



Experience in the use of quattor outside CERN



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HEPiX 2004 (Upton, NY)

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Fabric Management Overview

- ▶ Many different types of machines:
 - Desktop machines, cluster nodes, database servers, network infrastructure, backup servers ...
- ▶ Common problems:
 - ▶ manual configuration and installation (very expensive, error prone, ...)
 - ▶ package upgrades, security alerts
 - ▶ how to manage the dependencies between services
- ▶ Many partial solutions available.

Management of Grid Computing Environments

- ▶ Grid Middleware has complex configuration procedures:
 - Example: *'LCG Computing Element Manual Installation and Configuration'* has 64 pages.
- ▶ Grid Computing requires well managed and stable computing fabrics.
- ▶ Grid needs to meet strict policies.
- ▶ How to install 100 Worker Nodes?
- ▶ These problems are independent of site size!
- ▶ Small and medium sites do not have the resources/procedures/tool to perform their own Grid installation and configuration.

 quattor

quattor is an administration toolkit for optimizing resources

Goal: quattor is a system administration toolkit providing a powerful, portable and modular toolsuite for the automated installation, configuration and management of clusters and farms running UNIX derivatives like Linux and Solaris. Quattor was started in the scope of the EDG project (2001-2003). Development and maintenance is coordinated by CERN (IT department) in collaboration with other partner institutes (in particular UAM Madrid) in the scope of ELFms.

Web Page: <http://www.quattor.org>

Applications of Quattor

- ▶ **General Fabric Management:**

- ▶ Best example: CERN
- ▶ See presentation: *Large Farm 'Real Life Problems' and their Solutions*

