Rucio-client user guide

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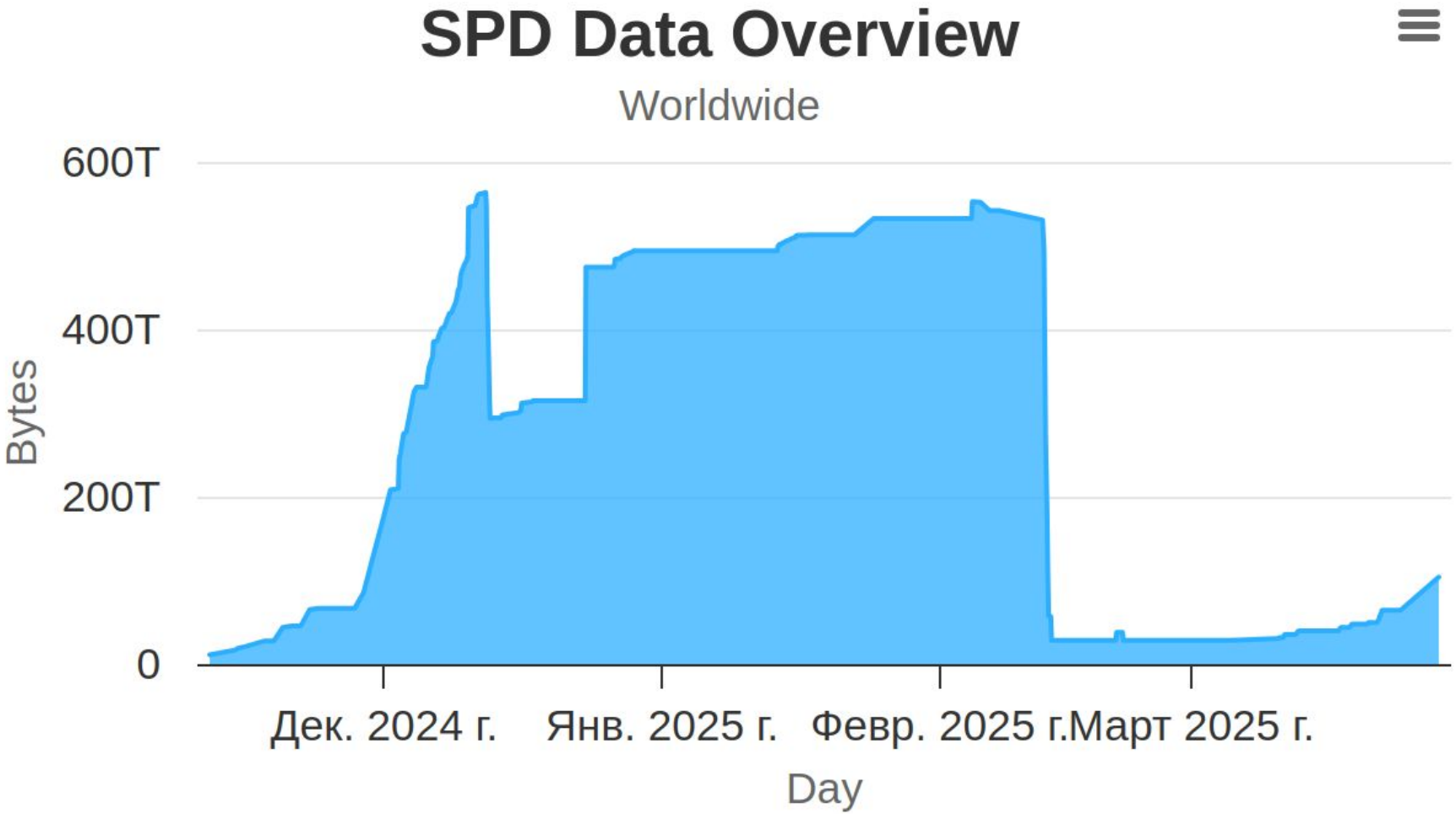

SPD Data Overview
Worldwide
600T
400T
200T
0
Bytes
Дек. 2024 г.
Янв. 2025 г.
Февр. 2025 г.
Март 2025 г.
Day

The FIRST! steps to search for data

Nowadays we have the results of several Monte Carlo data productions. Use the special table before for search what do you want!

https://docs.google.com/spreadsheets/d/1JWob53dfwMvTlmdsGncwQmPeVbmzFKuD8DHE4rYsJFw/edit?gid=0#gid=0

This table contains production parameters and description of data that appeared after data generation process.

