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LS3 Plans for the Timing System and beyond

MPP-SMP2 Meeting
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Our plans heavily depend on whether we renovate GMT using White Rabbit or stay with the current timing distribution system.

GMT on White Rabbit

- GMT is based on an aging technology
  - Low bandwidth that we are close filling up
  - The amount of information to be distributed is likely to grow

- With WR timing distribution we have
  - Guaranteed necessary bandwidth
  - Simplified timing networks and cross-network communication
  - Automatic link-delay calibration
  - Possibility to send messages from client crates
  - Increased availability
  - Simplification of the Local Timings
    - More intelligence in the CTR, less CTRs needed
  - Future-proof technology (IEEE standard)

GMT on White Rabbit

Applied for a Consolidation Budget for two projects:

- ***Sequencing and Synchronization Infrastructure on WR***
  - WR network reaching "*all*" locations at CERN
  - To be used by: GMT, Beam Synchronous Timing, RF Clock distribution, LHC Collimators synchronization, …
  - Installation: 2021-2025

- ***GMT Distribution based on WR***
  - Installation: 2023-2029 (start in LS3, finish in LS4)

- Outcome later this year

If we stay with current GMT

- No specific plans for LS3 yet
  - OP requests
  - A bunch of consolidation work pending
- CTRV supported till the end of the LHC
- SMP: Stay with the current distribution model

If we go for WR

- After LS2: Preparations
  - WR Data Master – to send messages
  - WR Central Timing Receivers – to receive messages
  - WR network installation (fibers, WR switches)
- Run3: Pilot installations or migrations
- LS3: First wave of migrations
- Run4: Smaller migrations during EYETS
- LS4: Final wave of migrations

If we go for WR

- New, WR-compatible CTR Module
  - Based on Mock Turtle
    - Programming in C rather than in HDL
    - https://www.ohwr.org/project/mock-turtle/wikis
  - Possibly more counters (8 → 24 or 32)
  - Current CTRV supported till LS4

- **Might** allow sending messages from client crates
  - Data Master for clients, with some restrictions
  - SMP could be injected into the WR network at the source
    - Still need to forward it to the old GMT cable
      - Unless all SMP clients migrated to WR during LS3

Summary

- If we stay with current GMT:
  - Everything stays as is
  - CTRV EoL: end of LHC

- If we go for WR:
  - New Data Master and new CTRs
  - Migration to WR GMT: LS3→LS4
  - Current CTRV EoL: LS4

- Answer: hopefully by the end of this year


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