Multi-VO Rucio

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Multi-VO Rucio at RAL

- Rucio was initially setup in April 2018 at RAL to support SKA development

- A number of Graduates at RAL have worked with core dev team to develop Multi-VO functionality to support integration with Multi-VO DIRAC to support experiments

- Evolved to supporting Multi-VO

- Has longer-term support with 1 FTE at RAL, as well as a Graduate

- George Matthews, Started in September working on Rucio until March

RAL Rucio Funding

Current Funding

- EGI funding for running Rucio to support VOs interest in using Multi-VO Rucio. Currently, no direct uptake instead opting for other solutions or deploying their own instance.

- Swift-HEP funding for research – The instance being used to investigate the best was forward for UK dataflows for HL-LHC
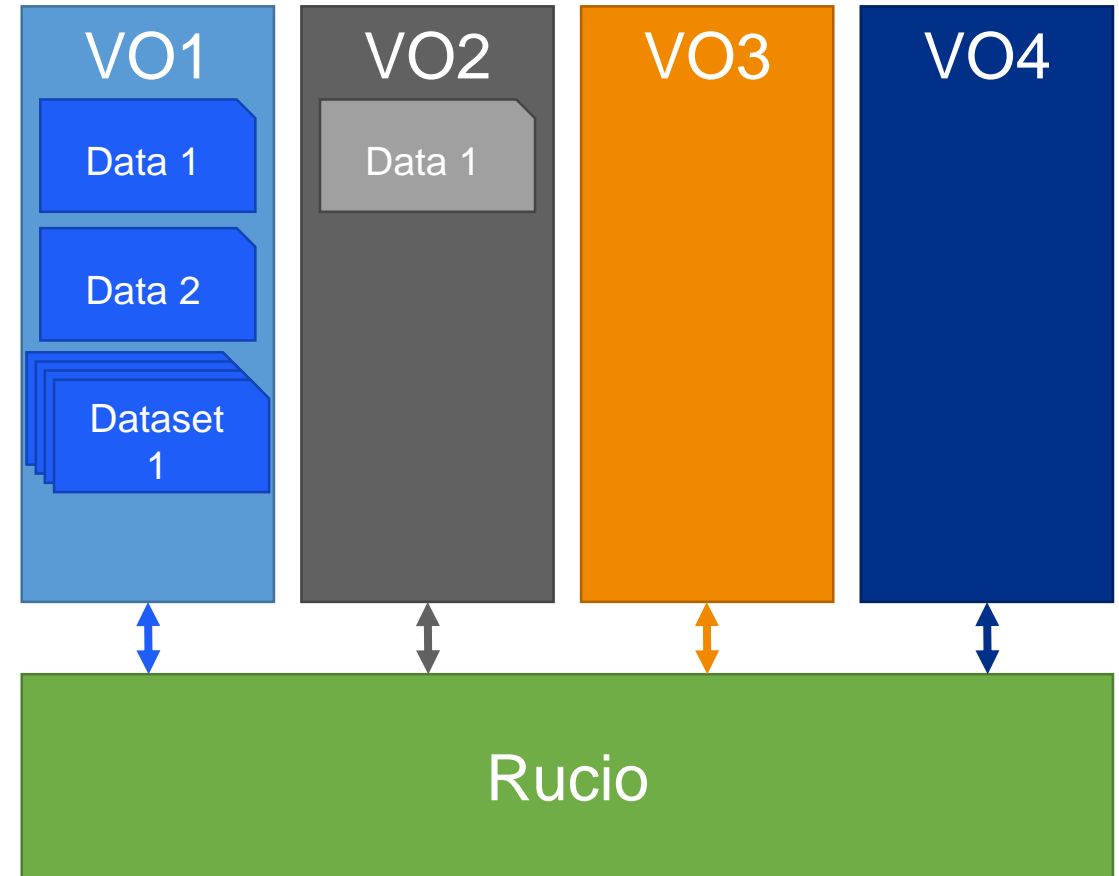
Future Funding

