



AMI / Rucio / LOCALGROUPDISK

ATLAS ソフトウェア講習会 2016

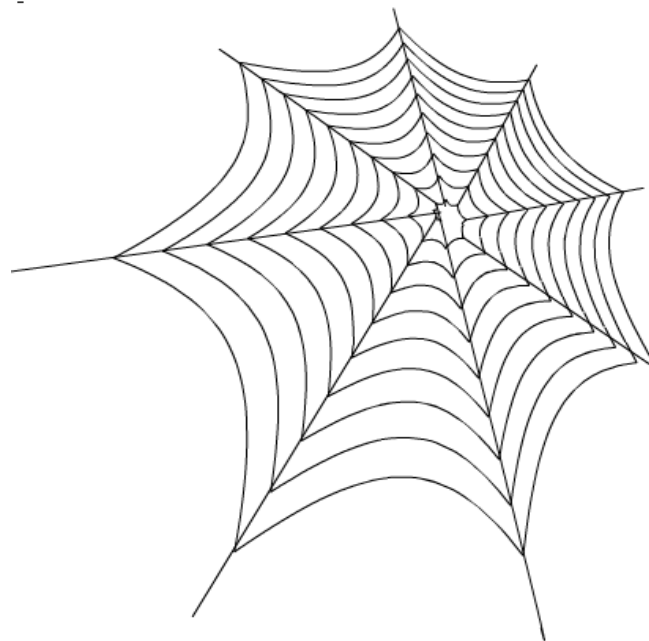
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Overview

- AMI (ATLAS メタデータインターフェース網)
 - AMI
 - ATLAS データセット
 - AMI CLI
 - AMI WebUI
- Rucio (ATLAS 分散データ管理システム)
 - 基本概念
- LOCALGROUPDISK
 - ATLAS LOCALGROUPDISK
 - Rucio CLI
- RucioUI (WebUI)

AMI (ATLAS メタデータインターフェース網)

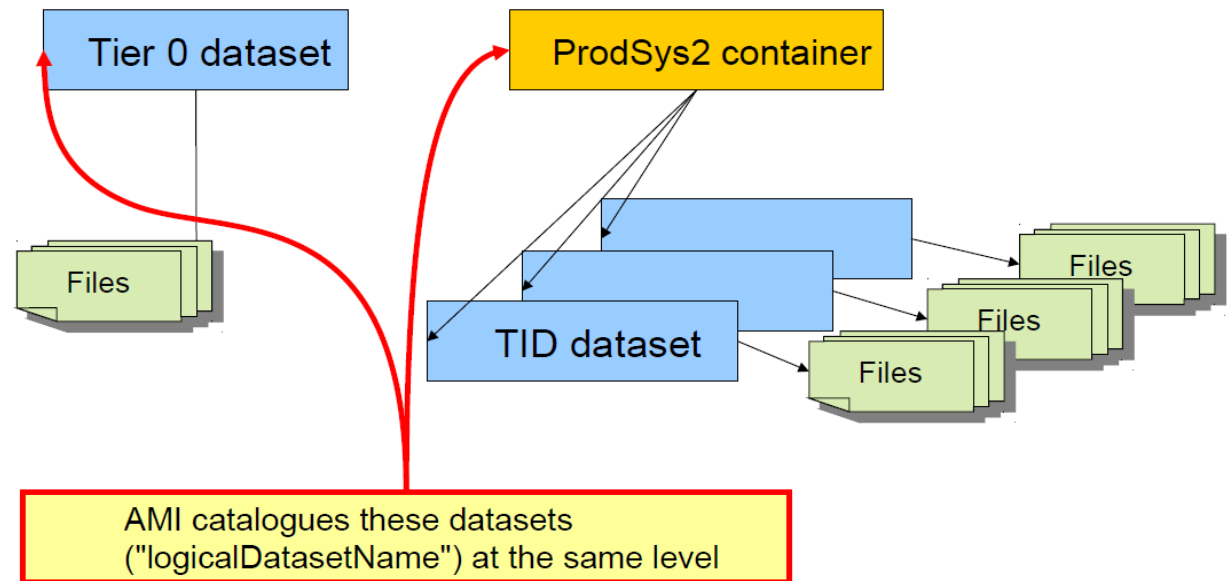


AMI (ATLAS Metadata Interface)

