MAGIC: A collaboration project to globally connect researchers and academics

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Abstract

Building on the success of the ELCIRA project, RedCLARA - with partners from Latin America, Europe, the Caribbean, West and Central Africa, Eastern and Southern Africa, North Africa and the Middle East, Central Asia and Asia-Pacific is leading MAGIC (Middleware for collaborative Applications and Global vIrtual Communities), a cooperation project that aims to significantly improve the ability of researchers and academics around the world to collaborate together. MAGIC might be the first really global collaborative project in the REN environment. But which are the benefits of the project to its partner institutions' (UbuntuNet and WACREN) members? How can the African researchers and academics benefit from MAGIC? By fostering and easing collaboration and mobility, MAGIC is fostering intra-regional and global collaboration, helping to reduce the technological gap, and as a consequence, in the long term, to reduce the brain drain.

Keywords

Collaboration, identity federations, eduroam, eduGAIN, scientific communities, researchers, academics, RENs, NRENs.

Introduction

A collaboration project to globally connect researchers and academics - aims to establish a set of agreements for all the participating world regions, aimed at consolidating and completing the building blocks of middleware necessary for the establishment of a marketplace of services and real-time applications which will facilitate mobility and the work of global science communities. It started in May 1st, 2015, and will run for 24 months; the project was evaluated and approved for a grant by the European Commission within the Horizon 2020 program.

For its development, MAGIC features the participation of RedCLARA, (coordination institution – Latin America), GÉANT (Europe), RENATA (Colombia), RNP (Brazil), SURFnet (Netherlands), REUNA (Chile), CEDIA (Ecuador), CUDI (Mexico),

RENATER (France), GRNET (Greece), CESNET (Czech Republic), CKLN (Caribbean), UbuntuNet Alliance (S&E Africa), WACREN (W&C Africa), ASREN (Arab States), TEIN*CC (Asia-Pacific), CAREN NOC – NITC (Central Asia), NIIFI (Hungary), CSIR (South Africa). It also counts with AARNET (Australia), APAN (Asia-Pacific) and InnovaRed (Argentina) as MoU partners (which is a possibility for the integration of other NRENs).

MAGIC might be the first global collaborative project in the REN environment. However, which are the benefits of the project to its partner institutions (UbuntuNet and WACREN) members? How can the African researchers and academics benefit from MAGIC?

MAGIC is enabling mobility and seamless access to services by promoting the establishment of identity federations connected to eduGAIN, creating awareness of privacy and security issues, and increasing uptake of eduroam. MAGIC is enabling the provision of collaboration tools and services among NRENs based on NREN-run applications made available via a worldwide application market; it is seeking consensus on interoperability of real-time applications and works towards the adoption of standards such as those proposed by the Global CEO Forum. By fostering and easing collaboration and mobility, MAGIC is fostering intra-regional and global collaboration, helping to reduce the technological gap, and as a consequence, in the long term, reduce the brain drain. In addition to the mentioned benefits, of course, looking after enhancing collaboration, MAGIC also provides face-to-face and on-line training.

Looking after enhancing the participation of African NRENs and their researchers and research communities, through the following paragraphs we will explain the most relevant parts of the project in depth.

Global Mobility

Within MAGIC the second Work Package (WP2) is in charge of working with platforms for mobility, and is led by the Brazilian national research and education network, RNP[1] that gained vast experience in this area throughout the work that carried out during the ELCIRA project, coordinating efforts to create AAI (Authorization and Authentication Infrastructure) and eduroam in Latin America.

RNP is coordinating WP2, aiming at the promotion and consolidation of the foundations for creating a framework for authentication and authorization in Africa, the Caribbean, Asia and for Latin America, CUDI (the Mexican NREN) is supporting RNP in the inclusion of new NRENs and their members. This work package is structured to enable other RENs to establish their own regional federation initiatives and will also facilitate the integration with the European initiatives under former TERENA activities such as TF-EMC2 and REFEDS, and will make the necessary arrangements to make it possible to join the eduGAIN interfederation service.

