DORII
Deployment of Remote Instrumentation Infrastructure

VO-aware Monitoring in Grids

MNM TEAM
Munich Network Management Team

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Tobias Lindinger
Ludwig-Maximilians-Universität, München

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e-infrastructure CAPACITIES

Functional Requirements for Grid Monitoring

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- Support for multiple roles due to
  - Different roles need different data
  - E.G. VO users, VO admins, resource admins, GOC…
- Support for VO views due to
  - Security / Privacy reasons
  - Clear arrangement
- Support for multi middleware grids (D-GRID)
  - Multiple middleware Installations on the same physical resource need to exchange data on running jobs, load, percentual utilization, …
- Integration of system monitoring tools
  - Enlarge information that is available via middleware sensors, e.g. Nagios
- History
  - Collect data for accounting purposes, longterm analysis, …

Informational Requirements for Grid Monitoring

- Monitoring of
  - Resources
    - Computing nodes, Storage, …
  - Software
    - Information on installed OS
    - Information on installed applications / libraries
  - Services
    - Availability, QoS
    - Inspection windows
  - VOs
    - Contact
  - ROs
    - Contact

Grid Monitoring Tools

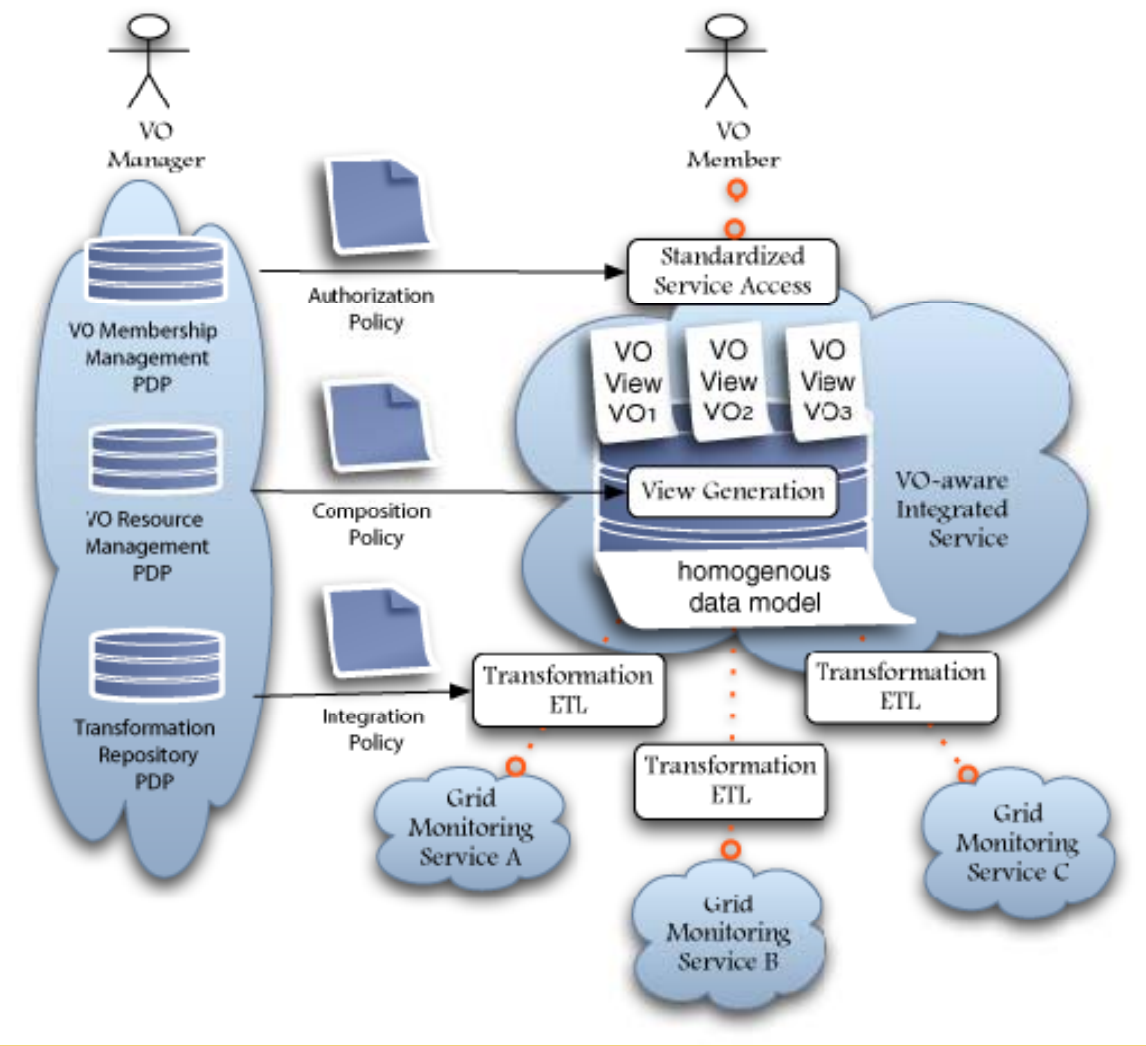
- Globus Toolkit MDS4
  - Based on WS-RF
  - GLUE 1.2
- gLite BDII
  - Based on LDAP
  - GLUE 1.3
- Unicore 6 CIS
  - Based on Exist Database
  - GLUE 2.0
- ...

