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XKIT for GridPP: (XRootD Kubentes Integration Testing for GridPP)

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XRootD is a robust, scalable service that supports globally distributed data management for diverse scientific communities. Within GridPP in the UK, XRootD is used by the Astronomy, High-Energy Physics (HEP) and other communities to access >100PB of storage. The optimal configuration for XRootD varies significantly across different sites due to unique technological frameworks and site-specific factors.

XRootD's adaptability has made it a cornerstone of the national data-management strategy for GridPP. Given its high-profile role, new releases, and features of XRootD undergo rigorous testing and verification before national deployment. Historically, this process involved manual integration testing and dedicated test deployments, which required substantial input from both local site administrators and remote support teams. This approach has placed considerable demands on support staff, requiring extensive technical expertise and significant time for verification.

To support the storage community within GridPP, we have developed a system that automates the deployment of a virtual grid using Kubernetes for XRootD testing, "XKIT". Using a container-based approach this system enables high-level integration tests to be performed automatically and reproducibly. This not only simplifies the support process but also significantly reduces the time staff need to dedicate to repetitive testing for new deployments.

We have identified >20 unique XRootD configurations necessary for XKIT. By deploying each of these setups on our platform, we aim to provide the GridPP community with a consistent suite of functional tests tailored to various site topologies.

This presentation will explore the development of the XKIT platform, discuss the challenges we encountered, and highlight the advantages this system offers to GridPP and the wider community.

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