

Title	IEEE 802.3 Liaison Report (Oct 2022)
Source	Tom Palkert (MACOM), Mabud Choudury (OFS)
Date	6 October 2022
Abstract	This liaison report covers IEEE 802.3 activities between the August and October 2022 T11 plenary meetings. This includes the 802.3 virtual interim meeting in Sept and the 802.3 July 802 hybrid plenary meeting in Montreal, QC, Canada/virtual and Oct 2022 802.3 TF meetings

# IEEE 802.3 Standards in force

- The current version in force is **IEEE Std 802.3-2022** – Approved 13 May 2022, **published 29 July 2022**
  - This incorporates 802.3bt, 802.3cb, 802.3cd, 802.3cn, 802.3cg, 802.3cm, 802.3cq, 802.3ch, 802.3ca, 802.3cr, 802.3cu, 802.3cv, 802.3ct, and 802.3cp
- IEEE Std 802.3dd-2022, Power over Data Lines of Single Pair Ethernet – Approved 16 June 2022, published TBD
- IEEE Std 802.3.1-2013, Ethernet MIBs, published 2 August 2013
- IEEE Std 802.3.2-2019, YANG Data Model Definitions – approved 26 March 2019, published 21 June 2019

# IEEE 802.3 Task Forces, Study Groups, CFIs

- [P802.3ck](#) 100 Gb/s per Lane Electrical Task Force
- [P802.3cs](#) Increased-reach Ethernet optical subscriber access (Super-PON) Task Force
- [P802.3cw](#) 400 Gb/s Ethernet over DWDM systems Task Force
- [P802.3cx](#) Improving PTP Timestamping Accuracy Task Force
- [P802.3cy](#) Greater than 10 Gb/s Electrical Automotive Ethernet Task Force
- [P802.3cz](#) Multi-Gigabit Optical Automotive Ethernet using Graded-Index Glass Optical Fiber Task Force
- [P802.3da](#) 10 Mb/s Single Pair Multidrop Segments Enhancements Task Force
- [P802.3db](#) 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force
- [P802.3de](#) Time Synchronization for Point-to-Point Single Pair Ethernet Task Force
- [P802.3df](#) 200 Gb/s, 400 Gb/s, 800 Gb/s and 1.6Tb/s Ethernet Task Force
- [P802.3dg](#) Physical Layer Specifications and Management Parameters for 100Mb/s Operation and Associated Power Delivery over a Single Balanced Pair of Conductors
- [P802.3dh](#) Multi-Gigabit Optical Automotive Ethernet using Graded-Index Plastic Optical Fiber
- [Maintenance](#) Task Force
- [New Ethernet Applications](#) Ad Hoc
- [Greater than 50 Gb/s bidirectional optical access](#) Call for Interest

# P802.3ck 100 Gb/s per lane Electrical Task Force

- 54<sup>th</sup> meeting (teleconference) 31 May, 1 June
  - Meeting materials: [https://www.ieee802.org/3/ck/public/22\\_06/index.html](https://www.ieee802.org/3/ck/public/22_06/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ck/public/22\\_06/minutes\\_3ck\\_0522.pdf](https://www.ieee802.org/3/ck/public/22_06/minutes_3ck_0522.pdf)
- 55<sup>th</sup> meeting 11-12 July
  - Meeting materials: [https://www.ieee802.org/3/ck/public/22\\_07/index.html](https://www.ieee802.org/3/ck/public/22_07/index.html)
  - Meeting minutes: not available
  - **D3.3 is final draft for P802.3ck project**
- SA ballot completed, submitted to RevCom for approval
  - RevCom Meeting: 19-20 September 2022; IEEE-SA Standards Board Meeting: 21-22 September 2022
  - RevCom and IEEE SASB are last 2 required approvals before publication. **Approved!**
- Approval Date: **21 September 2022**

# P802.3ck 100 Gb/s per lane Electrical Task Force Adopted Objectives (1 of 2)

- Support a MAC data rate of 100 Gb/s, 200 Gb/s, and 400 Gb/s
- 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 the existing bit error ratios (BERs) at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s, 200 Gb/s, and 400 Gb/s Ethernet
- Define a single-lane 100 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
- Define a single-lane 100 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
- Define a single-lane 100 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
- Define a single-lane 100 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m

