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Upgrades to the FACET-II data acquisition system

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The Data Acquisition System (DAQ) at FACET-II collects and saves synchronized, time-stamped data from various diagnostics on the linac and experimental area, including digital cameras and devices on the EPICS control system. During data acquisition, the camera input-output controllers (IOC) save image data to network-attached storage (NAS). While large files are able to save to the NAS efficiently, writing many small image files to the NAS is 10x slower. Additionally, the DAQ cannot acquire data from several important devices, such as BPMs, klystrons, and magnets, because they are only accessible via the legacy control system, the SLC Control Program (SCP). To address these issues, the FACET-II DAQ has been updated to save data faster by packaging multiple small image files as larger HDF5 files. The updated DAQ is also able to acquire BPM data from SCP by parallelizing the data acquisition process from both control systems, then comparing timestamps across cameras, EPICS devices, and SCP BPMs to ensure data is fully synchronized.

Footnotes

Funding Agency

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