- メタデータ = データのデータ
- ATLASのデータ再構築の過程でそれぞれのステップのAMI tagが作られる
 - ATLAS データセット・メタデータリンク
 - データセットの起源、サイズ
 - ファイル、イベント数
 - ソフトウェア・パラメタ (AMI Tags)
 - MCパラメタ (PDF, generator, cross section, etc)
 - 失われたファイルやLumi blockなど
 - 他のアプリケーションへのリンク (COMA, Rucio)
 - データ ピリオド
 - Luminosity、トリガー、データ取得時期などの情報
 - 特殊インタフェース
 - AMI-Tags
 - ソフトウェア設定パラメタ → software configuration parameters
 - AMI-Glance
 - データ + 出版物
 - Definition of data periods
 - Definition of physics containers
 - Reprocessing campaigns
 - Event count comparator

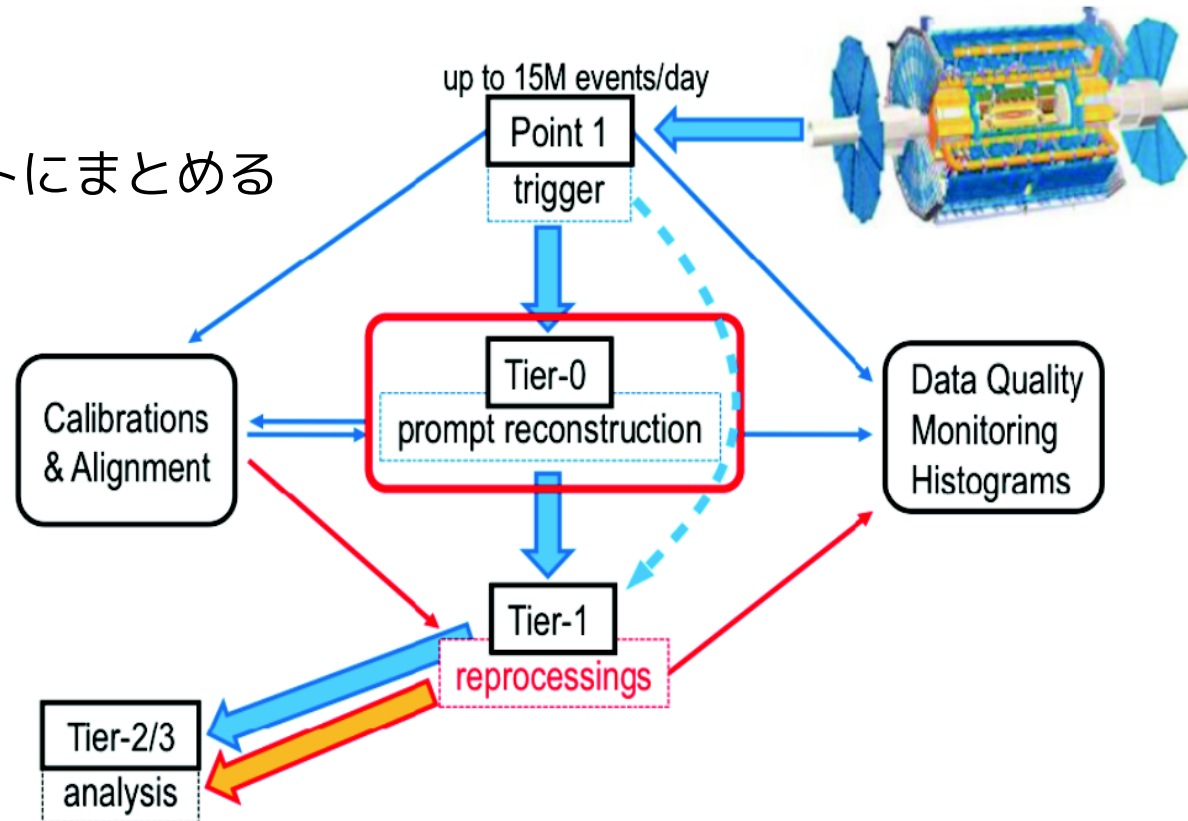
ATLAS データセット - 1

- データセットとは？ファイルの集合体
 - コンテナはデータセットあるいはコンテナの集合体
 - Tier0 ATLAS DAQ の出力ファイル
 - RAWと第一段再構築ファイル
 - ProdSys2 のタスクの出力ファイル
 - TID(Task ID) でタグ付けされる
 - MCとリプロセッシング



ATLAS データセット - 2

- Tier-0
 - RAW ファイルをデータセットにまとめる
 - 第一段階のデータ再構築
- ProdSys2
 - MC やリプロセッシング
 - PanDA, JEDI, DEFT
- 分散データ管理システム
 - Rucio



