

## **Socialization Strategies for Advanced Computing Services in Latin America: a Regional Experience**

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### **Abstract**

*This article will summarize the socializing experience with the potential users of the GISELA project e-Infrastructure in Latin America, in a regional learning context for the construction and consolidation of virtual research communities. Thus, beyond the computing resources capacity of centres available, it approaches the matter from an infoculture perspective, linked to cultural values, management philosophy of the institutions, regulatory elements, competences, functions and responsibilities that make up the context with the infostructure, and that somehow end up guaranteeing the successful use of technology tools. As part of the way to encourage ownership of the e-Infrastructure available in Latin America, the establishment and consolidation of virtual research groups that "discover" new needs in their research areas that lead to demands for use of the e-Infrastructure is, rather than a possibility, a challenge that must become a management policy if it is expected some sustainability for the computing services offered. On the other hand, the approach to regional authorities involved in the S&T sector and the negotiations in progress, as an inescapable political aspect in the field of the infoculture, also will be described in this experience in which the Latin American Cooperation of Advanced Networks -RedCLARA- is playing an important role.*

*The contribution of this article is based on the experience of the relationships created in the context of Latin America during the transition phase of the GISELA project to RedCLARA, primarily a descriptive deployment of the strategies and activities of the dissemination group of the GISELA project (WP2) together with some members of the transition team -CLARA TT- and RedCLARA staff, discovering constraints or opportunities offered by the context.*

## 1. Introduction

The project **Grid Initiatives for e-Science virtual communities in Europe and Latin America -GISELA**<sup>1</sup>- has within its main objectives to transfer to Latin American the experience of development and operation of an e-Infrastructure generated during a period of six years, through the projects EELA, EELA-2<sup>2</sup> and now GISELA, all co-founded by the European Community, in a joint effort with the Latin American Cooperation of Advanced Networks -RedCLARA<sup>3</sup>- to design a sustainable model of regional Advanced Computer Services (ACS)<sup>4</sup>.

In terms of resources, the GISELA e-Infrastructure currently has 13 official sites and 7 cooperating ones, about 1050 cores and 6000 cooperating and around 75TB of disk. The cooperation involve resources that are shared with the GISELA Grid but from organizations outside the project. In the last stage of the GISELA project, a transition is carry out by a regional group (CLARA Transition Team- CLARA TT-) to contribute to the appropriation of skills and practices that have accumulated in the operation of the Grid computing service in Latin America. This group, responsible for designing the regional mechanisms to sustain over time advanced computing services, has widely discussed the respective limitations and advantages and proposed a model of sustained progressive growth in the countries of greatest strength in this area, such as Mexico, Brazil and Colombia. The proposal has resulted in a cooperative model that includes, besides the support in the use of computational tools for certain areas, the preservation and curation of data and configuration of virtual resources (processors, storage and network access) to run tasks.

But both, the current capacity of a platform developed collaboratively and the proposed model require future work of socialization to involve various actors in the new mode of scientific production<sup>5</sup> in which the proposed new way of work is supported. It is a challenge to aspire quick responses in terms of ownership: the available infrastructure for science and education in Latin America begins its waiting for academic projects that are supported by the implementation of online tools that give social meaning to the platform, with demands adapted to the various areas of knowledge, which implies constant attention both of an infrastructure flexible to new requirements, as well as taking care of regional learning opportunities to stimulate the organization of new users. Undoubtedly, it is a scenario that requires from the political consensus to plan and invest in new processes of e-Science, up to sufficient understanding and ingenuity on the part of researchers to form working groups that, distantly, can broaden their impact in the region and even improve their competitiveness by making use of the infrastructure.

The promotion and socialization of the e-Infrastructure and the possible ways of use has meant a challenge and a learning process that requires the evaluation of aspects that make up the cultural aspects of scientific management, including policies and regulations, institutions

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<sup>1</sup> <http://www.gisela-grid.eu/>

<sup>2</sup> <http://www.eu-eela.eu/>

<sup>3</sup> <http://www.redclara.net/>

<sup>4</sup> From here on, we will understand as Advanced Computer Services (ACS) in Latin America, the ongoing construction of the e-Infrastructure (computing platform and tools) for academic research and in some cases to industry, for which the integrated regional model was defined in 2012 by the GISELA Project and RedCLARA.

<sup>5</sup> We are referring to the new mode of scientific production characterized by Gibbons (1995) as a change in the way of doing science, defined by the creation of heterogeneous groups, with transdisciplinary structure, no hierarchical organization, usually with many actors and greater social responsibility.

and values inherent to the way researchers' work. To pave a favourable path for the progressive growth of the services proposed and enhance its usability has driven the development of activities to publicize and promote the available supply options for the scientific system, taking into account the specificities of region.

