

CERN COMPUTER NEWSLETTER

Volume XL, issue 5 November–December 2005

Contents

Editorial

DES homes in on users' needs 1

Announcements & news

Computing featured in this month's *CERN COURIER* 2

AppleTalk routing is discontinued 2

Department reorganization emphasizes physics support 3

Account closure tightens security 3

Registration gets an electronic fax 3

CHEP06 scheduled for Mumbai, India, on 13–17 February 2006 4

CRA application represents the future of account handling 4

DES homes in on users' needs

In 2004, the Database and Engineering Services (DES) group was created, gathering activities that had previously been dispersed over three groups. *CNL* spoke to DES group leader Mats Moller about the synergies this has achieved, and the new technologies and services that the group is deploying.



The DES group covers three main areas: Database Services, Engineering Services and Systems Services. What important trends do you see in these services?

I would say that the most important development has been for these different services to focus more intensely on user needs. It is easy to get tied up solving technical problems – software is never perfect – and lose sight of the end-user. By comparing their approaches to user support, the different services in the group can learn from each other.

As a result of this user focus, we are extending monitoring of services to try to detect problems before the end-users see them – and take action to rectify them. An example is monitoring file systems to detect when they begin to overflow, which can block applications.

It's important to realize that these services cannot stop outside a scheduled maintenance window. A failure can immediately affect different parts of CERN, like administration or the SM18 magnet test facility.

There is also a move to commodity computing going on in the group. Not to the same extent as for the physics computing, perhaps, but it is happening. Solaris boxes for the

Mats Moller talked to CNL about his role as DES group leader.

database services are being gradually replaced by Linux clusters. Solaris support is being reduced and SUNDEV was shut down this summer. Solaris may be phased out entirely, although this would be over several years. On the engineering side, we are switching to Windows, as on PCs it is now the most popular platform in industry for engineering software.

Another Grid-inspired development is the use of hardware load balancers. These scale well with cluster size, and make it easier to add nodes in a cluster, or perform upgrades and maintenance, without having to shut down a service. Commodity clusters can also be easily integrated with central alarm services, such as LEMON, to ensure faster and cheaper maintenance. These sorts of changes are possible through close collaboration with other groups in IT, such as the Communication Systems (CS)

Editors Nicole Crémel and Hannelore Hämmerle, CERN IT Department, 1211 Geneva 23, Switzerland. E-mail: cnl.editor@cern.ch. Fax: +41 (22) 7668500. Web: cerncourier.com (link CNL).

Advisory board Wolfgang von Rüdén (head of IT Department), François Grey (IT Communication team leader), Christine Sutton (*CERN Courier* editor), Tim Smith (group leader, User and Document Services).

Produced for CERN by Institute of Physics Publishing
Dirac House, Temple Back, Bristol BS1 6BE, UK. Tel: +44 (0)117 929 7481. E-mail: jo.nicholas@iop.org. Fax: +44 (0)117 920 0733. Web: iop.org.

Published by CERN IT Department



©2005 CERN
The contents of this newsletter do not necessarily represent the views of CERN management.

Announcements & news

group for the switching behind the load balancer, and the Fabric Infrastructure and Operations (FIO) group for the system administration of Linux clusters.

It is often said that the problem with supporting general and administrative services is that the user only notices them when they fail. Could you give some quantitative feel to CNL readers of the scale of the activities that your group supports?

Take the Printer Services, for example. There are 1300 network printers, 1700 queues and 15 000 jobs each day, which makes for between 30 000 and 60 000 pages of print-outs. This corresponds to about 15 GB of spooled data every day.

Or consider the Concurrent Versions System (CVS) service where software developers store their code. This supports nearly 1200 developers, and is an absolutely critical service, since a major failure could mean the loss of millions of software-development man-hours. We have created a second CVS specifically for LCG, where there are 23 projects representing 400 developers, and work is ongoing to create a similar dedicated repository for EGEE.

Then there is the Engineering Data Management Service (EDMS). The DES group is collaborating with TS Department's Control, Safety and Engineering Databases (CSE) group to deliver this service. The DES group provides the database and application server part. The EDMS-MTF (Manufacturing and Test Folder) keeps, among other things, test results and configurations for the LHC magnets. There are 616 000 documents and 385 000 items of equipment stored in EDMS, with 675 documents and 770 items of equipment added every day, on average. The CADENCE cluster, which stores the electronics designs for some 400 systems engineers, is

another example of such a specialized yet vital service.

What changes and new services do you see the DES group supporting in the coming months and years?

A very important change is the update of all computer-aided-design information from the EUCLID system to the newer CATIA technology. There are some 160 000 designs in EUCLID today, so this represents a huge effort, primarily for the designers themselves, to ensure that the correct versions are transferred to the new system. Because the LHC is in a critical phase right now, we decided to start the migration to CATIA for only non-LHC designs, and continue with the LHC data after 2007.

Some new services we are supporting include Twiki, which allows groups of people to develop Web pages jointly and share information on these pages, using a form-based Web application. There are already 30 active Twiki projects and 400 users being supported. BOINC, the software platform that supports LHC@home, is another service that DES is supporting and further developing. Thanks to this service, there are more than 10 000 public PCs doing simulations of the LHC beam dynamics for the AB department. And other applications in physics are being investigated for use on this platform.

Overall, this is a challenging period for a service group like DES. We are changing the underlying architecture of our services quite radically, while maintaining critical services. Forward-looking activities, such as the CERN openlab collaboration with Oracle, which continues to develop well, are helping us to deal proactively with some of these changes. And of course, we must continue to listen to the evolving needs of our users – that is what good service is all about.

Computing featured in this month's CERN Courier



These articles appear in the November 2005 issue of *CERN Courier*. See www.cerncourier.com for full-text articles.

Computing News

- **Synergia provides new 3D tool**
Synergia 1.0 simulates particle behaviour in an accelerator.
- **Tim Berners-Lee receives Quadriga award**
The W3C director and World Wide Web creator is honoured.
- **W3C specification guidelines assist authors**
QA working group publishes its guide to clearer writing.

- **FZJ's new supercomputer offers extra power**
The 5.6 Tflop JUBL is installed.

IT products and calendar

Feature article

- **Internet growth requires new transmission protocol**
Possible solutions to high-rate data-transfer problems.

Viewpoint

- **The dark side of computing power**
Google's views on computing power.

AppleTalk routing is discontinued

AppleTalk is a legacy Mac OS protocol for discovering network file, print and other services. Internet Protocol (IP) has become a global standard for networking, replacing non-IP

networks, such as DECnet, IPX, AppleTalk and others. Following this evolution, support for AppleTalk on the CERN network infrastructure ceased on 3 October 2005.

The replacement solutions are:

- SMB/HTTP for file services; and
- LPR for print services.

We invite all users who have not done so already to switch to the replacement solutions. Instructions on how to do so can be found at <http://cern.ch/it/>

[gencomputing/mac-support/AppleTalk.htm](http://cern.ch/it/gencomputing/mac-support/AppleTalk.htm).

An early announcement was made in the *CERN Bulletin* 34–35/2005 (“AppleTalk Routing: Phase-Out 30 September 2005”).

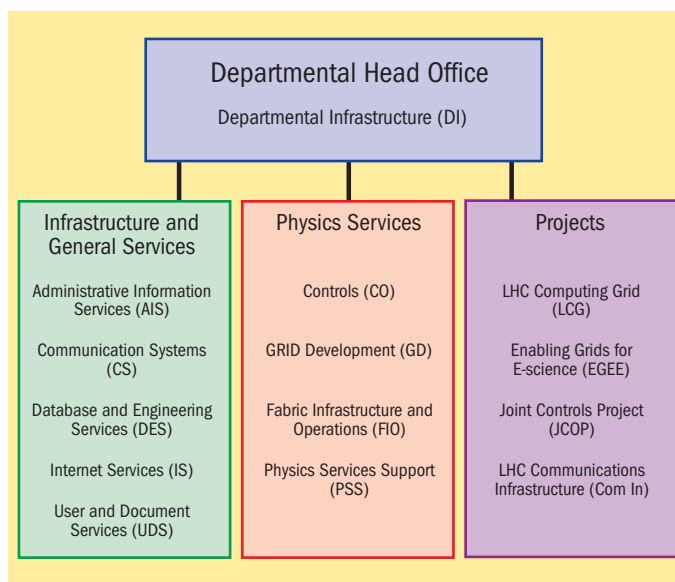
IT/Communications Systems Group

Department reorganization emphasizes physics support

As CERN moves into a second phase of both the LCG and EGEE projects, after due consultation I have decided to make the following organizational changes, effective from 1 November 2005.

