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High Performance Experiment Data Archiving with gStore

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GSI in Darmstadt (Germany) is a center for heavy ion research. It hosts an Alice Tier2 center and is the home of the future FAIR facility. The planned data rates of the largest FAIR experiments, CBM and Panda, will be similar to those of the current LHC experiments at Cern.
gStore is a hierarchical storage system with unique name space and successfully in operation since more than fifteen years. Its core consists of several tape libraries and currently ˜20 data mover nodes connected within a SAN network. The gStore clients transfer data via fast socket connections from/to the disk cache of the data movers (˜240 TByte currently). Each data mover has also a high speed connection to the GSI lustre file system (˜3 PByte data capacity currently). The overall bandwidth between gStore (disk cache or tape) and lustre amounts to 6 GByte/s and will be duplicated in 2012. In the near future the lustre HSM functionality will be implemented with gStore.
Each tape drive is accessible from any data mover, fully transparent to the users. The tapes and libraries are managed by commercial software (IBM Tivoli Storage Manager TSM), whereas the disk cache management and the TSM and user interfaces are provided by GSI software. This provides the flexibility needed to tailor gStore according to the always developing requirements of the GSI and FAIR user communities. For Alice users all gStore data are worldwide accessible via Alice grid software.
Data streams from running experiments at GSI u(p to 500 MByte/s) are written via sockets from the event builders to gStore write cache for migration to tape. In parallel the data are also copied to lustre for online evaluation and monitoring.
As all features related to tapes and libraries are handled by TSM gStore is practically completely hardware independent. Additionally, according to the design principles gStore is fully scalable in data capacity and I/O bandwidth. Therefore we are optimistic to fulfill also the dramatically increased mass storage requirements of the FAIR experiments in 2018, which will be some orders of magnitude higher than those of today.

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