Also You need to be registered in SPD-IAM (https://spd-iam.jinr.ru) to have access to Rucio. After registration your rucio-account will be created automatically on the next day.

Quick terminology recap

File – the smallest operational unit of data in Rucio.

Dataset – a named set of files.

Container – a named set of datasets or, recursively, containers

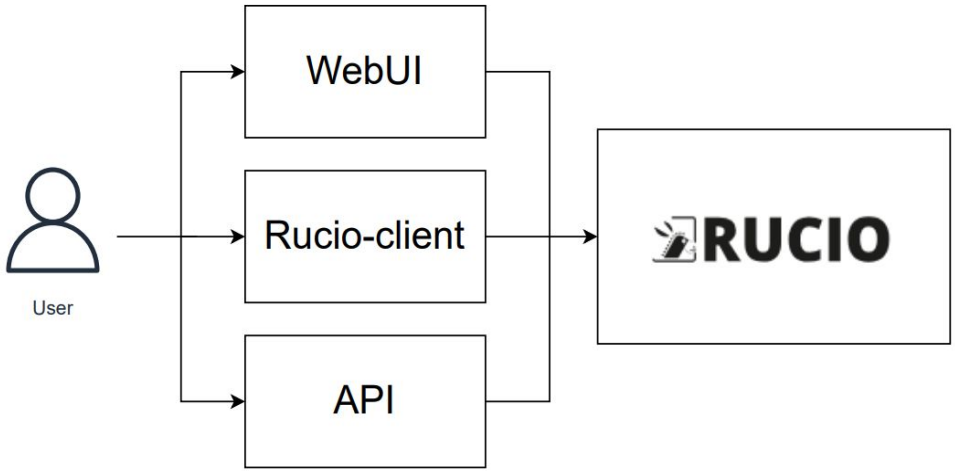
DID – rucio LFN for data (file/dataset/container) as combination of a scope and a name.

Scope – a scope partitions the namespace into several sub namespaces.

Replica – a managed copy of a file.

RSE – the logical abstraction of a storage system for physical files. It has a unique identifier and a set of meta attributes describing properties.

Several ways of interaction with rucio



WebUI

A user-friendly way to view a list of datasets, their contents, and as well all information about the data, including their location. But there is no way to interact with data yet!

Rucio-client

The main tool for user interaction with Rucio. It is used for all actions with data (upload, download, registration), obtaining information about data (statuses, where it is stored, metadata, etc.), managing rules, etc.

API

“Advanced” interaction with Rucio using software libraries.

Using the rucio-client at cvmfs

1) Enter at lxui.jinr.ru using ssh. Run command at CLI:
   ssh <sso_nickname>@lxui.jinr.ru

```
alex@alex-konak573:~$ ssh konak@lxui.jinr.ru
konak@lxui.jinr.ru's password:
Last login: Tue Mar 11 15:06:43 2025 from bk081.jinr.ru
```

2) Activate rucio client. Run command:
   source /cvmfs/spd.jinr.ru/sw/ddm/rucio-clients/latest/bin/activate

```
lxui04:~ > source /cvmfs/spd.jinr.ru/sw/ddm/rucio-clients/latest/bin/activate
(1.31.7) lxui04:~ >
```

3) Authenticate in rucio. You can use any rucio-client command. For example: **rucio whoami**

```
(1.31.7) lxui04:~ > rucio whoami
account_type : USER
status       : ACTIVE
suspended_at : None
created_at   : 2024-08-01T12:19:41
email        : konak@jinr.ru
account      : konak
deleted_at   : None
updated_at   : 2024-08-01T12:19:41
```

How to authenticate

We offer two flow of authentication in rucio-client.

