



# IEEE P802.3ba document structure

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# Agenda

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- Architectural overview
- Existing clauses
- Possible layer diagrams for 40G and 100G
- New clauses
- Summary

# 10GbE overview

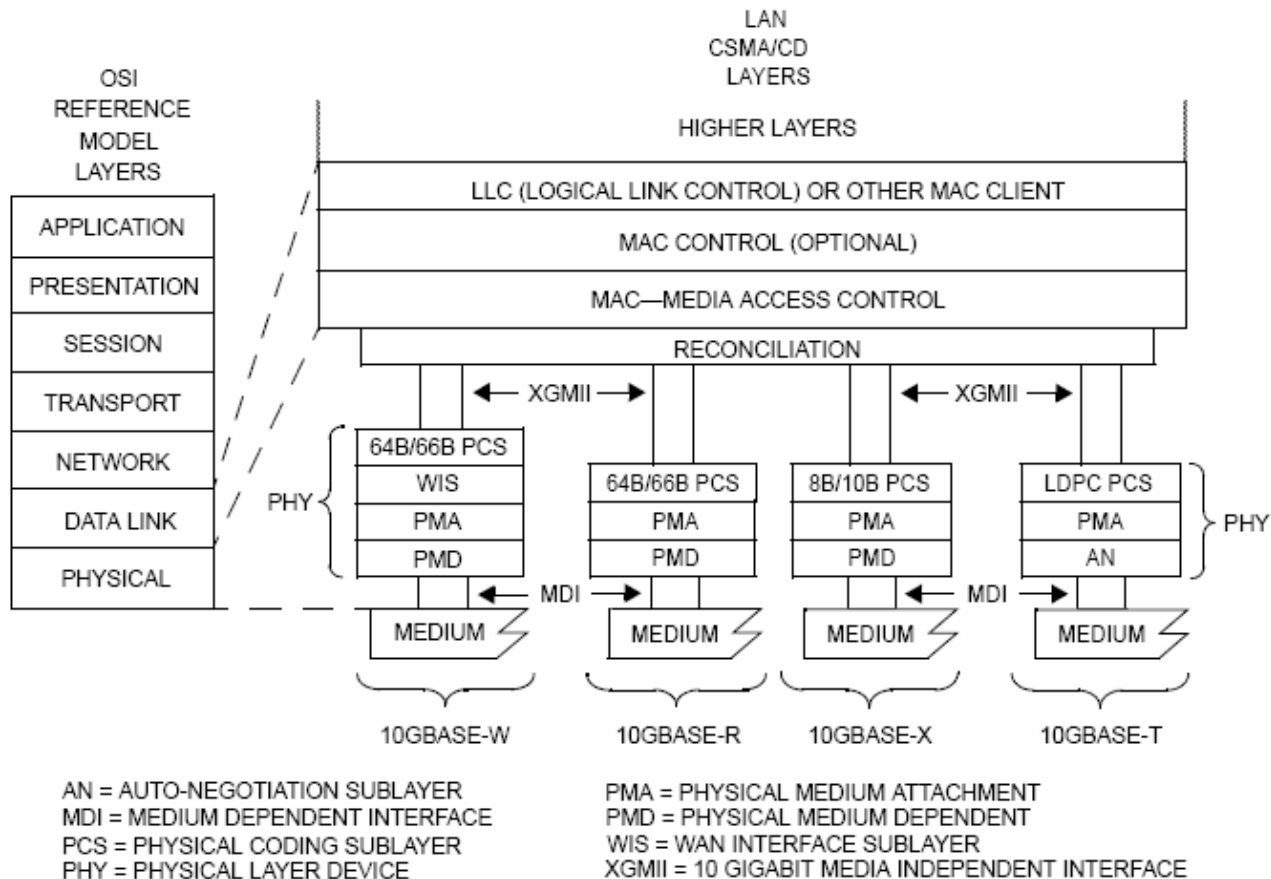
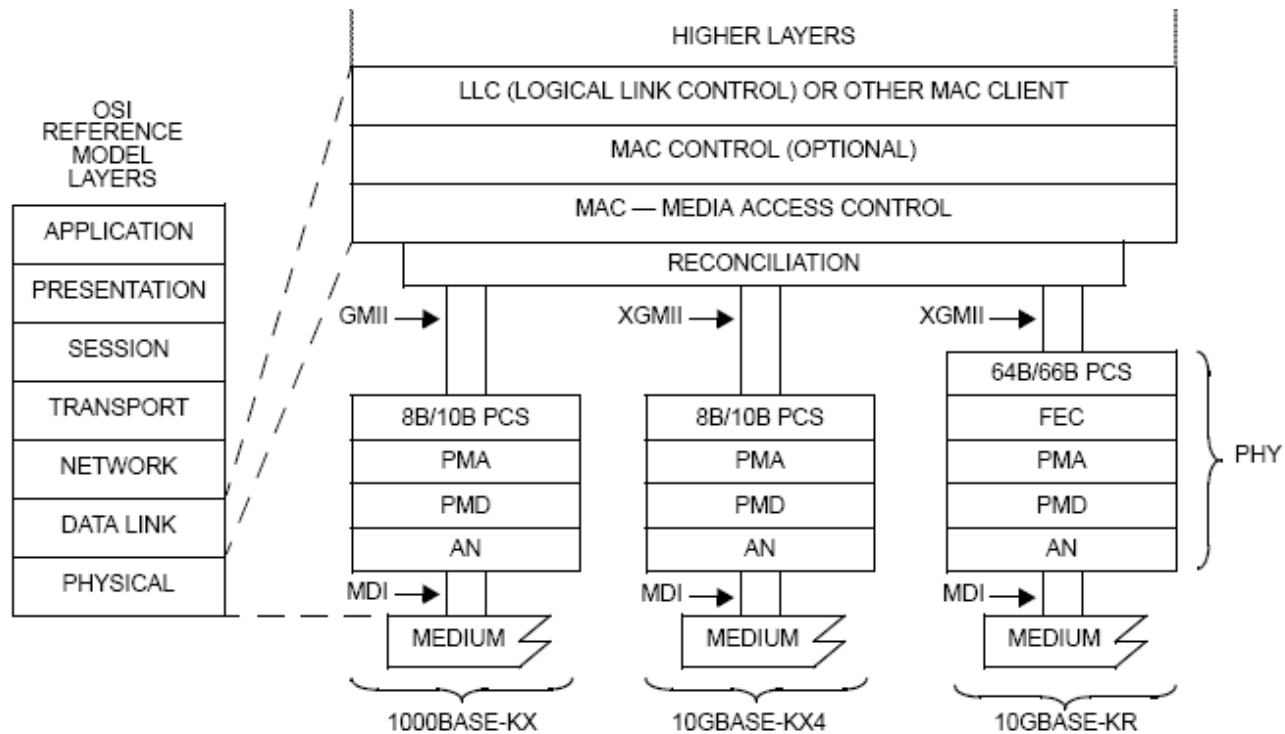