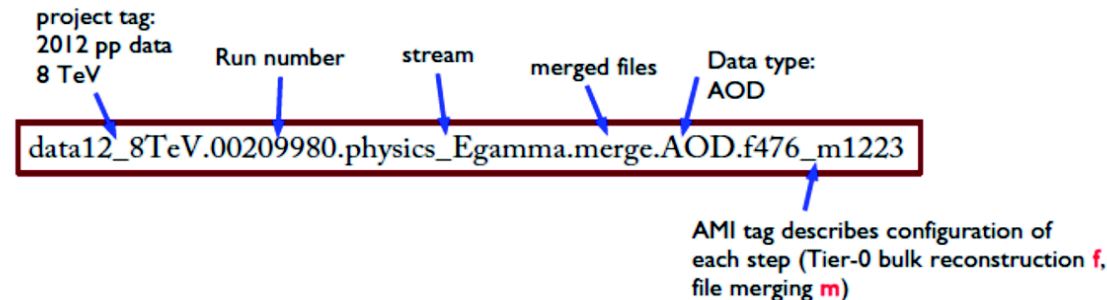
ATLAS データセット - 3

- データ再構築 → 例： x353 = AMI tag
 - Reco_tf.py —AMI=x353 --inputBSFile=tier0_RawData.data
- リプロセッシング・キャンペーン
 - ソフトウェアやフレームワークの大改良後、しばしば RAW から AOD データが再構築される
 - キャンペーン自体は大量の計算能力を使う
 - 結果、複数の異なったバージョンの AOD
 - Derivation framework はその間 AOD から DAOD (Derived AOD) を生成
 - 約 1% ほどのサイズのオリジナル AOD
 - 特定のイベントや変数
 - キャリブレーションやアプリ設定などはバージョンごとに潜在的に異なる

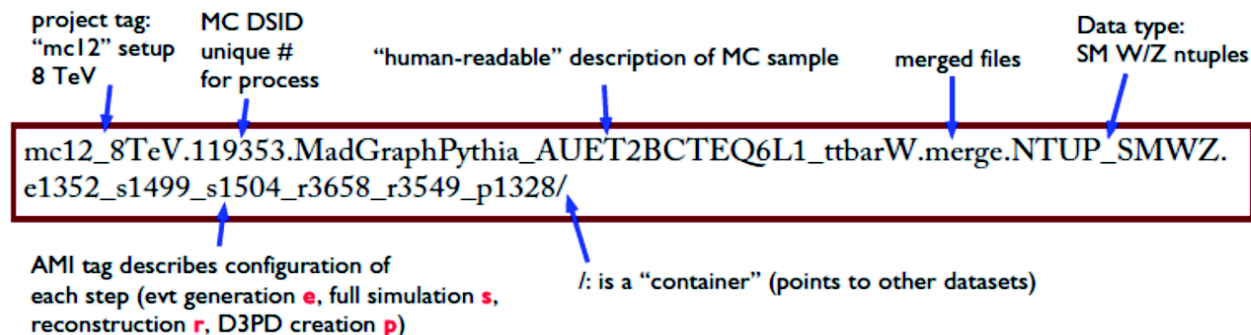
ATLAS データセット - 4

- データセットはファイルの集合体
 - 基本的に実験データ (data) と Monte Carlo (mc)

Data:



Simulation:

