Summary Presentation for TDD MPCP Enhancements (baseline proposal)

Andrea Garavaglia and Patrick Stupar
(Qualcomm)

Introduction

- During the last IEEE 802.3bn meeting, discussion about TDD in EPoC occurred and the following motion was approved for the specification of TDD mode:
  - **Starting point for TDD baseline:** Use garavaglia_02a_0113 [1] as a starting point for development of a TDD baseline.
- The presentation above was complemented by an additional document [2], in which the related changes are applied to the MPCP Clause, in order to provide the editor a more detailed version of the changes
- The presentation was further discussed in TDD ad-hoc conference calls and positive feedback and suggestions have been collected
- In this slides, the key points of the specification work are summarized again and submitted together with the revised text document [3], in order to create a first baseline for TDD in EPoC, with focus on MPCP aspects

Scope

- In this presentation, a baseline proposal for EPoC TDD is presented following the approved motion – the focus is on presenting changes to Clause 77 MPCP definition, to be included in a new MPCP Clause Z for EPoC TDD mode

- Additional aspects for the TDD mode have been presented in [1] and further listed in [4] for convenience – baseline proposal for those aspects is not covered in the current presentation

This presentation focuses on TDD specifics for MPCP and the presented material does not mean to preclude further changes to accommodate other EPoC functions

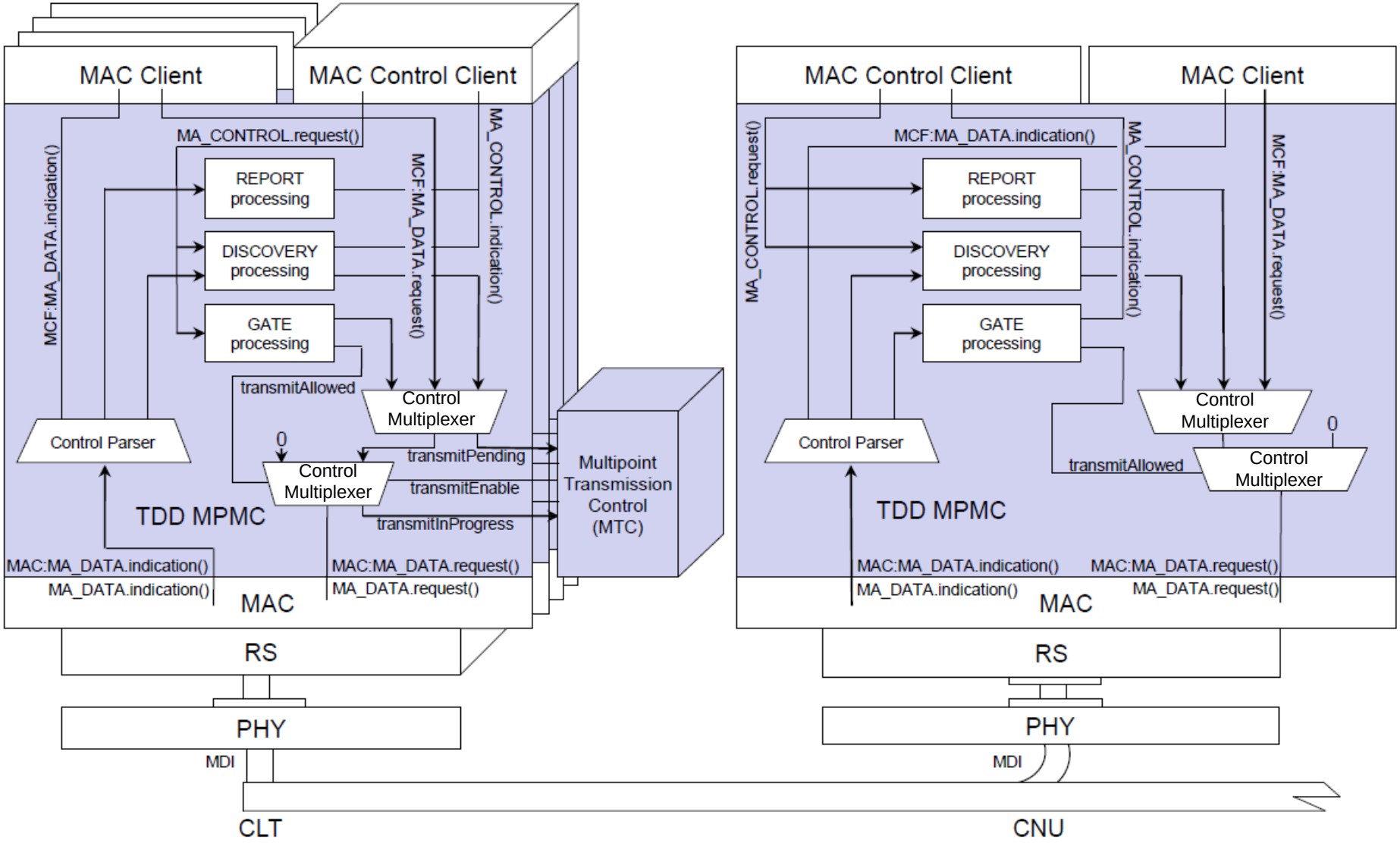
Summary of proposed changes (new slide)

