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Evaluating Tier-1 Sized Online Storage Solutions

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The Fermilab CMS Tier-1 facility provides processing, networking, and storage as one of seven Tier-1 facilities for the CMS experiment. The storage consists of approximately 15 PB of online/nearline disk managed by the dCache file system, and 22 PB of tape managed by the Enstore mass storage system. Data is transferred to and from computing centers worldwide using the CMS-developed PhEDEx transfer management system.

Prior to 2013, control over which files were staged on all Tier-1 nearline storage was provided on a site-by-site basis, despite the fact that the decisions were made centrally by the CMS Computing Operations team. We were required to change this model by mapping two separate PhEDEx transfer endpoints to our storage, allowing CMS to use this tool to manage Tier-1 nearline storage worldwide. In this paper, we evaluate various storage management solutions, most of which involve migrating the bulk of the disk (~13 PB) to another system. Hadoop, Lustre, EOS, dCache 2.x were the systems under consideration. We will present the results from evaluating the performance of metadata services, storage services, and support and operations models.

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