

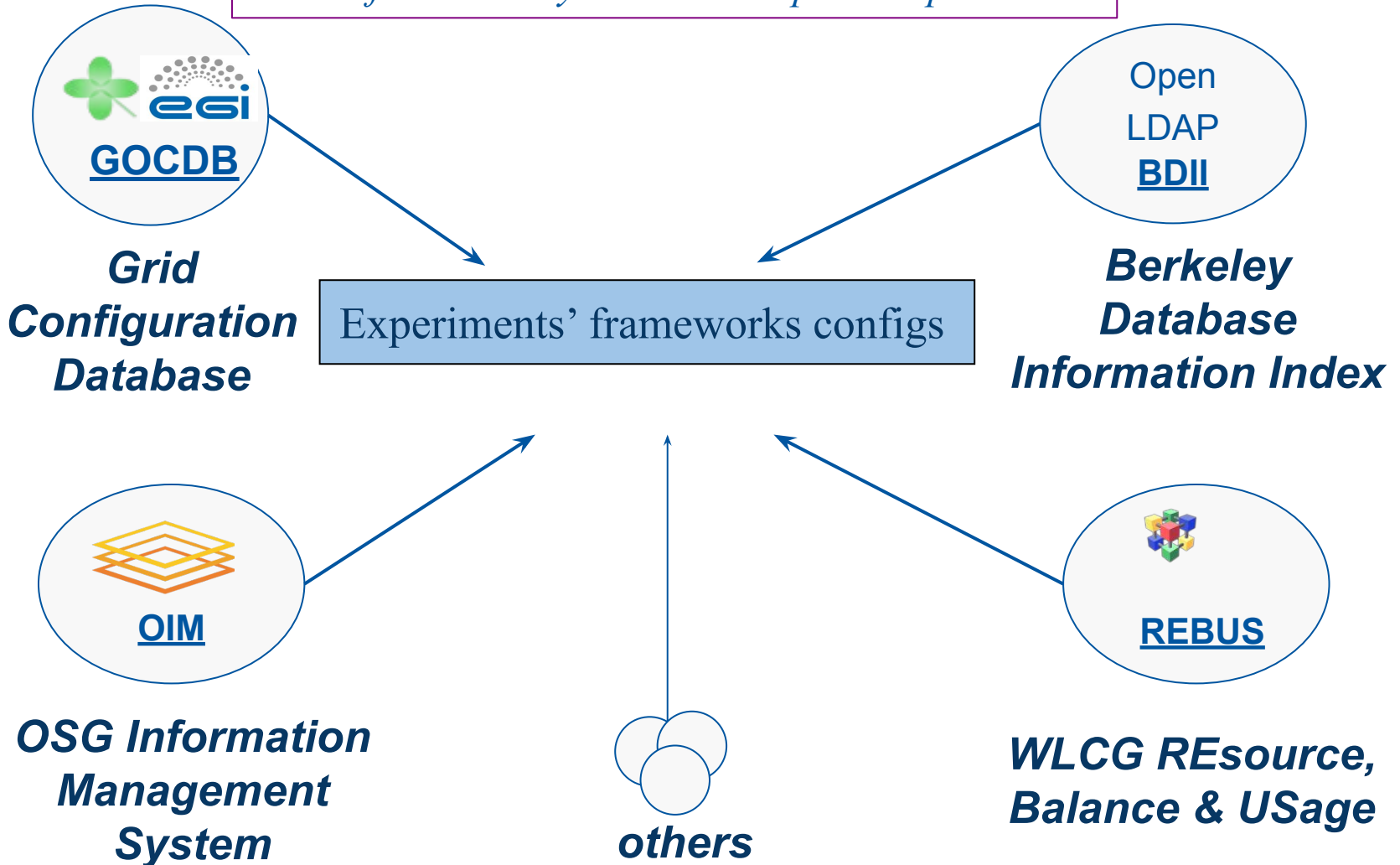
# **Computing Resource Information Catalog**

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The CRIC team (BINP, CERN, pic and INFN)

# Information Systems: a big world

*N.b.: Information System → multiple interpretations*



# Experiments frameworks: a big world



# Physical Resources & Frameworks

## Gluing the two “big worlds” together

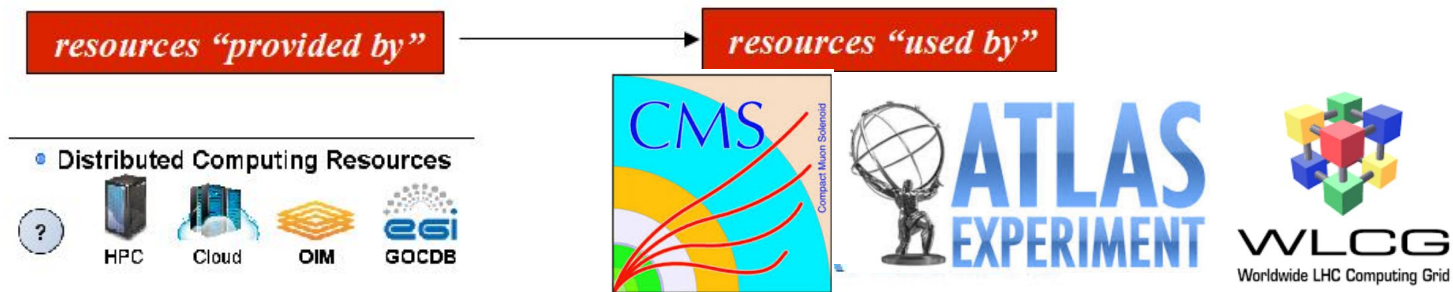
- ATLAS Grid Information System (AGIS) is the central information system for ATLAS:
  - connects Physical Resources and Experiments frameworks together for the ATLAS experiment.

AGIS integrates configuration and status information about resources, services and topology of the whole computing infrastructure used by ATLAS Distributed Computing

- **CRIC** is the AGIS evolution
  - Next generation system
  - Non-experiment specific: fitting the needs of multiple collaborations!

