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Managed Data Storage and Data Access Services for Data Grids

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The LHC needs to achieve reliable high performance access to vastly distributed storage resources across the network. USCMS has worked with Fermilab-CD and DESY-IT on a storage service that was deployed at several sites. It provides Grid access to heterogeneous mass storage systems and synchronization between them. It increases resiliency by insulating clients from storage and network failures, and facilitates file sharing and network traffic shaping.

This new storage service is implemented as a Grid Storage Element (SE). It consists of dCache as the core storage system and an implementation of the Storage Resource Manager (SRM), that together allow both local and Grid based access to the mass storage facilities. It provides advanced functionalities for managing, accessing and distributing collaboration data.

USCMS is using this system both as Disk Resource Manager at Tier-1 and Tier-2 sites, and as Hierarchical Resource Manager with Enstore as tape back-end at the Fermilab Tier-1. It is used for providing shared managed disk pools at sites and for streaming data between the CERN Tier-0, the Fermilab Tier-1 and U.S. Tier-2 centers

Applications can reserve space for a time period, ensuring space availability when the application runs. Worker nodes without WAN connection can trigger data replication to the SE and then access data via the LAN. Moving the SE functionality off the worker nodes reduces load and improves reliability of the compute farm elements significantly.

We describe architecture, components, and experience gained in CMS production and the DC04 Data Challenge.

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