



## State of Rucio at Fermilab

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Rucio Workshop

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# State of the Donkeys

- About Me
  - Distributed Data Development @ FNAL
  - Rucio Technical PoC @ FNAL (except for CMS)
  - Rubin Observatory Data Curation Group Lead
- Current Rucio Disposition
  - Providing individual Rucio services for 4 VOs
    - DUNE: Deep Underground Neutrino Experiment
    - ICARUS: Imaging Cosmic and Rare Underground Signals
    - Mu2e: Muon-to-Electron Conversion Experiment
    - Hypot: “Hypothetical” - for integration
    - Multiple development deployments
    - Not to mention Rubin Observatory Support
  - Deployment framework: tricky configuration, custom images



# ICARUS

- Experiment facts
  - Forms the far detector for the Short-Baseline Neutrino program
  - Searching for indications of sterile neutrinos
  - LAr-TPC design
- Data flows
  - FNAL  $\leftrightarrow$  CNAF
  - FNAL  $\leftrightarrow$  NERSC (HPC)
- Rucio Deployment
  - 1.29
  - Default policy package/algorithms



# Mu2e

- Experiment facts
  - Looking for evidence of charged lepton conversion
  - Pulsed negative muon beam fed into a solenoid system
- Data flows
  - All internal to Fermilab at first
  - Potential to expand to HPC sites (NERSC)
- Rucio Deployment
  - 1.29
  - Custom policy package
    - LFN2PFN algorithm based on lookup tables



Beam solenoid is a technical achievement

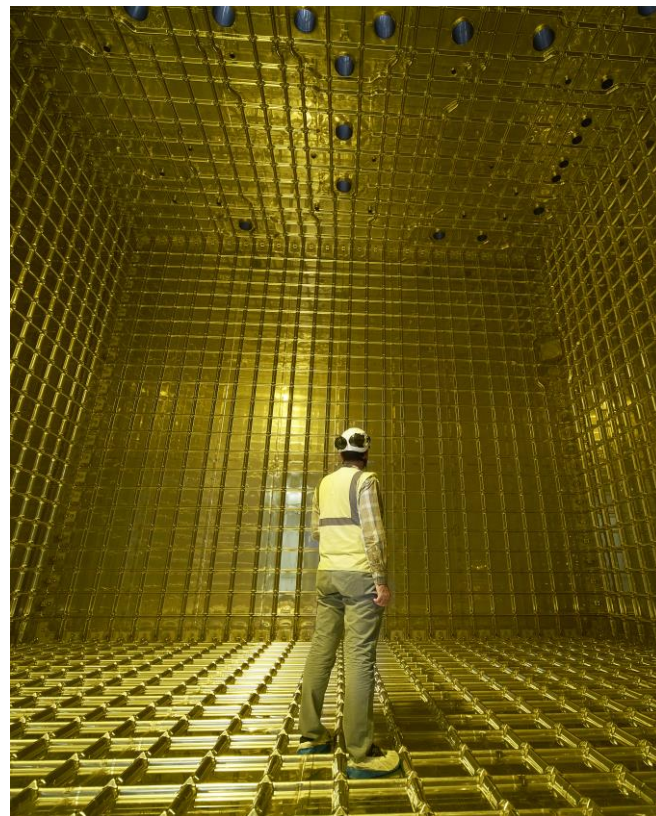
# DUNE

- Experiment facts
  - LArTPC detector
  - 70kt far detector 1500m underground in South Dakota
  - Event data volume: 3.8GB basic / 140TB supernova
  - Detectors located 1000s of miles from Fermilab
- Sites
  - 4 archive(tape)+compute (FNAL,IN2P3,CERN,RAL)
  - 11 disk+compute
  - 24 compute
  - Includes HPC sites, where reconstruction is run
- Rucio Deployment
  - 1.29
  - Custom policy package
    - Deployed early this year, and integrates with Metacat
    - Forces new DIDs to first be declared in Metacat



# DUNE

- Production DB surgery on all FNAL\_DCACHE replicas
  - Updated RSE prefix in place for PFNs of ~4 million replicas
- Previous replica catalog (SAM) being replicated into Rucio
- GeolP calculated distances to replicas are inaccurate
  - James Perry working on including compute-only sites in the distances table
- Data challenge rehearsal scheduled for Nov. 2023
- WLCG DC24 in February
- Look into usage of list-dataset-replicas --deep



# Current Operations Work

- Development
  - Rebuilt deployment framework ground-up based on experience with Rubin
    - More flexible, less restrictive
    - Unifies K8s and OKD deployment methods
  - Running v32 on integration deployment
    - Except for the newest WebUI incarnation
- Investigating client distribution methods
- Develop monitoring capabilities
- Setup cache-consumer for Mu2e use of scratch storage



## Future Developments

- Multi-VO Deployment (yes, still)
  - ICARUS and Mu2e would be good candidates
- Enable token authentication for clients
  - Experiment jobs going tokens-only ASAP
- v32: The Good, The Bad and the Donkey for everyone!
  - Surf the bleeding edge with CMS going forward?
- Integrate QoS functionality that BNL/CERN are creating
- Distribute Rucio secrets with Vault
- Work with FTS3 service to enable conveyor-receiver





# This Year's Requests

- Documentation improvements?
  - Subscriptions/transmogrifier
  - Python API use (DID format defined in code, not docs)
  - cache-consumer
    - Is the format of the messages required documented?
  - Automatix
    - Some configuration options are unclear
- Officially supported Prometheus monitoring Dashboard
  - Standardization of important metrics
- Investigate the ability to still registering files regardless of Metacat registration status
  - Creating a DID initially bypasses create\_did() API



# Thanks! Questions?



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