

White Rabbit @ ITU-T

Report on Q13/15 meeting in Boulder

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Outline

- 1 Introduction
- 2 Telecom PTP Profile
- 3 WR @ Q13/15 meeting
- 4 Conclusions



The Goal

- Standardization: ultimate destination for WR
- ITU-T : Telecom PTP Profile
- CERN : White Rabbit PTP Profile
- **WR-PTP \cap T-PTP = ?**



Q13/15

- Question 13, Study Group 15
- Network Synchronization and Time Distribution Performance
- Two PTP telecom profiles:
 - frequency distribution (GSM/UTS)
 - accurate phase/time distribution (TD-SCDMA/LTE-A)
- Rules:
 - key world players in the field
(Ericsson, China Telecom, France Telecom, Cisco, ...)
 - decisions by consensus
 - politics/interests play in the game
 - heavy legacy (SDH, SyncE)
 - the most stubborn wins
 - long process



Telecom PTP Profile for phase/time distribution (1)

- Recommendations G.827x
- Time and Phase Synchronization in packet networks
- Applications:
 - UTRA-TTD and LTE-TDD (small cell), accuracy $1\mu s - 1.5\mu s$
 - Wimax-TDD (small cell), accuracy $xns - 1\mu s$
- Targeted accuracy: sub- μs



Telecom PTP Profile for phase/time distribution (2)

- SyncE legacy (SDH legacy)
- Combination of SyncE and PTP
- Time error budget definition and assignment
- Hop-by-hop phase/time transfer: Telecom Boundary Clocks
- Telecom Boundary Clocks characteristics (hold-over, oscillator type, filtering, ...)
- Definition of PTP parameters:
 - request-response mechanism
 - PTP message
 - time intervals
- Modification of Best Master Clock Algorithm



Telecom PTP Profile for phase/time distribution (3)

- SyncE and PTP planes (to be decided)
 - independent or
 - governed by SyncE
- Timing requirements foreseen for all-conditions
- Application in well-controlled and hand-configured networks



WR contribution

- Informative contribution and presentation
- Great interest (DDMTD, mBMC, single fiber,...)
- Tons of questions and contact exchanged
- Reference during discussions (e.g. precision or mBMC)
- Considered valuable input



Technical Feedback

- Influence of temperature variation on fixed delays and asymmetry
- Best Master Clock Algorithm
 - Triggered much interest
 - Possible bug in WR's mBMC
- Possible problems (jumps) during switch-over
- Doubts as to whether sub-ns accuracy can be maintained in harsh conditions
- Possible reference/testing environment
- Expected/hoped future cooperation



WR standardization Feedback

- Many different suggestions:
 - Find common base between G.827x and WRPTP, try aligning
 - Do ITU-T WRPTP profile, very similar to telecom profile
 - Standardize WRPTP profile directly within IEEE
 - Find scientific equivalence of ITU-T/IEEE to standardize
- CERN ITU-T member ?
 - Good publicity for ITU and CERN
 - Probably within some scientific cooperation
 - Benefits for both sides (experience, PR)
- Whatever standardization path - strong suggestion to cooperate with Q13/15
- Next ISPCS meeting important - decision regarding PTPv3



WR vs. telecom

Feature	White Rabbit	Telecom
Syntonization	SyncE	
Synchronization	PTP	
Delay Mechanism	request-response	
PTP BMC	modified (redundancy support)	
PTP/SyncE planes	aligned to PTP's	independent or aligned to SyncE
SyncE used for	stable frequency reference timestamp phase alignment calibration	
Boundary Clock	syncE support timestamp precision calibration support frequency loop-back	holdover oscillator type



WR @ ITU-T

- Well-received
- Triggered interest
- Left mark in telecom world
- Received valuable feedback
- Left excitement in the community



Standardization Paths

- Profile at ITU-T: Within Telecom Profile (G.827x)
 - long process
 - valuable feedback
 - compromises required
- **Profile at ITU-T: Separate Profile (similar to Telecom)**
 - valuable feedback / useful for Telecom as reference
 - non-telecom solution in telecom world
 - starting curve / easier compromises
- Profile directly at IEEE
 - CERN – an "other appropriate organization"?
 - feedback from telecom world?
 - no compromises required
- Profile at other standardization body/consortium
 - who/how much?
 - feedback from telecom world?



Conclusions

- Separate Profile (similar to Telecom) at ITU-T seems interesting
- For Further Studies
 - alignment with G.827x
 - other PTP profiles (Power, LXI)
- E-mail consultation with key PTP players
- Evaluation of costs/efforts of standardization paths:
 - Profile at ITU-T
 - Profile directly at IEEE
 - Profile at other standardization body/consortium



Thank you

Any questions ?