Comparing Requirements

	MDS4	BDII	CIS
Roles	✗	✗	✗
VO views	✗	✗	✗
Support for multiple middleware	✗	✗	✗
Integration of system monitoring tools	(✓)	(✓)	(✓)
History	✗	✗	✗
Schema	✗	✗	✓

⇨ There is no native monitoring system, implementing all these features!

Architecture for VO-aware Monitoring in Grids



VO User Management
Knows about users and their membership in VOs

VO Resource Management
Knows about resources and VO specific access permissions

Central Monitoring Database
Collects and agregates information

Generation of VO views

Transformation
Adapter to extract, transform and load (store) information

Transformation

- Adapter extracts data from middleware monitoring service
  - wsrf-query (MDS4)
  - ldapsearch -> ldapXML (BDII)
  - ucc showdoc (CIS)
- XML document gets transformed into a mySQL Insert/Update Statement
  - Example for Globus Toolkit MDS4:

```
wsrf-query –a –z none –s myMDS4Adress | xmlproc
mds4.xslt –
```

- Pipe the result to the Database
  - Example for Globus Toolkit MDS4:

```
wsrf-query –a –z none –s myMDS4Adress | xmlproc
mds4.xslt – | mysql GLUE20  $DATABASE --user=$USER --
password=$PASSWORD --host=$HOST
```

