Computing Resource Information Catalogue (CRIC)

The evolution of the ATLAS Grid Information System for other Collaborations

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Worldwide LHC Computing Grid (WLCG)

ATLAS Computing

130 Computing Centers
300PB of storage
(140 disk +160 tape)

150k job slots pledged
(up to **300k** used)

3000 users

WLCG: Challenges

4 Experiments

Different Computing models

Different frameworks for Data & Workflow management

WLCG: Challenges

Variety of GRID Technologies

Different infrastructures, middleware providers

WLCG: Challenges

Variety of Computing Resources

"Standard Grid",
Opportunistic HPC,
Cloud



WLCG: Challenges

4 Experiments

Different Computing models

Different frameworks for Data & Workflow management

Heterogeneous GRID technologies

Different infrastructures, middleware providers

Heterogeneous Compute Resources

"Standard Grid", HPC, Cloud

WLCG Computing: Information component

4 Experiments	Variety of GRID technologies	Heterogeneous Compute Resources

Need for an intermediate middleware system

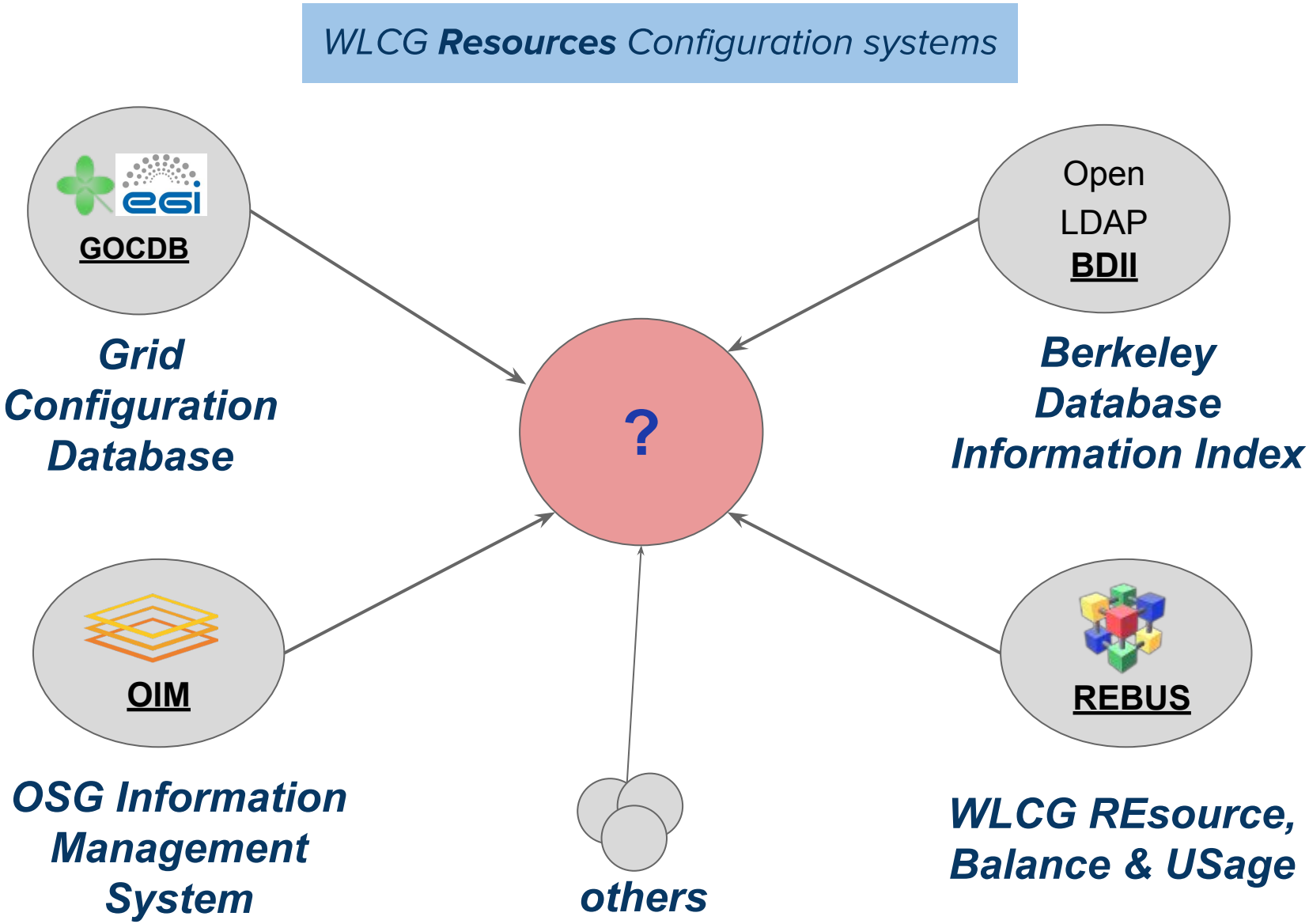
Information component

to describe and link together

all the Computing Resources,

their topology and services.

