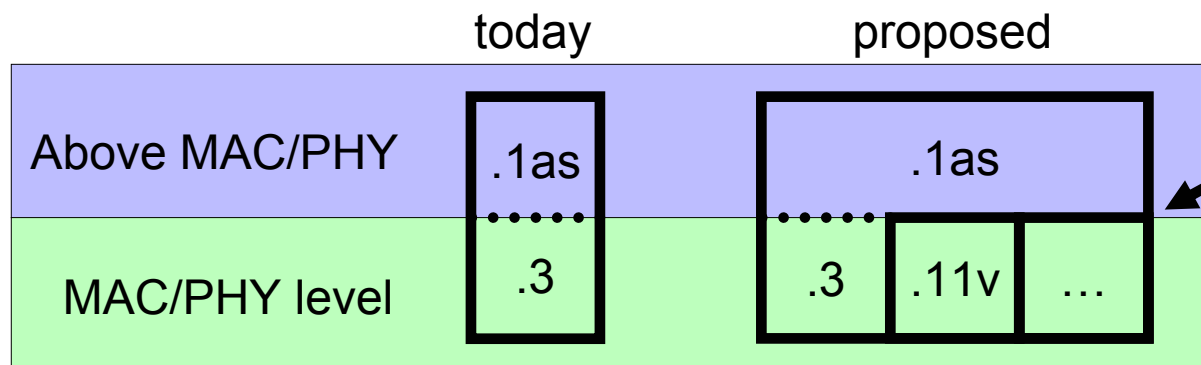


AV Time Synchronization Model

Dirceu Cavendish
NEC Labs

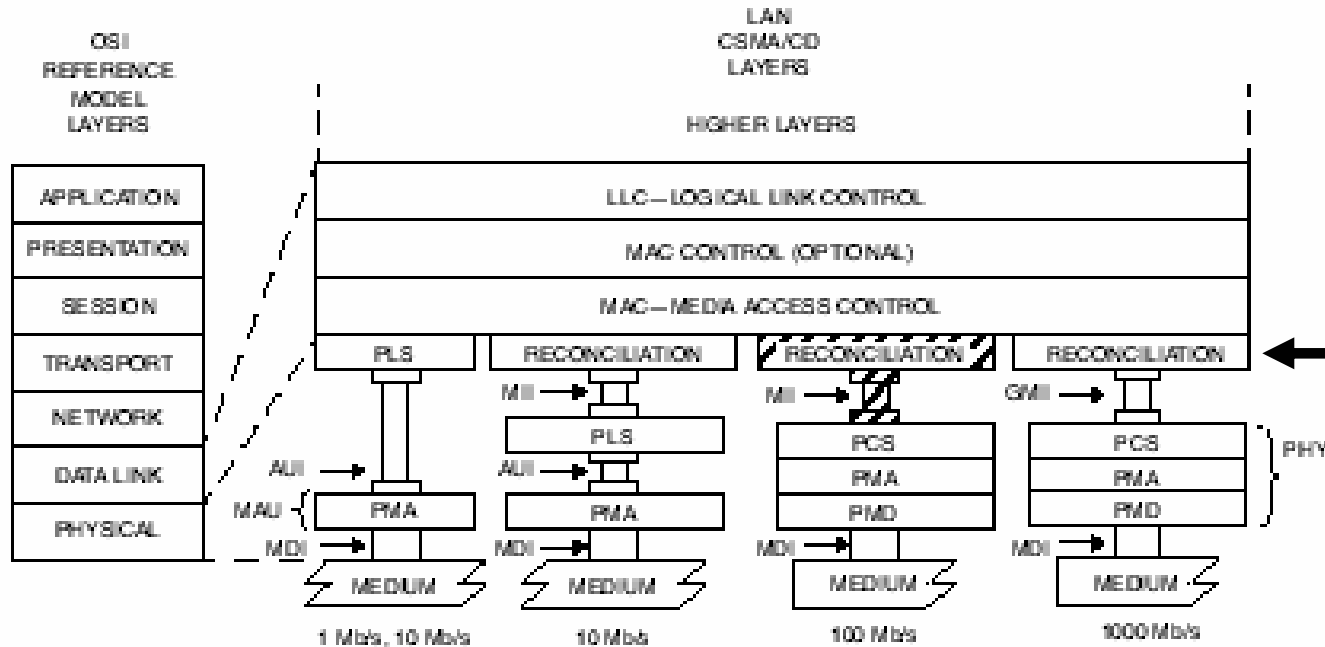
GOALS



802.1as will extend the service interface with timestamp. We must ensure the extension is generic enough to work for .11

- Define interoperability features
 - Bridging “Time” from one LAN to another
 - Interoperation between LANs
 - Define extension to MAC Service Interface to get timestamps
- Measurement:
 - Define timestamp snapshot precisely across various PHYs (.3, .11)
 - Define measurement accuracy options
- Protocol:
 - Define “Generic Messages” example
 - Would be used for 802.3 networks
 - Non 802.3 media would use the “Generic Messages” or define their own