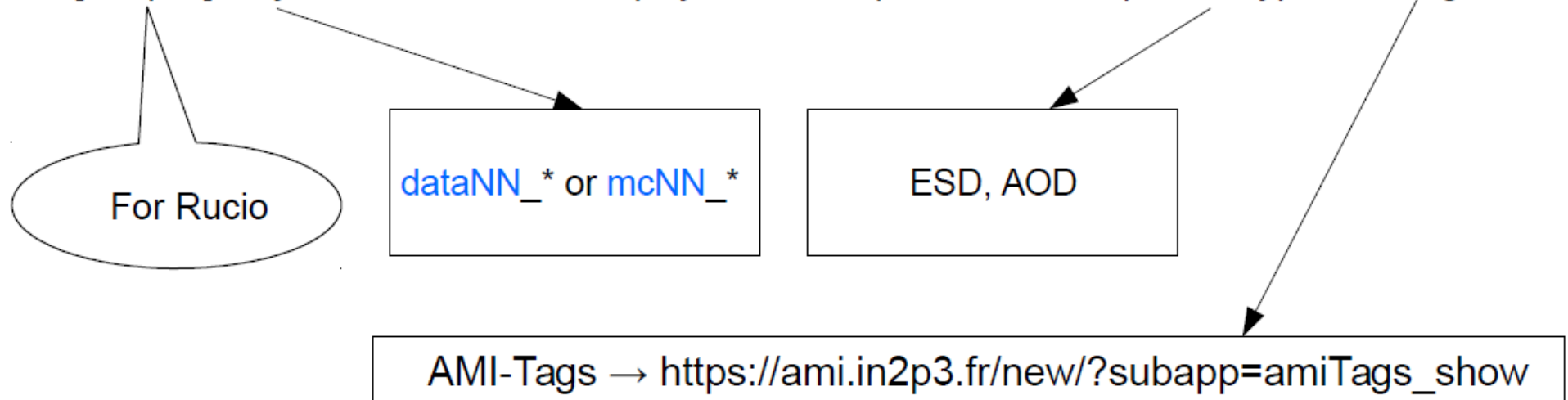


ATLAS データセット - 5

- AMI tag と Rucio

[scope:]Project.runNumber.streamType.productionStep.dataType.amiTag

[scope:]Project.datasetNumber.physicsShort.productionStep.dataType.amiTag



AMI CLI

- pyAMI ドキュメント : <https://ami.in2p3.fr/pyAMI/>

```
## Loading pyAMI client
```

```
lsetup pyami
```

```
## Displaying metadata
```

```
ami show dataset info data13_2p76TeV.00219364.physics_MinBias.merge.NTUP_HI.f519_m1313
```

```
logicalDatasetName: data13_2p76TeV.00219364.physics_MinBias.merge.NTUP_HI.f519_m1313
```

```
nFiles      : 547
```

```
totalEvents : 5771888
```

```
totalSize   : 2558965331099
```

```
runNumber   : 219364
```

```
period      : C4
```

```
prodsysStatus : Tier 0
```

```
dataType    : NTUP_HI
```

```
beamType     : NULL
```

```
conditionsTag : NULL
```

```
geometryVersion : NULL
```

```
streamName   : physics_MinBias
```

```
version      : f519_m1313
```

```
added_comment : NULL
```

```
keyword      : NULL
```

```
## Displaying provenance
```

```
ami show dataset prov data13_2p76TeV.00219364.physics_MinBias.merge.NTUP_HI.f519_m1313
```

AMI WebUI - 1

Datasets / Dataset Browser

Search Form 1: data12_001-real_data

1 dataset 1075 records

2 order by dataset.created DESC modified created

3 Query: dataset.amiStatus="VALID" AND (dataset.dataType like 'AOD') AND (dataset.streamName like 'physics_MinBias')

4

more fields	logicalDatasetName	nFiles	totalEvents	totalSize	runNumber	period
details X	data12_8TeV.00200804.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	18	585818	68.699 GB	200804	A1
details X	data12_8TeV.00200805.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	182	11645042	527.675 GB	200805	A2
details X	data12_8TeV.00200841.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	2	54277	1.881 GB	200841	A3
details X	data12_8TeV.00200842.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	4	188265	20.175 GB	200842	A3
details X	data12_8TeV.00200883.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	4	194266	17.213 GB	200883	A3
details X	data12_8TeV.00200913.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	4	99639	15.288 GB	200913	A3
details X	data12_8TeV.00200926.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	4	120698	16.403 GB	200926	A4
details X	data12_8TeV.00200965.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	2	47551	7.145 GB	200965	A4
details X	data12_8TeV.00200967.physics_MinBias.merge.AOD.r4644_p1517 DQ2 - Provenance - GANGA export	8	290279	36.652 GB	200967	A4
details X	data12_8TeV.00200982.physics_MinBias.merge.AOD.r4644_p1517	2	40071	7.092 GB	200982	A4

5 6 7 8

1: number of results
2: default order, more recent first

3: query clauses
4: +/- fields
5,6: filter,calculator

7: conversion of units
8: group by, order by tools

AMI WebUI - 2

Element's information

logicalDatasetName	mc14_8TeV.129173.Pythia8_AU2CTEQ6L1_gammajet_DP140.merge.AOD.e1146_s1896_s1912_r5591_r5625 RucioInfo - Provenance - Campaigns - GANGA export - Series
physicistResponsible	c.gwenlan1@physics.ox.ac.uk
nFiles	200
totalEvents	999500
totalSize	672.801 GB
dataType	AOD
prodsysStatus	ALL EVENTS AVAILABLE
ECMEnergy	8000
physicsComment	
PDF	CTEQ6L1 - LO with LO alpha_s
version	e1146_s1896_s1912_r5591_r5625 Datasets - Config_Tag
AtlasRelease	19.0.3
crossSection	122.170 nb Report an error - Jira issues
Transf	
data	

