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The management and storage of EAST diagnostic data

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For the purpose of plasma physics research on tokamak experimental, many diagnostics have been developed for Experimental Advanced Superconducting Tokamak (EAST). A distributed and continuous data acquisition system has been implemented for the diagnostic system. At present, there are more than 60 data acquisition units and more than 2500 raw signals including scientific data, video data, and images. The total maximum data streaming throughput is more than 5GBytes/s. The acquired data are combined into segment data in several seconds and transferred into data servers, and all the data are continuously archived into EAST database basing on mdsplus during discharge. The EAST mdsplus database are organized as several distributed trees, and each tree is composed into several sub-trees depending on different diagnostics.
The whole data storage system is constructed into 3 layers of different performance and capacity, latest data, archived data, and backup data. The layer-1 is the latest data stored into several servers installed with PCIe SSD which can provide fast IOPS and high read write speed. The layer-2 is a local SAS storage with all the archived data, the data size of last year is about 100TBytes and the total data is about 500TBytes. The layer-3 is a NFS backup data storage located in another data center in order to keep data safety.Researchers can access the diagnostic data using different ways such as browsers and C/MATLAB/Python clients interfaces. A computing server cluster with data access tools has also been provided for data analysis. The system details will be presented in the paper.

Eligible for student paper award?

No

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