Figure 44-1—Architectural positioning of 10 Gigabit Ethernet

# Backplane Ethernet overview



AN = AUTO-NEGOTIATION  
 GMII = GIGABIT MEDIA INDEPENDENT INTERFACE  
 MDI = MEDIUM DEPENDENT INTERFACE  
 PCS = PHYSICAL CODING SUBLAYER  
 FEC = FORWARD ERROR CORRECTION

PHY = PHYSICAL LAYER DEVICE  
 PMA = PHYSICAL MEDIUM ATTACHMENT  
 PMD = PHYSICAL MEDIUM DEPENDENT  
 XGMII = 10 GIGABIT MEDIA INDEPENDENT INTERFACE

**Figure 69-1—Architectural positioning of Backplane Ethernet**



# Introductory clauses

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- 10GbE introductory clause (Clause 44) provides overview of 10G architecture
  - Provides correlation between nomenclature and clauses
  - Information on delay constraints for sublayers
- Backplane Ethernet introductory clause (Clause 69) provides overview of Backplane architecture
  - Introduction of backplane Ethernet sublayers (1G and 10G)
  - Provides correlation between nomenclature and clauses
  - Information on delay constraints for sublayers
- 1000M introductory clause (Clause 34) provides introduction of 1G architecture and sublayers

