Updates to Clause 1

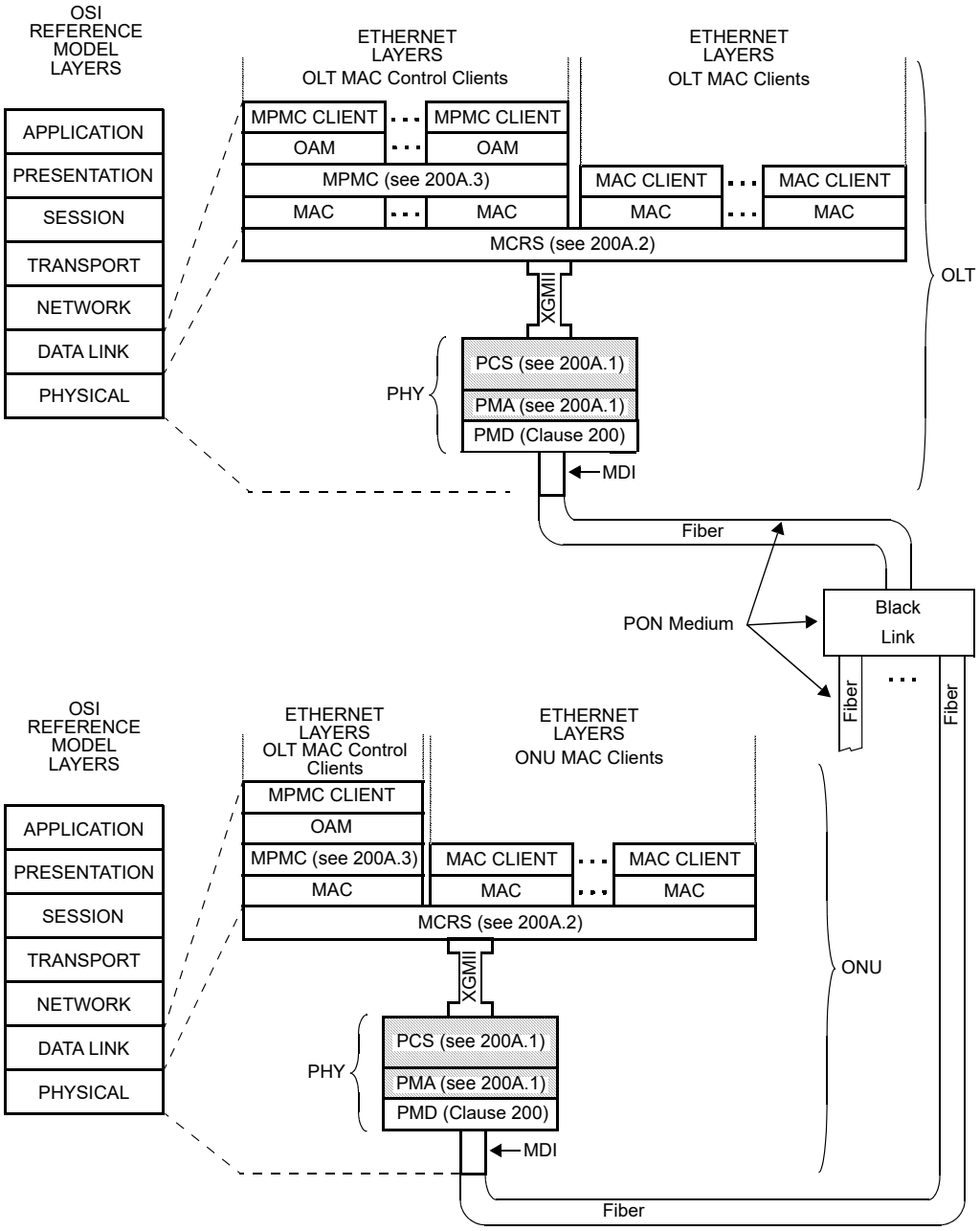
1.4.245c EQT: The unit of measurement of time for time-related parameters specified in Clause 144 and Clause 200 Multipoint MAC Control. Each EQT is equal to the time required to transmit one EQ between the MCRS and the PCS in the downstream direction. When an EQ is transmitted across 25GMII (Clause 144), the EQT is equal to 2.56 ns. When an EQ is transmitted across XGMII (Clause 200), the EQT is equal to 6.4 ns.

