# Agenda and General Information

IEEE 802.3cd

**50 Gb/s, 100 Gb/s and 200 Gb/s Ethernet Task Force**

Mark Nowell, Cisco

San Diego, CA

July 26th-28th, 2016

# Agenda

- Welcome and Introductions
- Approve Agenda
- Approve Minutes
- Reflector and Web
- Ground Rules
- IEEE
  - Structure, Bylaws and Rules
  - Call for Patents
  - IEEE Standards Process
- Liaisons and Communications
- Baselines
- Goals for this meeting
- Meeting Schedule
- Motions and Closing Business
- Future Meetings

# P802.3cd Task Force organization

- Chair: Mark Nowell, Cisco
- Recording Secretary:  Kent Lusted, Intel
- Chief Editor: Matt Brown, APM
- Ad hoc chair: Kent Lusted, Intel

# Task Force Decorum
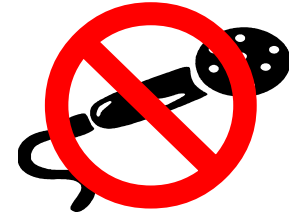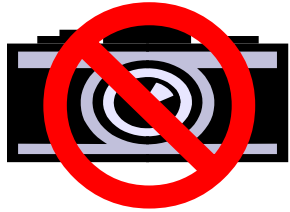


- Press (i.e., anyone reporting publicly on this meeting) are to announce their presence (December 2013 IEEE-SA Standards Board Ops Manual 5.3.3.5)
- Photography or recording by permission only (December 2013 IEEE-SA Standards Board Ops Manual 5.3.3.4)
- Cell phone ringers off
- Wear your badges at all 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 Task Force's 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 Task Force reflector messages to:

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


- Task Force's web page URL:

