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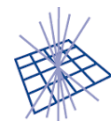


# Rucio

How to access, and utilise

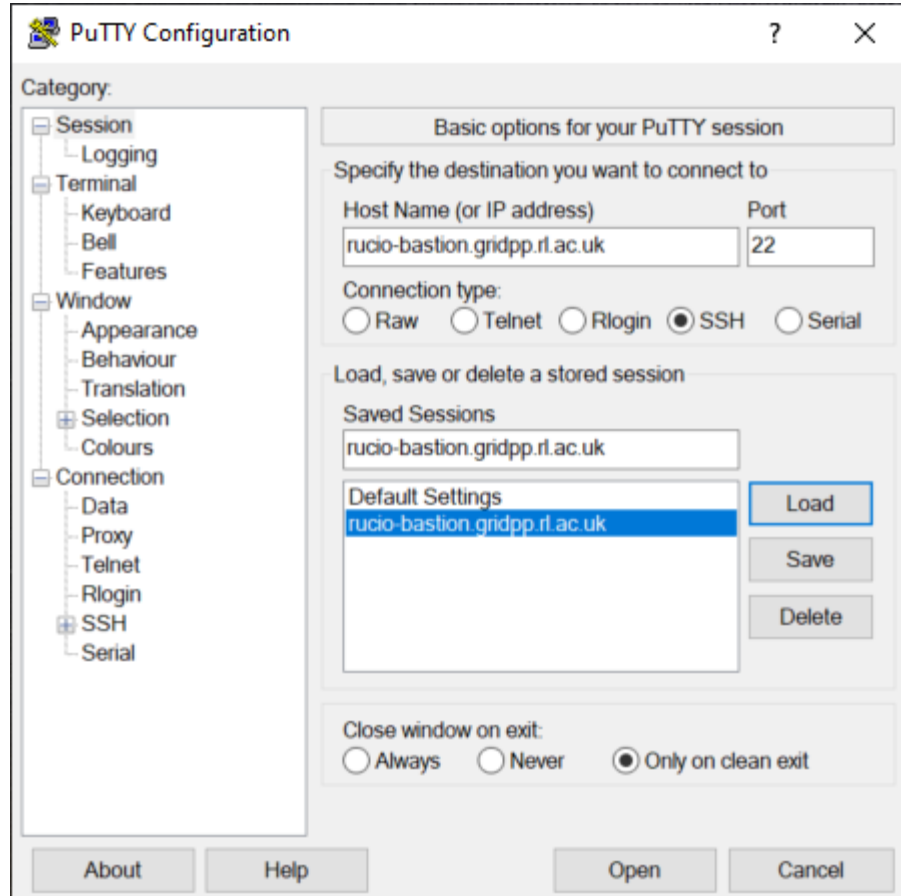


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**GridPP**  
UK Computing for Particle Physics

# Accessing the Rucio Bastion



- Using puTTY to save ssh session data is a useful way to access Rucio,
  - IP on the session page,
  - 'root' as the auto-login username on the Data page,
  - the path to your private key in the SSH Auth page.
- This can be saved on the Session page and recalled when a new session is needed

# Accessing the Rucio Bastion

```
C:\Users\rtt84632>ssh -i c:\users\rtt84632\id_tjn.rsa root@rucio-bastion.gridpp.rl.ac.uk
Enter passphrase for key 'c:\users\rtt84632\id_tjn.rsa':
```

# STC Cloud

```
Location: Unknown/Virtual
Branch: prod_cloud (domain)
Archetype: cloud
Personality: nubes-unmanaged-nogui
Operating System: sl7x-x86_64
Snapshot Date: 2019-12-01
```

Notice: Core software packages have been updated, a system

```
[root@bastion ~]# su tnoble
```

Notice: Core software packages have been updated, a sync

```
[tnoble@bastion root]$ cd
```

```
[tnoble@bastion ~]$ source /opt/rucio-env/bin/activate
(rucio-env) [tnoble@bastion ~]$
```