The Grid Middleware (GM) group has been merged into the Grid Deployment (GD) group, which Ian Bird is leading. This reflects the need to consolidate the middleware integration, testing, distribution and support tasks as LCG approaches full production status, and is in line with the priorities set for the second phase of the EGEE project starting in April 2006.

The focus of the merged group will be on support rather than on development, and the activity will be labelled in EU terms SA3 (support activity) rather than JRA1 (joint research activity). A few people will continue to work on development at CERN in JRA1, while INFN will take the lead of this EGEE activity. Frédéric Hemmer, previously GM group leader, has been appointed



The new structure of the IT Department groups, as of 1 November 2005.

deputy department head.

The Physics Services Support (PSS) group has been created to combine the Physics Database Services – which was in the Architecture and Data

Challenges (ADC) group – and the Experiment Integration Support section of the GD group, as well as ARDA, the distributed analysis project for the LHC (see p8). This new

group is led by Jürgen Knobloch. In establishing this group, the IT Department aims to ensure the necessary focus on the mission-critical needs of the LHC experiments in the run-up to LHC operations in 2007.

The rest of the ADC Group has been integrated into the activities of other existing groups. The Linux and AFS section of the ADC group has moved into the Fabric Infrastructure and Operations (FIO) group and the openlab activities previously in ADC have moved to the Departmental Infrastructure (DI) group. Bernd Panzer, previously ADC group leader, is appointed LCG fabric area manager on a full-time basis, thus strengthening the team and increasing the effort available for coordination.

Overall, these changes emphasize the department's key role in providing the necessary computing and Grid services for the LHC experiments.

Wolfgang von Rüden, head, IT

Account closure tightens security

In today's computing environment, where there is a permanent threat of computer-security incidents, it is vitally important to control who has access to CERN's computing infrastructure. To obtain a computer account it is already necessary to be registered at CERN, but until now closing of accounts has relied on an annual review carried out by the group administrators. This process is now being automated and linked into the CERN registration database. The account review will run permanently and trigger action both when an account is unused and when a person's end of contract is approaching. Advance warning of actions to be taken will be sent to both users and their supervisors:

- when an account has been

unused for six months – the account will be blocked and a year later, after a second warning, the account will be deleted;

- when a person's association with CERN comes to an end – based on the end date in the registration database, their computer accounts will be blocked. For most personnel there will be a grace period before the account is blocked to allow for the orderly transfer of data. This grace period will not apply to contractors. A year later, after a second warning, the account will be deleted.

A detailed table can be found at <http://cern.ch/ComputingRules/procedures/account-closure-summary.pdf>.

Before this procedure starts to run smoothly a major clean-up of accounts is needed. This will be done progressively over the

coming months with warnings sent by e-mail to the people concerned. The most common action will be the blocking of unused accounts. However the main actions that we expect users will need to take are:

- re-registration with CERN for users and other collaborators who are not often physically at CERN and have let their registration lapse;
- transfer of ownership of service accounts that are still in the name of someone who has left.

Initially this procedure will apply only to computer accounts but we foresee that the principle will quickly extend to other computing-related areas such as websites, mailing lists and devices connected to the network that require a named responsible person.

Judy Richards, IT/DI

Registration gets an electronic fax

Users who cannot bring or send their computing-accounts registration form to the User Registration office at CERN can now use the new electronic fax service and send the form (completed, and signed by their computing-group administrator) to the dedicated fax number: 69600 (or +41 22 766 9600 from outside CERN).

Using the new Fax Services provided by IT/IS, your fax will be delivered by e-mail directly to User.Registration@cern.ch. To know more about these services see <http://cern.ch/fax>, and the FAQs at <http://mmservices.web.cern.ch/mmservices/Help/?kbid=120020>.

All the information about account registration at CERN is available at <http://cern.ch/it-div/comp-usage>.

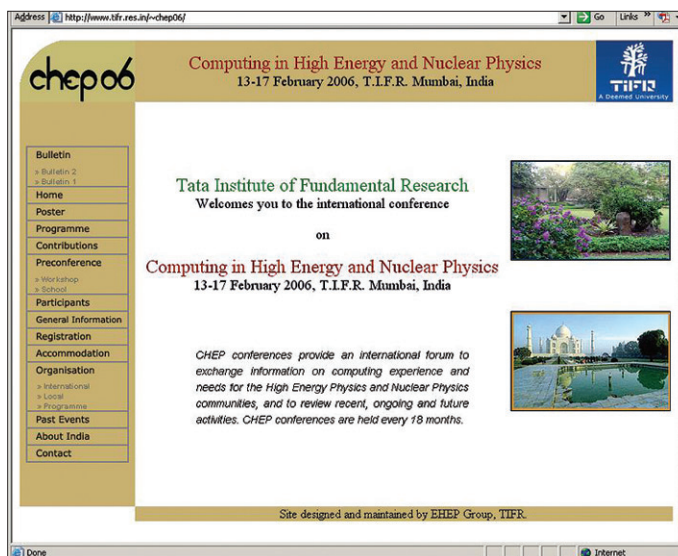
CHEP06 scheduled for Mumbai, India, on 13–17 February 2006

Computing in High Energy and Nuclear Physics (CHEP) is a major series of international conferences for physicists and computing professionals working in high-energy and nuclear physics, computer science and information technology.

CHEP conferences are held every 18 months and provide an international forum to exchange information on computing experience and the needs of the community, and to review recent, ongoing and future activities.

CHEP06 will be organized by the Tata Institute of Fundamental Research (TIFR), Mumbai, India, and takes place on 13–17 February 2006.

Pre-registration has started and can be done either online or by downloading the PDF file from the registration page (www.tifr.res.in/~chep06/regdetails.php) and sending the completed form by fax or e-mail. The conference fee is reduced



Register online for CHEP06, to be held in Mumbai in February 2006.

for early registration (before 15 December 2005).

There are plans to hold a three day pre-conference workshop on service challenges

for the LHC experiments just before the conference. This will be in the same venue on 10–12 February 2006 (Friday to Sunday). More information on

this topic is available at <https://uimon.cern.ch/twiki/bin/view/LCG/LCGServiceChallenges>.

The conference will focus on the processing of HEP data at all stages, from the high-level triggers that run on farms of CPUs situated close to the experiment, through to the final analyses that use worldwide resources.

We expect to draw on the experience from running experiments and also to review the status of new studies of the distributed computing models being made in preparation for the LHC experimental programme.

For all details (conference background, organizers, topics, programme and preliminary registration information) go to the CHEP06 website at www.tifr.res.in/~chep06/.

The easiest way to get in touch with the conference organizers is by e-mailing chep06@tifr.res.in.

CRA application represents the future of account handling

After more than 15 years of service, the Computer Centre Database (CCDB), which handles the computer account information for the IT-managed systems, will be replaced by the Computing Resources Administration (CRA) application. The benefits will be:

- new software technologies, like new relational database functionalities, which will enhance data quality;
- added functionality, like support for websites, e-mail lists and network devices;
- the removal of unused functionality, for instance budgeting and accounting for CPU usage, and supercomputer access rights; and
- improved computer security

through a tighter integration with personnel data (the HR database).