2.1 Identity Federations

NRENs (and their users) have been pioneers in the use of federated authentication to access web-based services that allow users to authenticate once, and then to have access to multiple

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[1] Rede Nacional de Ensino e Pesquisa: [http://www.rnp.br/]

services. This improves the experience for the user; it reduces the complexity and costs incurred in issuing and managing credentials, while providing accountability and protecting user privacy.
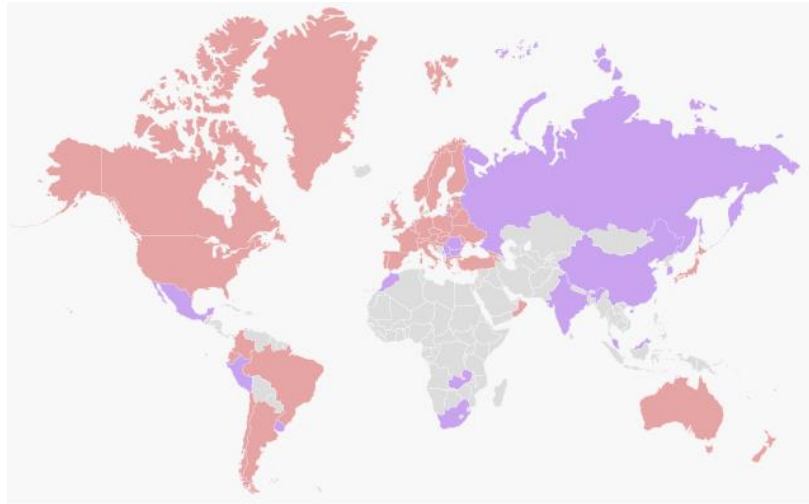

Figure 1: World federation scenario (November 2015) - Reference: REFEDS2

Nowadays, there are 61 federation initiatives, as shown in figure 1, of all initiatives, there are 43 federation in production and 18 in pilot state. This scenario has been changing since 2012, when it was launch the first project focuses on Region REN focused in AAI, eduroam and others initiatives, called project ELCIRA.

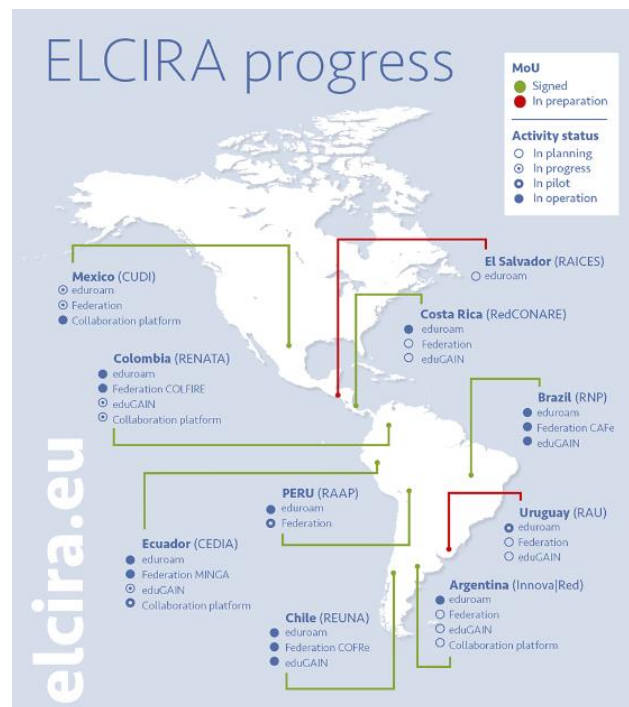[2] https://refeds.org/federations/federations-map

Figure 2: ELCIRA progress

The proposal of federation's work package (ELCIRA's WP2) was to affect the adoption of the AAI (Authentication and Authorization Infrastructure) standards, aiming standards defined by the eduGAIN Interfederation and integrate them with the Brazilian Federation (CAFe).