Information systems and sources: a big world



Experiments tools and services: a big world

Some examples from ATLAS.

ADC services require the diversity of common configurations as well.

ATLAS Data Management System (Rucio)

ATLAS Workload Management System

ATLAS Monitoring tools

DDM Accounting

WLCG Squid monitoring

Pilots, AutoPilot Factories

BigPanda Monitors

Software Installation systems

Testing systems (HammerCloud)

Resources & Services: Gluing the two worlds together

AGIS is the central information system:

- the framework which connects **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,

fitting the needs of all the experiments.

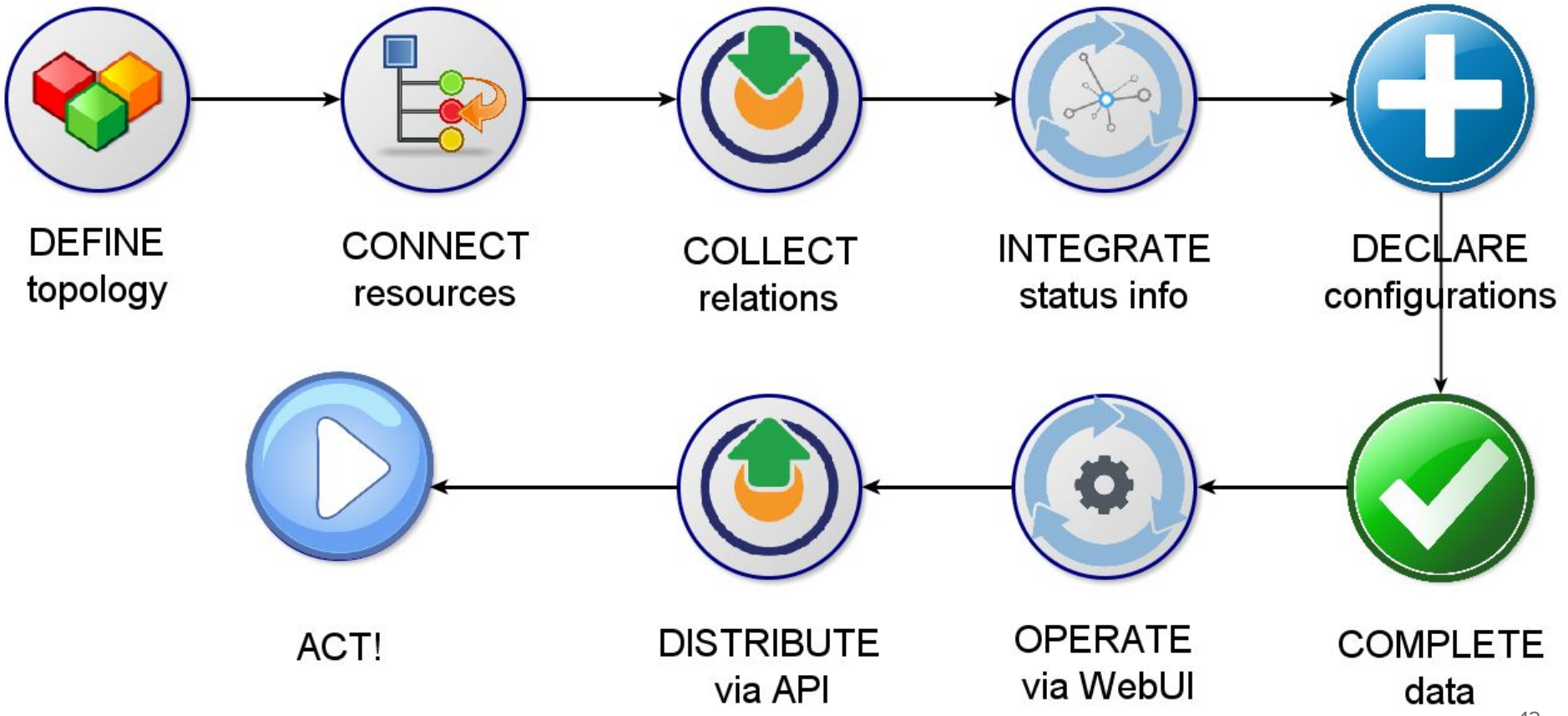
AGIS & CRIC: some history

