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Rucio (ATLAS 分散データ管理システム)

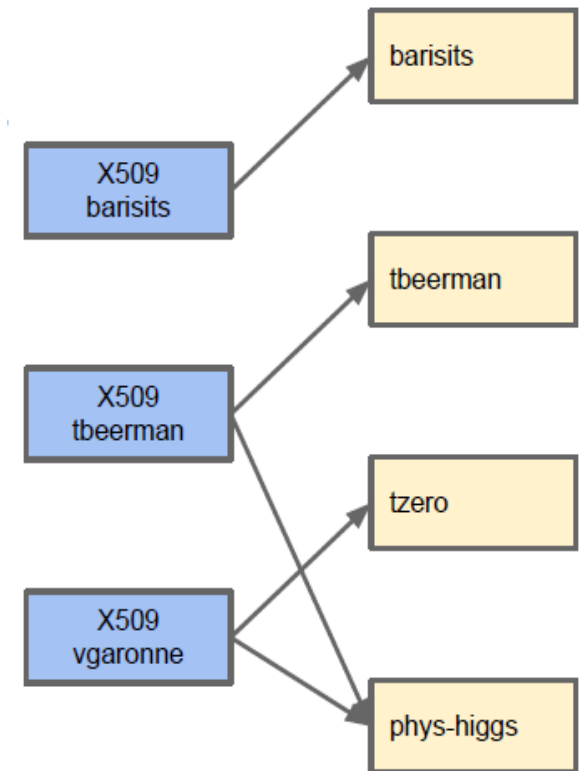


基本概念 - 1

- ATLAS の分散データ管理システム DQ2 の新しい実装
 - DQ2 のサポートは2016年12月で終了
- Grid ジョブ内部でのデータの移動にも使用
- CVMFS 上で Rucio CLI ツールから使用
 - Web インターフェースでも同じような機能を使用可能（後述）

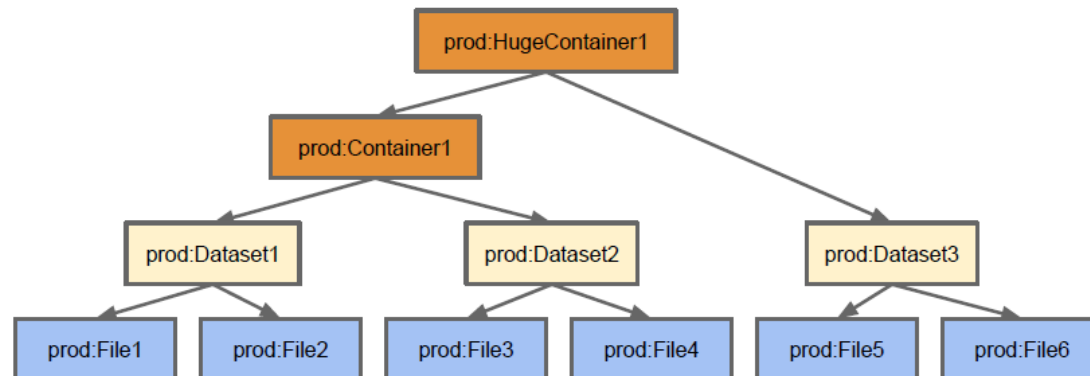
基本概念 - 2

- アカウント (account)
 - 各 Rucio アカウントはユーザーやグループ等にマップ
 - Quota や属性はそれぞれのアカウントごとに設定
 - Rucio account は X509 証明書やケルベロス認証をサポート
 - 一つの証明書は複数のアカウントにマップ可



基本概念 - 3

- Rucio ネームスペース
 - 3種類の Data Identifiers (DIDs): ファイル, データセット, コンテナ
 - データセット: 複数ファイルのセット
 - コンテナ: 複数 Collection of Datasets or Containers
 - The namespace is divided using scopes. A name is unique within a scope but can be used in other scopes. A DID is identified by a scope :



Basic concepts - 4

- Rucio ストレージエレメント (RSEs)
 - Rucio ストレージエンドポイント, 例: GOEGRID_LOCALGROUPDISK, CERN-PROD_DATADISK
 - 検索キーも使用可能 (例 tier=2, cloud=DE)
- レプリケーション (複製) 要求
 - Define how to replicate Data Identifiers to Rucio Storage Elements
 - E.g.: Make one replica of dataset user.gen:my.dataset on DESY-HH_LOCALGROUPDISK
 - Using RSE expression: 2 replicas at cloud=DE&type=LOCALGROUPDISK (any German LOCALGROUPDISK)
 - Will create the minimum number of replicas to optimise storage space and minimise transfers