Integration with the HR database allows us to block resources automatically once a person is no longer affiliated with CERN (for more information see p3). It will also enable us to notify the supervisor of a person no longer at CERN, and track other responsibilities, besides the ownership of accounts that need to be transferred.

Support will also be made simpler. The automatic resource expiration mentioned above will replace the yearly manual account-review process. Also, application maintenance is simplified by supporting only one user interface – the Web. A

typical end-user will connect to the application with an AIS account, which is used for all CERN administrative Web applications, like EDH and the electronic salary slip. The end-user can then enter a nickname, change the preferred e-mail address, choose the visible e-mail address from the list of generic e-mail addresses, or set the default Unix shell and/or personal homepage URL. In addition, a number of self-service possibilities will be offered, like creating additional accounts, and AFS space quota requests.

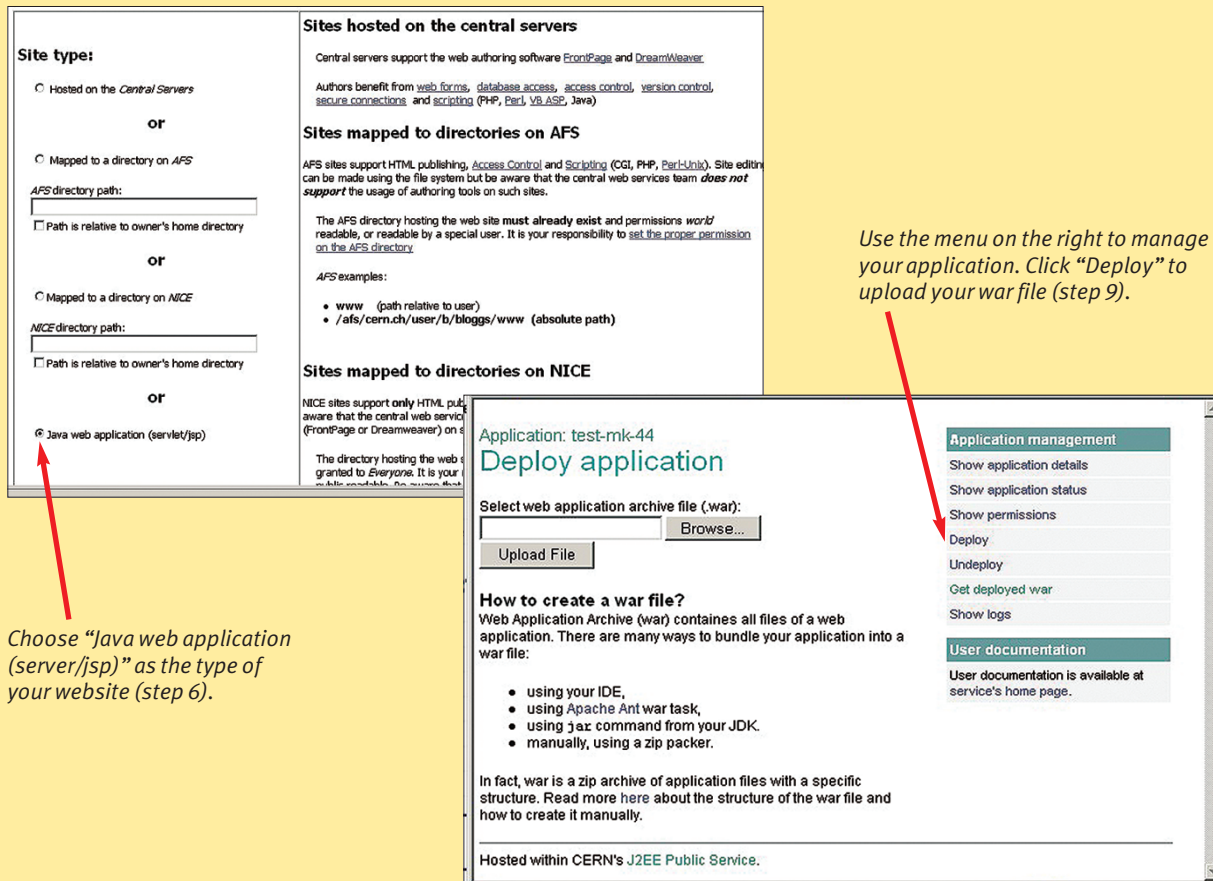
The first release of CRA is foreseen at the beginning of 2006. It will mainly replace the current CCDB functionality and implement the automatic

account expiration. However, its design is such that new features can be easily added in incremental releases over the next year. A few ideas we have in mind are automatic account creation once a person arrives at CERN, password management (synchronization and expiration), definition of dynamic groups of people for the creation of e-mail lists and access-control lists (e.g. everyone in the IT-AIS group), and support for other computing resources, like Oracle accounts and software licences.

For more information on the CRA project see the website at <http://cern.ch/ais/projs/cra/welcome.html>.

Wim van Leersum, IT/AIS

Java Web hosting comes to CERN



Choose "Java web application (servlet/jsp)" as the type of your website (step 6).

Use the menu on the right to manage your application. Click "Deploy" to upload your war file (step 9).

Until September 2005, there was no easy way to have a Java Web application hosted at CERN without running a J2EE server yourself. And running a J2EE server yourself has a lot of implications: keeping up to date with security patches, upgrading to recent releases, scheduling back-ups, monitoring, etc. The situation changed with the recent introduction of a new IT service: J2EE Public Service. It provides central server infrastructure for the deployment of Java Web applications (servlets/jsp), and it's meant for medium-size, non-critical applications.

Technically, each user of the service is assigned a separate Java application server (Apache Tomcat version 5.5), where they can deploy their Java Web application packaged as a war

file. The user later manages the application through a Web interface (see screenshots).

The service is integrated with central CERN Web Services, allowing the same rules for naming websites and the same mechanism for creating or managing websites. To create a Java website, please go to <http://cern.ch/WebServices/> and follow these steps:

Step 1

- Click "Create Web Site".

Step 2

- Log on using NICE authentication.

Step 3

- Choose the contents category of your website and click "Continue Registration".

Step 4

- Choose the name of your website and click "Continue Registration".

Step 5

- Enter a description of your website and click "Continue Registration".

Step 6

- Choose "Java web application (servlet/jsp)" as the type of your website (fourth bullet – if you can't see it, please scroll down) and click "Continue Registration".

Step 7

- Read the Service Level Agreement and CERN computing-security rules and click "I agree" at the bottom of the page.

Step 8

- Click "Create" on the last page. It takes up to a couple of minutes to create your website. Then, you can view the properties of your website and use the menu on the right to manage your application.

Step 9

- Click "Deploy" to submit your application packaged as a war file. After that, your application will be deployed on the server and accessible on the Web. By default, NICE authentication is configured, so you can use this mechanism to restrict access to resources in your application.

Please see <http://cern.ch/j2ee-public-service/>. Make sure the SLA fits your needs and give our service a try!

Michal Kwiatek, IT-DES

openlab II gets ready to build on the success of openlab I

Short review of “openlab I”

Principal mission

The CERN openlab for Datagrid applications was initiated during 2001–2002 and formally launched in January 2003. Leading IT companies that had a solid track record of delivering advanced technological solutions were invited to join in to evaluate and integrate cutting-edge technologies focused on the needs of the LCG. Since 2003, CERN openlab has involved CERN working in collaboration with Enterasys, HP, IBM, Intel and Oracle on a three-year project called the CERN opencluster.

Main project activity

The principal focus so far has been a Grid-enabled compute and storage farm – the CERN opencluster. It is based on 100 HP dual-processor Integrity servers, Intel’s Itanium Processor Family (IPF) processors, Enterasys’ 10Gbit/s switches and a high-capacity storage system based on IBM’s SAN FS storage subsystem. The 10 Gigabit Ethernet technology is used for both the local-area and the wide-area connections. Oracle 10g is deployed as the relational database software.