- ~7 years ago within the ATLAS experiment the ATLAS Grid Information System was firstly proposed.
  - A collaborative project involving several institutes, mainly: BINP, JINR, CERN IT.
  - Several people involved in the course of the years
  - More than 2 years to go from the design phase to production phase
    - Not only technical challenges!
    - Integration into “running” computing system was the challenge
  - In full production as one of the ATLAS critical framework since LHC Run-1
  - mainly ATLAS oriented information system

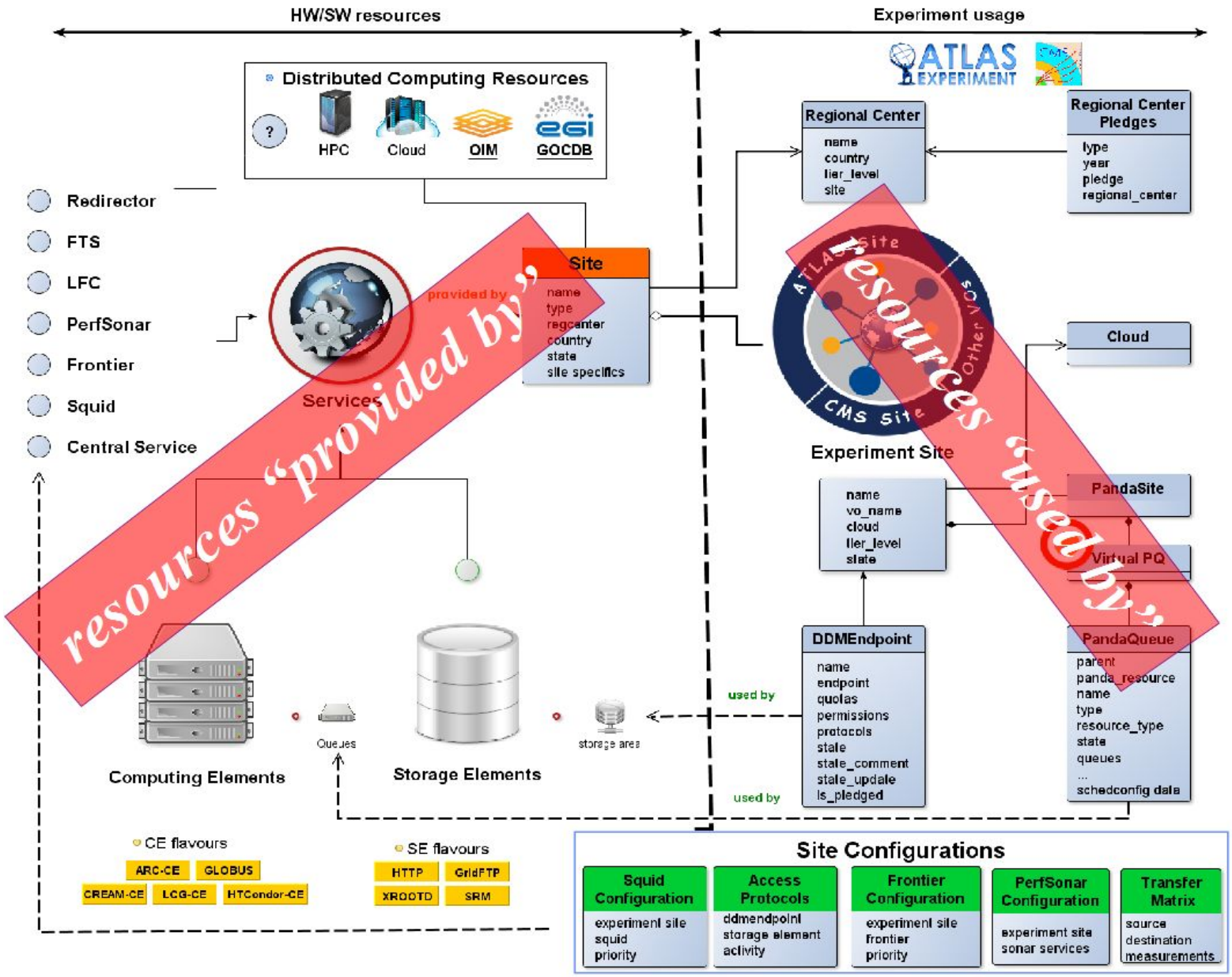
- **CRIC**: Computing Resources Information Catalog
  - Evolution of the AGIS framework
  - Refactoring of AGIS
  - Consolidation of WLCG topology and configurations into single information system
  - Experiment independent.