# CRIC: Physical Resources & Experiments Frameworks

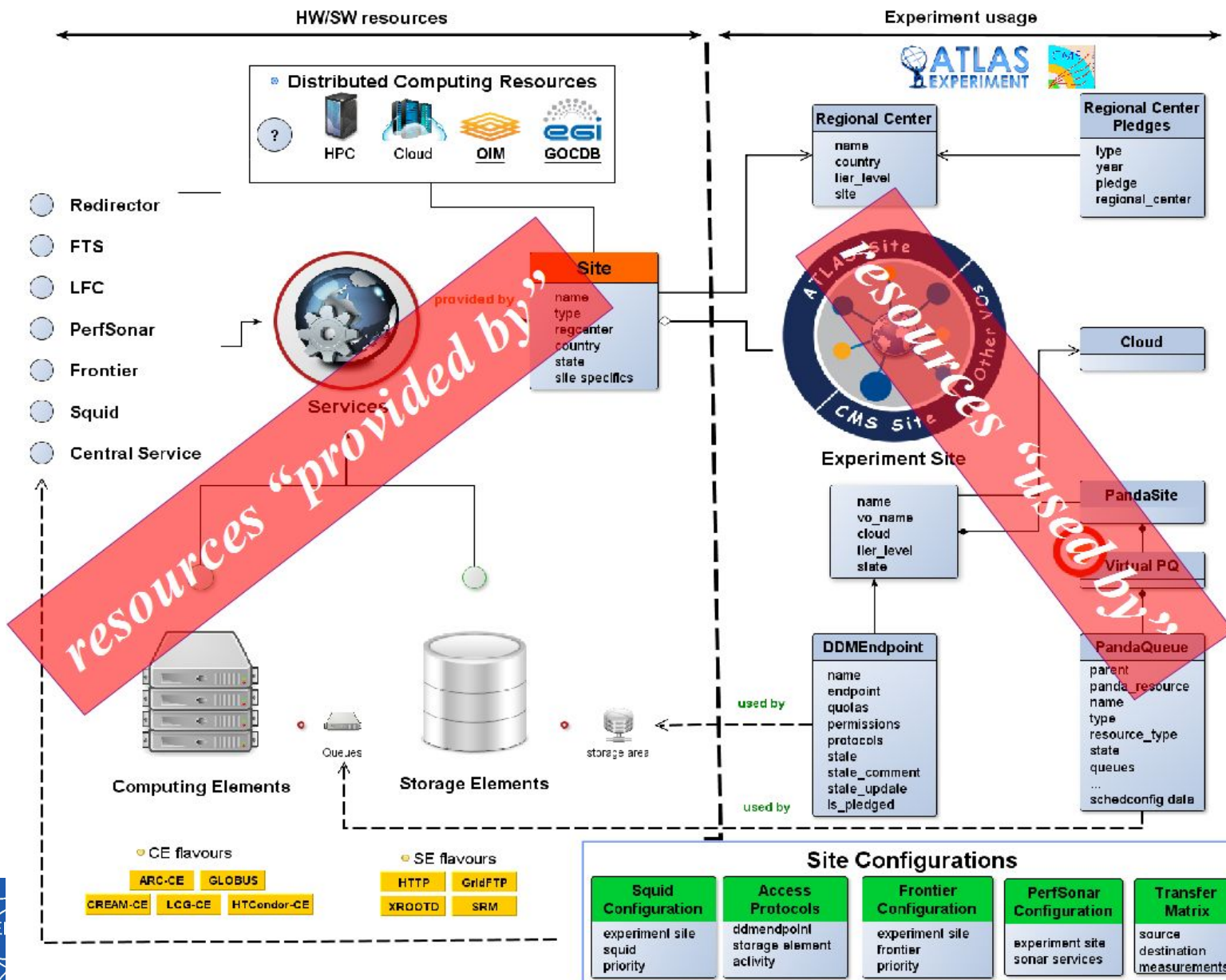
- Clear distinction between resources *provided by* (Sites) and resources *used by* (Experiments)
- Establish relationship between resources to Experiment objects



Providing an abstraction layer from the physical resources the system allows the Experiment to define their own real organization of the resources, experiment specific topology and own services structures.

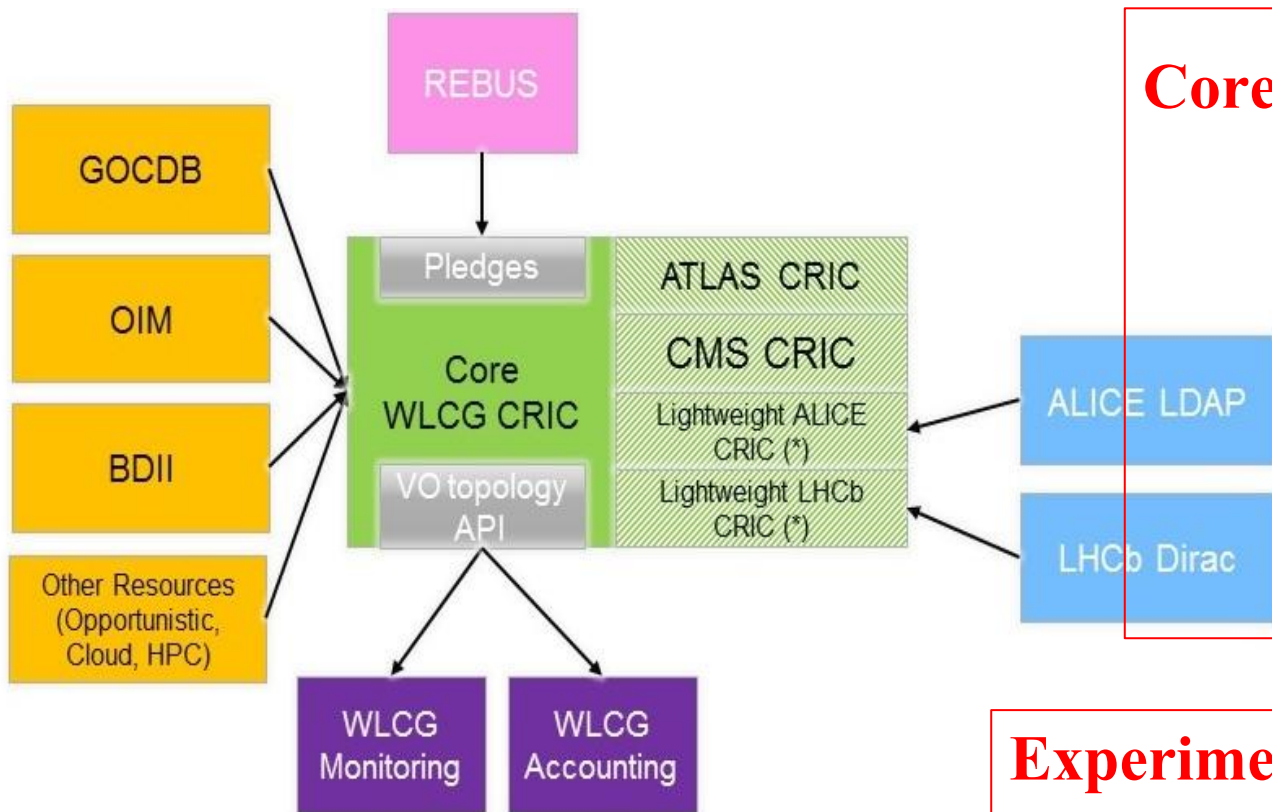
# “Physical”

