - Co-Located Interim with P802.3bj held Mar 12
- **OIF**
  - Ongoing communications between OIF and IEEE 802.3 initiated by IEEE P802.3ba project
  - In regards to OIF CEI-25G-LR, CEI-28G-SR, CEI-28G-VSR
  - Currently being operated through 802.3 Working Group and delegated to NG100GOPTX Study Group
- **ITU-T**
  - Proposed liaison activity to ensure alignment.

# Attendance

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- Tutorial Material on attendance tool
  - [http://ieee802.org/3/minutes/nov11/1111\\_imat.pdf](http://ieee802.org/3/minutes/nov11/1111_imat.pdf)
- URL: <https://murphy.events.ieee.org/imat/index>

# Tuesday Presentations

Tuesday 13-March-2012

Note –Times listed are subject to change.

Tuesday		Start Time	8:30	Discussion Time	12
Presentation Time	Duration	Presenter	Affiliation	Title	Filename
8:30	25	Dan Dove	Applied Micro	Introduction, Agenda & Objectives of Meeting	dove_02_0312_NG100GOPTX.pdf
8:55	15	Jonathan King	Finisar	100G Next Gen Optics MMF ad hoc meetings review	king_01_0312_NG100GOPTX
9:10	15	Pete Anslow	Ciena	Next Generation 100G SMF Ad Hoc report	anslow_01_0312_NG100GOPTX
9:25	20	Pete Anslow	Ciena	Objectives for Next Generation 100GbE Optical Interfaces	anslow_02_0312_NG100GOPTX
9:57	15	Mike Bennett, Wael Diab	Lawrence Berkeley National Laboratory Broadcom	Thoughts on Possible Energy Savings for 100G Next Generation Optical Ethernet	bennett_01_0312_NG100GOPTX
10:24	15	BREAK			
10:39	20	Piers Dawe Brad Booth Oren Sela	IPtronics Dell Mellanox	Low power MMF objective for High Performance Computing and End-of-Row applications	dawe_01_0312_NG100GOPTX
11:11	20	Ali Ghiasi, Fred Tang, Sudeep Bhoja	Broadcom	Measurements Results of 25.78 GBd VCSEL Over OM3 with and without Equalization	ghiasi_01_0312_NG100GOPTX
11:43	20	Ali Ghiasi, Fred Tang, Sudeep Bhoja	Broadcom	Simulations and Spreadsheet Link Model of 25.78G VCSEL Link	ghiasi_02_0312_NG100GOPTX
12:15	60	Lunch			
13:15	15	Andre Szczepanek	Inphi	Meeting MMF 5 Criteria	szczepanek_01_0312_NG100GOPTX
13:42	20	John Petrilla	Avago	100G MMF Reach Objective	petrilla_02_0312_NG100GOPTX
14:14	10	Jonathan King	Finisar	Potential MMF objectives and the 5 criteria	king_03_0312_NG100GOPTX
14:36	15	BREAK			
14:51	10	John Abbott	Corning	MMF Objectives and Bit Rate/Reach Gaps	abbott_01_0312_NG100GOPTX
15:13	15	Scott Kipp	Brocade	Low Power 100GbE Modules	kipp_01_0312_NG100GOPTX
15:40	15	Paul Kolesar	CommsScope	Setting Optimal Reach Objectives, Indications from Total Cost Analysis Over Time	kolesar_01_0312_NG100GOPTX
16:07	20	Mark Nowell, Matt Traverso, Kapil Shrikhande	Cisco Cisco Dell	Data Center architecture trends and their impact on PMD requirements	nowell_01_0312_NG100GOPTX
16:39	15	Parantap Lahiri, Darren Loher, Dan Dove	Microsoft Applied Micro	100GE Fiber and Optics Options	lahiri_01_0312_NG100GOPTX
17:06	0	RECESS Till 8am			

# Wednesday Presentations

Wednesday 14-March-2012

Note –Times listed are subject to change.