Important results have been produced via participation in LCG data challenges and service challenges, as well as individual demonstrations, tests and benchmarks. Delivery of results has also taken other forms, as in the porting and integration of the entire EGEE/LCG-2 middleware stack on the 64-bit Itanium platform. Furthermore, many requirement documents and functional assessment reports have been delivered to the partners. More information can be found in the CERN openlab annual report.

In most cases the work is carried out as a direct collaboration with the research and development arm of the partner concerned.



Sverre Jarp, chief technology officer of the CERN openlab.

Proposal for projects in “CERN openlab II”

Principal mission

The years 2006–2008 correspond to the period of the full deployment of the LHC Computing Grid. Real data will start flowing from the LHC detectors around the middle of 2007 but service challenges will simulate the real load on the Grid right from the start. The need to understand and master the continuous technological evolution will be just as important during this period as during the current three-year period. A natural option in this context is to build upon the expertise and reputation established by openlab I.

The mission of openlab II will continue to be a close collaboration with major trustworthy industrial partners able to demonstrate technological leadership and delivery of viable solutions. In addition, closer collaboration with the European Grid infrastructure project EGEE will be formalized, by taking advantage of the fact that EGEE enters a second phase in May 2006, called EGEE-II. EGEE is currently the largest multisite Grid-deployment

project in the world, with 70 institutional partners in Europe, the US and Russia.

Main project activities

Based on the openlab workshop Industrialising the Grid, held in June 2005, a number of topics were defined as of interest to CERN, the EGEE project and the openlab partners. Two specific themes were singled out as being of particular interest to some of the current openlab partners. These were:

- a Grid interoperability and integration centre (GIC) with close links to EGEE-II; and
- a platform competence centre (PCC) with the main focus on the PC-based computing hardware and the related software.

GIC

The GIC is proposed as a reinforcement of the activities within EGEE-II, and will allow the partners to take part in the integration and certification of Grid middleware. Partners will be expected to contribute hardware for a local test-bed, as well as suitable remote Grid resources.

The project will focus on the following activities:

- testing and certification – encompassing tests of the EGEE-II stacks on test-beds provided by the partners;
- support, analysis, debugging and problem solving – depending on the problems encountered on the contributed test-bed;
- interoperability – reviewing current levels of interoperability with industrial middleware stacks proposed by the partners, aiming to strengthen them and improve standardization of interoperable Grid middleware in general; and
- capture of requirements – based on all the other activities already mentioned.

PCC

The PCC will address a range of important fields, such as application optimization and platform virtualization.

Software and hardware optimization is seen as a vital part of the Grid deployment, since the demand for resources by the scientists is very likely to outstrip the available resources, even inside the Grid. Such optimization relies on deep knowledge of the architecture of the entire computing platform. On one hand this covers hardware items, such as processors, memory, buses and input/output channels. On the other hand it covers the ability to use advanced tools, such as profilers, compilers and linkers, specially optimized library functions, etc.

Platform virtualization can allow Grid applications to enjoy a highly secure and standardized environment presented by a “virtual machine hypervisor”, independent of all the hardware and software intricacies. The virtualization concept, initially offered as purely a software solution, will gradually move into hardware, allowing greatly improved performance of both the hypervisors and its “guests”.

These two themes will, of course, not exclude other activities being launched in the openlab framework.

Conclusion

During the first three years of existence, the CERN openlab has demonstrated the ability of CERN to work successfully with key industrial partners on the test and validation of new technologies. In the proposed second phase of CERN openlab, a formally defined relationship with EGEE-II will increase the impact of the openlab partnership beyond LHC computing to the wider domain of Grid-based scientific computing. Two projects for the second phase, the GIC and the PCC, are at an advanced stage of planning with several existing partners, and there is scope for further projects.

Sverre Jarp, IT/DI

CSC2005 is a record breaker



Participants at CSC2005. IT department leader Wolfgang von Rueden stands in the centre at the front, with CERN's director-general on his right.

This year's CERN School of Computing (CSC2005) has broken a record. The school took place in Saint Malo on 4–17 September, and attracted 79 participants of 27 different nationalities, overtaking the 2003 record of 25 nationalities.

Breaking nationality records is not a goal in itself, but it is a sign of the vitality and the increasing universality of CSCs. In fact, this year, in addition to most of the CERN member states, participants came from Armenia, Cameroon, China, Egypt, India, Iran, Korea, Mexico, Serbia and Montenegro, Russia, Turkey and Ukraine.

Such a rich and diverse attendance is made possible by the support that the school has received since 2004 (and will continue to receive for a period of four years) from the European Union, which provides grants to cover part or all of the participants' costs. This year, the selection process was particularly difficult as the committee received almost 160 applications for only 80 places.

The school was jointly organized by CERN and the French CEA-Saclay Centre, which proposed the venue in Saint



The record-breaking audience in the computing room at CSC2005.

Malo and provided the computing environment. CERN's director-general Robert Aymar visited the school and met students, had lunch with seven of them whose names were drawn from a hat, and attended a special session in which young participants presented topics of their choice after an on-site contest.

The tuition programme had three themes – Grid Technologies, Software Technologies and Physics Computing – and comprised 50 h of lectures and hands-on sessions. There were 10 lecturers from six different organizations.

One novelty of last year's school was the launch of the idea of an inverted school

(iCSC), "where students turn into teachers". The first iCSC took place at CERN in February 2005. In addition to the 10 senior lecturers at CSC2005, two of the young lecturers from iCSC were invited to deliver special lectures in Saint Malo.

One of the 2005 novelties was the CSC booklet, a comprehensive handbook available at the beginning of the school, gathering organizational and programme material, as well as the lecture hand-outs.

The school concluded with the now-traditional optional examination – now in its fourth edition – to which 70 students registered. Sixty-one of them passed and received the formal CSC2005 certificate of credit. Congratulations to all, with a special distinction to Marek Biskup, Anselm Vossen and Nuno Santos, who obtained the best marks.

Let's hope that this session's students will respond as enthusiastically as their predecessors to this iCSC, so that some of them may also contribute to CSC2006, which is to be held in Helsinki.

● For more information on CSC see <http://cern.ch/csc>.

François Fluckiger, IT/DI

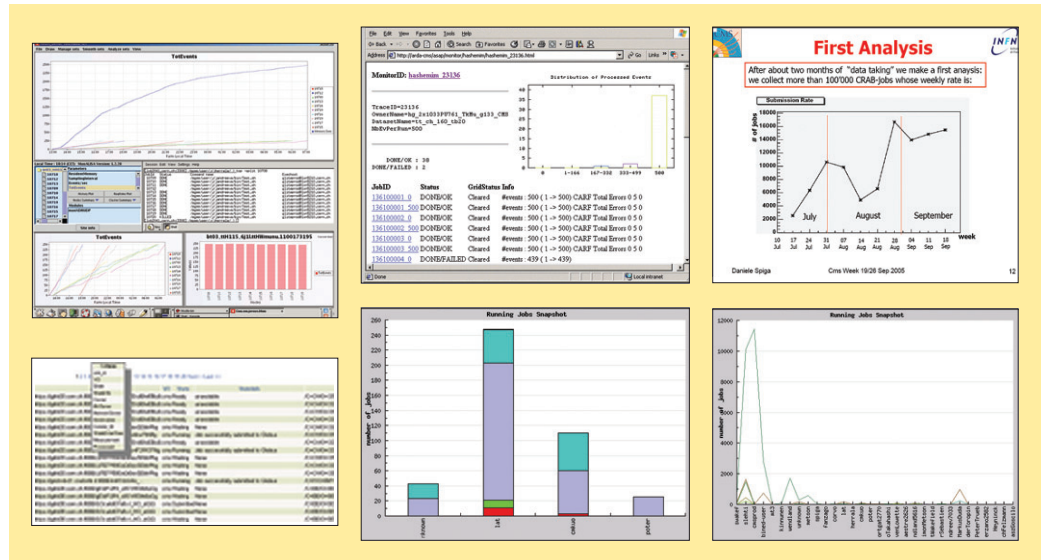
ARDA prototypes physics analysis

The ARDA project (A Realisation of Distributed Analysis for LHC) was created within the LCG project in 2004 to develop a prototype analysis system for the experiments at the Large Hadron Collider (LHC). The guiding idea behind ARDA is that exploring the opportunities and the problems encountered in using the Grid for LHC analysis would provide key inputs for the evolution of the EGEE gLite middleware.