# 10G nomenclature & clause correlation

Table 44-1—Nomenclature and clause correlation

Nomenclature	Clause										
	48 8B/10B PCS & PMA	49 64B/66B PCS	50 WIS	51 Serial PMA	52			53	54	55	68
					850 nm Serial PMD	1310 nm Serial PMD	1550 nm Serial PMD	1310 nm WDM PMD	4-Lane electrical PMD	Twisted- pair PCS & PMA	1310 nm Serial MMF PMD
10GBASE-SR		M <sup>a</sup>		M	M						
10GBASE-SW		M	M	M	M						
10GBASE-LX4	M							M			
10GBASE-CX4	M								M		
10GBASE-LR		M		M		M					
10GBASE-LW		M	M	M		M					
10GBASE-ER		M		M			M				
10GBASE-EW		M	M	M			M				
10GBASE-T										M	
10GBASE-LRM		M		M							M

<sup>a</sup>M = Mandatory



# 802.3ba changes to existing standard (1)

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- Clause 1 – Introduction to 802.3
  - Add appropriate normative references, definitions and abbreviations
- Annex A – Bibliography
  - Add appropriate informative references
- Clause 4, Annex 4A – Media access control
  - Mostly speed independent, update Table 4-2 MAC parameters
- Clause 30, Annex 30A & 30B – Management
  - Add new objects, attributes, and enumerations for 40Gb/s and 100Gb/s functions

Note: Some existing clauses may be modified by multiple task forces (e.g. EEE), so requires coordination among task forces



## 802.3ba changes to existing standard (2)

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- Annex 31B – MAC control PAUSE operation
  - Update timing considerations for PAUSE
- Clause 45 Management data input/output (MDIO) interface
  - Add new registers for the control and management of 40Gb/s & 100Gb/s PHY types
  - Update Backplane Auto-Negotiation and FEC registers
- Clause 57 – OAM
  - No current proposals to change





## 802.3ba changes to existing standard (3)

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- Clause 69 – Introduction to Ethernet operation over electrical backplanes
  - Add 40Gb/s backplane PHY “40GBASE-KR4”
- Annex 69A – Interference tolerance testing
  - Add “40GBASE-KR4” test methodology
- Annex 69B – Interconnect characteristics
  - Update “40GBASE-KR4” cross-talk limits if needed
- Clause 72 – 10GBASE-KR PMD
  - Update training protocol for 4 lane KR operation if needed
    - Could be included in new 40Gb/s PMA/PMD clause
- Clause 73 – Auto-Negotiation for Backplane Ethernet
  - Add Technology ability bit for “40GBASE-KR4”
- Clause 74 – Forward error correction for 10GBASE-R
  - Changes for 4 lane KR operation, possibly FEC synchronization
- Clause 74A – FEC block coding examples
  - Do not expect changes, may need additional patterns for 4 lanes