# P802.3ck 100 Gb/s per lane Electrical Task Force Adopted Objectives (2 of 2)

- Define a two-lane 200 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
  - Define a two-lane 200 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
  - Define a two-lane 200 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
  - Define a two-lane 200 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m
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- Define a four-lane 400 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
  - Define a four-lane 400 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
  - Define a four-lane 400 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
  - Define a four-lane 400 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m

# P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force

- 21<sup>st</sup> Task Force meeting (teleconference) 19, 25 May 2022
  - Meeting materials: <https://www.ieee802.org/3/db/public/May22/>
  - Completed comment resolution 35 comments against Standards Association ballot D3.0.
  - Authorized Standards Association 1<sup>st</sup> recirculation ballot D3.1
  - Liaison to T11.2 to make D3.1 available
- 22<sup>nd</sup> Task Force meeting (teleconference) 28-30 June 2022
  - Meeting materials: <https://www.ieee802.org/3/db/public/June22/>
  - Completed comment resolution 12 comments against Standards Association 1st recirculation ballot D3.1.
  - Authorized Standards Association 2<sup>nd</sup> recirculation ballot D3.2
  - Liaison to T11.2 to make D3.2 available
- IEEE SA 2<sup>nd</sup> recirculation ballot/D3.2
  - Opened: 05 July 2022. Closed: 20 July 2022
  - No comments against D3.2. No new negative votes
  - **D3.2 is final draft for P802.db project**
- SA ballot completed, submitted to RevCom for approval
  - RevCom Meeting: 19-20 September 2022; IEEE-SA Standards Board Meeting: 21-22 September 2022
  - RevCom and IEEE SASB are last 2 required approvals before publication. **Approved!**
- Approval Date: **21 September 2022**

# P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force

## Adopted Objectives (1 of 2)

1. Support a MAC data rate of 100 Gb/s, 200 Gb/s and 400 Gb/s
2. Support full-duplex operation only
3. Preserve the Ethernet frame format utilizing the Ethernet MAC
4. Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
5. Provide appropriate support for OTN
6. Support a BER of better than or equal to  $10^{-12}$  at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s operation
7. 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 and 400 Gb/s operation



# P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force

## Adopted Objectives (2 of 2)

8. Define a physical layer specification that supports 100 Gb/s operation over 1 pair of MMF with lengths up to at least 50 m
9. Define a physical layer specification that supports 200 Gb/s operation over 2 pairs of MMF with lengths up to at least 50 m
10. Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of MMF with lengths up to at least 50 m
11. Define a physical layer specification that supports 100 Gb/s operation over 1 pair of MMF with lengths up to at least 100 m
12. Define a physical layer specification that supports 200 Gb/s operation over 2 pairs of MMF with lengths up to at least 100 m
13. Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of MMF with lengths up to at least 100 m

# P802.3df 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force

- meeting (teleconference) Sept 2022
  - Meeting materials: [https://www.ieee802.org/3/df/public/22\\_09/index.html](https://www.ieee802.org/3/df/public/22_09/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/df/public/22\\_09/minutes\\_3df\\_2209\\_unapproved.pdf](https://www.ieee802.org/3/df/public/22_09/minutes_3df_2209_unapproved.pdf)
- meeting (teleconference) Oct 2022
  - Agenda: [https://www.ieee802.org/3/df/public/22\\_10/agenda\\_3df\\_a\\_2210.pdf](https://www.ieee802.org/3/df/public/22_10/agenda_3df_a_2210.pdf)
  - Motions and straw polls: [https://www.ieee802.org/3/df/public/22\\_10/motions\\_3df\\_221004.pdf](https://www.ieee802.org/3/df/public/22_10/motions_3df_221004.pdf)
- IEEE P802.3df October 2022 Series of Electronic Meetings
- As part of this series, the IEEE P802.3df Task Force will meet on the following days:
  - • Tuesday – 4<sup>th</sup> Oct, 9:30am to 12:30pm
  - • Wednesday 5<sup>th</sup> Oct, 9:30am to 12:30pm
  - • Tuesday 11<sup>th</sup> Oct, 9:30am to 12:30pm
  - • Wednesday 12<sup>th</sup> Oct, 9:30am to 12:30pm
- The agenda for this meeting will include: 1) Approval of Proposed IEEE P802.3df Modified PAR Project Documentation and IEEE P802.3dj PAR Project Documentation; and 2) Baselines related to all objectives.

