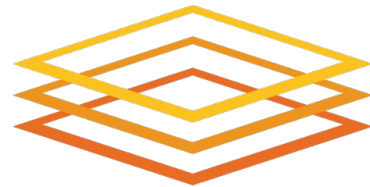# Rucio and the OSG

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Open Science Grid

Rucio

- Data management tool developed by ATLAS and used by AMS and Xenon1T
- Manages the location, upload, retrieval, and distribution of data (individual files, datasets, and sets of datasets) through a "subscription" model
  - Users define where data should be located, i.e. a "subscription"
  - Internal permission scheme that allows for various level of privilege, e.g. "Production" user add subscription for data raw data, while user "John/Jane Doe" can only download raw data
  - "Subscribed" data is transferred to destination site(s) through FTS
- Python-based implementation backed by a SQL database
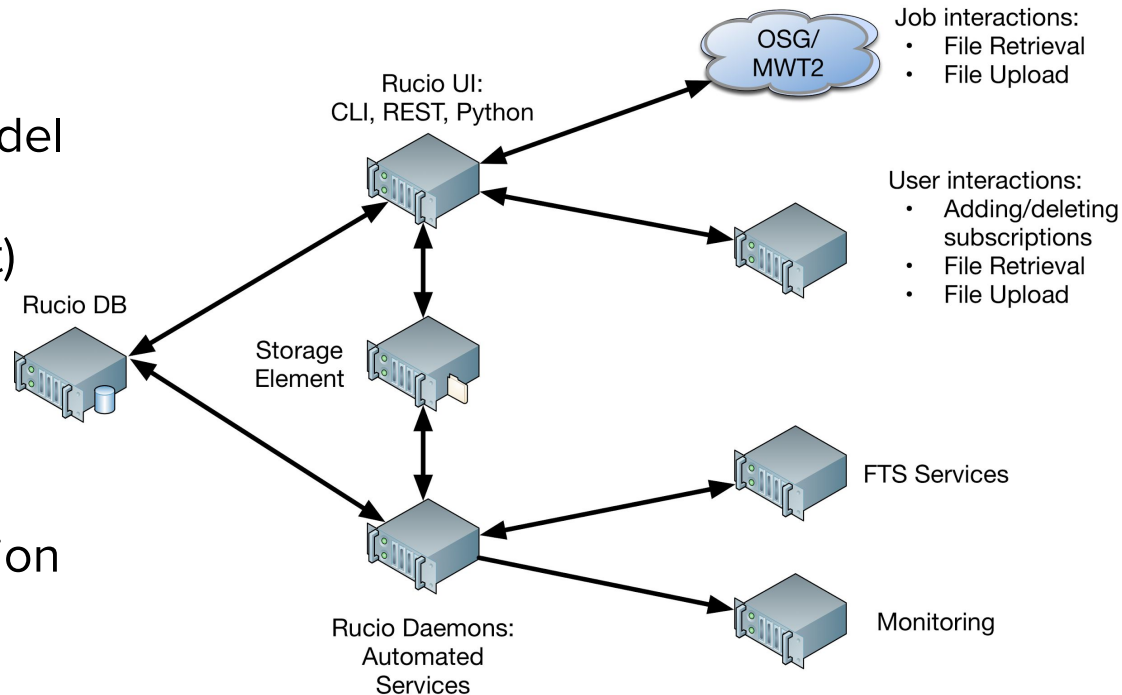
Rucio in Xenon1T

