Agenda and General Information

IEEE 802.3

50 Gb/s Ethernet over a single lane

And Next Generation 100 Gb/s and 200 Gb/s Ethernet

200 Gb/s Ethernet Single Mode Fiber

Joint Study Group Meeting
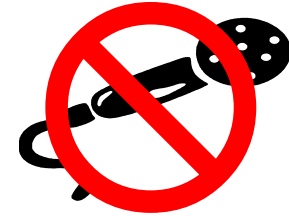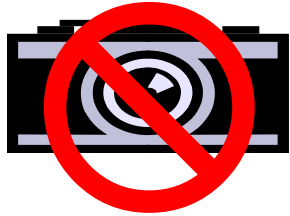
Mark Nowell, Cisco

Agenda

- Welcome and Introductions
- Approve Agenda
- Reflector and Web
- Ground Rules
- IEEE
  - Structure, Bylaws and Rules
  - IEEE Guidelines for Meetings
  - IEEE Standards Process
- Liaisons and Communications
- Crash course on Study Groups
- Goals for this meeting
- Big Ticket Items
- Meeting Schedule
- Motions and Closing Business
- Future Meetings

Study Groups' organization

- Chair: Mark Nowell, Cisco
- Recording Secretary: Kent Lusted, Intel
- Ad hoc chair: Kent Lusted, Intel

Task Force Decorum

- Press (i.e., anyone reporting publicly on this meeting) are to announce their presence (December 2013 IEEE-SA Standards Board Ops Manual 5.3.3.5)
- Photography or recording by permission only (December 2013 IEEE-SA Standards Board Ops Manual 5.3.3.4)
- Cell phone ringers off
- 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

Reflector and Web

- To subscribe to the Study Groups' reflector, send an email to:

  ListServ@ieee.org

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

  subscribe **stds-802-3-50G** *<yourfirstname> <yourlastname>*

  end

- Send Study Group reflector messages to:

  stds-802-3-50G@listserv.ieee.org

- Study Group's web page URLs:

  http://www.ieee802.org/3/50G/index.html
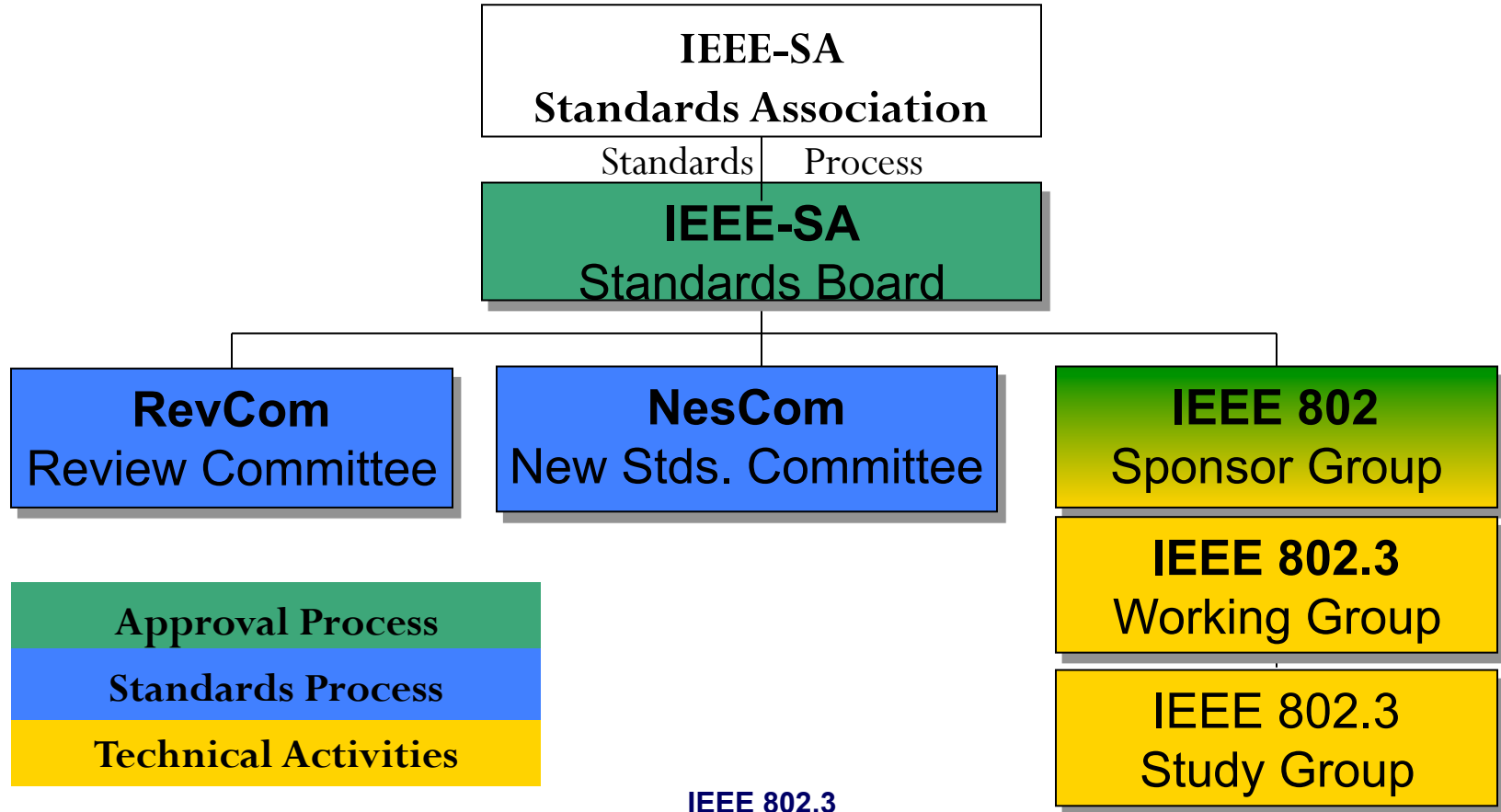 **http://www.ieee802.org/3/NGOATH/index.html**