    **http://www.ieee802.org/3/cd/index.html**

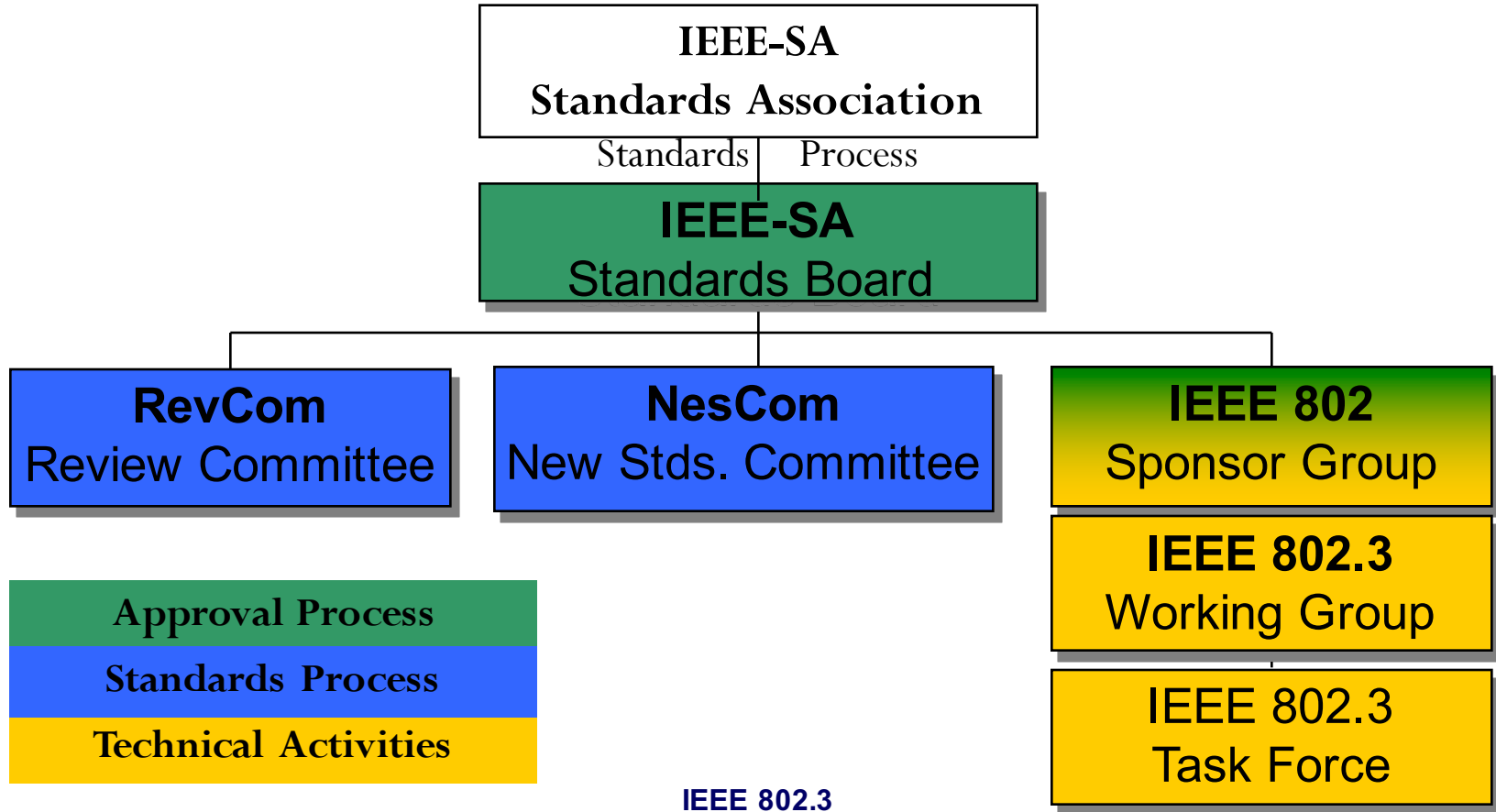# Task Force Private Area

- None yet

# 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
Task Force

**Approval Process**

**Standards Process**

**Technical Activities**

# 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**

# Participants, Patents, and Duty to Inform

**All participants in this meeting have certain obligations under the IEEE-SA Patent Policy.**

- **Participants [Note: Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2]:**
  - **"Shall inform the IEEE (or cause the IEEE to be informed)" of the identity of each "holder of any potential Essential Patent Claims of which they are personally aware" if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**
  - **"Should inform the IEEE (or cause the IEEE to be informed)" of the identity of "any other holders of potential Essential Patent Claims" (that is, third parties that are not affiliated with the participant, with the participant's employer, or with anyone else that the participant is from or otherwise represents)**
- **The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group**
- **Early identification of holders of potential Essential Patent Claims is strongly encouraged**
- **No duty to perform a patent search**

# Patent Related Links

All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.

Patent Policy is stated in these sources:

IEEE-SA Standards Boards Bylaws

*http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6*

IEEE-SA Standards Board Operations Manual

*http://standards.ieee.org/develop/policies/opman/sect6.html#6.3*

Material about the patent policy is available at

*http://standards.ieee.org/about/sasb/patcom/materials.html*

**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**

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

# Call for Potentially Essential Patents

- If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:
  - Either speak up now or
  - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
  - Cause an LOA to be submitted

