Deployment & Experiment Integration

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LCG

LCG Review

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History

- First set of reasonable middleware on C&T Testbed end of July (PLAN April)
  - limited functionality and stability

- Deployment started to 10 initial sites

middleware was late

  - Focus on establishing procedures
  - Training sites (sent personnel to 2 sites)

- End of August only 5 sites in
  - Underestimation of the effort and dedication needed
    - Complexity of the middleware, installation and configuration
    - Lack of experience with install/config tool

- First certified version LCG1-1_0_0 release September 1st (PLAN in June)
  - Limited functionality, improved reliability
  - Training paid off -> 5 sites upgraded (reinstalled) in 1 day
  - Last after 1 week….

- Security patch LCG1-1_0_1 first not scheduled upgrade took only 24h.

- Sites need between 3 days and several weeks to come online
  - All sites using the fabric management tool

Estimation of duration of the deployment process was correct

Release History

Overview: 5 releases up to now

Tag	Date	Comment
lcg1_20030717_1455	17 Jul	Pre-release:CNAF, CERN
LCG1-1_0_0	01 Sep.	EDG pre 2.0, several fixes by LCG
LCG1-1_0_1	19 Sep.	Security Patch (10sites)
LCG1-1_1_0	24 Oct.	Fixes, new WLM (17 sites)
LCG1-1_1_1	05 Nov.	Experiment SW
LCG1-1_1_2	Xx Nov.	Experiment SW (23 sites)

LCG-1 Deployment Status

- Up to date status can be seen (here) expect >20 by end of 2003

−**PIC-Barcelona**   **(RB)**
- **IFIC Valencia**   **(RB)**
- **Ciemat Madrid**
- **UAM Madrid**
- **USC Santiago de Compostela**
- **UB Barcelona**
- **IFCA Santander**   **(RB)**

−**BNL**
−**Budapest**   **(RB)**
−**CERN**   **(RB)**
−**CNAF**   **(RB)**
- **Torino**
- **Milano**

−**FNAL**
−**FZK**
- **Krakow**

−**Moscow**   **(RB)**
−**Prague**
−**RAL**   **(RB)**
- **Imperial C.**
- **Cavendish**

−**Taipei**   **(RB)**
−**Tokyo**

Total number of CPUs ~150

(current focus on # of sites)

Sites to enter soon

 CSCS Switzerland, Lyon, NIKHEF

Several tier2 centres in Italy

Sites preparing to join

Pakistan, Sofia,

CPUs added on experiments request

Users:

