



Contribution ID: 38

Type: **Poster Presentation**

Beam Instrumentation Data Acquisition System at Fermilab

Wednesday, 11 September 2024 14:20 (1h 30m)

A team at Fermilab has developed the Beam Instrumentation Data Acquisition (BIDAQ) system, designed to manage the readout of all beam instrumentation systems and their integration with the accelerator's control system. BIDAQ leverages widely available technologies and protocols to deliver an adaptable solution. Its communication framework relies on Ethernet, which supports speeds up to 100Gb/s, facilitates long-distance coverage, and offers scalability and cost-effectiveness. System upgrades are simplified, requiring only the replacement of switches and network interface cards. At the interface with the control system, BIDAQ uses commodity multi-core Linux servers. These servers act as a standardized platform, allowing each instrument instance to operate in its own isolated Docker container, simplifying scalability across multiple servers. Additionally, the software stack employs a streaming model to efficiently transfer data from the edge nodes to the servers, enhancing processing capabilities. BIDAQ is compatible with a range of hardware, from single-board FPGA systems using a lightweight UDP protocol to more complex MPSoC systems employing the REDIS model, the latter of which is being used for new uTCA-based systems.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Primary author: SANTUCCI, Robert (Fermi National Accelerator Laboratory)

Presenter: SANTUCCI, Robert (Fermi National Accelerator Laboratory)

Session Classification: WEP: Wednesday Poster Session

Track Classification: MC7: Data Acquisition and Processing Platforms