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High-Throughput Data Analysis at FRIB using ESnet

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With the beginning of the Facility for Rare Isotope Beams (FRIB) era, data acquisition systems and analysis tools are required to keep up with new detector technologies for higher data rates and volumes. Recent upgrades to the FRIB Data Acquisition System (FRIBDAQ) enable sustained data throughput of ≈ 200 MB/s. Experiments utilizing this capability write large amounts of data to disk, where nearline analysis methods are critical to inform decision-making by users. The introduction of the Energy Sciences Network (ESnet), a U.S. Department of Energy (DOE) supported high-speed network for scientific research, creates opportunities to leverage the computing power of DOE facilities like the National Energy Research Scientific Computing Center (NERSC). An analysis workflow, successfully demonstrated at MSU's Institute for Cyber-Enhanced Research, was adapted for processing data at NERSC using ESnet to mediate the transfer of data between facilities. A proof-of-principle test was performed using data from the first FRIB experiment. Data was transmitted from FRIB to NERSC where it was processed to measure observables of scientific interest before being transmitted back to FRIB. This workflow demonstrated that a week's worth of experimental data can be analyzed in approximately 90 minutes, a speedup of several orders of magnitude. A summary of the FRIBDAQ upgrades and results from the workflow development will be presented.

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Minioral

Yes

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No

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No

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