The following is measured at the end of the Project:

Two new federations created and operating in LA

Regarding the federations, the metric proposed was two new federations. This goal was achieved and surpassed. At the end of ELCIRA project there were three NRENs operating:

- Ecuador (CEDIA - www.cedia.org.ec);
- Argentina (INNOVA RED - www.innova-red.net);
- Colombia (RENATA - www.renata.edu.co)

Although Chile (REUNA - www.reuna.cl) was federated before ELCIRA, the project helped Chile to become member of eduGAIN.

AAI interoperability and interoperation was implemented in a pilot form. Although Authentication and Authorization Infrastructure is a very complex theme, the project has achieved the objectives. Actually, NRENs are integrated to eduGAIN:

- Chile (COFRe)
- Ecuador (MiNGA)
- Colombia (COLFIRE)
- Argentina (MATE) (Joining)

MAGIC's WP2 is working in this area, and its activities are the following ones:

- Analyze the regions that will encompass the project scope to design the best Federation architecture to be implemented per territory and implement that model selected for federation deployment.
- Develop and adapt training material for Identity Federation deployment, supporting local language requirements as necessary.
- Implement online training for Identity Federations in an e-learning platform (NREN or project partner).
- Identity Federation training workshop for Regional RENs.
- Develop and provide in-class training (boot camp) to establish identity management professionals in the region.

2.2 eduroam

eduroam (education roaming) is the secure, world-wide roaming access service developed for superior education; it allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop.

As same as federation subject, eduroam was worked in ELCIRA project as well. Eduroam's work package (ELCIRA WP4), has spread the use of the eduroam standard to interoperate a Global Roaming Wi-Fi Service for academic users. The following results can be ensured:

At least two (2) and ideally four (4) NRENs with have eduroam implemented and interoperating with the federations for internal use and replication

As predicted by the group, the countries bellow implemented and federated to eduroam:

- Chile (REUNA - www.reuna.cl)
- Peru (RAAP - www.raap.org.pe)
- Colombia (RENATA - www.renata.edu.co)
- México (CUDI - www.cudi.mx)
- Argentina (Innova|Red- www.innova-red.net)

- Costa Rica (CONARE - www.conare.ac.cr)
- Ecuador (CEDIA - www.cedia.org.ec)

Seven NRENs should sign an agreement to implement eduroam internally within 2 years from the project end.

It was expected that at the end of the project we have at least those NRENs already committed to implement eduroam:

- Colombia (RENATA - www.renata.edu.co);
- Argentina (Innova|Red- www.innova-red.net);
- Costa Rica (CONARE - www.conare.ac.cr);
- El Salvador (RAICES - www.raices.org.sv); (*)
- Ecuador (CEDIA - www.cedia.org.ec).
- Uruguay (RAU - www.rau.edu.uy); (*)
- Mexico (CUDI - http://www.cudi.edu.mx);

(*) - The implementation is ready but it is still pending sign the MoU and the statement between the nREN and the Global Committee of eduroam. This metric was achieved. It is important to mention that countries of the region signed an agreement for the creation of the Latin American Confederation of eduroam (CLATe).
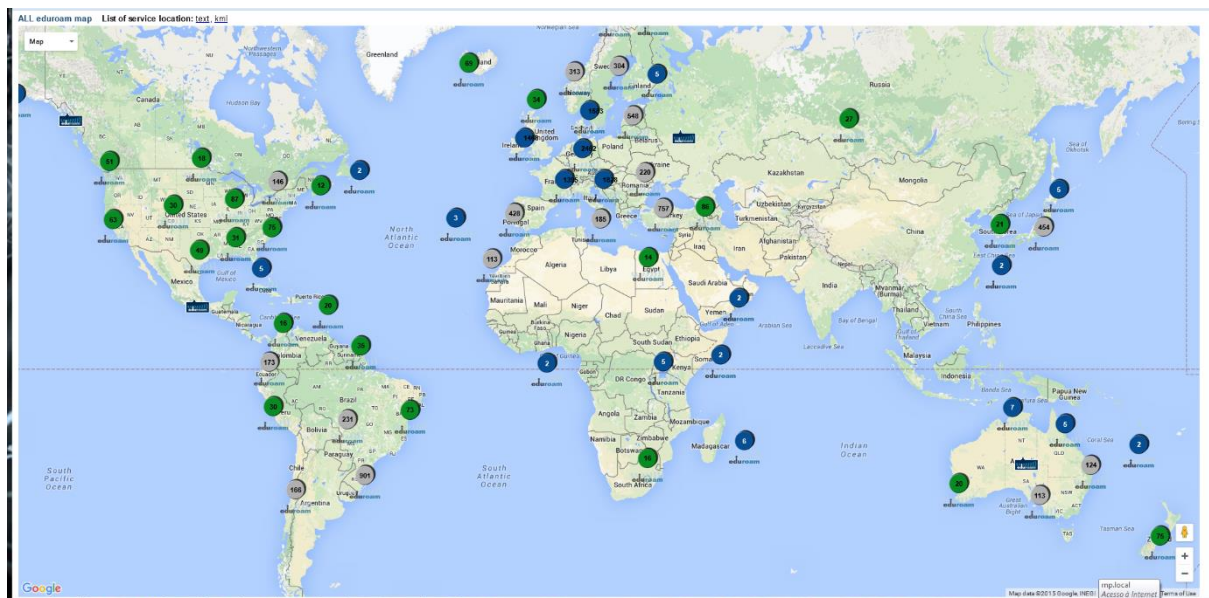