802 architecture and timestamps



Frame TX timing

Delay tolerance

802.3-2002

Table 35-5 GMII

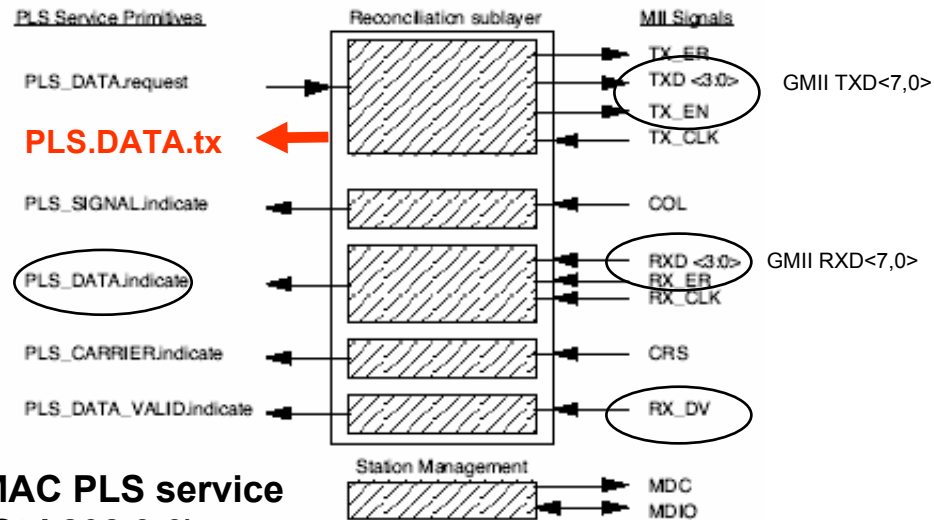
(48bits from TX_EN)

AUI = ATTACHMENT UNIT INTERFACE
 MDI = MEDIUM DEPENDENT INTERFACE
 MII = MEDIA INDEPENDENT INTERFACE
 GMII = GIGABIT MEDIA INDEPENDENT INTERFACE
 MAU = MEDIUM ATTACHMENT UNIT

PLS = PHYSICAL LAYER SIGNALING
 PCS = PHYSICAL CODING SUBLAYER
 PMA = PHYSICAL MEDIUM ATTACHMENT
 PHY = PHYSICAL LAYER DEVICE
 PMD = PHYSICAL MEDIUM DEPENDENT

Proposal for Time/sync in 802.3 architecture

(G)MII Reconciliation sublayer (Std 802.3-2002 35.2.1)



MAC PLS service (Std 802.3 6)

PLS_DATA.request (6.3.1.1) : MAC request to transmit a single PLS data_unit (frame?/bit?)