EDG: Experiment independent testers

Experiments: Alice, Atlas, CMS LHCb

LCG-1 Deployment Status Overview

Site's Status Page	CVS	Site Tag in CVS	LCG tag	Installation Status		Operation	Comment
PIC-BARCELONA(pic.ifae.es)	Yes	LCG1-1_0_1_PIC_20030923_1836	LCG1-1_1_1	Installed	S	Running	LCG-ES Coordinator South MDS
IFIC-VALENCIA(ific.uv.es)	Yes	LCG1-1_1_1_IFIC_20031105_1800	LCG1-1_1_1	Installed	S	Running	LCG-ES
CIEMAT-MADRID(ciemat.es)	Yes	LCG1-1_1_1_CIEMAT_20031105_1800	LCG1-1_1_1	Installed	S	Running	LCG-ES
UAM-MADRID(ft.uam.es)	Yes		LCG1-1_1_1	Installed	S	Running	LCG-ES
USC-SANTIAGO-DE-COMPOSTELA(usc.cesga.es)	Yes	LCG1-1_1_1_USC_20031105	LCG1-1_1_1	Installed	S	Running	LCG-ES
UB-BARCELONA(ecm.ub.es)	Yes	LCG1-1_1_1_UB_20031106_0001	LCG1-1_1_1	Installed	S	Running	LCG-ES
IFCA-SANTANDER(ifca.unican.es)	No		LCG1-1_1_1	Installed	S	Running	LCG-ES
BNL(bnl.gov)	Yes	LCG1-1_1_1_BNL_20031107_1525	LCG1-1_1_1	Installed	W	Running	-
BUDAPEST(kfki.hu)	Yes	LCG1-1_1_1_BUDAPEST_20031110_1535	LCG1-1_1_1	Installed	E	Running	
CERN(cern.ch)	Yes	LCG1-1_1_1_CERN_20031107_0857	LCG1-1_1_1	Installed	E	Running	East MDS
CSCS-SWITZERLAND(cscs.ch)	initial		LCG1-1_1_0	Installing	E	Offline	
CNAF(cr.cnaf.infn.it)	Yes	LCG1-1_1_1_CNAF_20031105_1630	LCG1-1_1_1	Installed	S	Running	South MDS
INFN-TORINO-LCG1 (to.infn.it)	No		LCG1-1_1_1	Installed	S	Running	S-site
INFN-MILANO-LCG1(mi.infn.it)	No		LCG1-1_1_1	Installed	S	Running	S-site
FNAL(fnal.gov)	Yes	LCG1-1_1_1_FNAL_20031106_1130	LCG1-1_1_1	Installed	W	Running	
FZK(fzk.de)	Yes	LCG1-1_1_1_FZK_20031105_1907	LCG1-1_1_1	Installed	E	Running	Primary site
KRAKOW(cyf-kr.edu.pl)	Yes	LCG1-1_1_1_CYFRONET_20031118_1436	LCG1-1_1_1	Installed	E	Running	Secondary site
LYON	Yes		LCG1-1_1_1	Installed	E	Offline	Missing host certificates, web page
MOSCOW(sinp.msu.ru)	Yes	LCG1-1_0_0_MOSCOW_20030903_1946	LCG1-1_1_1	Installed	E	Running	
PRAGUE(farm.particle.cz)	Yes	LCG1-1_1_1_PRAGUE_20031107_1317	LCG1-1_1_1	Installed	E	Running	
RAL(gridpp.rl.ac.uk)	Yes	LCG1_1_1_1_RAL_20031106_1437	LCG1-1_1_1	Installed	W	Running	West MDS P-site
IMPERIAL (hep.ph.ic.ac.uk)	Yes	LCG1_1_1_1_IMPERIAL_20031110_1715	LCG1-1_1_1	Installed	W	Running	S-site, dead link
CAVENDISH (hep.phy.cam.ac.uk)	Yes	LCG1_1_1_1_CAVENDISH_20031111_1220	LCG1-1_1_1	Installed	W	Running	S-site, wrong format web page
TAIPEI(grid.sinica.edu.tw)	Yes		LCG1-1_1_1	Installed	E	Running	East MDS
TOKYO(icepp.s.u-tokyo.ac.jp)	Yes	LCG1-1_1_0_TOKYO_20031027_2012	LCG1-1_1_1	Installed	E	Running	

LCG-1 Site Config in CVS

File		Rev.	Age	Author	Last log entry
Attic/ [show contents]					
budapestWorkerNode.h		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_cfgdir-cfg.h		1.2	2 months	gdebrecz	First working configuration !
_do_mkxprof.sh		1.1	2 months	emanuele	First version of the config files for Budapest site
_grid100		1.5	2 hours	gdebrecz	Slight modifications in UI config.
_grid109		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid110		1.4	2 hours	gdebrecz	Slight modifications in UI config.
_grid111		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid112		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid113		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid114		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid115		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid116		1.2	2 months	gdebrecz	First version using LCG1-1_0_0. Simple LDAP quieries, gridftp and simple job su...
_grid117		1.1	2 hours	gdebrecz	New working node.
_local-cfg.h		1.2	2 months	gdebrecz	First working configuration !
_nfsmount-cfg.h		1.3	2 months	gdebrecz	First working configuration !
_site-cfg.h		1.5	2 hours	gdebrecz	Slight modifications in UI config.

