

Reliable Grid Information Database (RGID) & the Jawari interface

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Agenda

- RGID
 - D-GRDL, database, portlets, architecture
- RGID interfaces
 - HW, SW, User?, VO?, Testcase
 - Cluster monitoring tools
 - Grid information services
- RGID Jawari interface

Reliable Grid Information Database

- based on the description language D-GRDL
- support for scheduling in MediGRID and Instant-Grid
- local resource sensor
- remote information/monitoring service interpreter
- backend: native XML database
- frontend: RGID-Portlets
- previous work: GRDB (Alexander Willner [2]), R-GRDB [5]
- not an other monitoring tool ☺

D-GRDL

D-Grid Resource Description Language

- Syntax & Schema [1] (D-Grid download area)
- Contact: Fraunhofer FIRST (Dr. Armin Wolf & Andreas Hoheisel)

Motivation:

- describe resources of different grid infrastructures (using the same form)
- store constant data
- resource aggregation

Using D-GRDL for:

- resource matching
- resource mapping
- storing and updating data
- integrity checking
- query and response language

D-GRDL datatype

Basic type:

- bool: true, false
- int, long: 1, 2, 1.2345
- string: „Grid resource 01”
- date: 26-05-2008
- time: 16:45:00, UTC 16:45:00+2:00
- uri: URL, URN

Compound type:

- GLUE Schema: Properties (type postfix: _t)


```
<simpleProperty ident=„Load" type=„Load_t">
  <field ident=„Last1Min" type=„int" unit=„percent">99</field>
  <field ident=„Last5Min" type=„int" unit=„percent">99</field>
  <field ident=„Last15Min" type=„int" unit=„percent">2</field>
</simpleProperty>
```

D-GRDL hardware resource

Describing the grid host: grid-01.domainname.org

```
<resource uri="hardware:grid-01.domainname.org">

  <ofClass uri="urn:dgrdl:hardware"/>

  <name>grid-01</name>
  <description>this is a grid resource</description>

  <provides>
    <resourceRef uri="software:applicationA"/>
    <resourceRef uri="software:applicationB"/>
    <resourceRef uri="software:applicationC"/>
  </provides>

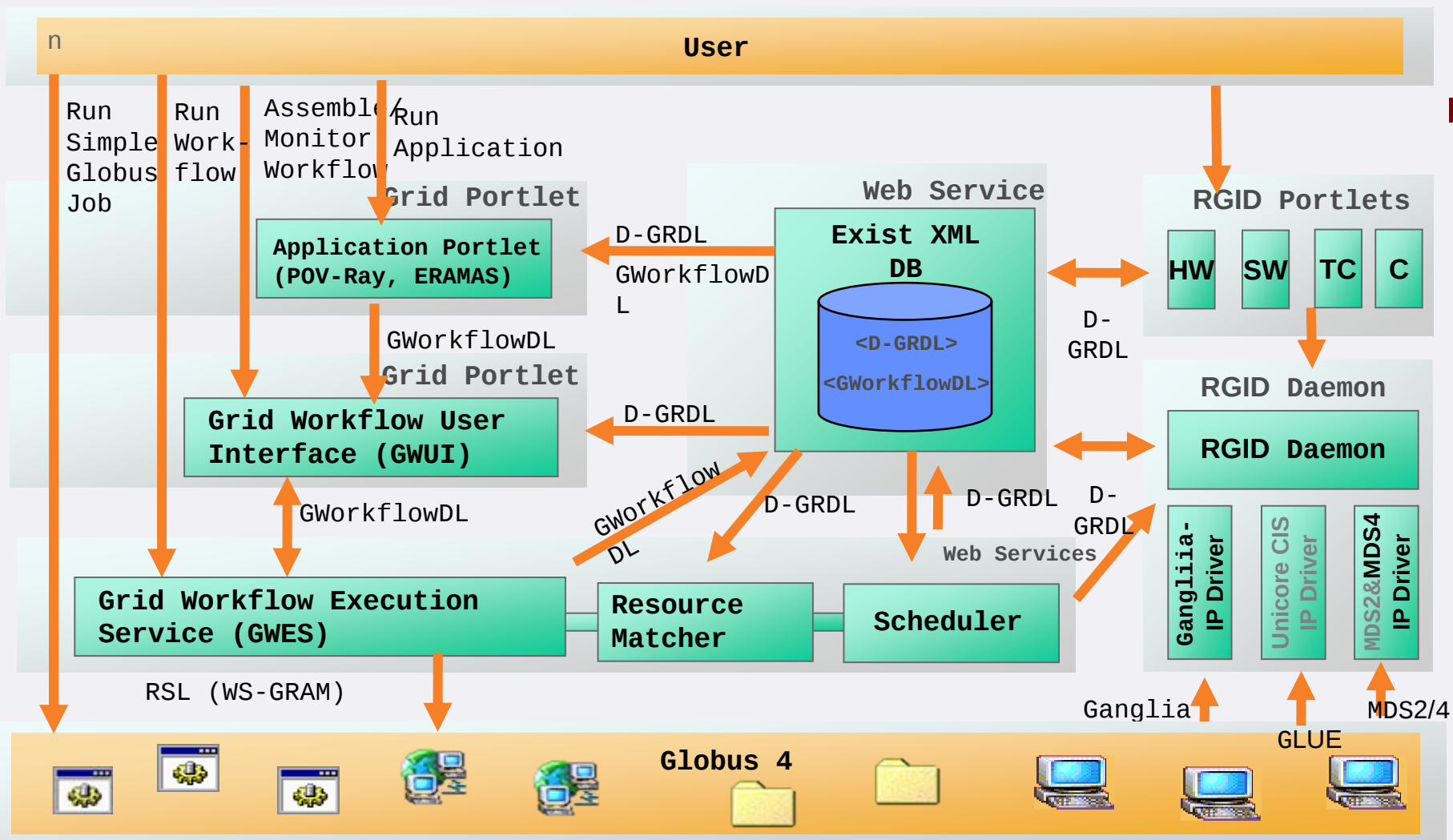
  <simpleProperty ident="WSRF.ManagedJobFactoryService" type="uri" unit="">
    https://server:8443/wsrf/services/ManagedJobFactoryService
  </simpleProperty>
  <simpleProperty ident="cpucount" type="int" unit="pcs">8</simpleProperty>
  <simpleProperty ident="cpuload" type="int"
    unit="percent">10</simpleProperty>
  ...
</resource>
```