Figure 1: World eduroam map (November 2015) - Reference: eduroam.org[3]

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[3] https://monitor.eduroam.org/eduroam_map.php?type=all

MAGIC aims to create eduroam Roaming Operators in at least two countries per region and to provide a local boot camp to develop eduroam experts in at least two countries per region.

MAGIC's WP2 activities in this area are the following ones:

- Develop and adapt training material for eduroam deployment, supporting local language requirements as necessary.
- Implement online training for eduroam in an e-learning platform (NREN or project partner).
- eduroam training workshop for Regional RENs.
- Develop and provide in-class training (boot camp) to establish eduroam professionals in the region.

2.3 Global Mobility results

2.3.1. First workshop on joining eduroam and Identity Federation

The workshop on Joining eduroam and Identity Federation was realized at Arab States Research and Education Network (ASREN) office at Talal Abu-Ghazaleh University (TAGI-UNI) on 8 to 10 September 2015 in conjunction with the 1st International Conference on Open Source Software Computing (OSSCOM 2015).

Figure 2: Workshop communication in ASREN website

The ASREN workshop was organized in cooperation with MAGIC Project and EUMEDCONNECT3 [4]Project, and it was designed for staff of the NRENs and Universities and the topics discussed were:

- **eduroam**: the secure, world-wide roaming access service developed for the international research and education community.
- **Federated Access**: effective and secure management of authentication and identity information to build a trust relationship between Identity Providers (IdP) and Service Providers (SP). It devolves the responsibility for authentication to a user's home institution, and establishes authorization through the secure exchange of information (known as attributes) between the two parties.
- **eduGAIN**: a service developed within the GÉANT Project that interconnects identity federations around the world, simplifying access to content, services and resources for the global research and education community. eduGAIN enables the trustworthy exchange of information related to identity, authentication and authorization (AAI) by coordinating elements of the federations technical infrastructure and providing a policy framework that controls this information exchange.

There were 11 participants from 6 countries: Algeria, Jordan, Lebanon, Morocco, Palestine and Tunisia; Michal Procházka and Jan Oppolzer, both from CESNET (Czech Republic's NREN), produced the training material used in the workshop, which covered the following topics: Identity Federations, Identity Federation Problems, eduGAIN, eduroam and eduroam policy. Prior to the end of the workshop, and in order to enhance the collaboration

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[4] http://www.eumedconnect3.net/Pages/Home.aspx

possibilities through the development of these services within the participant countries, the following actions were suggested and are currently under development:

- Morocco:
    - To continue enhancing the eduroam and IdP services;
    - To work on implementing ASREN Community Portal.
- Jordan: to start implementing eduroam in Balqa Applied University which includes 20 campus location in all Jordan;
- Algeria: to start implementing eduroam and continue developing their IdP services. Will also work on NRENum.net;
- Palestine: to start implementing eduroam in 2 universities;
- Lebanon: started implementing eduroam in AUB and will work on IdP later;
- Egypt: though Egypt people didn't attend, they will use the training material to start implementing eduroam first;
- Any NREN that completes implementing eduroam and IdP before the end of November 2015 will be recognized and appreciated during e-AGE 2015 Conference in Casablanca 7-8 December 2015.

