

# TOMAS<sup>3</sup>: **T**owards an **O**pen **M**anagement **A**rchitecture for **S**ystems, **S**oftware and **S**ervices

Applications to the Management of Grid  
Computing Fabrics

Rafael Garcia Leiva  
R&D Manager  
Andago Ingenieria  
rafael.garcia@andago.com

- ◆ Management of Distributed Networks
- ◆ Management of Grid Computing Fabrics
- ◆ TOMAS<sup>3</sup> Project
  - ◆ Consortium
  - ◆ History
  - ◆ Functionality
  - ◆ Design Guidelines
  - ◆ Roadmap
- ◆ TOMAS<sup>3</sup> and EGA Reference Model
- ◆ TOMAS<sup>3</sup> and Object Web Middleware
- ◆ Conclusions

## Different types of Hardware

- ♦ workstations
- ♦ computing nodes
- ♦ database servers
- ♦ network servers
- ♦ backup servers
- ♦ ...

## Highly dependent components

- ♦ Example: The upgrading of a file server requires to reconfigure the clients to use an alternate server

## Common Problems

- ▶ software upgrades
- ▶ security incidents
- ▶ hardware and software failures (ex. during installation)
- ▶ the lack of skilled system managers
- ▶ ...

## Common Solutions

- ▶ Installation and configuration by hand (very expensive, error prone, ...)
- ▶ Home-made tools (incomplete, not flexible, ...)
- ▶ A combination of existing tools: management (ex. Cfengine), installation (ex. kickstart), image cloning (ex. SISimage), and so on.

## Grid middleware is difficult to install and configure

- ◆ Example: A minimal installation of LCG middleware requires to read and understand at least five manuals
- ◆ Example: How do we install a cluster of 100 nodes?

...

## Grid computing requires very stable environments and correctly configured

- ◆ Example: Problems due to security holes
- ◆ Example: A misconfigured Grid site could cause the overall fail of the global Grid!

◆ ...

## The rules to be part of a Grid are very strict

- ◆ Example: Continuous upgrades of the operating system and Grid middleware
- ◆ Example: quick answers to problems

◆ ...

These problem are common to all kind of centers, with independence of its size

Small and medium sites do not have the skilled people, the procedures, and the necessary tools to install and properly configure a Grid environment

Configuration mistakes are the **number one problem** of current Grid environments in production!



An open source toolsuite for the management of large distributed networks

## **TOMAS<sup>3</sup> is:**

- An Open Architecture that provides the basis where you can integrate other already existing management products.
- A middleware that you can use to develop your own customized management solutions.
- A production quality product that you can use to manage your own distributed network



