

# **XRootD and FTS Workshop @ STFC UK**

## **Report of Contributions**

Contribution ID: 56

Type: **not specified**

## Stress testing an OSDF/Pelican/XrootD origin

*Thursday 12 September 2024 11:00 (20 minutes)*

We create a set of tests to test every hardware and software limit related to XrootD. The idea of this talk is to show the results of these tests. Moreover, it will show some OSDF statistics.

**Author:** ANDRIJAUSKAS, Fabio (Univ. of California San Diego (US))

**Presenter:** ANDRIJAUSKAS, Fabio (Univ. of California San Diego (US))

**Session Classification:** XRootD Presentations

Contribution ID: 57

Type: **not specified**

## Experince with XCache on HPC in Germany (CMS)

*Thursday 12 September 2024 11:50 (30 minutes)*

With this contribution, I want to present our first production deployment of XCache for workflow and efficiency optimizations of CMS jobs at our local HPC cluster at KIT, HoreKa. The project is part of the preparations for the future German HEP computing strategy focusing on HPC contributions.

Our fully containerized setup is deployed on a login node of the cluster and uses a shared filesystem for the cache (GPFS with RDMA/IPoB) to optimize the data access for the cluster.

The talk will include a description of our setup, the challenges and limitations with XRootD on HPC we encountered, and the experiences we made.

**Author:** HOFSAESS, Robin (KIT - Karlsruhe Institute of Technology (DE))

**Presenter:** HOFSAESS, Robin (KIT - Karlsruhe Institute of Technology (DE))

**Session Classification:** XRootD Presentations

Contribution ID: 59

Type: **not specified**

## Catching Up With XRootD (Part 2)

*Wednesday 11 September 2024 14:30 (20 minutes)*

In this contribution, we discuss infrastructure updates to XRootD and other development topics.

**Author:** AMADIO, Guilherme (CERN)

**Presenter:** AMADIO, Guilherme (CERN)

**Session Classification:** XRootD Presentations

Contribution ID: 60

Type: **not specified**

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

*Friday 13 September 2024 09:50 (30 minutes)*

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.

**Author:** Dr CURRIE, Robert Andrew (The University of Edinburgh (GB))

**Co-author:** YUAN, Wenlong (The University of Edinburgh (GB))

**Presenter:** Dr CURRIE, Robert Andrew (The University of Edinburgh (GB))

**Session Classification:** XRootD Presentations

Contribution ID: **61**

Type: **not specified**

## Catching Up With XRootD

*Wednesday 11 September 2024 14:00 (30 minutes)*

Features and changes since the last workshop (5.5.4 to 5.7.1).

**Author:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Presenter:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Session Classification:** XRootD Presentations

Contribution ID: 62

Type: **not specified**

## XRootD Future Feature Plans

*Wednesday 11 September 2024 14:50 (20 minutes)*

A roundup of planned features and improvements.

**Author:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Presenter:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Session Classification:** XRootD Presentations

Contribution ID: **63**

Type: **not specified**

## Contributing to XRootD

*Wednesday 11 September 2024 15:10 (20 minutes)*

- XRootD Development Model
- Documentation and Submitting Patches
- GitHub Actions Continuous Integration
- Building and Running Tests Locally

**Author:** AMADIO, Guilherme (CERN)

**Presenter:** AMADIO, Guilherme (CERN)

**Session Classification:** XRootD Presentations



Contribution ID: 64

Type: **not specified**

## Load Balancing in XRootD

*Friday 13 September 2024 11:00 (30 minutes)*

To address the need for high transfer throughput seen for large datacentres using XRootD for projects such as the LHC experiments, it is important to make optimal and sustainable use of our available capacity. Load balancing algorithms play a crucial role in distributing incoming network traffic across multiple servers, ensuring optimal resource utilization, preventing server overload, and enhancing performance and reliability. At the Rutherford Appleton Laboratory (RAL), the UK's Tier-1 centre for the Worldwide LHC Computing Grid (WLCG), we started with a DNS round robin then moved to XRootD's cluster management service component, which has an active load balancing algorithm to distribute traffic across 26 servers, but encountered its limitations when the system as a whole is under heavy load. We describe our tuning of the configuration of the existing algorithm before proposing a new tuneable, dynamic load-balancer based on a weighted random selection algorithm, as well as the observed behaviours of servers under stress conditions