Using proxy-certificate	Using SPD-IAM
You need to have user certificate issued by **Russian Data Intensive Grid** (https://ca.grid.kiae.ru/RDIG/) or **JINR Grid Certification Authority** (https://ca.jinr.ru/)	With authentication command need to specify parameter "**-S=oidc**" or export this - **export RUCIO_AUTH_TYPE=oidc**
Usercert and userkey in ".pem" format need to be placed in **<home_dir>/.globus** with access mode 600 and 400	You need using browser to authenticate
You need to register user certificate in SPD-IAM	
Generate proxy-certificate with command `voms-proxy-init -voms spd.nica.jinr:/spd.nica.jinr</Role>`	
export proxy-cert with command `export X509_USER_PROXY=/tmp/<proxy_cert>`	
rucio-client at cvmfs use auth method with proxy by default	

Auth with proxy-certificate

1) Create proxy-certificate using command **voms-proxy-init -voms <VO:VO-role>**

```
lxui03:~ > voms-proxy-init -voms spd.nica.jinr:/spd.nica.jinr/Role=production
Contacting spd-voms.jinr.ru:15000 [/C=RU/O=JINR/OU=GRID/OU=hosts/CN=spd-voms.jinr.ru] "spd.nica.jinr"
Remote VOMS server contacted succesfully.


Created proxy in /tmp/x509up_u8102.

Your proxy is valid until Tue Apr 01 02:34:53 MSK 2025
```

2) Export created proxy-certificate

```
lxui03:~ > export X509_USER_PROXY=/tmp/x509up_u8102
```

3) Authenticate with activated rucio-client

```
(1.31.7) lxui04:~ > rucio whoami
account_type : USER
status       : ACTIVE
suspended_at : None
created_at   : 2024-08-01T12:19:41
email        : konak@jinr.ru
account      : konak
```

Auth with SPD-IAM [1]

1) **export RUCIO_AUTH_TYPE=oidc**

```
lxui03:~ > export RUCIO_AUTH_TYPE=oidc
```

2) Authenticate with activated rucio-client

```
(1.31.7) lxui03:~ > rucio whoami

Please use your internet browser, go to:

    https://spd-rucio.jinr.ru/auth/oidc_redirect?mz6Chd3grZtm57vrYcLWKQv

and authenticate with your Identity Provider.
Copy paste the code from the browser to the terminal and press enter:
```

3) Use your internet browser to authenticate in SPD-IAM with following link

Auth with SPD-IAM [2]

4) Allow authorization through the client

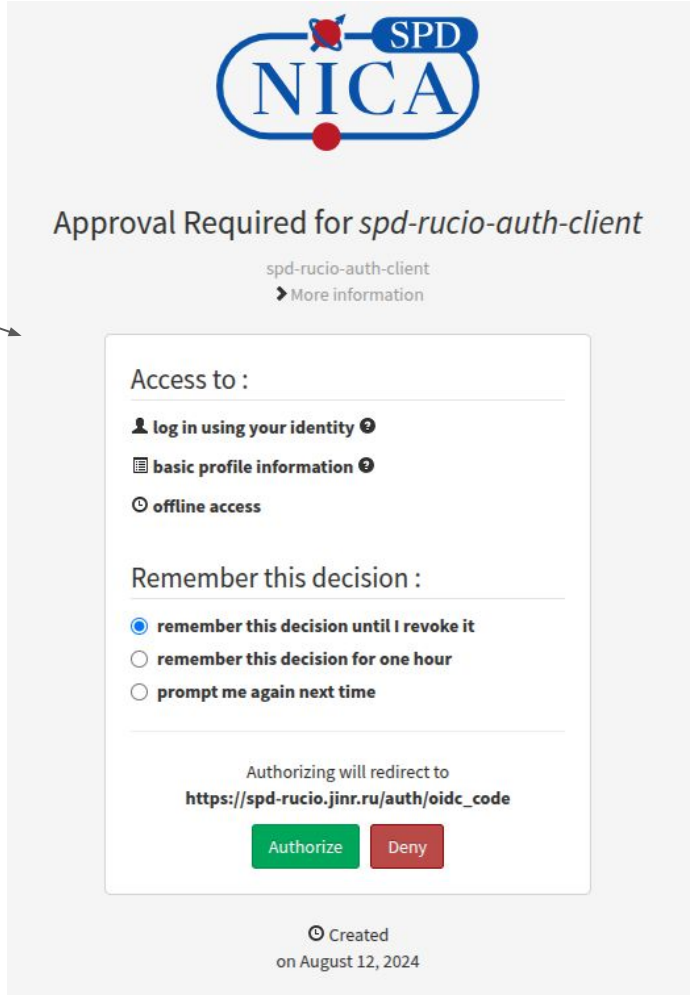
5) Copy special code from Rucio Web UI and paste it to the terminal