Annex 200A (Normative)

Physical Coding Sublayer, Physical Media Attachment, Reconciliation Sublayer, and Multipoint MAC Control Sublayer for Super-PON

The Super-PON Physical Coding Sublayer, Physical Media Attachment, Reconciliation Sublayer, and Multipoint MAC Control Sublayer are respectively based on the Nx25G-EPON Physical Coding Sublayer and Physical Media Attachment (see clause 142), Reconciliation Sublayer (see clause 143), and Multipoint MAC Control Sublayer (see clause 144). This annex specifies extensions to clause 142, 143, and 144 to make them suitable for Super-PON.

200A.1 Extensions to Nx25G-EPON Physical Coding Sublayer and Physical Media Attachment (clause 142) for Super-PON

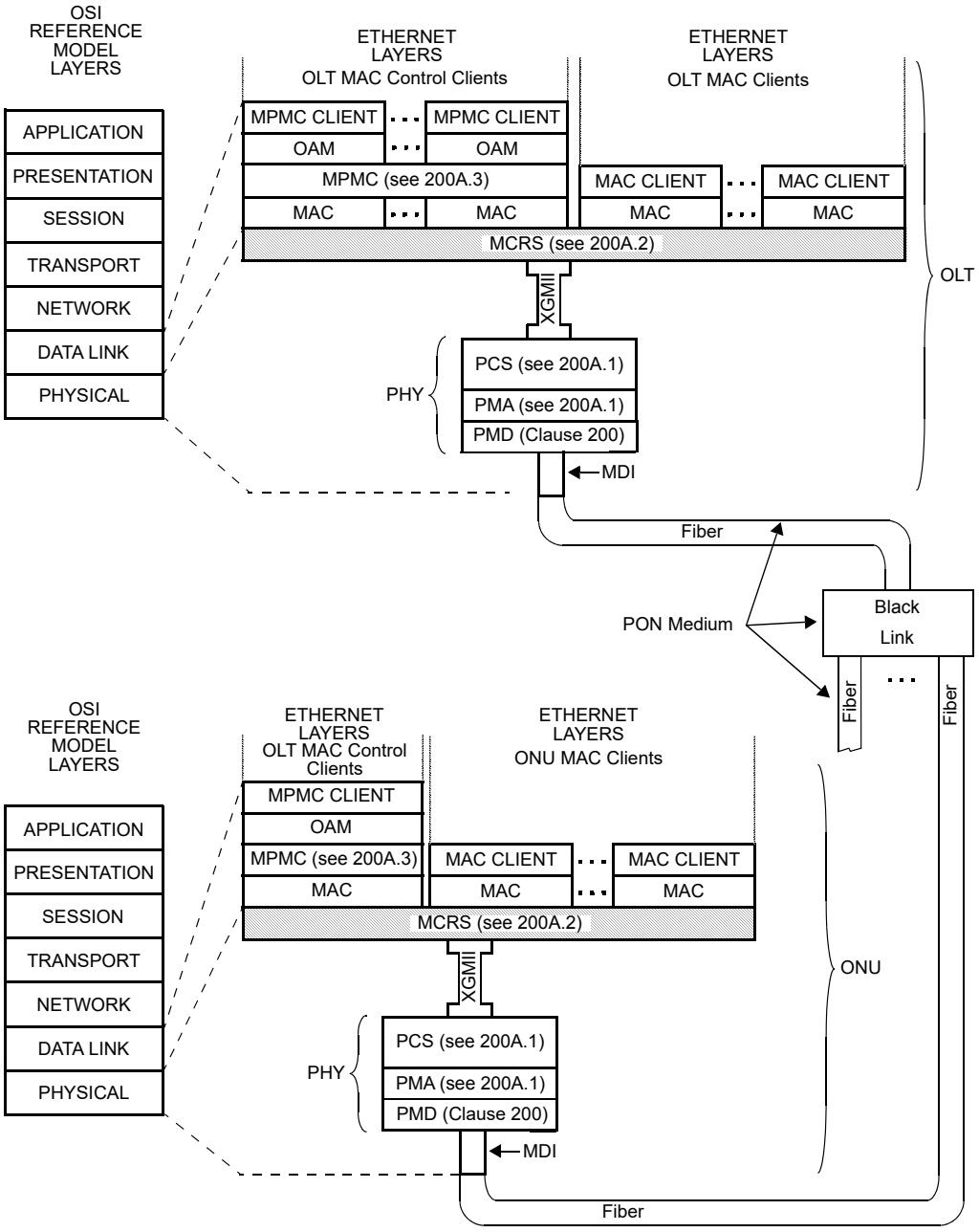


PCS and PMA described in this subclause

XGMII= 210GIGABIT MEDIA INDEPENDENT INTERFACE
MDI = MEDIUM DEPENDENT INTERFACE
OAM = OPERATIONS, ADMINISTRATION & MAINTENANCE
OLT = OPTICAL LINE TERMINAL
MCRS= MULTI-CHANNEL RECONCILIATION SUBLAYER
MPMC= MULTI-POINT MAC CONTROL
ONU = OPTICAL NETWORK UNIT
PCS = PHYSICAL CODING SUBLAYER
PHY = PHYSICAL LAYER DEVICE
PMA = PHYSICAL MEDIUM ATTACHMENT
PMD = PHYSICAL MEDIUM DEPENDENT

Figure 200A–1—Relationship of EPON P2MP PMD to the ISO/IEC OSI reference model and the IEEE 802.3 Ethernet model

200A.2 Extensions to Nx25G-EPON Reconciliation Sublayer (clause 143) for Super-PON