Show files using tag: – Non–branch tags –

(Show)

- Keeping track of site configuration
- Central CVS repository at CERN
- ALL sites, ALL configuration, ALL versions
- Helps in problem tracking
- First version of config provided by CERN or tier1 center

Introducing a release

- Well established procedure (C&T presentation)
  - Software handed to the Deployment Team by C&T
    - Adjustments in the configuration
    - Update of documentation and templates (in CVS)
    - Final installation tests
- How do we deploy?
  - Service Nodes (RB, CE, SE …)
    - LCFGng (fabric management tool from EDG),
    - We provide for new sites config files based on a questionnaire
  - Worker and User interface nodes (by tool and manual instruction)
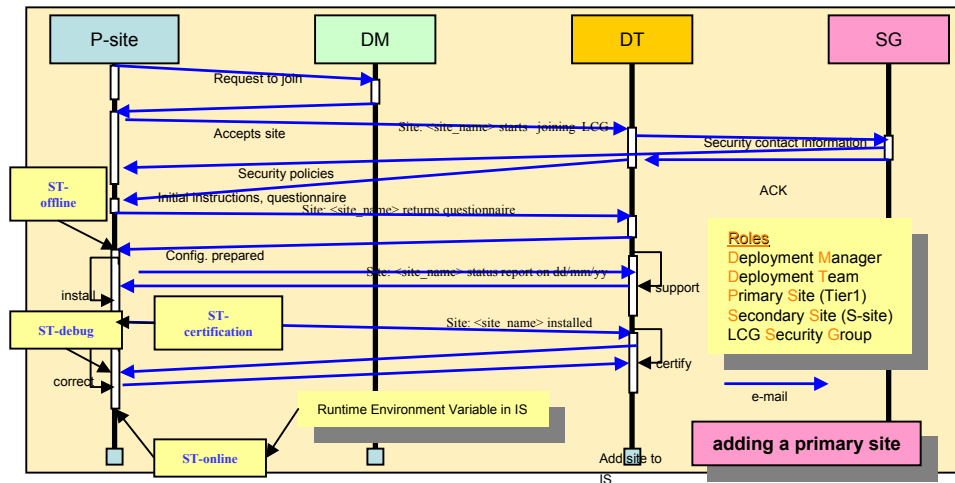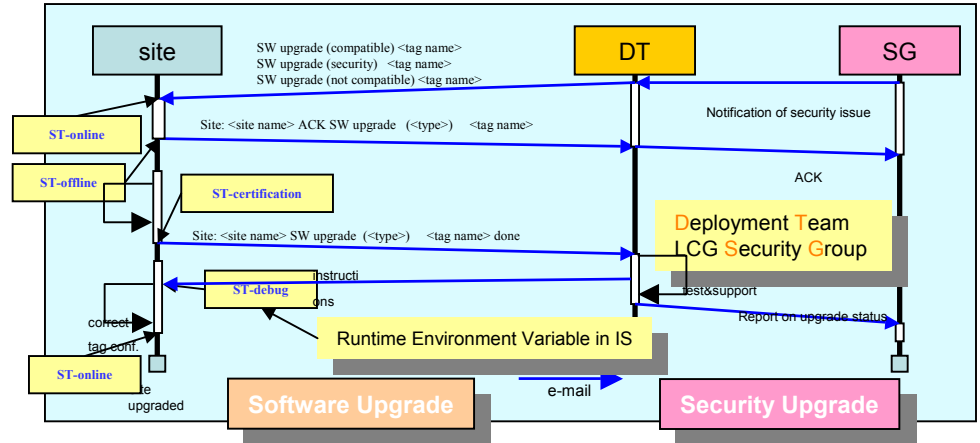- **Communication:** list **LCG-rollout@rl.ac.uk** (~10 mails/day)
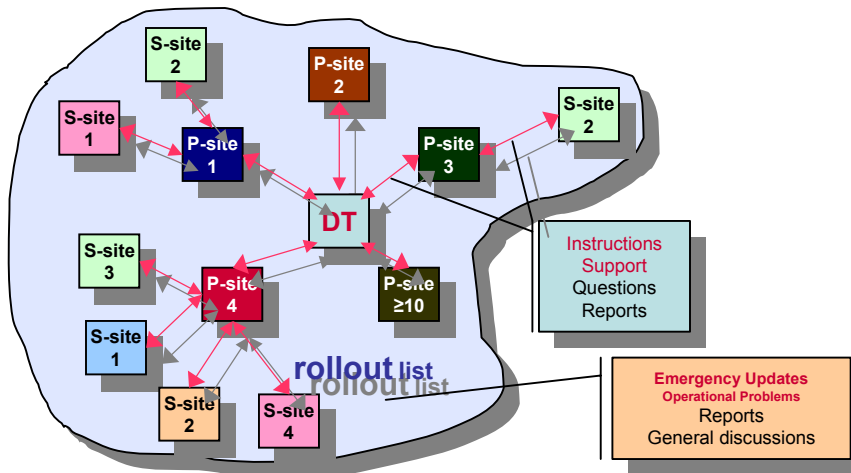
| Roles	Description
Deployment **T**eam	Prepares releases, deploys first, supports P-sites and handles escalated problems
Primary **site**	Experienced site with resources to support some S- sites
Secondary **site**	Inexperienced site (can have more computing than P-site)

