Contribution ID: **372** Contribution code: **TUAC01** Type: **Contributed Oral Presentation**

Control-Agnostic Beam Instrumentation with Redis at the Core

Tuesday 9 September 2025 10:00 (20 minutes)

Redis isn't a database —it's our protocol. Fermilab's RedisAdapter provides a high-performance, control-system-agnostic bridge between digitized beam data and downstream consumers such as ACNET and EPICS. It forms the foundation of three new software components deployed across MicroTCA-based digitizers: GM-MDM, a runtime for memory-mapped data movement from Zynq-based platforms; GRAFE, a front end for Redis-to-ACNET presentation; and GREFE, an EPICS IOC front end. Together, these tools enable modular, standardized instrumentation pipelines. Precision timing is handled via White Rabbit PPS distribution, allowing nanosecond-scale synchronization across crates. This architecture, originally prototyped in Booster BPM systems, is now deployed on modern hardware and designed to meet the performance, modularity, and scalability requirements of the PIP-II era.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

Author: STEINKAMP, Derek (Fermi National Accelerator Laboratory)

Co-author: JOSHI, Shreya (Fermi National Accelerator Laboratory)

Presenter: STEINKAMP, Derek (Fermi National Accelerator Laboratory)

Session Classification: TUA

Track Classification: MC07: Data Acquisition and Processing Platforms