RSE 検索キ一

- Rules can be created either with an exact RSE name or by using tags that are defined on an RSE, this is then called an RSE expression
 - Examples:
 - RSEs in German cloud: cloud=DE
 - LOCALGROUPDISKS in UK: country=UK&type=LOCALGROUPDISK
 - Any T2 in Italy but not INFN-NAPOLI: cloud=FR&tier=2\INFN-NAPOLI
 - More about this can be found in the Rucio documentation:
 - http://rucio.cern.ch/replication_rules_examples.html
- When using RSE expressions you can define a replication factor, so you can create multiple replicas for one datasets with on rule
- Also you can define the grouping of the data:
 - ALL: Rucio selects an RSE and all files will be copied to this RSE
 - DATASET: If there are multiple datasets Rucio will pick an RSE for each one and will copy all files in the same dataset to the same RSE
 - NONE: Rucio will pick a new RSE for every file, so that they spread over all available RSEs

RucioUI (WebUI)



RucioUI

- Move data between RSEs, use Rucio replication rules
- Such request can be generated by CLI and UI
- The UI tool is *the Rucio Rule Definition Droid (R2D2)*
<https://rucio-ui.cern.ch/r2d2>
- Basic need: X509 certificate in your browse



ATLAS Rucio UI Monitoring Data Transfers (R2D2) Reports pattern OR name OR rule id Search Using account: gkawamur Other Monitoring Help

You are here: Rucio Rule Definition Droid - List Rules Rucio Version (WebUI / Server): 1.8.0 / 1.8.0

Rules

New request

Account	RSE	State	Activity	Interval	
gkawamur	RSE		User Subscriptions	14	days

Apply

Show 10 entries

Search:

Name	Account	RSE Expression	Creation Date	State	Locks OK	Locks Replicating	Locks Stuck
No data available in table							
Name	Account	RSE Expression	Creation Date	State	Locks OK	Locks Replicating	Locks Stuck

Showing 0 to 0 of 0 entries

Previous Next

delete rule

download as JSON

RucioUI: Select DIDs - 1

- Data transfers (R2D2) → Request new rule

ATLAS Rucio UI Monitoring Data Transfers (R2D2) Reports pattern OR name OR rule id Search Using account: gkawamur Other Monitoring Help

You are here: Rucio Rule Definition Droid -

If you are new to this interface, please take the [tour](#).

If you find any errors or have suggestions for improvements for this interface please report it to [Jira](#).

Your input will be saved until you submit it. If you want to clear the form please click [here](#).

1. Select Data Identifiers (DIDs)

DID Pattern Search List of DIDs

Please start by entering a DID or DID wildcard and search for either containers or datasets. Then select the requested DIDs. Please do not use a trailing '/' for containers.

Data pattern panda.0323093918.103961.lib._7993599 Search Container Dataset

Show 10 Filter:

entries

Name
panda.0323093918.103961.lib._7993599

Showing 1 to 1 of 1 entries

Continue Select All Previous 1 Next

Data Identifiers and Scope

Files, datasets and containers share the same naming convention, which is composed of two strings: the scope and the name, separated by a colon. The combination of scope and name is called a data identifier (DID).

The scope is used to divide the name space into several, separate sub spaces for production and individual users. User scope always start with 'user.' followed by the account name.

By default users can read from all scopes but only write into their own one. Only privileged accounts have the right to write into multiple scopes including production scopes like `mc15_13TeV`.

Examples:

Official dataset:
`data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00`

User dataset:
`user.jdoe:my.dataset.1`

Enter if you have a dataset list

Wild card query by Rucio expression

RucioUI: Select DIDs - 2

- E.g. a wild card pattern
 - “data15_13TeV.*.physics_Main.merge.DAOD_SUSY1.*”

Your input will be saved until you submit it. If you want to clear the form please click [here](#).

1. Select Data Identifiers (DIDs)

DID Pattern Search

List of DIDs

Please start by entering a DID or DID wildcard and search for either containers or datasets. Then select the requested DIDs. Please do not use a trailing '/' for containers.

Data pattern

data15_13TeV.*.physics_Main.merge.DAOD_SUSY1.*

Search

☐

Container

☒

Dataset

Show

10

Filter:

entries

Name	
data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00	
data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2425_tid06685122_00	
data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2540_tid07869001_00	
data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r7600_p2521_p2614_tid08133087_00	
data15_13TeV.00266919.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2425_tid06685125_00	
data15_13TeV.00266919.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2540_tid07869009_00	
data15_13TeV.00266919.physics_Main.merge.DAOD_SUSY1.r7600_p2521_p2614_tid08133105_00	
data15_13TeV.00267073.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05629722_00	
data15_13TeV.00267073.physics_Main.merge.DAOD_SUSY1.r6943_p2410_p2425_tid06685128_00	
data15_13TeV.00267073.physics_Main.merge.DAOD_SUSY1.r6943_p2410_p2540_tid07869016_00	

Showing 1 to 10 of 524 entries

Continue

Select All

Previous

1

2

3

4

5

...