- Connect to the Rucio-Bastion using ssh
  - `$ ssh -I <path/to/rsa> root@rucio-bastion.gridpp.rl.ac.uk`
- Switch users to yourself
- Navigate to your home dir
- Activate the rucio CLI
  - `$ source /opt/rucio-env/bin/activate`

# Setting up your environment

```
(rucio-env) [tnoble@bastion ~]$ voms-proxy-init --voms dteam
Contacting voms2.hellasgrid.gr:15004 [/C=GR/O=HellasGrid/OU=hellasgrid.gr/CN=voms2.hellasgrid.gr] "dteam"...
Remote VOMS server contacted succesfully.
```

```
Created proxy in /tmp/x509up_u1020.
```

```
Your proxy is valid until Tue May 11 01:44:47 UTC 2021
```

```
(rucio-env) [tnoble@bastion ~]$ export RUCIO_VO=dtm
(rucio-env) [tnoble@bastion ~]$ export RUCIO_ACCOUNT=tnoble
(rucio-env) [tnoble@bastion ~]$ export X509_USER_PROXY=/tmp/x509up_u$(id -u)
(rucio-env) [tnoble@bastion ~]$ rucio ping
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: Cryptography
team. Support for it is now deprecated in cryptography, and will be removed
from cryptography import x509
1.23.6.post1
(rucio-env) [tnoble@bastion ~]$ rucio whoami
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: Cryptography
team. Support for it is now deprecated in cryptography, and will be removed
from cryptography import x509
status      : ACTIVE
account     : tnoble
account_type : USER
created_at  : 2021-04-09T10:31:42
updated_at  : 2021-04-09T10:31:42
suspended_at : None
deleted_at  : None
email       : timothy.noble@stfc.ac.uk
(rucio-env) [tnoble@bastion ~]$
```

## ■ Renew / setup the proxy

- \$ voms-proxy-init --voms <your VO>

## ■ Set up the rucio environmental variables:

- \$ export RUCIO\_VO=<your VO 3 CHAR>
- \$ export RUCIO\_ACCOUNT=<your account>
- \$ export X509\_USER\_PROXY=/tmp/x509up\_u\$(id -u)

## ■ Test the environment with:

- \$ rucio ping – returns rucio version
- \$ rucio whoami – returns rucio account info

# Setting up your environment

```
[tnoble@bastion ~]$ cat RucioConnect.sh
#!/bin/bash

# A Script to set up Rucio to connect

# TNoble 2021-04-12

source /opt/rucio-env/bin/activate

voms-proxy-init -voms dteam

export RUCIO_VO=dtm
export RUCIO_ACCOUNT=tnoble
export X509_USER_PROXY=/tmp/x509up_u$(id -u)

rucio whoami
rucio ping
export RUCIO_ACCOUNT=root
rucio whoami
[tnoble@bastion ~]$
```

- I recommend setting up a short bash script to set up the environment and proxy quickly and easily
  - Accesses the Rucio CLI,
  - Renews my proxy,
  - Exports the Rucio environment variables
  - checks everything is running correctly:
    - rucio ping
    - rucio whoami
- Changes my to root
  - Verifies I can run as root – you shouldn't need this

