

WP4 Fabric Management

3rd EU Review



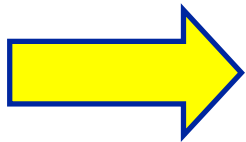
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Outline



- ◆ Objectives from the technical annex
- ◆ Achievements: summary of WP4 products
- ◆ Lessons learned
- ◆ Future
- ◆ Exploitation
- ◆ Questions

“To deliver a computing fabric comprised of all the necessary tools to manage a center providing grid services on clusters of thousands of nodes.”



- **User job management (Grid and local)**
- **Automated management of large clusters**

WP4 Architecture concepts

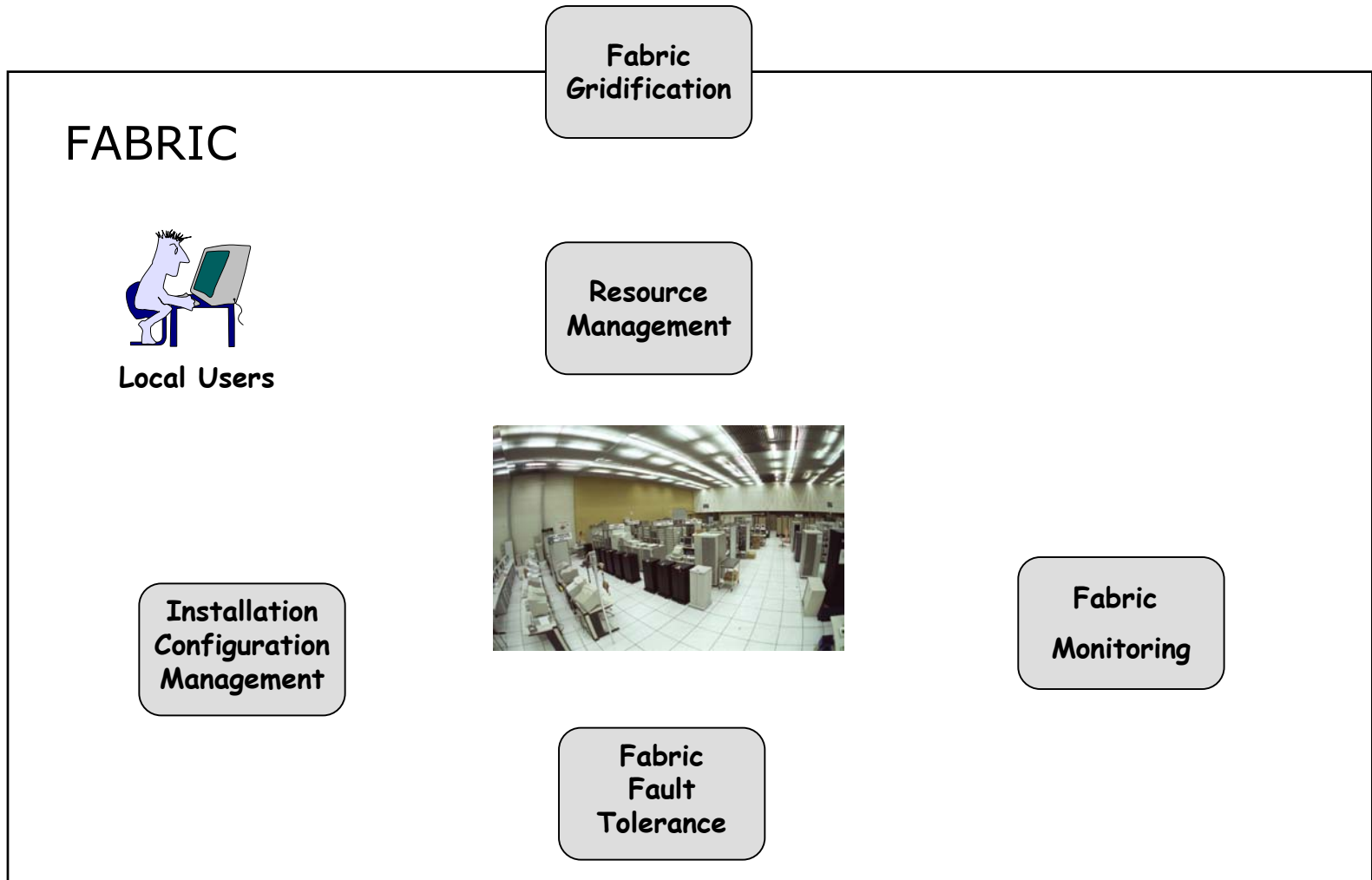


- ◆ **Modularity.** Open interfaces and protocols
- ◆ **Scalability.** Thousands of machines
- ◆ **Automation.** Minimize manual interventions
- ◆ **Node autonomy.** Operations are handled locally whenever possible
- ◆ **Site autonomy.** A site must keep control of its local resources