# IEEE P802.3 df Objectives

- **Non-Rate Specific**

- 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 a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Provide support to enable mapping over OTN

- ~~**200 Gb/s Related**~~

- ~~• Support a MAC data rate of 200 Gb/s~~
- ~~• Support optional single lane 200 Gb/s attachment unit interfaces for chip to module and chip to chip applications~~
- ~~• Define a physical layer specification that supports 200 Gb/s operation:~~
  - ~~• over 1 pair of copper twin axial cables in each direction with a reach of up to at least 1.0 meter~~
  - ~~• over 1 pair of SMF with lengths up to at least 500 m~~
  - ~~• over 1 pair of SMF with lengths up to at least 2 km~~

- **400 Gb/s Related**

- Support a MAC data rate of 400 Gb/s
- ~~• Support optional two lane 400 Gb/s attachment unit interfaces for chip to module and chip to chip applications~~
- Define a physical layer specification that supports 400 Gb/s operation:
  - ~~• over 2 pairs of copper twin axial cables in each direction with a reach of up to at least 1.0 meter~~
  - ~~• over 2 pairs of SMF with lengths up to at least 500 m~~
  - over 4 pairs of SMF with lengths up to at least 2 km

# IEEE P802.3 df Objectives

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- **800 Gb/s Related**

- Support a MAC data rate of 800 Gb/s
- Support optional eight-lane 800 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- ~~• Support optional four-lane 800 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications~~
- Define a physical layer specification that supports 800 Gb/s operation:
  - ~~• over 4 pairs of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter~~
  - over eight lanes of twin axial copper cables with a reach up to at least 2 meters
  - over eight lanes over electrical backplanes supporting an insertion loss  $\leq 28\text{dB}$  at 26.56GHz
  - over 8 pairs of MMF with lengths up to at least 50 m
  - over 8 pairs of MMF with lengths up to at least 100 m
  - over 8 pairs of SMF with lengths up to at least 500 m
  - over 8 pairs of SMF with lengths up to at least 2 km
  - ~~• over 4 pairs of SMF with lengths up to at least 500 m~~
  - ~~• over 4 pairs of SMF with lengths up to at least 2 km~~
  - ~~• over 4 wavelengths over a single SMF in each direction with lengths up to at least 2 km~~
  - ~~• over a single SMF in each direction with lengths up to at least 10 km~~
  - ~~• over a single SMF in each direction with lengths up to at least 40 km~~

# IEEE P802.3 df Objectives

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## ~~1.6 Tb/s Related~~

- ~~• Support a MAC data rate of 1.6 Tb/s~~
- ~~• Support optional sixteen-lane 1.6 Tb/s attachment unit interfaces for chip-to-module and chip-to-chip applications~~
- ~~• Support optional eight-lane 1.6 Tb/s attachment unit interfaces for chip-to-module and chip-to-chip applications~~
- ~~• Define a physical layer specification that supports 1.6 Tb/s operation:~~
  - ~~• over 8 pairs of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter~~
  - ~~• over 8 pairs of SMF with lengths up to at least 500 m~~
  - ~~• over 8 pairs of SMF with lengths up to at least 2 km~~

# Proposed IEEE P802.3df Objectives

- **Non-Rate Specific**

- 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 a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Provide support to enable mapping over OTN