# Rucio Commands

```
ping          Ping Rucio server.
whoami        Get information about account whose token is used.
list-file-replicas List the replicas of a DID and its PFNs.
list-dataset-replicas List the dataset replicas.
add-dataset   Add a dataset to Rucio Catalog.
add-container Add a container to Rucio Catalog.
attach        Attach a list of DIDs to a parent DID.
detach        Detach a list of DIDs from a parent DID.
ls            List the data identifiers matching some metadata
              (synonym for list-dids).
list-dids     List the data identifiers matching some metadata
              (synonym for ls).
list-dids-extended List the data identifiers matching some metadata
              (extended version to include metadata from various
              resources).
list-parent-dids List parent DIDs for a given DID
list-parent-datasets List parent DIDs for a given DID
list-scopes   List all available scopes.
close         Close a dataset or container.
reopen        Reopen a dataset or container (only for privileged
              users).
stat          List attributes and statuses about data identifiers.
erase         Delete a data identifier.
list-files    List DID contents
list-content  List the content of a collection.
list-content-history List the content history of a collection.
upload        Upload method.
get           Download method (synonym for download)
download      Download method (synonym for get)
get-metadata  Get metadata for DIDs.
set-metadata  set-metadata method
delete-metadata delete metadata
list-rse-usage Shows the total/free/used space for a given RSE. This
              values can differ for different RSE source.
list-account-usage Shows the space used, the quota limit and the quota
              left for an account for every RSE where the user have
              quota.
list-account-limits List quota limits for an account in every RSEs.
add-rule       Add replication rule.
delete-rule    Delete replication rule.
rule-info      Retrieve information about a rule.
list-rules     List replication rules.
list-rules-history List replication rules history for a DID.
update-rule    Update replication rule.
move-rule      Move a replication rule to another RSE.
list-rses      Show the list of all the registered Rucio Storage
              Elements (RSEs).
list-rse-attributes List the attributes of an RSE.
list-datasets-rse List all the datasets at a RSE
test-server    Test Server
touch          Touch one or more DIDs and set the last accessed date
              to the current date
```

- Rucio has a lot of functionality and therefore commands
- By far the most used option for myself is -h
  - This outputs the options for the command

# Rucio useful commands – get

- `$ rucio get --dir <path/to/destination/directory> /  
--nrandom <NO of files> <scope>:<datafile/dataset/container name>`

```
2021-05-10 15:06:06,371 INFO      Processing 1 item(s) for input
2021-05-10 15:06:06,371 INFO      Getting sources of DIDs
2021-05-10 15:06:06,717 INFO      Selecting 2 random replicas from DID(s): [{'scope': 'test', 'name': 'testdataset'}]
2021-05-10 15:06:06,731 INFO      Using 2 threads to download 2 files
2021-05-10 15:06:06,732 INFO      Thread 0/2: Preparing download of test:random1G.txt
2021-05-10 15:06:06,735 INFO      Thread 1/2: Preparing download of test:random100M.txt
2021-05-10 15:06:06,771 INFO      Thread 1/2: Trying to download with gsiftp from UKI-SCOTGRID-GLASGOW: test:random100M.txt
2021-05-10 15:06:06,788 INFO      Thread 0/2: Trying to download with gsiftp from UKI-SCOTGRID-GLASGOW: test:random1G.txt
2021-05-10 15:06:15,339 INFO      Thread 1/2: File test:random100M.txt successfully downloaded. 104.858 MB in 5.74 seconds = 18.27 MBps
2021-05-10 15:09:08,440 INFO      Thread 0/2: File test:random1G.txt successfully downloaded. 1.070 GB in 176.83 seconds = 6.05 MBps
-----
Download summary
-----
DID test:testdataset
Total files:                2
Downloaded files:          2
Files already found locally: 0
Files that cannot be downloaded: 0
```



# Rucio useful commands – get

- `$ rucio get --dir <path/to/destination/directory> <scope>:<datafile/dataset/container name>`

```
2021-05-10 15:09:43,223 INFO      Processing 1 item(s) for input
2021-05-10 15:09:43,223 INFO      Getting sources of DIDs
2021-05-10 15:09:43,790 INFO      Using 3 threads to download 3 files
2021-05-10 15:09:43,791 INFO      Thread 0/3: Preparing download of test:random100M.txt
2021-05-10 15:09:43,791 INFO      Thread 0/3: File exists already locally: test:random100M.txt
2021-05-10 15:09:43,794 INFO      Thread 1/3: Preparing download of test:random10M.txt
2021-05-10 15:09:43,796 INFO      Thread 2/3: Preparing download of test:random1G.txt
2021-05-10 15:09:43,797 INFO      Thread 2/3: File exists already locally: test:random1G.txt
2021-05-10 15:09:43,859 INFO      Thread 1/3: Trying to download with gsiftp from UKI-SCOTGRID-GLASGOW: test:random10M.txt
2021-05-10 15:09:49,566 INFO      Thread 1/3: File test:random10M.txt successfully downloaded. 10.486 MB in 3.71 seconds = 2.83 MBps
-----
Download summary
-----
DID test:testdataset
Total files:                3
Downloaded files:           1
Files already found locally: 2
Files that cannot be downloaded: 0
(rucio-env) [tnoble@bastion ~]$
```