Fabric Management

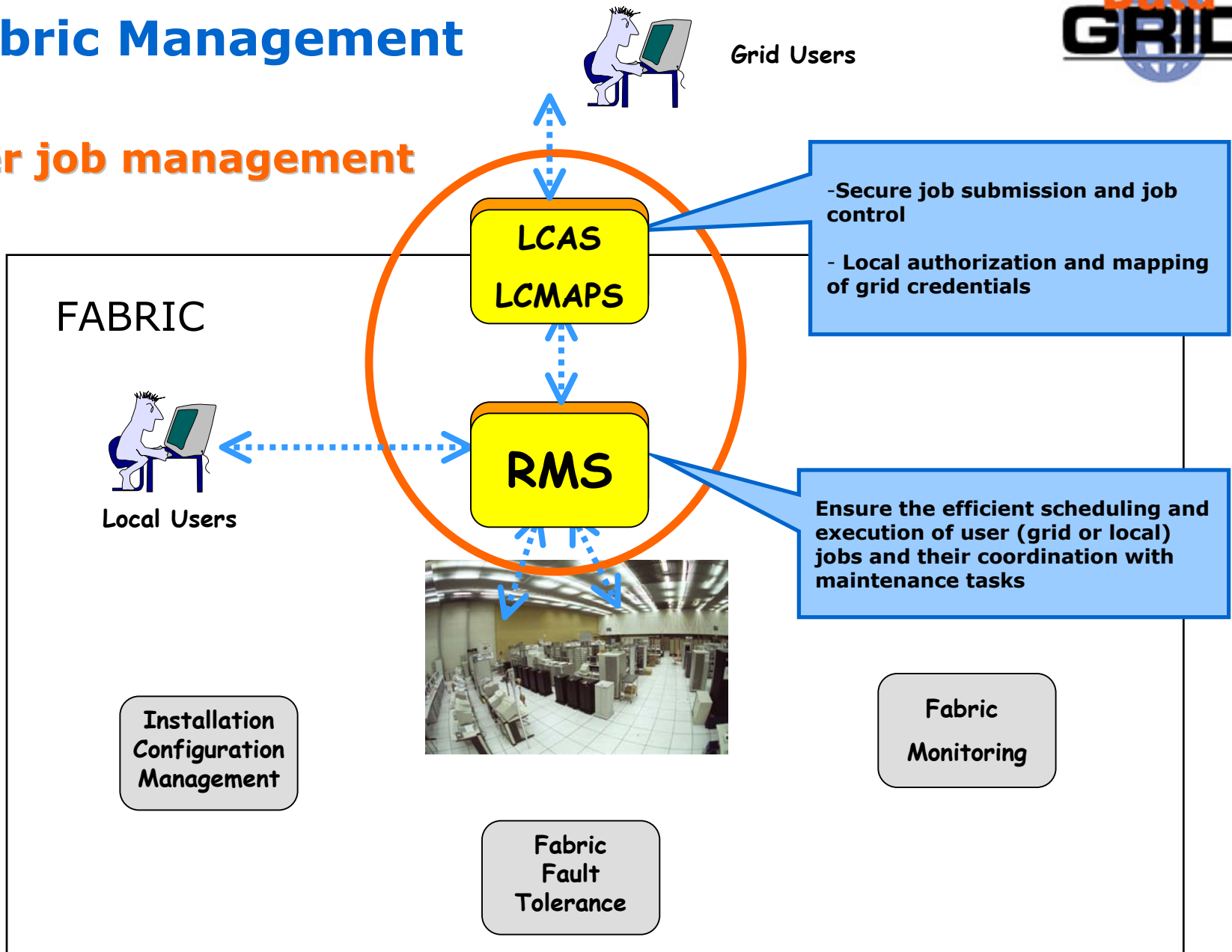


Grid Users



Fabric Management

User job management



Fabric Management



Grid Users

-Fabric wide CDB provides central storage and management of all fabric configuration information

-Subsystems running on the nodes take care of managing software packages and configuring local services