Enabling a large, distributed community of individual users or small groups to use the Grid without central control stresses the infrastructure in a radically different way compared with large-scale, continuous production activities, such as generating simulated data or event reconstruction. Production can be regarded as a single-user activity and the emphasis is on maximizing the CPU utilization over long periods. All activity should be carefully logged. In the analysis environment, multiple users compete for resources and the latency between issuing a task and the availability of the first (partial) results becomes important. Often, the latency will be limited by I/O capabilities more than CPU power, like in scanning events or performing further event selection.

ARDA started in parallel with the EGEE project, which aims to provide a dependable Grid infrastructure for users from different scientific domains. In EGEE, the LHC experiments and a wide community of biomedicine applications have the key role of driving the evolution of the infrastructure. They are also major users of the computing infrastructure, for example with the LHC experiments' data challenges.

The LHC experiments also contribute to the Grid evolution through initiatives like ARDA (jointly funded by LCG and EGEE). This provides the opportunity for exploring new ideas and prototyping advanced services not yet provided by the infrastructure, which might lead to the development of innovative applications.



The different components of the CMS analysis system being assembled within the LCG-CMS task force. Clockwise from top left: a screenshot from MonaLisa, collecting information from the running jobs; the report page of the ASAP prototype; a summary of the CMS-CRAB user activity; and three screenshots of the CMS dashboard showing user/job activity.

Fostering innovation is a key element: the understanding of analysis activities in the LHC era is still evolving very quickly, so we need to retain flexibility. We remember, for example, how the analysis paradigm changed during the LEP years. While the hardware evolution is not under our control, the HEP community partially drives the way in how the computing and networking resources are organized (as do other cutting-edge developments, such as gLite). The patterns observed in the past suggest that the new Grid infrastructure will enable and stimulate new approaches to data handling and analysis, with the ultimate goal of enabling a large scientific community to maximize the scientific output of the LHC programme. However, a sound approach is needed for such an evolving infrastructure; therefore the future systems are prototyped together with the users, exposing them early to the Grid environment, and discussing the evolution on the basis of their experience.

Testing the Grid under real conditions gives effective feedback to the developers of Grid middleware and operators of the Grid infrastructure. During the first phase of EGEE, ARDA

played a key role in testing the middleware, with its access to "previews" of gLite components. This activity progressively moved towards detailed studies of performance issues, but always using the analysis scenario as a guideline. As an example, the experience and requirements of the LHC experiments led ARDA to propose a general interface for metadata access services. An ARDA prototype called AMGA (ARDA Metadata Grid Application) has been integrated into the gLite middleware and is now also used by non-HEP applications.

The LHC experiments welcomed the idea of the prototype activity agreed with ARDA. First, this is compatible with the physicists' approach of building a series of prototypes to control and guide the evolution of their instruments (from detectors to software). Second, ARDA helps to create the critical mass in the experiments' distributed-analysis teams by adding a small but dedicated set of experts.

From the beginning, it was decided to propose an independent prototype activity to each LHC experiment. It was considered unrealistic to force commonality in the use of tools at an early stage, since each

experiment has different physics goals and data-organization models. However, all the different activities hosted in the ARDA team benefit from common experience and cross-fertilization.

The ARDA-LHCb prototype activity is focusing on the GANGA system (a joint ATLAS-LHCb project). The main idea behind GANGA is that the physicists should have a simple interface to their analysis programs. GANGA allows preparing the application to organize the submission and gathering of results via a clean Python API. The details needed to submit a job on the Grid (such as special configuration files) are factorized out and applied transparently by the system. In other words, it is possible to set up an application on a portable PC, run some higher-statistics tests on a local facility (like LSF at CERN) and then analyse all the available statistics on the Grid by just changing the parameter that identifies the execution back-end.

The ARDA-CMS activity started with the comprehensive evaluation of gLite and existing CMS software components. Eventually ARDA focused on providing a full end-to-end prototype called ASAP,

prototyping some advanced services, such as the Task Monitor and the Task Control. The Task Monitor gathers information from different sources: MonaLisa (providing mainly run-time information via the CMS C++ framework COBRA); the CMS production system; and Grid-specific information (initially the gLite/LCG Logging and Bookkeeping and recently the R-GMA system).

The Task Control implements CMS-specific strategies, making essential use of the Task Monitor information. Task Control understands the user tasks (normally a set of jobs) and organizes them so that the user can delegate many tasks, e.g. the actual submission (the user registers a set of tasks and then disconnects) and error recovery. Some key components of this very successful prototype, which incorporated a lot of feedback from real users, are now being migrated within the official CMS system CRAB in the framework of the CMS-LCG taskforce.

The ATLAS work started with a series of exploratory activities, from contributions to specific components of the ATLAS production system, to the investigation of existing systems like DIANE (a tool for parallel analysis), as well as middleware evaluation. This activity continues in the framework of the ATLAS-LCG taskforce. Recently ATLAS has emphasized the usability of the distributed-analysis system and ARDA is directly involved in this activity. For example, DIANE was distributed to pilot users for evaluation, receiving good feedback. The usage of GANGA in ATLAS has been demonstrated and the first physicists are starting to use it.

The ALICE prototype is an evolution of the early distributed-analysis prototypes made by the experiment using their AliEn system, incorporating features from the Parallel Root Facility (PROOF) system and providing the user with access via the ROOT/ALIROOT prompt.

Close integration with the standard (local) analysis environment can be obtained only by carefully designing the gateway into the distributed system.

An important component, developed within ARDA, is the C Access Library. This optimizes the connection to the Grid infrastructure via an intermediate layer that caches the status of the clients (in particular their authorization) and therefore helps to optimize the performance as required for interactive use. Operations like browsing the file catalogue or inspecting a running job can be provided via mechanisms already known to ALICE users (shell commands and ROOT system).

ARDA is a direct and very active contributor to the EGEE project. EGEE benefits from exchanging ideas and experience with groups that actively support scientific communities, notably the LHC experiments and biomedicine. Being able to map concepts and strategies

developed in one particular application domain to other sciences is a powerful indicator of an improved theoretical understanding of Grid techniques. Each application domain can contribute with its specific requirements and knowledge, and improve the system as a whole.

The different prototype activities in ARDA, together with other activities within the experiments, are converging on a first version of the distributed-analysis systems, which will be used in the first phase of LHC operation. In the second phase of EGEE we expect to streamline this activity to further support the experiments' systems for both production and analysis. This means also continuing to influence the evolution of the middleware and the Grid infrastructure, using larger-scale experience and fostering the contacts with non-HEP scientists established during the first phase.

Massimo Lamanna, IT/PSS, CERN

Barcelona's Port d'Informació Científica: a centre of excellence for scientific-data processing

PIC, the "Scientific Information Harbour", in Barcelona gives support to scientific communities working in projects that require massive data processing and data storage. Since its creation in 2002, PIC has been collaborating closely with the LHC Computing Grid (LCG) as a Tier-1 centre and coordinates the participation of the seven research institutions (CIEMAT, IFAE, IFCA, IFIC, UAM, UB and USC) that constitute the Spanish contribution to the LCG. Manuel Delfino, PIC initiator and director, also coordinates the South-West Europe federation of the EU EGEE Grid Infrastructure project.