Sub-clause	Scope	Proposed Change
	General	Update terminology to EPoC (e.g. CNU, cable, etc.)
Z.1	Overview	Include EPoC specifics, add a figure for TDD timeline, remove 1G EPON figure, update figure Z-4 with transmitAllowed signal
Z.2.2	Multipoint Control Multiplexer	Update figure Z-8 with transmitAllowed signal and extended scope of the signal to CLT
Z.2.2.7		Updated figure Z-13 with transmitAllowed signal and Check Size state for TDD DS transmission
Z.3.1	Multipoint Control	Added TDD operations to multipoint principles
Z.3.3.5		Extend scope of MA_CONTROL.request for TDD
Z.3.5	Gate processing	Extend scope to TDD, add distinction between local and normal grant based on DA field
Z.3.5.2		Add localGrantList for TDD mode
Z.3.5.6		Update figure Z-28 with localGrantList generation
		Add figure Z-28b for GATE activation in CLT (TDD only)
Z.5.4.3	PICS	Include statement for GATE activation in CLT (TDD only)

MPCP for TDD – Clause Z

- Details of changes

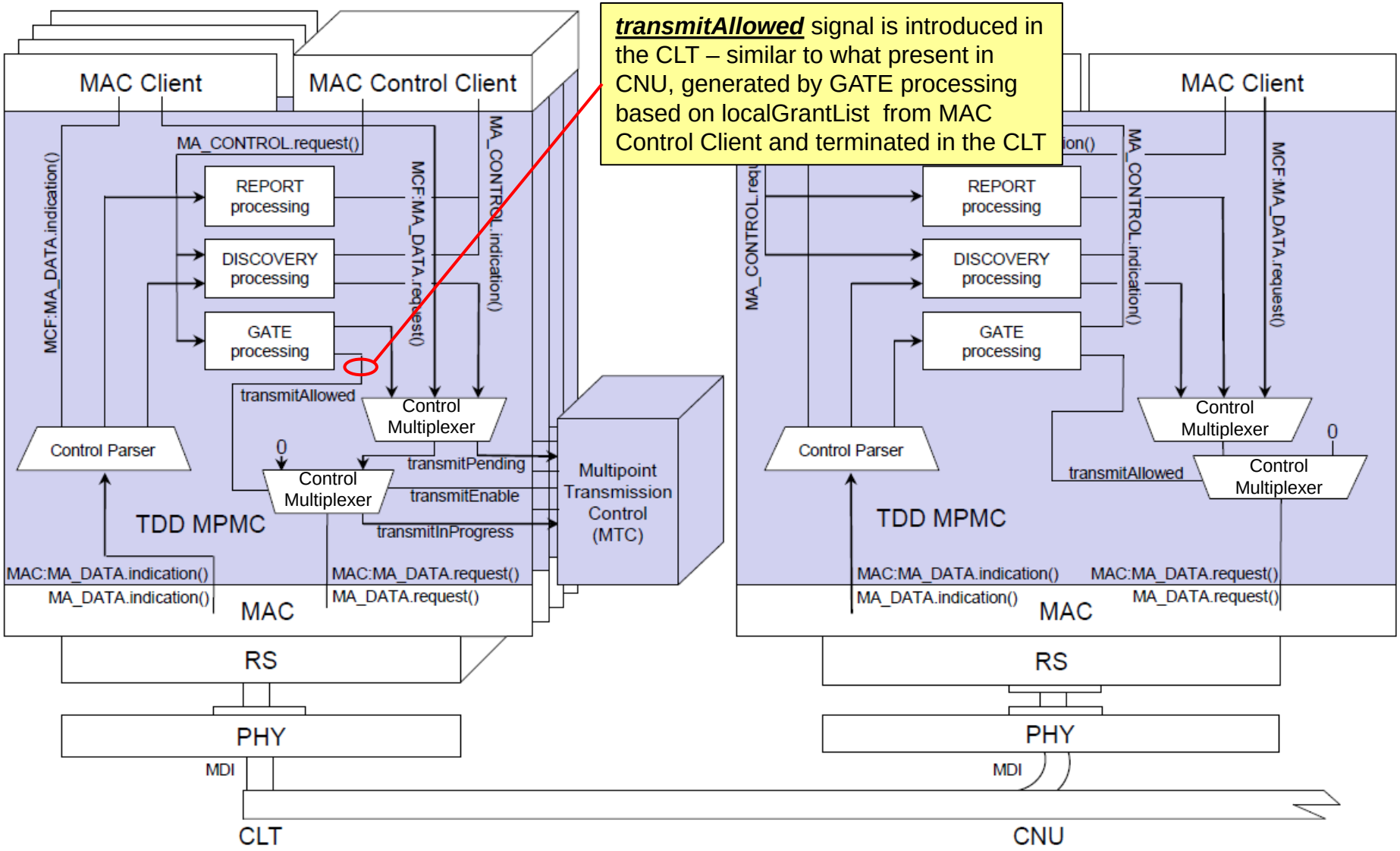
TDD operation – CLT Multipoint MAC Control



