Grid Infrastructure in Latin America
The EELA-2 story and legacy

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ISGC2010 Conference – 09 to 12 March 2010
Taipei – Taiwan
• Networks & Grid coverage

• EELA-2 objectives and outcomes

• The EUAsiaGRID – EELA-2 Memorandum of Understanding

• The GISELA project: e-infrastructure & support to VRCs
EELA & EELA-2 objectives

**EELA** (Jan. 2006 – Dec. 2007)
- Build a bridge between consolidated e-Infrastructure initiatives in Europe and emerging ones in Latin American
- Create a collaboration network to deploy a large portfolio of scientific applications on a well supported Pilot Test-bed
- Care in parallel of the training in grid technologies and of the knowledge dissemination and outreach

**EELA-2** (Apr. 2008 – March. 2010)
- Provide an empowered Grid Facility with versatile services fulfilling application requirements
- Ensure production quality services
- Ensure the long term sustainability of the e-Infrastructure beyond the term of the project
- Expand the current EELA e-Infrastructure
- Look for new communities outside academia (Industry and Business)
EELA (SSA under EU FP6)

- E-infrastructure shared between Europe and Latin America
- EC support: 1.7 M€
- CIEMAT extra support: 0.4 M€
- 10 Countries (3 in Europe)
- 2 International Organisations
- 20 Members (7 in Europe)

At the final review EELA was awarded the highest EC rank: “Good to excellent project”

EELA-2 (CP-CSA under EU FP7)

- E-science grid facility for Europe and Latin America
- EC support: 2.1 M€
- CETA-CIEMAT extra funds: 0.3 M€
- Currently 16 Countries (11 in LA)
- 2 new countries (Panama & Uruguay)
- 1 International Organisation (CLARA)
- Currently 78 Members (62 in LA)
- 32 Institutions joining (31 in LA)
- Currently 13 JRUs (9 in LA)
- 4 new JRUs (3 in LA)
Currently 25 RCs, 9000 cores & 35 TB

16 Countries
18 Partners (13 JRUs)
78 Members

Argentina
Brazil
Chile
Colombia
Cuba
Ecuador
Mexico
Peru
Venezuela

France
Ireland
Italy
Portugal
Spain

CLARA (International)

PANAMA
URUGUAY
NA2 = Dissemination & Training
Much more training effort delivered than pledged
Relevant and strategic applications that have been selected through a strict, although open, procedure from a large portfolio. The actual assessment of applications was based taking into consideration the following criteria:

- Number of involved institutions from Europe and Latin America
- Suitability for Grid deployment
- Easiness of gridification
- Grid added value
- Resources (CPU, storage) commitments of the Institutions involved
- Usage of the infrastructure (number of jobs and frequency of runs)
- Potential outreach / impact (in the scientific community, industry, socially in the country, towards policy / decision makers)

In order to foster even more the collaboration between European Institutions and Latin American ones, applications involving partners from both continents were preferred.
Grid Schools, Gridification Weeks, User Forums, User Guides, Tutorials, FAQs, etc. helped a lot!
Currently: 61 Applications

Scientific Domain

- Life Sciences: 29
- Earth Sciences: 2
- Engineering: 11
- HEP: 7
- Computer Science and Mathematics: 5
- Computational Chemistry: 4
- Others: 2

Europe: 22
LA: 41

Number of applications

- Argentina: 18
- Brazil: 16
- Chile: 14
- Colombia: 12
- Cuba: 10
- Ecuador: 8
- France: 6
- Ireland: 4
- Italy: 2
- Mexico: 2
- Peru: 2
- Portugal: 2
- Spain: 2
- Venezuela: 2
> 60 EELA-2 applications

Home
Applications
Statistics
Monitoring
Web portals
Propose new Application
Self-training
Technical support
Training Events
Call for Papers
Announcements
About NA3
Staff
Help

http://applications.eu-eela.eu

www.eu-eela.eu

ISGC2010 Conference – Taipei (Taiwan) – 10 March 2010

Total of Applications: 66

Distribution by readiness status

Distribution by middleware

Distribution by programming languages

Genre distribution - prod.vo.eu-eela.eu users

Males (68)