- **400 Gb/s Related**

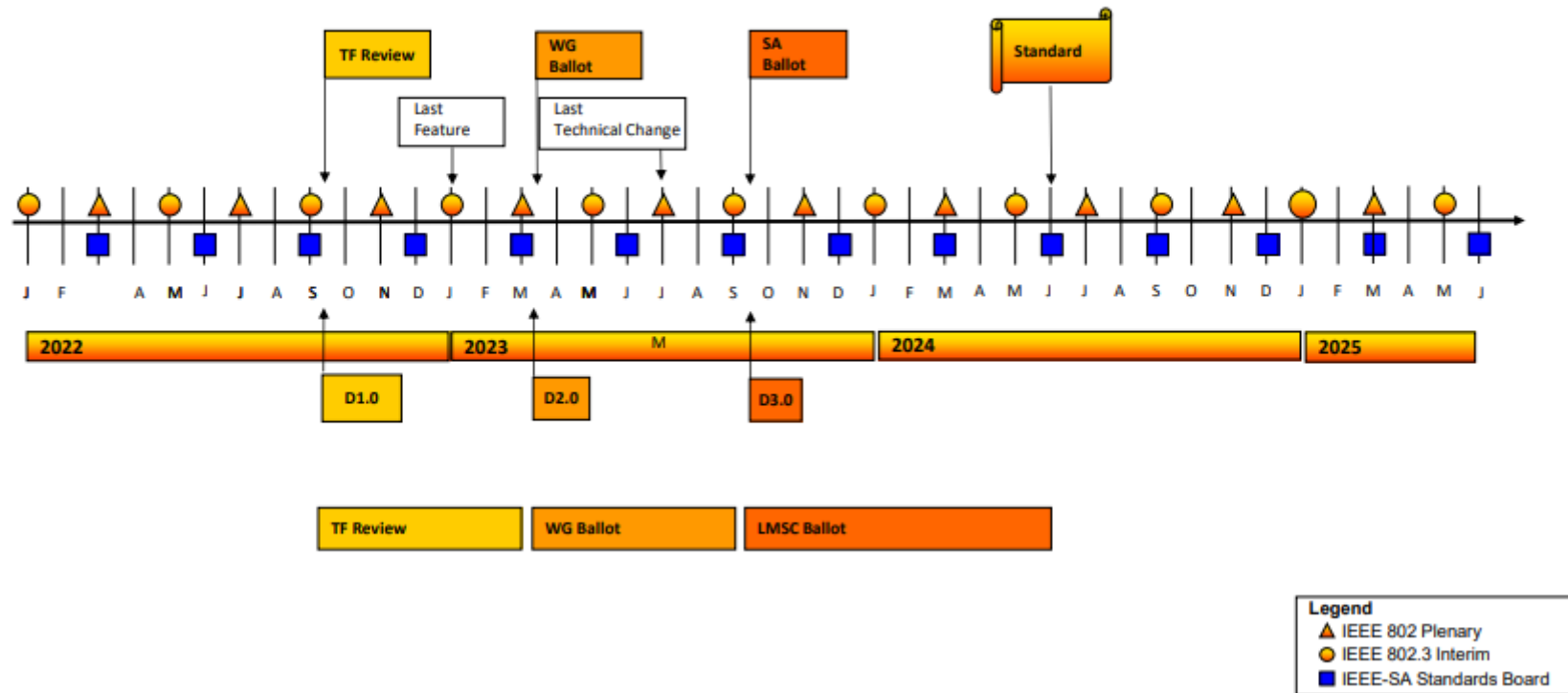
- Support a MAC data rate of 400 Gb/s
- Define a physical layer specification that supports 400 Gb/s operation:
  - over 4 pairs of SMF with lengths up to at least 2 km

- **800 Gb/s Related**

- Support a MAC data rate of 800 Gb/s
- Support optional eight-lane 800 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Define a physical layer specification that supports 800 Gb/s operation:
  - over eight lanes of twin axial copper cables with a reach up to at least 2 meters
  - over eight lanes over electrical backplanes supporting an insertion loss  $\leq 28\text{dB}$  at 26.56GHz
  - over 8 pairs of MMF with lengths up to at least 50 m
  - over 8 pairs of MMF with lengths up to at least 100 m
  - over 8 pairs of SMF with lengths up to at least 500 m
  - over 8 pairs of SMF with lengths up to at least 2 km

# If P802.3df PAR is split, Modified P802.3df Proposed (early) Timeline – June 2024

## Proposed IEEE P802.3df Timeline





# If P802.3df PAR is split (likely, November), Proposed Objectives – P802.3dj PAR

## Proposed (1 of 2)

- **Non-Rate Specific**

- 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 a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Provide support to enable mapping over OTN

- **200 Gb/s Related**

- Support a MAC data rate of 200 Gb/s
- Support optional single-lane 200 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Define a physical layer specification that supports 200 Gb/s operation:
  - over 1 pair of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter
  - over 1 pair of SMF with lengths up to at least 500 m
  - over 1 pair of SMF with lengths up to at least 2 km