PLS_DATA.indicate (6.3.1.2): Generated to all MAC sublayers after a PLS_DATA.request is issued

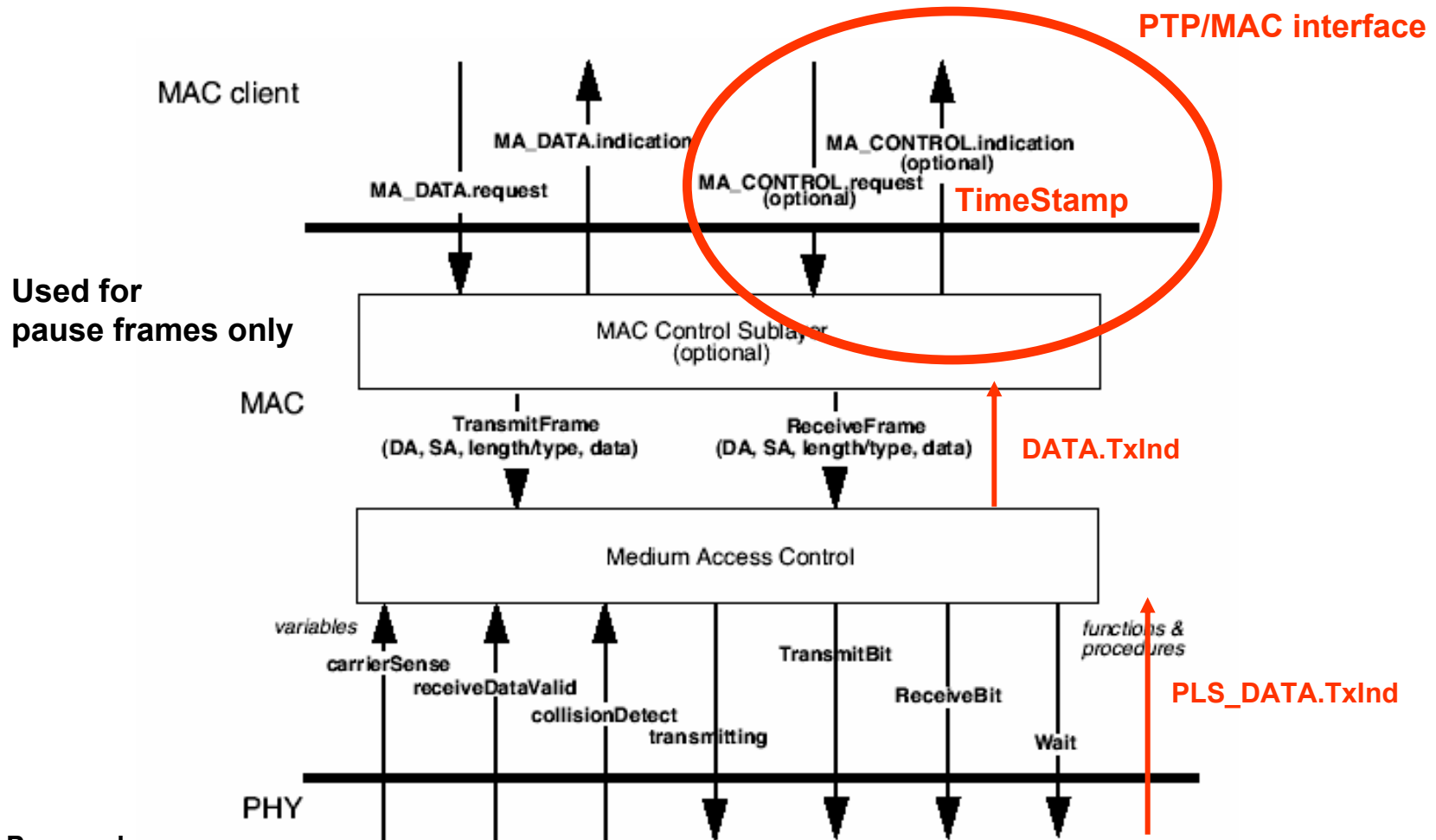
PLS_DATA.tx (6.3.1.X): new primitive, for transmission timestamp

ISSUES:

-Not clear what a PLS data_unit is – 802.3 frame/bit?