Procedures defined for:

- **adding primary/secondary sites**
- **software upgrades**
- **security upgrades**

- http://cern.ch/markusw/JoiningLCG.doc
- http://cern.ch/markusw/JoiningLCG.pdf
- http://cern.ch/markusw/JoinLCG.html

LCG1 Information System

- The Information System (IS) is the nervous system of LCG
  - Used by almost all services (RB, Replica Manager, RLS, …) to
    - Discover resources and their properties *(static and dynamic)*
  - Based on Globus MDS
  - Know scalability problems with MDS
    - Number of sites, Amount of data
    - Fatal handling of failures that propagate through he hierarchy
- Ongoing effort to make MDS more robust
  - Modified EDG-BDII replacing top level MDS
    - BDII == database + LDAP server + perl script to query MDS
    - LCG improved version: no stale information, redundant sources
    - Partitioning in regions: less load/region, confinement of problems
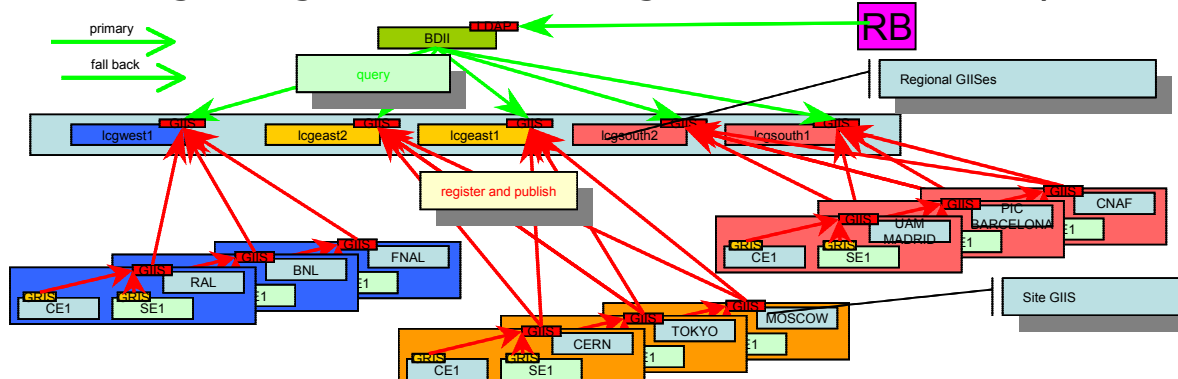
Security (related to deployment)

- LCG Security Group (Dave Kelsey (RAL))
  - Defines policies

- Deployment Team implements policies
  - LCG registration http://lcg-registrar.cern.ch/
  - CERN Certification Authority
    - http://lcg-registrar.cern.ch/pki_certificates.html
  - Tools for VO management
  - Host VO for LCG1 users and dteam
    - Experiment VOs are run at **NIKHEF**
  - Distribution of security policies to sites
  - Maintains security contacts

