



Contribution ID: 264 Contribution code: MOPMO29

Type: Poster Presentation

Next-Gen Middleware for Fermilab Beam Instrumentation DAQ Systems

Monday 8 September 2025 16:00 (2 hours)

Fermilab Accelerator Division, Instrumentation Department is always adopting modern and current software methodologies for complex DAQ architectures. This paper presents the Redis Adapter (RA), a high-performance, modular interface bridging digitizers and distributed control systems like ACNET and EPICS. Using Redis and containerization, RA streamlines communication by linking Redis-based data streams to ACNET front ends, IOCs, and EPICS frameworks.

Previously, data passed through a UDP-based Distributed Data Communication Protocol (DDCP). In the updated architecture, DDCP remains as the ingestion layer, while RA decouples and reformats timestamped data for downstream use.

The proposed architecture replaces legacy VME digitizers with new SOM-based ones that interface with Redis via the RA. RA acts as both a performance-critical bridge and a protocol-agnostic adapter, ensuring compatibility with legacy control frameworks while enabling future scalability and modularity. It simplifies the data flow, lowers latency, and supports high throughput.

We will demonstrate RA's role in core products GRAFE and GREFE, showcasing its dual support for legacy systems and evolving architectures.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

Author: JOSHI, Shreya (Fermi National Accelerator Laboratory)

Co-author: STEINKAMP, Derek (Fermi National Accelerator Laboratory)

Presenters: STEINKAMP, Derek (Fermi National Accelerator Laboratory); JOSHI, Shreya (Fermi National Accelerator Laboratory)

Session Classification: MOP

Track Classification: MC07: Data Acquisition and Processing Platforms