Ground Rules

- 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
- NO product pitches
- NO corporate pitches
- NO prices!!!
  - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

Attendance

- Tutorial Material on attendance tool
  - http://ieee802.org/3/minutes/attendance_procedures.pdf

- Access details
  - URL: http://imat.ieee.org/
  - Use your imat login
    - (must be on meeting SSID – no VPN)

IEEE Structure

IEEE-SA
Standards Association

Standards | Process

IEEE-SA
Standards Board

RevCom
Review Committee

NesCom
New Stds. Committee

IEEE 802
Sponsor Group

IEEE 802.3
Working Group

IEEE 802.3
Study Group

Approval Process

Standards Process

Technical Activities

IEEE 802.3

Important Bylaws and Rules

- **IEEE-SA Operations Manual**
  http://standards.ieee.org/develop/policies/sa_opman/

- **IEEE-SA Standards Board Bylaws**
  http://standards.ieee.org/develop/policies/bylaws/

- **IEEE-SA Standards Board Operations Manual**
  http://standards.ieee.org/develop/policies/opman/

- **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/devdocs.shtml

- **IEEE 802 LAN/MAN Standards Committee (LMSC) Working Group (WG) Policies and Procedures**
  http://www.ieee802.org/devdocs.shtml

- **IEEE 802.3 Working Group Operating Rules**
  http://ieee802.org/3/rules/P802_3_rules.pdf

IEEE 802.3

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.**

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit http://standards.ieee.org/about/sasb/patcom/index.html
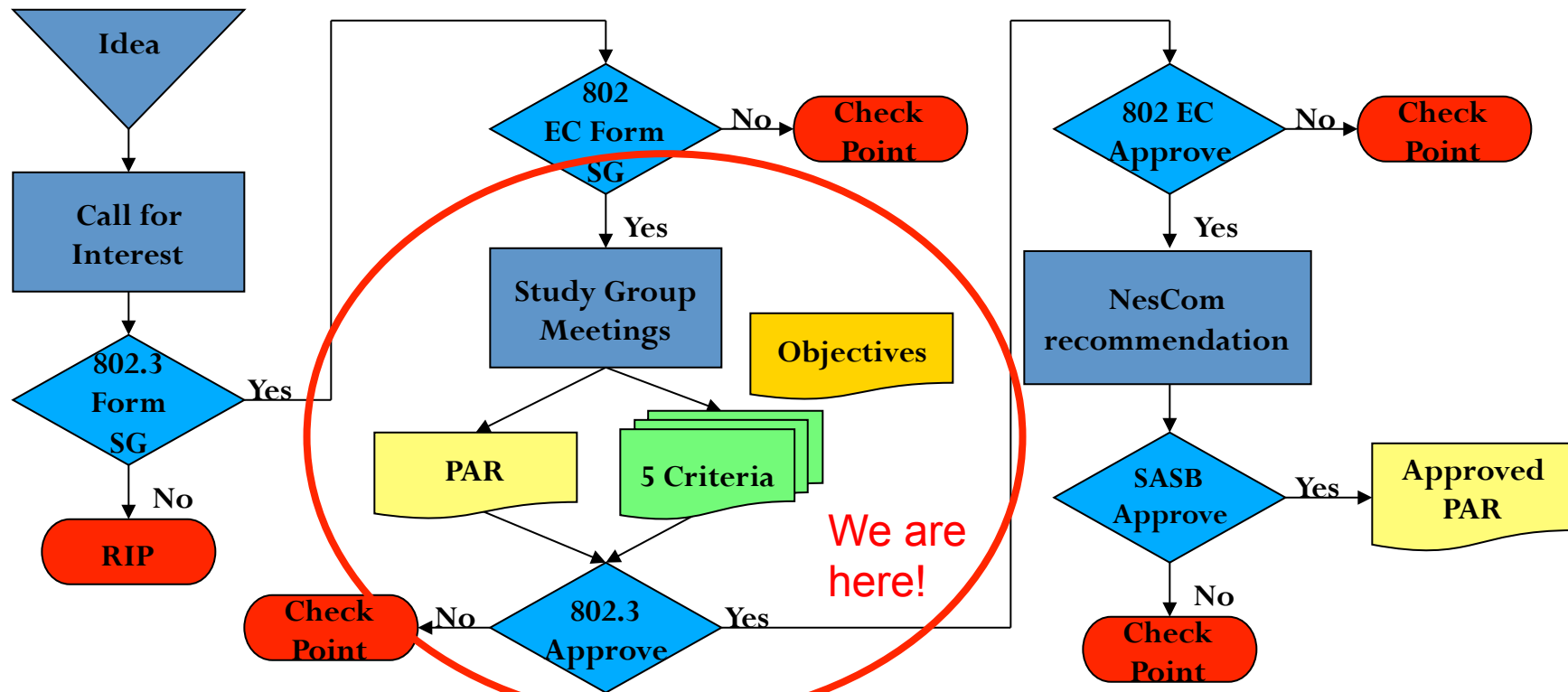
See IEEE-SA Standards Board Operations Manual, clause 5.3.10 and "Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy" for more details.