Multipoint MAC Control – from [2] "IEEE 802.3 Architecture" – law_01a_1112.pdf

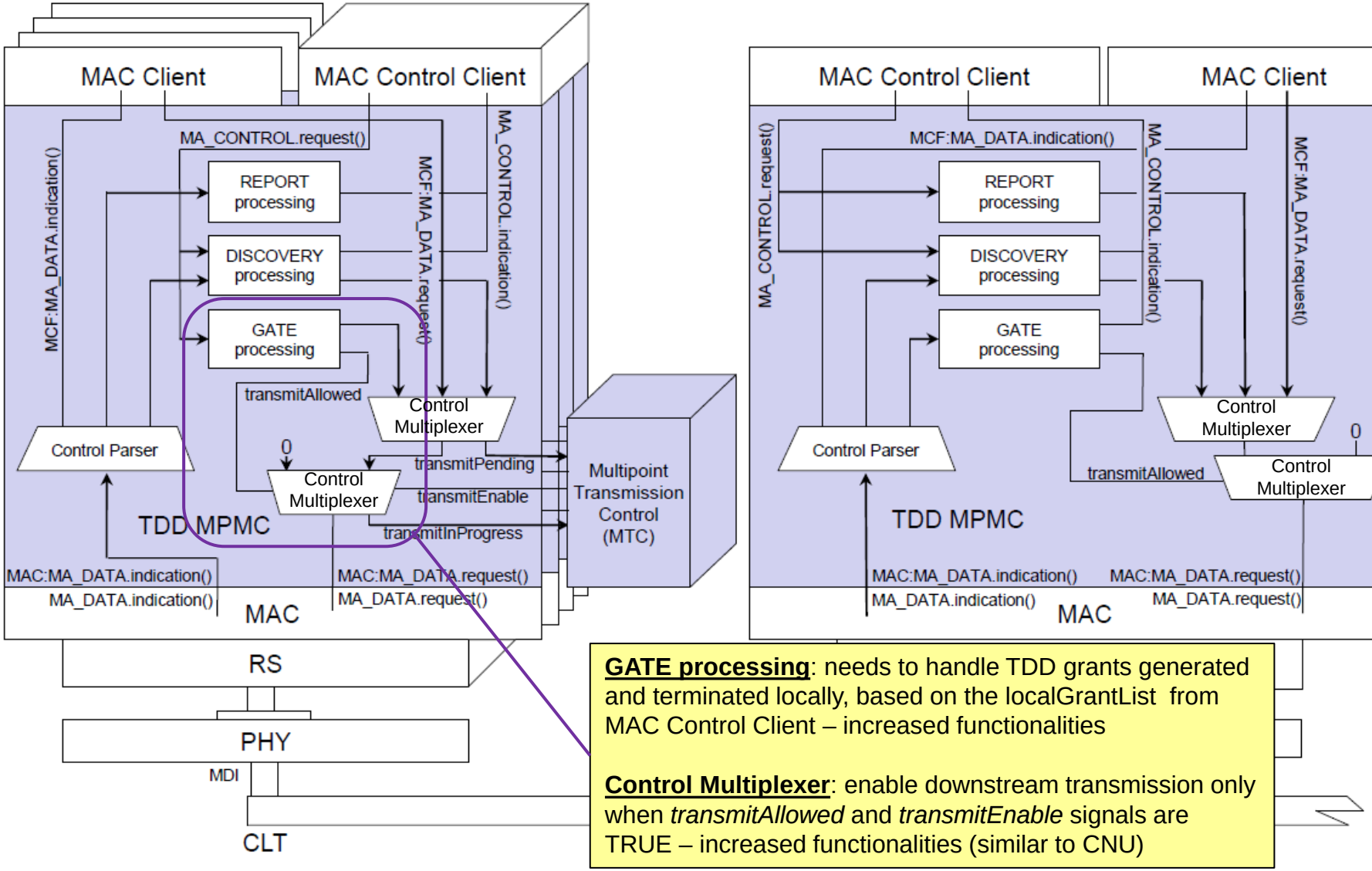
TDD operation – CLT Multipoint MAC Control