RUCIO

SCIENTIFIC DATA MANAGEMENT

Please copy-paste the following code to the open terminal session with Rucio Client in order to get your access token:

ehY3NT9VhozkugICpGx4wUIEA9ZyfBaJaRGMvt133mZ9RBYolo



Auth with SPD-IAM [3]

6) Paste special code to the terminal

```
(1.31.7) lxui03:~ > rucio whoami

Please use your internet browser, go to:

    https://spd-rucio.jinr.ru/auth/oidc_redirect?mz6Chd3grZtm57vrYcLWKQv

and authenticate with your Identity Provider.
Copy paste the code from the browser to the terminal and press enter:
ehY3NT9VhozkuglCpGx4wUIEA9ZyfBaJaRGMvt133mZ9RBYolo
account_type : USER
status       : ACTIVE
suspended_at : None
created_at   : 2024-08-01T12:19:41
email        : konak@jinr.ru
account      : konak
deleted_at   : None
updated_at   : 2024-08-01T12:19:41
```

How to explore data [1]

- To view the list of DIDs, use the command **rucio list-dids <did_pattern>** (shows a list of dids match given pattern)

```
(1.31.7) lxui03:~ > rucio list-dids MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001*
+-------------------------------------------------------------------------------------+--------------+
| SCOPE:NAME                                                                          | [DID TYPE]   |
|-------------------------------------------------------------------------------------+--------------|
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.2.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.2.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.R        | DATASET      |
+-------------------------------------------------------------------------------------+--------------+
```

```
(1.31.7) lxui03:~ > rucio list-dids MC2025_S1:MC2025_S1.minbias-FTF*
+-----------------------------------------------------------------------------------+--------------+
| SCOPE:NAME                                                                        | [DID TYPE]   |
|-----------------------------------------------------------------------------------+--------------|
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.S      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.P      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.R     | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.log   | DATASET      |
+-----------------------------------------------------------------------------------+--------------+
```

```
(1.31.7) lxui03:~ > rucio list-dids MC2025_S1:*RECO*
+-----------------------------------------------------------------------------------+--------------+
| SCOPE:NAME                                                                        | [DID TYPE]   |
|-----------------------------------------------------------------------------------+--------------|
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.R      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.1.R      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.RECO.1.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.R     | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.2.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.2.R      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.RECO.1.R      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.RECO.1.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.1.log    | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.RECO.1.R      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.log   | DATASET      |
+-----------------------------------------------------------------------------------+--------------+
```

```
(1.31.7) lxui03:~ > rucio list-dids MC2025_S1:*
+-------------------------------------------------------------------------------------+--------------+
| SCOPE:NAME                                                                          | [DID TYPE]   |
|-------------------------------------------------------------------------------------+--------------|
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.2.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.2.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.5.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.1.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.SIM.3.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-001.RECO.1.R        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.1.R        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.2.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.2.R        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.SIM.1.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.SIM.1.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.SIM.1.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.SIM.1.P         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.log     | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.RECO.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.SIM.1.log       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.SIM.1.S         | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.S        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.NA.PROD2025-004.SIM.331               | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.SIM.1.P        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-FTF-spdroot4171-dev.5GeV-UU.PROD2025-005.RECO.1.R       | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.RECO.1.R        | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-003.RECO.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.RECO.1.log      | DATASET      |
| MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-004.RECO.1.R        | DATASET      |
+-------------------------------------------------------------------------------------+--------------+
```

We do not recommend searching all over the production scope! This loads the system and may take a long time to complete. Check the table (slide 3) and search for the production you are interested in.

