IEEE P802.3bf
Time Synchronization

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This contribution reuses material from law_1_0110.pdf
submitted to the IEEE 802.3bf Interim Meeting, New Orleans, January 2010 and
siepon_1002_hajduczenia.pdf

IEEE P802.3bf Background

- Before the IEEE P802.3bf TF was formed …
  - Work on Ethernet time synchronization started in 2004 within the Residential Ethernet Study Group (RESG SG) in IEEE 802.3 WG
  - RESG determined that the project was best suited for the IEEE 802.1 WG
  - IEEE 802.1 WG created the Audio-Video Bridging Group (802.1 AVB)
 - At the time, it was understood that there would be an 802.3 component to support the 802.1 AVB work

IEEE P802.3bf Background

- and where IEEE 802.3 is now…
  - Ethernet Support for the IEEE P802.1AS Time Synchronization Protocol Task Force (IEEE P802.3bf) started work in January 2010
  - IEEE P802.3bf is also commonly referenced to as "Time Sync" for short
  - IEEE P802.3bf Draft 0.3 is current as of 2010.05
    - draft 0.4 is expected to be released out of May 2010 meeting
  - IEEE P802.3bf intends to request Working Group ballot in July 2010
    - on draft 0.4
   - might be updated to 1.0 to keep numbering consistent …

IEEE P802.3bf Objectives

- **Formal objectives:**
  - Provide an accurate indication of the transmission and reception initiation times of certain packets as required to support IEEE P802.1AS.

- **Informal objectives:**
  - Restrict changes to IEEE 802.3 base document
  - Provide PHY agnostic solution, capable of supporting existing and future 802.3 PHYs
  - Provide open architecture, which can be scaled to higher data rate PHYs

