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Experiences with gStore, a scalable Mass Storage System with Tape Backend

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GSI in Darmstadt (Germany) is a center for heavy ion research and hosts an Alice Tier2 center.
 For the future FAIR experiments at GSI, CBM and Panda, the planned data rates will reach those of the current LHC experiments at Cern.
 Since more than ten years gStore, the GSI Mass Storage System, is successfully in operation.
 It is a hierarchical storage system with a unique name space.
 Its core consists of several tape libraries from different vendors 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 (~40TB currently).
 Each tape 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.
 For Alice users all gStore data are worldwide accessible via Alice grid software,
 and in a test environment the Alice Tier2 xrootd system has been integrated successfully with gStore.
 For 2007 it is planned to provide ~200TB via xrootd backed with gStore.
 Our experiences show that it's possible to develop, maintain and operate successfully a large scale mass storage system with mainly 2 FTEs.
 As gStore is completely hardware independent and fully scalable in data capacity and I/O bandwidth, we are optimistic to fulfill also the dramatically increased mass storage requirements of the FAIR experiments in 2014, which will be several orders of magnitude higher than today.

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