CRIC (AGIS)

CRIC is the middleware designed to describe the topology of the Computing models, providing unified description of resources and services used by Experiment applications

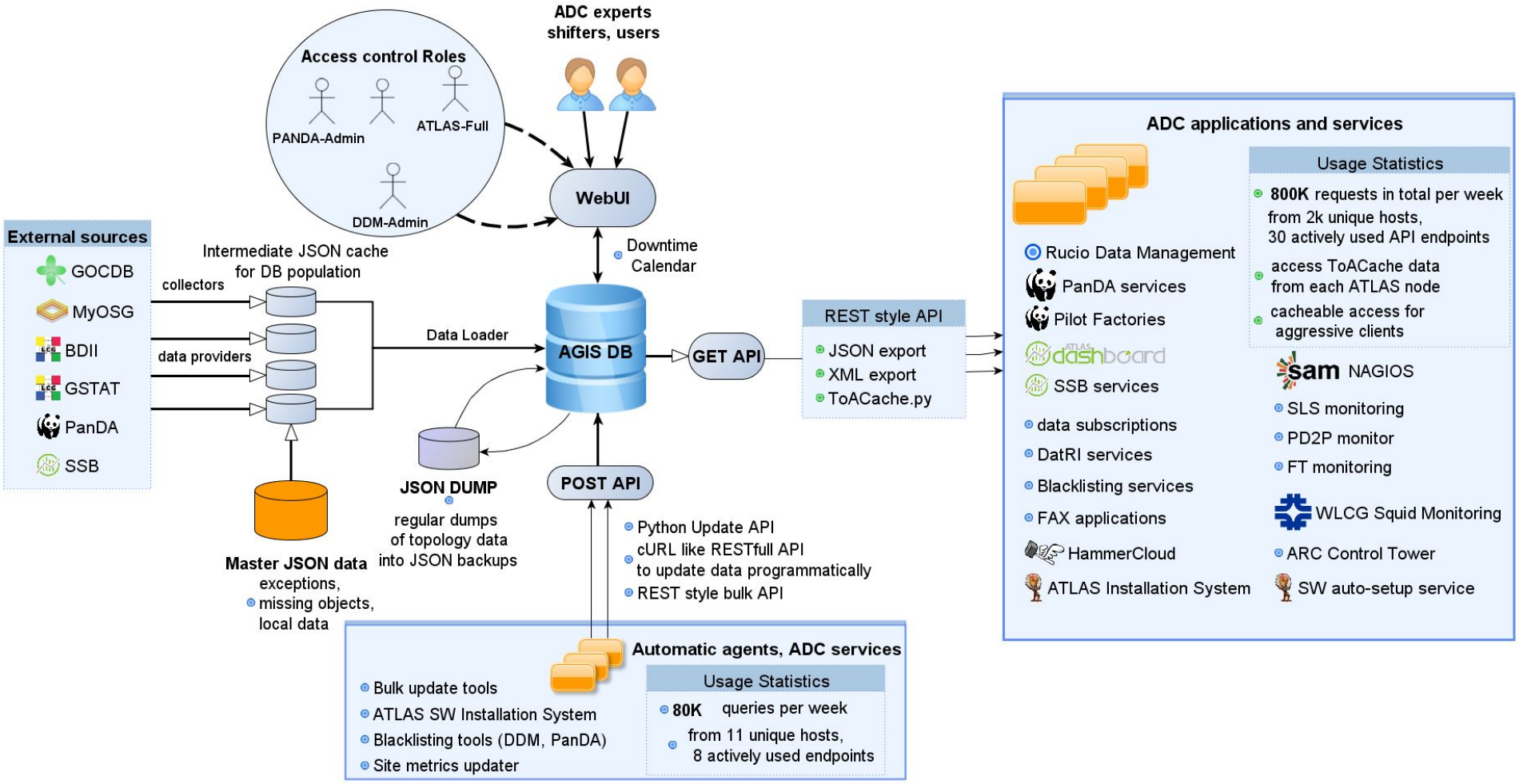


Fundamental concept of the system

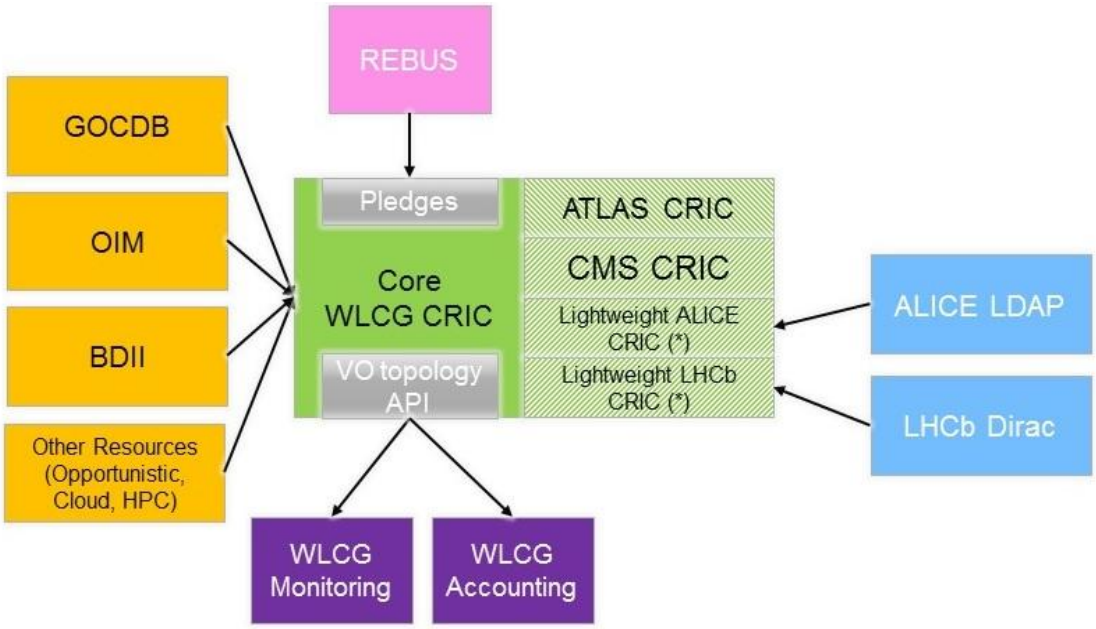


Architecture of the system: Example from ATLAS

General overview of system services and data workflow



Plugin based approach: Experiment CRICs



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

- WLCG Core CRIC
  - Single entry point for WLCG topology and service configuration
  - Consumes information from available information sources
- Experiments CRICs
  - Describes experiment topology
  - Uses core CRIC and adds extra info needed by experiment operations and workflows

- Lightweight CRIC
  - Experiment site names and WLCG site names mapping and information on which resources are used by the experiment
  - It is needed for WLCG monitoring and accounting

Conclusions

- Successful experience in ATLAS Computing with **AGIS** motivated and inspired WLCG community to evolve and consider **CRIC** as a base platform for WLCG Information configuration system

- **CRIC** architecture and core functionalities are focused to cover Experiment needs and cope with requirements from other collaborations. It is not only limited to ATLAS.
  - CRIC will provide a common framework for the description of all WLCG resources and consistent interfaces for the clients from several collaborations.
  - CRIC will offer the possibility to extend the system and implement experiment specific CRIC plugins.
  - Easy and light to integrate by Collaborations thanks to well defined (REST) interfaces.

- Part of **CRIC** tools can be actually shared and centrally managed to minimize support efforts for several Collaborations.
  - Built-in lightweight version of experiment CRIC will be provided for small Collaborations, not even need to host your own full CRIC service.

Thank you for your attention!

References / Useful links

- AGIS
  http://atlas-agis.cern.ch
- Core CRIC
  https://twiki.cern.ch/twiki/bin/view/EGEE/CoreCRIC
- WLCG IS Evolution Task Force
  https://twiki.cern.ch/twiki/bin/view/EGEE/WLCGISEvolution

Information System: Resources & Experiments together

- 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.