- **400 Gb/s Related**

- Support a MAC data rate of 400 Gb/s
- Support optional two-lane 400 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Define a physical layer specification that supports 400 Gb/s operation:
  - over 2 pairs of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter
  - over 2 pairs of SMF with lengths up to at least 500 m



# If P802.3df PAR is split (likely, November), Proposed Objectives – P802.3dj PAR

## Proposed Objectives (2 of 2)

- **800 Gb/s Related**

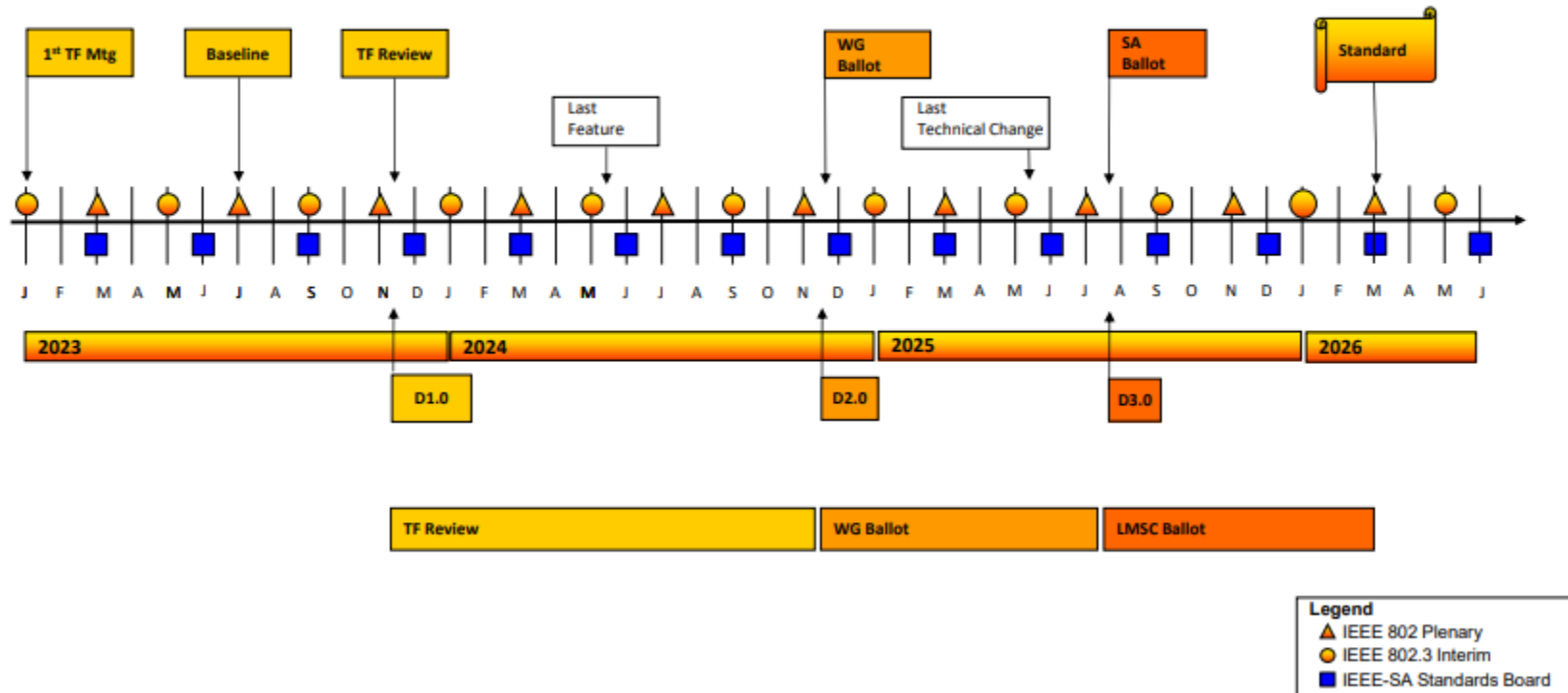
- Support a MAC data rate of 800 Gb/s
- Support optional four-lane 800 Gb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Define a physical layer specification that supports 800 Gb/s operation:
  - over 4 pairs of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter
  - over 4 pairs of SMF with lengths up to at least 500 m
  - over 4 pairs of SMF with lengths up to at least 2 km
  - over 4 wavelengths over a single SMF in each direction with lengths up to at least 2 km
  - over a single SMF in each direction with lengths up to at least 10 km
  - over a single SMF in each direction with lengths up to at least 40 km