PIC is co-financed by national and regional governments through CIEMAT and IFAE and is equipped with solid data-processing and networking resources. PIC is hosted by the Universitat Autònoma de Barcelona, which maintains the physical infrastructure, including a 500 kVA motor generator. Within a very short time, PIC has

become an important centre of reference for the implementation of the GRID and the development of related technologies in Spain. Its team of 18 engineers, technicians and researchers are working in manifold application collaborations to endow international research projects with an extremely powerful and cost-saving tool.

The automated mass-storage system at PIC is based on a StorageTek L5500 silo with a capacity for 6000 tapes, purchased in 2003. At present the slots are equipped with 200 GB cartridges. The five installed 9940 B tape units allow a sustained transfer of 30 Mbit/s through a Fibre Channel link, with a top speed of 150 MB/s burst transfer or 1.2 Gbit/s. The current maximum storage capacity is 1.2 PB given the number of slots and cartridge capacity. Space for a second robot is reserved in the 150 m² machine room.

At present, 10 projects are storing data on the PIC mass-

storage system, with a 40% share for LHC experiments involving Spanish groups (Atlas, CMS and LHCb). Other physics-related collaborations storing data at PIC are the Alpha Magnetic Spectrometer (AMS – to be installed in Earth orbit), MAGIC (an astrophysics telescope located at La Palma, Canary Islands) and K2K (a neutrino experiment in Japan). Since 2004 digital medical images coming from the UDIAT centre at the Parc Taulí Hospital are being stored at PIC for medical research. PIC also stores data for molecular biology studies, medical drug research and turbulent fluid dynamics simulations.

During summer 2005 the traffic of digital data flowing to PIC from different research centres has risen considerably, due to the service challenges of the LCG project and the beginning of data transfer from a fluid-dynamics research project that actively uses the Barcelona Super Computer (MARE NOSTRUM).

Sustained data transfers related to the LCG project have taken place from CERN to PIC, starting in July 2005. Up to 5 TB of data each day at an average speed of 60 MB/s were attained. The test, coordinated by Dr Gonzalo Merino, was designed to verify that the Grid middleware allows the automated transfer of large amounts of data.

By 2008, when the LHC experiments will be in full data production, they alone will store more than 1 PB of data at PIC each year. The L5500 silo is connected to a mass-storage system based on CASTOR, an open-software product developed at CERN with contributions from engineers at PIC and CNAF (Italy). CASTOR lets users write to tapes as if they were writing to their hard disk. Some 40 TB of storage disk space are currently used, around 10% of the total tape capacity. This storage system will have to be scaled up substantially in the future.

Stéphanie Buchholz, PIC

CERN explains its Linux strategy: SLC4 or SLC5?

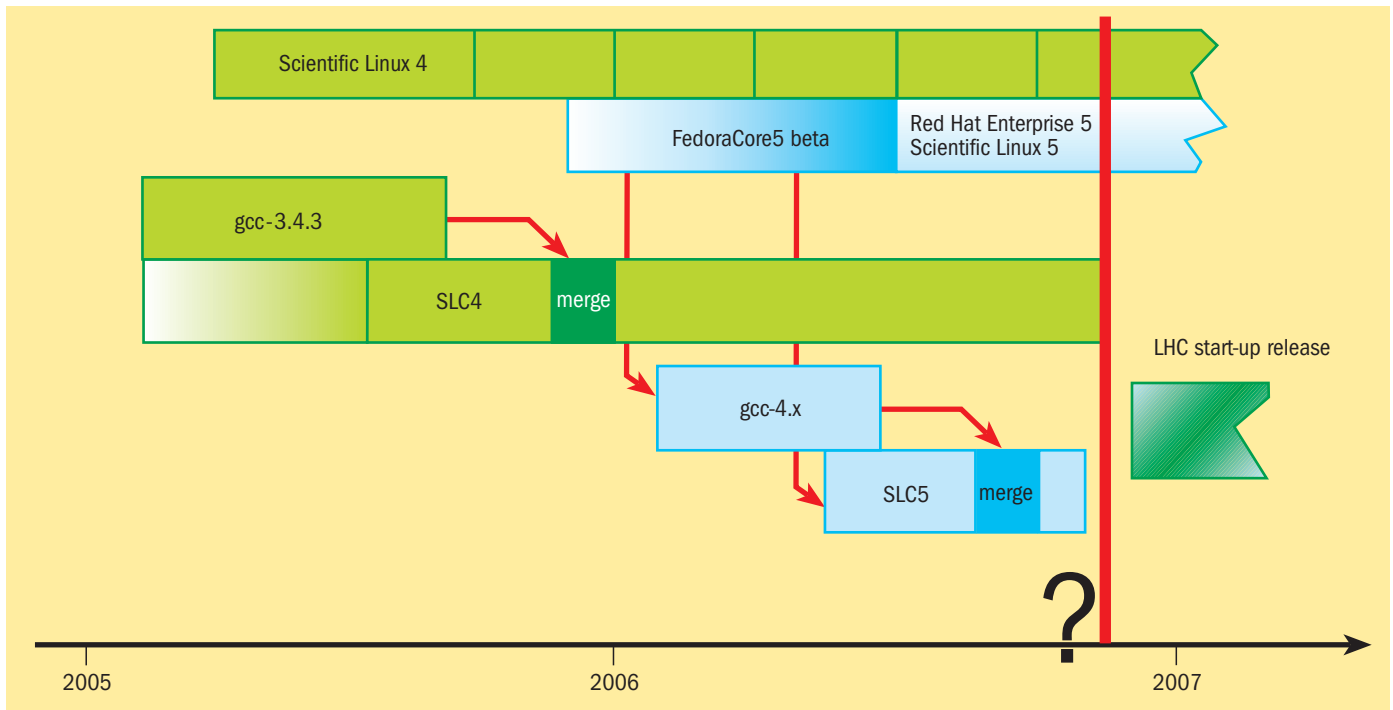


Fig. 1: the two OS candidates and their respective system compilers (gcc-3.4.3 and gcc-4), together with the planned certification timelines.

PC hardware evolves. Applications evolve. Linux evolves. Linux distributions evolve. CERN Linux moves along with the rest of the crowd, trying to match the release schedules of the operating system (OS) and system software (AFS, KDE/GNOME, etc) to our experiments and user-community timelines, and so every 12–24 months a new release needs to be brought forward at CERN. This article looks at the planning for the Linux release that will be used at the LHC start-up.

The CERN Linux currently in distribution is Scientific Linux CERN 3 (SLC3). It is based on Scientific Linux 3 (SL3), an HEP-wide collaboration with FermiLab and CERN as major contributors. SL3 is itself based on the freely available Red Hat Enterprise 3 sources.

SLC3 was certified in November 2004, after six months of validation by the

various CERN Linux user communities. SLC3 still supports most of the hardware arriving at CERN, and currently has very few functional deficiencies. But over time, newer hardware will require updates, and newer software versions will offer shiny new functionalities that CERN users may crave. So eventually, SLC3 will need replacing – but when and with what?

In 2007, LHC will start up. Given the complexity of all its computer-driven components, introducing a new Linux release in the middle of start-up is considered unwise. Working backwards from the various deadlines, the last opportunity for changing Linux versions will be around October 2006. Whatever Linux version is certified at that time will stay in place for several years.

Possible candidates are SLC4, derived from Red Hat Enterprise 4 (released in February 2005) via SL4 (released April 2005), and a

future SL(C)5 based on the yet-to-come Red Hat Enterprise 5. In the third quarter of 2006, the SLC4 codebase will be about 24 months old (quite old by Linux standards). SLC5 will be fresher (e.g. it will support more recent hardware and have nicer/newer versions of application software), but no firm release date is known. So there is a risk that the formal certification of SLC5 could be delayed beyond the cut-off date in October 2006.

In order to keep SLC5 as an option, but still have a reliable fallback solution in case of delays with it, the LXCERT coordination group decided in May 2005 to fully certify SLC4 until the end of 2005, but not to deploy it widely on CERN machines except for hardware that was too new to be supported by SLC3 (e.g. certain desktop and notebook models).

