GOCDB–4, a new architecture for the European Grid Initiative

Gilles Mathieu, John Casson
STFC, Rutherford Appleton Laboratory

ISGC–2010, Taipei, Taiwan
11th of March 2010
Outline

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  - Context and big picture – Why a new model?
  - Architecture of a GOCDB module
  - Central and regional interactions

- GOCDB-4 model
  - The “PROM” concept
  - Benefits and limitations of the PROM approach
  - Adaptation and specific use in GOCDB-4

- Conclusion
  - Ready for the European Grid Infrastructure?
  - Questions and discussion
Context and big picture

• Did you say GOCDB?
  - GOCDB = Grid Operations Centre DataBase
  - A central (static) information repository
  - Key component of EGEE and WLCG, used as an authoritative data source

• Stores information about (and links together):
  - Regions and countries
  - Sites, nodes and services
  - Users

• Handles:
  - Administrative info (e.g. contacts, names, countries...)
  - Resources and services (service endpoints and types)
  - Maintenance plans and failures (downtimes)
Context and big picture

• Why a new GOCDB?
  • To transform the central operation tool it is now into a tool available both for central and regional purposes.
  • To ensure the new version can work in an EGI/NGI context

• Key principles
  • Keep a central service and propose regional services
  • Build a sustainable regionalised architecture
  • Propose an implementation where nothing exists, work with existing solutions otherwise

• Solution
  • A module, deployable and configurable, to be used as the central service and distributed to the regions that want it
Module architecture

Standard interfaces
- Giving access to the tool to end users and tools
- Allowing modules to communicate with one another

Web services / GUI
- SOAP
- GOCDB-PI
- ActiveMQ
- Portal

3rd party tools
End users

Configurati on
- Allowing large customisation
- Keeping the code generic

XML input / output
- XML I/O
  - Standard and configurable ways to access the data
  - Transparent and independent from actual data schema

PROM database
- A relational model implemented the object way
- Relations are stored as meta-data in the DB itself
- The schema can easily evolve and is completely configurable

Administrator

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Central GOCDB (0) is a repository to access all EGEE/EGI data centrally (read only).

Regions can have their own GOCDB deployed (1), use central GOCDB (2) or use any other tool with similar functions (3).
The PROM concept

• GOCDB schema designed the “PROM” way

Data
- SITES
- SERVICES
- USERS
- CONTACTS
- DOWNTIMES
- ROLES
- DESCRIPTORS

Metadata
- Object types
- Link types
- Objects
- Links

Defines logic entities (site, downtime, user…)
Defines links between logic entities (site to user, downtime to service…)
Gives actual list of objects (site A, user X…)
Gives actual links between objects (site A to user X, downtime D to service S…)

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PROM pro and cons

• Benefits of the model
  – Flexibility: *nothing is really hardcoded*
  – Reusability: *not application specific*
  – Scalability: *easy to extend the model*
  – Modularity: *easy to split the model*

• Downsides and risks
  – Usability: *Not completely intuitive*
  – Coding: *Requires a good abstraction layer*
  – Usage: *Performance risks if badly used*
Adaptation examples

• Improved usability
  – Extensive use of XML configuration files
    • For deploying and maintaining the schema
    • For the queries plan and web interface
  – Encapsulation
    • No need to understand the model to operate it

• Example of model adaptation: Added link cardinality
  – No cardinality
    • Many links allowed for the same child and link type
      – e.g. user to role (and user can have many roles)
  – Simple cardinality
    • Only 1 link allowed for the same child and link type
      – e.g. site to time zone (a site has only one time zone)
  – Complex cardinality
    • Only 1 link for the same child to a parent linked to a “level 2” parent
      – e.g. site to group to group-type (a site can link to many groups, but only to one group of type “Country”)
• Ready for the EGI?
  – Central GOCDB–4 is in production
    • https://next.gocdb.eu/portal
  – Central input system in testing
    • https://gocdb4.esc.rl.ac.uk/portal
  – Regional package released as an RPM
    • http://goc.grid.sinica.edu.tw/gocwiki/GOCDB_Regional_Module_Technical_Documentation
More information

• GOCDB4 architecture
  • http://goc.grid.sinica.edu.tw/gocwiki/GOCDB4_architecture

• GOCDB4 development and plans
  • http://goc.grid.sinica.edu.tw/gocwiki/GOCDB4_development

• PROM (DB model behind GOCDB4)
  • “A pseudo object database model and its applications on a highly complex distributed architecture” by P.Colclough
    IARA/IEEE 1st Conference on Advances in Databases (DBKDA 2009)
    March 1–6, 2009 – Cancun, Mexico

• Questions?
  • Now is a good time to ask!
  • Let’s have a chat during this conference
  • Drop us a line to gocdb-admins@mailtalk.ac.uk