Figure **5** Workshop session

2.3.2 Second workshop on Joining eduroam and Identity Federation

The Caribbean Knowledge and Learning Network (CKLN) [R3] represents the Caribbean region National Research and Education Networks (NRENs) in the MAGIC project along with a number of other global partners. As such, CKLN coordinated the 3-day training of trainer's workshop, on eduroam and Federated Identity, from October 7th to 9th 2015. Other elements of the MAGIC project include working with science communities on themes of common interest, and using the middleware being learned and developed in the developing regions.

The Jamaica Research and Education Network, JREN, along with the UWI, hosted this important workshop and saw participation from Jamaican tertiary institutions, as well as representatives from institutions and NRENs in Grenada, Mexico and the Dominican Republic.

The three main goals of the workshop were to contribute to strengthening of NRENs in eduroam service deployment for the Roaming Operator and Campuses (UWI Mona is currently working on deploying eduroam), Federation Policy Development, and SAML federation deployment (for campus, federation and inter-federation. Participants are expected to develop Federation Identity Policies in their countries as well as develop eduroam for their institutions, while training others as part of the MAGIC pilot implementation.

Actual pilot of an eduroam deployment was done during the workshop. This development paved the way for JREN's proposed deployment of eduroam through the UWI Mona Campus by the first quarter of next year.

The workshop was facilitated Mr. Brook Schofield, Project Development Officer from GÉANT, the pan-European research and education network that interconnects Europe's NRENs. Most of Mr. Schofield's recent work is on dissemination of eduroam, which works hand-in-hand with federated identities.

Figure 3: Workshop communication in CKLN website

The workshop was held at the Jamaica Tertiary Education Commission conference room located on the Mona Campus of the UWI and is the address used for the Jamaica National

Research and Education Network, JREN. The suggested actions following the training are as follows:

- Jamaica, Dominican Republic and Mexico each to set up a Federation;
- UWI Mona setting up Eduroam (pilot, using UWI servers). Use these for a JREN pilot, as well as regional deployment;
- Participants to encourage and advocate for eduroam to IT Directors at universities;
- CKLN – seek additional PR Material in French and Spanish to support participants in their advocacy;
- Develop technical paper on how to establish an identity provider on your campus, deploying virtual machines – CKLN will undertake this with assistance from Brook and other community members;
- CKLN to work with interested parties in Barbados and the Bahamas;
- JREN will seek to write the Policy document based on the international template ;
- Encourage the other NRENs to also prepare a policy document.

Figure 7: Workshop session

Global Services and Real Time Applications for a Global Community

To enable the provision of collaboration tools and services among NRENs based on NREN-run applications made available via a worldwide application market and to seek consensus on interoperability of real-time applications and work towards the adoption of standards such as those proposed by the Global CEO Forum, are two main goals of MAGIC. Again, collaboration it is the key factor, and fostering collaboration, the ultimate aim.

The obvious question is what is MAGIC doing in this arena? Two work packages are focused in the provisioning of these global services: WP3 - Cloud Provisioning and Groupware Standards, and WP4: Agreements for Real Time Collaboration.

3.1 WP3: Cloud Provisioning and Groupware Standards

The Cloud Provisioning and Service-sharing Groupware Standards is the task of WP3 which is led by RedCLARA. Its objectives are:

- To develop a model for inter-operation between NREN cloud application markets of participating world regions based on cloud provisioning and taking advantage of applications developed and run by NRENs across different continents to create a model for a worldwide application market for collaboration tools and services.
- To choose or define the standards in order to make groups' management systems interoperable across different federated environments, extending federations' integration to facilitate authorization, user interaction, and global group administration.
- To establish a set of standard requirements for cloud providers to increase security, quality, interoperability and privacy over shared resources and services in the NREN clouds.

