



Science & Technology
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GOADB-4, a new architecture for the European Grid Initiative

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Outline

- GOCDB-4 Overview
 - 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 GOCDDB?
 - GOCDDB = **G**rid **O**perations **C**entre **D**ata**B**ase
 - 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 GOCDDB?
 - 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



3rd party tools



End users



XML I/O

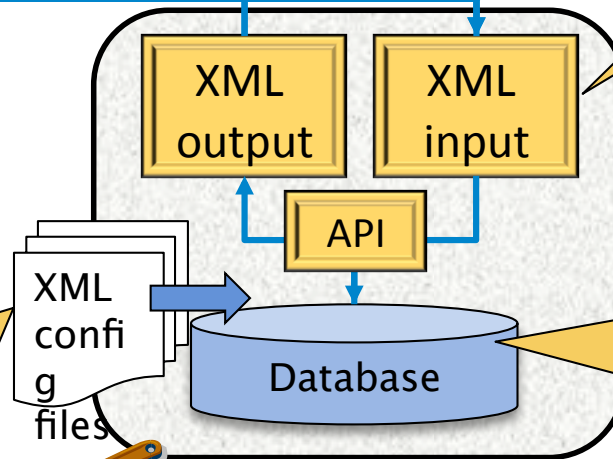
- Standard and configurable ways to access the data
- Transparent and independent from actual data schema

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

Configurati on

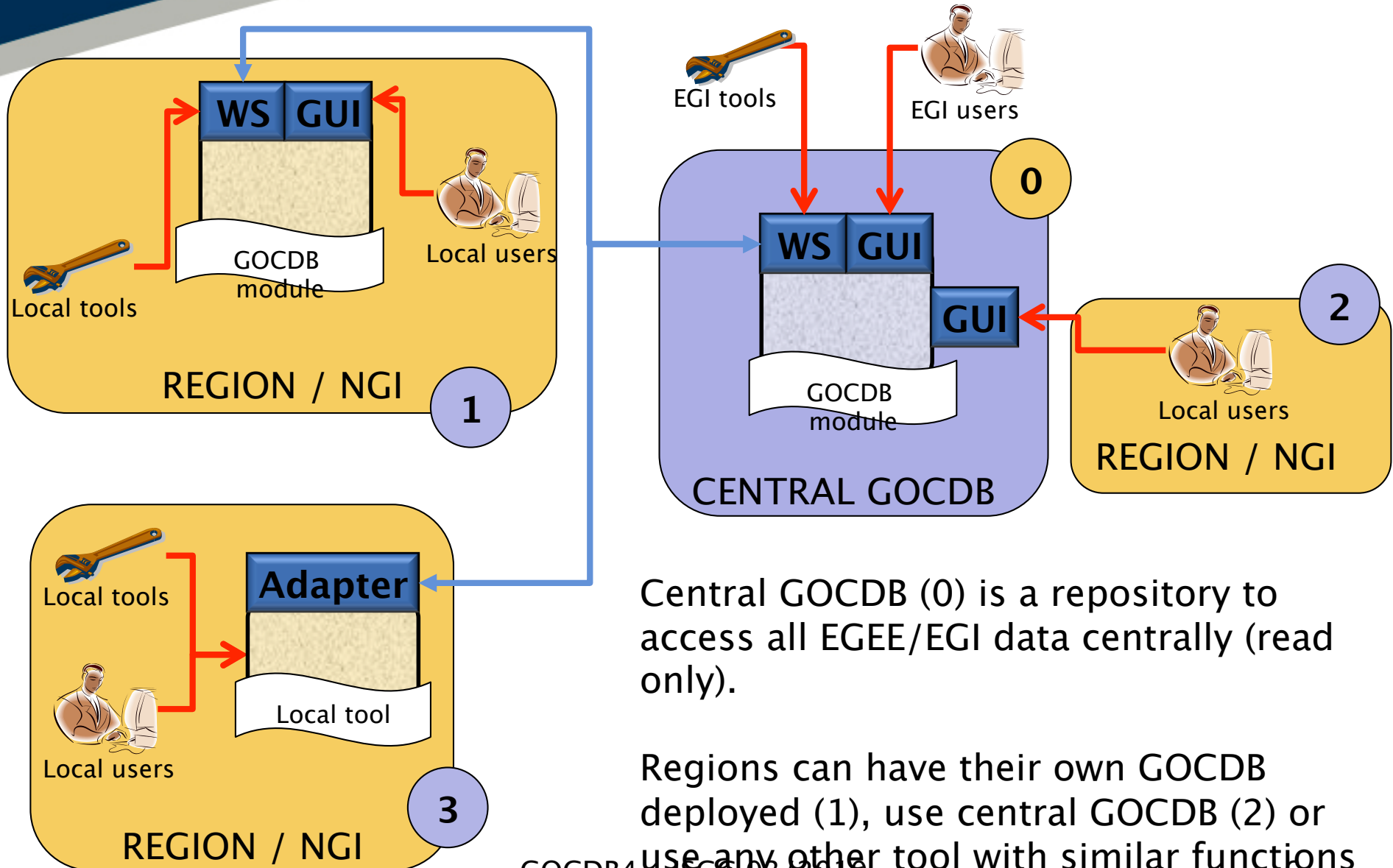
- Allowing large customisation
- Keeping the code generic



Administrator



Module interactions



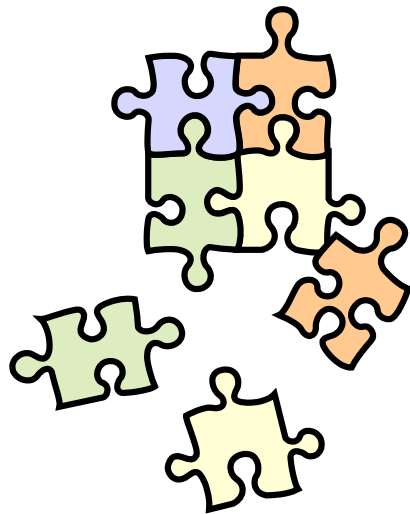
Central GOcdb (0) is a repository to access all EGEE/EGI data centrally (read only).

Regions can have their own GOcdb deployed (1), use central GOcdb (2) or use any other tool with similar functions (3)



The PROM concept

- GOCDDB schema designed the “PROM” way



Data
SITES
SERVICES
USERS
CONTACTS
DOWNTIMES
ROLES
DESCRIPTORS

Metadat
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...)



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”)



Conclusion

- Ready for the EGI?
 - Central GOCDB-4 is in production
 - <https://next.gocdb.eu/portal>  GOCDB4
 - Central input system in testing
 - <https://gocdb4.esc.rl.ac.uk/portal>  GOCDB4
Regional
 - Regional package released as an RPM
 - http://goc.grid.sinica.edu.tw/gocwiki/GOCDB_Regional_Module_Technical_Documentation



More information

- GOCDDB4 architecture
 - http://goc.grid.sinica.edu.tw/gocwiki/GOCDDB4_architecture
- GOCDDB4 development and plans
 - http://goc.grid.sinica.edu.tw/gocwiki/GOCDDB4_development
- PROM (DB model behind GOCDDB4)
 - “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