Females (12)

Java (2)

C (16)

not defined (14)

Fortran (16)

C plus plus (9)

Perl (1)

Python (1)

Distribution by country

Spain (14)

Argentina (5)

Brazil (17)

Chile (4)

Colombia (8)

Ecuador (1)

Cuba (3)

France (5)

Ireland (1)

Italy (2)

Mexico (7)

Portugal (5)

Total of Applications: 66

Brazil (17)

Chile (4)

Colombia (8)

Ecuador (1)

Cuba (3)

France (5)

Ireland (1)

Italy (2)

Mexico (7)

Portugal (5)
Application distribution as of today

• >15% increase w.r.t. the DoW

Feasibility of application deployment rather than production of results!
• Life Sciences / Biomedicine

Heart Simulator
UFJF - Brazil

The current computational models track the electrophysiology of the heart from sub-cellular to the whole-organ level and, therefore, allow a better comprehension of important cardiac diseases, such as Ventricular Arrhythmia, Myocarditis, Infarct, Chagas Disease, Diabetes, etc. In addition, the cardiac response to drugs can be better quantified.

A single heart beat can be computed in 10 hours, when running in a 64-node cluster. However, model parameter studies as well as associated inverse problems will demand thousands of single-beat simulations.

Earth Science

Water management UFCG – Brazil

BRAMS is a climate and weather forecast model developed by INPE (Brazil's National Institute for Space Research). It is a modification of RAMS. It is a key component of SegHidro platform. This application is particularly helpful to the Brazilian Northeast, a semi-arid region, where irregular rainfall distribution causes many problems to the population. BRAMS model execution provides SegHidro platform with weather forecast and climate prediction over a given area and period of time.

Weather predictions
UNICAN - Spain

The Weather Research and Forecasting Model (www.wrf-model.org) is a next-generation mesoscale numerical weather prediction system designed to serve both operational forecasting and atmospheric research needs. It features multiple dynamical cores, a 3-dimensional variational (3DVAR) data assimilation system, and a software architecture allowing for computational parallelism and system extensibility. WRF is suitable for a broad spectrum of applications across scales ranging from meters to thousands of kilometers.

Civil Protection

CROSS-Fire
U.Minho - Portugal

Collaborative Resources
Online to Support Simulations on Forest Fires

Forest fires represent a typical CP emergency case that requires a fast and reliable risk management support system, with real-time or near real-time availability of critical geo-referenced data and settings-based forecasts for fire spreading.

• **Aerospace Manufacturing**

  AeroVant  
  UNRC - Argentina

  This application simulates nonlinear and unsteady behavior of joined wings, high altitude, long endurance unmanned aerial vehicles.

SA1 = Grid Infrastructure Service Activity
Every EELA-2 country has access to the LA PKI
Resource Centres Map (Y1)
Infrastructure Usage - all VOs (Y1)

Executed Jobs per month

About 1 million jobs executed
EOC – EELA-2 Grid Operation Centre
ENSC – EELA-2 Networking Support Centre
ENOC – EGEE-III Network Operation Centre
• In the context of Latin America and Europe
  – Collaboration with EGEE network support*

* http://www.eu-egee.org
Interaction between ENSC and the NREN NOCs

1. Site contacts ENSC
2. Use of monitoring tools to verify network connectivity
3. ENSC contacts NREN NOCs
4. NREN NOCs contact CLARA NOC
• Implementation of a multi-domain network monitoring service based on perfSONAR
  – Measurement points deployment at EELA-2* sites
  – Integration with the monitoring services available in the domains (CLARA and GEANT networks)
    ▪ Each network controls its own monitoring system
• **ICE CUBE:** for on demand measurements
  
• Data Management
  – Digital archives (Grid Storage Access Framework - GSAF)
    ▪ integration of data management operations (SE, LCF, AMGA)
  – Secure storage
    ▪ avoid the insider abuse attack
  – Cooperative annotation of data
• Job management
  – VO compliant Virtual Machine environments
  – Workflow for OurGrid jobs
  – WatchDog
    ▪ monitoring and control of job execution on the gLite Worker Node
• Catalogue and file management
  – lcg-rec toolkit
    ▪ recursive version of the lgc-* suite of commands
Purpose