# “Logical”





# Plugin based: Core and Experiments



(\*) Maintained by WLCG to store very simple experiment topology information (i.e. experi

## Core CRIC

- Resources “Provided by”
- Single entry point for WLCG topology and service configuration
- Consumes information from available information sources

## Experiments CRICs

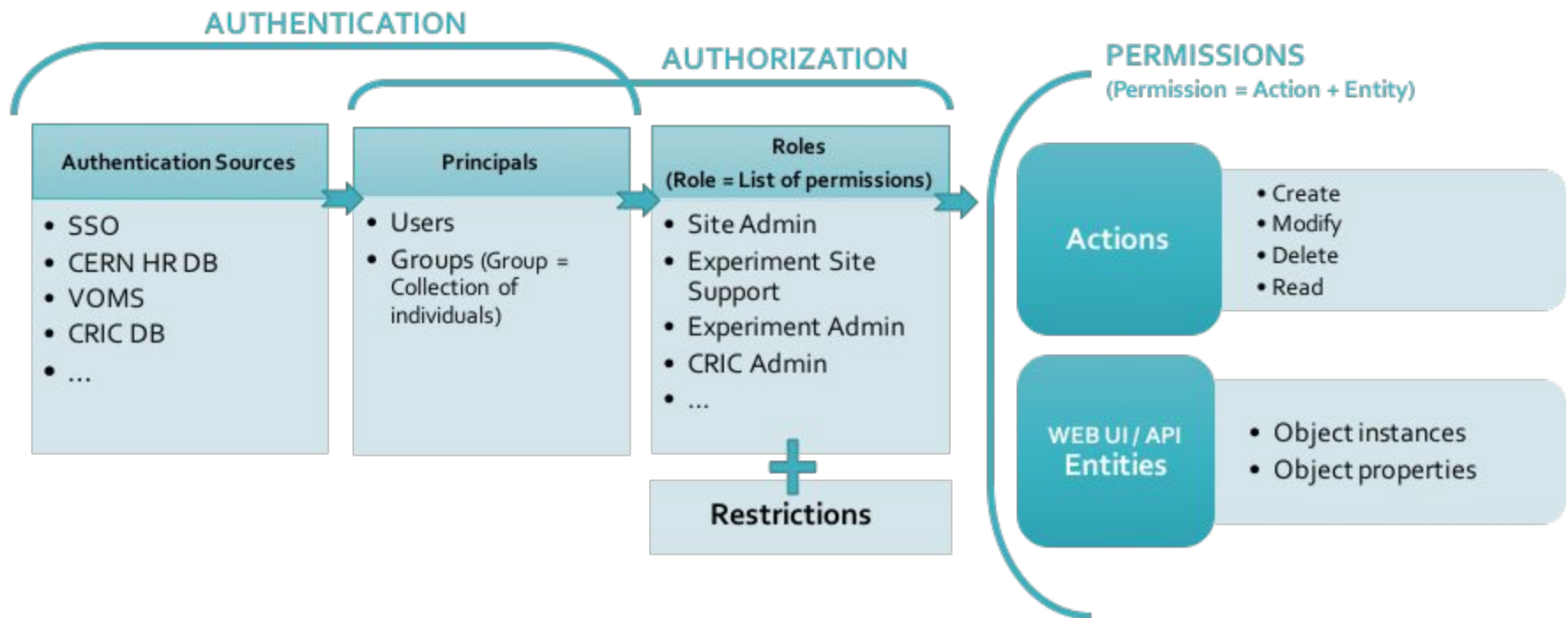
- Resources “Used by”
- Describes experiment topology
- Uses core CRIC and adds extra info needed by experiment operations and workflows

