

Telecom Deployments for 5G/4G Interop Using ITU Partial and Full Timing Support PTP Profile

Amit Verma

Software Engineer Senior Staff

JUNIPER 
driven by Mist AI



Agenda

- ITU-T profiles for phase and time
- Profile differences
- IWF for the profile
- Complexity of the IWF model
- Simpler options for inter working functionality
- Summary



PTP ITU Profiles for time and phase transfer

- G.8275.1
 - Precision time protocol telecom profile for phase/time synchronization with full timing support from the network
- G.8275.2
 - Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network

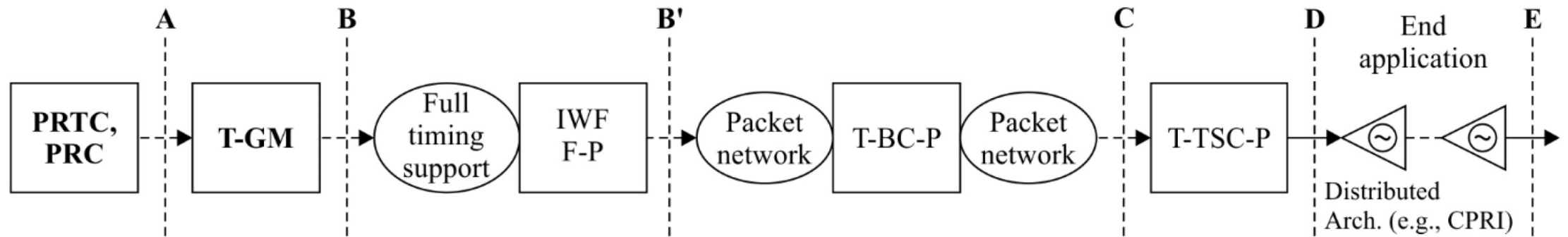


(In)compatibility of the profiles

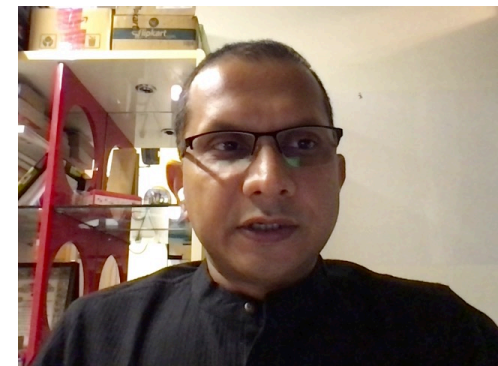
Feature/Attribute	G.8275.1	G.8275.2	Comment
BMCA	A-BMCA	A-BMCA	Same
Domain	24-43	44-63	Different
PTP Transport	Layer 2	Layer 3	Different
Message type and rates	Fixed	Negotiated	Different
Physical layer frequency	Needed	Optional	Different
VLAN allowed	No	Yes	



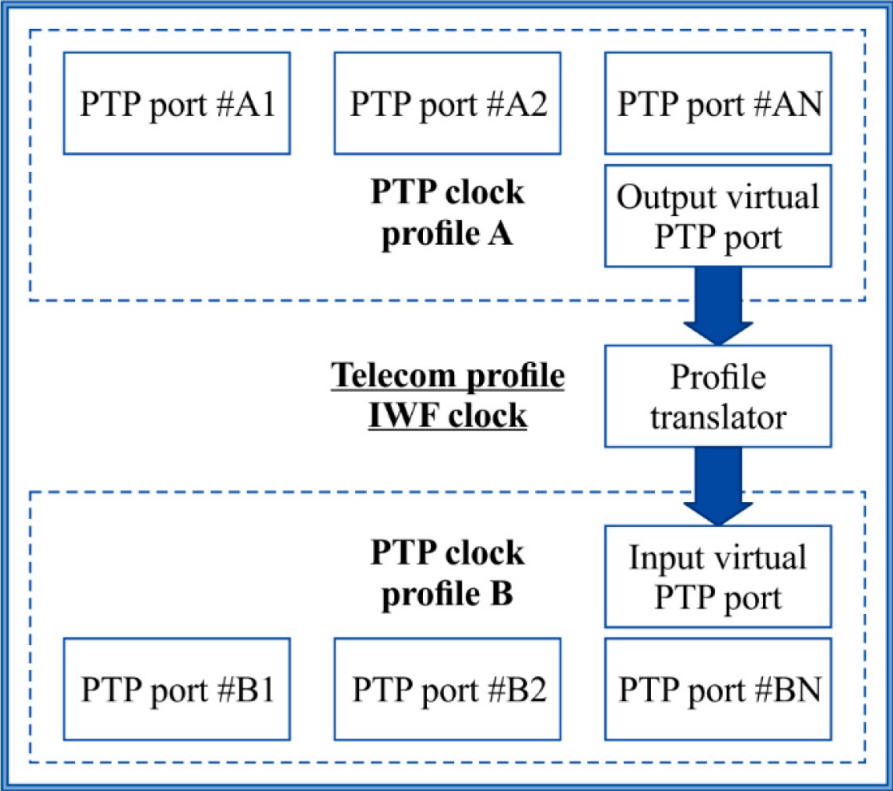
Interworking functionality between profiles



