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Distributed caching system for a multi-site DPM storage

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The experience gained in several years of storage system administration has shown that the WLCG distributed grid infrastructure is very performing for the needs of the LHC experiments. However, an excessive number of storage sites leads to inefficiencies in the system administration because of the needs of having experienced manpower in each site and of the increased burden on the central operations. On the other hand, user analysis is often based on clusters hosted in small sites such as Tier3s: thus, it is important to provide dynamic and efficient data access in such sites as well. Both these requirements can be met by diskless Tier3s with a local data cache.

A prototype of a system fulfilling such requirements is presented in this work. The system storage relies on the possibility to implement volatile storage pools behaving as caches, offered by the latest releases of the Disk Pool Manager (DPM) with its new core called DOME (Disk Operation Management Engine).

Leveraging the fast and reliable connections among different sites, this study proposes a configuration where a primary site represents a single entry point for the whole storage system that includes disk areas located at remote sites. A remote disk pool, configured as volatile, works as local cache with zoning access mechanisms. It may take as data source the other pools of the same system or external data areas, with mechanisms under investigation in terms of scalability and performance. With such a system, in a Tier3 the user analysis would be able to access locally cached input data, relieving the local system administrator from managing a full storage system and making the site transparent for central operations.

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