-Framework for automatic fault detection and correction

- Correlation Engines regularly check the monitoring data

-If data is not between defined limits, they trigger alarms or recovery actions

Fabric Gridification

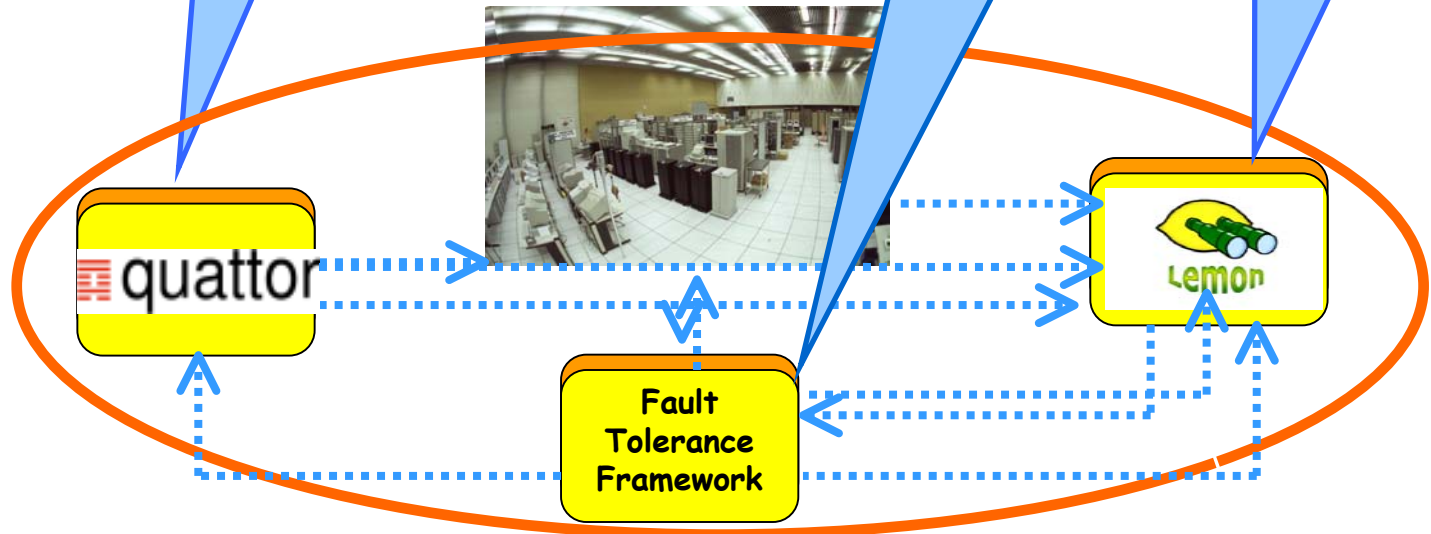
Resource Management

Automated management of large clusters

FABRIC



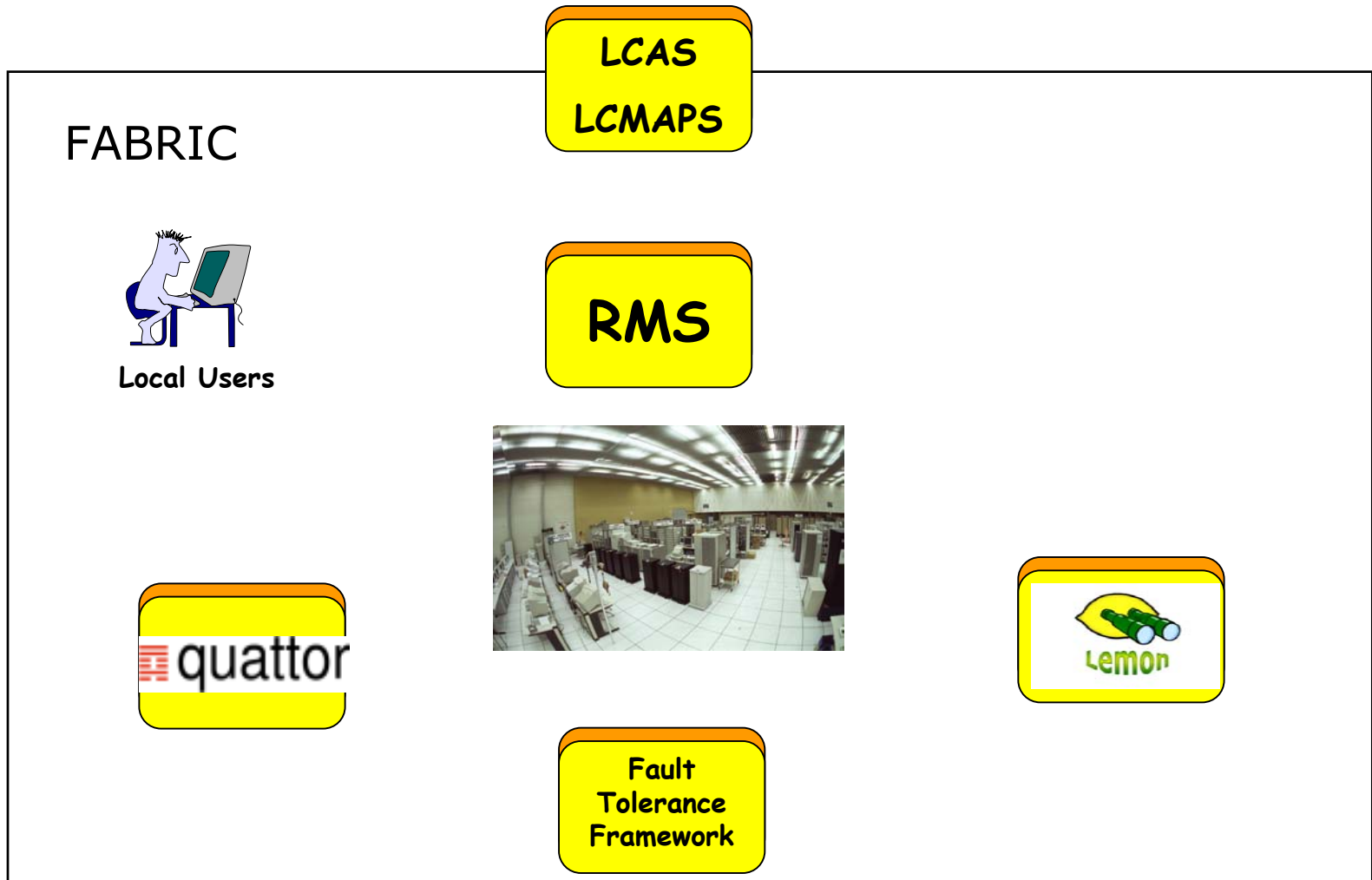
Local User



Fabric Management



Grid Users



Lessons learned

- ◆ Fabric Management components are not grid components themselves but they are essential for a working grid.
- ◆ Fabric management components need to be deployed, stabilized and understood by system administrators before the rest of the middleware components
- ◆ Experience and feedback with existing tools helped to get requirements and early feedback from users and site administrators