# CRIC: few implementation details

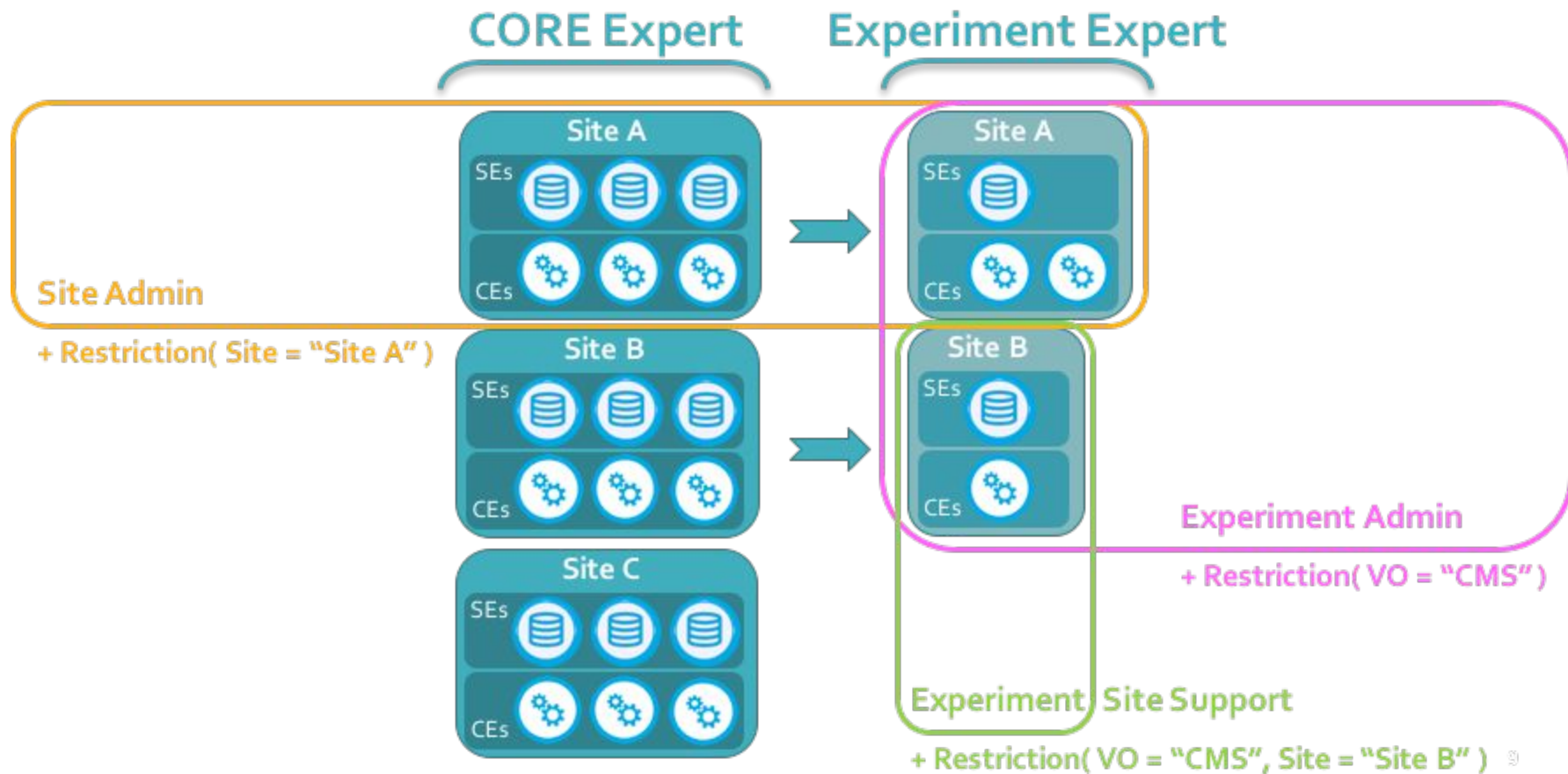
- Django based
- Client-server architecture, 2 independent services:
  - API service (REST-full GET export: JSON, etc; POST update) -- mainly used to export data, bulk updates and operate data programmatically
  - WebUI portal (AJAX support, JQuery widgets, based on Bootstrap, etc) -- mainly used to navigate, browse and declare objects
- Various integrated collectors run by crons to populate/sync DB from ext. sources
- The system supports information protection (Federated Identity through SSO):
  - Authorization is required to modify data: Groups, Roles and list of specific permissions could be directly associated to users



# More details: Auth & Auth



# More details: Auth & Auth



# Storages - pre-CRIC attempts

... Either too little (too simplified)



## Service: atlasrm-fzk.gridka.de - SRM

SRM dCache endpoint dedicated to ATLAS.

### System

Host name	PROTECTED - Auth required
IP Address	PROTECED - Auth required
IP v6 Address	PROTECED - Auth required
Operating System	PROTECTED - Auth required
Architecture	PROTECTED - Auth required
Contact E-Mail	PROTECTED - Auth required

### Grid Information

Host DN	PROTECTED - Auth required
URL	
Parent Site	FZK-LCG2
Scope Tags	atlas, EGI, tier1, wlcg

### Project Data

Production Level	✓
Beta	✗
Monitored	✓

### Service Groups this Service Belongs To

### Service Endpoints (endpoints?)

Name	URL	Interface Name
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- Describe only those system characteristics that are really needed
- Dynamic - static separation
- Keep simple things simple
- BUT Avoid oversimplification