- SKA

- LSST

Separation of VOs

VO namespaces

- Each VO is a separate namespace
- Policy packages can be VO specific
  - Placement algorithms
  - Authentication levels
  - Regex of for sense checking

VO1	VO2	VO3	VO4
Data 1	Data 1		
Data 2			
Dataset 1			

Rucio

# Advantages to use Multi-VO Rucio

- Running a Rucio instance that supports multiple VOs is beneficial for small experiments:
    - Maintained by RAL not by smaller experiments
    - Low levels of load from smaller experiments.
    - One instance to support and maintain.
    - Shared RSE configuration
    - New VOs are quick to add – work with VO admin to setup their environment

- More contact with Developers and larger communities using Rucio to know how best to utilise

Multi-VO Setup

- Configuration switch to enable
  - Added VO argument to client to specify (can be transparent to users if set in ENV or rucio.cfg)
  - Addition of credentials (x509 proxy)
- Originally pip installed Rucio server and daemons
- Deployed components to Docker
- Daemons and server deployed on K8S cluster
- Currently supporting 2 VOs simultaneously with single Daemons

Feature development: Multi-VO Conveyor

- Multi-VO Rucio was still under development when I joined
- Conveyor daemons could only have once authentication x509
- Certificate selection based on VO for single daemon operation
  - Implemented in 1.27
- Completed the Multi-VO capability for the daemons
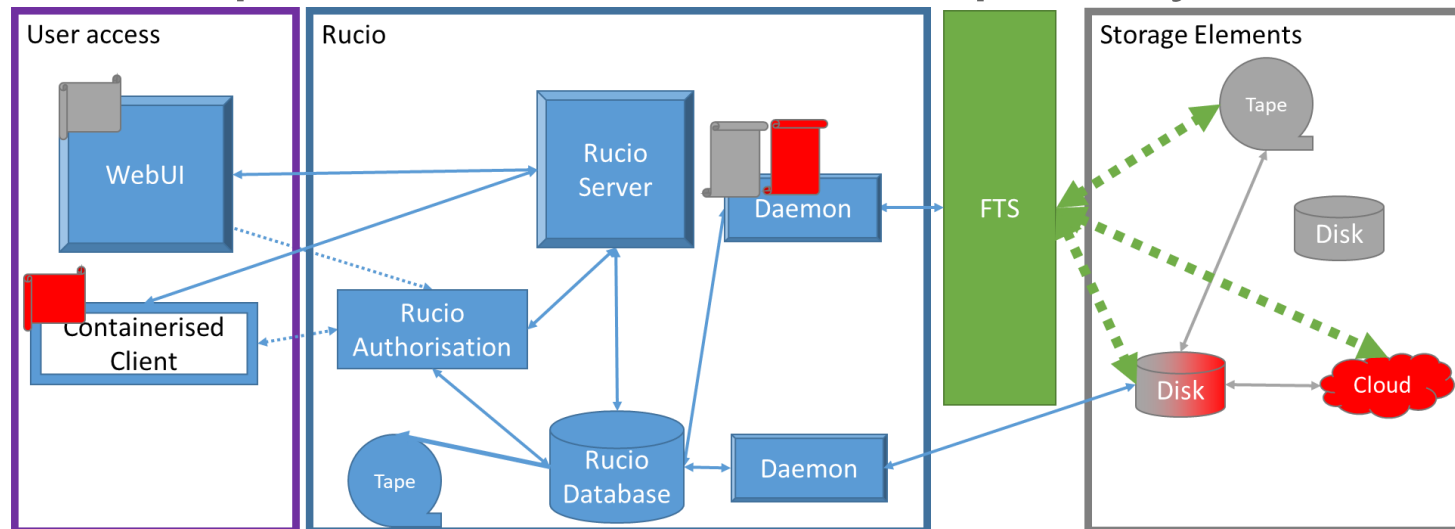
Multi-VO deployment developments

