EASIER AND FASTER
ENVIRONMENT 2.0 FOR ACCESS TO ADVANCED COMPUTING RESOURCES?

A great challenge falls upon those who are at the forefront of Grid technology as an alternative to new ways of doing science: make it easier to use. How to make way for researchers when they become users of the Grid platform, with simple, fast and transparent steps? Could this opportunity increase its use? are some of the questions that have been around in recent years as a key challenge to the e-infrastructure.

Grid technology has emerged as an option for those research areas that require high storage and computing capacity. So far, the most traditional areas that have used this platform are associated with astrophysics and bioinformatics, and more recently, some fields of medicine and geophysics, due the amount of data produced and the potential that computation offers for simulation.

But although the trend in scientific data management is increasing and, consequently, the computing needs for processing it is latent, the Grid is still waiting for more users, one of several thousand investigators using networks in Europe is using Grid, as can be read in the article “Fostering the use of the Mediterranean e-Infrastructure with Science Gateways and Identity Federations” by Ardizzone et al, recently published on the Web.

“ Historically, high-performance computing resources have been used by only a small portion of the science and engineering research community.” can also be read in the “Growing an Infrastructure: The Role of Gateway Organizations in Cultivating New Communities of Users” by Ann Zimmerman and Thomas A. Finholt.

Among the reasons for this low use are the complex processes that researchers must adapt to, which do not always produce a quick and easy way. In recent years, attracting new users to enjoy the great advantages of the Grid has been part of a problem to solve. Given this, a great challenge rests on those who are at the forefront of Grid technology as an alternative to new ways of doing science: making it easier to use.

Procedures instituted by the Grid technology until now have required specialized training, since their use has led to confront the complexities of web security, and institutional and technical steps to ensure access to computing resources distributed around the world .

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In this quest, part of the answer seems to have focused on the Science Gateway (SG), as a

graphical interface, which underneath groups a set of complex activities but provides an easier and straightforward way to use computing resources. The SG is a web portal that technically has required connecting two or more separate computer systems, programs or networks, to fit the Grid management. Although it seems a simple website, it is much more than that: behind the graphical interface it wraps the complexity of working with the Grid platform. Users can authenticate, run specialized applications, store and preserve large amounts of data, display results and, more importantly, join up in communities, according to the interest that bonds them, all this with just one click.

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Safe but easy

Safety, a crucial aspect in the use of resources in the Grid platform, has not always been so well accepted by users, given the complex authentication mechanisms, even when you know that this helps prevent fraudulent cases in the complex arrangement of resources distributed in various parts of the world.

The traditional authentication protocol has become rigid in the use of the Grid platform and involves waiting processes to obtaining the certificate, which is not always fast. Surveys of perception of Grid users confirm that the procedures for obtaining digital certificates are not well accepted. In this sense, the preferred way for researchers to authenticate themselves keeps being by providing their username and password.

Ensuring this shorter road for authentication is one of the great advantages of SG's. One of the proposed authentication models is based on Identity Federations and international standards, such as proposed by the INFN Catania (Italy), a promoter of the SG.

As described by Roberto Barbera, a member of INFN Catania, this new authentication mechanism available on the SG greatly simplifies access to the e-infrastructure by non-expert users, thus avoiding the traditional process based on digital certificates. It's easy and standard, a user can be authorized selecting the identity provider closest to his/her region or country being compliant with,the Security Grid policies. With a username and password, the researcher is authorized to use the e-platform and he could obtain different roles and privileges in the SG.

Barbera: the new authentication mechanism available on the SG greatly simplifies access to the e-infrastructure

This authentication process does not have any particular requirement: users can access all internal resources with the same credentials and a single login. When registering, researchers must fill out a form with some information about the activities to perform and apply for access to the SG, based on the credentials provided by the organizations to which they belong, so they have to select the Identity Federation accordingly, by country and institution.

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Identity Federations are established in many countries worldwide and currently cover about 16 million people, which facilitates the mediation work in the SG. Although in Latin America only

Brazil has a Federation, the goal is to also establish them in other countries. Until we will reach this target, researchers coming from countries without Identity Federation could use a catch-all Identity Federation.

As an extension, authentication using Identity Federation has opened a way beyond advanced computing services in the region. For example this authentication mechanism could be used to access in a standardized and integrated way to university online library resources. This and other options are considered within the RedCLARA model of services mediated by the SG that will be available in the coming months.