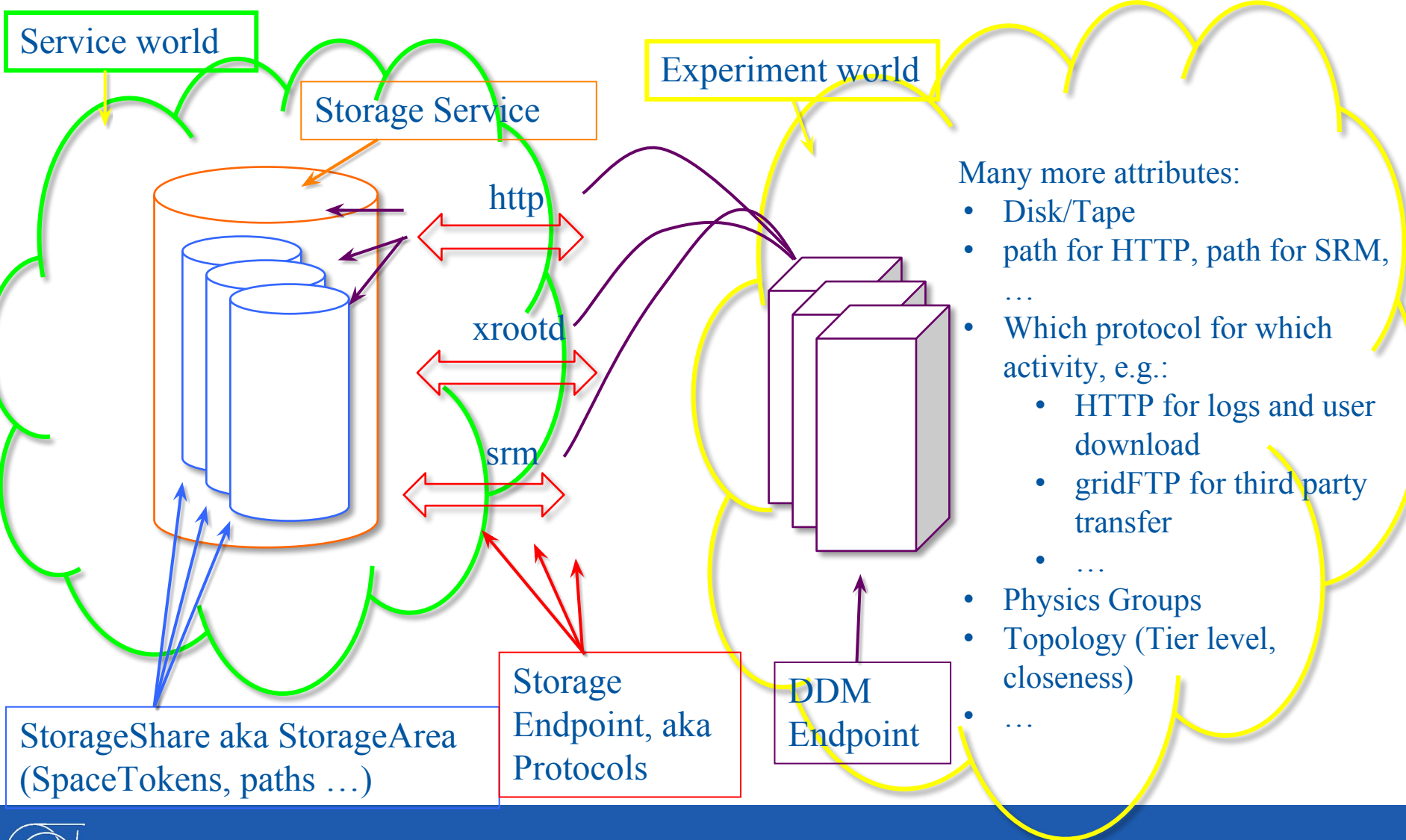
# Storages in CRIC: details of objects

- StorageService: represents the entire storage system that makes its Shares, defined within a DataStore, available via Endpoints. Static information.
  - Attributes: name, id, servicetype, implementation, capabilities, qualitylevel, storagecapacity ...
- StorageShare: represents a logical storage area, a part of the storage capacity, allocated on DataStore(s) for a specific user group or use case. May contain dynamic information (e.g. space usage)
  - Attributes: name, id, policyrules, path, assigned endpoints, servingstate, accessmode, maximumlatency, retentionpolicy, defaultlifetime, maximumlifetime, expirationmode, totalsize, usedsize, numberoffiles, message
- StorageEndpoint: represents the network interface to the storage system that maybe contacted to manage and access data stored in the StorageShare(s) of DataStore(s). May contain dynamic information (e.g. healthstate or servingstate)
  - Attributes: name, id, endpointurl, assignedshares, interfacetype, interfaceversion, capabilities, qualitylevel, servingstate, healthstate, message
- DataStore: describes a homogeneous instance of a physical storage extent (e.g. a tape or a disk server). Static information.
  - Attributes: name, id, datastoretype, latency, totalsize, vendor, message

Iterative approach



# Storage Endpoint diagram



Many more attributes:

- Disk/Tape
- path for HTTP, path for SRM, ...
- Which protocol for which activity, e.g.:
  - HTTP for logs and user download
  - gridFTP for third party transfer
  - ...
- Physics Groups
- Topology (Tier level, closeness)
- ...

# CRIC - "Physical" - Sites view

Export Columns Filter Reload Show 100 entries

filter by Site Name filter by Alt name filter by State filter by RC Tie IT-I filter by Country

Site Name	Alt name	State
INFN-BARI	INFN-BARI, BARI, Italy	DISABLED
INFN-CATANIA	INFN-CATANIA, Catania, Italy	DISABLED
INFN-CNAF-LHCB	INFN-CNAF-LHCB	DISABLED
INFN-FRASCATI	INFN-FRASCATI	DISABLED
INFN-LNL-2	LEGNARO, Padova, Italy	DISABLED
INFN-MILANO-ATLASC	ATLAS Tier2 Milano Site	DISABLED
INFN-NAPOLI-ATLAS	NAPOLI, Napoli, Italy	DISABLED
INFN-PISA	INFN-PISA, Pisa, Italy	DISABLED
INFN-ROMA1	INFN-ROMA, Roma, Italy	DISABLED
INFN-ROMA1-CMS	INFN-ROMA1, Roma, Italy	DISABLED
INFN-T1	INFN-T1 Bologna, Italy	DISABLED
INFN-TORINO	TORINO (INFN), Italy	DISABLED

### Update RC Site object: INFN-BARI

Basic relations

Resource Center: INFN-BARI

Regional Center name: [IT-INFN-T2, tier\_level=2, country=Italy]

Country: Italy

Settings

Alternative Name: INFN-BARI, BARI, Italy

Timezone: Europe/Rome

InfoURL:

Is pledged:

Object state

Object state: DISABLED

State comment: Automatically collected from GOCDDB

Dynamic Parameters auto collected by GStatLoaderCron from REBUS

Average CPU power per core: 0.0

Dynamic Parameters auto collected by OIMGOCDDBInfoLoaderCron

status: Production

cert status: Certified

admin email: grid-prod-ba@lists.infn.it

### RC Site INFN-BARI

Extended name: INFN-BARI, BARI, Italy

URL:

Longitude: 16.88381

Latitude: 41.10835

Timezone: Europe/Rome

Country: Italy

Regional Centre: NULL

State: DISABLED

State Comment: Automatically collected from GOCDDB

State Updated: None

Status: Production

Certification Status: Certified

Administrator: grid-prod-ba@lists.infn.it

Security: grid-sec-ba@lists.infn.it

Corepower: 0.0

GOCDDB Primary Key: 23800

GOCDDB Info URL: https://gocdb.eui.eu/portals/index.php?Page\_Type=Site&id=193

Last Modified: June 29, 2017, 1:10 p.m.