Project Leader  
Research & Development



Pilot Scenario: Retail



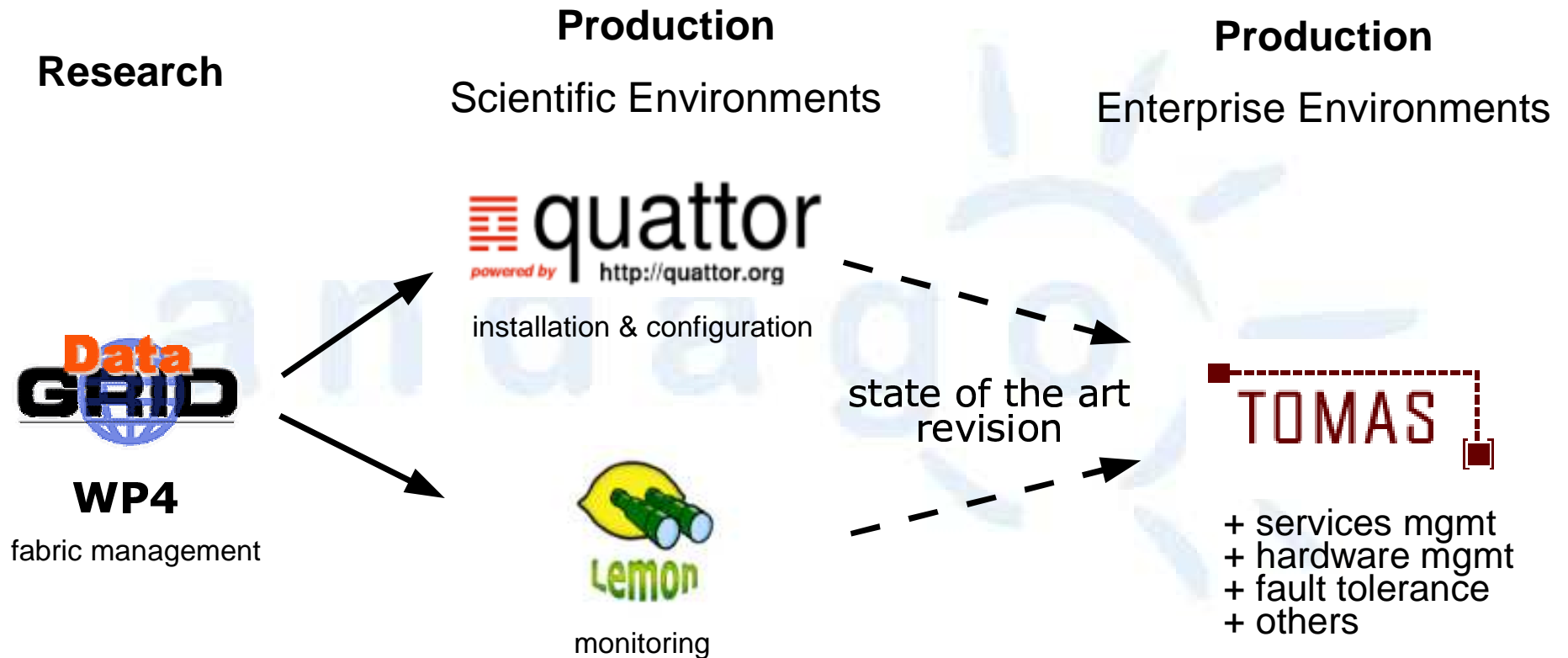
Distributed Systems Laboratory  
Research & Development