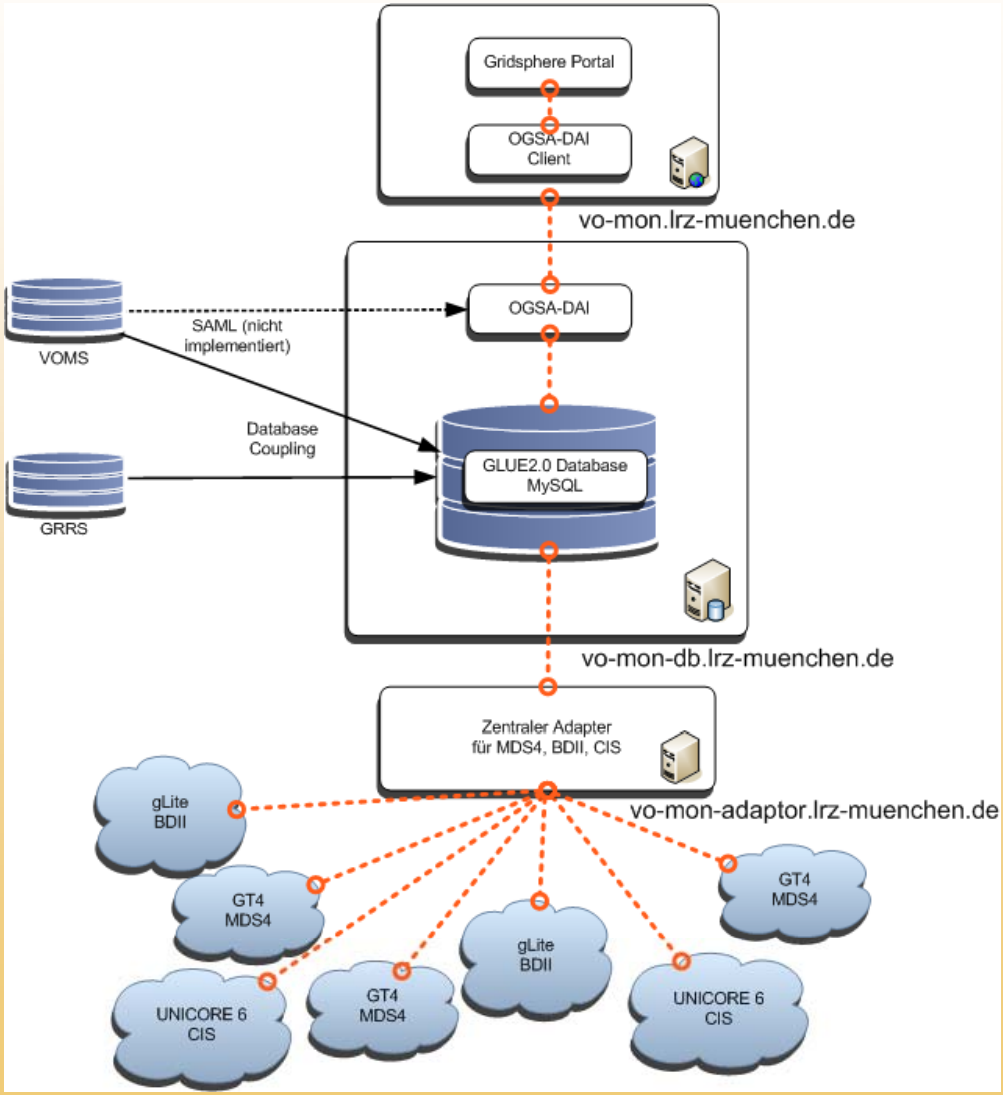
Database

- Schema GLUE 2.0
  - Newest GLUE version
  - CIS is already based on GLUE 2.0
  - Most comprehensive information repository
- MySQL 5.1
  - Support for Federated Databases
    (needed to connect to VO Managament Databases in D-GRID)
    ⇨ Joining of monitoring databases and VO management databases enables creation of VO Views
  - Support for schedules, needed for cleaning the database regulary
  - Generation of parameterized database views is possible
    ⇨ Creating VO aware views is possible by setting a parameter and querying a generic view
  - Free of charge ☺

Service Access Point

- OGSA-DAI 3.1
  - WS-RF enabled standard for accessing databases in grids
  - Authentication / Authorization via SAML-VOMS
    - Integrates seamless into grid infrastructure
    - No need to create additional accounts in mySQL for users
  - Automatically choosing the right VO viewis possible , since the VO parameter can be extracted from SAML Certificate

Implementation in D-GRID



Demo

- OGSA-DAI Command Line Client written in Java for querying the Database in context of the VO AstroGrid (ad)
  - Based on standard OGSA-DAI CLC
  - Extended to set a session parameter in SQL before the ultimate query
  - Example:

```
java DMONSQLClient
-u http://dmondb.lrz-muenchen.de:8080/dai/services/
-d DMONDataResource
   -q "SELECT * FROM ComputingService_VO"
   -v ad
```

⇨ *shows all instances of ComputingService Entries, which can be accessed by a member of VO AstroGrid*