# Other Guidelines for IEEE WG 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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  **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.**
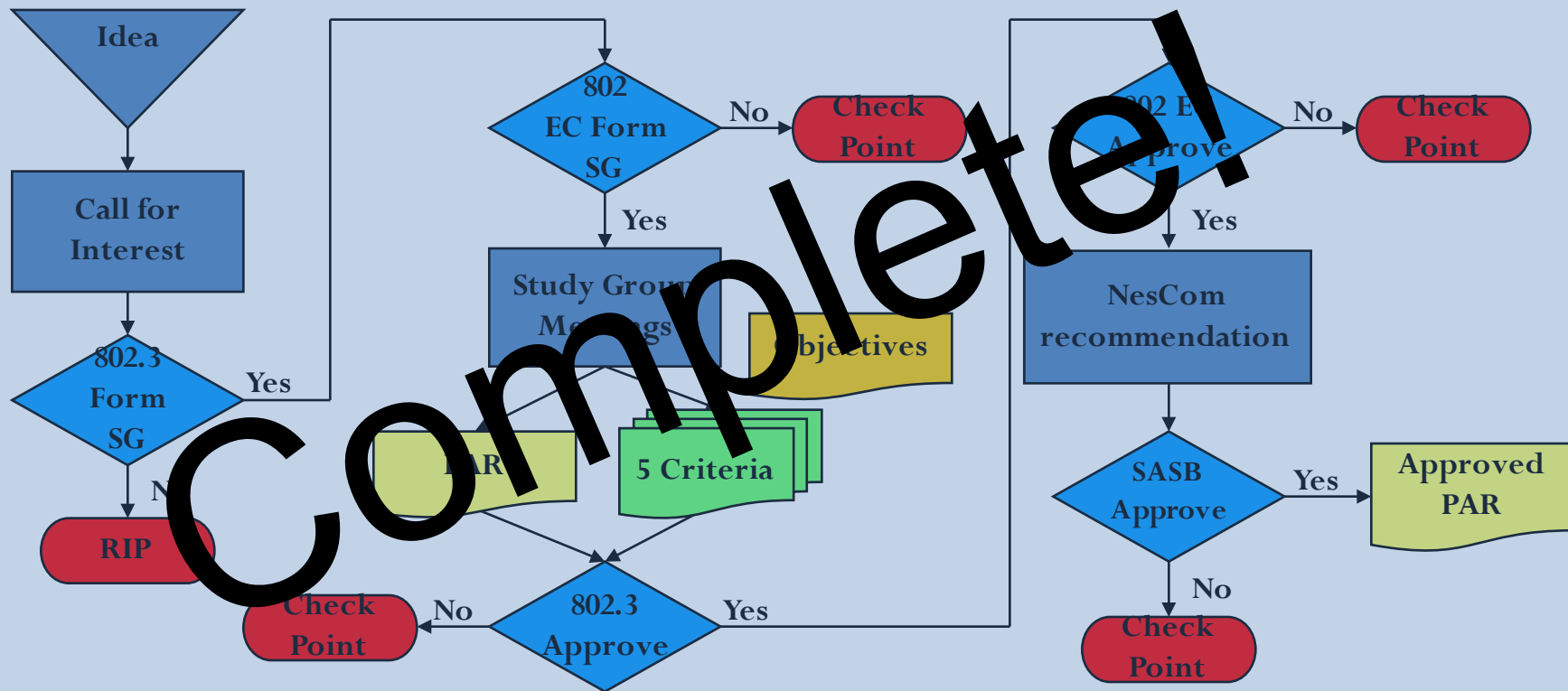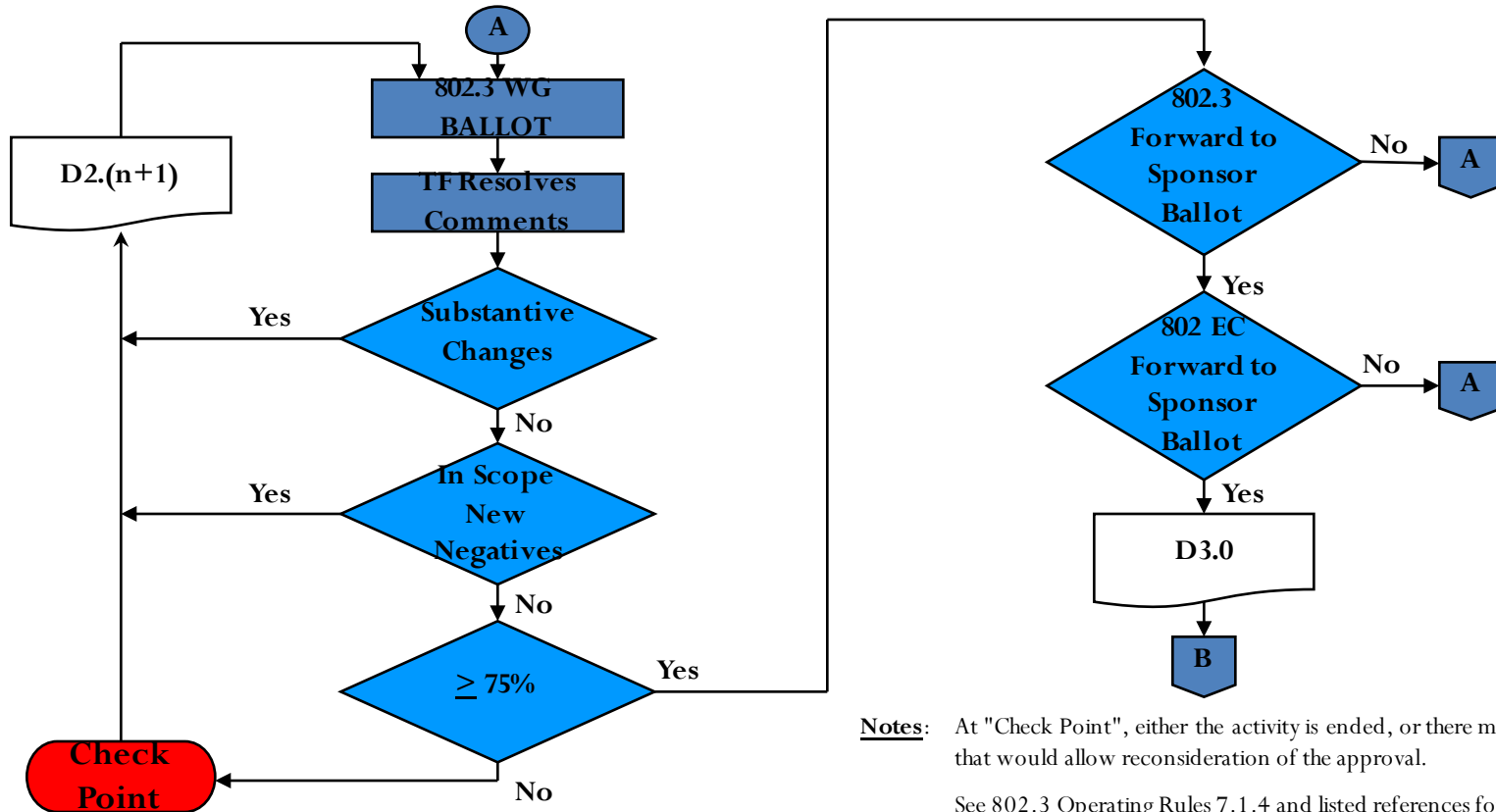
Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