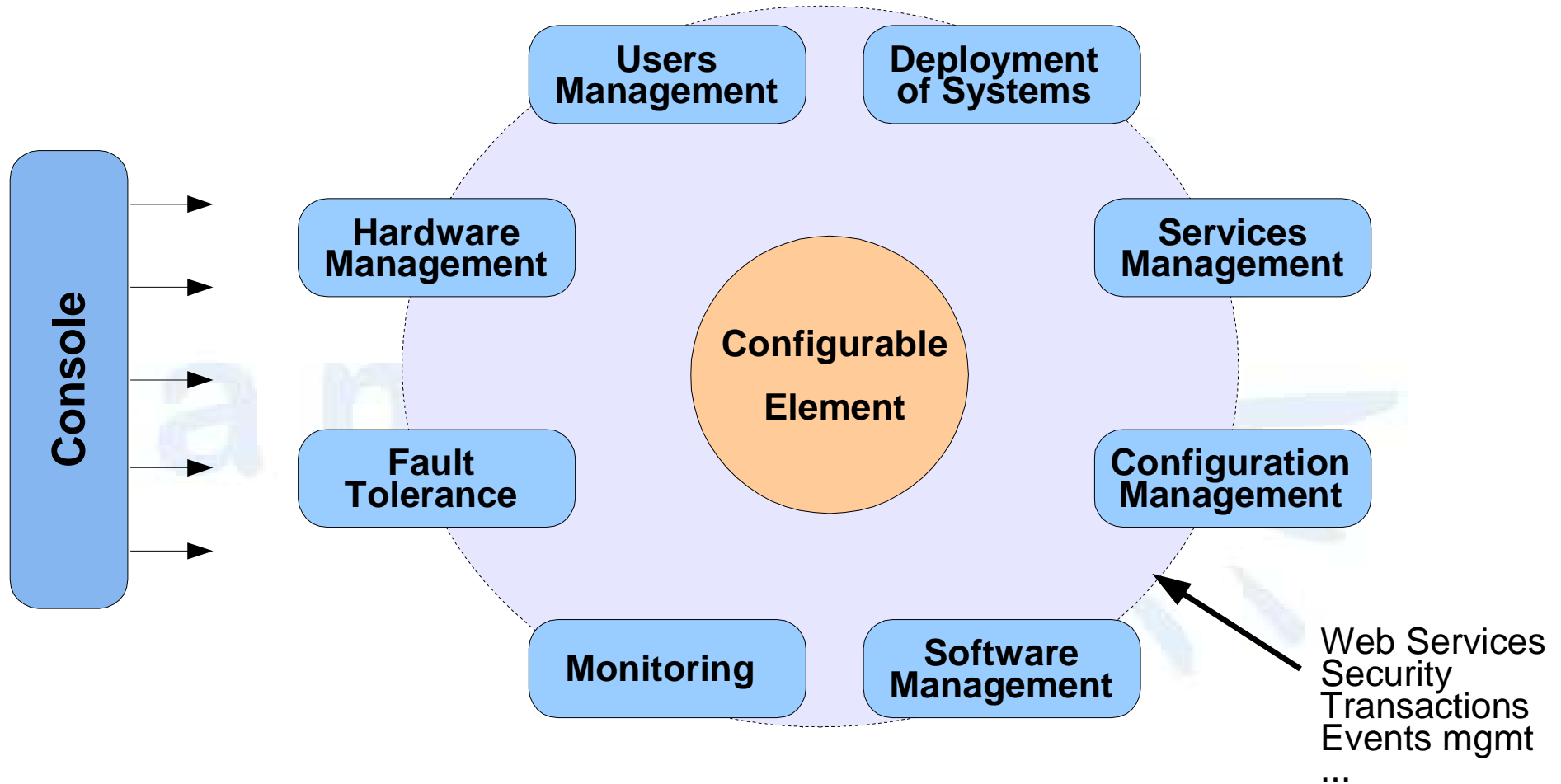


Linux Reference Center  
Pilot Scenario: Industry

Funded by:

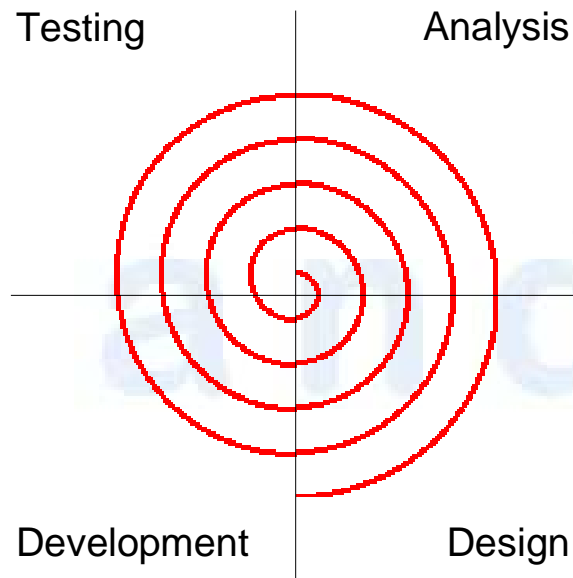






- ◆ Based on a SOA architecture (Web Services)
- ◆ Interoperable with other management toolsuites
- ◆ Comply with management standars
- ◆ Flexible architecture, adaptable to changes
- ◆ Reuse of existing tools (easier maintenance)
- ◆ Distributed design, with a reliable architecture
- ◆ Scalable up to thousands of nodes
- ◆ Every element in TOMAS<sup>3</sup> is optional and can be replaced