IEEE P802.3bf Architecture

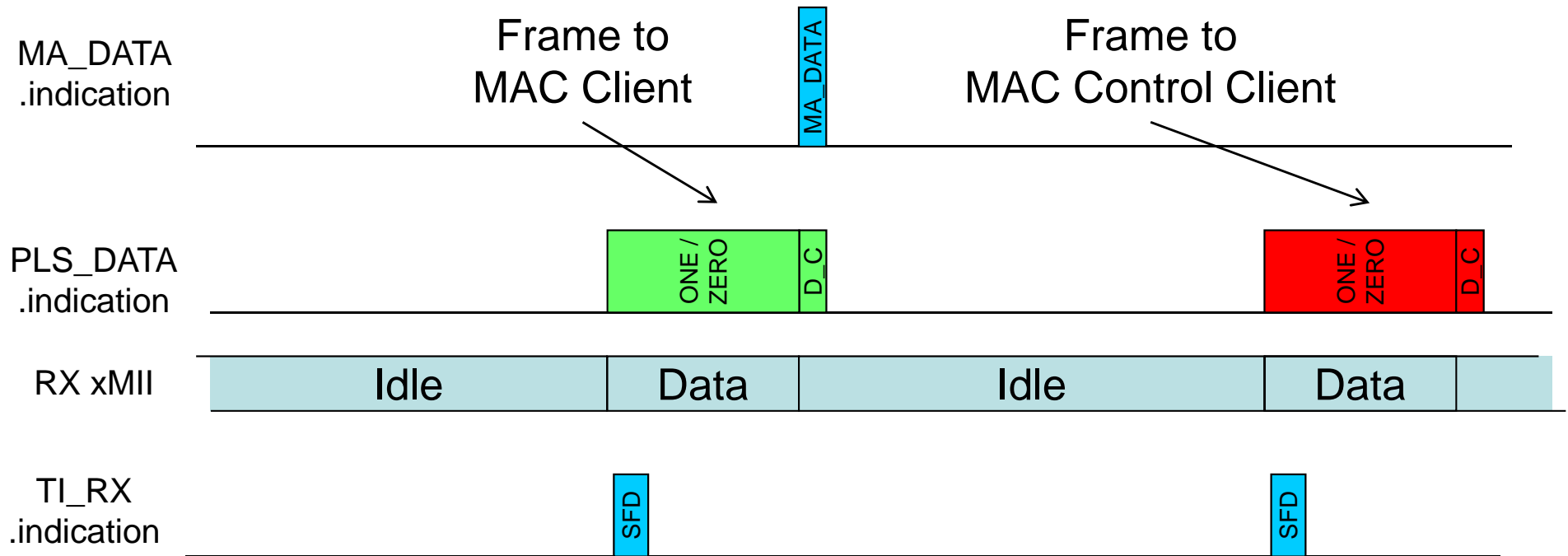**Joint IEEE 802/ITU Workshop
Geneva May 2010**
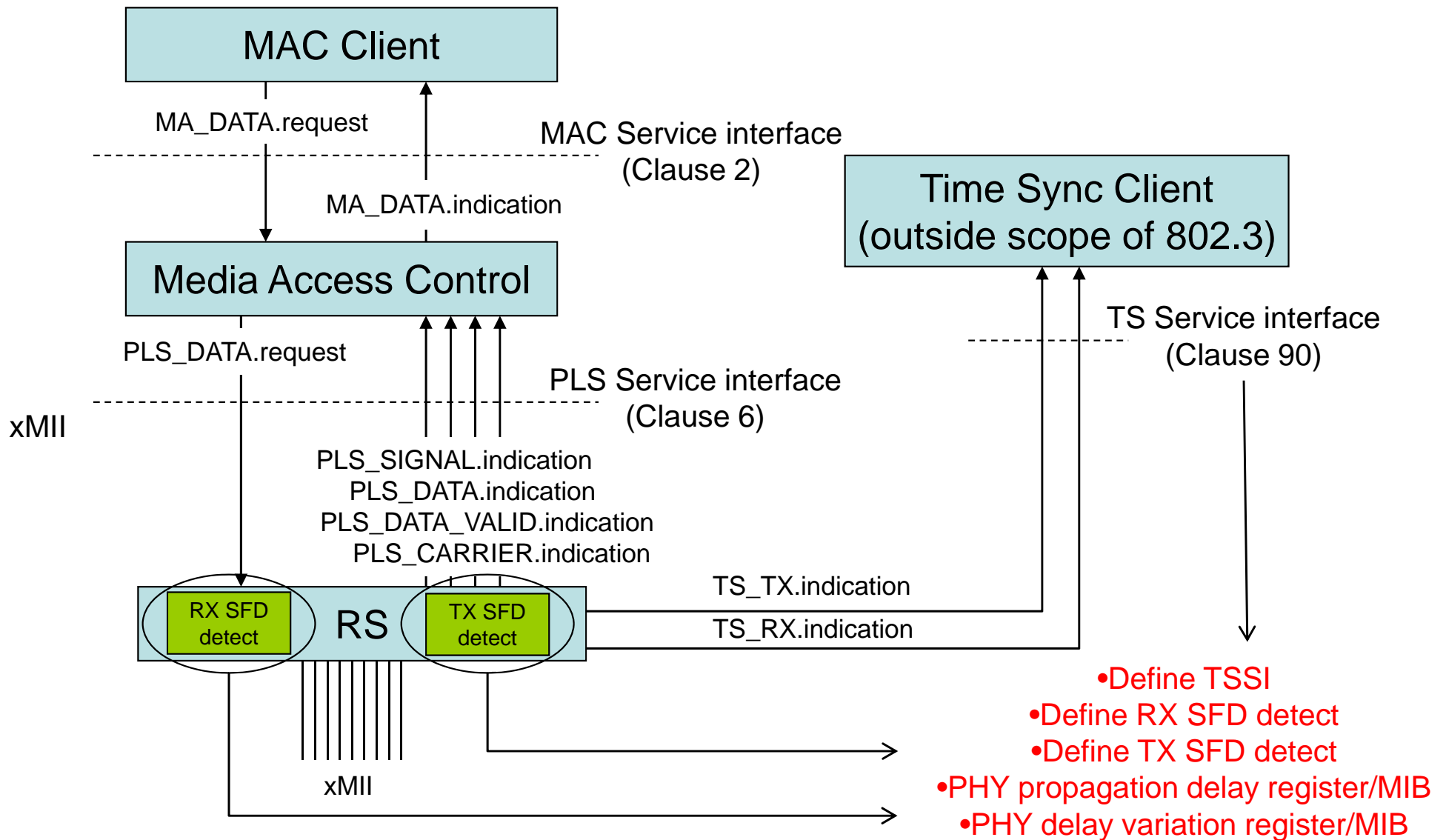
Service primitive generation - downstream
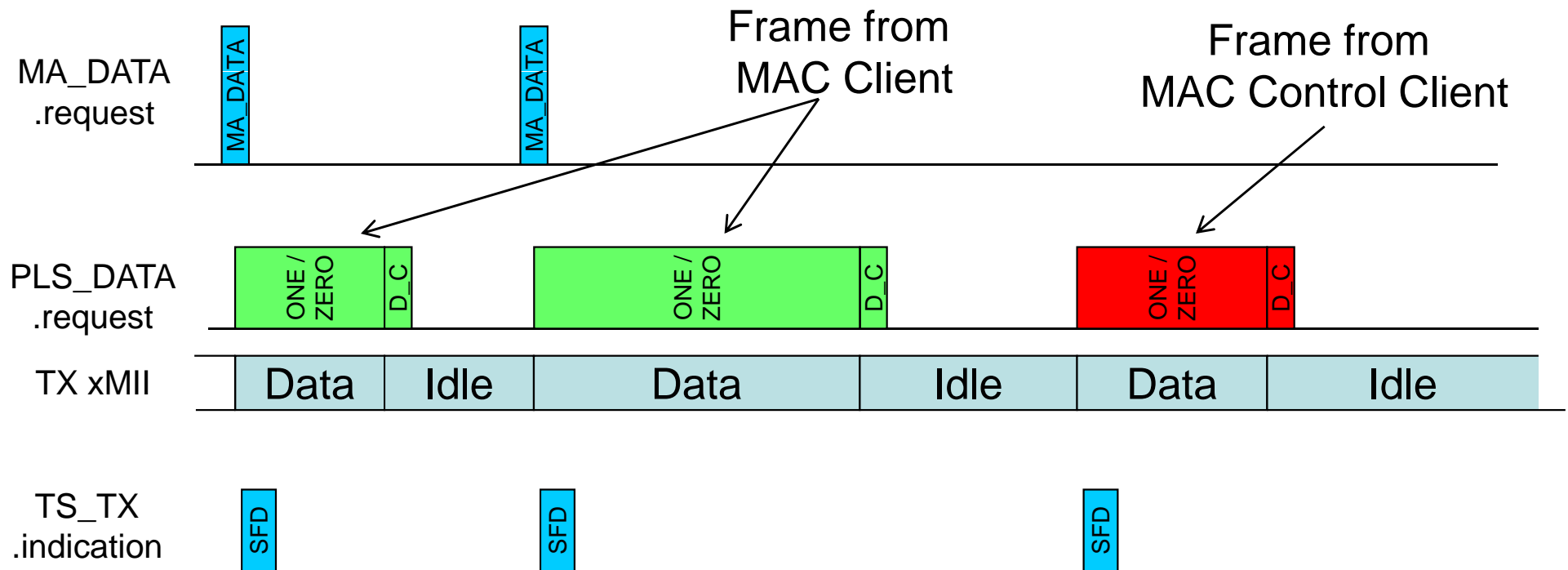
- Frames may be generated by MAC Control Client and not by MAC Client
  - In that case, MA_DATA.request is not generated (nothing is passed through the MAC Service Interface)
  - TS_TX.indication will be generated nonetheless (there is a frame passed through the xMII)

