

A Staging Storage Sharing System for Data Handling in a Multisite Scientific Organization

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Abstract—In large scientific organizations, the laboratory experiments produce a huge amount of data and their processing and storage management are a challenging issue. Cloud architectures are exploited here and there for storage solutions and data sharing as well, in order to realize a collaborative world wide distributed platform. Whilst large experimental facilities manage themselves Information and Communications Technology (ICT) resources such as: compute, networking and storage, small experimental laboratories are demanding more and more departmental ICT resources for their own scientific instruments aided by data acquisition and control systems, specially in terms of storage and sharing/publishing data solutions. ENEA Staging Storage Sharing (E3S) system has been developed over the ENEA ICT infrastructure using Owncloud as architectural component for file syncing and sharing. E3S provides a homogeneous platform able to store and share heterogeneous data produced by many different laboratories geographically spread on several sites and working on collaborative projects. The cloud storage technology has allowed to design an architecture based on concepts such as: i) data integrity and security, ii) scalability, iii) reliability. A first deployment of E3S works in a project for cultural heritage diagnostics involving several laboratories in different ENEA sites producing schema-free data. The paper presents the first deployment of E3S and a performance analysis of the architectural components. The performance analysis has been carried out with customized benchmark tools on a test bed consisting of a HPC cluster over Infiniband mounting a high performance storage.

Index Terms —Cloud Storage, Linux, AFS, GPFS

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