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Note about use of Partial Timing Support (PTS) in NGFI

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Next Generation Fronthaul Interfaces
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Current text on PTP profiles

- Agreement on use of FTS and PTS for NGFI-I and NGFI-II reached during teleconference on Friday 11th January 2019 documented in § 8.5.2 of new draft:

  The following PTP profiles are applicable to NGFI network time distribution:

  1. PTP Profile with Full Timing Support (FTS): ITU-T G.8275.1 PTP Telecom Profile for Phase/Time Synchronization with Full Timing Support from the Network.
  2. PTP Profile with Partial Timing Support (PTS): ITU-T G.8275.2 PTP Telecom Profile for Phase/Time Synchronization with Partial Timing Support from the Network.

  For NGFI-I networks, FTS shall be supported and PTS is optionally supported.

  For NGFI-II networks, at least one of FTS and PTS shall be supported.

- Consensus reached during the call amongst all participants

Discussion on note to be added

- Agreement also reached during that same teleconference on Friday 11th January 2019 on notes to add to this section
  1. Reword the text to refer to the eco-system of standards around each architecture (FTS or PTS), since the protocol profile itself is not sufficient: clock specification and network limits shall be added ⇨ contribution from Tim Frost (Calnex)
  2. Add a note about consideration for deployment of PTS, but agreement on the text was not reached ⇨ **proposal made in this contribution**.
     - Use factual information based on ITU-T Q13/15 status to avoid "opinions" on performance.

- Note: the discussion about source of asymmetry over email with Richard Tse is independent of the above

Suggestion for text

Support of Partial Timing Support (PTS) architecture requires additional considerations:

- Partial Timing Support allows switches with no T-BC or T-TC (i.e. PTP unaware), hence there is no guarantee of synchronization performance based on ITU-T standard specification such as G.8273.2. As a result, the system operator must ensure the network components will have adequate performance to meet frequency and phase error budgets to allow an accurate detection of frequency accuracy and phase for proper network operation. Such budgets and implications on performance require further investigation.
- Refer to ITU-T G.8271.2 Appendix II "Considerations for handling precision time protocol traffic in networks with partial timing support"

Same text as xRAN-FH.CUS.0 v2.0 (cf. slide 8)

If above text is considered outdated or too strong, propose this instead to avoiding debate about performance. This is a fact from ITU-T Q13

Suggestion for text (continued)

Support of Partial Timing Support using ITU-T G.8275.2 Telecom Profile also requires additional considerations *(continued)*:

- ITU-T G.8275.2 mandates L3 encapsulation (UDP/IP) and unicast communication with GM. Its use therefore require the CU/DU/RU and any network transport node acting as T-GM, T-BC-P or T-TSC-P to support IP encapsulation and IP address configuration.
- The work on Partial Timing Support is still in progress in ITU-T (clocks in G.8273.4, noise accumulation methodology)
- ITU-T has defined the FTS architecture and timing method to target ITU-T G.8271 accuracy level 4/5/6, i.e. Category C, B and A applications; and the PTS architecture to target ITU-T G.8271 accuracy level 4 (1.5 usec), i.e. Category C (3us TAE or 1.5us TE).
  - This is corresponding to application categories D, C1, C2 in Section 8.5.1.1, Table 4 - TAE Requirements at the Radios.

Merge of other two bullets of xRAN-FH.CUS.0 v2.0

Facts from ITU-T

Reference xRAN-FH.CUS.0 v2.0

9.2.4.2.2 Partial Timing Support

Support of Partial Timing Support using ITU-T G.8275.2 Telecom Profile is currently considered as permissible but requires additional considerations:

- Partial Timing Support allows switches with no T-BC orT-TC, hence there is no guarantee of synchronization performance based on ITU-T standard specification sch as G.8273.2. As a result, the system operator must ensure the network components will have adequate performance to meet frequency and phase error budgets to allow an accurate detection of frequency accuracy and phase for proper network operation. Such budgets are and implications on performance require further investigation.
- RUs (and lls-CU as T-TSC from fronthaul in configuration C3) must support L3 (UDP/IP) which is considered "optional" in this version of the CUS-Plane specification.
- RUs (and lls-CU as T-TSC from fronthaul in configuration C3) must support unicast communication with the GM.
- For configurations C1 and C2, the lss-CU must implement G.8275.2 PTP master function.

Note finally that Partial Timing Support is not finalized in the ITU, which has considered this timing method only for relatively coarse timing accuracy (1.5 µsec).