

# Clause 64 in D1.1 and beyond

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# Current state of Clause 64

- Clause 64 in D1.0 contains the following changes against 802.3-2006 Clause 64:
  - Introduction of 2<sup>nd</sup> SCB MAC (baseline #10) and 2<sup>nd</sup> broadcast LLID (baseline #15) to support independent 1G and 10G operation;
  - Introduction of Discovery Information exchange during discovery and registration process (baseline #21):
    - changes to GATE MPCPDU (Discovery Version);
    - changes to REGISTER\_REQ MPCPDU;

# Pending changes to Clause 64

- Clause 64 in D1.1 should contain the following changes against D1.0 Clause 64:
  - Introduction of negotiable laser on/off times for ONUs (baseline #30):
    - changes to REGISTER\_REQ MPCPDU;
    - changes to REGISTER MPCPDU;
  - Introduction of changes to state machines and/or variables:
    - due to 1G and 10G operation;
    - modified FEC for 10G EPONs;
    - further changes to e.g. Discovery Process state machines;

# From D1.0 to D1.1 of Clause 64 [1]

- D1.0 Clause 64 already features a number of substantial changes against 2005 version:
  - introducing changes in line with submitted comments will only increase the complexity of the clause;
  - all state machines become significantly more complex due to coexistence of 1G and 10G MPCP e.g. in Figure 64-12 or 64-13 will need to operate at 1G and 10G using different logic;
  - there are significant problems maintaining a unified MPCP Control entity definition as presented in Figure 64-3 when operated at two different data rates.

# From D1.0 to D1.1 of Clause 64 [2]

## Solution n<sup>o</sup> 1

- fallback with Clause 64 back to 802.3-2005 version, assuring standard compliance of existing 1G implementations;
- create a new normative Annex 64A with extensions to Clause 64 MPCP sublayer required for 10G operation (see next two slides) with the tentative title “Extensions to Multi Point Control Protocol for 10G EPON”
- no coexistence issues discussed in Annex 64A – this information will be included in informative Annex 64B (tentative name)
- all changes introduced to Clause 64 will be limited to maintenance requests and alignment with Annex 64A;

# From D1.0 to D1.1 of Clause 64 [3]

## Solution n<sup>o</sup> 1

- Proposed structure of Annex 64A :
  - 64A.1 Extensions to Clause 64 Multipoint MAC Control
    - required modifications to the MPCP sublayer to support 10G
    - modified figure 64-2
  - 64A.2 Multicast and single copy broadcast support
    - Information about the 2nd SCB MAC and respective LLID
    - Information on how this impacts the transmission of individual MPCP DUs
  - 64A.3 State Machines, Variables and Functions
    - Placeholder for any modifications in the state machines, variables and functions resulting from the submitted comments
    - Subject to significant changes along with the progress of the project

# From D1.0 to D1.1 of Clause 64 [4]

## Solution n<sup>o</sup> 1

- Proposed structure of Annex 64A:
  - 64A.4 Extensions to MPCPDUs
    - 64A.4.1 GATE MPCPDU
      - Discovery Information handshake
    - 64A.4.2 REGISTER\_REQ MPCPDU
      - Discovery Information handshake
      - Negotiable laser on/off
    - 64A.4.3 REGISTER MPCPDU
      - Negotiable laser on/off
- Annex 64B structure remains undefined at this time;

# From D1.0 to D1.1 of Clause 64 [5]

## Solution n<sup>o</sup> 2

- restructure Clause 64 to incorporate only data rate independent operation since MAC Control operation should be data rate agnostic;
- move all the data rate dependent issues (variables, functions e.g. FEC\_overhead) to Annex 64A for 1G EPONs and Annex 64B for 10G EPONs
- no coexistence issues discussed in Clause 64 – this information will be included in informative Annex 64C (tentative name)
- all changes introduced to Clause 64 will be limited to maintenance requests;
- new Clause 64 structure would provide a more future proof standard and easier extensibility with the next releases of PON specifications;

# From D1.0 to D1.1 of Clause 64 [6]

## Solution n<sup>o</sup> 2

- Structure of Clause 64 remains unchanged;
  - part of the text and some variables / functions are migrated to new Annex 64A;
- Annex 64A structure:
  - 64A.1 State Machines, Variables and Functions
    - Placeholder for any data rate dependent function definitions, variables etc.
    - Subject to significant changes along with the progress of the project
- Annex 64B structure:
  - 64B.1 Extensions to Clause 64 Multipoint MAC Control
    - required modifications to the MPCP sublayer to support 10G
    - modified figure 64-2

# From D1.0 to D1.1 of Clause 64 [7]

## Solution n<sup>o</sup> 2

- 64B.2 Multicast and single copy broadcast support
  - Information about the 2<sup>nd</sup> SCB MAC and respective LLID
  - Information on how this impacts the transmission of individual MPCP DUs
- 64B.3 State Machines, Variables and Functions
  - Placeholder for any modifications in the state machines, variables and functions resulting from the submitted comments
  - Subject to significant changes along with the progress of the project
- 64B.4 Extensions to MPCPDUs
  - 64B.4.1 GATE MPCPDU
    - Discovery Information handshake
  - 64B.4.2 REGISTER\_REQ MPCPDU
    - Discovery Information handshake
    - Negotiable laser on/off
  - 64B.4.3 REGISTER MPCPDU
    - Negotiable laser on/off