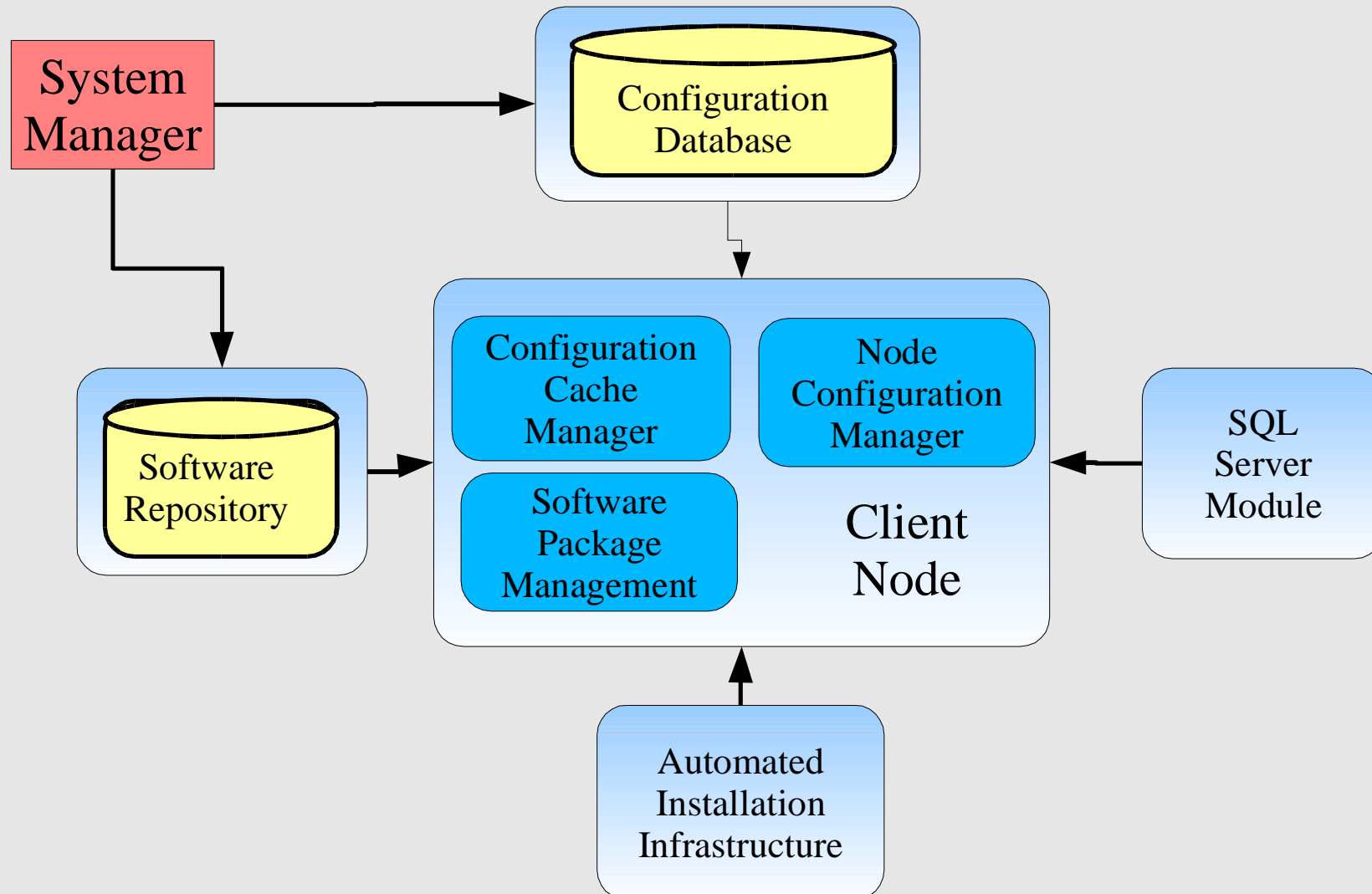
- ▶ **Grid Computing:**

- ▶ Best example: LAL - Orsay

- ▶ **Desktop Management:**

- ▶ Best example: UAM University - Madrid

Overview of quattor architecture

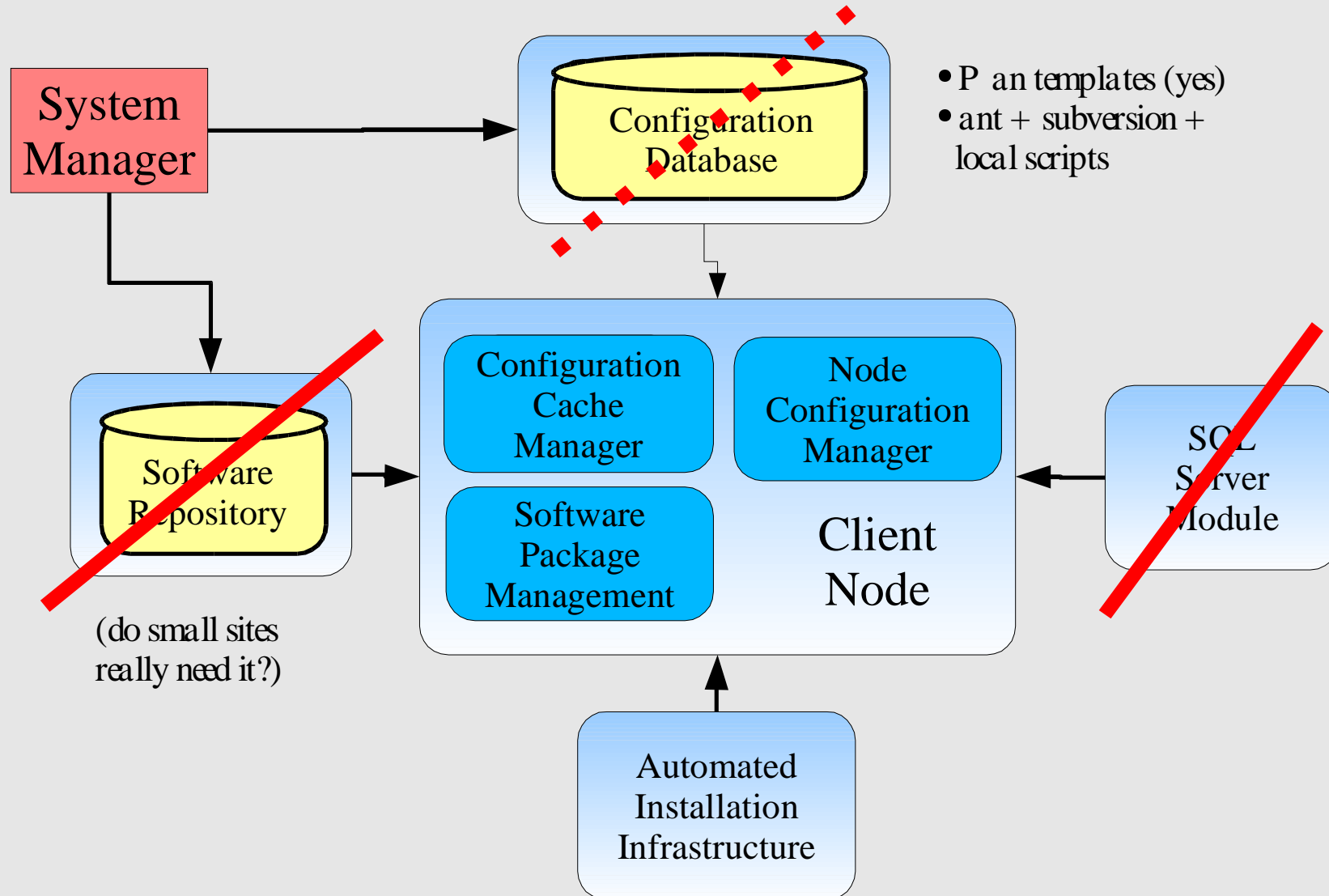


Example of Use: LAL (Orsay)