Experiment Integration

Goal:

Help experiments integrating their production and analysis environment with LCG

- – One person assigned to each experiment. But work on global scope.
- – Guides and manuals for users and developers
  - **LCG-1 User Guide** (https://edms.cern.ch/file/412777/1/LCG-1-UserGuide.pdf)
  - Interface definition for Workload, Data Management and POOL software (https://edms.cern.ch/file/384019/0.4/WP1-WP2.doc)
  - The LCG-1 Information System (https://edms.cern.ch/file/384587/0.2/LCG-1_Information_System.pdf)
  - Experiment Software Installation on LCG-1 (https://edms.cern.ch/file/412781/1/SoftwareInstallation.pdf)

Start Here

Experiment Integration

- Providing assistance/testbed to exercise/integrate new middleware features
- Ongoing activities:
  - ALICE: AliEn tests on LCG-1
    (https://wwwlistbox.cern.ch/earchive/alice-support-lcg-eis)
  - Significant effort to create the CMS LCG-0 testbed:
    - **real production done and produced 2 million events**
    (http://cmsdoc.cern.ch/cms/LCG/LCG-0/)
  - ATLAS exercises with software installation via PACMAN in the new proposed Experiment Software Installation LCG Tools; Ongoing testing with Grid3
    (https://wwwlistbox.cern.ch/earchive/support-eis)
  - CMS integration with POOL. Exercise with usage of catalogues.
    (http://server11.infn.it/archive-cms-lcg-edt/)
  - Distribution, installation and configuration of experiment software
    - Tools provided and under test
    - Some open issues

- Identifying missing functionality
  - Aggregating the experiments requirements

Direct channel for the experiments into the LCG deployment

Experiment Status on LCG

- Alice, Atlas, CMS, and LHCb on LCG-1
  - Basic functionality tested
- Extensive list of problems reported
  - many configuration related
  - helps defining a better validation procedure for sites
- Preparing for Data Challanges
- Providing first level user support
  - until grid user support at FZK is in full operation

Problems (deployment)

- Installation too complex
  - Components are too interdependent
  - Manual install procedures only supported for WNs and Uis (now)
  - Better installation guide needed
- Debugging site configurations
  - Discovery of the remote site's setup is hard
  - Changes take a long time
  - Misleading error messages during installation
  - Site certification procedures not adequate
- Some sites are in contact with grids for the 1st time
  - "Beginners Guide to Grids" needed
- Time zones slow down the propagation of changes