This slide set is available

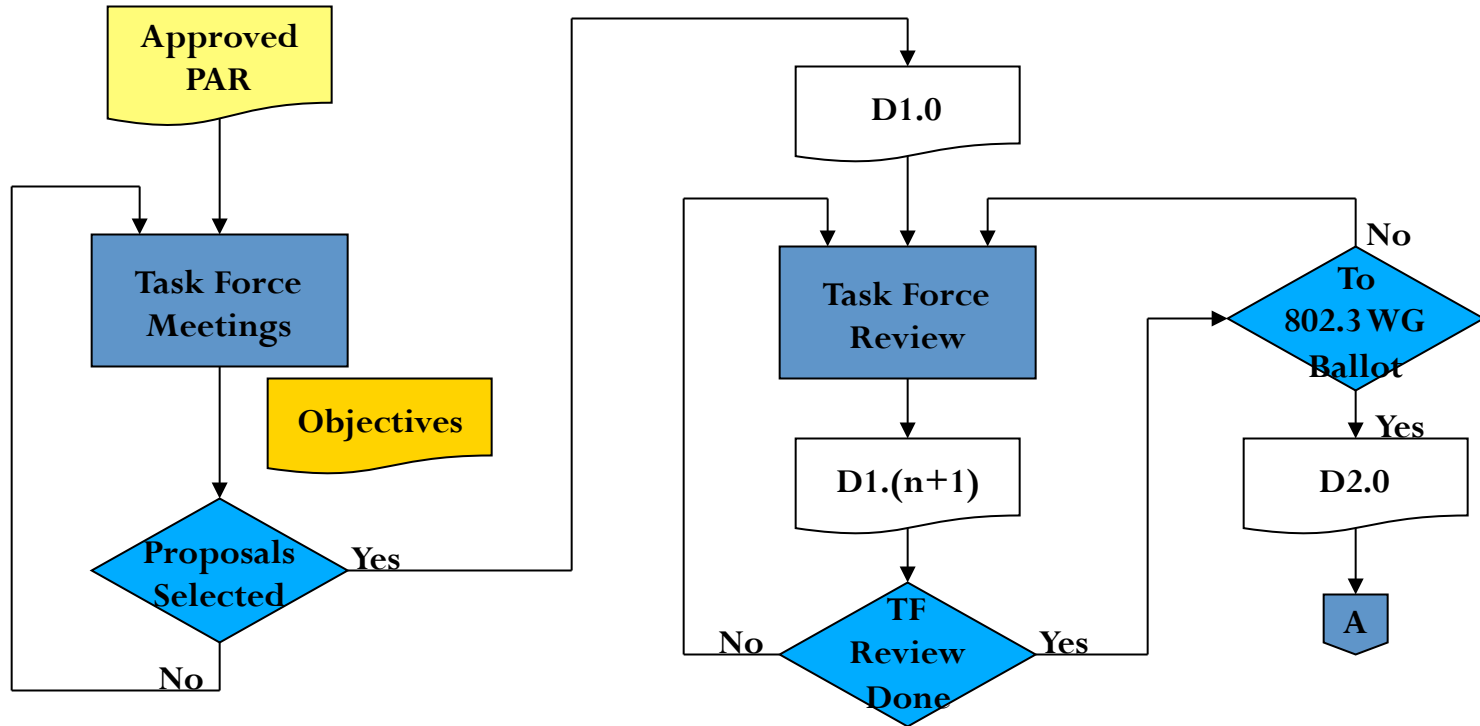at https://development.standards.ieee.org/myproject/Public/mytools/mob/preparslides.ppt