transmitAllowed signal is introduced in the CLT – similar to what present in CNU, generated by GATE processing based on localGrantList from MAC Control Client and terminated in the CLT



Multipoint MAC Control – from [2] "IEEE 802.3 Architecture" – law_01a_1112.pdf

TDD operation – CLT Multipoint MAC Control



GATE processing: needs to handle TDD grants generated and terminated locally, based on the localGrantList from MAC Control Client – increased functionalities

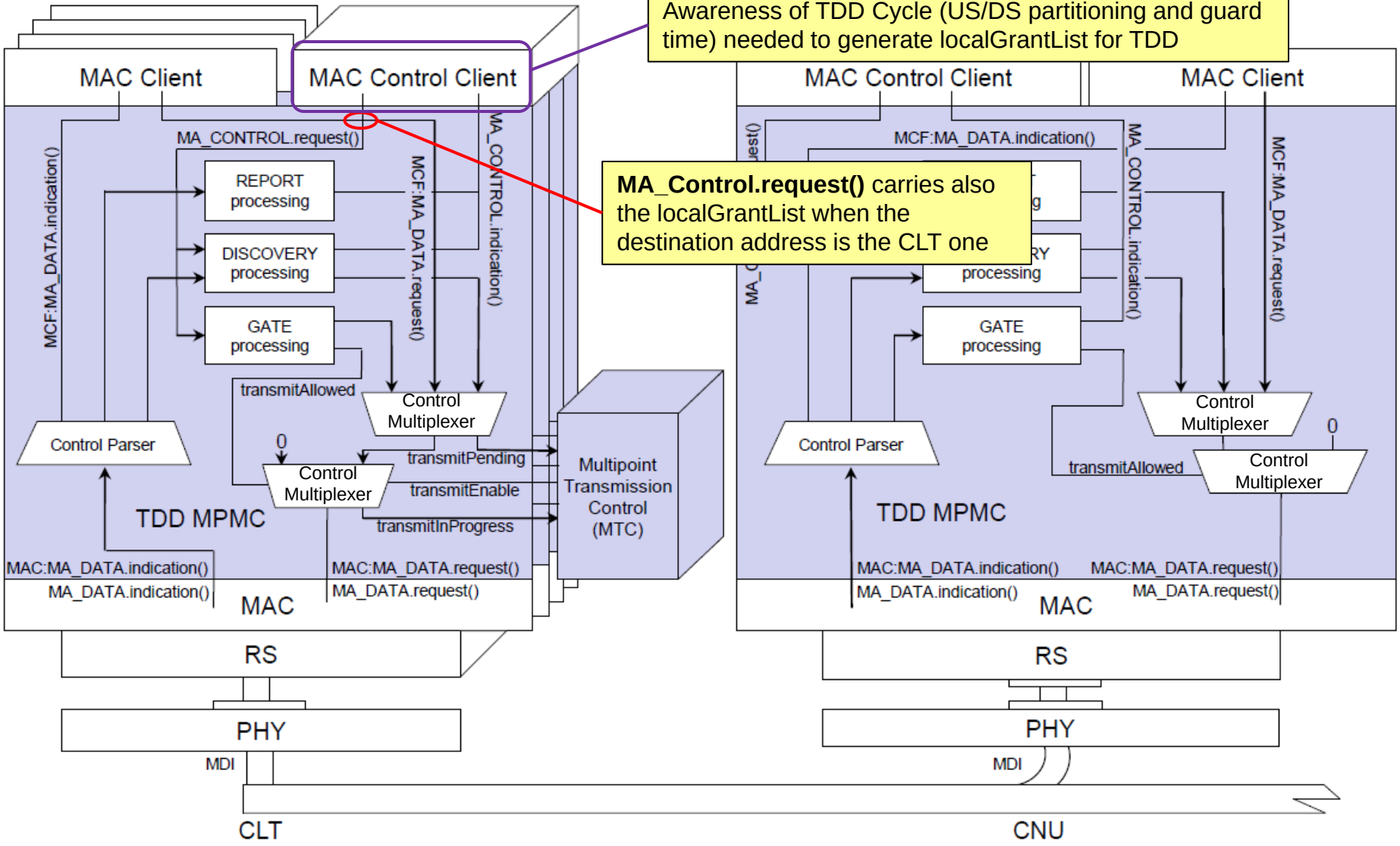
Control Multiplexer: enable downstream transmission only when *transmitAllowed* and *transmitEnable* signals are TRUE – increased functionalities (similar to CNU)