**Authors:** THOMAS, Jyothish (STFC); BYRNE, Thomas

**Co-author:** WALDER, James William (Science and Technology Facilities Council STFC (GB))

**Presenter:** THOMAS, Jyothish (STFC)

**Session Classification:** XRootD Presentations

Contribution ID: 65

Type: **not specified**

## Optimising Vector Read requests for RAL disk storage

*Friday 13 September 2024 09:20 (30 minutes)*

For a long time Ceph-based disk storage at RAL Tier-1 was not able to execute Vector Read requests effectively, causing problems for some VOs. The talk describes multiple changes that were made to the Xrootd-Ceph plugin and configuration to solve the problem.

**Author:** ROGOVSKIY, Alexander (Rutherford Appleton Laboratory)

**Presenter:** ROGOVSKIY, Alexander (Rutherford Appleton Laboratory)

**Session Classification:** XRootD Presentations

Contribution ID: **66**

Type: **not specified**

## Site update on FTS at RAL

*Tuesday 10 September 2024 09:30 (20 minutes)*

General overview of the current status of the FTS service being run at RAL and plans for it moving forward.

**Author:** COOPER, Rose

**Presenter:** COOPER, Rose

**Session Classification:** FTS Presentations

Contribution ID: 67

Type: **not specified**

## FTS@CERN: Site Report

*Tuesday 10 September 2024 09:00 (30 minutes)*

General overview of the FTS deployment at CERN

**Author:** MURRAY, Steven (CERN)

**Co-author:** PATRASCOIU, Mihai (CERN)

**Presenter:** MURRAY, Steven (CERN)

**Session Classification:** FTS Presentations

Contribution ID: **68**

Type: **not specified**

## **FTS 2024: State of Affairs**

*Monday 9 September 2024 14:10 (30 minutes)*

Updates on recent developments, releases and all that's new in the FTS world of 2024

**Author:** PATRASCOIU, Mihai (CERN)

**Co-authors:** LOPES, Joao Pedro; REGNIER, Louis; MISRA, Shubhangi; MURRAY, Steven (CERN)

**Presenter:** PATRASCOIU, Mihai (CERN)

**Session Classification:** FTS Presentations

Contribution ID: **69**

Type: **not specified**

## FTS in the Token World

*Wednesday 11 September 2024 09:00 (40 minutes)*

Overview of FTS in the token ecosystem, reflections on the DC'24 and decisions moving forward

**Authors:** LOPES, Joao Pedro; PATRASCOIU, Mihai (CERN); MURRAY, Steven (CERN)

**Presenter:** PATRASCOIU, Mihai (CERN)

**Session Classification:** FTS Presentations

Contribution ID: **70**

Type: **not specified**

## **BNL FTS Status**

*Tuesday 10 September 2024 09:50 (20 minutes)*

Report of BNL FTS status

**Author:** ITO, Hironori (Brookhaven National Laboratory (US))

**Presenter:** ITO, Hironori (Brookhaven National Laboratory (US))

**Session Classification:** FTS Presentations

Contribution ID: 71

Type: **not specified**

## **XCache news & upcoming changes [25 min]**

*Thursday 12 September 2024 09:30 (25 minutes)*

New resource monitoring infrastructure.

Purge plugin support.

Planned development:

- extensions of resource monitoring, planned and possible
- improvement of prefetching

**Author:** TADEL, Matevz (Univ. of California San Diego (US))

**Presenter:** TADEL, Matevz (Univ. of California San Diego (US))

**Session Classification:** XRootD Presentations



Contribution ID: 72

Type: **not specified**

## **XRootd Http as web server for ROOT [10 + 10 min]**

*Friday 13 September 2024 11:30 (30 minutes)*

Present motivation & possibilities.

Discussion on feasibility and required changes for prototype implementation.

**Author:** TADEL, Matevz (Univ. of California San Diego (US))

**Presenter:** TADEL, Matevz (Univ. of California San Diego (US))

**Session Classification:** XRootD Presentations

Contribution ID: 73

Type: **not specified**

## LHCb FTS Community talk

*Monday 9 September 2024 15:05 (25 minutes)*

To be added

**Author:** HAEN, Christophe (CERN)

**Presenter:** HAEN, Christophe (CERN)

**Session Classification:** FTS Presentations

Contribution ID: 74

Type: **not specified**

## **CMS experiment overview of XRootD usage**

This talk will present an overview of the different components of XROOTD and how FTS/XRootd fits into the data management and transfer parts of our Computing Model.