March 2015

IEEE-SA Standards Board Patent Committee

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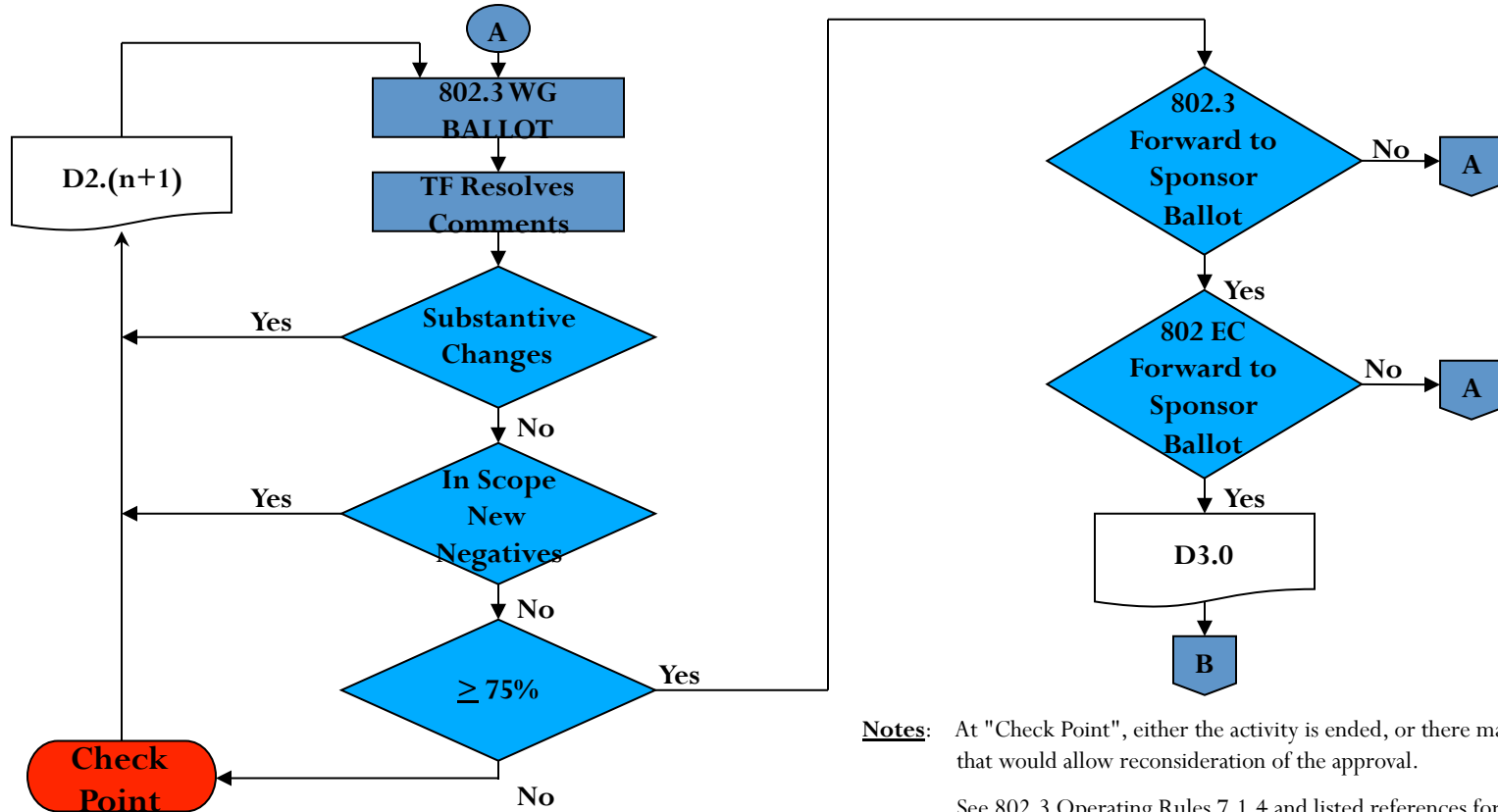

Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

IEEE 802.3

Overview of IEEE 802.3 Standards Process (2/5) – Task Force Comment Phase
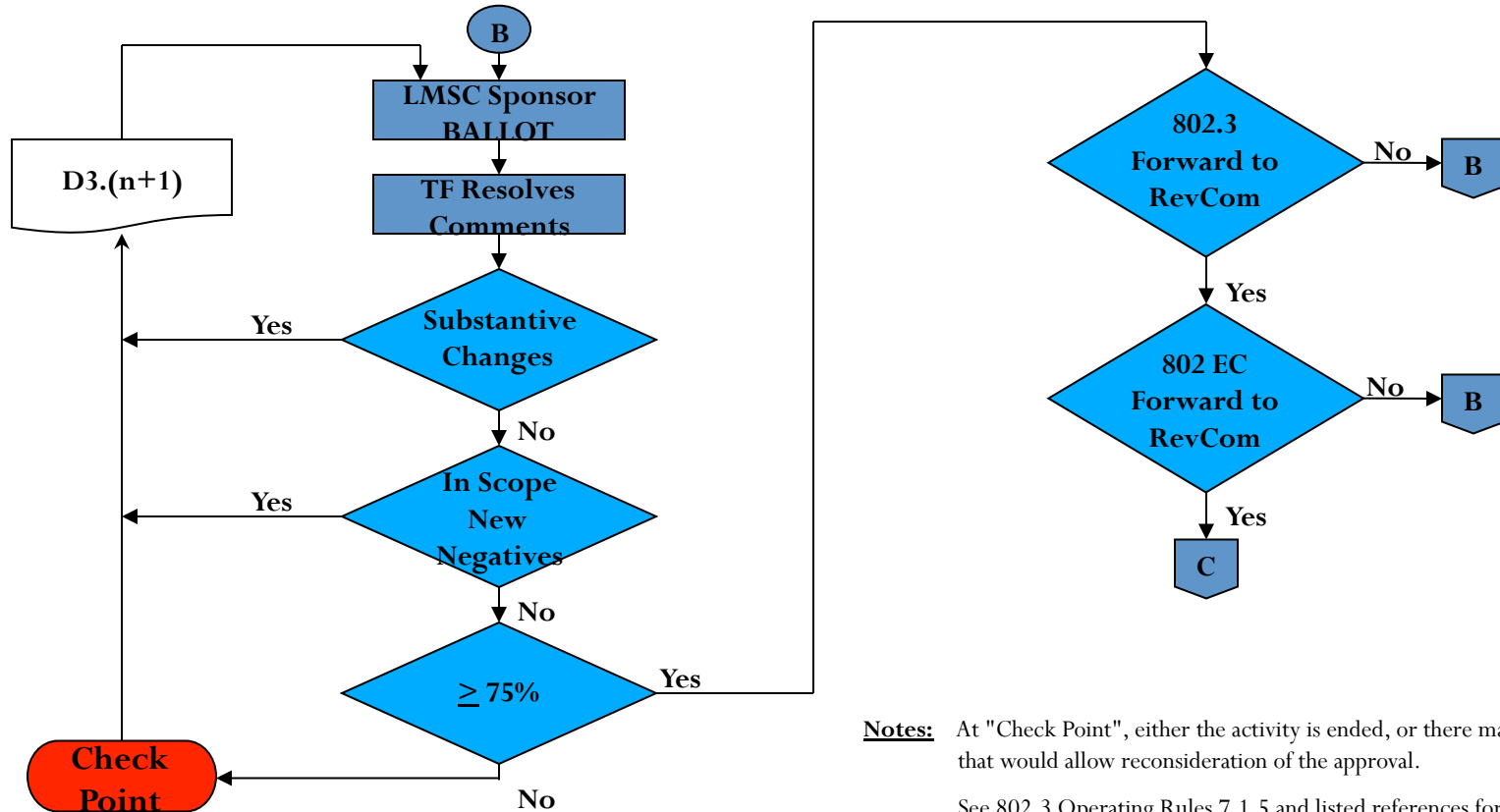
Overview of IEEE 802.3 Standards Process (3/5) – Working Group Ballot Phase

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

B

LMSC Sponsor BALLOT

D3.(n+1)

TF Resolves Comments

Substantive Changes — Yes →

No

In Scope New Negatives — Yes →

No

≥ 75% — Yes →

No

Check Point

802.3 Forward to RevCom — No → **B**

Yes

802 EC Forward to RevCom — No → **B**

Yes

C

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

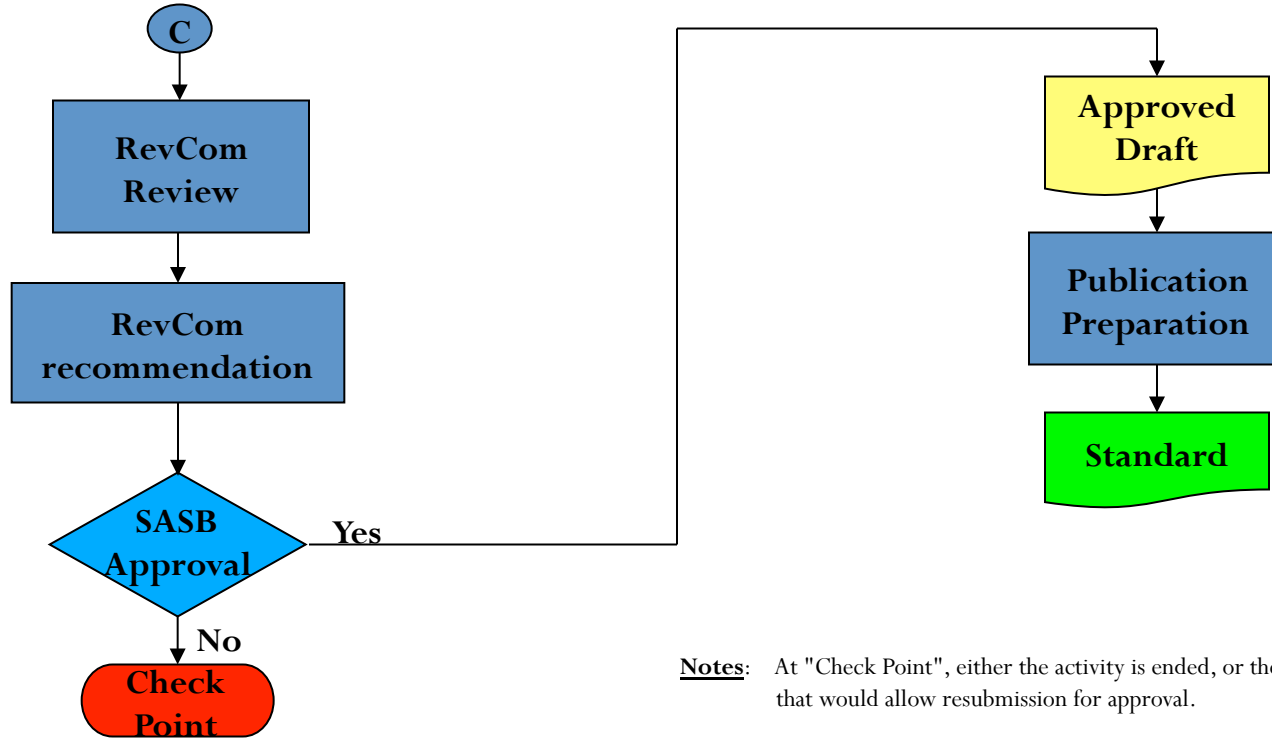See 802.3 Operating Rules 7.1.5 and listed references for complete description

