IEEE 802 Nov 2023

IEEE 802.3 Ethernet WG
Closing Plenary
16 Nov 2023

IEEE P802.3dj
200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s
Ethernet Task Force
Closing Report

IEEE P802.3dj Task Force Project information

- **Organization**
  - **John D'Ambrosia, Chair, IEEE P802.3dj Task Force**
  - **Mark Nowell, Vice-Chair, IEEE P802.3dj Task Force; Chair, Optics Track**
  - **Kent Lusted, Secretary, Chair, Electrical Track**
  - **Matt Brown, IEEE P802.3dj Chief Editor**
  - **Gary Nicholl, Chair, Architecture and Logic Track**

- **Task force web and reflector information:**
  - **Home page: https://www.ieee802.org/3/df/index.html**
  - **Reflector Info - https://www.ieee802.org/3/df/reflector.html**
    - **TF Reflector: stds-802-3-b400g@listserv@ieee.org**
    - **Logic Reflector: stds-802-3-b400g-logic@listserv@ieee.org**
    - **Optical Reflector: stds-802-3-b400g-optx@listserv@ieee.org**
    - **Electrical Reflector: stds-802-3-b400g-elec@listserv@ieee.org**

- **Project Documentation –**
  - **PAR : https://www.ieee802.org/3/dj/projdoc/P802d3dj_PAR.pdf**
  - **CSD: https://mentor.ieee.org/802-ec/dcn/22/ec-22-0256-00-ACSD-p802-3dj.pdf**
  - **Objectives: https://www.ieee802.org/3/dj/projdoc/objectives_P802d3dj_230518.pdf**
  - **Adopted Timeline: https://www.ieee802.org/3/dj/projdoc/timeline_3dj_230116.pdf**
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Activities This Week

- **Heard 31 technical presentations**
  - **https://www.ieee802.org/3/dj/public/23_11/index.html**
  - **Additional presentations will be heard at Nov 28&29 Contingent interim meeting**

- **Significant Progress made!!!! - Key Decisions (see next slide) in all areas (Architectural, Copper, Optical) were made!**

- **Discussed project time line status – update decision pending**

- **Generated liaison to ITU-T regarding G.652 fiber link property**

Decisions

Decisions noted in GREEN approved via UNANIMOUS CONSENT

Logic
- filled in some holes found in the previously adopted logic baselines
- adopted "FECo" as the only FEC for the 500m SMF PMDs (200GBASE-DR1, 400GBASE-DR2, 800GBASE-DR4, 1.6TBASE-DR8)

Optical
- Adopted an additional 800 GbE optical objective (4 wavelength, 500m)
- Adopted a majority of the optical PMD baselines:
  - 200GBASE-DR1, 400GBASE-DR2, 800GBASE-DR4, 1.6TBASE-DR8
  - 200GBASE-FR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2, 1.6TBASE-DR8-2
  - 800GBASE-FR4
  - 800GBASE-LR4 (802.3 y/n/a: 78 / 1 / 14)

Electrical
- Adopt a two package approach for electrical KR and C2C AUI
- Adopted key package parameters or backplane and CR objectives
- Adopted host and cable assembly insertion loss budgets
- Adopted DER_0 and both host and cable assembly insertion loss budgets for CR objectives
- Adopted the "TP1-TP4 IL" column in the table and MCB insertion loss

Proposed Modified IEEE P802.3dj Objectives

Adopted IEEE P802.3dj Objectives (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 lane over electrical backplanes supporting a die-to-die insertion loss <= 40 dB at 53.125 GHz **
    - 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 lanes over electrical backplanes supporting a die-to-die insertion loss <= 40 dB at 53.125 GHz **
    - 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 2 pairs of SMF with lengths up to at least 2 km

Adopted IEEE P802.3dj 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 lanes over electrical backplanes supporting a die-to-die insertion loss <= 40 dB at 53.125 GHz **
    - 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
    - <u>**over 4 wavelengths over a single SMF in each direction with lengths up to at least 500 m ***</u>
    - over 4 wavelengths over a single SMF in each direction with lengths up to at least 2 km
    - over 1 wavelength over a single SMF in each direction with lengths up to at least 10 km *
    - over 4 wavelengths 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 lanes over electrical backplanes supporting a die-to-die insertion loss <= 40 dB at 53.125 GHz **
    - 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