-Not clear when PLS_DATA.indicate is issued as related to an incoming data/frame

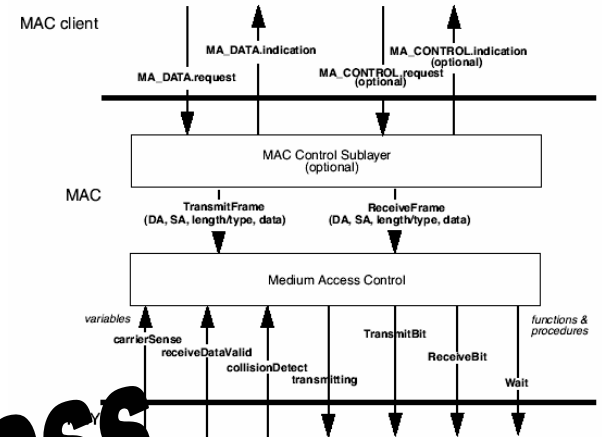
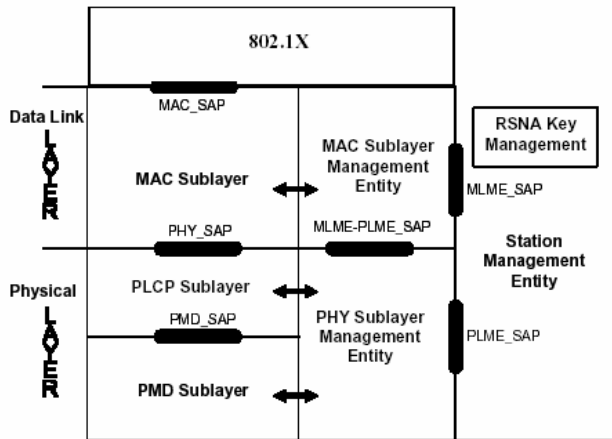
Proposal for Time/sync in 802.1 architecture



Proposal:

- MAC client implements PTP protocol (via MA_CONTROL interface?)
- MAC Control Optional sublayer handles timestamp support
- MAC sublayer needs to generate DATA.TxInd (optional flag at TransmitFrame MAC service?)
- MAC sublayer needs to receive (and filter?) PLS_DATA.TxInd

Time/sync in 802.11 architecture



Work In Progress

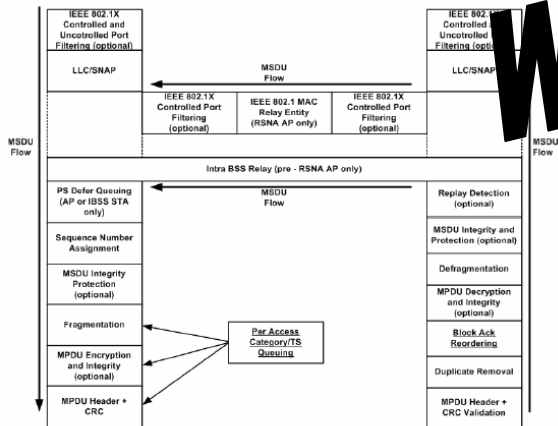


Figure 18—MAC data plane architecture

PLS_DATA.indicate : used for reception timestamp
 PLS_DATA.tx : new primitive, for transmission timestamp

Proposal:
 -Sync/Followup
 -Pdelay/Resp

Proposal:
 - Timestamping

dataTx

dataTx

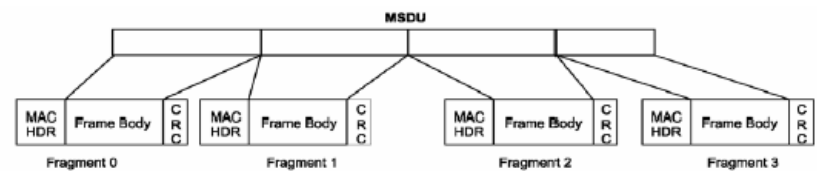


Figure 155—Fragmentation