

MPCP: Time Markers in the PHY

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Introduction

- ❑ **PHY marker is a new idle code**
- ❑ **In Upstream:**
 - Marker represents start of slot
- ❑ **In Downstream:**
 - Marker represents a reference timer

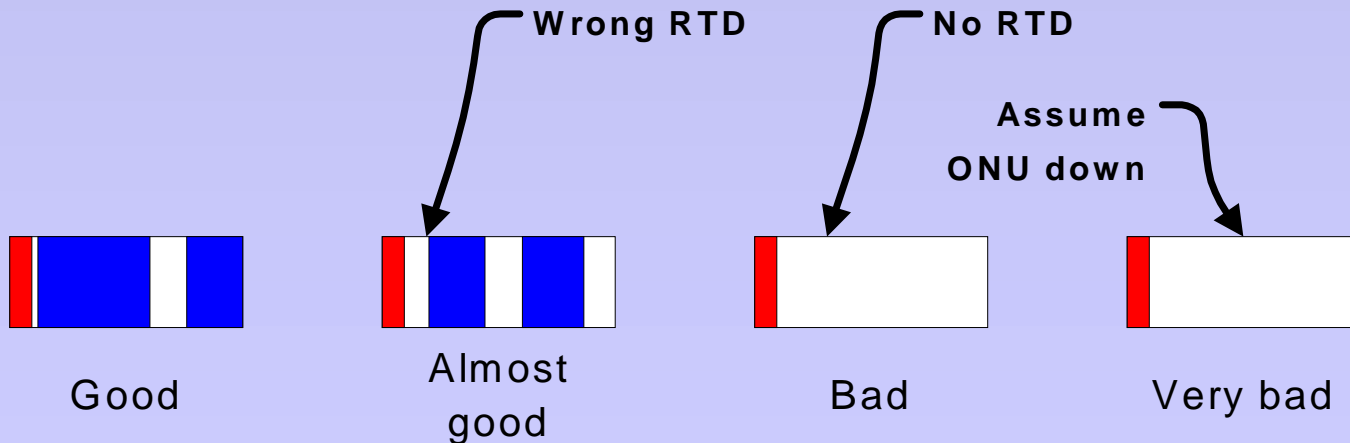
What Do We Do With It?

Upstream

- ❑ Accurately measure round trip delay
- ❑ Passively monitor RTD
- ❑ Fault detection

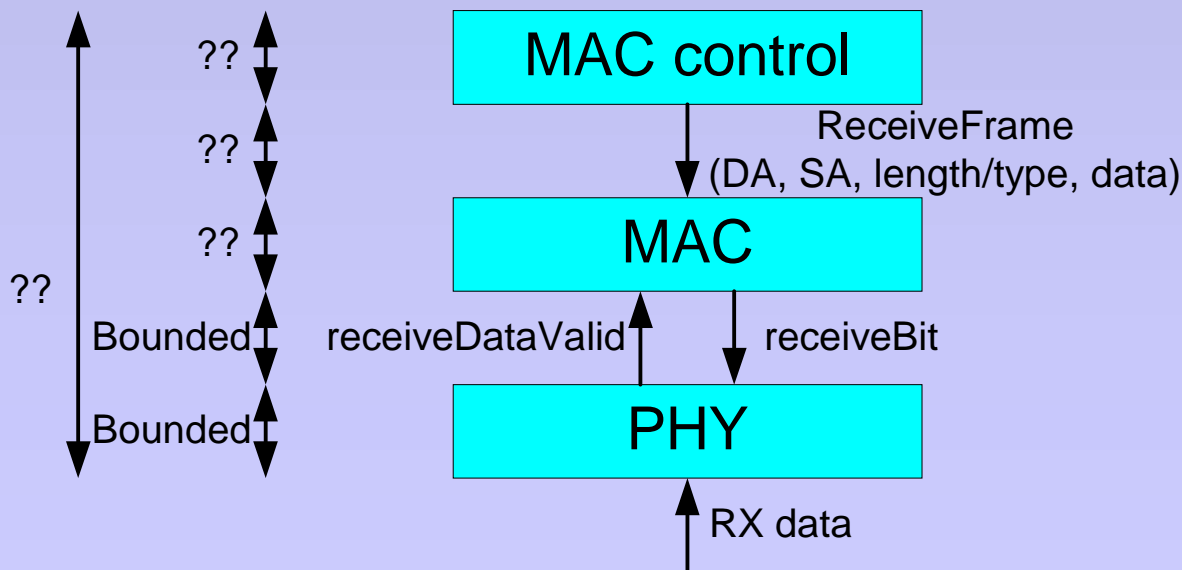
RTD Measurement

- Upstream marker allows OLT to measure accurately round trip delay of ONU
- Measurement is independent of user traffic
 - Existence and transmission phase
- Measurement is continuous



