



Enabling Grids for E-science in Europe

Quattor Installation of Grid Software

C. Loomis (LAL-Orsay)



- **Goal**
 - Quattor installation, configuration, and management of *sites* running grid services.
- **Outline**
 - LCG Quattor Working Group
 - Evolution of Grid Installation Tools
 - Configuration Guidelines
 - Grid Services
 - LCG 2.3.0 Configuration
 - Available Components
 - Available Templates
 - Using LCG 2.3.0 Configuration
 - Summary

- **Mandate**
 - Create and support a Quattor configuration for grid software.
- **Contacts**
 - Chair: C. Loomis (charles.loomis@cern.ch)
 - Mailing List: project-lcg-gdb-quattor-wg@cern.ch
- **Support Infrastructure (TBD)**
 - Website, CVS, Bug tracking
- **Priorities**
 - Grid software: LCG-2.3.0, gLite
 - OS: RHEL-like (ScientificLinux, CentOS, ...)
- **QWG wants you!**

- **European DataGrid (EDG)**
 - LCFGng
- **LHC Computing Grid (LCG)**
 - Manual Installation (< 2.3.0)
 - YAIM (2.3.0)
 - LCFGng (RH7.3 only)
 - Quattor (2.2.0+)
- **Enabling Grids for E-science in Europe (EGEE)**
 - manual installation
- **Lessons:**
 - Faster site deployment & fewer configuration errors with installation tool.
 - Avoid software dependencies on installation tool.

- **Broadly Applicable**
 - Works with little or no effort for most sites.
 - Easily adaptable to all sites (esp. with complex configurations).
- **Grid Software**
 - Include all grid services.
- **Philosophy**
 - Service-oriented configuration.
 - High-level of consistency checking.
 - Organized to allow:
 - independent upgrade cycles for separate parts
 - independent responsibility for separate parts

- **OS Services**
 - cron, nfs, ntp, ...
- **LCG-2 Services**
 - condor, edg-wl-ftpd, edg-wl-jc, edg-wl-lbserver, edg-wl-lm, edg-wl-locallogger, edg-wl-ns, edg-wl-proxyrenewal, edg-wl-wm, globus-gatekeeper, globus-gridftp, globus-mds, lcg-bdii, myproxy, rgma, ...
- **External Services**
 - maui, rfio, torque, ...
- **Lots of services to configure!**

- **Locations:**
 - Quattor CVS: quattor/ncm-components/core
 - LAL: <http://grid05.lal.in2p3.fr/pkgsg/ncm-components/>
- **Core (i.e. OS/quattor services)**

```

ncm-access_control  ncm-cron             ncm-lmsensors      ncm-profile
ncm-accounts        ncm-dirperm         ncm-logrotate     ncm-serialclient
ncm-altlogrotate    ncm-filecopy       ncm-mailaliases   ncm-smartd
ncm-authconfig      ncm-grub           ncm-netdriver     ncm-spma
ncm-autofs          ncm-interactivelimits ncm-nfs           ncm-ssh
ncm-ccm             ncm-iptables       ncm-ntp           ncm-state
ncm-cdp             ncm-ldconf         ncm-portmap       ncm-sysctl

../cern-it-ps-solaris/ncm-etcservices

```

- **Locations:**

- Quattor CVS: `quattor/ncm-components/lcg-2`
- LAL: <http://grid05.lal.in2p3.fr/pkg/ncm-components/>

- **LCG-2**

<code>ncm-bdiicfg</code>	<code>ncm-globuscfg</code>	<code>ncm-lcmaps</code>	<code>ncm-rm</code>
<code>ncm-ceinfo</code>	<code>ncm-gridmapdir</code>	<code>ncm-mkgridmap</code>	<code>ncm-sshkeys</code>
<code>ncm-cliconfig</code>	<code>ncm-guiconfig</code>	<code>ncm-myproxy</code>	<code>ncm-sysconfig</code>
<code>ncm-cmnconfig</code>	<code>ncm-infoproviders</code>	<code>ncm-ntp</code>	<code>ncm-uicmnconfig</code>
<code>ncm-condorconfig</code>	<code>ncm-lbconfig</code>	<code>ncm-pbsclient</code>	<code>ncm-wlconfig</code>
<code>ncm-dblbconfig</code>	<code>ncm-lcas</code>	<code>ncm-pbsexechost</code>	<code>ncm-yaim</code>
<code>ncm-edglcg</code>	<code>ncm-lcgbdi</code>	<code>ncm-pbsknownhosts</code>	
<code>ncm-gip</code>	<code>ncm-lcginfo</code>	<code>ncm-rgmaproducer</code>	

- **Warnings:**
 - Following descriptions are based on the LAL configuration for LCG 2.3.0.
 - Written to be generally useful, but there may be hidden gotchas. Your mileage may vary!
 - The LAL configuration is not “sanctioned” by any official body, so only best-effort support (from me).

- **Status:**
 - LCG 2.3.0 running at LAL.
 - Installed using Quattor.
 - Supported machine types: CE, WN, SE, BDII, RB, MON, PX, UI.