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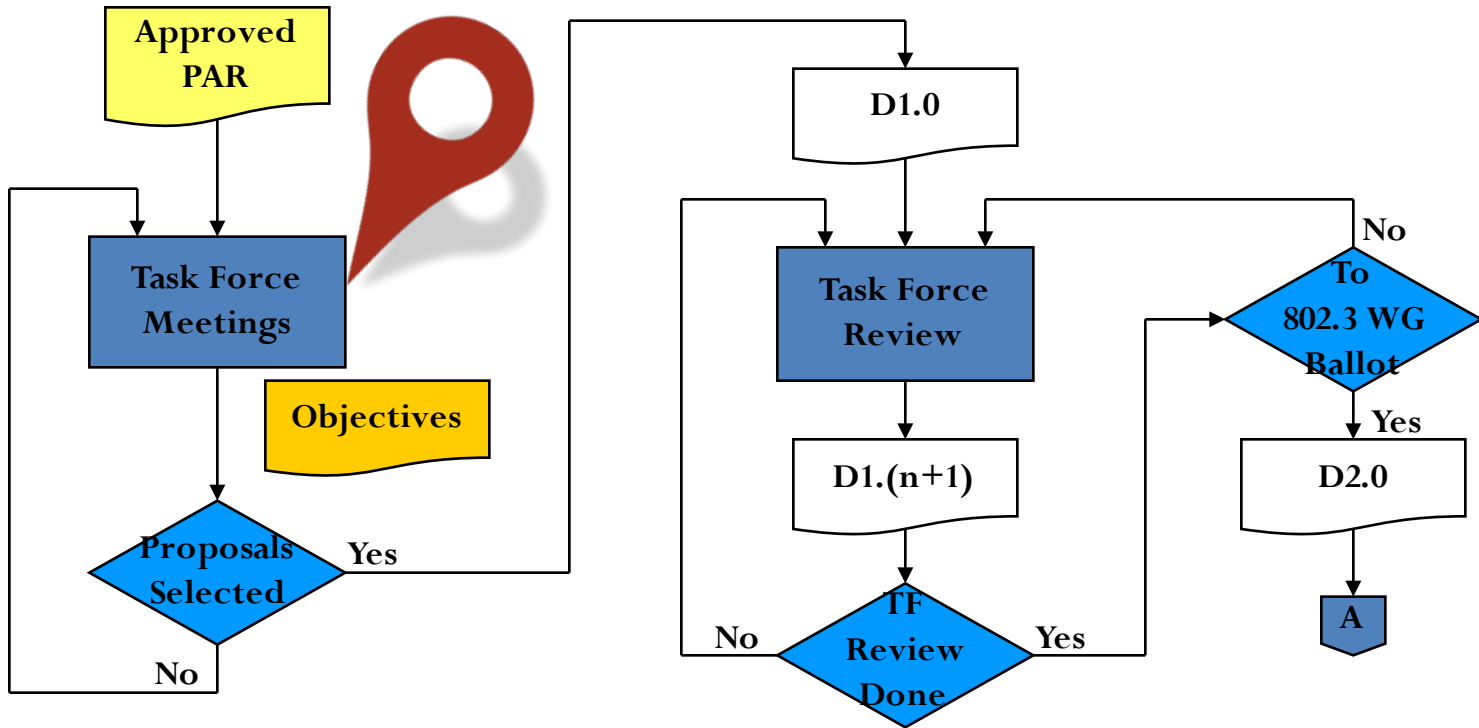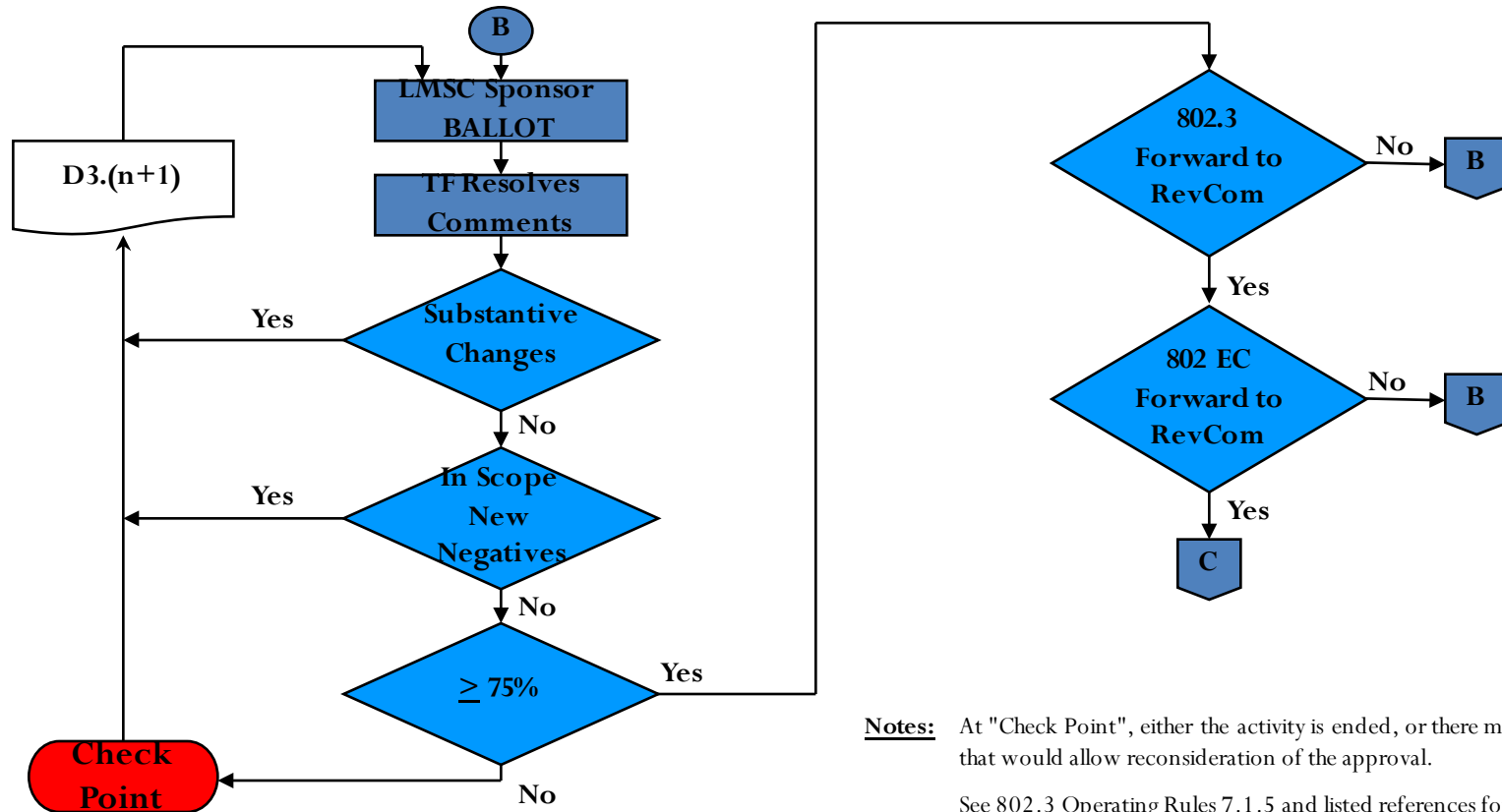
# Overview of IEEE 802.3 Standards Process (3/5) – Working Group Ballot Phase