• To define a framework of collaboration between EUAsiaGrid and EELA-2 (hereafter also referred to as “the Party” or the “Parties”)

Joint Work plan

• The specific activities that will be undertaken in the context of the collaboration driven by this MoU are

• A1- Analysis and contextualization to Asia-Pacific of the EELA-2 model for a long-term sustainable e-Infrastructure

• A2- Identification and support of scientific applications of interest for both regions in order to trigger/foster virtual organisations across Asia-Pacific and Latin America

• A3- Sharing of best practices in e-Infrastructure operation and grid training

• A4- Sharing efforts to create joint user guides and technical documentation
From  
**EELA-2**  
E-science grid facility for Europe and Latin America

To

**GISELA**

Grid Initiatives for e-Science virtual communities in Europe and Latin America

Submitted to the FP7 INFRA-2010-2 call  
Topic INFRA-2010-1.2.3: Virtual Research Communities  
Hearing meeting on 10/02/2010
Plan for the long-term sustainability of the e-Infrastructure in the Latin American continent

Full support of the Virtual Research Communities spanning Latin America and Europe, using the e-Infrastructure.

Focus on two inter-related goals:

- Implement the NGI / LGI sustainability model, as specified in DSA1.3 (http://documents.eu-eela.org/record/1119/files/), in association with CLARA and collaborating with EGI.
- Provide the communities with the suited e-Infrastructure and Application-related Services required to improve the effectiveness of their research. This will address both:
  - The current EELA-2 User Communities whose research investigations are carried out at the Institution level or in small collaborations.
  - The larger Virtual Research Communities whose Grid future support is anticipated to be implemented through the new instrument called “Specialised Support Centre” (SSC).
Evolution of the LGI Model

CLARA

APPLICATIONS MANAGER

NETWORK MANAGER (NSC)

GRID COMMUNITY COORDINATOR

GOC

NGI or EDGS

NOC

Regional GOC + GOC

Country LA - 1
CHILE-REUNA

Country LA - N

NGI or EDGS

NOC

Country LA - 2

Regional NOC + NOC

NGI or EDGS
Iniciativa de Grid de America Latina – Caribe

- EGI / EGEE ROC
- LA Resource Centres deployment and maintenance assistance
- Multi-middleware support
- Prod VO maintenance/operations
- Interface between service grids in LA (eg. GISELA) and Europe (eg. EGI)
- VRC support
- Officially launched on December 2009
- Guaranteed funding up to December 2010
- Currently pledged resources
  - ~800 job slots and ~30 TB of storage
  - multi-middleware (gLite, OurGrid, OSG)
- Fully open to new services / partnerships
- All interested institutions invited to actively participate: roc@igalc.org
Conclusions

- EELA was a success, recognised by the highest EC ranking
- EELA and EELA-2 drastically changed the perspectives about e-Science in Latin America
- Long-term sustainability of e-Infrastructures worldwide is key for a continued support of Scientific Communities
- CLARA, an EELA / EELA-2 Partner, is becoming a major GISELA actor
- GISELA proposal submitted on 23/11/09 ……
- Hearings on 10/02/2010
- **GISELA got the mark 14.5 / 15 after the hearings (hot news on 08/03/10)**
- Negotiation (hopefully) at the end of March 2010
- Hopefully starting in August / September 2010 !...
- **Future collaboration with**
  - VRCs: mandatory!!!!!
  - Sister projects (EGI, EUAsiaGRID, etc.) natural and … desirable
Useful references

• **Project website:**
  – www.eu-eela.eu

• **Final review of EELA:**
  – http://indico.eu-eela.eu/conferenceOtherViews.py?view=standard&amp;confId=113

• **First review of EELA-2:**
  – http://indico.eu-eela.eu/conferenceOtherViews.py?view=standard&amp;confId=193

• **LGI model:**
  – http://documents.eu-eela.org/record/1119/files