



WLCG Information System Evolution

GDB 13.02.2019

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Information System (IS) Evolution task force

- Has been setup in the second half of 2015. One of the main reasons is the decision of OSG to stop using BDII
- Goals :
 - Analysis of the functionality and use-cases for the WLCG IS
 - Assessment of the current system and understanding its' limitations
 - Propose strategy for the IS evolution
 - Follow up on its actual implementation

[IS Evolution Task Force twiki](#)

Analysis of the required functionality

- Experiments use mostly static or semi-static information
- BDII (with 3 levels of hierarchy) and GLUE schema might not be needed to satisfy WLCG use-cases, though bring quite some complexity
- Current IS has been designed for the EGI fully distributed operational model.
- WLCG operational model is centralized. While we are missing central place where topology and configuration data can be aggregated, validated, corrected and then served to all interested clients
- System is not flexible. For example, integration of new types of resources (HPC, clouds) is not straightforward.

From the presentation of Maria Alandes

Strategy under discussion

- The IS TF is trying to evolve the current IS to something...
 - More flexible
 - Accept other information sources than the BDII
 - Accept more formats than only LDAP/LDIF
 - More reliable
 - Enforce validation of information before it gets published
 - Provide clear guidelines on how to publish information (i.e. benchmark values)
 - Simpler
 - Do we need the BDII and the whole GLUE schema to fulfil WLCG use cases?
https://espace.cern.ch/WLCG-document-repository/Technical_Documents/WLCGFutureISUseCases_1.6.pdf
 - More complete
 - Only grid resources are currently described in the IS
 - What about Cloud, HPC, new sites outside EGI/OSG or not running a BDII?

Follow up on implementation

- **Primary data sources** for service level information. Currently propagated via BDII
- **Central topology and configuration service** which collects and validates data from all primary sources. Provides possibility to correct data by authorized users. Provides common set of UIs and APIs for all interested clients. Sends notifications in case of spotted inconsistencies, etc...
- Both should be compatible in terms of data structures for service description

Primary data sources

Current

For static and dynamic information

Service BDII -> Site BDII -> Top level BDII

GLUE schema and ldap protocol

Future

For static and dynamic information

Storage Resource Reporting (SRR) json topology description and storage accounting data for storage services and Computing Resource Reporting (CRR) topology description for computing services. Accessible via http protocol

Limited set of attributes compared to BDII, published in a well defined format, following an agreed schema

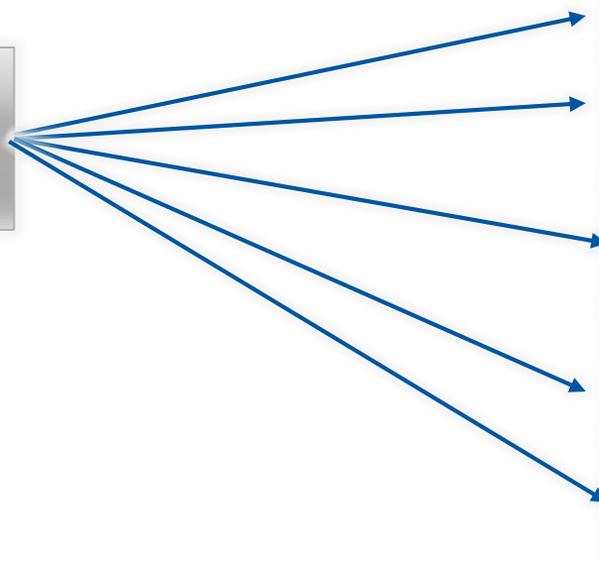
Data structures and their attributes

Service providing storage or compute resources

Implementation
Capacity
VOs
Status...



Implementation
Endpoint
Status...