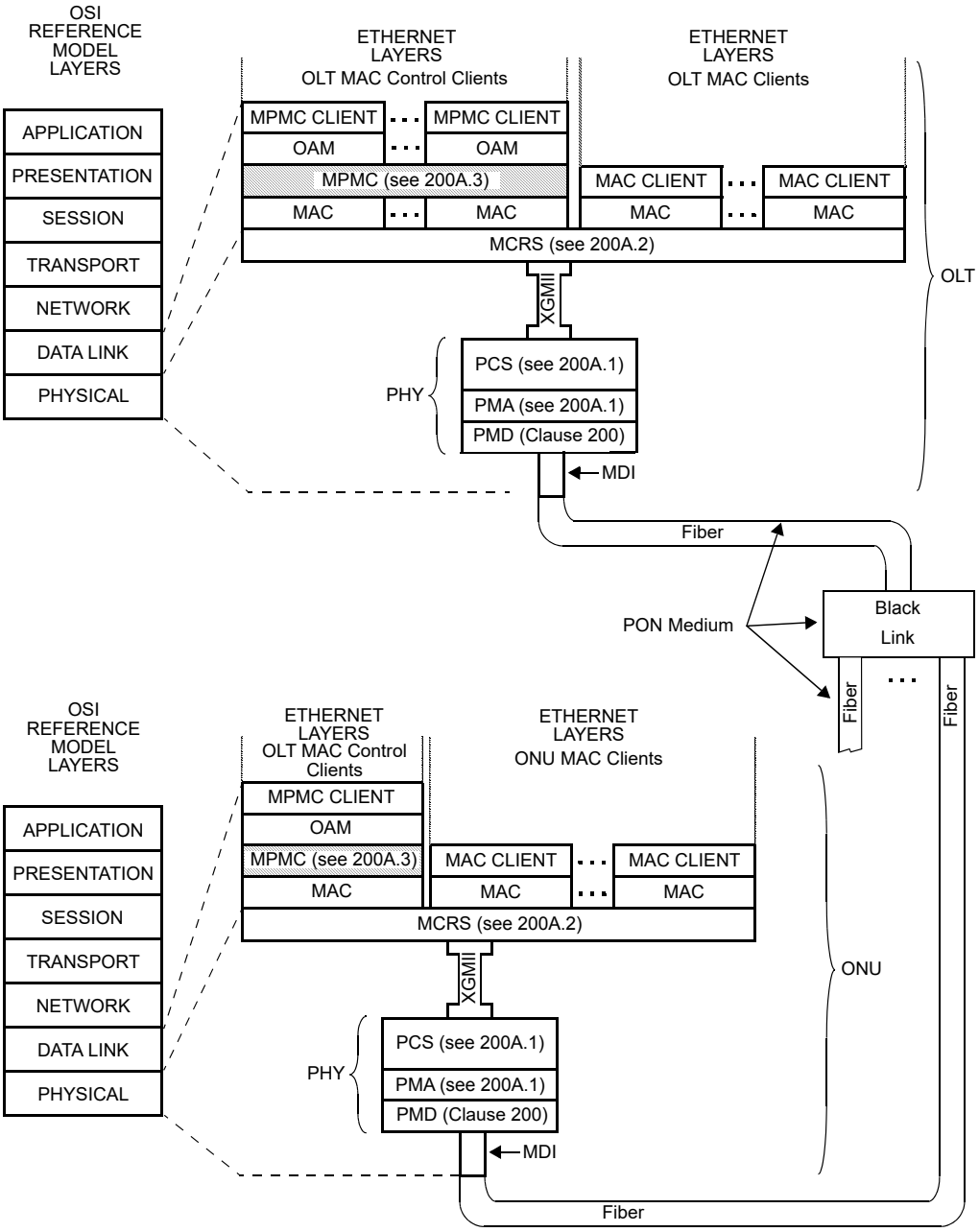


MCRS described in this subclause

XGMII= 10 GIGABIT MEDIA INDEPENDENT INTERFACE
MDI = MEDIUM DEPENDENT INTERFACE
OAM = OPERATIONS, ADMINISTRATION & MAINTENANCE
OLT = OPTICAL LINE TERMINAL
MCRS= MULTI-CHANNEL RECONCILIATION SUBLAYER
MPMC= MULTI-POINT MAC CONTROL
ONU = OPTICAL NETWORK UNIT
PCS = PHYSICAL CODING SUBLAYER
PHY = PHYSICAL LAYER DEVICE
PMA = PHYSICAL MEDIUM ATTACHMENT
PMD = PHYSICAL MEDIUM DEPENDENT

Figure 200A–2—Relationship of EPON P2MP PMD to the ISO/IEC OSI reference model and the IEEE 802.3 Ethernet model

200A.3 Extensions to Nx25G-EPON Multipoint MAC Control (clause 144) for Super-PON



MPMC described in this subclause

XGMII= 10 GIGABIT MEDIA INDEPENDENT INTERFACE
MDI = MEDIUM DEPENDENT INTERFACE
OAM = OPERATIONS, ADMINISTRATION & MAINTENANCE
OLT = OPTICAL LINE TERMINAL
MCRS= MULTI-CHANNEL RECONCILIATION SUBLAYER
MPMC= MULTI-POINT MAC CONTROL
ONU = OPTICAL NETWORK UNIT
PCS = PHYSICAL CODING SUBLAYER
PHY = PHYSICAL LAYER DEVICE
PMA = PHYSICAL MEDIUM ATTACHMENT
PMD = PHYSICAL MEDIUM DEPENDENT

Figure 200A–3—Relationship of EPON P2MP PMD to the ISO/IEC OSI reference model and the IEEE 802.3 Ethernet model

200A.3.1 Overview

This clause defines the mechanisms and control protocols required in order to reconcile Super-PON networks into the Ethernet framework.

The functions of the Multipoint MAC Control for Super-PON include allocation of transmission resources in EPON, discovery and registration of EPON devices, and reporting queue occupancy to higher layers to facilitate dynamic bandwidth allocation schemes and statistical multiplexing across the PON.