Stability&Operation

- Stability greatly improved with each release
- Only few MDS related problems (improvements under test)
- Focus now on: <u>Hardening services for production</u>
  - Jobs with realistic workload
  - Chaotic usage test
  - Integration with local production fabric
  - Operate services for extended periods
    - Do they "age" or "pollute" the platforms they are running on?
  - Capture "state" of services to restart them without loosing active jobs
  - Learn how to upgrade services (RMC, LRC…) without stopping
    - LCG1 can't be drained for upgrading
  - Integration of new components (GFAL, MSS, managed storage)
  - Work together with EIS on providing user level software installation mechanisms.
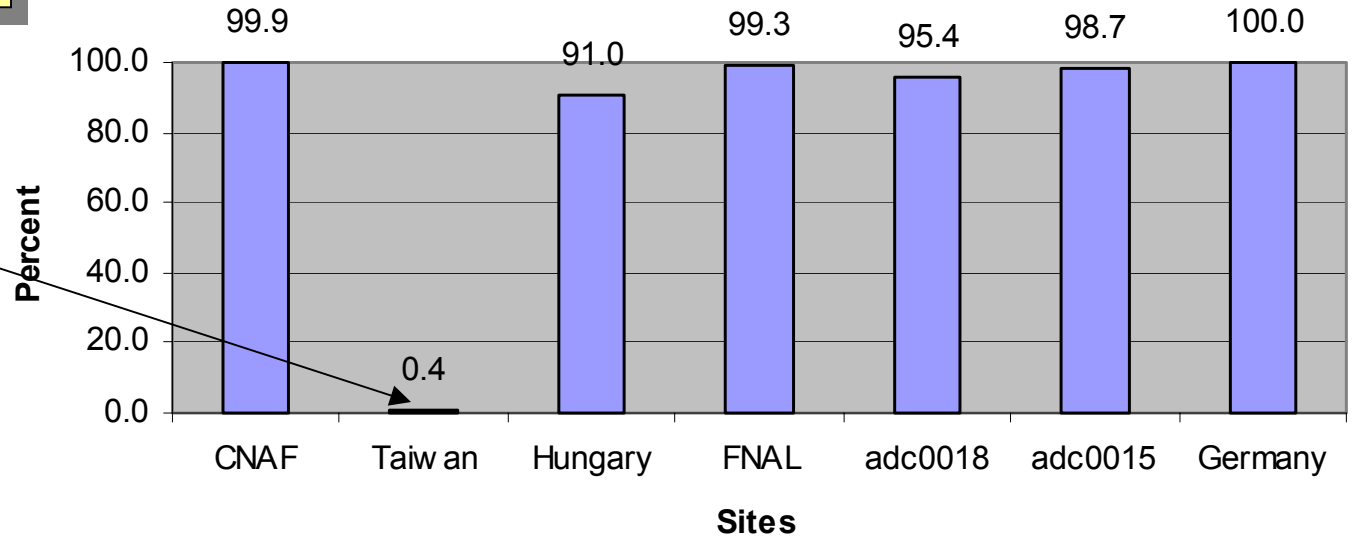
Geographical Job Distribution
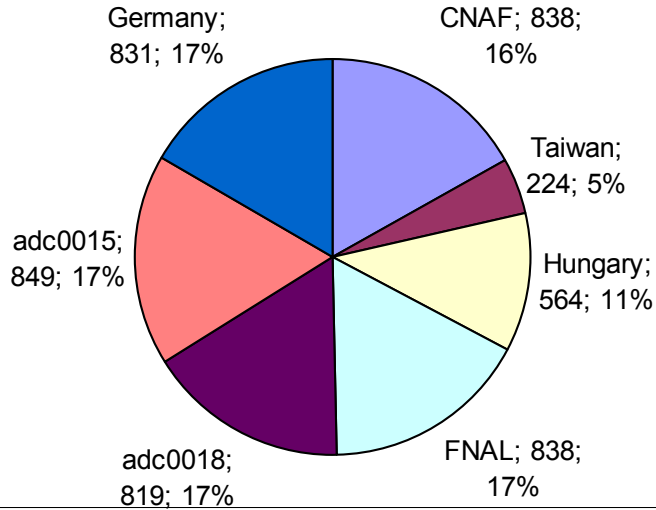
Test

LCG 1.0 Test (19./20. Sept. 2003):
- 5 streams
- 5000 short jobs

Ingo Augustin
from EDG WP8

Taipei changed configuration during the test.

Not a failiure of the site

Ratio of succesful jobs of retrieved jobs (4963 of 5000 = 99.26%)

Site	Percent
CNAF	99.9
Taiwan	0.4
Hungary	91.0
FNAL	99.3
adc0018	95.4
adc0015	98.7
Germany	100.0

Summary

- Middleware was 3 months late
  - Less: functionality, tests, experience with operation
- Number of sites now at scale foreseen (23 sites)
  - Deployment process seems to work
  - Need better site certification
- Experiments are testing the system
  - good end user documentation
  - discover problems (config. errors)
  - SW- distribution process implemented, needs testing/acceptance
- Very little time to turn this into a real production system
  - Critical components are just arriving (SE)
  - Has to be done <u>incrementally</u> on the <u>running</u> service
- Deploying the software at new sites is not always easy
  - various reasons (attitude, complexity, priorities, acceptance of tools)