The activities that this group is carrying out in order to achieve its objectives are:

- Agreements for a Federated Group Management (FGM) Standard and Application Programming Interfaces (API) for it
- Definition of a set of applications that will adopt the FGM Standard
- Recommendations for service definitions from a marketing point of view
- Pilot portals for the participant regions as appropriate, incorporating the FGM Standard (Colaboratorio: already implemented by RENATA and CKLN)
- Definition of a standard for interoperability of cloud provisioning
- Deployment of a pilot Federated Cloud Service Model for NRENs

Have there been any results so far in this scope? Yes, lets give a quick look at them:

- Colaboratorio Portal deployed in Ecuador (CEDIA), Costa Rica (CONARE) and Nigeria (NgREN).It will soon also be deployed in the Arab States (ASREN), Argentina (INNOVA RED) and México (CUDI). UbuntuNet and WACREN are also working on deploying it. Colaboratorio's current tools are:
  o Webconference (MCONF)
  o Social Network for Researchers
  o Large File Sharing (UNINET)
  o Conference Organization (INDICO-CERN)
  o More tools coming
- Open source tools provided locally or in cloud form by NRENs for NRENs

3.2 WP4 - Agreements for Real Time Collaboration

Led by RENATA, the objective of this working group is to seek consensus among participating world regions on the importance of the interoperability of real-time applications

and work towards the adoption of standards such as those proposed by the Global CEO Forum to promote the creation of a worldwide environment for these applications.

Real-time communications are a key work area for NRENs. Almost all research areas, especially biology, medicine and physics, rely on real-time communications in their daily work. In this task, the MAGIC work group aims to expand video-network reach, and functionality by:

a) `fostering the adoption of NRENum.net[5] based dialing,
b) integrating the legacy (SIP capable) global video network with existing web-conference systems to achieve unified communications, and
c) Improving NRENum implementations with secure DNS (DNSSec) adoption.

By expanding use of the NRENum.net service, the group will help to deploy real-time communications as a service integrated with the global community. The NRENum.net based dialing standard will use the Domain Name System (DNS) for universal dialing across the world, and will allow future integration with VoIP networks. The DNSSec implementation will help to provide a more secure ENUM/NRENum.net service, avoiding DNS hijacking based attacks.

In July 8, in Viña del Mar, Chile, within the context of the TICAL Conference, MAGIC held it first face-to-face training session in NRENum.net, with the participation of 11 attendees from Chile, Costa Rica, Ecuador, Mexico and Peru, and the results of the activities carried out by this WP are quite impressive when we consider that during September and October 2015, Ecuador, El Salvador and Mexico were integrated to NRENum.net. MAGIC is expecting for the upcoming month the integration to NRENum.net of Chile, Costa Rica and Uruguay, and for the near future it candidates countries include: Senegal, Nigeria, Moroccoand others.

Finally it is important to mention that there is an NRENum deployment course in Spanish, English and French available on line and accessible to all the interested people through MAGIC's website[6]. In addition there are seven (7) groupware standards in analysis to seek for interoperability

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[5] The NRENum.net Service is an end-user ENUM service run by the GÉANT Association (formerly TERENA) and participating NRENs (National Research and Education Networking organizations). The service aimed primarily at academia.

What is ENUM? It's a technology standard used to translate telephone numbers into URL addresses (a domain name). As a result of work of the Internet Engineering Task Force's (IETF's) Telephone Number Mapping working group. ENUM is used to build dialing infrastructure for VoIP, and Videoconference networks at global scale.