**Author:** SEXTON-KENNEDY, Elizabeth (Fermi National Accelerator Lab. (US))

**Presenter:** SEXTON-KENNEDY, Elizabeth (Fermi National Accelerator Lab. (US))

**Session Classification:** XRootD Presentations

Contribution ID: 75

Type: **not specified**

## Shoveler XRootD monitoring

*Thursday 12 September 2024 15:00 (30 minutes)*

The old XRootD monitoring 'GLED' has been turned off. It will be replaced with Shoveler. This presentation looks at the testing and validation of this software, as well as other XRootD monitoring status.

**Author:** ELLIS, Katy (Science and Technology Facilities Council STFC (GB))

**Presenter:** ELLIS, Katy (Science and Technology Facilities Council STFC (GB))

**Session Classification:** XRootD Presentations

Contribution ID: 76

Type: **not specified**

## CMS Data Transfers: An Overview of Token Workflows

*Wednesday 11 September 2024 10:45 (30 minutes)*

Since Run 1, CMS has relied on certificates for user identification and experiment/group membership through extensions. However, as support for both certificates and extensions declines, CMS is transitioning to token-based authentication, aligned with the WLCG profile, for the upcoming High-Luminosity LHC run. With certificates, sites were responsible for mapping roles to capabilities. Tokens will allow CMS to take a more granular approach to security whilst also aligning with industry-standard practices.

This presentation provides an overview of the token-based authentication and authorisation workflows implemented for CMS data transfers. It also reflects on past experiences, outlines the current testing efforts, and discusses future enhancements to optimize the use of tokens within CMS.

**Authors:** CHAUHAN, Rahul (CERN); ELLIS, Katy (Science and Technology Facilities Council STFC (GB)); LAMMEL, Stephan (Fermi National Accelerator Lab. (US))

**Presenter:** CHAUHAN, Rahul (CERN)

**Session Classification:** FTS Presentations

Contribution ID: 77

Type: **not specified**

## FTS & Rucio

*Wednesday 11 September 2024 09:40 (40 minutes)*

The Rucio communities depend on FTS to orchestrate site-to-site transfers.

Over the past year, the two development teams have worked closely to drive the transition from X.509 certificates to OAuth 2.0 tokens. This talk will focus on that effort. It will cover the original design, the preparation leading up to the Data Challenge 2024, the Data Challenge itself and the lessons learned from it, the more recent discussions and experiments, and a view into the short- and medium-term future.

This talk will also mention other non-token-related developments in Rucio.

**Author:** CHRISTIDIS, Dimitrios (CERN)

**Presenter:** CHRISTIDIS, Dimitrios (CERN)

**Session Classification:** FTS Presentations

Contribution ID: 78

Type: **not specified**

## The Square Kilometre Array: SRCNet v0.1 and synergies with HEP

*Tuesday 10 September 2024 10:10 (20 minutes)*

The Square Kilometre Array (SKA) Observatory will be supported by a global network of SKA Regional Centres (SRCNet) distributed across its member states. SRCNet v0.1 –to be deployed in 2025 - represents the prototype compute, storage and service infrastructure needed to prepare for full operations.

For SRCNet v0.1, Rucio, FTS and Storage endpoint technologies from the HEP Community have been selected to full the data management and logistics requirements.

This presentation will provide an overview of the current status of SRCNet and outline the development and implementation plans for SRCNet v0.1,(e.g. data movement campaigns). Additionally, the talk will explore synergies with the HEP community and discuss potential future requirements as SRCNet develops.

**Author:** WALDER, James William (Science and Technology Facilities Council STFC (GB))

**Co-author:** COMMUNITY, SRCNet

**Presenter:** WALDER, James William (Science and Technology Facilities Council STFC (GB))

**Session Classification:** FTS Presentations

Contribution ID: 79

Type: **not specified**

## **ATLAS & FTS: Reflections and ideas**

*Monday 9 September 2024 16:00 (25 minutes)*

ATLAS & FTS: Reflections and ideas

**Authors:** FORTI, Alessandra (University of Manchester (GB)); LASSNIG, Mario (CERN)

**Presenter:** FORTI, Alessandra (University of Manchester (GB))

**Session Classification:** FTS Presentations



Contribution ID: **80**

Type: **not specified**

## **CMS FTS Community Talk**

*Monday 9 September 2024 16:25 (25 minutes)*

A description of CMS Data Management with particular emphasis on FTS. This will include the latest updates and changes since the last workshop.