Multipoint MAC Control – from [2] "IEEE 802.3 Architecture" – law_01a_1112.pdf

TDD operation – CLT Multipoint MAC Control

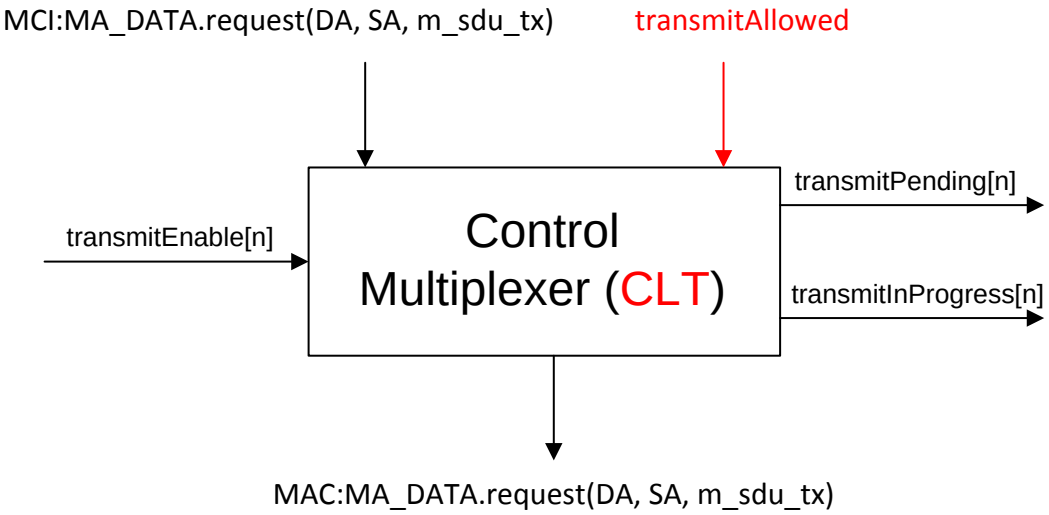
Awareness of TDD Cycle (US/DS partitioning and guard time) needed to generate localGrantList for TDD

MA_Control.request() carries also the localGrantList when the destination address is the CLT one



Multipoint MAC Control – from [2] "IEEE 802.3 Architecture" – law_01a_1112.pdf

CLT Control Multiplexer - Service Interfaces



Applicability of *transmitAllowed* (in clause Z.2.2.3 – Variables)