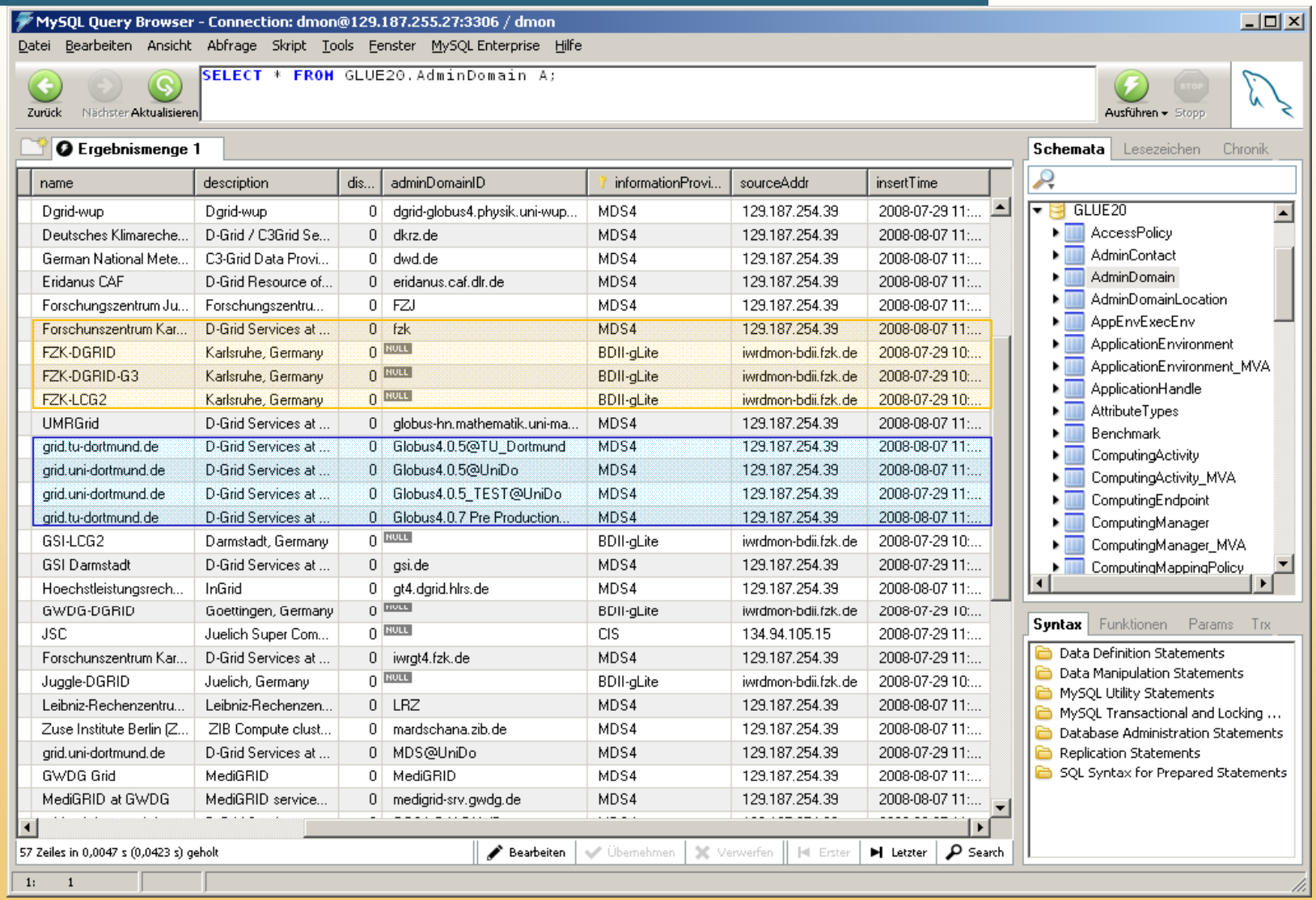
Problems in Real Life

- ROs are independant Organisations
  - Some ROs do not want to give away monitoring /accounting data
  - Some ROs break the naming schema of resources and services

    -> automatic aggregation of resources / services and VO management information becomes impossible

    e.g. Site IDs „LRZ“ and „LRZ-München“ can not be matched
- A list of all native monitoring services has to be created and must be administrated

Problems in Real Life



Experiences

- Misconfigurations and incnosistent configurations can be found, when several monitoring systems report in parallel
- Aggregated information of several native monitoring services is a value added service

Future Work

- Integrate even more monitoring tools and services
- Create History of Data
  - Can be done easiliy by a trigger
  - Which data should be archived? Which one mustn‘t due to legal regulation?

The End

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Questions?