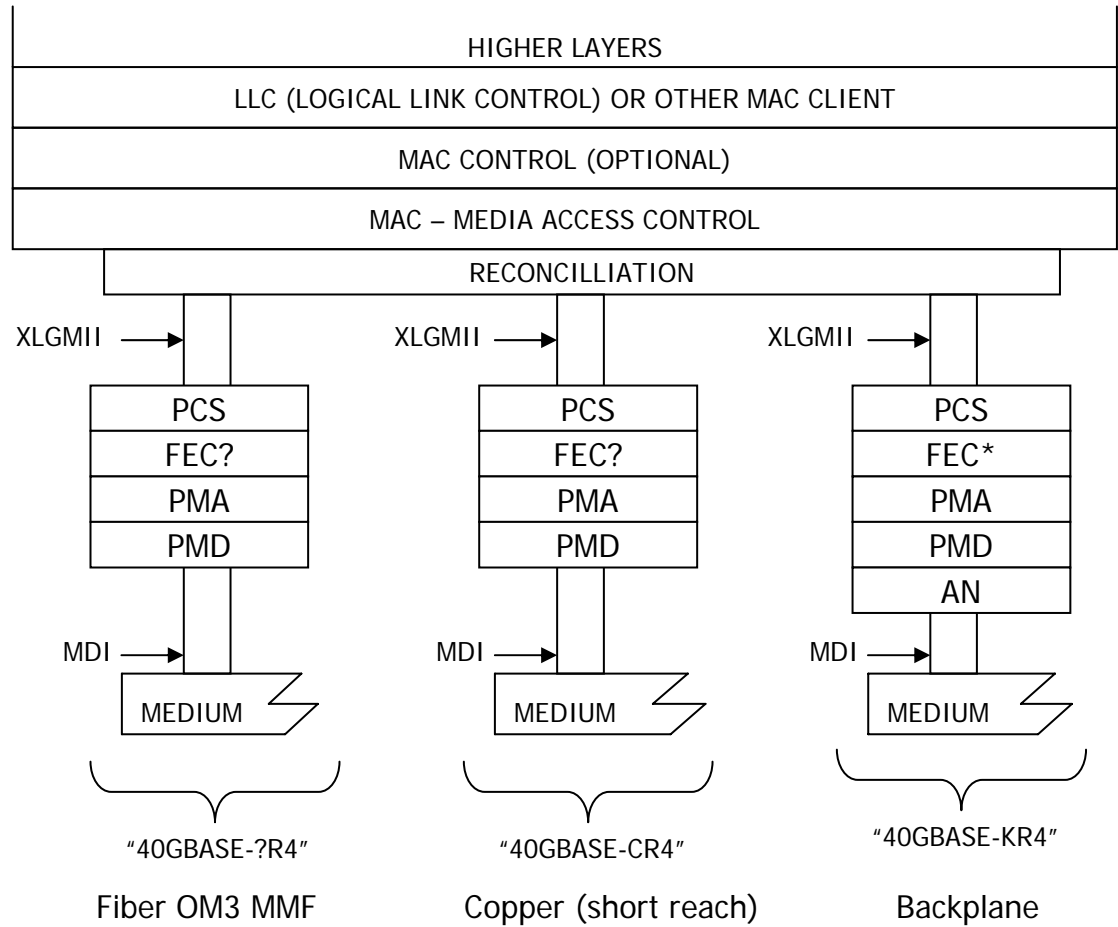
# New clauses

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- Listed potential new clauses below:
  - New clause structure will evolve as high speed task force adopts new proposals
  - New clause numbers will be determined in cooperation with other amendment projects
- Introduction to 40Gb/s and 100Gb/s operation