Resource share

Resource share

Resource share

Resource share

Resource share

Various configuration parameters. Examples: Queue name, max memory, number of cores, space quota path, etc... VOs which can use a given resource share (overloads the one defined on the service level)

Compute resource example

LUND-condor-HTCONDOR
(condor cluster at AGLT2)

```
"jobmanager": "condor",  
"jobmanager_version": "xxx",  
"status": "production",  
"number_logical_cpus": xxx,  
"capacity_HS06":xxx,  
"OS" : xxx,  
"assigned_vos" : [ATLAS, CMS]
```

Computing elements

<https://gate01.aglt2.org:8888>

<https://gate12.aglt2.org:1122>

Queues

Long

Short

```
"max_walltime_minutes": xxx,  
"max_cputime_minutes": xxx,  
"memory_GB":xxx,  
"assigned_vos": ["ATLAS", "CMS"],
```

```
"flavour": "HTCondor-CE",  
"version": "2.12",  
"status": "production"
```

More details can be found following the link:

https://docs.google.com/document/d/1pg_5Kibc_Z4JF4_HJyW5xL6GVYKwXxOU7DXf2QP9Ag

Storage Resource Example

goliass100.farm.particle.cz
(DPM at Prague)

“implementation”:"DPM",
“status”:"production”

Protocols

root

srm

https

gsiftp

Storage shares or space quotas

ATLASDATADISK

DUNEDATADISK

DTEAM

ATLASLOCALGR
OUPDISK

“interfacetype”:"gsiftp",
“status”:"production”,
“endpoint”:"
gsiftp://goliass100.farm.particle.cz/
”

“servingstate”:"open”,
“vos”:"atlas”,
“path”:"/dpm/farm.particle
.cz/home/atlas”,
“totalsize”:"208907209277
4400”,
“usedsize”:"182119395051
4079”

**More details
can be found
following the
link:**

<https://docs.google.com/document/d/1yzCvKpxsbcQC5K9MyvXc-vBF1HGpBk4vhjw3MEXoXf8/>

SRR and CRR implementation

- Work with all storage middleware providers in order to enable SRR generated by storage services. All of them put in place first SRR prototype. [More details](#).
- DPM is the most advanced one. DPM already entered deployment phase. [DPM Upgrade Task Force](#) has been setup. Pioneer sites have been upgraded.
- CRR format has been agreed by the IS Evolution Task Force. Implementation of CRR by the pioneer sites is ongoing.

Central Topology and Configuration Service

- Computing Resources Information Catalogue (CRIC) is a high level information system aiming to describe the topology of the WLCG infrastructure and other resources used by the LHC experiments (HPC, clouds, etc...) and experiment-specific configuration required to exploit these resources according to the experiments Computing models.
- Inspired by ATLAS Grid Information System (AGIS). Evolving AGIS towards common global solution.
- CRIC should become a central entry point for all kinds of WLCG topology and configuration information

CRIC development principles

- Plugin based -> straightforward customization to address various experiment requirements and implementation of the dedicated experiment instances
- Shared building blocks -> common look and feel and optimized development process
- Flexible -> possible to follow technology evolution and changes in the experiment computing models and applications.

Lego bricks like approach

CRIC structure

WLCG CRIC

Extension of CORE CRIC to support LHCb and ALICE and WLCG central operations tasks

CMS CRIC

To describe CMS - specific configuration required to use provided resources

CORE CRIC

To describe resources provided to the LHC experiments

DOMA CRIC

To provide additional configuration required for TPC tests

Every CRIC instance contains CORE part and one of the blue plugins

ATLAS CRIC

To describe ATLAS-specific configuration required to use provided resources

Functionality

- Collecting data from variety of sources (GocDB, OIM, REBUS, CMS Glideins config XML, BDII, CRR/SRR...)
- Providing UI and APIs for all kinds of topology and configuration info
- Authentication & Authorization for data viewing and update
 - Several Authentication methods are enabled
 - Flexible utilization of Permissions, Roles and Groups at various levels
 - Fine grain A&A on the level of a single CRIC object
- Advanced logging functionality. Logging is performed on the CRIC object level. One can check **who, when and how** interacted with a given object
- Notification. One can subscribe to be notified in case of modification of a particular object

Status

- CMS CRIC deployed in production in September 2018. Provides functionality which allows to retire SiteDB.
 - [Production instance](#)
<http://cms-cric.cern.ch/>
- WLCG CRIC – stable prototype. Will be deployed in production after validation of ALICE and LHCb VO feeds (work in progress).
 - [Production instance, no editing via UI is currently allowed.](#)
<http://wlcg-cric.cern.ch/>
 - [Validation and playground instance. Anyone can edit information](#)
<http://wlcg-cric-dev-1.cern.ch>
- DOMA CRIC – under development.
- ATLAS CRIC – the plan is to have a workable prototype by the end of Q2 2019. Migration from AGIS should be agreed with ATLAS. If thing goes well migration could be done by the end of 2019.