Service primitive generation - upstream

MA_DATA .indication

Frame to MAC Client

MA_DATA

Frame to MAC Control Client

PLS_DATA .indication

ONE / ZERO | D_C

ONE / ZERO | D_C

RX xMII

Idle | Data | Idle | Data

TI_RX .indication

SFD

SFD

- Frames may be addressed to MAC Control Client and not to MAC Client
    - In that case, MA_DATA.indication is not generated (nothing is passed through the MAC Service Interface)
    - TS_RX.indication will be generated nonetheless (there is a frame passed through the xMII)

IEEE 802.3bf applications

- Provides an accurate indication of the transmission and reception times of all packets
  - direct use case in IEEE P802.1AS
  - there is nothing preventing other use cases as well
    - TSSI is defined in an abstract manner and it is not bound to a specific PHY / PHY class
    - IEEE 1588v2 could also use IEEE P802.3bf TSSI interface for support of transparent clocks

IEEE 802.3bf project information

- **Primary website**
  - http://www.ieee802.org/3/bf/

- **Public folder**
  - http://www.ieee802.org/3/bf/public/index.html

- **Private folder**
  - http://www.ieee802.org/3/bf/private/

- **IEEE 802.3bf PAR**
  - http://www.ieee802.org/3/bf/P802.3bf.pdf

- **IEEE 802.3bf 5 Criteria**
  - http://www.ieee802.org/3/time_adhoc/P802_3bf_5Criteria_802_3_approved_1109.pdf

- **IEEE 802.3bf Objectives**
  - http://www.ieee802.org/3/time_adhoc/P802_3bf_objective_802_3_approved_1109.pdf

- **Email reflector**
  - http://www.ieee802.org/3/bf/reflector.html

Questions?

Backup
# Slides

Abstract Service Interface

- Clause 2 MAC Service Interface example

MA_DATA.request (destination_address, source_address, mac_service_data_unit, frame_check_sequence)

This primitive defines the transfer of data from a MAC client entity to a single peer entity or multiple peer entities in the case of group addresses.

MAC Client output
MA_DATA.request
(MAC Service
interface)

MA_DATA .request(..)   MA_DATA .request(..)

- Clause 6 Physical Signaling (PLS) service Interface example

PLS_DATA.request (OUTPUT_UNIT)

The OUTPUT_UNIT parameter can take on one of three values: ONE, ZERO, or DATA_COMPLETE and represent a single data bit. The DATA_COMPLETE value signifies that the Media Access Control sublayer has no more data to output.

MAC output
PLS_DATA.request
(PLS Service
interface)