**Author:** ELLIS, Katy (Science and Technology Facilities Council STFC (GB))

**Presenter:** ELLIS, Katy (Science and Technology Facilities Council STFC (GB))

**Session Classification:** FTS Presentations

Contribution ID: 81

Type: **not specified**

## Benchmarking XRootD: A Versatile Testing Framework for the Grid Community

*Friday 13 September 2024 10:20 (15 minutes)*

As Tier 1 storage continues to expand, an increasing number of sites are contributing to the World-wide LHC Grid, making efficient data transfer a critical component for big data analytics. XRootD is pivotal for scientific data management, facilitating seamless data movement and access across the 3 tiers. However, with the growing complexity and scale of grid infrastructures, it is essential to benchmark and evaluate the performance of XRootD in its intended production environment.

This talk introduces the XRootD testing framework, a tool designed to assess the performance of XRootD functionality across multiple tiers, networks and protocols. By enabling systematic benchmarking, this framework provides valuable insights into the functionality and efficiency of data transfers, ensuring that sites can test different configurations and their impact. The framework is highly extensible to other sites and functionalities, making it a versatile tool for the wider grid community. Test results can be run and visualised in Jenkins, which offers insights for developers. Attendees will gain an overview of the framework, and how to utilise it to measure performance and reliability of data transfers within their own grid institutions.

**Author:** DEMIR, Mariam

**Presenter:** DEMIR, Mariam

**Session Classification:** XRootD Presentations

Contribution ID: **82**

Type: **not specified**

## **XRootD monitoring at Lancaster**

*Thursday 12 September 2024 16:00 (20 minutes)*

We show how we've combined three means of monitoring of our gateways, and suggest some enhancements.

**Authors:** HAND, Gerard (Lancaster University (GB)); DOIDGE, Matthew (Lancaster University); SIMPSON, Steven (Lancaster University)

**Presenter:** SIMPSON, Steven (Lancaster University)

**Session Classification:** XRootD Presentations

Contribution ID: **84**

Type: **not specified**

## **Pelican and the OSDF Overview**

*Thursday 12 September 2024 09:00 (30 minutes)*

Pelican and the OSDF Overview

**Author:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Presenter:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Session Classification:** XRootD Presentations

Contribution ID: **85**

Type: **not specified**

## **The Pelican Globus/HTTP/S3 OSS backend**

*Thursday 12 September 2024 11:20 (30 minutes)*

The Pelican Globus/HTTP/S3 OSS backend

**Author:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Presenter:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Session Classification:** XRootD Presentations

Contribution ID: **86**

Type: **not specified**

## The Pelican XrdCl plugin

*Thursday 12 September 2024 09:55 (30 minutes)*

The Pelican XrdCl plugin

**Author:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Presenter:** BOCKELMAN, Brian Paul (University of Wisconsin Madison (US))

**Session Classification:** XRootD Presentations

Contribution ID: **87**

Type: **not specified**

## **Network isolation for multi-IP exposure in XRootD**

*Friday 13 September 2024 09:00 (20 minutes)*

**Outline:**

- The need to expose multiple IPs
- Network namespaces for isolation
- Manual approach
- k8s/multus approach

Duration: 20 min Virtual Presentation

**Presenter:** DAVILA, Diego (UCSD)

**Session Classification:** XRootD Presentations

Contribution ID: **88**

Type: **not specified**

## OSCER Status

*Thursday 12 September 2024 12:20 (15 minutes)*

**Presenter:** SEVERINI, Horst (University of Oklahoma (US))

**Session Classification:** XRootD Presentations



Contribution ID: **89**

Type: **not specified**

## **XRootD Monitoring Streams**

*Thursday 12 September 2024 16:20 (10 minutes)*

The types of information available via XRootD Monitoring

**Presenter:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Session Classification:** XRootD Presentations

Contribution ID: **90**

Type: **not specified**

## **Discussion: XRootD Monitoring: What's missing? What needs to change?**

*Thursday 12 September 2024 16:30 (30 minutes)*

Discussion

**Presenter:** HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US))

**Session Classification:** XRootD Presentations

Contribution ID: **91**

Type: **not specified**

## **CERN Central Monitoring Overview**

*Thursday 12 September 2024 14:30 (30 minutes)*

A presentation on CERN Central Monitoring, showcasing how data gets ingested, processed, enriched, aggregated and stored in OpenSearch.