Collaboration as support

In Europe and the U.S., SG's have taken nuanced ways. In the U.S. TeraGrid, an initiative that combines several independent computer centres, supported projects that were classified as Science Gateway, whose main objective was the construction of an infrastructure tailored to various research communities for access in an easier way to advanced computing resources. In Europe, Grid platform projects such as CHAIN (Co-ordination & Harmonisation of Advanced e-Infrastructures) and EUMEDGridSupport reveal in their sites a tab for quick access to advanced computing resources in few steps. Also, the first tests of SG's for specific communities in different areas are taking place.

The Science Gateway has come to be regarded by Americans as a type of intermediary organization that can play a major role in attracting new users to the Grid platform.

But beyond the technical possibilities, the Gateway organization is being seen as the human aspect that supports this initiative, which is nothing else than the extension of advanced computing services tailored to scientific and researchers organizations that are able to cooperate for common goals.

Thus, it can be argued that beyond the technical aspects, the SG is supported by the collaborative spirit and the strengthening of research communities that exploit science in an e-infrastructure environment, a lesson that Latin America intends to interpret in that order.

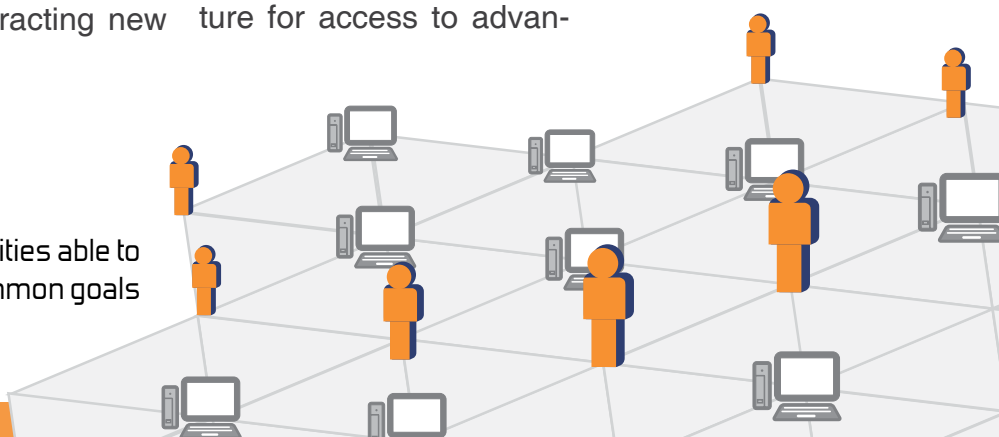
Tailored to Latin America

As part of the transition of advanced computing services to Latin America, the project Grid Initiatives for e-Science virtual communities in Europe and Latin America (GISELA) has proposed a model supported in the use of SG, aiming at facilitating researchers the access to resources.

The strategy for sustainability, along with RedCLARA, looks at strengthen the development of research communities as a more viable mechanism for the appropriation of Science Gateways, to make a web environment a meeting place where researchers from Latin America can program and reserve computing resources, brought together by common interests.

> Authentication using Identity Federation has opened a way beyond advanced computing services in the region

Through a strategic alliance between RedCLARA, national networks and higher education bodies, the model proposes an architecture for access to advan-



Tailored to communities able to cooperate for common goals

ced computing services in which the Grid and e-infrastructure are only a part of it. Among some services, the aim is to provide: tools to develop skills for creating applications; repository of applications ready to use, according to various levels of users; configuration of virtual space for data preservation; configuration of new applications.

Right now, the way is open to generate the necessary technical skills to exploit the possibilities of a web environment to access advanced computing resources. “To achieve this in the region -said Luis Nunez, academic-manager of RedCLARA- we want to encourage the creation of a technical workforce in Latin America for the construction, maintenance and development of such tools. This would be a technical group to support communities in this process of appropriation. We will start with the training supported by some national networks like CUDI, RENATA and CEDIA, to then gradually increase the scale to other networks.” This training program would be generated in cooperation with the European project EPIKH by which a group of skilled people selected from the region would receive training in Europe, on the theme of Science Gateways.