Children elements

dataset_extra	4 Records
dataset_keywords	5 Records
dataset_comment	No records found
files	200 Records
jobOptions	No records found
prodsys_task	1 Records

field	approx_crossSection
value	1.2217E+02

field	approx_GenFiltEff
value	9.6932E-04

field	autoConfiguration
value	['everything']

field	postInclude
value	['RecJobTransforms/UseFrontier.py']

1: provenance & rucio
2: JIRA link for X section pbs

3: click for list of files
4: detail of prodsys task
5: cross section

Rucio (ATLAS 分散データ管理システム)

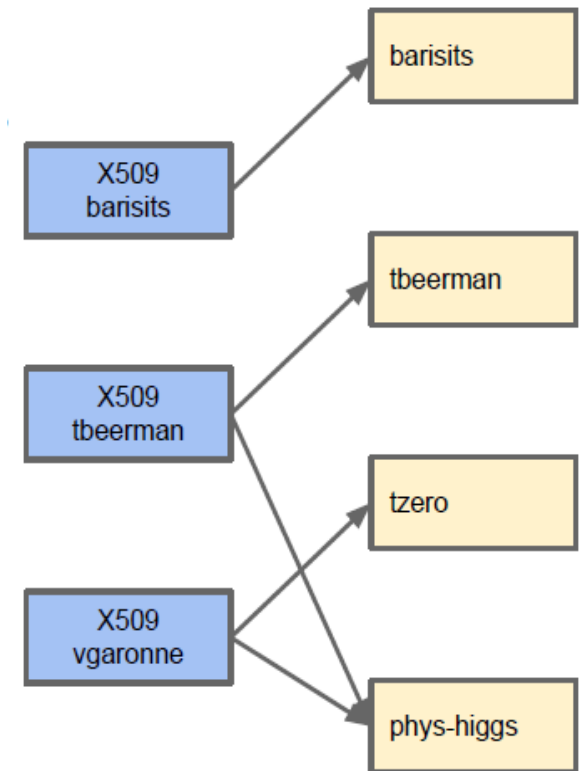


基本概念 - 1

- 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

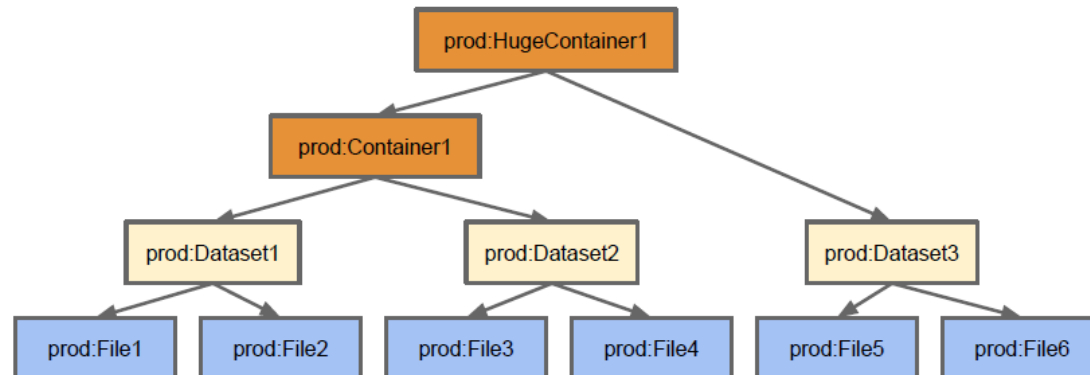
- アカウト (account)
 - 各 Rucio アカウトはユーザーやグループ等にマップ
 - Quota や属性はそれぞれのアカウトごとに設定
 - Rucio account は X509 証明書やケルベロス認証をサポート
 - 一つの証明書は複数のアカウトにマップ可



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: 複数データセットあるいは複数コンテナ
- ネームスペースはスコープごとに分割可能。ネームスはスコープ内で一意。DID はスコープやネームで識別可能