WLCG CRIC functionality

- View & edit: federations, pledges, resource center sites, experiment sites, services, storage protocols, queues
- Table view and detailed instance view is provided for all data models
- All changes are being logged
- Downtime calendar (two types of visualization)
- A&A is work in progress

Screenshot examples (1)

Federation table

Export data in json, csv or pdf

Switch on filter

Sort columns

Export | Columns | Filter | Reload | Pledge View

Show 100 entries

Search:

Federation	Accounting name	Tier	Country	DISK 2018 ALICE	CPU 2018 ALICE	TAPE 2018 ALICE	DISK 2018 ATLAS	CPU 2018 ATLAS	TAPE 2018 ATLAS	DISK 2018 CMS	CPU 2018 CMS	TAPE 2018 CMS	DISK 2018 LHCb	CPU 2018 LHCb	TAPE 2018 LHCb
AT-HEPHY-VIENNA-UIBK	Austrian Tier-2 Federation	2	Austria	250	5000	0	120	1875	0	500	10000	0	0	0	0
AU-ATLAS	University of Melbourne	2	Australia	0	0	0	1390	18318	0	0	0	0	0	0	0
BE-TIER2	Belgian Tier-2 Federation	2	Belgium	0	0	0	0	0	0	5570	56200	0	0	0	0
BR-SP-SPRACE	SPRACE, Sao Paulo	2	Brazil	0	0	0	0	0	0	1900	25200	0	0	0	0
CA-EAST-T2	Canada-East Federation	2	Canada	0	0	0	2275	29000	0	0	0	0	0	0	0
CA-TRIUMF	TRIUMF-LCG2	1	Canada	0	0	0	7400	94900	21100	0	0	0	0	0	0
CA-WEST-T2	Canada-West Federation	2	Canada	0	0	0	2275	29000	0	0	0	0	0	0	0
CH-CERN	CERN-PROD	0	Switzerland	26200	350000	49100	27000	411000	105000	26100	423000	97000	11400	88000	33600
CH-CHIPP-CSCS	CHIPP	2	Switzerland	0	0	0	2100	54000	0	1600	36000	0	800	24000	0
CN-IHEP	IHEP, Beijing	2	China	0	0	0	400	5780	0	540	5780	0	0	0	0
CZ-Prague-T2	FZU AS,	2	Czechia	1400	6000	0	1800	16000	0	0	0	0	0	0	0

Screenshot examples (2)

Federation table

🔗 📄 Export 🖨️ ▼ Columns 🔍 Filter 🔄 Reload 👁️ Pledge View
Show 100 entries
Search:

filter by Federation		filter by Acc		filter	iermany	filter t	filter t	filter t	filter b	filter b	filter b	filter	filter	filter	filter	filter	filter
Federation	Accounting name	Tier	Country	DISK 2018 ALICE	CPU 2018 ALICE	TAPE 2018 ALICE	DISK 2018 ATLAS	CPU 2018 ATLAS	TAPE 2018 ATLAS	DISK 2018 CMS	CPU 2018 CMS	TAPE 2018 CMS	DISK 2018 LHCb	CPU 2018 LHCb	TAPE 2018 LHCb		
🔗 DE-DESY-ATLAS-T2	ATLAS Federation DESY	2	Germany	0	0	0	2900	38700	0	0	0	0	0	0	0		
🔗 DE-DESY-GOE-ATLAS-T2	ATLAS Federation, HH/Goe	2	Germany	0	0	0	1467	19333	0	0	0	0	0	0	0		
🔗 DE-DESY-LHCB	LHCb Federation DESY	2	Germany	0	0	0	0	0	0	0	0	0	17	8050	0		
🔗 DE-DESY-RWTH-CMS-T2	CMS Federation DESY RWTH Aachen	2	Germany	0	0	0	0	0	0	5250	67600	0	0	0	0		
🔗 DE-FREIBURG/WUPPERTAL	ATLAS Federation FR/W	2	Germany	0	0	0	2934	38666	0	0	0	0	0	0	0		
🔗 DE-DARMSTADT	GSI, Darmstadt	2	Germany	2600	28000	0	0	0	0	0	0	0	0	0	0		
🔗 DE-KIT	FZK-LCG2	1	Germany	8000	76500	10250	9000	118625	24375	6000	60000	18800	4090	42250	10270		