Operation of Super-PON is defined as an extension of Nx25G-EPON operation. Therefore, this subclause predominantly references the specification defined in Clause 144 with the exceptions listed below.

200A.3.2 Allowed drift threshold

The drift threshold represents the maximum amount of timestamp drift allowed in a system. Exceeding this threshold causes ONU deregistration. The value of the drift threshold is represented by DRIFT_THOLD constant, which in Super-PON is defined as follows:

DRIFT_THOLD

Type: Integer
Description: This constant holds the maximum amount of drift allowed before a timestamp drift error is declared. Exceeding this drift causes ONU deregistration (either self-deregistration or deregistration by the OLT).
Value: 2 (for the receive channels operating at 10 Gb/s) or 3 (for the receive channels operating at 2.5 Gb/s)
Unit: EQT

200A.3.3 Delay variability requirements

The MPCP protocol relies on strict timing based on distribution of timestamps. A compliant implementation needs to guarantee a constant delay through the MAC and PHY in order to maintain the correctness of the timestamping mechanism. The actual delay is implementation dependent; however, a complying implementation shall maintain the combined delay variation through the MAC and PHY of less than one EQT for channels operating at 10.3125 GBd and less than two EQTs for channels operating at 2.578125 GBd.

200A.3.4 Discovery margin

DISCOVERY_MARGIN

Type: Integer
Description: This constant holds the extra margin reserved at the end of a discovery grant to accommodate the largest possible round-trip time on a given ODN. The round-trip time also includes any internal delays in the OLT and ONU, such as FEC encoding and decoding delays.
Value: 78,906 (505 μs for ODN with 50 km reach)
Unit: EQT