transmitAllowed

TYPE: Boolean

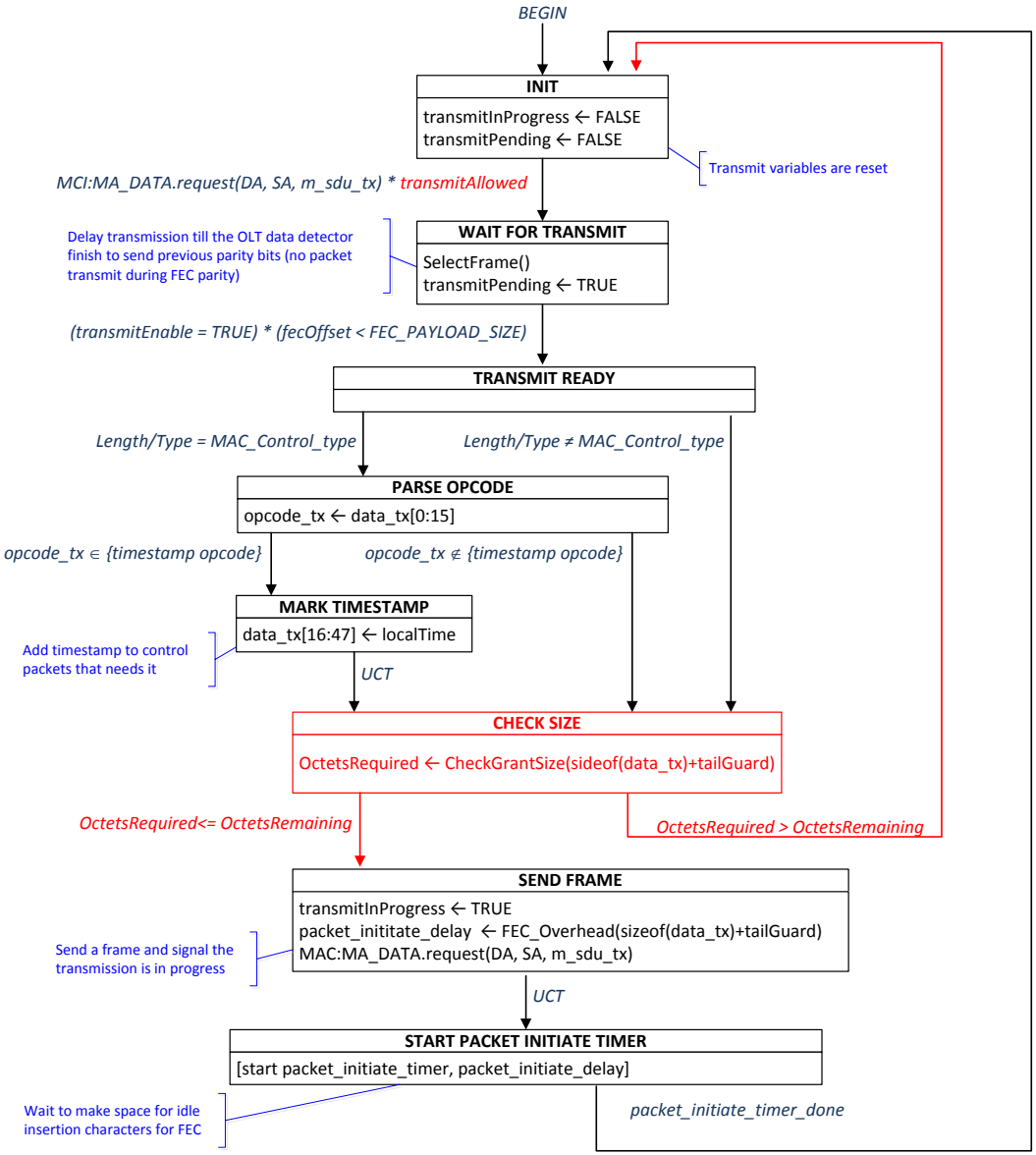
This variable is used to control PDU transmission at the CNU and at the CLT. It is set to true when the transmit path is enabled, and is set to false when the transmit path is being shut down. transmitAllowed changes its value according to the state of the Gate Processing functional block.