G.8275-Y.1369(17)-Amd.1(18)_FIII.1



Standard Interworking



G.8275-Y.1369(17)_FIII.2

- Unidirectional static interworking
 - Full to Partial (IWF F-P)
 - Partial to Full (IWF P-F)
- Strict definition of two PTP clock
- Output & Input via a virtual PTP port
- Profile translator for Field translation between profiles (Table III.2 below)
- Physical layer frequency generation

Table III.2 –Translation between the [ITU-T G.8275.1] and the [ITU-T G.8275.2] profiles

Group	Field	In Profile A: [ITU-T G.8275.1] Out Profile B: [ITU-T G.8275.2]	In Profile A: [ITU-T G.8275.2] Out Profile B: [ITU-T G.8275.1]
Time properties DS	Leap61	Direct mapping	Direct mapping
Time properties DS	Leap59	Direct mapping	Direct mapping
Time properties DS	currentUtcOffsetValid	Direct mapping	Direct mapping
Time properties DS	ptpTimescale	No translation; set TRUE	No translation; set TRUE



Complexity of the IWF

- Implementation of two isolated clocks
- Implementation of virtual port
- Handle transition of IWF from F-P to P-F
- Full IWF support where the slave port Ebest selection is across the two clocks is challenging
- Since there is no HRM for this, testing and compliance is difficult.



How to get to a simplified IWF

- Extends the G.8275.x profile attributes to be flexible
- Domain numbers configurable on a per port basis
 - And extended limits from 0 to 127
- Allow Layer2 or Layer3 transport to be available
 - Will support for unicast negotiation if needed for Layer3
- Allow VLAN configuration to be done for g.8275.1 profile



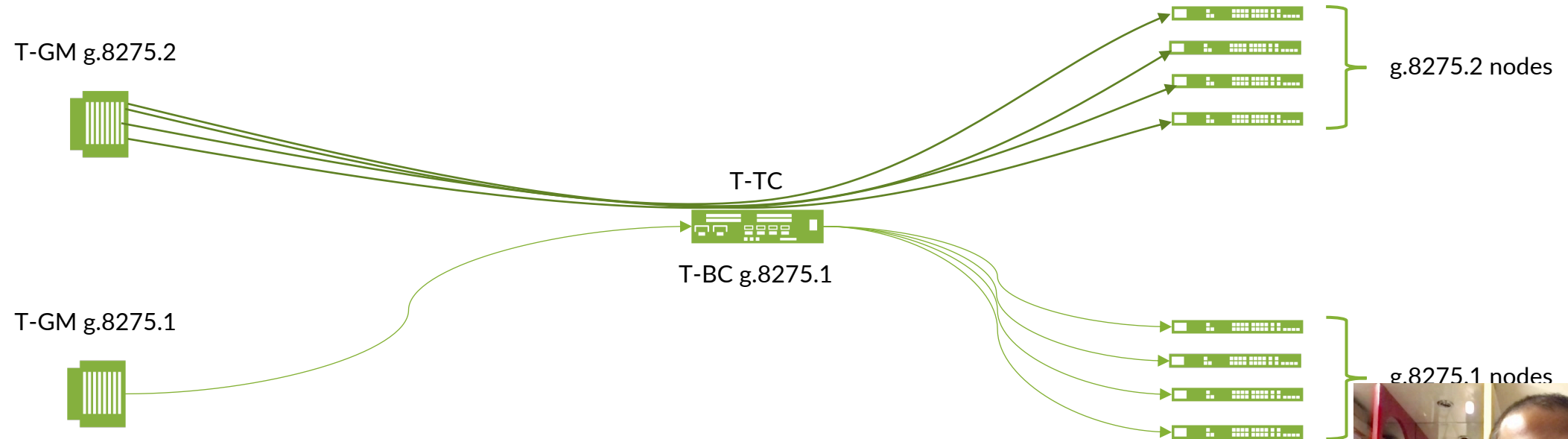
Solution 1 - G.8275.x profile with enhancements

- Boundary clock, Ordinary clock allowed
- IPv4, Ethernet transport across profiles
- Unicast negotiation on L3 for G.8275.1
- VLAN – supported for G.8275.1
- Flexible packet rates up to 128pps for event packets, and 8pps for announce
- Full domain number range allowed 0 – 127



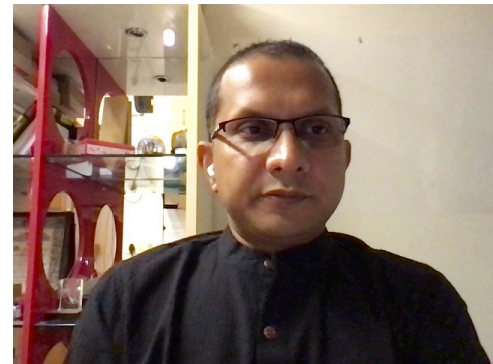
Solution 2 – PTP BC with simultaneous TC

- PTP T-BC node with overlayed T-TC behavior (Syntonized or non-syntonized)
- Easily achievable due to timestamping at PHYs.



Summary

- G.8275 allows for IWF between profiles but the implementation is complex
- The mechanism for qualification and conformance for the IWF is not yet defined
- There are simpler solutions to support the typical usecases seen in network deployments
- Allowing for flexibility in configuration of standard profiles helps for few use case
- Allowing multiple PTP clock type together helps in few other implementations



Thank you