How to explore data [2]

- To get content from dataset/container use **rucio list-files <did>**

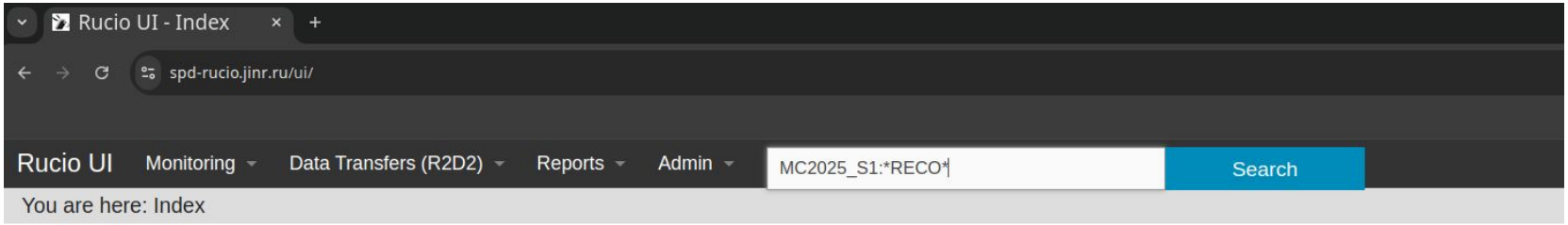
```
(1.31.7) lxui03:~ > rucio list-files MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.P | head -n 8
+-------------------------------------------------------------------------------------------+--------------------------------------+-------------+-----------+----------+
| SCOPE:NAME                                                                                | GUID                                 | ADLER32     | FILESIZE  | EVENTS   |
|-------------------------------------------------------------------------------------------+--------------------------------------+-------------+-----------+----------|
| MC2025_S1:p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000001.root.1 | 61BBC477-7554-45BE-948C-BBFEED0419E1 | ad:76e05c6b | 1.422 MB  |          |
| MC2025_S1:p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000002.root.1 | E5B745C7-E285-4D84-ABDA-0252CA694D45 | ad:53cc796a | 1.422 MB  |          |
| MC2025_S1:p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000003.root.1 | BC9D8822-466B-4491-8831-723AB58C3482 | ad:71da4ed5 | 1.422 MB  |          |
| MC2025_S1:p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000004.root.1 | BC830E72-AC7C-47B3-9363-552953AE3603 | ad:054aac17 | 1.422 MB  |          |
| MC2025_S1:p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000005.root.1 | E752A5F4-410C-4A4F-A022-92B4F64EF709 | ad:e6cfaba0 | 1.422 MB  |          |
```

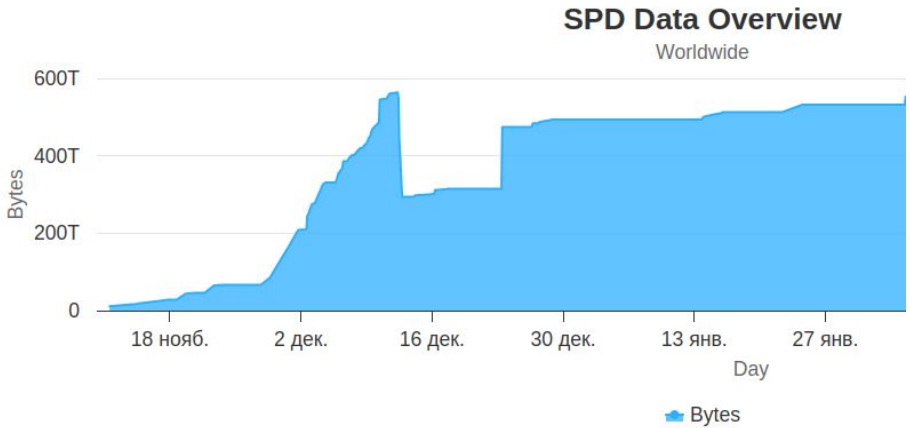
- To get PFNs use **rucio list-file-replicas <did> --pfns**

```
(1.31.7) lxui03:~ > rucio list-file-replicas MC2025_S1:MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.P --pfns | head -n 8
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/49/cf/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000001.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/5b/c1/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000002.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/ae/24/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000003.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/79/8e/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000004.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/9e/41/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000005.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/89/d5/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000006.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/08/ce/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000007.root.1
root://eos.jinr.ru:1094//eos/nica/spd/datadisk/rucio/MC2025_S1/7a/0a/p.MC2025_S1.minbias-P8-spdroot417-dev.10GeV-UU.PROD2025-002.SIM.1.000008.root.1
```