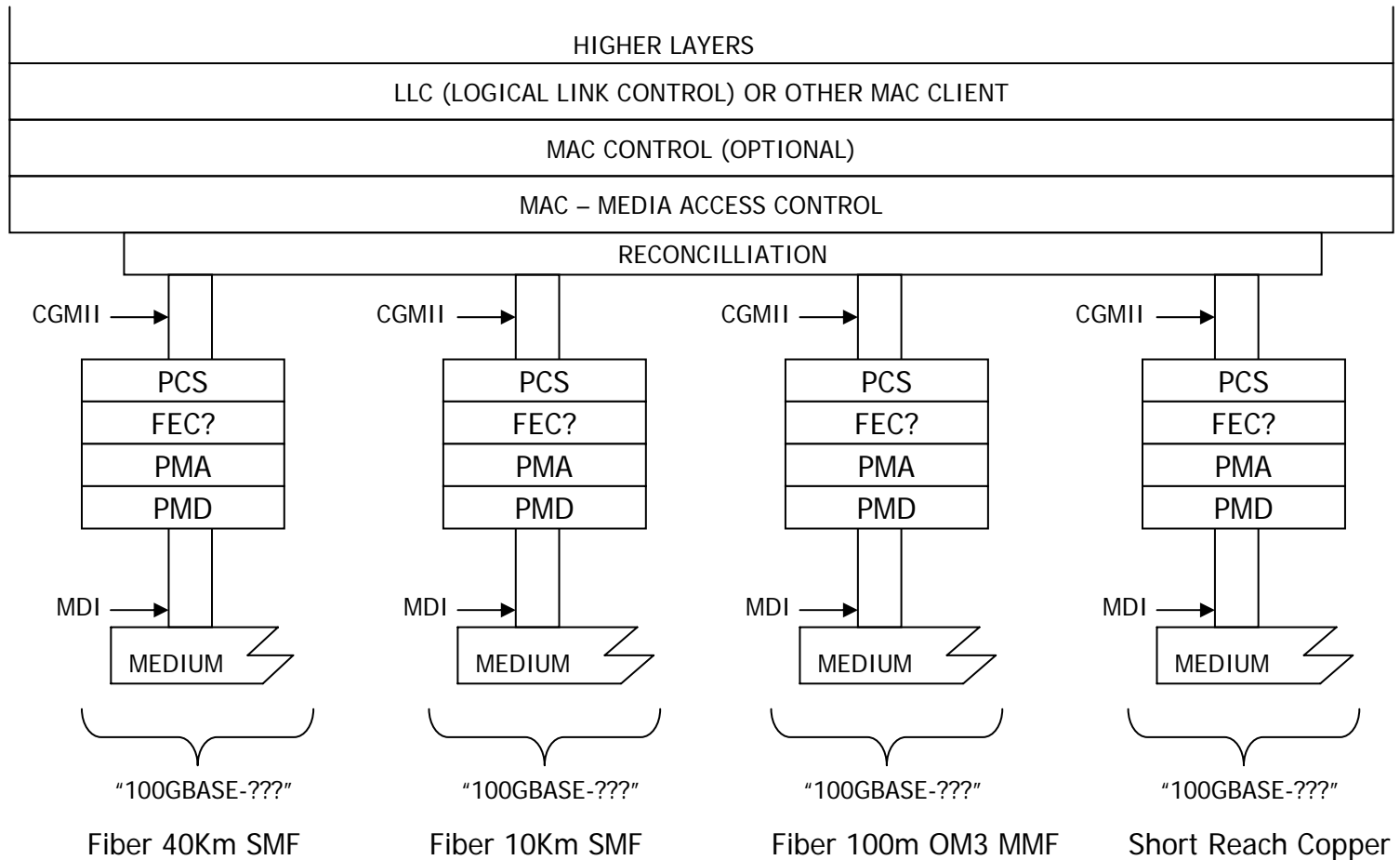
# Possible 40Gb/s layer diagram

- Possible layer diagram based on discussions in HSSG
- Assumptions
  - 4 lanes of 10G
  - R PCS (64b/66b coding)



Note: \* optional

# Possible 100Gb/s layer diagram





# Possible new clauses (1)

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- Reconciliation Sublayer and Media Independent Interface
  - One or two clauses as appropriate for adopted baseline proposals
- xGMII Extender Sublayer clause(s) if included in adopted baseline proposals
- Physical Coding Sublayer
  - One or two clauses as appropriate for adopted baseline proposals
    - Some proposals may reference existing PCS
- Physical Medium Attachment Sublayer
  - One or two clauses as appropriate for adopted baseline proposals
    - Would be two clauses if different 4 lane and 10 lane PMA is adopted



# Possible new clauses (2)

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- Physical Medium Dependant Sublayer
  - 40Gb/s operation over a backplane medium
    - Some proposals may reference existing KR
  - 40Gb/s and 100Gb/s operation over 10m copper cable assembly
    - One or two clauses as appropriate for adopted baseline proposals



# Possible new clauses (3)

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- Examples of possible PMD clauses
  - 40Gb/s operation over 100m OM3 MMF
  - 100Gb/s operation over 40Km on SMF
  - 100Gb/s operation over 10Km on SMF
  - 100Gb/s operation over 100m OM3 MMF
    - This may be a single clause for 40Gb/s and 100Gb/s operation depending on solutions adopted
- Additional annexes to describe test methods, channel characteristics, coding details, etc.,
- PICS: In case of single clause for 40 and 100Gb/s sublayer(s) , separate PICS tables for 40 and 100Gb/s



# Summary

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- P802.3ba to be an amendment to IEEE Std 802.3-200x
  - P802.3ay expected to be approved in 2008
- Extent of changes to existing clauses and new clauses will evolve when higher speed task force adopts proposals
  - Proposals should be adopted in sets that work together
  - Proposals should be complete for consideration as baseline proposals
- Start building consensus on architecture, interfaces and layer diagrams