WRXI: status and plans

White Rabbit eXtensions for Instrumentation

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Outline

1 Short Overview of WRXI

2 Current Status & Plans



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Introduction

- WR provides clock and time synchronisation.
- For some setups this is all that is needed.
 - Time and frequency transfer
 - Distributed precise timestamping
 - **(...)**
- For others, an additional communication and coordination layer is required.
 - Timing* systems
 - Distributed instrumentation
 - RF distribution over WR
 - **(...)**
- Need to exchange timestamped data payloads between Nodes in a deterministic way.



White Rabbit extensions for Instrumentation

- WRXI aims to standardise:
 - the contents of these Event Messages
 - the API for the configuration and monitoring of nodes and the relevant aspects of the WR network
- WRXI will also provide a Supervisor tool to:
 - enumerate new WRXI nodes
 - be a single entry point for the user
 - resolve scheduling issues
- The goal is to have WRXI-enabled equipment (also by commercial manufacturers) that is plug & play and interoperable.



Is WRXI better than LXI, PXI, [...]?



Is WRXI better than LXI, PXI, [...]?

Betteridge's law of headlines

"Any headline that ends in a question mark can be answered by the word no."



Is WRXI better than LXI, PXI, [...]?

WRXI:

- is not a complete platform for remote control of electronic instrumentation.
- is a subsystem that handles timing and triggering over WR.
- can be used on top of another instrumentation platform, if that instrument supports WR.
- is platform-agnostic and can be used to exchange Event Messages between Nodes belonging to different platforms.



More Information

For a more in-depth introduction to WRXI and the motivation behind it, please refer to past presentations of WRXI:

https://www.ohwr.org/projects/wrxi/wiki/ presentations



1 Short Overview of WRX

2 Current Status & Plans



Current Status

- LXI Event Messages (part of extended functions) the closest existing standard.
- IVI 3.15 (IviLxiSync) describes the API for handling LXI event messages.
- Active collaboration with IVI Foundation and LXI consortium.
 - Meeting held in Munich in June 2018 to discuss how WRXI could be made part of IVI/LXI
 - We will list our requirements, they offer to map them to IVI/LXI and extend where necessary
- An early demonstrator for CERN OASIS WR-based trigger distribution is under development.



Draft Proposal to IVI/LXI

- A draft proposal to IVI/LXI is being distributed for comments (currently at draft03).
- You can find the latest version at the WRXI project page in OHWR. Your comments are welcome!



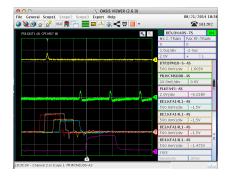
https://www.ohwr.org/projects/wrxi/documents



OASIS WR-based Trigger Distribution

What is OASIS:

- Analogue signal monitoring system
- 6000 analogue signals
- 2500 multiplexed digitizer channels
- 300 trigger signals





OASIS WR-based Trigger Distribution

A "straightforward" application of WRXI:

- Convert OASIS triggers to Event Messages at the sources using FMC-TDC cards
- Broadcast them in the WR network
- Receive them with WRXI-enabled digitizers, or convert them back to TTL pulses using FMC-Delay cards



OASIS WR-based Trigger Distribution

- Based on LHC Instability Trigger distribution System (LIST).
- Internally based on MockTurtle, a deterministic, multi-core, soft-CPU.
- Rewritten API to abstract it and align it with IviLxiSync 3.15.
- Minimise the migration cost to WRXI once the latter is released.
- Use this example as a case study for current IVI/LXI shortcomings.



Outlook

- OASIS WR-based Trigger Distribution to be gradually deployed at CERN during 2019.
- Proposal to IVI/LXI group to be delivered in Q1 2019.
- Develop a WRXI-based "distributed oscilloscope" demonstrator for Q2 2019.

Feel free to join the discussions and participate in shaping the future of WRXI!



Thank you!

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