State Machine of CLT Control Multiplexer

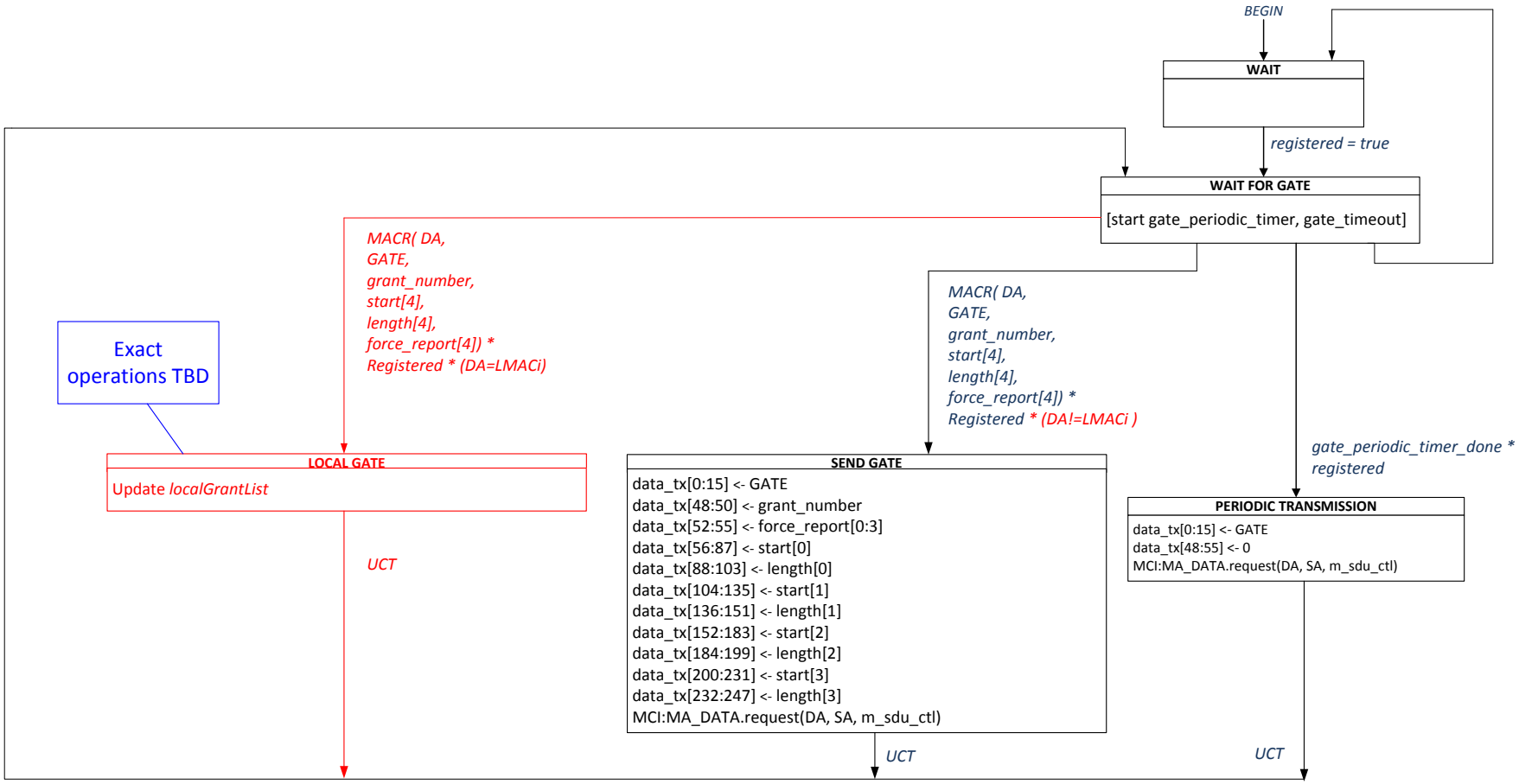
Note: new variables/constants introduced by these changes need to be reflected in the corresponding sections too

Source: Figure 77-13 (OLT Control Multiplexer state diagram) in Clause 77.2.2.7

Extended with parts of Figure 77-14 (ONU Control Multiplexer state diagram)