## Spiral Development Model



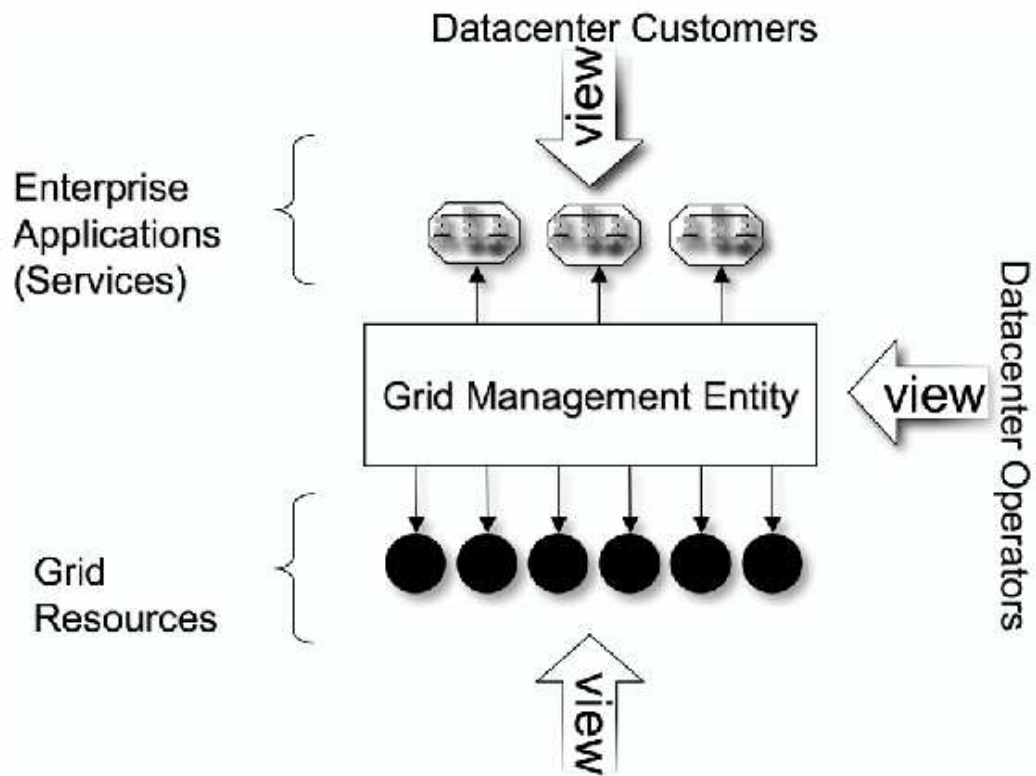
### Cycle 0:

Start: 1 December 2005  
 Alpha: April 2006  
 Beta: May 2006  
 Release: End of May 2006

### Cycle 1:

Start: June 2006  
 Alpha 1: September 2006  
 Beta: October 2006  
 Beta 2: November 2006  
 Release: End of 2006

