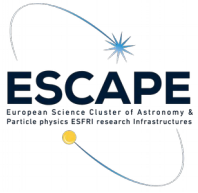




Test QoS endpoints in ESCAPE datalake

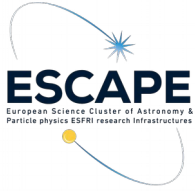
**Aleem Sarwar, Paul Millar (DESY)
Aristeidis Fkiaras (CERN)
April 22nd, 2020**





Outline

- Rucio
- QoS
- QOS Model
- Demo



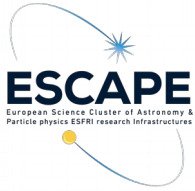
Rucio

- Rucio Data Management System
 - Orchestrates data Using Rules
 - Keep track of the available storage sites as Rucio Storage Elements (RSE's)
 - Accessible using CLI, WEB-UI, API

Rucio Documentation: <https://rucio.readthedocs.io/en/latest/index.html>

Quality of Service (QOS)

- Empowers researchers to make cost-benefit decisions on how data is stored.
- This may involve trade-offs in performance and operational characteristics.
- Over the lifetime of data, the optimal solution may vary; for example, placing data on high performance (and expensive) storage capacity when that data is under heavy use, but migrating to lower performance (and cheaper) storage when data is no longer of immediate interest.

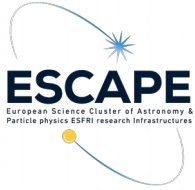


QoS Model

- Each RSE has a single QoS.
- All data stored in that RSE will have that QoS.
- Changing QoS means copying data from RSE to another RSE.
- If a storage system supports multiple QoS then these must be bound to particular paths, and QoS transitions means copying data over the network.

QOS Model (continued)

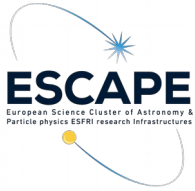
- This model is (likely) not good enough.
- The demo show what is possible right now , even it is a primitive solution.
- ... and we have to start somewhere.



Demo

- List of Available RSE's

CNAF-STORM
CNAF_CMS_TEMP
DESY-DCACHE
EULAKE-1
EULAKE-2
IN2P3-CC-DCACHE
INFN-NA-DPM
LAPP-DCACHE
LAPP-DPM
PIC-DCACHE
PIC-INJECT
SARA-DCACHE



Demo (continued)

- Create RSE -- done once

```
$ rucio-admin rse add QOS-A-PIC  
Added new deterministic RSE: QOS-A-PIC
```

```
QOS-A-PIC  
QOS-B-SARA
```

- Add Protocol about RSE

```
$ rucio-admin rse add-protocol --hostname xrootd.pic.es --scheme root --prefix '/pnfs/pic.es/tape/' --port 1094 QOS-A-PIC
```

- RSE Properties

```
$ rucio-admin rse info PIC-DCACHE
```


Demo (continued)

- Add attribute on RSE -- likely done only once

```
$ rucio-admin rse set-attribute --rse QOS-A-PIC --key QOS --value A  
Added new RSE attribute for QOS-A-PIC: QOS-A
```

- List RSE's by QoS Label

```
$ rucio list-rses --expression 'QOS=B'  
PIC-DCACHE  
CNAF-STORM
```

Demo (continued)

- File Upload -- done once per file

```
$ rucio upload test_qos --scope testing --rse DESY-DCACHE
```

```
2020-04-20 16:01:52,856 INFO Preparing upload for file test_qos
2020-04-20 16:01:53,037 INFO Successfully added replica in Rucio catalogue at DESY-DCACHE
2020-04-20 16:01:53,178 INFO Successfully added replication rule at DESY-DCACHE
2020-04-20 16:01:53,799 INFO Trying upload with davs to DESY-DCACHE
2020-04-20 16:01:54,821 INFO Successfully uploaded file test_qos
```



Demo (continued)

- File availability on a QOS=B Site

```
$ rucio add-rule testing:test_qos 1 'QOS=B'  
1f87409a72934e0bab2e9168ae3f5d58
```

- Requiring particular QoS -- done each time desired QoS changes.
- Check file transfer status

```
$ rucio list-rules testing:test_qos
```

ID CREATED (UTC)	ACCOUNT	SCOPE:NAME	STATE[OK/REPL/STUCK]	RSE_EXPRESSION	COPIES	EXPIRES (UTC)
1a97227b69034c5d9c3528d542831bde	root	testing:test_qos	OK[1/0/0]	DESY-DCACHE	1	2020-04-20 14:01:53
1f87409a72934e0bab2e9168ae3f5d58	root	testing:test_qos	REPLICATING[0/1/0]	QOS=B	1	2020-04-20 14:06:47

Rucio Development

- Upstream Ticket <https://github.com/rucio/rucio/issues/3419>
 - 3 people assigned to it
 - Just started dedicated weekly dev meeting about it
 - Expected in production Q2 2020
-
- When transitioning from Site to Site, approach will be similar to the ESCAPE one but more user friendly
 - When transitioning QoS within the same Site, need to avoid TPC

Thank you and Questions