# Rucio useful commands – list-rses

- \$ rucio list-rses

```
(rucio-env) [tnoble@bastion ~]$ rucio list-rses
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/
ase.
  from cryptography import x509
RAL-LCG2
test--
UKI-LT2-IC-HEP
UKI-LT2-QMUL
UKI-NORTHGRID-LANCS-HEP
UKI-NORTHGRID-MAN-HEP
UKI-SCOTGRID-GLASGOW
(rucio-env) [tnoble@bastion ~]$
```

# Rucio useful commands – upload

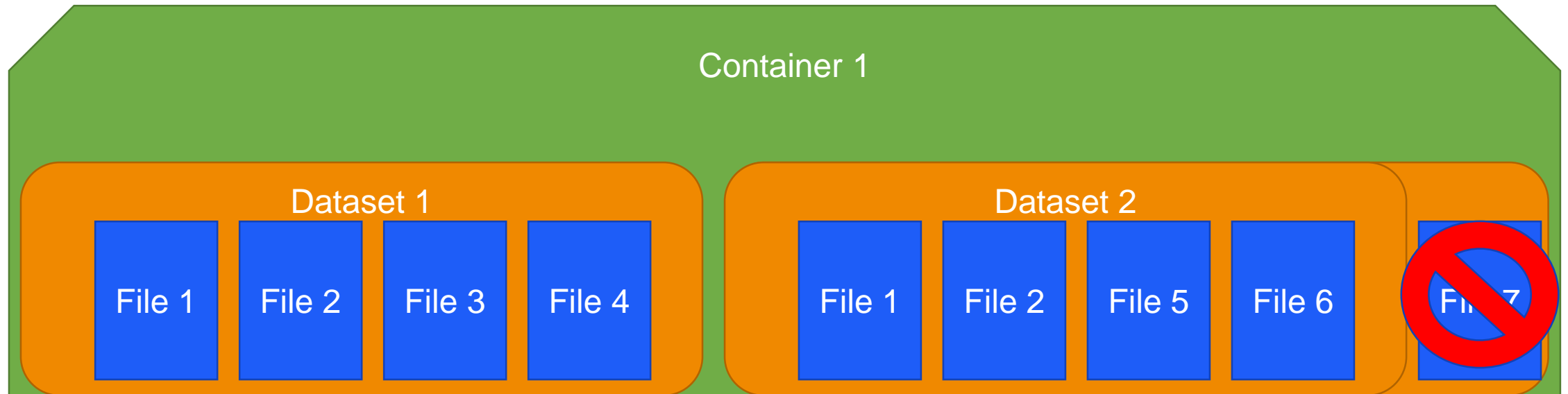
- `$ rucio upload --rse <RSE> --scope <SCOPE> --register-after-upload <path/to/file> <path/to/file> ...`

```
(rucio-env) [tnoble@bastion ~]$ rucio upload --rse UKI-LT2-IC-HEP --scope test --register-after-upload test/test_file1M.txt test/test_file2M.txt test/test_file3M.txt test/test_file4M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning: Python 2 is no longer supported by the Python core team. Support for it is now deprecated in
ase.
  from cryptography import x509
2021-05-10 15:27:16,924 INFO    Preparing upload for file test_file1M.txt
2021-05-10 15:27:17,221 INFO    File already registered. Skipping upload.
2021-05-10 15:27:17,222 INFO    Preparing upload for file test_file2M.txt
2021-05-10 15:27:17,320 INFO    Trying upload with srm to UKI-LT2-IC-HEP
2021-05-10 15:27:17,691 INFO    Successful upload of temporary file. srm://gfe02.grid.hep.ph.ic.ac.uk:8443/srm/managerv2?SFN=/pnfs/hep.ph.ic.ac.uk/data/dteam/rucio/test/test/test_file2M.txt
2021-05-10 15:28:20,903 INFO    Successfully uploaded file test_file2M.txt
2021-05-10 15:28:25,653 INFO    Successfully added replica in Rucio catalogue at UKI-LT2-IC-HEP
2021-05-10 15:28:26,712 INFO    Successfully added replication rule at UKI-LT2-IC-HEP
2021-05-10 15:28:28,730 INFO    Preparing upload for file test_file3M.txt
2021-05-10 15:28:28,799 INFO    Trying upload with srm to UKI-LT2-IC-HEP
2021-05-10 15:28:29,390 INFO    Successful upload of temporary file. srm://gfe02.grid.hep.ph.ic.ac.uk:8443/srm/managerv2?SFN=/pnfs/hep.ph.ic.ac.uk/data/dteam/rucio/test/test/test_file3M.txt
2021-05-10 15:29:32,666 INFO    Successfully uploaded file test_file3M.txt
2021-05-10 15:29:34,375 INFO    File DID already exists
2021-05-10 15:29:35,733 INFO    Preparing upload for file test_file4M.txt
2021-05-10 15:29:35,830 INFO    File already registered. Skipping upload.
2021-05-10 15:29:35,831 ERROR    Not all of the given files have been uploaded.
(rucio-env) [tnoble@bastion ~]$
```