**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



**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.

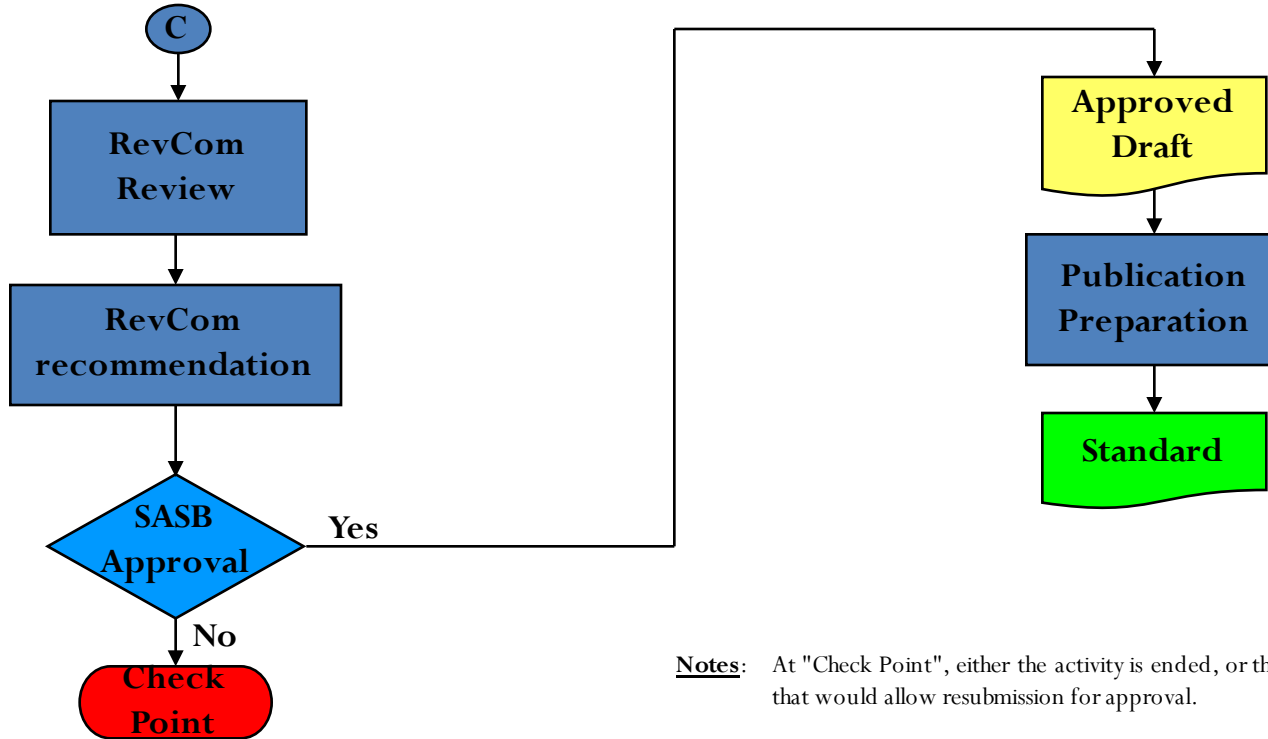See 802.3 Operating Rules 7.1.5 and listed references for complete description

**IEEE 802.3**

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# 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 resubmission for approval.

