

High-performance Signal and Data Processing: Challenges in Astro- and Particle Physics and Radio Astronomy Instrumentation



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The White Rabbit project

White Rabbit (WR) is a multi-laboratory, multi-company collaboration for the development of a new Ethernet-based technology which ensures sub-nanosecond synchronization and deterministic data transfer. It was initiated at CERN to provide a successor of the currently used General Machine Timing system for the accelerator complex. The project uses an open source paradigm for the development of hardware, gateway and software components. The presentation will give a general overview of the project, its origin, architecture and applications. It will describe how the three main technologies used in WR (IEEE1588, layer-1 synchronization and precise phase measurements) are combined to achieve sub-nanosecond accuracy of synchronization in the entire network. Methods to ensure high reliability and deterministic data delivery will be also outlined. Two of the main components of White Rabbit will be introduced: the WR Switch and the WR PTP Core. The presentation will then give an overview of the first White Rabbit installation for the CERN Neutrinos to Gran Sasso project and discuss future applications of White Rabbit in different places around the World. The last part of the presentation will explain the ongoing effort in IEEE1588 to include WR solutions into the standard.

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