Wednesday		Start Time	8:30	Discussion Time 12		
Presentation Time	Duration	Presenter	Affiliation	Title	Filename	
8:30	10	Dan Dove	Applied Micro	Introductions, Review SG Operation		
8:40	15	Chris Cole	Finisar	100G PAM PMD Observations	cole_01_0312_NG100GOPTX	
9:07	20	John Heaton Beck Mason	JDSU JDSU	Bandwidth Requirements for PAM	heaton_01_0312_NG100GOPTX	
9:39	20	Jonathan King	Finisar	PAM-N, coherent interference and return loss specs	king_02_0312_NG100GOPTX	
10:11	15	BREAK				
10:26	20	Tom Palkert	Luxtera	Silicon Photonics 101	palkert_03_0312_NG100GOPTX	
10:58	30	Bipin D. Dama, Mark Webster, Kalpendu Shastri, David Piede, Vipul Bhatt, Ray Nering	Lightwire	High Speed NRZ& PAM Optical Modulation Using CMOS Photonics	dama_01_0312_NG100GOPTX	
11:40	20	Ali Ghiasi	Broadcom	Multipath Interference Penalty	ghiasi_03_0312_NG100GOPTX	
12:12	60	Lunch				
13:12	15	Taichi Kogure Kiyu Hiramoto Jon Anderson	Opnext	Analysis of Phase-to-Intensity Noise by multiple reflections in 100G-PAM SMF links	kogure_01_0312_NG100GOPTX	
13:39	20	Gary Nicholl Chris Fludger	Cisco Cisco	Update on technical feasibility for PAM modulation	nicholl_01_0312_NG100GOPTX	
14:11	15	Andre Szczepanek	Inphi	PAM8 Gearbox Issues	szczepanek_02_0312_NG100GOPTX	
14:38	15	BREAK				
14:53	20	Tom Palkert	Luxtera	PAM simulation	palkert_05_0312_NG100GOPTX	
15:25	20	Yurii Vlasov	IBM	Considerations for WDM NRZ links: CMOS-Integrated Silicon Photonics case	vlasov_01_0312_NG100GOPTX	
15:57	20	Tom Palkert	Luxtera	Proposed 100G PSM4 relative costs	palkert_01_0312_NG100GOPTX	
16:29	15	John Petrilla	Avago	Intermediate SMF reach option for 100GE	petrilla_01_0312_NG100GOPTX	
16:56	20	Chris Cole	Finisar	100G Parallel PMD Observations	cole_02_0312_NG100GOPTX	
17:28	0	RECESS Till 8am				



# Thursday Presentations

Thursday 15-March-2012

Note –Times listed are subject to change.

<b>Thursday</b>		Start Time	8:30	Discussion Time 15	
Presentation Time	Duration	Presenter	Affiliation	Title	Filename
8:30	10	Dan Dove	Applied Micro	Introductions, Review SG Operation	
8:40	20	Tom Palkert	Luxtera	Broad Market Support of PSM4	palkert_02_0312_NG100GOPTX
9:15	15	Francois Tremblay	Genum	PAM 16 implementation challenges (subject to SG Approval)	tremblay_01_0312_NG100GOPTX
9:45	15	BREAK			
10:00	100	Study Group		Motion Madness	
11:40	20	Dan Dove	Applied Micro	Wrap-Up & Adjourn at noon	

# Future Meetings

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- See: <http://www.ieee802.org/3/interims/index.html>
- **Monday, May 14<sup>th</sup> through Thursday, May 17<sup>th</sup>, 2012**
  - **IEEE P802.3 interim session**  
**All IEEE 802.3 Task Force and Study Groups will meet**
  - **Hosted by Cisco**
    - Hilton Minneapolis
    - Minneapolis, MN
    - USA
- **Monday, July 16<sup>th</sup> through Thursday, July 19<sup>th</sup>, 2012**
  - **IEEE 802 plenary**
  - **Grand Hyatt Manchester**
  - **San Diego, CA**
- Anyone interested in hosting a meeting contact Steve Carlson.

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# Thank You!