- Transition to a K8S deployment of Rucio
  Convert cronjobs for testing over to K8S jobs

- Adapt existing Rucio cronjobs for multi-VO K8S deployment

- Deployment of a small Kubernetes cluster to support Rucio
  - Rancher RKE2
    - Helm
    - Prometheus monitoring from Graphite
    - Crons – renewals and delegation
    - Server, daemons
    - TODO: Flux, authentication server
  - External deployments
   - Loadbalancer / HAproxy

Graduate Project

- George is to be working on Rucio for 6 months
- Started in September
- Working with Mayank and other Devs to ensure new WebUI will function with and has features specific to Multi-VO
- Helping deploy functionality for the K8S
  - Converted testing crons to K8S deployment
  - Put in PR to convert proxy renewal and delegation to K8S proxy

Token Authentication

- In principle works on Multi-VO, needs some configuration and editing of sync scripts

- Transition to K8S deployment 1st step

- Information for IRIS-HEP and EGI Check-in OIDC is already configured and ready for testing as soon as auth server is ready and functional

Rucio Monitoring

- Implementing further monitoring for Rucio by collaborating with Edinburgh (Wenlong and Rob) to get the Hermes-based monitoring implemented and accessible by communities that may want to use Multi-VO Rucio.

- Modelled on the Monitoring deployed for DUNE
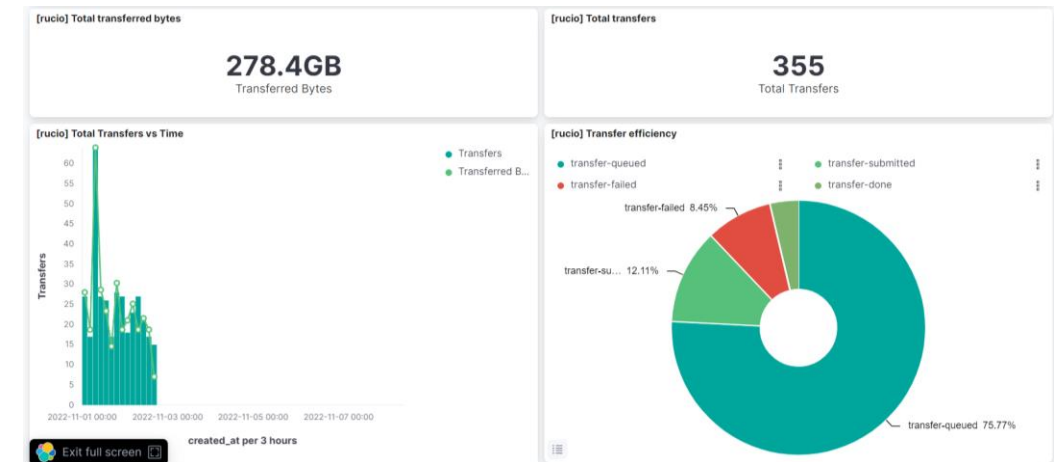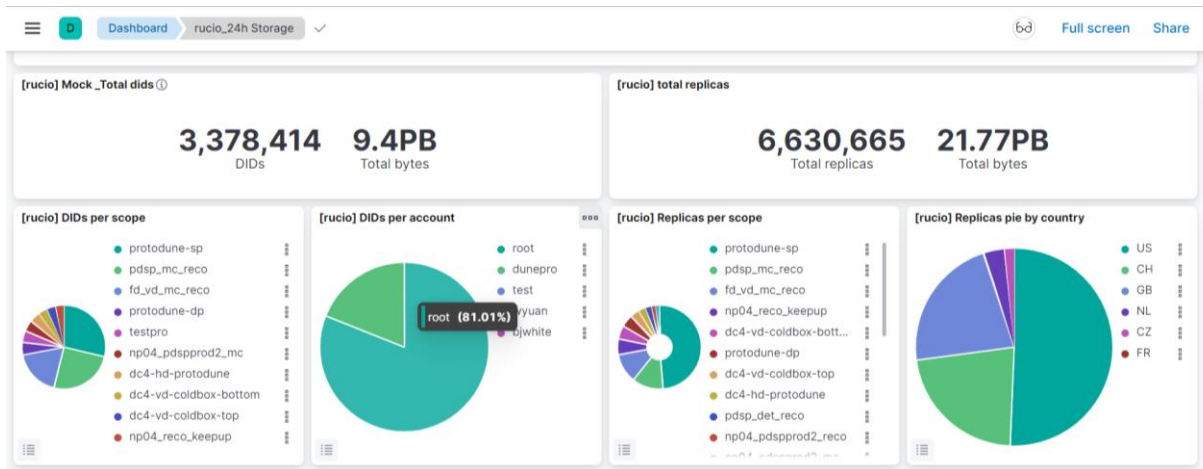
Data-lake within workflow management