# Rucio useful commands – add-dataset / add-container

- \$ rucio add-dataset --lifetime <time in seconds> <scope>:<dataset name>

```
(rucio-env) [tnoble@bastion ~]$ rucio add-dataset --lifetime 2000 test:test.dataset1
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
Added test:test.dataset1
(rucio-env) [tnoble@bastion ~]$
```



# Rucio useful commands – attach / detach

- \$ rucio attach <scope>:<target dataset/container>  
<scope>:<file, dataset or container>

```
(rucio-env) [tnoble@bastion ~]$ rucio attach test:test.testdataset1 test:test_file1M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
DIDs successfully attached to test:test.testdataset1
(rucio-env) [tnoble@bastion ~]$
```

```
(rucio-env) [tnoble@bastion ~]$ rucio list-content test:test.testdataset1
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
+-----+-----+
| SCOPE:NAME | [DID TYPE] |
+-----+-----+
| test:test_file1M.txt | FILE |
| test:test_file2M.txt | FILE |
| test:test_file3M.txt | FILE |
| test:test_file4M.txt | FILE |
+-----+-----+
(rucio-env) [tnoble@bastion ~]$
```

- \$ rucio detach <scope>:<target dataset/container> <scope>:<file, dataset or container>

```
(rucio-env) [tnoble@bastion ~]$ rucio detach test:test.testdataset1 test:test_file1M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
DIDs successfully detached from test:test.testdataset1
(rucio-env) [tnoble@bastion ~]$
```

```
(rucio-env) [tnoble@bastion ~]$ rucio list-content test:test.testdataset1
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
+-----+-----+
| SCOPE:NAME | [DID TYPE] |
+-----+-----+
| test:test_file2M.txt | FILE |
| test:test_file3M.txt | FILE |
| test:test_file4M.txt | FILE |
+-----+-----+
(rucio-env) [tnoble@bastion ~]$
```

# Rucio useful commands – erase / undo

\$ rucio erase <scope>:<filename>

```
(rucio-env) [tnoble@bastion ~]$ rucio erase test:test_file1M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning: Python 2 is no longer supported by the Python core team. Use setuptools to install OpenSSL.
  from cryptography import x509
2021-05-10 16:22:57,496 INFO CAUTION! erase operation is irreversible after 24 hours. To cancel this operation you can run the following command:
rucio erase --undo test:test_file1M.txt
(rucio-env) [tnoble@bastion ~]$
```