In this context, both the GISELA project WP2 (Work Package 2: Dissemination and Outreach) and CLARA TT members have discussed, defined and developed strategies to approach members of the scientific and technological system in the region with the following objectives: **1.-** To familiarize policy-makers and researchers with the available technology stack; **2.-** Assess usage experiences of the Grid platform before GISELA (EELA and EELA-2); **3.-** Identify strategic areas in the region according to social impact and demand capacity; **4.-** To encourage the establishment of communities as an organizing mechanism for sharing research resources; and **5.-** Present and evaluate with the political instances of the S&T sector cooperation opportunities for a regional ACS model. The experience explained in this article does not include similar efforts that may have been generated in other groups of the GISELA project - which in effect have been made- to reinforce the achievement of these objectives.

## **2. Socialization strategies of advanced computing services in Latin America**

We can divide the socialization strategies of the ACS in Latin America as:

### **2.1.- Dissemination**

Involves the effort placed in the promotion of the GISELA project activities and the work together with RedCLARA. Strategies in this case have sought to channel the information organized in various journalistic formats (periodic bulletins, websites, briefings, twitter, mailing lists announcements, among others).

**2.1.1.- Newsletter:** Semi-annual editions have assembled a journalistic narrative of the GISELA project progress with sections that often integrate spokesmen of member countries under various styles, interviews, special reports, press releases. Editions (three in total) have been distributed in PDF format in English Spanish version<sup>6</sup>.

**2.1.2.- Special Issue:** To strengthen the promotion of the Science Gateway<sup>7</sup> as a trend for access to computational resources, a special edition called "Environment 2.0 for access to advanced computing resources?" to address the efforts to facilitate the use of distributed resources was produced. The edition was distributed in PDF format in English and Spanish<sup>6</sup>.

**2.1.3.- Promotional material:** Under an integrated approach in terms of image, WP2 has generated a number of materials designed to promote different themes from the project. In this regard, there have been flyers about GISELA, on use of the Science Gateway, on the GISELA-CHAIN Conference<sup>8</sup>, and a portfolio for the Advanced Computing Services model<sup>9</sup>.

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<sup>6</sup> Available in: [http://www.gisela-grid.eu/index.php?option=com\\_content&view=article&id=24&Itemid=28](http://www.gisela-grid.eu/index.php?option=com_content&view=article&id=24&Itemid=28)

<sup>7</sup> The Science Gateway is an interface through which users can run applications more easily without having to deal with cumbersome Grid commands. The first version of the GISELA Science Gateway is still under construction, available at: <https://gisela-gw.ct.infn.it/science-gateways>

<sup>8</sup> <http://www.gisela-grid.eu/conference>

<sup>9</sup> 10 Good Reasons to Become a GISELA User, The how to for the GISELA Science Gateway, Computación avanzada para América Latina: Un modelo cooperativo y solidario: [http://www.gisela-grid.eu/index.php?option=com\\_content&view=article&id=26&Itemid=30](http://www.gisela-grid.eu/index.php?option=com_content&view=article&id=26&Itemid=30)

**2.1.4.- Short notes:** brief notes have been distributed via e-mail.

The promotion of this periodic material has been supported by regional mailing lists, on channels like twitter (@gisela\_grid) and has been an ongoing input to update the official project site (<http://www.gisela-grid.eu>) and its informative site ([www.cecalc.ula.ve/gisela](http://www.cecalc.ula.ve/gisela)). It has also received support from the communication instances of the National Research and Education Networks -NRENs-, where the information has spread to Latin America. In Europe, an agreement between e-ScienceTalk and GISELA allowed replication of news to that continent, through iSGTW (<http://www.isgtw.org/>).

## **2.2.- Evaluation of use of e-Infrastructure and virtual meeting strategies**

Is the review of past experiences in the use of the Grid platform in the EELA, EELA-2 and GISELA projects to define degrees of satisfaction and identified constraints, including the definition of strategies for convening key stakeholders to enable the collaborative use of the platform (the communities as proposed).