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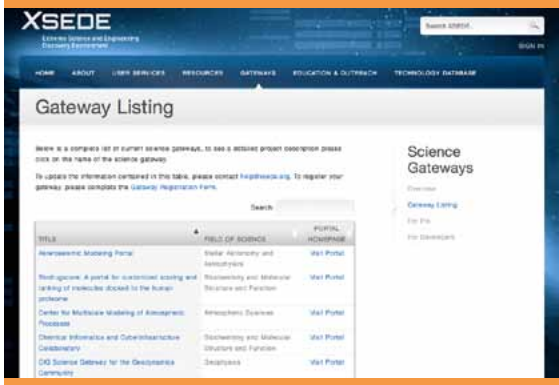
The first version of the GISELA Science Gateway (GSG) is available, were Latin American researchers will begin testing the use of the GISELA e-Infrastructure in an easier way, through a simple web interface and without personal digital certificates. With just one click, researchers can register for a personal account. The GSG is in the integration phase of the applications available in the various areas of knowledge.

Reference cases

In the United States, TeraGrid is supporting about twenty projects in the spirit of Science Gateway. The summary of the experiences of communities can be seen here

- https://www.xsede.org/gateways-listing
- https://www.xsede.org/wwwteragrid/archive/web/science-gateways/gateway_list.html

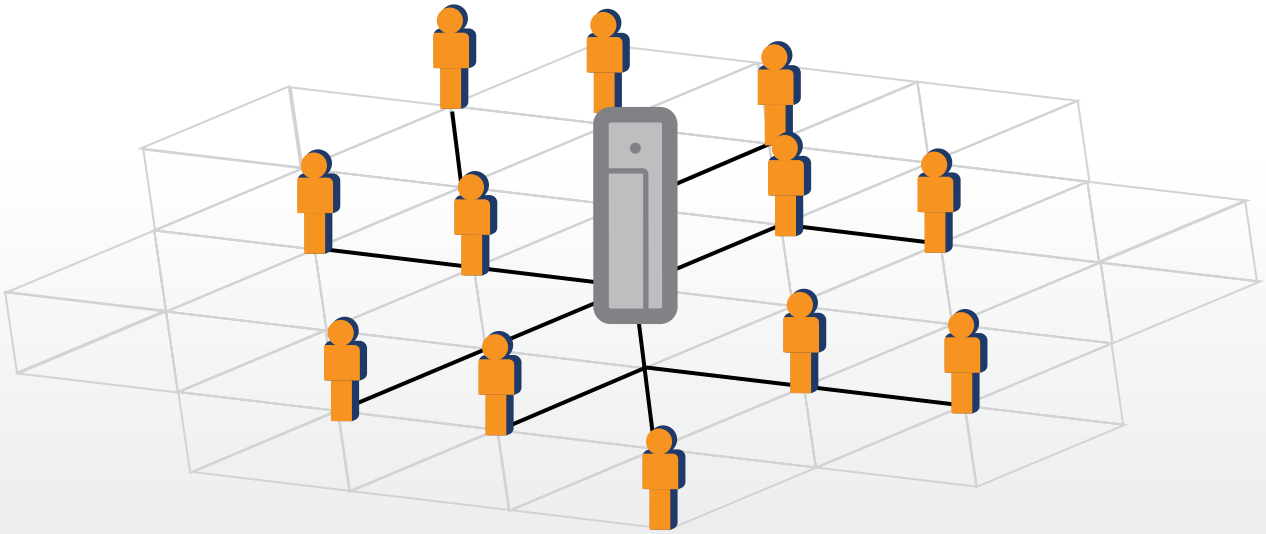


Europe has initiated a series of experiences with communities who aspire to be joined by special interests to use computational resources. Some examples:

- http://www.chain-project.eu/
- http://applications.eu-decide.eu/
- http://applications.eumedgrid.eu/
- http://gilda.ct.infn.it/
- http://gisela-gw.ct.infn.it/
- http://indicate-gw.consorzio-cometa.it/
- http://ricevi.ct.infn.it/
- http://www.special-project.it/
- http://viralgrid.ct.infn.it/

Latin American researchers may start using the GSG in any of these options: testing the first applications available; integrating their own applications or suggesting a SG configuration for a community.

Interested researchers can begin to register and start the first tests in this environment. To propose the integration of new applications or creating specific SG communities, please fill out the survey and you could also send an email to wp3@gisela-grid.eu



RedCLARA seeks to reinforce the creation of research communities in the region

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