# Liaisons and Communications

- OIF
  - http://www.ieee802.org/3/minutes/jul16/incoming/OIF_to_IEEE_P802d3bs_June_2016.pdf
  - 802.3bs TF asked to craft response
  - 802.3cd TF may need to approve
- ITU

See http://www.ieee802.org/3/cd/public/July16/  for posted letters approved by 802.3bs

# Ad hocs

Charter: to discuss topics towards supporting the developed objectives, PAR and CSD or for providing the Task Force with contributions to help it prepare for future decisions.

Chair: Kent Lusted, Intel

http://www.ieee802.org/3/cd/public/adhoc/index.html

- Expected to continue the regular biweekly cadence.
- Wednesdays @ 8am PT

# IEEE P802.3cd Task Force Approved Project Documents

- ## PAR

  - http://www.ieee802.org/3/cd/P802.3cd.pdf

- ## CSD

  - https://mentor.ieee.org/802-ec/dcn/16/ec-16-0060-00-ACSD-802-3cd.pdf

- ## Objectives

  - http://www.ieee802.org/3/cd/P802d3cd_objectives_v2.pdf

- ## Timeline

  - Not yet

# 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

# Objectives 2 of 2

**50 Gb/s Ethernet PHYs**

- Define single-lane 50 Gb/s PHYs for operation over
    - copper twin-axial cables with lengths up to at least 3m.
    - printed circuit board backplane with a total channel insertion loss of <= 30dB at 13.28125 GHz.
    - MMF with lengths up to at least 100m
    - SMF with lengths up to at least 2km
    - SMF with lengths up to at least 10km

**100 Gb/s Ethernet PHYs**

- Define a two-lane 100 Gb/s PHY for operation over
    - copper twin-axial cables with lengths up to at least 3m.
    - printed circuit board backplane with a total channel insertion loss of <= 30dB at 13.28125 GHz.
    - MMF with lengths up to at least 100m
    - SMF with lengths up to at least 500m
- Define a 100 Gb/s PHY for operation over SMF with lengths up to at least 2 km

**200 Gb/s Ethernet PHYs**

- Define four-lane 200 Gb/s PHYs for operation over
    - copper twin-axial cables with lengths up to at least 3m.
    - printed circuit board backplane with a total channel insertion loss of <= 30dB at 13.28125 GHz.
- Define 200 Gb/s PHYs for operation over MMF with lengths up to at least 100m

# P802.3cd Project Documentation heads up

Recently added objective:  100G SMF over 2km

Potential baselines (based on contributed presentations):

- $2\lambda$ x 50 Gb/s
- $1\lambda$ x 100 Gb/s

- PAR language does not limit consideration of any baselines to the new objectives but some language ambiguity could be addressed in the "Need" section
- CSD responses at time of writing assumed only 50 Gb/s signaling technologies would be adopted

**Plan:**  Wait for TF baseline adoption and then address any changes to documentation with approval @ TF, WG, EC etc. as necessary

More details:
http://www.ieee802.org/3/cd/public/adhoc/archive/dambrosia_060816_3cd_01b_adhoc.pdf