- Xenon1T is a direct dark matter detection experiment located in Italy
  - Liquid Xenon time projection chamber surrounded by active muon veto
  - Looking for nuclear recoil of WIMPs on Xenon nuclei, which produces a distinctive charge time-series charge deposition pattern
  - Data moves from experimental site to "permanent" storage on EGI sites and "temporary" storage on OSG for processing. Data Rate: 1.4 TB/day
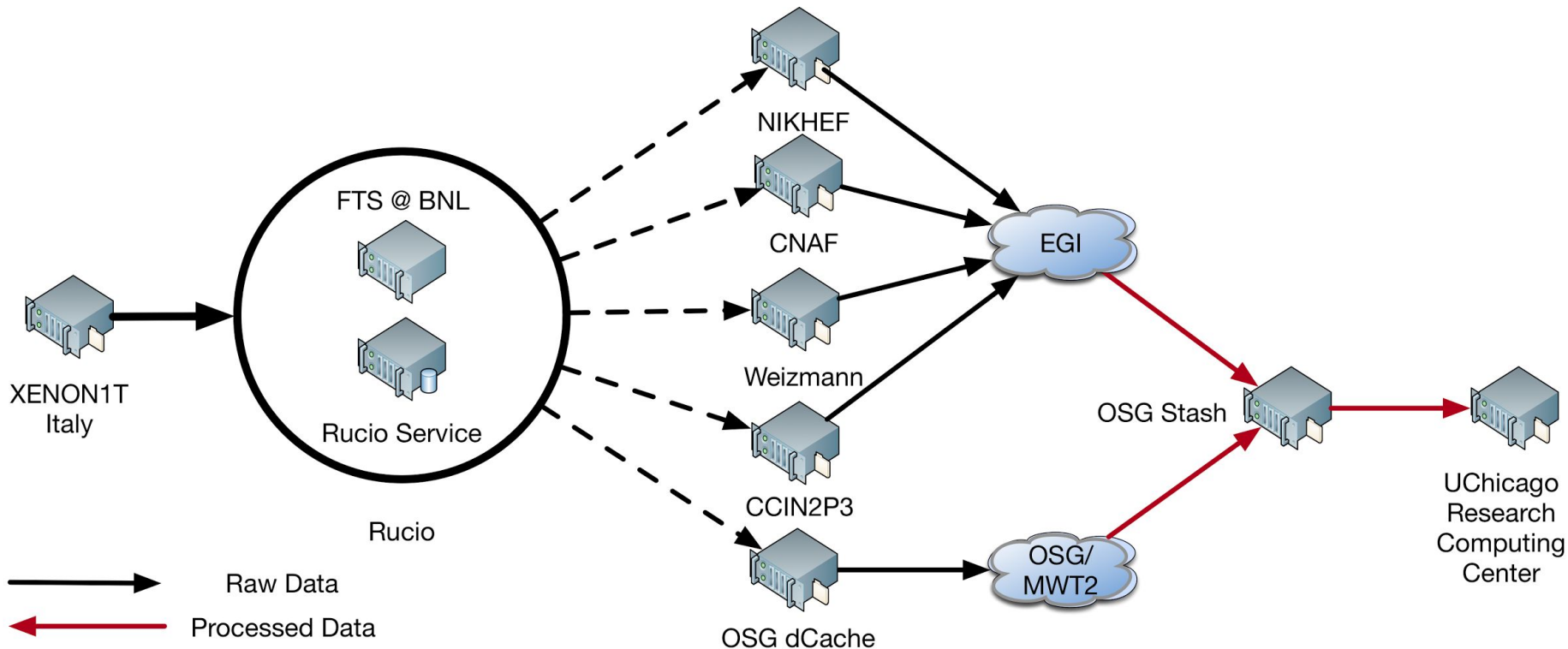
Rucio Overview

Key components

- Rucio DB
- Flexible namespace model
- Client tools
- Subscription (placement) model
- Reliable transfer service through FTS
- Automated disk management, e.g. deletion of expired data
- Internal permission and allocation model

OSG/ MWT2

Rucio UI:
CLI, REST, Python

Job interactions:
- File Retrieval
- File Upload

User interactions:
- Adding/deleting subscriptions
- File Retrieval
- File Upload

Rucio DB

Storage Element

FTS Services

Rucio Daemons:
Automated Services

Monitoring

Rucio environment for XENON1T

Xenon1T Rucio Ops

- Continuous independent monitoring of storage accessibility
- Stats:
  - Over 14600 datasets
  - Over 88000 files
  - Total Available Storage: 1305 TB
  - Used Storage: 793.3 TB

Xenon1T Rucio Status

#1092 **CNAF RSE Download** 10 minutes ago	#1092 **CNAF RSE Status** 8 minutes ago
#1092 **CNAF_TAPE RSE Download** 59 minutes ago	#1092 **CNAF_TAPE RSE Status** 12 minutes ago
#1345 **IN2P3 RSE Download** 51 minutes ago	#1344 **IN2P3 RSE Status** 21 minutes ago
#1344 **LNGS RSE Download** 34 minutes ago	#1345 **LNGS RSE Status** 41 minutes ago
#1344 **Nikhef RSE Download** 21 minutes ago	#1345 **Nikhef RSE Status** 48 minutes ago
#1334 **OSG RSE Download** 56 minutes ago	#1344 **OSG RSE Status** 27 minutes ago
#1344 **RCC RSE Download** 19 minutes ago	#1345 **RCC RSE Status** 35 minutes ago
#1491 **Rucio Central Service** 33 minutes ago	#1345 **Stash Download** 46 minutes ago
#1344 **Stash Status** 39 minutes ago	#1347 **Weizmann RSE Download** 41 minutes ago
#1345 **Weizmann RSE Status** 32 minutes a... 0	