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P3.042 Remote control of a high-speed pellet injector and data synching & sharing tools

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The four-barrel, two-stage gun Ignitor Pellet Injector (IPI) was developed in collaboration between ENEA and ORNL to provide cryogenic Deuterium pellets of different mass and speed to be launched into tokamak plasmas with arbitrary timing. The prototype injector is presently located at Oak Ridge (TN, USA), and is normally operated locally through a control and data acquisition system developed in LabVIEW, handling multiple subsystems: vacuum, cryogenics, propulsion valves and pellet diagnostics. More recently, a remote-control system has been set up, based on RealVNC®, which allows to fully operate the IPI from a control room in Italy. Tools for data transfer and storage into ENEA ICT area have also been provided1. A Staging Storage Sharing system, named E3S, previously developed over the ENEA ICT infrastructure, using OwnCloud as architectural component, is used for file syncing and sharing of the IPI data. It provides a homogeneous platform able to store and share heterogeneous data produced by many data acquisition systems in large nuclear fusion experiments like the tokamaks. The cloud storage technology has allowed to design an architecture based on concepts such as: i) data integrity and security, ii) scalability, iii) reliability. The deployment of E3S works on the pellet facility and allows storing data acquired by the diagnostic systems onto a wide area distributed file-system for sharing, as well as for remote data access based on MDS+ tool, and integrated with MySQL metadata accessible by means of web-services. The paper presents the 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.

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