### **2.2.1.- Perception of the supply and use of scientific applications on the Grid platform in Latin America (interviews on experiences in the EELA, EELA-2 and GISELA projects):**

The GISELA project inherited from EELA and EELA-2 a list of scientific applications with varying degrees of use by communities in the region. The list included mostly applications related to Life Sciences, Earth Sciences and Bioinformatics<sup>10</sup>. To know about the experience of the user of these groups, only applications that maintained a status 4 and 5 were selected, i.e. they had been properly gridified and tested. Interviews were conducted via e-mail to a group of 33 users. Not all interviews were actually answered. The purpose of this review aimed to approximate the degrees of satisfaction with the experience of using applications in the Grid environment. The results are not strictly quantitative because the mode of approach was the interview with open questions, so they were grouped according to the texts sent by the user. The questions were classified for the user to describe the experience in:

***The gridification of the application:*** the factors that stimulated the gridification of the application where the user was involved (e.g. for initial training on the use of Grid, for higher needs of computing and storage to preserve data, for academic testing or for other reasons).

***Usage of the application on the Grid:*** the current state of use of the application under the Grid platform (e.g. it is used actively, it has been used intermittently, currently being used, was used only for a specific time, used in a National Grid, outside Gisela, reasons for discontinuing its use).

***Grid and their features:*** the application gridification most important advantages and limitations, according to the user experience.

***Potential uses of the tool:*** adaptability to other areas or expansion of users, according to the expertise as a researcher.

As a key trend, two results highlighted:

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<sup>10</sup> <http://gisela-gw.ct.infn.it/application-database>

- Applications gridified during the EELA - EELA-2 period are not used under the platform offered; only in two cases the application kept being used, but off the shelf, with local resources.
- In bulk, users expressed satisfaction with the training experience to gridify applications in EELA - EELA-2, but several reasons led to suspend their use.

According to user feedback, the reasons for suspending the use of applications can be classified as follows:

**Logistical:**

- Expiration of the certificate

**Technical:**

- Updates of the versions or software where they were installed.
- Development of a new platform.
- Dissatisfaction with infrastructure: response delayed<sup>11</sup>.

**Organization, community (inherent to users):**

- People in charge of the project changed.
- Lack of demand.

Among the offered reasons for dissatisfaction in using the Grid platform are:

- Difficult processes to obtain free resources.
- Poor service stability.
- Inadequate response time.
- Lack of documentation.
- Bureaucracy associated with obtaining and renewal of certificates<sup>12</sup>.
- Cloud as an alternative for the ease of use, low prices and support (case of applications for Bioinformatics).

**2.2.2.- The virtual sessions with members of the ecosystem potential use of e-Infrastructure:** Taking into account that the use of the e-Infrastructure requires a minimum collaborative organization from the standpoint of science, institutional, and research policies, GISELA's WP2 started together with members of CLARA TT a series of virtual activities to convene stakeholders around common goals. The initiatives focused on: Regional Sessions for e-Science, conducted in October-November 2011 and called for political actors, decision makers in the scientific and technological system and researchers by work areas, being the most successful one the session with members of the Seismology communities in the region

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<sup>11</sup> In applications with low computing requirements, having to wait 0.5 to 1 hour to get simulation results were considered too much.

<sup>12</sup> This trend in the user experience is akin to similar studies. You can read in the work by Zimmerman and Finholt "Growing an Infrastructure: The Role of Gateway Organizations in Cultivating New Communities of Users" that "Historically, high-performance computing resources have been used by only a small portion of the science and engineering research community.", being one of the reasons the cumbersome process of certification ([http://misc.si.umich.edu/media/papers/Zimmerman\\_Finholt\\_GROUP\\_2007\\_08\\_09\\_30.pdf](http://misc.si.umich.edu/media/papers/Zimmerman_Finholt_GROUP_2007_08_09_30.pdf)). Similar results can be seen at work "Fostering the use of the Mediterranean e-Infrastructure with Science Gateways and Identity Federations" (Ardizzone and others).

on management and prevention of natural disasters<sup>13</sup>.

The second phase of these initiatives focused on Virtual Days, following similar agendas made in Mexico by the University Corporation for Internet Development -CUDI<sup>14</sup>- and RedCLARA. The Virtual Days focused on thematic areas and seek to bring together researchers, students and interested parties to discuss possibilities of the e-Infrastructure in the topic at hand. So far, they have been very successful, convening a significant number of people in Latin America: Virtual Culture Day (March 28, 2012) and the Virtual e-Infrastructure Day (May 8, 2012). These activities have been led by RedCLARA and supported on the academic networks with most technical and organizational expertise of the region: Mexico, Brazil, Colombia and Costa Rica.