Edit site description

Certified	0	11.34	44.49
Certified	0	12.68	41.79
Certified	0	11.95	45.35
Certified	0	9.23	45.47
Certified	0	14.236	40.853
Certified	0	10.4	43.7
Certified	0	13.026	41.783
Certified	0	13.026	41.783
Certified	0	11.342	44.495
Certified	0	7.4	45.03
cert_status	core power	longitude	latitude

- **Values extracted from GOCDDB and OIM using collectors.**
  - **Possibility to enrich info, filter values, and search inside the table.**
  - **Site attributes are editable via form (auth required).**

# CRIC - "Physical" - Services view

Site Name	Service Type	Site
<a href="#">INFN-BARI-CE-CREAM-CE-ce-01.recas.ba.infn.it</a>	CE	INFN-BARI
<a href="#">INFN-BARI-CE-CREAM-CE-ce-02.recas.ba.infn.it</a>	CE	INFN-BARI
<a href="#">INFN-BARI-CE-CREAM-CE-ce-03.recas.ba.infn.it</a>	CE	INFN-BARI
<a href="#">INFN-BARI-PerfSonar-Bandwidth-perfsonar2.ba.infn.it</a>	PerfSonar	INFN-BARI
<a href="#">INFN-BARI-PerfSonar-Latency-perfsonar1.ba.infn.it</a>	PerfSonar	INFN-BARI
Site Name	Service Type	Site

## Computing Element INFN-BARI-CE-CREAM-CE-ce-03.recas.ba.infn.it

Type	CE
Description	
Job Manager	
Version	None
Architecture	
Implementation	
Virtual Instance	False
Endpoint	ce-03.recas.ba.infn.it
Flavour	CREAM-CE
Monitored	True
Deployed at	INFN-BARI
State	DISABLED
State Comment	Automatically collected from GOCDB/OIM source
State Updated	June 20, 2017, 1:10 p.m.
Status	production
Last Modified	June 20, 2017, 1:10 p.m.

[Edit service description](#)

Update CE service object: INFN-BARI-CE-CREAM-CE-ce-03.recas.ba.infn.it

Basic relations

Site:

Type:

Unique Service Name:

Info: Keep this field empty to let the system generate default value.

Settings

Architecture:

Implementation:

Description:

is\_virtual:

State settings

Object state:

State comment:

CE settings

Job manager:

Version:

Protocol settings

Endpoint:

Flavour:

## Service INFN-BARI-PerfSonar-Bandwidth-perfsonar2.ba.infn.it

Type	PerfSonar
Description	
Architecture	
Implementation	
Virtual Instance	False
Endpoint	perfsonar2.ba.infn.it
Flavour	Bandwidth
Monitored	True
Deployed at	INFN-BARI
State	ACTIVE
State Comment	Automatically collected from GOCDB/OIM source (ACTIVE by default)
State Updated	June 20, 2017, 1:10 p.m.
Status	production
Last Modified	June 20, 2017, 1:10 p.m.

[Edit service description](#)

- **Values extracted from GOCDB and OIM using collectors.**
  - Possibility to enrich info, filter values, and search inside the table.
  - Attributes for each service type are editable via form.

# CRIC - “Logical” - Experiment Site view

Define new CMS Site object

Basic relations

Experiment Site: T1\_DE\_KIT

Tier level: 1

Country: Germany

RC site (GOCDB/OIM): NULL

VO name: CMS

Settings

status: -

Average CPU power per core: 0

Use local average CPU power per core:

Object state

Object state: DISABLED

State comment: CMS Site object was created using WebUI

Administration

admin email:

security email:

Executive email: manuel.giffels@cern.ch

Technical email: gunter.quast@cern.ch

CMS Site T2\_IT\_Bari

VO Name cms

RC Site NULL

Tier level 2

Country Italy

State DISABLED

State Comment CMS Site object was created using WebUI

State Updated June 20, 2017, 8:53 p.m.

Status

Administrator

Security

Executive giacinto.donvito@cern.ch

Technical giorgio.maggi@ba.infn.it

Corepower 0.0 (overrides default value 0.0 from NULL)

Last Modified June 20, 2017, 8:53 p.m.

[Edit site description](#)

Update CMS Site object: T2\_IT\_Pisa

Basic relations

Experiment Site: T2\_IT\_Pisa

Tier level: 2

Country: Italy

RC site (GOCDB/OIM): NULL

VO name: CMS

Settings

status:

Average CPU power per core: 0.0

Use local average CPU power per core:

Object state

Object state: DISABLED

State comment: CMS Site object was created using WebUI

Administration

admin email:

security email:

Executive email: giuseppe.bagliesi@cern.ch

Technical email: tommaso.boccali@cern.ch

CMS Site Name	State	Tier level	Country	Status	Core power
<a href="#">T1_DE_KIT</a>	DISABLED	1	Germany		0
<a href="#">T2_IT_Bari</a>	DISABLED	2	Italy		0
<a href="#">T2_IT_Pisa</a>	DISABLED	2	Italy		0
CMS Site Name	State	Tier level	Country	Status	Core power

**A CMS site groups “service units”: collects resources to be used by the experiment for e.g. job submission.**

- Experiments computing experts can define & edit new Exp Sites**

# CRIC - "Logical" - Exp Compute Unit View

**Define new CMS Compute Unit object**

Basic relations

Name:

CMS Experiment Site:

Administration

Admin email:

Use Compute Unit administrator contact:

Technical email:

Compute Unit Name	CMS Site	Administrator	Technical
<a href="#">CondorCore</a>	T2_IT_Bari	giorgio.maggi@ba.infn.it	leonardo.cristella@cern.ch
Compute Unit Name	CMS Site	Administrator	Technical

**Update CMS Compute Unit object: CondorCore**

Basic relations

Name:

CMS Experiment Site:

Administration

Admin email:

Use Compute Unit administrator contact:

Technical email:

**CMS Compute Unit CondorCore**

Deployed at [T2\\_IT\\_Bari](#)

Administrator [giorgio.maggi@ba.infn.it](#) (overrides default administrator [giacinto.donvito@cern.ch](#) from T2\_IT\_Bari)

Technical [leonardo.cristella@cern.ch](#)

Last Modified June 21, 2017, 10:38 a.m.