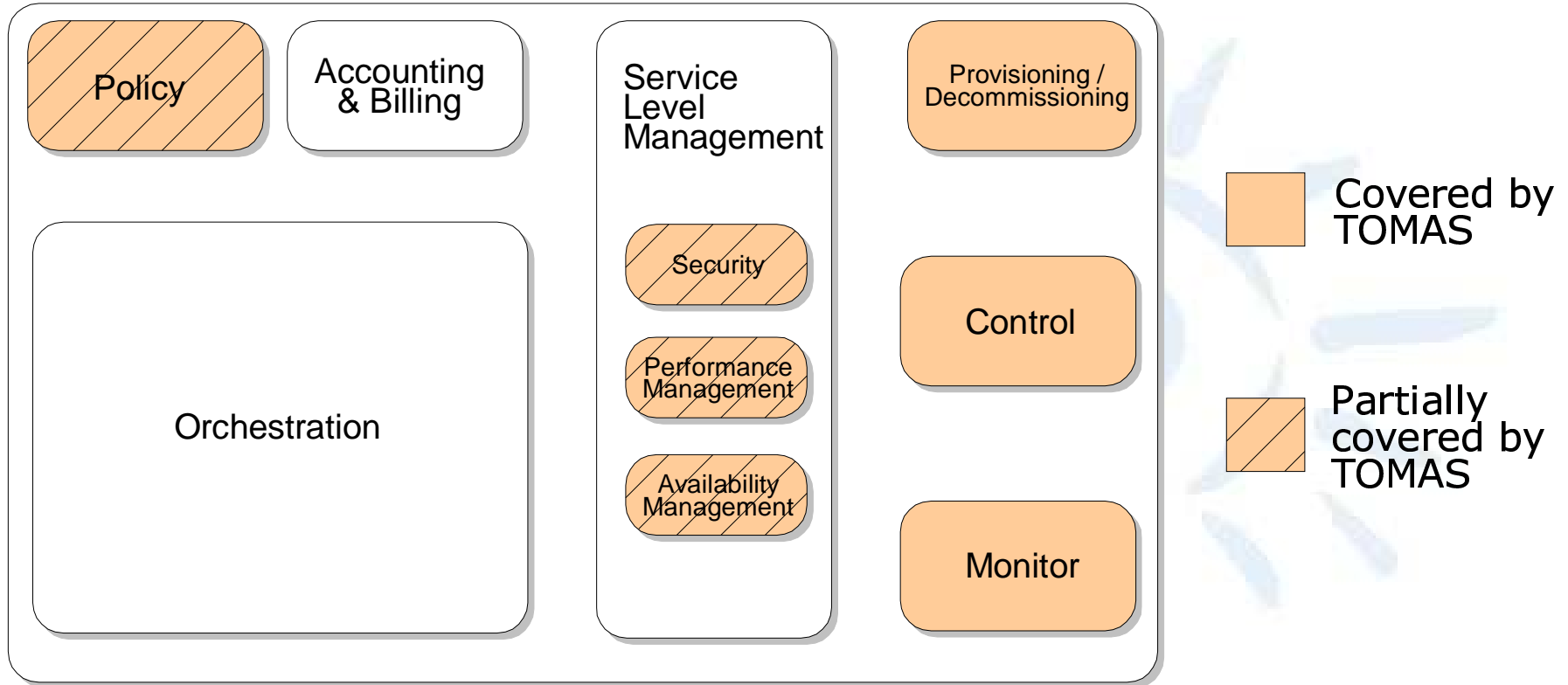
Short Cycles: 6 months  
 Long Cycles: 12-18 months



An **enterprise grid** is a collection of interconnected (networked) **grid components** under the control of a **grid management entity**

TOMAS is a toolsuite for the management of grid components and their life cycle. TOMAS is part of the grid management entity.

## GME Funtional Areas



## Development

- ◆ TOMAS will leverage the ObjectWeb JASS project to provide atomicity of complex configuration deployments.
- ◆ TOMAS will use an ObjectWeb workflow, such as Bonita, to deal with complex management operations (for example hardware replacements).
- ◆ We are also considering the use of an ObjectWeb workflow to reduce the need of management scripts.

## Management

Thanks to the genericity of TOMAS, it can be used to install, upgrade, deploy and configure any ObjectWeb system, such as JoNaS, in large enterprise Grids.

There is the need of a tool for the installation, configuration and automatic management of Grid fabrics.

This tool is need by all kinds of sites, both scientific and enterprise, independently of its size.

The current experience with quattor and lemon shows they are powerful tools, modular and highly flexible that can be used for the management of large Grid fabrics in case of scientific environments.

TOMAS will fill in the gap in case of the management of enterprise production Grid environments.