ZERO ZERO ZERO ZERO ONE ZERO ONE D_C   ONE ZERO ONE ZERO ONE ZERO
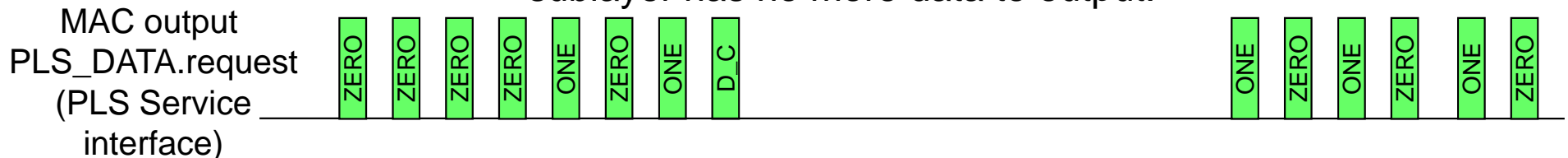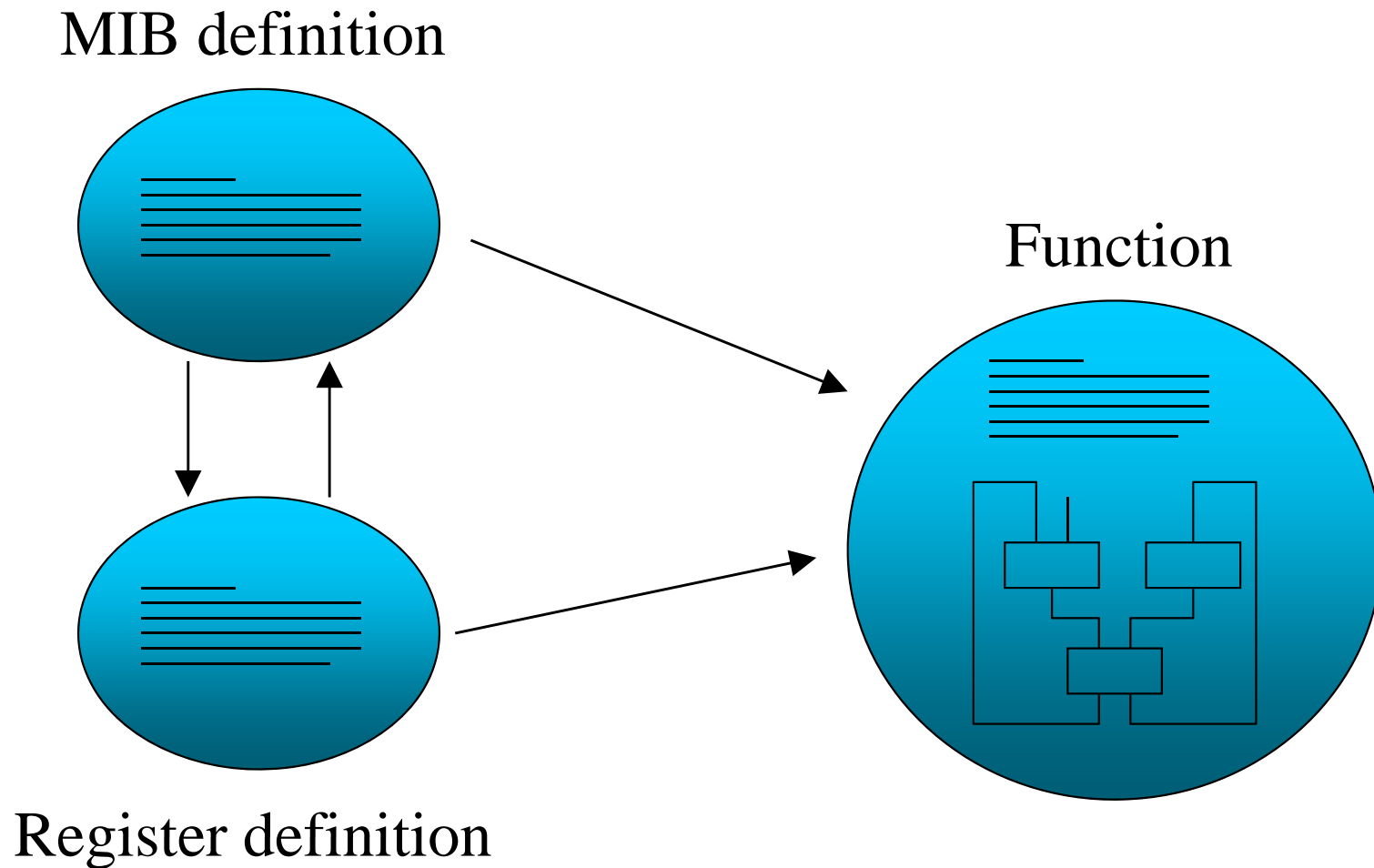
NOTE – The above is only an **illustration** of the abstract messages passing interface – messages are instantaneous