[Edit compute unit description](#)

**The Exp Compute unit groups a set of Compute Elements for administrative and organizational purposes.**

- **Exp Site experts can create & edit new instances**

# ... and now...

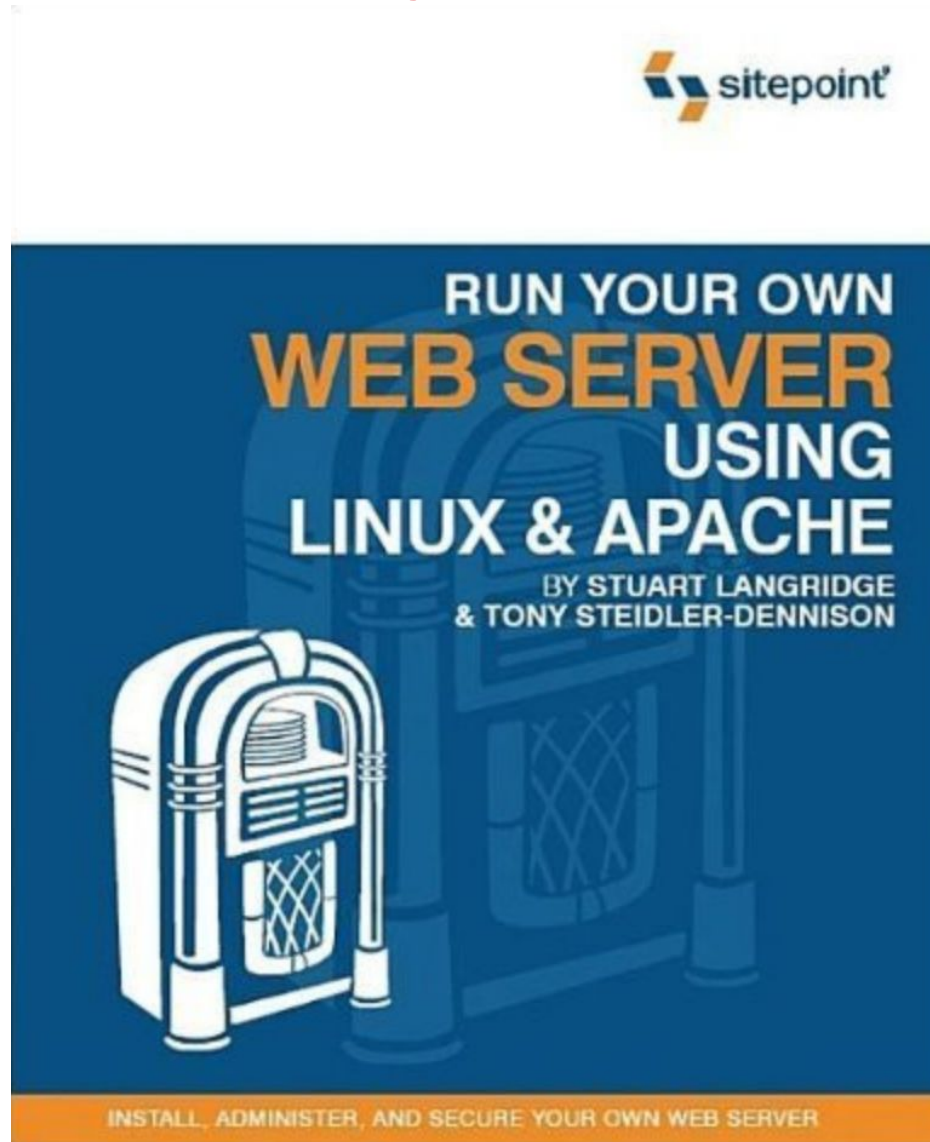
- What's the problem we are trying to solve?
- We do NOT have a problem!
  - Experiments work!
- ... really no problem???
  - maybe we can do things better
    - Why? How? Where?
- Many things are “common”
  - Network is shared. We can't have the experiments “speaking different languages!”
  - Storages:
    - Often shared
    - up to now emails from site admins/resp to the experiments experts, difficulties to integrate new technologies within the experiments
      - Difficulties also within the experiment, integration within the DataManagement and within the WorkflowManagement
  - Minimize the re-doing of the same work