# IEEE P802.3cd Task Force Potential Timeline
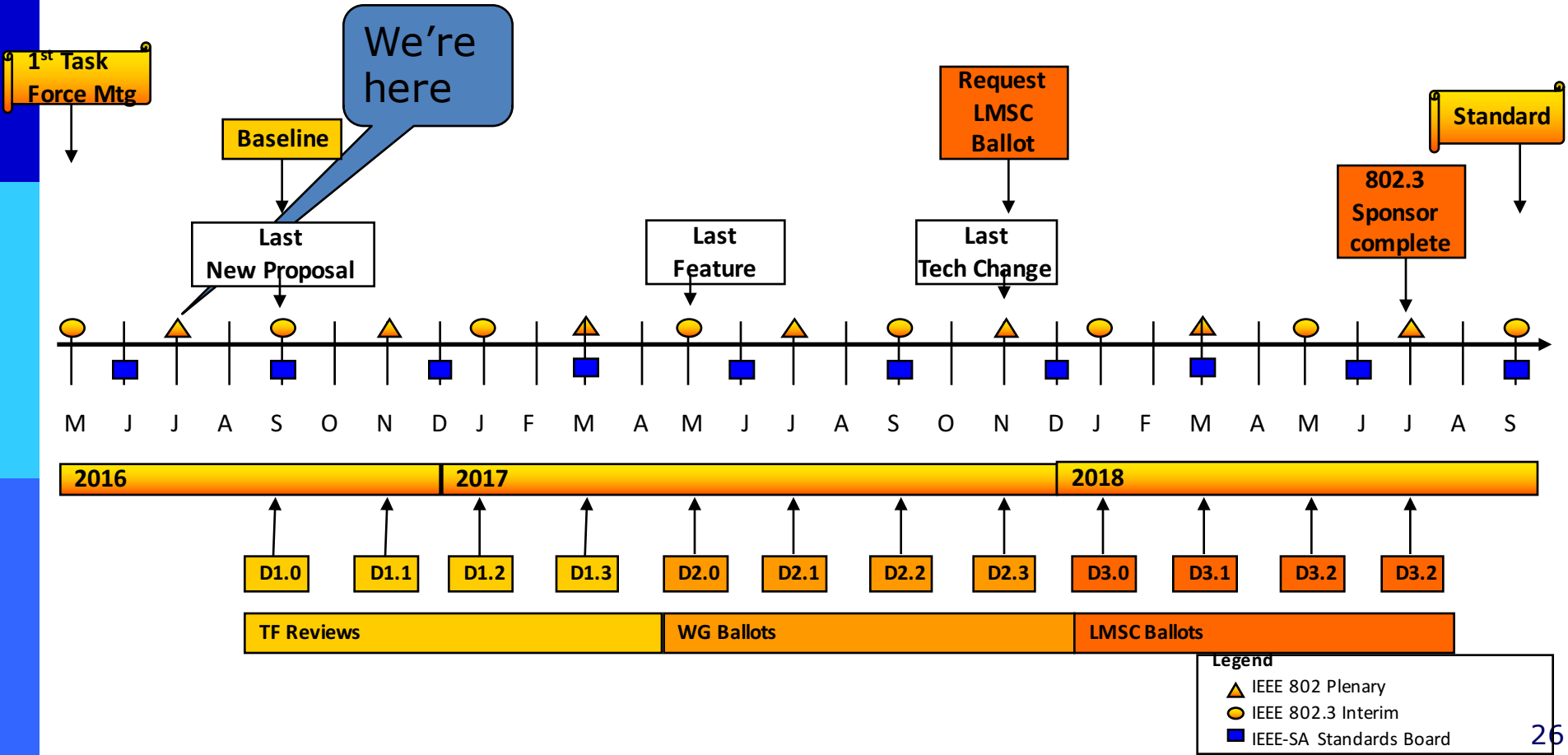
# Goals for the meeting

- Review technical contributions
- Build, assess consensus on proposals
- Consider making some decisions:
    - Baselines
    - New Objectives
- Establish work items for Sept Meeting
- Adopt a schedule

- Request approval @ 802.3WG for new objectives

# Meeting Schedule - Tuesday

| Tuesday 26-Jul-16 | Time | Presenter | Affiliation | Title | File Name | Duration |
|---|---|---|---|---|---|---|
| | 1:00 PM | Mark Nowell | Cisco | Agenda and General Information | agenda_3cd_01_0716.pdf | 0:40 |
| | 1:40 PM | Kent Lusted | Intel | 802.3cd Task Force Ad-hoc report | lusted_3cd_01_0716.pdf | 0:10 |
| | 1:50 PM | Matt Brown | APM | 802.3cd Editorial Consideration | brown_3cd_01_0716.pdf | 0:10 |
| | 2:00 PM | Kent Lusted | Intel | Nomenclature Update | lusted_3cd_02_0716.pdf | 0:15 |
| | 2:15 PM | Peter Stassar | Huawei | Continuing discussion on "Missing objectives | stassar_3cd_01_0716.pdf | 0:20 |
| | 2:35 PM | Break | | | | 0:15 |
| | 2:50 PM | Ali Ghiasi | Ghiasi Quantum | Architectural Support for 50/100 GbE Breakout | ghiasi_3cd_01_0716.pdf | 0:20 |
| | 3:10 PM | Mark Gustlin | Xilinx | The need for 25G electrical lanes support | gustlin_3cd_01_0716.pdf | 0:20 |
| | 3:30 PM | Tongtong Wang | Huawei | 50GE/NG100GE PCS Consideration | wang_3cd_01_0716.pdf | 0:20 |
| | 3:50 PM | Andre Szczepanek | Inphi | 50GE FEC codeword alignment with 16k AM spacing | szczepanek_3cd_01_0716.pdf | 0:20 |
| | 4:10 PM | Pete Anslow | Ciena | RS(544,514) FEC performance including precoding | anslow_3cd_01_0716.pdf | 0:25 |
| | 4:35 PM | Raj Hegde | Broadcom | TX precoder for 802.3cd electrical links | hegde_3cd_01_0716.pdf | 0:20 |
| | 4:55 PM | Gary Nicholl | Cisco | 50GbE and NG 100GbE Logic Baseline Proposal | nicholl_3cd_01_0716.pdf | 0:30 |
| | 5:25 PM | Dave Ofelt | Juniper | PreFEC BER Monitoring | ofelt_3cd_01_0716.pdf | 0:20 |
| | 5:45 PM | Break | | | | |

Note –Times listed are subject to change.