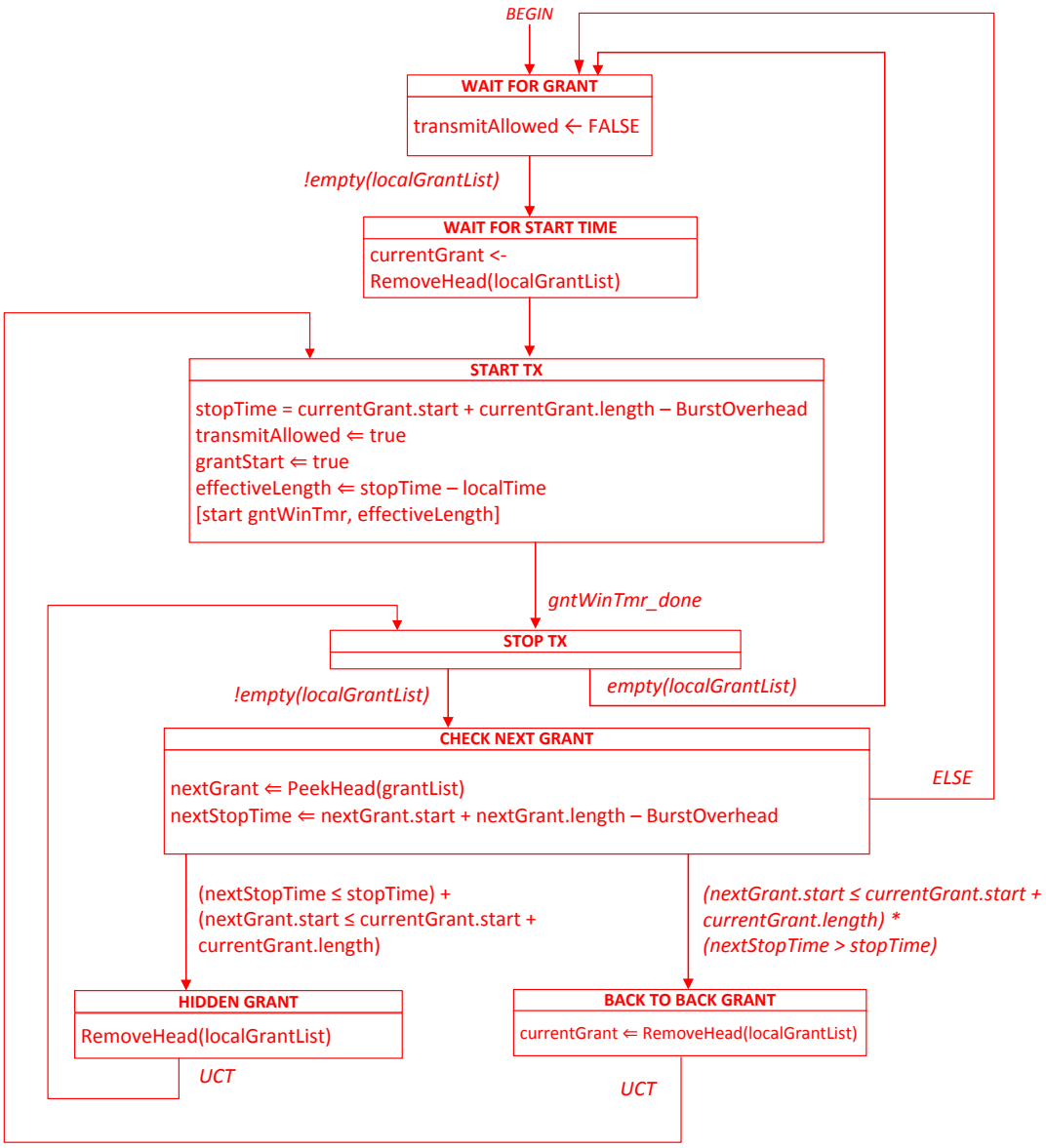
Gate processing in CLT for local (TDD) grant



Note: new variables/constants introduced by these changes need to be reflected in the corresponding sections too

State machine derived by extending state machine defined in Figure 77-28 (Gate Processing state diagram at OLT) from clause 77.3.5.6

Gate processing CLT local (TDD) grant Activation (new)



State machine derived by simplifying state machine defined in Figure 77-30

Gate Processing ONU Activation state diagram from clause 77.3.5.6

Note: new variables/constants introduced by these changes need to be reflected in the corresponding sections too

Editorial Changes– description text

Text describing TDD enhancements

- In “Z.1 Overview”
  - provide high level description of TDD
- In “Z.1.1 Goals and objectives”
  - List TDD as part of the objectives
- In “Z.2 Multipoint MAC Control operation”
  - List TDD as part of the Multipoint MAC control operations

References

[1] **garavaglia_02a_0113**: “EPoC TDD” – Andrea Garavaglia and Patrick Stupar (Qualcomm)

[2] **garavaglia_04_0113**: “Multipoint MAC Control for EPoC – TDD Mode” – Andrea Garavaglia and Patrick Stupar (Qualcomm)

[3] **garavaglia_3bn_02a_0313**: “Multipoint MAC Control for EPoC – TDD Mode” – Andrea Garavaglia and Patrick Stupar (Qualcomm)

[4] **shellhammer_3bn_01_0313**: “TDD Open Items and Checklist” – Steve Shellhammer and Andrea Garavaglia (Qualcomm)