Assuming its successful certification, SLC4 will be available and supported at CERN

during 2006. It will support newer hardware, and may perform better than SLC3 for specific applications. But for the moment it does not have a longer support horizon than SLC3, so should only be deployed in areas where another re-installation a few months later is acceptable.

Instead, an attempt will be made to certify SLC5 in 2006. To speed up the certification process, it has been decided to split the basic OS validation (hardware and typical user applications) from the compiler certification (which concerns mostly the physics software), and merge the OS and compiler late in the process.

Only if SLC5 is delayed will SLC4 become the new production version, and SLC3 will be made obsolete shortly afterwards. If SLC5 certification happens on time, SLC4 will be made obsolete together with SLC3.

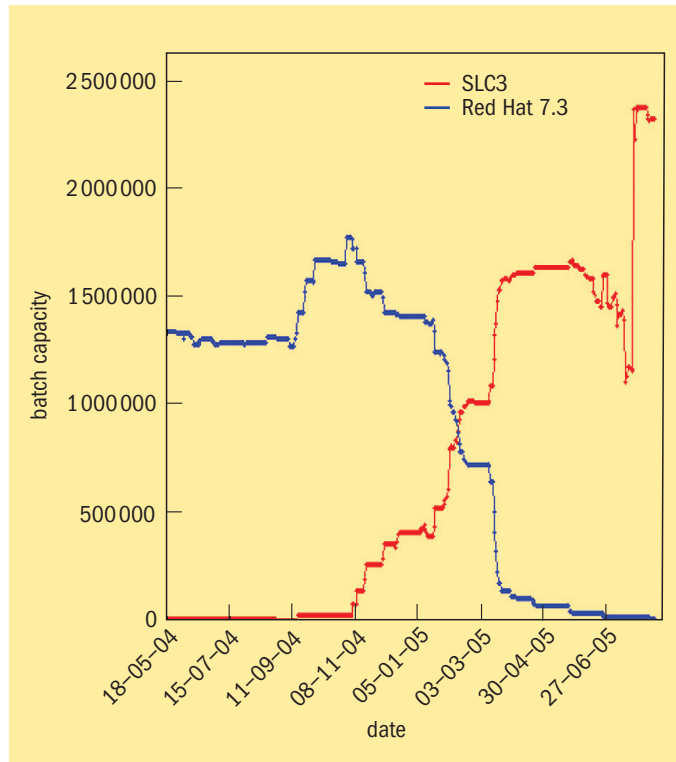
Jan Iven, IT/FIO

Cluster-management helps ATLAS tests run smoothly

Regular users of the IT-FIO batch services (see <http://cern.ch/it-dep-fio-fs/>) will remember a major reduction in capacity in June and July as more than 700 dual CPU nodes were allocated for ATLAS tests. This article explains the background to these tests and how important our new cluster-management software was for their smooth running – and the return to normal service afterwards.

As part of their preparation for LHC data taking, the ATLAS online team needed a large number of nodes to perform functionality and verification tests of the planned DAQ farm and High Level Trigger system before moving ahead with purchase and installation for 2007. In particular, they needed individual subsystem tests for DAQ and Event Building Systems and then the Level 2 Trigger and the Event Filter system. At full scale, the ATLAS DAQ/HLT farm will comprise some 2000 nodes, so at least 600 nodes were needed for realistic tests. Where to find these today? The 1400 node LXBATC cluster seemed the perfect solution.

However, the ATLAS online team had many special requirements for the machines ranging from fine tuning of the operating system and network configuration to the installation of specific ATLAS DAQ, HLT and monitoring software and the configuration of Apache Web servers. Ordinarily, making all the necessary changes across



The decrease of LXBATC capacity during the ATLAS TDAQ challenge period can be seen above, starting on 6 June 2005 and ending on 22 July 2005 when all the resources were moved back to LXBATC.

700 machines would be a time-consuming process with a high risk of errors if some of the nodes were not configured correctly – and, moreover, more time would need to be spent reconfiguring the systems after the tests.

Fortunately, the Extremely Large Farm management system (ELFms, see <http://cern.ch/elfms/>) that has been

introduced by IT to manage the future large-scale offline farms for LHC came to the rescue.

Two dedicated RPM packages containing the ATLAS software were installed into SWREP, the Quattor (see <http://cern.ch/quattor/>) software repository. The requirements of the ATLAS test cluster, for both installed software and operating system configuration, were then

entered into CDB, the Quattor machine database that controls almost all systems in CERN's Computer Centre.

The test schedule involved a steady ramp-up of the number of nodes allocated to ATLAS, allowing any final bugs or problems with the code to be ironed out with minimal disruption to normal services. As more nodes were needed, they were moved logically in CDB from the LXBATC cluster to the ATLAS test cluster. The full power of the ELFms tools then took over with the LEAF suite (see <http://cern.ch/leaf/>) and LEMON monitoring information (see <http://cern.ch/lemon/>), ensuring the nodes were drained of running batch jobs and readied for reinstallation.

At this stage the Quattor installation and configuration tools took over, reinstalling the operating system according to the ATLAS requirements. When the tests were complete, the process was reversed – the nodes were moved logically back to the LXBATC cluster in CDB and then the ELFms tools took care of reinstalling the 700 nodes with the LXBATC configuration and returning them to service in just 36 h!

As well as being vital for the ATLAS online team the tests were also a useful exercise for the FIO group as we look ahead to the challenge of managing the Tier-0 and Tier-1 clusters at CERN.

Thorsten Kleinwort and Véronique Lefébure, IT/FIO

The CNL editorial team wishes you a very merry Christmas and a happy New Year!

Keep your software updated and stay ahead of viruses

Up-to-date and patched software helps minimize the risk of your computer being infected by a virus or attacked by a hacker. In most cases, making the update process automatic can only help.

At CERN you have an easy option – let your Windows PC be managed by the NICE service or profit from the automatic update option that is set to “on” by default in the CERN standard Linux desktop installation. This

will ensure that the operating system and CERN-supported applications are kept up to date.

At home it requires a bit of initiative on your part but the amount of software offering automatic updates is steadily increasing. The CERN licence for anti-virus software from Symantec allows you to install and update the software on your home computer, as well as unmanaged computers at CERN (see <http://cern.ch/antivirus>).

Did you know about Microsoft Update, which provides patches not only for Windows, but also for other Microsoft products, such as Microsoft Office, Visio, Project and Publisher? If you are already using Windows Update, open it, click on the “News” item “Upgrade to Microsoft Update” in the lower right-hand corner and follow the instructions. If you are not already using Windows Update go to <http://update.microsoft.com/>

microsoftupdate. Finally, check that you have a firewall active – from the Control panel go to Security Centre.

If you are concerned that automatic updates may go wrong and damage your system, remember that you are one of many millions who will use these update systems and the more standard and up to date your system is, the smaller the risk of something going wrong.

Judy Richards, IT/DI

Questions and answers from the Helpdesk

The User Assistance Team in IT/UDS maintains a database for Questions and Answers (Q&As) that have been dealt with by the Computing Helpdesk. This provides many tips on daily computing issues. You can search the database at <http://consult.cern.ch/qa/>.

Below are two questions that were raised recently at the Helpdesk (<http://consult.cern.ch/qa/3937> and <http://consult.cern.ch/qa/3938>).

Procedure for broken PC under guarantee

Question

I have a broken PC that is still under guarantee. What is the procedure?

Answer

Contact the Helpdesk who will send a technician to carry out a proper diagnostic. If there is a hardware fault the PC must be returned to the manufacturer. The technician will help you to complete the necessary return form, which triggers a transport request to collect the machine.

When repaired, the machine will be delivered back to the user with a report on the work done. If the user needs more help to configure the machine then the Helpdesk will assist.

In case of an excessive delay the user should contact the

CERN stores (Didier Colombarini or Isabelle Mardirossian).