- Requirement to move to Rucio 1.29

- VO specific policies to ensure correct working with DIRAC without disrupting other VOs on Multi-VO Rucio

- Work with Janusz to ensure integration with DIRAC
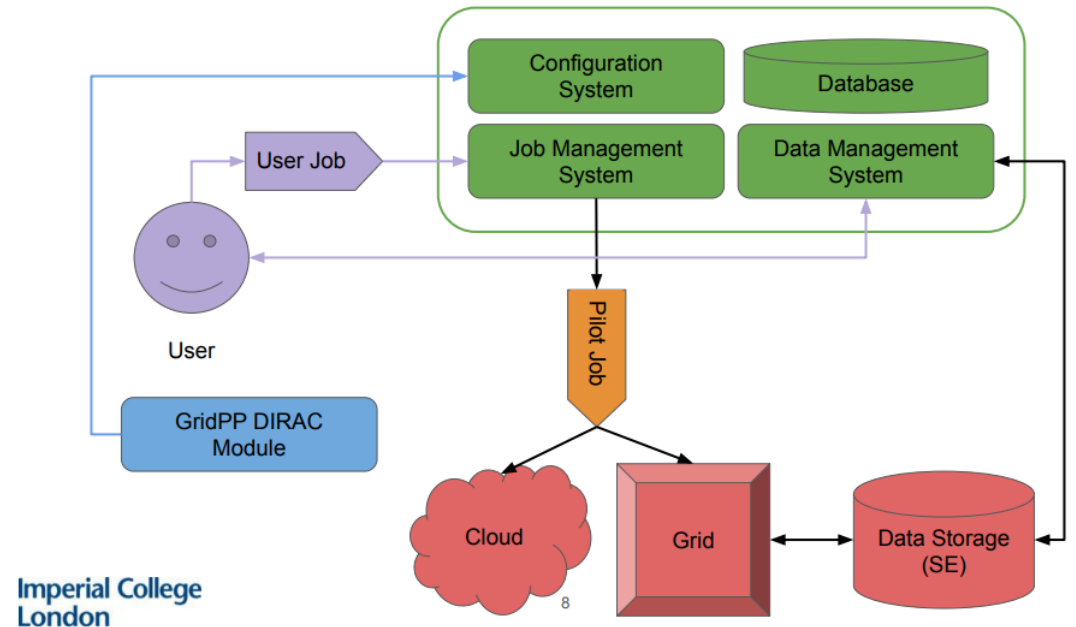
Janusz's presentation at SWIFT-HEP May meeting

Rucio development work

- Core Rucio work:
  - Removing deprecated storage code (S3 related) to cut down dependencies
  - Debugging and fixing a problem with S3 RSEs in Multi VO mode
  - Enforcing version check on policy packages to prevent breakages when Rucio API changes

- Improvements to DUNE policy package:
  - Updating to work with newer Rucio versions
  - Using MetaCat Python API instead of direct REST calls (with help from Igor Mandrichenko)
  - New SURL algorithm that queries MetaCat, for use with tape storage sites

Slide provided by James Perry, Edinburgh

Questions?