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100 Gbit/s UDP Data Acquisition on Linux using AF XDP: The TRISTAN Detector

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A growing number of detectors produce data rates of more than 100 Gbit/s, which often necessitate software-defined data processing to operate. Because of its simplicity, UDP offers a straightforward method for integrating such detectors with online computing resources that host the data processing software. Nevertheless, conventional technologies—such as POSIX sockets—are either ineffective or difficult to apply on detector boards based on FPGAs, like RDMA. The new Linux sockets AF_XDP are a novel method that uses RDMA-like zero-copy methods to target high data speeds. In this paper, we present a DAQ framework based on AF_XDP and UDP for readout systems with more than 100 Gbit/s. We evaluate our framework for the TRISTAN detector whose rates are expected to reach 200 Gbit/s. We describe our experience developing a TRISTAN detector readout system using AF_XDP.

Minioral

Yes

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No

Are you a student?

Yes

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