Related links

● Stores fulfil computing orders (CNL September–October 2005).

Electronic Fax Service (cern.ch/fax)

Question

I read about the new Fax Service in *CERN Bulletin* 38/2005 (see <http://bulletin.cern.ch/fre/egeneral.php?bullno=38/2005&base=gen#Article6>).

However, my registration failed because my “NICE account was ineligible for the service”.

Could you explain why, and how I can become eligible?

Answer

Only CERN staff members, project associates and fellows can register to use the service. A NICE account is required to log in to <https://cern.ch/mmmsservices/tools/fax>, where registration is performed. If you get the error message “Your account is not eligible to Fax Services”, then your NICE account is not related to an official CERN staff member/associate/fellow.

You can still register if you have a professional need related to your CERN work. To do so you, or preferably the person at CERN responsible for you, should e-mail the Helpdesk.

“Service accounts” can also be registered (to allow secretaries to get an electronic fax number) by e-mailing Computing. Helpdesk@cern.ch.

Please note that IT/IS is currently reviewing the situation to understand the effective needs for this service and its user community.

Related links:

● Using Fax Services (<http://mmsservices.web.cern.ch/mmmsservices/Help/?kbid=120001>)
● FAQ about Fax Services (<http://mmsservices.web.cern.ch/mmmsservices/Help/?kbid=120020>).

Other general-interest Q&As and their corresponding websites

Windows (NICE – Office) related

- <http://consult.cern.ch/qa/3921>
- <http://consult.cern.ch/qa/3908>
- <http://consult.cern.ch/qa/3932>
- <http://consult.cern.ch/qa/3913>
- <http://consult.cern.ch/qa/3960>
- <http://consult.cern.ch/qa/1596>

sftpdfs – Name or service not known – Connection reset by peer
Weird folders in local drive after installing Windows updates
Take notes directly into a PowerPoint presentation
Windows taskbar icon disappears regularly
Visio 2003
Copy/paste from/to exceed

Unix (AFS-Lxplus/Lxbatch) related

- <http://consult.cern.ch/qa/3934>
- <http://consult.cern.ch/qa/0011>
- <http://consult.cern.ch/qa/3728>
- <http://consult.cern.ch/qa/3957>

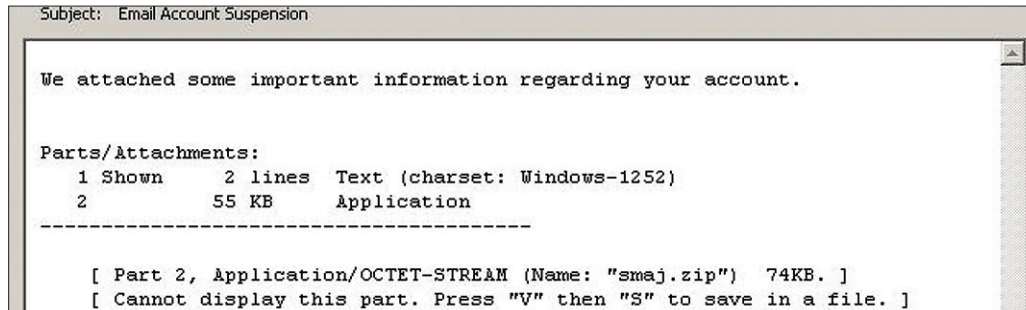
ssh key and passwordless access to Lxplus
Using ssh/scp from batch/cron jobs
Problem with command kpasswd
Usage of Lxbuild

Miscellaneous

- <http://consult.cern.ch/qa/1076>
- <http://consult.cern.ch/qa/3919>

Wrong data and information in CERN phone book
Web – Java application JSP/Servlet

IT services e-mails do not contain attachments



Spammers commonly spread viruses by sending e-mails that seem to contain important information and that appear to be sent from a service manager's account. The screenshot above shows such a message that CERN users have received, i.e. a mail from the registration

service, supposedly providing important information about your computer account. You must immediately delete these e-mails from your mailbox, and never open the attachment. None of the CERN services managers will ever send an attachment. If information has to

be separated from the message (for instance because it is too long) then, in most cases, you will be referred to a CERN-registered website (containing cern.ch in the URL). If in any doubt ask the Helpdesk before taking any action (call 78888 or e-mail Helpdesk@cern.ch).

Service Status Board gets dynamic

You may have noticed that the IT Service Status Board (SSB) has been split into two pages: the usual page at <http://cern.ch/it-servicestatus> contains information written by the IT manager on duty at the request of all IT services providers, to inform users about a service incident, a scheduled intervention or a service change that was agreed and planned in

advance. There is now a second page collecting all the "dynamic" information including the current status of most services, as provided by the services responsible (e.g. the TVScreen provided by IT/FIO, or the AIS news from the Administrative Information Services). This dynamic page is easily accessible from the SSB via a link, or can be accessed

directly at <http://cern.ch/it-support-servicestatus/default-dynamic.asp>. If you have information for these pages please contact the IT manager on duty at mod@cern.ch. As usual, changes to services in the IT department are published on the SSB. The most recent changes and their dates of posting are shown below.

15 September	Restrictions on the number of database sessions for DEVDB service (19 September)
22 August	HR11i upgrade – Jinitiator to be reinstalled (22 August)
19 August	AppleTalk Routing: Phase-out 30 September 2005 (30 September)
9 August	CASTOR client upgrade on LXPLUS/LXBATCH/LXGATE/LXBUILD – libshift.a (9 August)
28 June	Wide deployment of the CASTOR client software (4–5 July)
25 April	Rundown of SUNDEV facility (1 July)
27 June	Secure external access to CERN's services to replace VPN (June)
20 June	End of Red Hat 7 batch and interactive services (end of June)

News from the IT Bookshop

CERN users can find computer and physics books and CDs at discount prices at the User Support Bookshop in Building 52 1-05 in the Central Library (since July 2005). The shop is open weekdays 8.30 a.m. – 12.30 p.m. and can also be contacted by e-mail (Bookshop@cern.ch) or phone (74050).

Books are bought from some 15 publishing houses, and users are very welcome to suggest acquisitions. The catalogue can be found at <http://cdsweb.cern.ch/tools/itbook.py> and now includes physics books. The most recent computing acquisitions include:

- **Simply C++** by Deitel, Choffnes



and Kelsey;

- **C++ Primer** (fourth edition) by Lippman, Lajoie and Moo
- **Learning Java** (third edition) by

Calendar

November
30 – 2 Dec **IFIP International Conference on Network and Parallel Computing (NPC 2005)** Beijing, China, <http://grid.hust.edu.cn/npc05>

December
5–8 **IEEE International Conference on e-Science and Grid Technologies** Melbourne, Australia, www.gridbus.org/escience

7–9 **International Symposium on Parallel Architectures, Algorithms, and Networks (I-SPAN)** Las Vegas, NV, US, <http://sigact.acm.org/ispan05/>

2006

February
13–17 **15th International Conference on Computing in High Energy and Nuclear Physics (CHEP06)** Mumbai, India, www.tifr.res.in/chep06/

March
1–3 **TridentCom 2006** Barcelona, Spain, www.tridentcom.org

April
3–7 **HEPiX Spring 2006** CASPUR, Rome, Italy, www.caspur.it/en/

The deadline for submissions to the next issue of CNL is

3 January 2006

E-mail contributions to cnl.editor@cern.ch

To be e-mailed when a new issue of CNL is available, subscribe to the mailing list cern-cnl-info. You can do this from the CERN CNL website at <http://cern.ch/cnl>.

Niemeyer and Knudson

- **Home Networking: The Missing Manual** by Lowe
- **Oracle PL/SQL Programming** (fourth edition) by Feuersteinn and Pribyl
- **Learning Perl** (fourth edition) by Swartz, Phoenix and Foy
- **Coding Theory – A First Course** by Ling and Xing.

Roger Woolnough and Jutta Megies, IT/UDS