53

Next

Select the DIDs you want to replicate

Data Identifiers and Scope

Files, datasets and containers share the same naming convention, which is composed of two strings: the scope and the name, separated by a colon. The combination of scope and name is called a data identifier (DID).

The scope is used to divide the name space into several, separate sub spaces for production and individual users. User scope always start with 'user.' followed by the account name.

By default users can read from all scopes but only write into their own one. Only privileged accounts have the right to write into multiple scopes including production scopes like mc15_13TeV.

Examples:

Official dataset:

data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00

User dataset:

user.jdoe:my.dataset.1

metadata

RucioUI: Select DIDs - 3

- Metadata

data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00	
accessed_at	Mon, 14 Sep 2015 04:34:53 UTC
account	panda
availability	AVAILABLE
closed_at	Mon, 24 Aug 2015 14:33:30 UTC
created_at	Sun, 07 Jun 2015 10:09:59 UTC
datatype	DAOD_SUSY1
did_type	DATASET
events	10593
filesize	237.94 MB
hidden	false
is_open	false
length	7
monotonic	false
name	data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00
obsolete	false
prod_step	merge
project	data15_13TeV
run_number	266904
scope	data15_13TeV
stream_name	physics_Main
suppressed	true
task_id	5608871
updated_at	Mon, 14 Sep 2015 06:35:06 UTC
version	f594_m1435_p2361

RucioUI: select a RSE - 1

- Find your destination space

2. Select Rucio Storage Elements (RSEs)

Please enter an RSE or an RSE expression.

RSE (expression) Check Quota

RSE	Remaining Quota	Total Quota
BNL-OSG2_SCRATCHDISK	45.47 TB	45.47 TB

Name **Remaining Quota** **Total Quota**

Continue If you have quota the table will show your total and remaining quota

2. Select Rucio Storage Elements (RSEs)

Please enter an RSE or an RSE expression.

RSE (expression) Check Quota

You have no quota for this RSE. If you really want to create a rule for this RSE you can continue and create a manual request, which you will have to send to DDM support.

Continue If you have no quota use either have to switch to an account which has quota or you can ask for approval

RucioUI: select a RSE - 2

- SCRATCHDISKs in Germany
 - cloud=DE&type=SCRATCHDISK

2. Select Rucio Storage Elements (RSEs)

Please enter an RSE or an RSE expression.

RSE (expression)

cloud=DE&type=SCRATCHDISK

Check Quota

Total size of selected DIDs: 237.94 MB

RSE	Remaining Quota	Total Quota
CSCS-LCG2_SCRATCHDISK	20 TB	20 TB
CYFRONET-LCG2_SCRATCHDISK	11 TB	11 TB
DESY-HH_SCRATCHDISK	30.68 TB	30.68 TB
DESY-ZN_SCRATCHDISK	25 TB	25 TB
FMPHI-UNIBA_SCRATCHDISK	11 TB	11 TB
FZK-LCG2_SCRATCHDISK	50 TB	50 TB
GOEGRID_SCRATCHDISK	25 TB	25 TB
HEPHY-UIBK_SCRATCHDISK	1.65 TB	1.65 TB
IEPSAS-KOSICE_SCRATCHDISK	14.29 TB	14.29 TB
LRZ-LMU_SCRATCHDISK	26.91 TB	26.91 TB
MPPMU_SCRATCHDISK	20 TB	20 TB
PRAGUELCG2_SCRATCHDISK	20.4 TB	20.4 TB
PSNC_SCRATCHDISK	2.2 TB	2.2 TB
TUDRESDEN-ZIH_SCRATCHDISK	4.26 TB	4.26 TB
UNI-FREIBURG_SCRATCHDISK	32.5 TB	32.5 TB
UNI-SIEGEN-HEP_SCRATCHDISK	50 GB	50 GB
WUPPERTALPROD_SCRATCHDISK	22.55 TB	22.55 TB
Name	Remaining Quota	Total Quota

Continue

RucioUI: select options

3. Options

Please select/enter your wanted options and then submit your rule request.

Grouping

☐ All ☒ Dataset ☐ None

A grouping definition
of how the replica will
be distributed

Lifetime (in days). Leave empty for infinite lifetime.