## N.b.: it's NOT simple!

- Technically
- ... and sociologically



# Do we want to run your own mail server?



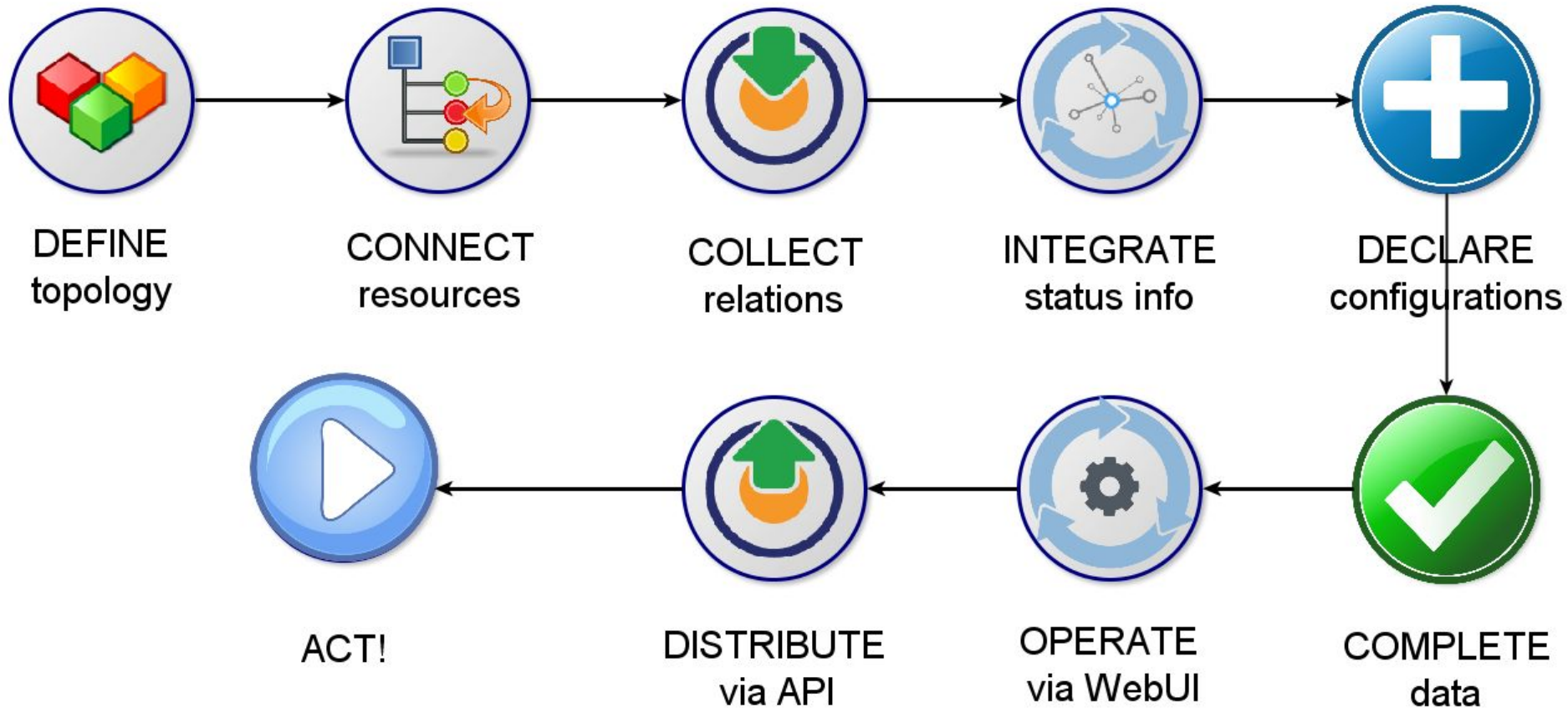
# backup

- .
- .



Computing Resource Information Catalog

Describe the topology of the experiments computing models,  
providing unified description of resources and services used by  
Experiment applications



# IS: a key component of Computing

It does not really matter how big or small an Experiment/Collaboration is

- **An information component/service/system is needed in order to effectively operate and configure computing system:**
  - Proper description of physical Computing resources
  - Proper description of Experiment's Computing Model, its topology and implication to high level applications
  - Integration of configuration and settings of high-level applications and services involved into Distributed Computing
  - Central operation entry point (WebUI portal) for end-users
  - Central data provider (REST-full API) for applications
  - Information protection, authorization, **input data validation**, tracking history of changes, rollback functionality .. user-oriented views ..

# Pledges for Federations

Allows WLCG and Site Managers to review the physical resources pledged up to now

Export Columns Filter Reload Show 100 entries Search:

Regional Center	Accounting name	Tier level	Country	DISK 2017	CPU 2017	TAPE 2017	DISK 2016	CPU 2016	TAPE 2016	DISK 2015	CPU 2015	TAPE 2015	DISK 2014	CPU 2014	TAPE 2014
AT-HEPHY-VIENNA-UIBK	AT-HEPHY-VIENNA-UIBK	3	Portugal	120	1857	-									
AU-ATLAS	AU-ATLAS	2	Australia	1311	17765	-									
BE-TIER2	BE-TIER2	2	Belgium	-	-	-									
BR-SP-SPRACE	BR-SP-SPRACE	2	Brazil	-	-	-									
CA-EAST-T2	CA-EAST-T2	2	Canada	2100	28150	-									
CA-TRIUMF	TRIUMF-LCG2	1	Canada	6800	92100	18800									
CA-WEST-T2	CA-WEST-T2	2	Canada	2100	28150	-									
CH-CERN	CERN-PROD	0	Switzerland	25000	404000	77000									
CH-CHIPP-CSCS	CH-CHIPP-CSCS	2	Switzerland	1800	46200	-	1225	29000	-	1225	29000	-	1142	21400	-
CN-IHEP	CN-IHEP	2	China	400	5780	-	320	5780	-	320	5780	-	70	4800	-
CZ-Prague-T2	CZ-Prague-T2	2	Czech Republic	1800	15000	-	1600	13000	-	1600	13000	-	1600	10000	-
DE-DESY-ATLAS-T2	DE-DESY-ATLAS-T2	2	Germany	2750	37500	-	1770	20700	-	1770	20700	-	1633	15600	-
DE-DESY-GOE-ATLAS-T2	DE-DESY-GOE-ATLAS-T2	2	Germany	1380	18750	-	667	4860	-	667	4860	-	817	6500	-
DE-DESY-LHCB	DE-DESY-LHCB	2	Germany	-	-	-	-	-	-	-	-	-	-	-	-
DE-DESY-RWTH-CMS-T2	DE-DESY-RWTH-CMS-T2	2	Germany	-	-	-	-	-	-	-	-	-	-	-	-
DE-FREIBURGWUPPERTAL	DE-FREIBURGWUPPERTAL	2	Germany	2766	37500	-	1117	9720	-	1117	9720	-	1634	13000	-
DE-GSI	DE-GSI	2	Germany	-	-	-	-	-	-	-	-	-	-	-	-
DE-KIT	FZK-LCG2	1	Germany	8500	97200	22090	4410	53250	8125	4410	53250	8125	4125	44375	5500
DE-MCAT	DE-MCAT	2	Germany	2766	37500	-	1584	13693	-	1584	13693	-	1634	13000	-

Update Regional Center object: AU-ATLAS

RegionalCenter name: AU-ATLAS

Accounting name: AU-ATLAS

Tier level: 2

Country: Australia

Check Input data

- Values extracted from REBUS.
- Possibility to filter values, and search inside the table.
- Federation attributes are editable via form (auth required).

# CRIC - Input Data: WebUI Forms

Define new Site object

Basic relations

Resource Center:

Regional Center name:

Country:

Settings

Alternative Name:

Timezone:

InfoURL:

is pledged:

Object state

Object state:

State comment:

Dynamic Parameters auto collected by GStatLoaderCron from REBUS

Average CPU power per core:

Dynamic Parameters auto collected by OIMGOCDBInfoLoaderCron

status:

cert status:

admin email:

Define new Service obje

Basic relations

Site:

Service type:

Unique Service name:

Info: Keep this field empty to let the system generates default value.

Settings

Architecture:

Implementation:

Description:

is\_virtual:

State settings

Object state:

State comment:

Protocol settings

Endpoint:

Flavour:

GOCDB/OIM Status:

is\_monitored:

Define new CE service

Basic relations

Site:

Service type:

Unique Service name:

Info: Keep this field empty to let the system generates default value.

Settings

Architecture:

Implementation:

Description:

is\_virtual:

State settings

Object state:

State comment:

CE settings

Job manager:

Version:

Protocol settings

Endpoint:

Flavour:

**Site administrators and managers have the possibility to add new physical resources. Same will be possible using a REST API importing objects in JSON format (in development as of now).**