[6] http://magic-project.eu/

Global User Communities

The development and fostering of Global Science Communities is the major duty of MAGIC Project Work Package 5 (WP5) that is led by UbuntuNet Alliance. Its objectives are:

- To invite/select three global research and scientific communities with common topics of research and education interests which include researchers of the MAGIC participating regions to participate in collaborative initiatives using advanced networks and services.
- To extend/update the Funding Opportunities Database and Partner Search application developed by the ELCIRA Project to include information from other MAGIC developing regions and provide valuable funding information for the global communities and other research groups worldwide.
- To foster the collaborative work of Global Science Communities by actively promoting the participation of researchers from all participating regions in European Commission Calls and those of other international funding agencies with high impact in the participating regions and other networking activities.
- To promote and foster the use of collaboration technologies among worldwide research communities, encouraging the proper and active use of the collaborative platforms, services and tools, by supporting them with training material and activities to learn how to use the tools.
- To use these collaborative platforms to spread knowledge and the practices of the Global Science Communities by sharing information and experiences among experts in the priority fields identified, looking to raise awareness of prevailing issues to wider audiences including policy makers, and also, to foster and improve collaboration among researchers of the MAGIC regions.

In order to achieve these objectives WP5 is including the participation of the Research Communities, raising their awareness and training communities on the use of collaborative technological platforms. This is essentially a coordination activity where the project team is working to establish a small set of relevant user communities working on areas/topics that are of high interest in a significant number of world regions. Preference is given to user communities that have experience of working in international projects and have at least worked in projects involving at least two of the regions involved. The global communities are provided with online collaborative tools and are receiving training on how to use them. In addition, the communities are provided with tools to identify funding opportunities for their research. MAGIC is expanding the Funding Opportunities and Partner Search portal developed in the ELCIRA project, and use it to disseminate funding opportunities. Agreements with European and other funding agencies are sought to automatically include information on their calls on the application. Following the experience of projects such as GLOBAL, ALICE2, ELCIRA, GILERA, CHAIN and CHAIN-REDS the project has been organizing Virtual Information days to take advantage of the information provided during EC Information Days and disseminating that information worldwide and specifically to the selected user communities.

Conclusion

The MAGIC collaboration is globally connecting researchers and academics. UbuntuNet-Connect is an outstanding scenario for promoting the project benefits within one of the

project regions and this paper aims at inviting the African research communities to take advantage of the projects' services, tools and resources in order to enhance their collaboration and research possibilities both in an intra-regional and a global fashion. In time ,this will contribute to reducing the technological gap, and as a consequence, in the long term, to reducing the brain drain.

Biographies

María José López Pourailly is Communications & PR (CPR) Manager of RedCLARA, MAGIC's WP6 manager (Dissemination and Training). She holds a Licentiate in Social Communication and a Bachelor´s degree in Journalism from the University Andrés Bello (UAB - Chile) in 1998. Before joining RedCLARA as a full time employee (February 2010) she worked as CPR manager at REUNA (Chilean NREN - May 2000 / January 2010), where she also managed CPR for CLARA since November 2004. Previously to her career in the advanced networks area, she worked at several Chilean media (radio, tv, newspapers) and editorials and was full time professor of Multimedia Journalism of the UAB in Santiago. She has wide experience in advanced networks, collaborative and distributed projects development and implementation, web sites design and management, editing and coordination of scientific and of advanced networks, collaborative and distributed projects development and implementation, web sites design and management, editing and coordination of scientific and of advanced networks events; she developed the PR Plan for CLARA, ALICE2, ELCIRA, EELA, EELA2 and worked in the organization of the ALICE – CLARA Launch Event (Río de Janeiro, November 22, 2004).

Leandro Marcos de Oliveira Guimarães (RNP) has been Service Manager of RNP since May, 2010. He is responsible for communication and collaboration services, identity management services and strategic hosting services, and currently is member of the GeGC (Global eduroam Governance Committee) and acts as secretary of the Latin American eduroam Committee. He has worked for over fifteen years in Information Technology areas, focusing on projects, planning and operation. He has an MBA in Project Management from IBMEC and another MBA in Information Security from IBPINET - RJ-FUNCEFET. He is certificated as PMP by PMI, COBIT Foundation by ISACA, the EXIN ITIL v3 and the MCSO (Modulo Certified Security Officer) by Modulo. With a Degree in Computer Networks from University Estacio de Sa., Leandro has worked in large companies such as Petrobras, TIM, Claro and Xerox Brazil. He also manages RNP's activities in the ELCIRA project coordinating actions for AAI between EU and LA, and promoting the deployment of eduroam services.