From OpenSearch storage, tools such as Grafana can leverage the data and create dashboards and plots.

**Author:** GARRIDO BEAR, Borja (CERN)

**Presenter:** GARRIDO BEAR, Borja (CERN)

**Session Classification:** XRootD Presentations

Contribution ID: 92

Type: **not specified**

## Future of FTS

*Tuesday 10 September 2024 11:00 (30 minutes)*

An overview of what's being prepared for the new generation of FTS.

**Author:** MURRAY, Steven (CERN)

**Co-authors:** LOPES, Joao Pedro; PATRASCOIU, Mihai (CERN)

**Presenter:** MURRAY, Steven (CERN)

**Session Classification:** FTS Presentations

Contribution ID: **93**

Type: **not specified**

## **FTS & EOSC**

*Monday 9 September 2024 14:40 (25 minutes)*

A description of the EOSC project and where FTS fits in the picture.

**Author:** LOPES, Joao Pedro

**Presenter:** LOPES, Joao Pedro

**Session Classification:** FTS Presentations

Contribution ID: 94

Type: **not specified**

## Welcome & Logistics

*Monday 9 September 2024 13:45 (25 minutes)*

Start of the FTS & XRootd 2024 workshop

**Author:** DEWHURST, Alastair (Science and Technology Facilities Council STFC (GB))

**Presenter:** DEWHURST, Alastair (Science and Technology Facilities Council STFC (GB))

**Session Classification:** Welcome & Logistics

Contribution ID: **96**

Type: **not specified**

## Reception Information

*Wednesday 11 September 2024 12:15 (15 minutes)*

Details about Wednesday's reception

**Presenter:** DEWHURST, Alastair (Science and Technology Facilities Council STFC (GB))

**Session Classification:** Welcome & Logistics

Contribution ID: 97

Type: **not specified**

## UK storage with XRootD

*Thursday 12 September 2024 14:00 (30 minutes)*

UK Storage (XrdCeph, CephFS+XrootD, XCAche, and VP)

**Author:** DEWHURST, Alastair (Science and Technology Facilities Council STFC (GB))

**Presenter:** DEWHURST, Alastair (Science and Technology Facilities Council STFC (GB))

**Session Classification:** XRootD Presentations



Contribution ID: **98**

Type: **not specified**

## Deep Dive into XRootD Github Repo

*Friday 13 September 2024 13:30 (30 minutes)*

How to maneuver around the XRootD Github repository and find helpful treasures at every click.

**Presenter:** AMADIO, Guilherme (CERN)

**Session Classification:** XRootD Presentations

Contribution ID: 99

Type: **not specified**

## On the use of XRootD in StorageD at the Rutherford Appleton Laboratory, UK

*Friday 13 September 2024 12:00 (30 minutes)*

StorageD is the data aggregator component within archiving systems that supports the work of the Diamond

Light Source (DLS) and the Centre for Environmental Data Analysis (CEDA) at the Rutherford Appleton

Laboratory (RAL). StorageD provides file ingest and recall services to scientists and engineers internationally

through DLS and CEDA. StorageD currently support ingest of over 100TB daily. StorageD uses the CERN

Tape Archive (CTA) backend in writing data to tape. Current holding on tape is approximately 100PB.

Over the past 2 years, StorageD has migrated from using the RFIO access protocol to using XRootD for file

transfer to the backend. This talk will cover the description of the development work on the transition of

StorageD away from RFIO at the backend, towards XRootD. Furthermore, optimisation work that has become

necessary because of this transition will be discussed.

Service management of StorageD includes monitoring, reporting and management with maintenance scripts.

These efforts will be discussed in this talk.

**Presenter:** BEJIDE, Emmanuel

**Session Classification:** XRootD Presentations

Contribution ID: **100**

Type: **not specified**

## **CMS Pre-XRootd Lunch topics**

**Author:** SEXTON-KENNEDY, Elizabeth (Fermi National Accelerator Lab. (US))

**Presenter:** SEXTON-KENNEDY, Elizabeth (Fermi National Accelerator Lab. (US))