(many thanks to Charles Loomis)

- ▶ **Usage:**
 - ▶ Grid Services Management (LCG2)
- ▶ **Task:**
 - ▶ Software Management
 - ▶ Configuration Management
 - ▶ Initial Bootstrapping of New Machines
- ▶ **Operating Systems:**
 - ▶ Scientific Linux 3.02 (tested with RH7.3, FC2 and SL 3.01)
- ▶ **Future plans:**
 - ▶ LCG2, migrate all Unix system management

Quattor usage at LAL



Experience at LAL

➤ Advantages:

- Provides a centralized point from which our clusters (and services in those clusters) can be managed.
- Provides a high-level, extensible method of validating the configuration of machines *before* deploying changes.
- Allows a way to partition responsibility for certain aspects of configuration to different people/groups while easily allowing local customization.
- Porting of LCG2 very fast with very limited resources!

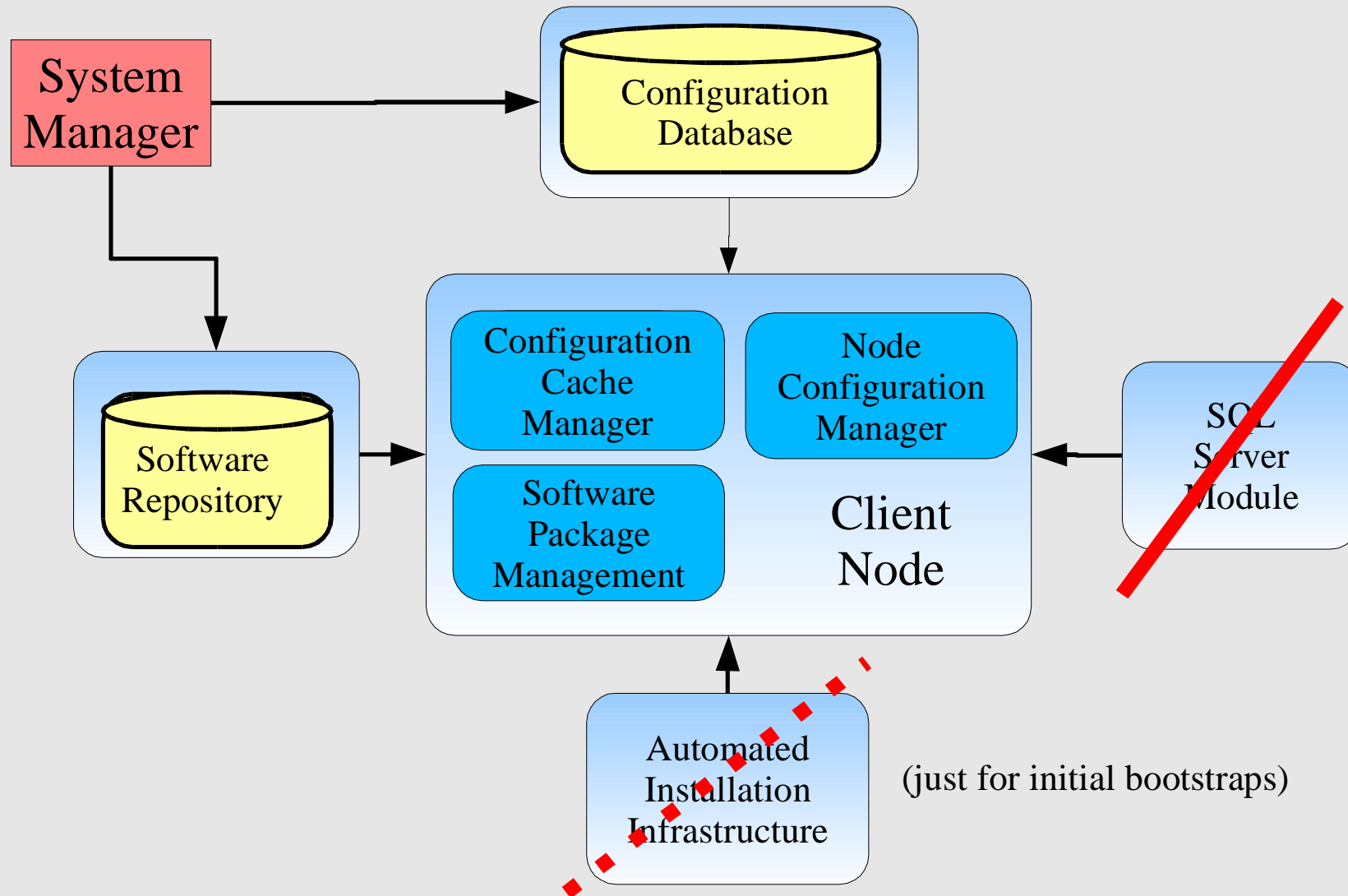
➤ Problems found:

- CDB should be able to manage multiple test-beds with just one single instance.
- It is needed a mechanism for secure distribution of machine credentials.
- It would be nice to extend the pan language to simplify even more the configuration management.

Example of Use: UAM University (Madrid)

- ▶ **Usage:**
 - ▶ Desktop Management
- ▶ **Task:**
 - ▶ Software Management
 - ▶ Configuration Management
 - ▶ Initial Bootstrapping of New Machines
- ▶ **Operating Systems:**
 - ▶ CERN Linux, RedHat 7.3
- ▶ **Future plans:**
 - ▶ Full desktop management, LCG2, computation during the night

Quattor usage at UAM



Experience at UAM University

➤ **Advantages:**

- Provides an easy way to manage software updates: apt-push :-)
- Provides a central place for configuration management while client nodes are independent by caching locally configuration information.
- Easy initial bootstrapping of new machines.

➤ **Problems found:**

- We need help to provide more configuration components (firewall configuration), or to extend the already existing ones (for example. auth).
- Disk partitioning with the Automatic Installation Infrastructure is not possible (yet).

Other Sites Using Quattor

- **NIKHEF:** Grid computing (LCG/EDG) and cluster management. Plans to migrate all the LCG2 machines (waiting for the SCL3 port of LCG2). LV-E Certification testbed and NDPF farm (~160 machines).
- **CNAF-INFN:** LCG (plans for 10 servers and 700 WN).
- **CC-IN2P3 (CNRS):** Waiting for LCG support. Evaluating quattor for the management of local farms.
- **GridPP:** Recommends the use of quattor.
- **DESY Zeuthen and DESY Hamburg:** General Fabric Management, Grid Computing, desktop management.
- **Poznan Supercomputing and Networking Center:** LCG and Cluster management (already have a testbed managed by quattor)
- **Forschungszentrum Karlsruhe:** InfiniBand cluster installation and management. Waiting for LCG support.
- **Others:** USC-CESGA Santiago de Compostela, LIP-Lisboa, National Technical University of Athens, discussions in the LCG-ROLLOUT mailing list, ...

General Experience

- ▶ It is highly modular and flexible (it can be adapted to our needs).
- ▶ It is highly portable (except for rpmt).
- ▶ Beta release used in production environments.
- ▶ Experience shows it is very easy to install a quattor server:
 - ▶ ½ day for an experienced system manager (knowledge of LCFG or similar tool).
 - ▶ 1 or 2 days for an inexperienced system manager.
- ▶ Very easy transition from LCFGng to quattor.
- ▶ No major architecture or design problems found so far.

Should I migrate to quattor?

- ▶ Version 1.0 almost ready:
 - ▶ CVS is frozen.
 - ▶ Testing final packages and updating installation guide.
 - ▶ New 'Quick Installation Guide'.
 - ▶ Release expected in 1 or 2 weeks.
- ▶ Beta release is used already in production:
 - ▶ CERN, UAM, NIKHEF, ...
- ▶ LCG2:
 - ▶ Installation and Configuration Ready.
 - ▶ Many sites waiting for LCG support to migrate to quattor, specially the small and medium sites.

Conclusion

- ▶ There is a real need for a tool to install, configure and manage Grid computing clusters correctly and automatically.
- ▶ This is true for the small, medium and large sites.
- ▶ Current experience with quattor shows that it provides a powerful, portable and modular toolsuite for the automated installation, configuration and management of clusters integrated into Grid environments.
- ▶ Quattor is already in production use outside CERN computing centre, and it is being evaluated for many sites.
- ▶ We have got positive feedback from many sites!