\$ rucio erase --undo <scope>:<deleted filename>

```
(rucio-env) [tnoble@bastion ~]$ rucio erase --undo test:test_file1M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning: Python 2 is no longer supported by the Python core team. Use setuptools to install OpenSSL.
  from cryptography import x509
2021-05-10 16:23:37,011 INFO Erase undo for DID: test:test_file1M.txt
(rucio-env) [tnoble@bastion ~]$
```

# Rucio useful commands – add-rule / delete-rule

- \$ rucio add-rule <scope>:<filename> <No of replicas> <RSE destination/s>

```
(rucio-env) [tnoble@bastion ~]$ rucio add-rule test:test_file1M.txt 1 RAL-LCG2
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
e329735bba914070a303b758b2f2d2bf
(rucio-env) [tnoble@bastion ~]$
```

- \$ rucio delete-rule <rule\_ID>

```
(rucio-env) [tnoble@bastion ~]$ rucio delete-rule e329735bba914070a303b758b2f2d2bf
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
(rucio-env) [tnoble@bastion ~]$
```

- Rule\_ID can be obtained via a search for the file name in list-rules DID (<scope>:<filename> or when a rule is added

# Rucio useful commands – list-rules

- \$ rucio list-rules <DID>

```
(rucio-env) [tnoble@bastion ~]$ rucio list-rules test:test_file1M.txt
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning: Python 2 is no longer supported by the Python core team. Support
ase.
from cryptography import x509
ID          ACCOUNT    SCOPE:NAME          STATE[OK/REPL/STUCK]  RSE_EXPRESSION  COPIES  EXPIRES (UTC)          CREATED (UTC)
-----
e329735bba914070a303b758b2f2d2bf  root      test:test_file1M.txt  REPLICATING[0/1/0]   RAL-LCG2        1       2021-05-10 17:27:20    2021-05-10 16:26:21
(rucio-env) [tnoble@bastion ~]$
```