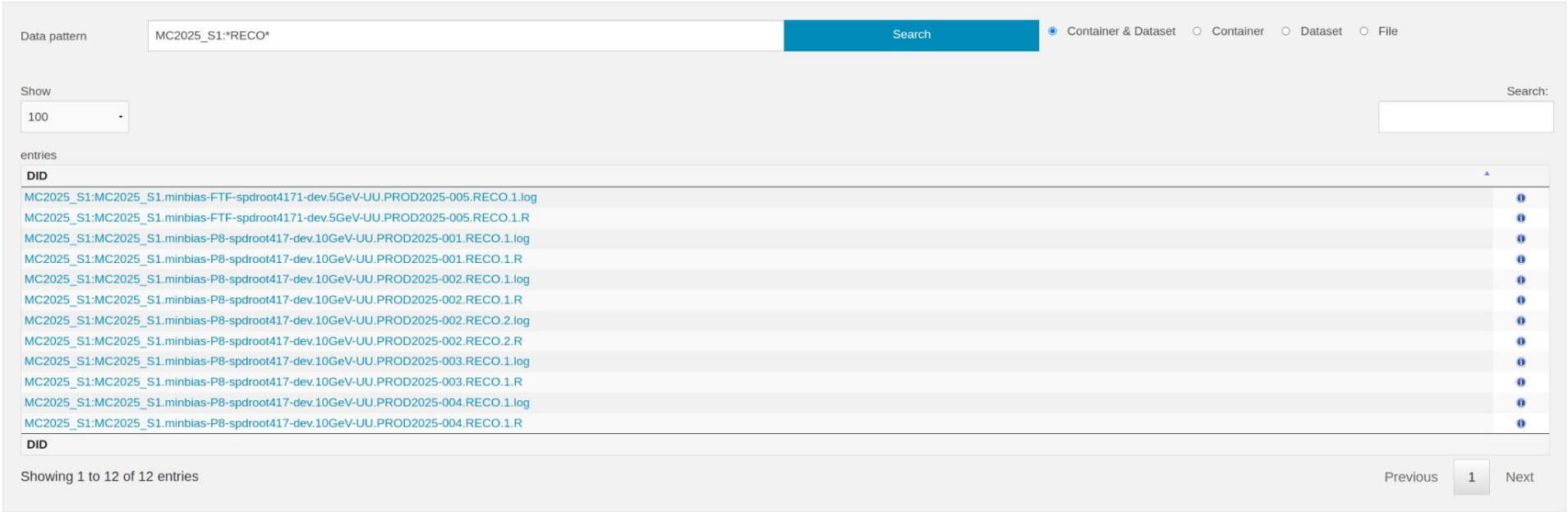
How to explore data on Web Interface [1]

Use special search box with DID pattern.





How to explore data on Web Interface [2]



Some helpful commands

rucio -h or **rucio --help** – full list of rucio-client commands.

rucio <any_command> -h or **rucio <any_command> --help** – help information about specified command. For example: **rucio list-dids --help**

rucio list-scopes – show list of scopes. (each user have own scope with name ***user.<username>***).

rucio list-rses – show list of RSEs.

Contact information and additional resources

For all question contact:
- konak@jinr.ru

Official Rucio documentation:
- https://rucio.cern.ch/documentation/

Previous guide:
- https://git.jinr.ru/nica/spdroot/-/wikis/Rucio%20basics

To be continued…