Updated versions will be captured with new filename versions

# Meeting Schedule – Wednesday

| Wednesday 27-Jul-16 | Time | Presenter | Affiliation | Title | File Name | Duration |
|---|---|---|---|---|---|---|
| | 8:00 AM | Mark Nowell | Cisco | Opening | agenda_3cd_01_0716.pdf | 0:10 |
| | 8:10 AM | Jeff Slavick | Broadcom | Cl73 AN baseline proposal for 802.3cd | slavick_3cd_01_0716.pdf | 0:20 |
| | 8:30 AM | Jeff Slavick | Broadcom | EEE baseline proposal for 802.3cd | slavick_3cd_02_0716.pdf | 0:20 |
| | 8:50 AM | Mike Peng Li | Intel | 50GAUI-2 and 100GAUI-4 C2C and C2M Baseline Proposals for 50G and 100G Ethernets | li_3cd_01_0716.pdf | 0:20 |
| | 9:10 AM | Paul Kolesar | Commscope | TIA-492AAAE wideband multimode fiber spec publication | kolesar_3cd_01_0716.pdf | 0:20 |
| | 9:30 AM | Jonathan Ingham | FOIT | Updated baseline proposal for the 100 Gb/s MMF objective using two-wavelength PAM4 transmission | ingham_3cd_01_0716.pdf | 0:20 |
| | 9:50 AM | Jonathan Ingham | FOIT | Transmitter testing for MMF PMDs | ingham_3cd_02_0716.pdf | 0:20 |
| | 10:10 AM | Rick Pimpinella | Panduit | Wavelength Dependence of Multimode Fiber Bandwidth & Dual Wavelength Channel Performance | pimpinella_3cd_01_0716.pdf | 0:20 |
| | 10:30 AM | | | Break | | 0:15 |
| | 10:45 AM | Chris Cole | Finisar | Baseline specifications for 100G 2km and 10km SMF PMDs following 200G 2km and 10km SMF PMD specs | cole_3cd_01_0716.pdf | 0:20 |
| | 11:05 AM | Brian Welch | Luxtera | 100GBase-DR2: A Baseline Proposal for the 100G 500m Two Lane Objective | welch_3cd_01_0716.pdf | 0:20 |
| | 11:25 AM | Tom Palkert | MACOM | Data center applications for 100GBase-FR objective | palkert_3cd_01_0716.pdf | 0:20 |
| | 11:45 AM | | | Lunch | | 1:15 |
| | 1:00 PM | Matt Traverso | Cisco | Experimental results on single wavelength 100Gbps PAM4 modulation | traverso_3cd_01_0716.pdf | 0:20 |
| | 1:20 PM | David Lewis | Lumentum | Baseline proposal for the 100 Gb/s SMF PHY 2 km objective using single wavelength PAM4 modulation | lewis_3cd_01_0716.pdf | 0:25 |
| | 1:45 PM | Jeffery Maki | Juniper | Ethernet Adoption: SERDES Rates & Form Factors | maki_3cd_01_0716.pdf | 0:20 |
| | 2:05 PM | Nathan Tracy | TE | One meter measured backplane channel data | tracy_3cd_01_0716.pdf | 0:20 |
| | 2:25 PM | Chris Diminico | MC Communications | Baseline proposals for copper twinaxial cable specifications | diminico_3cd_01_0716.pdf | 0:25 |
| | 2:50 PM | Rich Mellitz | Samtec | Die/Ball Level Parameters and Channel Characteristics Annex | mellitz_3cd_01_0716.pdf | 0:20 |
| | 3:10 PM | | | Break | | 0:20 |
| | 3:30 PM | Ali Ghiasi | Ghiasi Quantum | Revisiting MCB/HCB requirements in support 50G/lane PAM4 | ghiasi_3cd_02_0716.pdf | 0:20 |
| | 3:50 PM | Adam Healey | Broadcom | PAM4 transmitter training protocol | healey_3cd_01_0716.pdf | 0:20 |
| | 4:10 PM | Upen Reddy Kareti | Cisco | Working towards baseline COM parameters for Backplane and Direct Attach Cable | kareti_3cd_01_0716.pdf | 0:20 |
| | 4:30 PM | | | Discussions/Straw Polls/ Motions | | 1:00 |
| | 5:30 PM | | | Break | | |

Note – Times listed are subject to change.

Updated versions will be captured with new filename versions

# Meeting Schedule – Thursday

| Thursday | Time | Presenter | Affiliation | Title | File Name | Duration |
|---|---|---|---|---|---|---|
| 28-Jul-16 | 8:30 AM | Mark Nowell | Cisco | Opening | | 0:10 |
| | 8:40 AM | | | Discussions/Straw Polls/ Motions | | 1:50 |
| | 10:30 AM | | | **Break** | | 0:15 |
| | 10:45 AM | | | Discussions/Straw Polls/ Motions | | 1:00 |
| | 11:45 AM | | | **Adjourn** | | |

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Updated versions will be captured with new filename versions

**IEEE 802.3**

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# Future Meetings & Ad hocs

- Ad-hoc meeting plans
  - Single on-going biweekly meetings, all topics (will cycle) – agendas will be published. 2hr duration.
  - Wed 8-10 Pacific
- See: http://www.ieee802.org/meeting/index.html
- September 2016 Interim
  - Week of Sept 12th, 2016 – Fort Worth, Tx
- November 2016 Plenary
  - Week of Nov 7th, 2016 – San Antonio, Tx
- January 2017 Interim
  - Week of Jan 9th, 2017 – Location TBD


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

# Thank You!