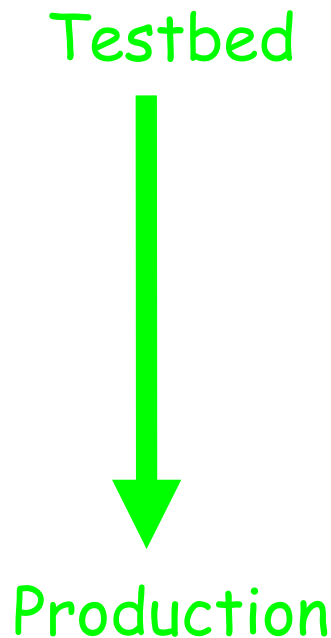
But interim solutions tend to live longer than expected!

Lessons learned

- ◆ There is a real need to be able to install, configure and manage the **small-medium-big** sites (complexity is the same!)

- ◆ Sites find it very difficult to change fabric management framework:
 - It implies **learning** a new framework: new procedures, new tools
 - It has to **coexist with legacy tools**, services and procedures, hence it has to be **modular** and with very clean interfaces so they can be incrementally replaced
 - The EDG sites were **testbeds**, where tools and procedures could be imposed. This is not the case for **production** sites

Move from testbeds to production fabrics



- ◆ Functionality
 - Performance and scalability

- ◆ Simplification, Automation
 - Focus on providing a service
 - Process and procedure
 - Availability and reliability
 - Stability and robustness


Future



- ◆ **Gridification**: evolution in the directions marked by GGF for authorization and authentication
 - The support and extension will be undertaken by EGEE
- ◆ **RMS**: Evolution for data aware scheduling in clusters
- ◆ **EDG-LCFGng**: No support after the end of the project. Replaced by quattor, the final solution for installation and configuration mgt
- ◆ **Quattor**:
 - Security enhancements (e.g. fine-grained authorization access to CDB, data encryption)
 - Porting to Solaris and to future RH versions or other Linux distributions
- ◆ **Lemon**:
 - Displays/GUIs
 - Port to other platforms (Solaris, Windows)
- ◆ **Fault Tolerance**:
 - User FT API
 - Port to other platforms

Exploitation

WP4 products have been deployed within the EDG testbed and within other production sites and Grid projects/environments:

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- A light gray world map with small black squares indicating the locations of various grid projects across North America, Europe, and Asia.
- ◆ LHC Computing Grid project (LCG)
 - ◆ CrossGrid project
 - ◆ GridIce project
 - ◆ Virtual laboratory for E-science project
 - ◆ FlowGrid project
 - ◆ INFN grid project
 - ◆ CERN Computing Centre (~2000 nodes)
 - ◆ Universidad Autonoma de Madrid (Spain)
 - ◆ University of Liverpool (UK)
 - ◆ NIKHEF (The Netherlands)
 - ◆ LAL (Orsay, France)
 - ◆ ZIB (Berlin, Germany)
 - ◆ KIP (Heidelberg, Germany)
 - ◆ Fermilab (U.S.)
 - ◆ BARC (India)

Exploitation

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- ◆ LHC Computing Grid project (LCG)
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These deployments will ensure the maintenance and evolution of the WP4 framework after the end of the DataGrid project

- ◆ INFN grid project
- ◆ ZIB (Berlin, Germany)
- ◆ KIP (Heidelberg, Germany)
- ◆ Fermilab (U.S.)
- ◆ BARC, India

Summary



- ◆ WP4 has delivered a complete and evolvable fabric management framework
- ◆ Initial deployments at production sites show that the framework is accepted
- ◆ The growing user community will ensure the continued existence of the WP4 fabric management framework after the end of the DataGrid project

WP4 release schedule