- \$ rucio list-rules --account <account>

```
d4b473faadef47b95e50e8e3658b5ed  root      test.functional:file1_9b5cc7bd-7f52-4955-a1eb-55465b9523b8  OK[1/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-13 17:50:27    2021-05-06 17:50:27
9737157b7a5f44dda6717b4b7693f8ea  root      test.functional:file7_7ba2f696-ea45-4d66-b0fe-45128d992740  OK[1/0/0]          RAL-LCG2                1       2021-05-12 22:50:35    2021-05-05 22:50:35
3c2226653d7541ab9e7339ab4efd7d09  root      test.functional:dataset3_c1647675-58d5-448a-a4d2-b0cf692ae60f  OK[0/0/0]          RAL-LCG2                1       2021-05-13 02:50:38    2021-05-06 02:50:38
d0a2da43a2884d199f3c6725e540f6c6  root      test:test_file3M.txt  REPLICATING[0/1/0]  UKI-SCOTGRID-GLASGOW    1       2021-05-13 15:10:23    2021-05-04 15:10:23
6ac9b9292f464e278b611210d71e9a25  root      test.functional:file7_e5e88b39-71ca-40d5-a520-354c41350ecc  REPLICATING[0/1/0]  UKI-NORTHGRID-MAN-HEP   1       2021-05-14 14:50:36    2021-05-07 14:50:36
0a68f48564bc44dcbe9ce5e510144342  root      test.functional:dataset3_c1647675-58d5-448a-a4d2-b0cf692ae60f  OK[0/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-13 02:50:40    2021-05-06 02:50:40
ca6dc3709d5e4675a4ee101a8251fd3a  root      test.functional:file1_ca4b3a3b-6ba5-4b70-9c45-8b7a76b8804f  OK[1/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-13 04:50:27    2021-05-06 04:50:27
a2d507ae0ee2426bb229f7b8c6e90435  root      test.functional:file1_394e1792-8d08-429b-b1af-7939d1a82397  OK[1/0/0]          RAL-LCG2                1       2021-05-14 07:50:02    2021-05-07 07:50:02
5445316e232a45748515760d5b9daa5f  root      test.functional:file6_8bc01283-48a3-4231-af44-e0f06da9b5bf  OK[1/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-12 18:50:15    2021-05-05 18:50:15
4e81fea2dfda47ce95adfcab7e024a54  root      test.functional:file6_f7c356c8-6611-4bb2-b953-2c03dd9903ad  OK[1/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-13 23:50:13    2021-05-06 23:50:13
12ab9ede96dd4432b8e10a327d8c8d91  root      test.functional:file7_2ce3dfe0-7f54-4bf0-b91d-f66a84cf74cd  OK[1/0/0]          UKI-SCOTGRID-GLASGOW    1       2021-05-12 18:50:22    2021-05-05 18:50:22
db52ac0fdadb414e93d2e61735661a14  root      test:testdataset      OK[3/0/0]          UKI-LT2-IC-HEP          1       2021-05-13 22:50:36    2021-05-04 16:08:28
6968ffac91af44e181f603ce348dcd89  root      test.functional:file7_c30d9a00-b15a-4bc4-b3d1-c11becf6715e  REPLICATING[0/1/0]  UKI-LT2-IC-HEP          1       2021-05-13 22:50:36    2021-05-06 22:50:36
f2495246fcf8419bbf54961b3ef44362  root      test.functional:dataset3_c1647675-58d5-448a-a4d2-b0cf692ae60f  OK[0/0/0]          UKI-NORTHGRID-MAN-HEP   1       2021-05-13 02:50:39    2021-05-06 02:50:39
c119fd30b0854ef3be4ead7a28e35ef8  root      test.functional:file1_b743ded5-fd56-472b-ba0b-b4f970abd450  OK[1/0/0]          UKI-LT2-IC-HEP          1       2021-05-12 18:50:29    2021-05-05 18:50:29
ae11b6b9fd84397b4c6cb775e0d77d8  root      test.functional:file1_0b8ff6e2-5acc-4537-9f14-885a09355178  OK[1/0/0]          RAL-LCG2                1       2021-05-12 12:50:03    2021-05-05 12:50:03
dbaebc56217f42d8b1d9c4b19f3141e7  root      test.functional:container1_f74d5001-ba7a-49dd-a9de-77466f5a624e  REPLICATING[0/4/0]  UKI-NORTHGRID-MAN-HEP   1       2021-05-14 14:50:38    2021-05-07 14:50:38
74b913fffd1c14406b2cd1ebccbb2b369  root      test.functional:file1_9b5cc7bd-7f52-4955-a1eb-55465b9523b8  OK[1/0/0]          UKI-SCOTGRID-GLASGOW    1       2021-05-13 17:50:27    2021-05-06 17:50:27
0c74986fd75341bdab0b64586e781c10  root      test.functional:file6_9d44749f-0a00-4df6-a332-bdb8f24a9b68  OK[1/0/0]          UKI-NORTHGRID-LANCS-HEP  1       2021-05-12 12:50:12    2021-05-05 12:50:12
```



# Rucio useful commands – update-rule

- `$ rucio update-rule --lifetime <time in seconds> <rule_ID>`

```
(rucio-env) [tnoble@bastion ~]$ rucio update-rule --lifetime 100 37a38d91b53846719cbdf319b2674d96
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning: Please
  use.
  from cryptography import x509
Updated Rule
(rucio-env) [tnoble@bastion ~]$
```

# Rucio useful commands – move-rule

- \$ rucio move-rule <rule\_ID> <destination RSE>

```
(rucio-env) [tnoble@bastion ~]$ rucio move-rule 49d63e6e44ef454cb4216ca12c3229cf RAL-LCG2
/opt/rucio-env/lib/python2.7/site-packages/OpenSSL/crypto.py:12: CryptographyDeprecationWarning:
ase.
  from cryptography import x509
37a38d91b53846719cbdf319b2674d96
(rucio-env) [tnoble@bastion ~]$
```