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

C

RevCom Review

RevCom recommendation

SASB Approval — **Yes** →

No

Check Point
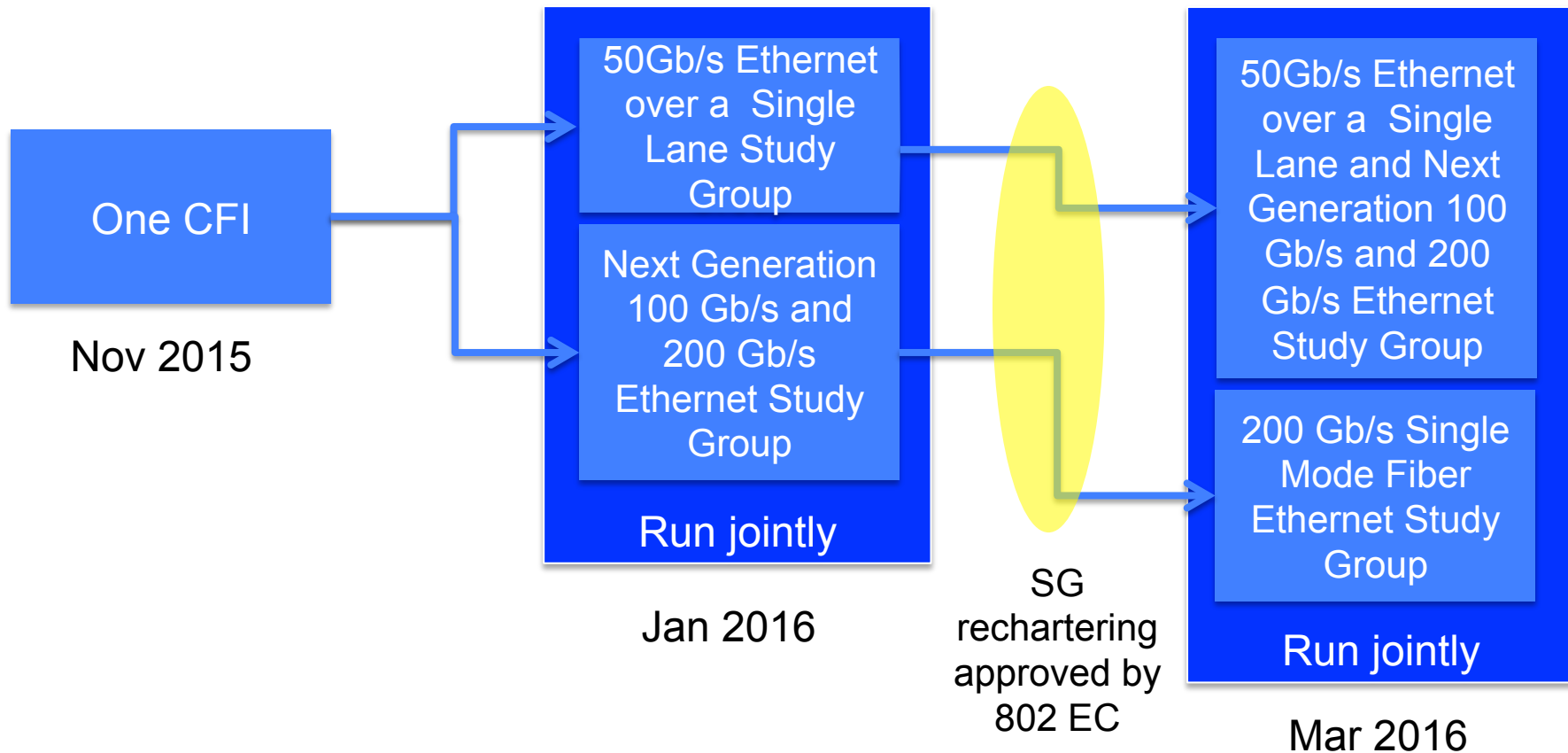
Approved Draft

Publication Preparation

Standard

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

Liaisons and Communications

- none

Procedural changes since CFI

One CFI

Nov 2015

50Gb/s Ethernet over a Single Lane Study Group

Next Generation 100 Gb/s and 200 Gb/s Ethernet Study Group

Run jointly

Jan 2016

SG rechartering approved by 802 EC

50Gb/s Ethernet over a Single Lane and Next Generation 100 Gb/s and 200 Gb/s Ethernet Study Group