Click

Screenshot examples (3)

CORE Federation DE-KIT

General Information

Federation name DE-KIT
Accounting name FZK-LCG2
Tier level 1
Country Germany
Last modification date 2019-01-30 13:47:16.177296

[Edit](#)

Experiment Sites

Show entries Search:

Site	RCSite	VO
FZK	FZK-LCG2	ALICE
FZK-LOG2	FZK-LCG2	ATLAS
LCG.GRIDKA.de	FZK-LCG2	LHCb
T1_DE_KIT	FZK-LCG2	CMS

Detailed Experiment Site view contains tables with services, queues and protocols hosted by this site

[main page](#)

VO name atlas
RC site (GOCDB/OIM) [FZK-LCG2](#)
Country Germany
Tier level 1
Administrator
Security
Corepower 0.0
Last modification date 2019-01-30 14:15:00.871035

Status Information

Object state ACTIVE
State comment

[Edit](#)

Services

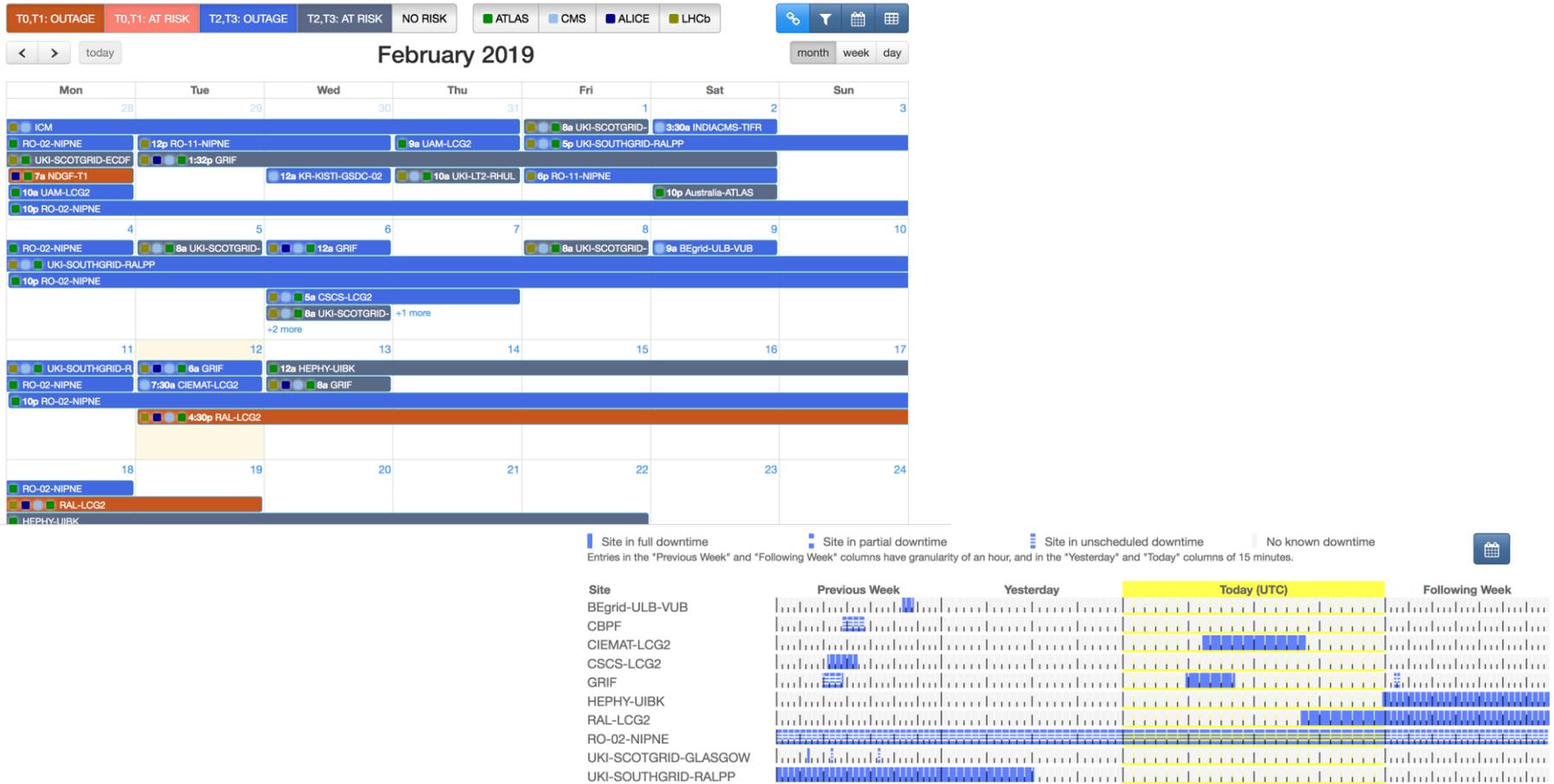
Show entries Search:

Name	Type	Endpoint	State	Monitored	Virtual	Last Modified
FZK-LOG2-CE-arc-1-kit.gridka.de	CE	arc-1-kit.gridka.de:2811	ACTIVE	False	False	Jan. 30, 2019, 2:15 p.m.
FZK-LOG2-CE-arc-2-kit.gridka.de	CE	arc-2-kit.gridka.de:2811	ACTIVE	False	False	Jan. 30, 2019, 2:15 p.m.
FZK-LOG2-CE-arc-3-kit.gridka.de	CE	arc-3-kit.gridka.de:2811	ACTIVE	False	False	Jan. 30, 2019, 2:15 p.m.

Federation detailed page shows which RCsites belong to a given federation and which Experiment sites correspond to these RCsites

Screenshots examples (4)

Two different representations of the downtime calendar



APIs

RC site (GO

Ad

Last modifi

Status Info

OI

State

Edit

- API index
- Federation JSON export
- Resource Centre Site JSON export
- Service JSON export
- Compute Element JSON export
- Site JSON export
- Downtime JSON export
- User JSON export
- User Roles JSON export
- Group JSON export

base URI: [/api/core/](#)

The list of accepted functions and its descriptions

operation	API endpoint	available JSON presets	description of accepted input keys			required_keys
			accepted_keys	accepted_list_keys	accepted_flags	
base URI= /api/accounts/group/query/						
help	/api/accounts/group/query/help/					
list	/api/accounts/group/query/list/	default full merged	columns, draw, egroups, email, firstname, id, last_modified, lastname, length, name, order, preset, source, start, username, users	name, source, user_id, username	json, json_pretty	
base URI= /api/accounts/user/query/						
help	/api/accounts/user/query/help/					
list	/api/accounts/user/query/list/	default group-responsibilities groups people roles site-responsibilities whoami	columns, date_joined, dn, draw, email, firstname, group, group_source, groups, id, is_active, is_staff, is_superuser, lastname, length, order, preset, profiles, start, username	group, group_id, group_source, username	json, json_pretty	
base URI= /api/core/ce/query/						
help	/api/core/ce/query/help/					
list	/api/core/ce/query/list/	default	columns, country, country_code, description, draw, endpoint, federation, flavour, id, is_monitored, jobmanager, length, name, order, preset, queue, queues, rcsite, rcsite_state, start, state, status, version	country, country_code, federation, flavour, id, name, queue, rcsite, rcsite_state, state, status	json	
base URI= /api/core/downtime/query/						
help	/api/core/downtime/query/help/					

DOMA CRIC

- TPC DOMA activity required configuration for the tests. The tests are performed using RUCIO. Number of participating sites is growing. Various configurations are required for every protocol depending on the tested activity (LAN/WAN reading, LAN/WAN writing)
- CRIC team volunteered to help in providing necessary configuration. It is VO-independent. Decided to implement a dedicated plugin to host all the models describing DOMA's configurations
- In a matter of days, CRIC development team was able to create the new CRIC plugin and to spawn a new instance for DOMA use-case
- Expected to be ready for use in the coming weeks

Conclusions

- IS Evolution task force aimed to define the strategy for moving towards the system which would be compatible with the WLCG operational model and could overcome current limitations
- We are currently in the active implementation phase
- First version of the WLCG CRIC is deployed for validation. Feedback is welcome!