### **2.3.- Regional Negotiation**

It includes the experience approaching political and decision-making instances in the science and technology sector in Latin America as well as the agreements mechanisms with researchers whose common objectives are relevant for the creation of communities and the design of projects aiming at demands for use of the e-Infrastructure. These negotiations are being promoted at various levels by RedCLARA.

**2.3.1.- Approach to directors of national networks and RedCLARA partners:** a series of meetings allowed to report on the scope of the e-Infrastructure. The progress in the GISELA project (as well as the CHAIN<sup>15</sup> project) were presented in plenary sessions with the RedCLARA partners in Tegucigalpa, Honduras (June 2011) and Montevideo, Uruguay (November 2011), as well as in the 1st Conference of Directors of Technology Information and Communication of Latin American Universities (TICAL<sup>16</sup>) in Panama City, Panama (June 2011). Particularly in the Uruguay meeting there was an extensive discussion on the business model to provide advanced computing services in the region.

**2.3.2.- Approach to S&T officials in the region:** as from the meetings in Tegucigalpa and Montevideo, reunions have been organizing with senior officials of agencies for science and technology of the region. So far we have visited Venezuela, Colombia, Panama and Costa Rica. These visits have insisted on showing advanced computing facilities available in the region thanks to projects like GISELA and CHAIN.

**2.3.3.- Search for funding mechanisms and sources:** Discussions have been promoted and steps taken to open possibilities for continuation, even partially, with the effort centred in

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<sup>13</sup> The virtual meeting via videoconference, held on November 3, main objectives were to publicize the advanced computing scenery and its main advantages; present the experience of Seismic Sensor, application developed in EELA-2 ([http://applications.gisela-grid.eu/application\\_details.php?l=20&ID=71](http://applications.gisela-grid.eu/application_details.php?l=20&ID=71)), and discuss possibilities of collaboration. As main concerns of this meeting, participants, potential users of advanced computer-services focused on: the format and data confidentiality and the process of migration of the tools being used to benefit from the Grid infrastructure. As an experience of integration of these researchers into the Grid platform environment, CLARA TT members agreed to try a thrust stage and organize the participants in a collaborative community, to transcend the mere use of tools and discover the added value offered by this type of collaboration; this activity is currently under development and has led, for example to an ongoing collaboration between the UNAM (Mexico) and ULA (Venezuela), and a review of projects in the area, to enhance the use of the e-Infrastructure.

<sup>14</sup> <http://www.cudi.mx/>

<sup>15</sup> <http://www.chain-project.eu/>

<sup>16</sup> [http://tical\\_2011.redclara.net/](http://tical_2011.redclara.net/)

projects developed on the e-Infrastructure, so that as to approach some scenarios that apply the concept of sustainability at a regional level. The strategy for ensuring the sustainability of advanced computational services operates on two levels: **1.-** Ensure the operation of the national or institutional resource centres, and **2.-** Explore mechanisms to ensure the operation of a resource centre with regional scope.

The first level aims to ensure the availability of resources (hardware, software and manware) in a federation of academic institutions, while the second level aims to maintain the organization and remote access to those resources by researchers in the region. To keep operating the resource centres of institutional, and supported by the directors of national networks, a strategy for developing a project for information management and early warning for natural disasters in Central America has been initiated. This proposal is driven by the Mexican government and supported by CUDI, also with the participation of national networks and academic institutions in Guatemala, Costa Rica, El Salvador, Panama, Colombia, Venezuela and Ecuador. CUDI has been contacted to ensure the operation of a regional resource centre, so that in cooperation with ROC-LA<sup>17</sup>, organization of centres for High Energy Physics in Mexico, Colombia and Brazil, to take responsibility for the regional coordination.

### **3. Conclusions**

The survey of applications users that were gridified on the EELA - EELA-2 platform shows that the experience was mostly taken by users as a trial period assessed by training, but not driven by the infrastructure offered. As a challenge, the transition phase of the GISELA project involves moving from a trial phase to a stable service period, whose local demand must be constantly revised, taking into account the particularities that might be involved in the learning curve and appropriation of e-Infrastructure.

Understanding, for example, the rejection that users, not only in Latin America but in Europe and the U.S., have expressed about the cumbersome certification process has led to consider new schemes that require expedite authentication mechanisms, as indeed are being applied in GISELA with the Science Gateway. But the challenge to increase local users has required a comprehensive effort included in the new model of Advanced Computer Services in which different actors and technologies converge into communities as basic organization to encourage collaborative use of the e-Infrastructure. Definitely a slow and complicated learning process.

### **References**

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<sup>17</sup> <http://www.e-science.unam.mx/rocla.jsp>