15

Copies

1

Comment

For ATLAS-D

Create sample

☐

Number of files

Asynchronous Mode

☐

Use if you select files
randomly

Continue

Rucio UI: summary

- Before submission check rules

4. Summary

This request will create rules for the following DIDs:

DID	Copies	Files	Size	Requested Size
data15_13TeV:data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00	1	7	237.94 MB	237.94 MB
data15_13TeV:data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2425_tid06685122_00	1	14	2.96 GB	2.96 GB
data15_13TeV:data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r6944_p2410_p2540_tid07869001_00	1	5	3.4 GB	3.4 GB
data15_13TeV:data15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.r7600_p2521_p2614_tid08133087_00	1	10	2.62 GB	2.62 GB
Total	4	36	8.59 GB	8.59 GB

The rules will replicate to one of the following RSEs:

Check quota limit carefully!

RSE	Remaining Quota	Total Quota
CSCS-LCG2_SCRATCHDISK	20 TB	20 TB
CYFRONET-LCG2_SCRATCHDISK	11 TB	11 TB
DESY-HH_SCRATCHDISK	30.68 TB	30.68 TB
DESY-ZN_SCRATCHDISK	25 TB	25 TB
FMPHI-UNIBA_SCRATCHDISK	11 TB	11 TB
FZK-LCG2_SCRATCHDISK	50 TB	50 TB
GOEGRID_SCRATCHDISK	25 TB	25 TB
HEPHY-UIBK_SCRATCHDISK	1.65 TB	1.65 TB
IEPSAS-KOSICE_SCRATCHDISK	14.29 TB	14.29 TB
LRZ-LMU_SCRATCHDISK	26.91 TB	26.91 TB
MPPMU_SCRATCHDISK	20 TB	20 TB
PRAGUELCG2_SCRATCHDISK	20.4 TB	20.4 TB
PSNC_SCRATCHDISK	2.2 TB	2.2 TB
TUDRESDEN-ZIH_SCRATCHDISK	4.26 TB	4.26 TB

Rucio UI: Transfer status

- Go to top page and see your transfer activity
 - <https://rucio-ui.cern.ch/r2d2>

ATLAS Rucio UI Monitoring Data Transfers (R2D2) Reports pattern OR name OR rule id Search Using account: gkawamur Other Monitoring Help

You are here: Rules Backlog Monitoring Rucio Version (WebUI / Server): 1.8.0 / 1.8.0

Account: gkawamur Activity: Activity Endpoint: RSE State: Done Age: younger than 12 hours Load

Rules

Data Type: Project: Stream: Get Link

Search:

Name	Endpoint	State	Creation Date	Data Type	Project	Stream	Version	OK	Replicating	Stuck
data16_13TeV.00309640.express_express.recon.E SD.f750	CERN-PROD_DATADISK	Done	Sun, 02 Oct 2016 20:23:55 UTC	ESD	data16_13TeV	express_express	0	956	0	0
data16_13TeV.00309640.physics_Late.recon.ESD.f750	SLACXRD_DATADISK	Done	Sun, 02 Oct 2016 20:59:14 UTC	ESD	data16_13TeV	physics_Late	0	955	0	0
data16_13TeV.00309640.physics_Late.recon.ESD.f750	BNL-OSG2_DATADISK	Done	Sun, 02 Oct 2016 20:59:14 UTC	ESD	data16_13TeV	physics_Late	0	955	0	0
data16_13TeV.00309640.debugrec_hlt.merge.AOD.g53_f750_m1689	CERN-PROD_DATADISK	Done	Sun, 02 Oct 2016 21:01:47 UTC	AOD	data16_13TeV	debugrec_hlt	0	1	0	0
data16_13TeV.00309640.debugrec_hlt.merge.AOD.g53_f750_m1689	INFN-T1_DATADISK	Done	Sun, 02 Oct 2016 21:01:47 UTC	AOD	data16_13TeV	debugrec_hlt	0	1	0	0
data16_13TeV.00309640.debugrec_hlt.merge.AOD.g53_f750_m1689	UNI-FREIBURG_DATADISK	Done	Sun, 02 Oct 2016 21:01:48 UTC	AOD	data16_13TeV	debugrec_hlt	0	1	0	0
data16_13TeV.00309640.physics_Late.merge.AOD.f750_m1689	RAL-LCG2_DATADISK	Done	Sun, 02 Oct 2016 23:08:55 UTC	AOD	data16_13TeV	physics_Late	0	96	0	0
data16_13TeV.00309640.physics_Late.merge.AOD.f750_m1689	UKI-NORTHGRID-LANCS-HEP_DATADISK	Done	Sun, 02 Oct 2016 23:08:55 UTC	AOD	data16_13TeV	physics_Late	0	96	0	0

Links and references

- RucioUI
 - <https://rucio-ui.cern.ch/>
- Rucio Documentation
 - <http://rucio.cern.ch/index.html>
- ATLAS-D meeting 2015 Rucio Tutorial, Thomas Beermann
- ATLAS-D meeting 2016 Grid/Rucio Tutorial, Gen Kawamura
- Software tutorial using Grid
 - <https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/SoftwareTutorialUsingTheGrid>