RGID components

The main RGID components are:

- Backend
 - Information, data store
- Frontend
 - Portal + portlets
- Daemon
 - Interfaces
 - Collecting and processing data

RGID + Scheduling



Native XML Database

- eXist
- MediGRID: central resource database
- (also the workflow database)
- Data not archived at the moment
- D-GRDL format

- Portal based
- JSR-168 Portlets
 - Hardware resources
 - Software resources
 - Test definitions
 - Daemon configuration

■ Portlets

The screenshot displays the RGID daemon interface, which is a web-based tool for monitoring and managing grid resources. The interface is divided into several sections:

- Available hardware resources:** A table listing various grid nodes with their names, CPU counts, and memory usage. A yellow callout labeled "Resource List" points to this section.
- RGID daemon:** A central panel for configuring the daemon, including fields for the URL, update interval, and live data refresh. A yellow callout labeled "RGID daemon" points to this section.
- Information Provider configuration:** A section for configuring the information provider, including a dropdown menu for the provider and a "Change the provider" button. A yellow callout labeled "Interface" points to this section.
- XML Database:** A section for configuring the XML database, including a field for the XML database URL and a "Set new collection" button.
- Tested resources:** A section showing a list of tested resources, including their names, descriptions, and various performance metrics. A yellow callout labeled "Tested resources" points to this section.
- GWDG D-Grid1 resource:** A section showing a detailed view of a specific resource, including its name, description, and various performance metrics. A yellow callout labeled "GWDG D-Grid1 resource" points to this section.

The interface also includes several charts and graphs, such as a bar chart showing CPU load over time, a pie chart showing memory usage, and a line graph showing file system usage.

Different modes of operation:

- local resource sensor
- remote information/monitoring service interpreter

Output:

- D-GRDL

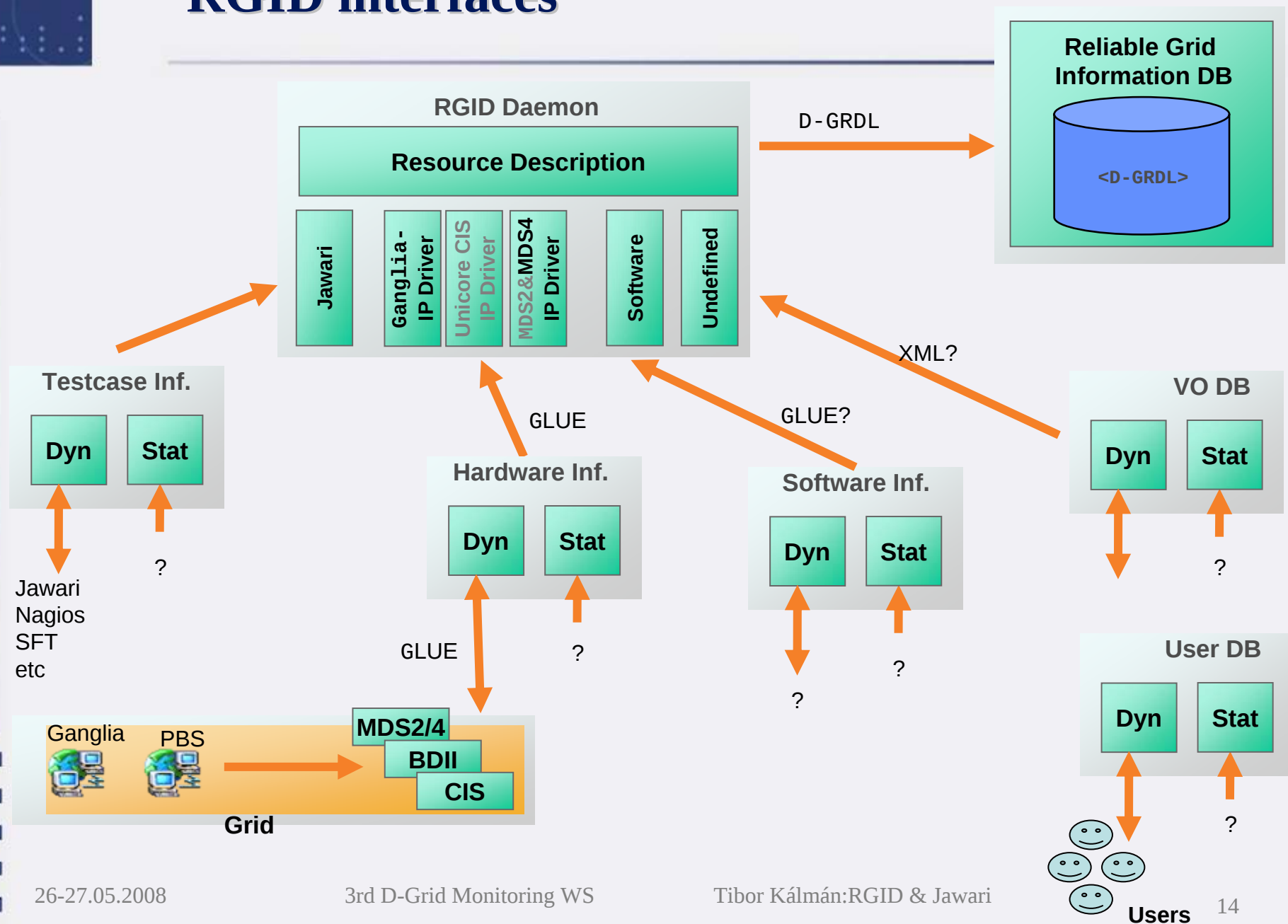
Input:

- different interfaces

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RGID interfaces



RGID Jawari interface

RGIDJawari

- Jawari grid benchmarking [4]
- Using the suggested Jawari client API (Java)
 - `interface.client = JawariClient.newInstance();`
- Jawari user authentication:
 - `client.login();`
 - `client.logoff();`
- 2 already implemented important function:
 - the **last timestamp** of a service benchmark
 - the **last result** of a service benchmark execution
- Interoperability:
 - naming convention
 - philosophy

Latest timestamp of a service benchmark

Get the latest timestamp of a service benchmark:

```
/**
 * Returns the latest timestamp when the informed benchmark type
 * was executed for the informed service.
 * @param uri          the service URI.
 * @param benchmarkType the benchmark type.
 * @return the execution timestamp.
 */

public Date getLatestTimestamp(String uriService,
    BenchmarkType benchmarkType) {
    EvaluationResult evaluationResult =
        client.getLatestEvaluationResult(scheduleName);
    Evaluation evaluation =
        evaluationResult.getEvaluation();
    return evaluation.getLatestUpdate();
}
```

- Static Single Task benchmark
- The benchmark must be registered in Jawari

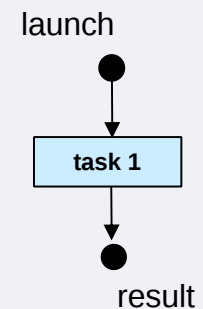
Last benchmark result

Get the last result of a service benchmark:

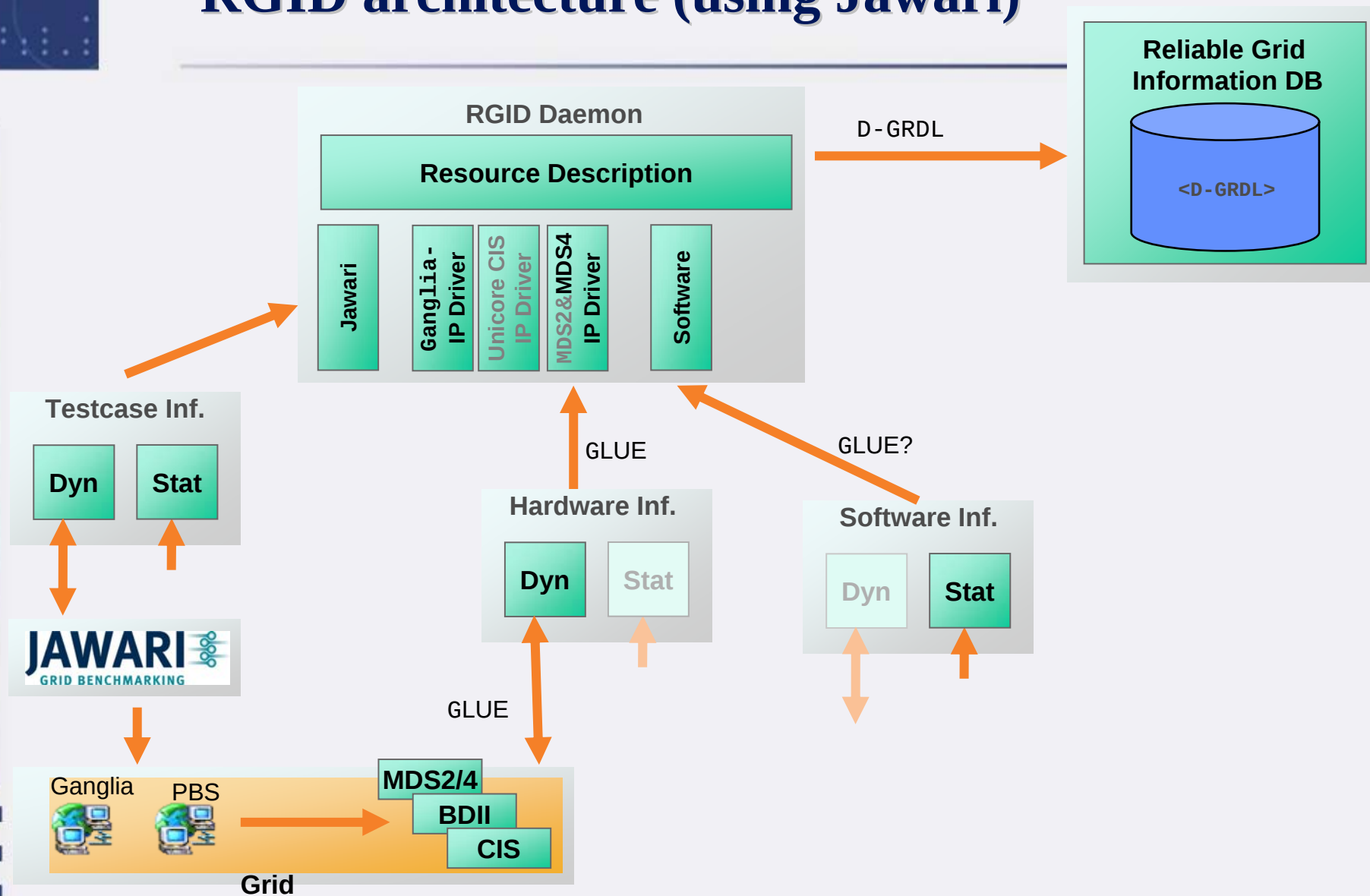
```
/**
 * This returns with the latest test result for one host (execution status of
 * a service benchmark)
 * @param uri          the service URI.
 * @param benchmarkType the benchmark type.
 * @return "OK" if the benchmark execution was successful; the error message
 * otherwise..
 */

public String getLatestTestResult(String uri, BenchmarkType benchmarkType) {
    Set<BenchmarkResult> results = getLatestBenchmarkResults(uri, benchmarkType);
    BenchmarkResult latest = results.iterator().next();
    if (latest instanceof FailureResult) {
        FailureResult failure = (FailureResult) latest;
        return failure.getErrorMessage();
    } else {
        return OK_EXECUTION;
    }
}
```

- Static Single Task benchmark
- The benchmark must be registered in Jawari



RGID architecture (using Jawari)



Bibliography

- [1] Armin Wolf: Spezifikation der D-Grid-Ressourcenbeschreibungssprache D-GRDL. Technical report, Kern-D-Grid, FG 2–4, Fraunhofer FIRST, 2007.
- [2] Alexander Willner: Entwurf und Implementierung einer Ressourcen-Datenbank für das Instant-Grid-Projekt der GWDG. Masterarbeit im Studiengang Angewandte Informatik, ISSN 1612-6793, Nummer ZFI-BM-2006-36 (2006)
- [3] Andreas Hoheisel: Grid Workflow Description Language, <http://www.gridworkflow.org/>
- [4] Ely de Oliveira: Jawari Grid Benchmarking, <http://www.jawari.net/>
- [5] Tibor Kálmán: D-Grid Resource Description Language and Reliable Grid Resource Database, 2nd D-Grid Monitoring Workshop, 2007.