200 Gb/s Single Mode Fiber Ethernet Study Group

Run jointly

Mar 2016

IEEE 802.3

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Documents approved by SG in January

50G/NGOATH Ethernet SG

- Objectives
  - http://www.ieee802.org/3/50G/public/objectives_50G_NGOATH_01a_0116.pdf

- CSD
  - http://www.ieee802.org/3/50G/public/CSD_50G_NGOATH_01_0116.pdf

- PAR
  - http://www.ieee802.org/3/50G/public/50G_NGOATH_PAR_0116.pdf

200 GbE SMF SG

- Objectives
  - http://www.ieee802.org/3/50G/public/objectives_50G_NGOATH_01a_0116.pdf

- P802.3bs CSD modifications
  - http://www.ieee802.org/3/50G/public/NGAOTH_802d3bs_CSD_modification_0116.pdf

- P802.3bs PAR modifications
  - http://www.ieee802.org/3/50G/public/NGAOTH_802d3bs_PAR_modification_0116.pdf

Adopted Objectives 1 of 2

- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support optional Energy-Efficient Ethernet operation
- Provide appropriate support for OTN
- Support a MAC data rate of 50 Gb/s and 100 Gb/s
- Support a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent) for 50 Gb/s and 100 Gb/s operation
- Support a MAC data rate of 200 Gb/s
- Support a BER of better than or equal to 10^{-13} at the MAC/PLS service interface (or the frame loss ratio equivalent) for 200 Gb/s operation

IEEE 802.3

Adopted Objectives 2 of 2

- Define single-lane 50 Gb/s PHYs for operation over
  - copper twinaxial cables.
  - printed circuit board backplane.
  - MMF with lengths up to at least 100m
  - SMF with lengths up to at least 2km
  - SMF with lengths up to at least 10km
- Define 200 Gb/s PHYs for operation over
  - copper twinaxial cables.
  - printed circuit board backplane.
  - MMF with lengths up to at least 100m
- Provide physical layer specifications which support 200 Gb/s operation over:
  - At least 2km of SMF
  - At least 10km of SMF
- Define a two-lane 100 Gb/s PHY for operation over copper twin-axial cables.
- Define a two-lane 100 Gb/s PHY for operation over a printed circuit board backplane.
- Define a two-fiber 100 Gb/s PHY for operation over MMF with lengths up to at least 100m

Note: Objectives in red have been proposed to be handled by the P802.3bs Task Force (400 Gb/s Ethernet).

IEEE 802.3

Crash course on Study Group goals

For an excellent overviews of the Study Group activities please refer to:

Overview of the Process – Wael Diab
http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf

Review of the 5 Criteria – Howard Frazier
http://www.ieee802.org/3/400GSG/public/13_05/frazier_400_01_0513.pdf

Guidelines for Project Objectives – Howard Frazier
http://www.ieee802.org/3/400GSG/public/13_05/frazier_400_02_0513.pdf

The following slides are taken from these excellent presentations

What does the Study Group produce?

- 5 Criteria
  - Broad Market Potential, Compatibility, Distinct Identity, Technical Feasibility, Economic Feasibility
- PAR
  - Your "contract" with the IEEE-SA and "authorization" to develop a standard
  - Broadly focuses on what the standard is that group will work on including scope, purpose, broad timeline (not a project plan)
  - Good idea to look at examples of prior projects
- Objectives
  - Your "contract" with 802.3
  - At a high level it is what the group will work on (and what it will not)
  - Somewhat more specific than the scope in the PAR

From:
Overview of the Process – Wael Diab
http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf

Final Thoughts

- Goal is to get to a Task Force
- To do that, focus on
  - Producing the objectives
  - Producing the PAR
  - Producing the 5 criteria
  - Work on building consensus
  - Leave the rest of it to the Task Force phase
    - Plenty of time to work on solutions
    - Plenty of time to debate the text of the solutions

From:
Overview of the Process – Wael Diab
http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf

Goals for the WG meeting (Thurs)

- Review adopted documents

- For each SG:

    - Request Approval for Objectives, CSDs, PAR (modification)

Goals for the SG meeting

- Review/Refine/Complete/Modify the set of objectives for the Study Groups

- Review feedback from other WGs on our documentation

- Review/Refine/Complete/Modify responses for the CSD (Criteria for Standards Development) as necessary

- Review/Refine/Complete/Modify Develop PAR and PAR modifications

- Review presentations substantiating the above

Goals for the SG meeting (2)

50G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
100m MMF	y	y	y	
2km SMF	y	y	y	
10km SMF	y	y	y	

100G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
2 fiber 100m MMF	y	~	n	

200G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
100m MMF	y	y	~	
2km SMF	y	y	~	
10km SMF	y	y	~	

Other potential objectives	TF	EF	BMP	Comments
200G 500m SMF	n	n	n	Needs proposal
Low latency	n	n	n	Needs proposal
100G Compatibility	n	n	n	Needs proposal

50G and NGOATH Study Groups Ad Hoc – 3 February 2016

From:
lusted_020316_50GE_NGOATH
_adhoc.pdf

Initial review of the gaps after the January Interim

Some good progress in ad hoc meetings

Goals for the SG meeting (3)

Focus areas discussions for this week

- Copper objectives – reach/loss

- New Objectives?