基本概念 - 4

- Rucio ストレージエレメント (RSE)
 - Rucio ストレージエンドポイント, 例: CERN-PROD_DATADISK
 - 検索キーも使用可能 (例 tier=2, cloud=FR)
- レプリケーション (複製) 要求
 - 例、データセット user.gen:my.dataset を Tokyo-LCG2_LOCALGROUPDISK へ複製
 - RSE 検索キー: cloud=FR&type=LOCALGROUPDISK
 - Rucio はレプリカ作成の際に最小ディスク容量と最小転送量になるよう最適化

LOCALGROUPDISK



ATLAS LOCALGROUDDISK

- 一般ユーザが管理可能なディスクエリアは2つある
 - 各サイトはSCRATCHDISK と LOCALGROUDDISKを提供している

- **SCRATCHDISK** (例：ドイツ Tier1 + Tier2s)

- FZK-LCG2_SCRATCHDISK
- DESY-HH_SCRATCHDISK
- DESY-ZN_SCRATCHDISK
- LRZ-LMU_SCRATCHDISK
- WUPPERTALPROD_SCRATCHDISK
- UNI-FREIBURG_SCRATCHDISK
- GOEGRID_SCRATCHDISK

このエリアはジョブアウトプット等の一時保存用。一定時間後（2週間？）消去される。

- **LOCALGROUDDISK** (例： DESY-HH と UniGoettingen)

- DESY-HH_LOCALGROUDDISK
- GOEGRID_LOCALGROUDDISK
-_LOCALGROUDDISK

このエリアはデータの恒久保存用

ATLAS LOCALGROUDDISK

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- GOEGRID_SCRATCHDISK

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- **LOCALGROUDDISK** (例： DESY-HH と UniGoettingen)

- DESY-HH_LOCALGROUDDISK
- GOEGRID_LOCALGROUDDISK
-_LOCALGROUDDISK

このエリアはデータの恒久保存用

日本では TOKYO-LCG2 LOCALGROUDDISK のみ

Rucio CLI

Loading Rucio client

Isetup rucio

Requested: rucio ...

Setting up emi 3.17.1-1 v2.sl6 ...

Skipping: grid middleware already setup (from UI)

Setting up rucio 1.7.3 ...

Info: Setting compatibility to slc6

Info: Set RUCIO_AUTH_TYPE to x509_proxy

Info: Set RUCIO_ACCOUNT to qkawamur

```
>>>>>>>>>>>>>>>>>>> Information for user <<<<<<<<<<<<<<<<<
```

emi:

Your proxy has 95h:54m:0s remaining

In Rucio, check which account you use

rucio whoami

Check all RSEs in Tokyo

```
$ rucio list-rses | grep TOKYO
```

TOKYO-LCG2_DATADISK
TOKYO-LCG2_DET-MUON
TOKYO-LCG2_LOCALGROUPDISK
TOKYO-LCG2_PERF-JETS
TOKYO-LCG2_PERF-MUONS
TOKYO-LCG2_PHYS-EXOTICS
TOKYO-LCG2_PHYS-HIGGS
TOKYO-LCG2_PHYS-SUSY
TOKYO-LCG2_SCRATCHDISK
TOKYO-LCG2_TRIG-DAQ

RucioUI (WebUI)



RucioUI

- データを RSE の間で転送、 Rucio 複製ルールの使用
- RucioUI ツール : *Rucio Rule Definition Droid (R2D2)*
<https://rucio-ui.cern.ch/r2d2>
- ブラウザに X509 ユーザー証明書が必要



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: DIDs の選択 - 1

- Data transfers (R2D2) → 新しいルールの定義

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

Enter if you have a dataset list

Wild card query by Rucio expression

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

RucioUI: DIDs の選択 - 2

- 例、ワイルドカード
 - “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	
Name	

Showing 1 to 10 of 524 entries

Previous

1

2

3

4

...

53

Next

Continue

Select All

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:mc15_13TeV.00266904.physics_Main.merge.DAOD_SUSY1.f594_m1435_p2361_tid05608871_00

メタデータ
を表示

複製したい DIDs を選択

RucioUI: DIDs の選択 - 3

- メタデータ

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: RSE の選択 - 1

- 転送先 RSE を選択

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: RSE の選択 - 2

- 例：SCRATCHDISK の選択
 - 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: オプションの選択

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: 確認

- 複製要求を出す前に最後の確認

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:

RSE のディスク容量を確認！

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: 転送状況

- 複製（転送）状況の確認をトップページで確認
 - <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

リンクと参考文献

- 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
- The pyAMI
 - <https://ami.in2p3.fr/pyAMI/>
- ATLAS Software Tutorial, Feb 2016
 - <https://indico.cern.ch/event/465378/>