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Status of DUNE Offline Computing

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We summarize the status of the Deep Underground Neutrino Experiment (DUNE) software and computing development. The DUNE Collaboration has been successfully operating the DUNE prototype detectors at both Fermilab and CERN, and testing offline computing services, software, and infrastructure using the data collected. We give an overview of results from end-to-end testing of systems needed to acquire, catalog, reconstruct, simulate and analyze the beam data from ProtoDUNE Horizontal Drift (PDHD) and Near Detector 2x2 Demonstrator, and cosmic data from ProtoDUNE Vertical Drift (PDVD). These tests included reconstruction and simulation of data from all prototype detector runs utilizing a variety of distributed computing and HPC resources. The results of these studies help define the development path of DUNE core software and computing to support the physics goals of precision measurements of neutrino oscillation parameters, detection of astrophysical neutrinos, measurement of neutrino interaction properties and searches for physics beyond the Standard Model. The data from the full DUNE far and near detectors, expected in 2029 and 2031 respectively, will present significant challenges in terms of data product memory management, optimized use of parallel processing for reconstruction and simulation, and management of large individual trigger data volumes. DUNE will present plans for future development to accommodate the requirements of the larger DUNE far and near detectors, and the timeline for future data challenges leading to data taking at the end of the decade.

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