Review of management architecture
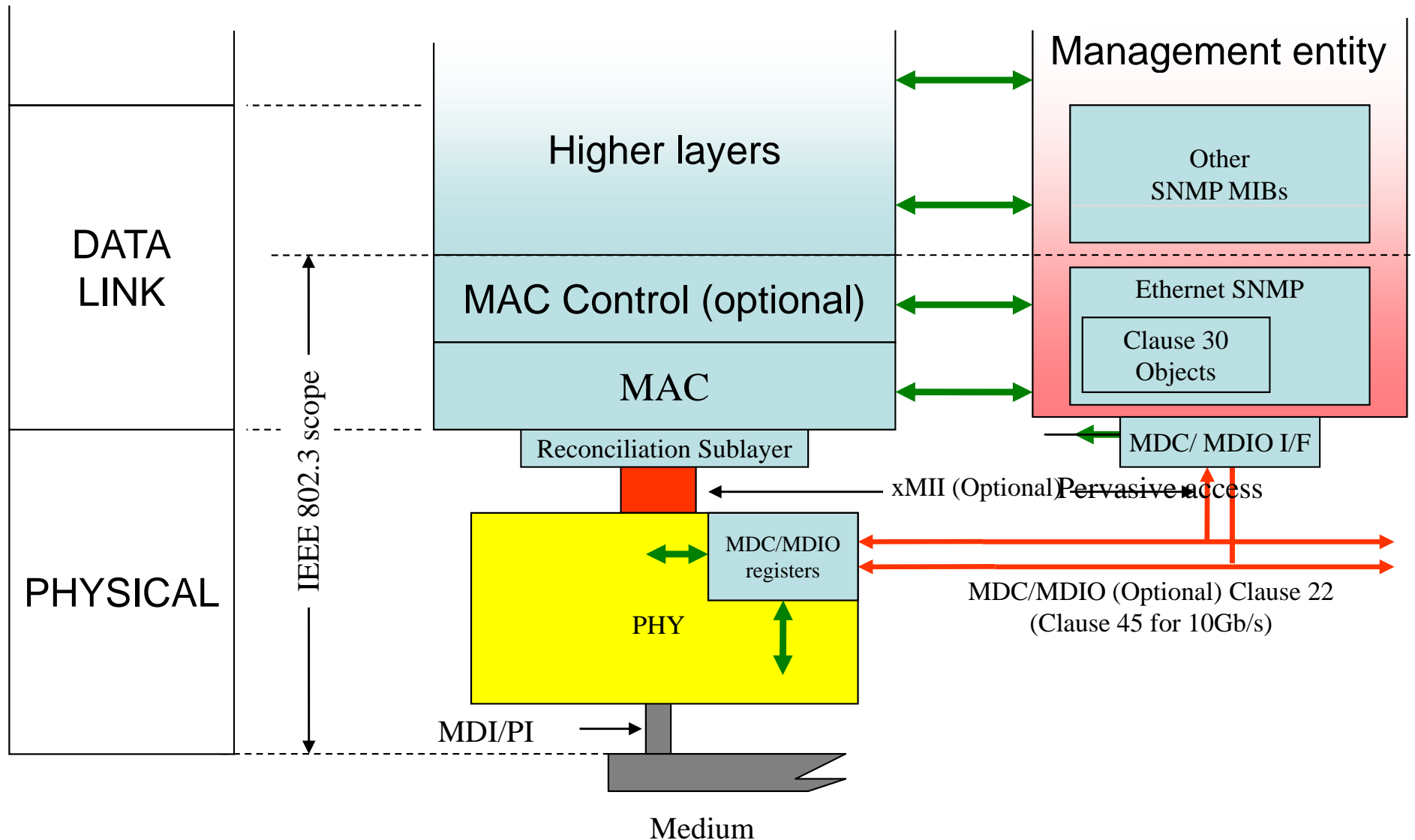
MIB, Registers and Function

Function in PHY needs register access to make it manageable

MIB definition

Function

Register definition

Review of sublayers and interfaces

MAC Client

MA_DATA.request

MA_DATA.indicate

MA_Control.request

MA_Control.indicate

Clause 2

MAC Control

MA_DATA.request

Clause

MA_DATA.indicate

Media Access Control

PLS_DATA.request

Clau

PLS_SIGNAL.indication

PLS_DATA.indication

PLS_DATA_VALID.indication

PLS_CARRIER.indication

RS

Clause 22/35/46

xMII

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