- **LAL Subversion Repository:**
 - <http://grid05.lal.in2p3.fr/svn/egee-cfg/trunk/>
 - Can browse URL directly or checkout with svn.
 - Can use wget to download everything from URL.
- **Tarball with snapshot of LCG 2.3.0 configuration.**
 - <http://grid05.lal.in2p3.fr/lal-lcg-2.3.0.tar.gz>

- **Base URL:**
 - <http://grid05.lal.in2p3.fr/svn/egee-cfg/trunk/cfg/shared>
- **Standard (standard)**
- **Site (site)**
- **Repository (repository)**
- **Quattor (quattor)**
- **Components (components)**
- **Hardware (hardware)**
- **OS (os, os/sl303-i386, ...)**
- **LCG-2.3.0 (lcg-2.3.0/source, lcg-2.3.0/rpmlist_sl3)**

- **Standard**
 - typical data types
 - validation functions for those types
 - schema
- **Site**
 - various bits of cluster information
 - default config. for std. daemons (ntpd, logrotate, etc.)
 - useful functions
 - global variables (hostname, domain, nameserver, network params.)
 - putting network params. in right place
 - “databases”
 - IP, hostname mapping
 - hostname, hardware profile mapping

- **Repository**
 - “Databases” of available packages.
 - Naming convention: repository_<name>.tpl
- **Regenerating Templates**
 - SWRep: swrep-client template <area>
 - HTTP locations
 - Quattor CVS: quattor/utils/misc/html2pan.pl
 - Instructions in same directory.

- **Quattor**
 - Essentially package list for Quattor client.
 - Naming convention: `pro_quattor_client_<os-name>.tpl`
- **Maintained with OS versions**

- **Declaration Templates**
 - Defines schema (parameters) for the component.
 - Naming convention: `pro_declaration_component_<name>.tpl`
- **Software Templates**
 - Includes:
 - Default parameters.
 - Dependencies between components.
 - Includes package with component.
 - Naming convention: `pro_software_component_<name>.tpl`

- **Hardware Templates**
 - Hard disks, CPUs, RAM, NIC card
 - Naming convention:
 - `pro_hardware_card_harddisk_<type>.tpl`
 - `pro_hardware_cpu_<type>.tpl`
 - etc.
- **Machine Templates**
 - “Assembles” hardware into a complete machine
 - Naming convention: `pro_hardware_machine_<name>.tpl`
- **LAL Particularities**
 - Strict separation of hardware/software configuration.
 - Only changed when hardware is added or modified.

- **OS Templates**
 - Naming convention:
 - pro_sl303_group_<name>.tpl
 - pro_sl303_defaults.tpl (default groups)
 - pro_sl303_fixes.tpl (rpm version downgrade)
- **Existing**
 - SL 3.03 (i386, x86_64)
 - CentOS (i386, x86_64)
- **Creating New Templates**
 - Convert comps.xml to pan templates
 - comps2pan utility in CVS (quattor/util/misc/)
 - Some hand-fiddling with kernel versions

- **RPM Lists (rpmlist_sl3)**
 - Functional sets of software packages.
 - Naming convention:
 - pro_software_lcg2_machine_<machine type>.tpl
 - pro_software_lcg2_service_<service name>.tpl
- **Configuration Templates (source)**
 - Service & machine configuration.
 - Naming convention:
 - pro_lcg2_machine_config_<machine type>.tpl
 - pro_lcg2_service_<service name>.tpl
 - pro_lcg2_config_<identifier>.tpl
- **Virtual Organization Templates**
 - Naming convention: pro_lcg2_vo_<vo>_<type>.tpl

- **Working Quattor server:**
 - Install and configure Quattor server.
 - Verify that a client can be installed with Quattor.
- **Download software packages.**
 - Quattor (should already have these).
 - Configuration components (CVS or LAL).
 - Grid software packages (LCG2 repository or LAL).
- **Download templates.**
 - Two areas used for configuration:
 - “shared” are standard, unmodified templates
 - “clusters” are modified for working LAL configuration
 - Take & modify “clusters” templates over those in shared.

- **Modify templates for your site:**
 - Site templates
 - Hardware descriptions
 - LCG-2 site information template (see example)
 - Modify machine profile (see example)
- **Correct errors until profile compiles.**
- **Check that configuration is correctly propagated to Quattor client.**
- **Test:**
 - Useful commands: `ccm-fetch`, `ncm-query`, `ncm-ncd`
- **Drink champagne!**

- **Virtual Organization Configuration**
 - Goal: “Drop-in” configuration for VOs.
 - Problem: Involves changes to many configurations.
 - Status: Mixture of approaches.
- **“Database” Services**
 - Problem: Services need configuration from many machines.
 - Examples: DHCP, DNS, LRMS
 - Status: No good solution found yet.
- **Security**
 - Controlled access to configuration information.
 - Controlled access to individual or groups of templates.
 - Credential distribution.

- **Versioning & Distribution**
 - Components
 - Component templates
 - Configuration
 - Templates appropriate for given quattor & LCG versions.

- **Strong typing is your friend!**
 - Use the validation features of Pan.
 - Design schemas to check parameter values and format.
- **Isolate site changes.**
 - Use Pan's ability to redefine values rather than modifying templates created, managed, updated by others.
- **Feed back problems, ideas for improvement**
 - Quattor: developers via savannah.
 - Components: developers via savannah
 - LCG 2.3.0 configuration: QWG mailing list.

- **Installing LCG-2.3.0 with Quattor works!**
 - All major machine types/services supported.
 - Reasonably modular for general use.
- **Quattor Working Group needs your help:**
 - Try the LCG-2.3.0 Quattor configuration.
 - Feed back ideas for improvements.
 - Report any bugs with the configuration.