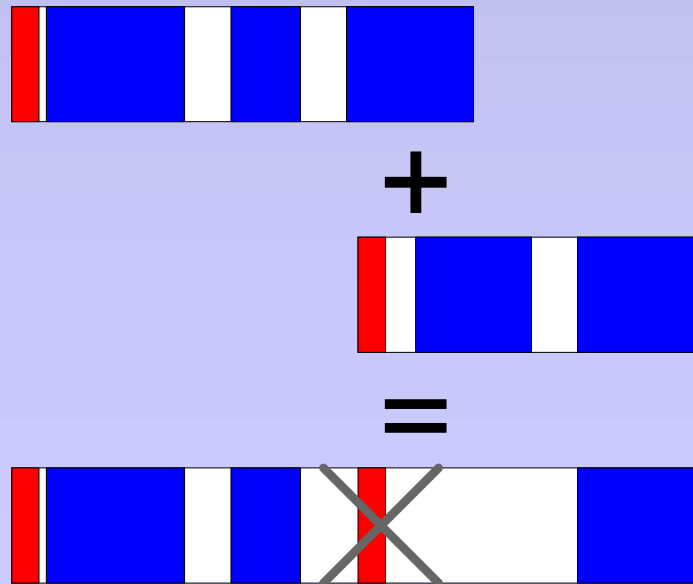
Measuring Packet Arrival

- Data-path timing is ambiguous and unreliable in 802.3



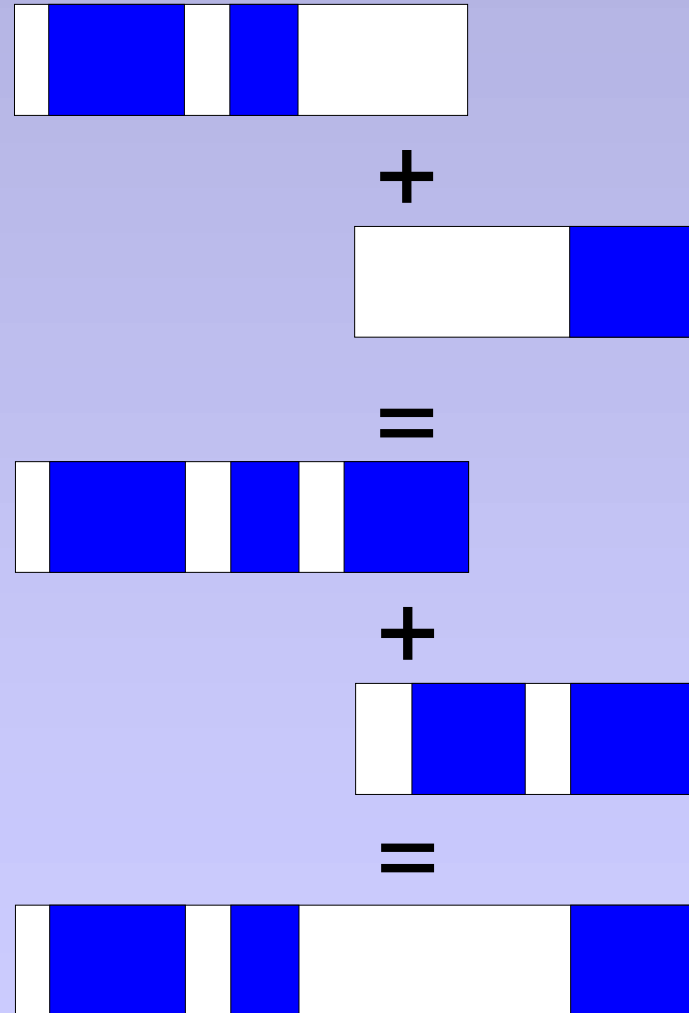
Fault Detection

- ❑ PHY marker allows to detect collisions
- ❑ Absence indicates collision in previous frame



Fault Detection 2

- ❑ Packet boundaries detection allow ambiguity
- ❑ Colliding frames appear the same as Idle frames at MAC client
- ❑ Fault state indistinguishable from correct state at MAC client

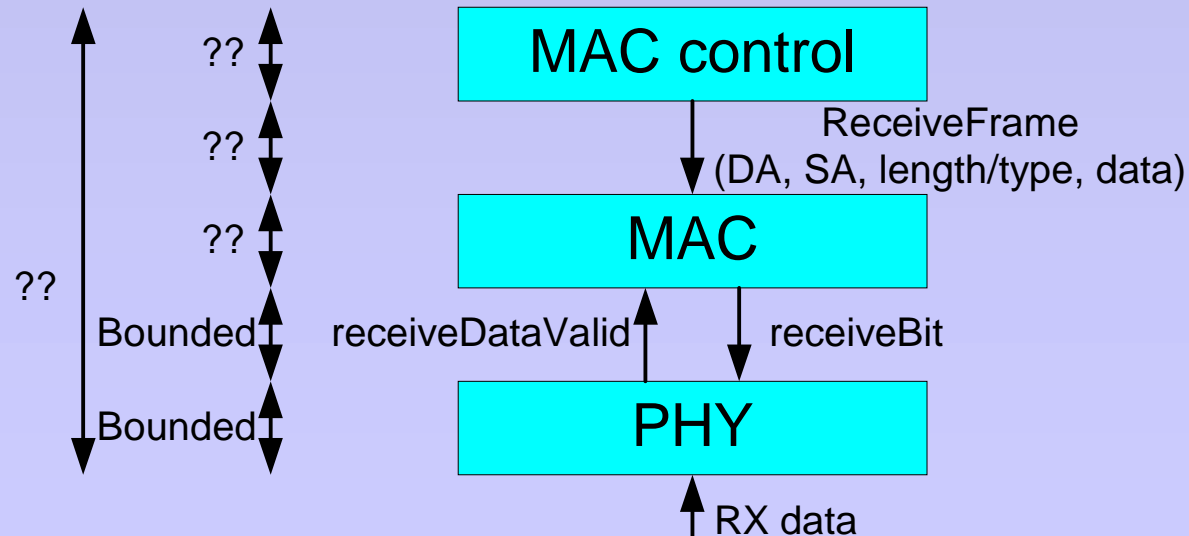


What Do We Do With It? Downstream

- **Distribute time base for MPCP layer**

Timer Distribution

- ❑ Network time should relay on an exact octet counter
- ❑ Alternative: parsing in MAC control sublayer, introducing jitter
 - Current jitter definition for parsing MAC control packet is specified for Pause as 1023 bits (clause 31B.3.7)



Conclusion

- ❑ PHY marker should be added to Downstream to distribute time accurately
- ❑ PHY marker should be added to Upstream to specify slot start event unambiguously