- **1.6 Tb/s Related**

- Support a MAC data rate of 1.6 Tb/s
- Support optional sixteen-lane 1.6 Tb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Support optional eight-lane 1.6 Tb/s attachment unit interfaces for chip-to-module and chip-to-chip applications
- Define a physical layer specification that supports 1.6 Tb/s operation:
  - over 8 pairs of copper twin-axial cables in each direction with a reach of up to at least 1.0 meter
  - over 8 pairs of SMF with lengths up to at least 500 m
  - over 8 pairs of SMF with lengths up to at least 2 km

# If P802.3df PAR is split, P802.3dj Proposed (early) Timeline – March 2026

## Proposed IEEE P802.3dj Timeline



# New Ethernet Applications (NEA) Ad Hoc

- Meeting on 802.3 interim 19 May 2022 (teleconference)
  - Meeting materials: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/22\\_05/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/22_05/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/22\\_05/unapproved\\_minutes\\_nea\\_0522.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/22_05/unapproved_minutes_nea_0522.pdf)
  - Discussion of PHY bonding in the context of bonding 25G PHYs in automotive applications (related to 802.3cy). This relates closely to FlexE, although the mechanism that was suggested in the discussion is different from FlexE. Further discussion about this is expected.
- Interim meeting (teleconference) on 2 June 2022 – Greater than 50 Gb/s bidirectional optics access
  - Meeting materials: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0602/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0602/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0602/minutes\\_nea\\_220602\\_unapproved.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0602/minutes_nea_220602_unapproved.pdf)
- Interim meeting (teleconference) on 22 June 2022 – Ethernet in high-performance computing applications
  - Meeting materials: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0622\\_HPE/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0622_HPE/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0622\\_HPE/minutes\\_nea\\_220622\\_HPE\\_unapproved.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0622_HPE/minutes_nea_220622_HPE_unapproved.pdf)
- Joint NEA/NENDICA (802.1) meetings (teleconferences) 1, 8, 22, 29 June regarding Cut-Through Forwarding
  - Meeting materials: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0601/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0601/index.html)  
[https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0608/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0608/index.html)  
[https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0622\\_CTF/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0622_CTF/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0601/minutes\\_nea\\_220601\\_approved.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0601/minutes_nea_220601_approved.pdf)  
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[https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0622\\_CTF/minutes\\_nea\\_220622\\_CTF\\_unapproved.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0622_CTF/minutes_nea_220622_CTF_unapproved.pdf)  
[https://www.ieee802.org/3/ad\\_hoc/ngrates/public/calls/22\\_0629/minutes\\_nea\\_220629\\_unapproved.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/22_0629/minutes_nea_220629_unapproved.pdf)
- Meeting at 802.3 plenary 13 July 2022
  - Meeting materials: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/22\\_07/index.html](https://www.ieee802.org/3/ad_hoc/ngrates/public/22_07/index.html)
  - Meeting minutes: [https://www.ieee802.org/3/ad\\_hoc/ngrates/public/22\\_07/minutes\\_nea\\_2207.pdf](https://www.ieee802.org/3/ad_hoc/ngrates/public/22_07/minutes_nea_2207.pdf)
  - CFI on Greater than 50 Gb/s bidirectional optical access held 12 July, motion passed to form a Study Group to develop a PAR and CSD

# Future Meetings

Meeting	Location	Dates
IEEE 802 plenary	Bangkok, Thailand/Hybrid	14-17 November 2022
IEEE 802.3 interim	TBD	16-19 January 2023
IEEE 802 plenary	Atlanta, GA, USA	13-17 March 2023
IEEE 802.3 interim	TBD	15-19 May 2023
IEEE 802 plenary	Berlin, Germany	10-13 July 2023
IEEE 802.3 interim	TBD	11-15 September 2023
IEEE 802.3 plenary	Oahu, HI, USA	13-16 November 2023

2023 interim meetings are still being planned; the intent is that they will be face-to-face/hybrid meetings.

Upcoming meeting details at: <http://ieee802.org/3/interims/index.html>