* - Approved by IEEE 802.3 WG 16 Mar 2023
** - Approved by IEEE 802.3 WG 18 May 2023
*** - Pending IEEE 802.3 WG Approval, 16 Nov 2023

WG Motion

Motion	Move that the IEEE 802.3 Working Group approve the IEEE P802.3dj 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force objectives, as per 1123_3dj_close_report.pdf
Technical (>= 75%)	
Moved by	Kent Lusted
Second by	Mark Nowell
Results 802.3 (y/n/a)	

WG Motion

Motion	Move that the IEEE 802.3 Working Group approve: • IEEE_802d3_to_ITU_3dj_1123_Redacted.pdf with editorial license granted to the Chair (or his appointed agent) as liaison communications from the IEEE 802.3 Working Group to ITU-T SG15.
Technical (>= 75%)	
Moved by	John D'Ambrosia
Second by	Mark Nowell
Results 802.3 (y/n/a)	

Summary IEEE P802.3dj Progress @ End of 16 Nov 2023 Meeting – Logic

Ethernet Rate	AUI	Backplane	CU Cable	SMF 500m/2km	SMF 10km 4 Wavelength	SMF 10km 1 Wavelength	SMF 40km
	PCS/FEC/PMA?	PCS/FEC/PMA?	PCS/FEC/PMA?	PCS/FEC/PMA?	PCS/FEC/PMA?	PCS/FEC/PMA?	PCS/FEC/PMA?
200 Gb/s							
400 Gb/s							
800 Gb/s							Two proposals
1.6 Tb/s							

Adopted baselines   **Proposed Baselines**

Summary IEEE P802.3dj Progress @ End of 16 Nov 2023 Meeting – PMDs (& AUIs)

Ethernet Rate	Assumed Signaling Rate	AUI	Backplane	Cu Cable	SMF 500m	SMF 2km	SMF 10km	SMF 40km
200 Gb/s	200 Gb/s	200GAUI-1 C2C C2M	200GBASE-KR1	200GBASE-CR1	200GBASE-DR1	200GBASE-FR1		
400 Gb/s	200 Gb/s	400GAUI-2 C2C C2M	400GBASE-KR2	400GBASE-CR2	400GBASE-DR2	400GBASE-DR2-2		
800 Gb/s	200 Gb/s	800GAUI-4 C2C C2M	800GBASE-KR4	800GBASE-CR4	1. 800GBASE-DR4 2. 800GBASE over 4λ	1. 800GBASE-DR4-2 2. 800GBASE-FR4	800GBASE-LR4	
	800 Gb/s						Over single SMF in each direction Coherent	Over single SMF in each direction Coherent
1.6 Tb/s	100 Gb/s	1.6TAUI-16 C2C C2M						
	200 Gb/s	1.6TAUI-8 C2C C2M	1.6TBASE-KR8	1.6TBASE-CR8	1.6TBASE-DR8	1.6TBASE-DR8-2		

Adopted baselines   **Proposed Baselines**

Future Meetings
IEEE P802.3cw: https://www.ieee802.org/3/cw/public/index.html
IEEE P802.3df: https://www.ieee802.org/3/df/public/index.html
IEEE P802.3dj: https://www.ieee802.org/3/dj/public/index.html

- Any additional meetings will be announced, as appropriate.
- IEEE P802.3cw
    - Contingent Electronic Meeting – 11 Dec 2023, 9am to 1pm
    - Contingent Electronic Meeting – 08 Jan 2024, 9am to 1pm

- IEEE P802.3df
    - Contingent Electronic Meeting – 18 Dec 2023, 9am to 1pm
    - Contingent Electronic Meeting – 09 - 11 Jan 2024, 9am to 1pm

- IEEE P802.3dj
    - Contingent Electronic Meeting – 28 – 29 Nov 2023, 9am to 1pm
    - Electrical & Logic/Optical Meetings – TBA

- Joint IEEE P802.3cw / df / dj Task Force Meeting
    - Week of 22 – 25 Jan 2024

THANK YOU!