  - 200G SMF 500m

  - Low latency

- Future (?) objectives discussions

  - Backwards compatibility

- BMP discussions

Meeting Map

Meeting Schedule

Time	Presenter	Affiliation	Title	File Name	Duration
8:00 AM	Mark Nowell	Cisco	Agenda and General Information	agenda_50GE_NGOATH_01_0316.pdf	1:00
9:00 AM	Kent Lusted	Intel	50 Gb/s and NGOATH Ethernet Ad-hoc report	lusted_50GE_NGOATH_02_0316.pdf	0:10
9:10 AM	Kent Lusted	Intel	50G/NGOATH Nomenclature	lusted_50GE_NGOATH_01_0316.pdf	0:15
9:25 AM	Brad Booth	Microsoft	50G and 100G Use Cases	booth_50GE_NGOATH_01_0316.pdf	0:20
9:45 AM	Gary Nicholl	Cisco	Thoughts on 200GbE	nicholl_50GE_NGOATH_01_0316.pdf	0:20
10:05 AM	Break				0:15
10:20 AM	Upen Reddi Kareti	Cisco	Considerations for 50 Gbps Backplane and Direct attached Cable Channels	kareti_50GE_NGOATH_01_0316.pdf	0:20
10:40 AM	Rich Mellitz	Intel	30dB Copper Channel: Maximum Loss Consideration	mellitz_50GE_NGOATH_01_0316.pdf	0:15
10:55 AM	Mike Li	Intel	CEI-56G-LR-PAM4 Efforts for IEEE 802.3 50G Backplane	li_50GE_NGOATH_01_0316.pdf	0:20
11:15 AM	Ali Ghiasi	Ghiasi Quantum	Feasibility 50 Gb/s PAM4 on 30 dB channels	ghiasi_50GE_NGOATH_01_0316.pdf	0:20
11:35 AM	Chris Diminico	MC Communications	IEEE 802.3 NGOATH SG Twinaxial Cu Cable Assembly Objective	diminico_50GE_NGOATH_01_0316.pdf	0:20
11:55 AM	Lunch				1:05
1:00 PM	Brian Welch	Luxtera	In Support of a 500m Objective for 200G Ethernet: Part I (Technical and Economic Feasibility)	welch_50GE_NGOATH_02_0316.pdf	0:20
1:20 PM	Brian Welch	Luxtera	In Support of a 500m Objective for 200G Ethernet: Part 2 (Broad Market Potential, Distinct Identity, and Compatibility)	welch_50GE_NGOATH_03_0316.pdf	0:20
1:40 PM	Brian Welch	Luxtera	200G-PSM4: Potential Specifications	welch_50GE_NGOATH_01_0316.pdf	0:15
1:55 PM	Tongtong Wang	Huawei	Multi Lane PCS Proposal for 50G&NGOATH	wang_50GE_NGOATH_01_0316.pdf	0:20
2:15 PM	Ali Ghiasi	Ghiasi Quantum	Supporting optional 50GAUI-2 in the objective	ghiasi_50GE_NGOATH_02_0316.pdf	0:20
2:35 PM	Rob Stone	Broadcom	Backwards Compatibility Objectives for 50G and 100G	stone_50GE_NGOATH_01_0316.pdf	0:20
2:55 PM	Break				0:15
3:10 PM	Review of Objectives, CSD, PARs. Discussions, Straw Polls & Motions				2:20
5:30 PM	Break				

Note –Times listed are subject to change.

Updated versions will be captured with new filename versions

Not all contributed presentations are scheduled. Will depend on comment resolution schedule.

Meeting Schedule

Thursday 17-Mar-16	Time	Presenter	Affiliation	Title	File Name	Duration
	8:00 AM	Mark Nowell	Cisco	Opening		0:10
	8:10 AM	Review of Objectives, CSD, PARs. Discussions, Straw Polls & Motions				1:50
	10:00 AM	Break				0:15
	10:15 AM	Review of Objectives, CSD, PARs. Discussions, Straw Polls & Motions				1:15
	11:30 AM	Adjourn (to be immediately followed by P802.3bs TF meeting)				1:00

Note –Times listed are subject to change.

Updated versions will be captured with new filename versions

Not all contributed presentations are scheduled. Will depend on comment resolution schedule.

Future Meetings & Ad hocs

- Ad-hoc meeting plans
  - Single on-going weekly meetings, all topics (will cycle) – agendas will be published. 2 hr duration.
  - Joint with P802.3by Task Force
- See: http://www.ieee802.org/meeting/index.html
- May 2016 Interim
  - Week of May 23rd, 2016 – Whistler, B.C., Canada
- July 2016 Plenary
  - Week of July 24th, 2016 – San Diego, CA

- Anyone interested in hosting a interim meeting contact me or the IEEE 802.3 Executive Secretary Steve Carlson.

Thank You!