

# Title: BELLA: Ensuring Future Connectivity between Europe and Latin America

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Global Collaboration  
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## Abstract

### Background: RedCLARA and its Interconnection with GÉANT Today and in the Future

RedCLARA, the Latin American Research and Education Network, interconnects NRENs across 13 countries in the region with a high-capacity regional network, where in some areas multiple 10Gbps links can be deployed as needed. RedCLARA is interconnected with GÉANT, the European Research and Education Network, via a 5Gbps intercontinental link.

This achievement has been built on the foundation of a strong collaborative relationship between the RedCLARA and GÉANT communities which began in Toledo, Spain, in June 2002, when representatives of academic networks from a dozen Latin American countries, in discussions with the EC, DANTE (now GÉANT) and the NRENs of Spain, Portugal and Italy, committed themselves to the creation of a regional R&E network for Latin America. With funding support from the European Commission through the ALICE (Latin America Interconnected with Europe) and ALICE2 projects, RedCLARA became the self-sustaining network which it is today.

However, much work remains to be done to ensure the long-term scalability and affordability of connectivity in Latin America and with Europe to meet the needs of

research collaborations involving Europe and Latin America. Since ALICE2, parts of the RedCLARA network across Central America, as well as between Chile, Argentina and the south of Brazil, are built on long-term agreements for access to optical fibre. However, the network is still limited by the high cost of leasing large telecommunication capacities in the remaining countries.

Furthermore, the cost of intercontinental connectivity is heavily affected by a lack of competition among a handful of high-capacity submarine cables connecting Latin America to the rest of the world. Currently, only four such cables exist, and all of them connect Latin America only to North America, obliging connections to other continents to use a second intercontinental link onwards from North America. As a result of this market concentration, Latin America pays ten to twenty times as much as Europe for connectivity to North America although the distances involved are practically the same.

Consequently, the costs of connectivity between the Latin American and European Research and Education Networks, despite significant improvements in recent years, can be considered a serious threat to the continued close cooperation between the two regions. Such a threat concerns access to large research facilities on both continents, such as the numerous astronomy and cosmic ray observatories in Latin America, or the Large Hadron Collider in Europe, among others.

To address the issues of scalability and affordability, described above, an integrated approach called BELLA (Building Europe Link to Latin America) has been developed.

BELLA aims to remove the existing barriers for data communication between European and Latin American research communities by implementing two complementary initiatives:

- Europe-Latin America Transatlantic Connectivity: to obtain, implement and operate a significant fraction of the optical spectrum, during its entire lifetime, of a new submarine optical fibre cable between Europe and Latin America, for use by academia and non-profit organisations in Europe and Latin America;
- RedCLARA optical fibre network: to complete and operate the terrestrial optical fibre network infrastructure of RedCLARA, with the capacity to extend access of appropriate capacity to the submarine cable for research and education networks in the RedCLARA community.

For the GÉANT and RedCLARA communities, the opportunity to obtain access to optical spectrum on a new transatlantic cable is an innovative and unique way of acquiring capacity. Together with the build-out of the RedCLARA network to become a state-of-the-art optical network across the region, the connectivity needs for European-Latin American research and education collaboration will be guaranteed for at least the next 25 years.

Funding for BELLA will be provided by the European Commission (DG-CONNECT, DG-DEVCO and DG-GROWTH) alongside cash and in-kind contributions from Latin American NRENS.

The work to acquire, implement and operate BELLA connectivity will be carried out by a consortium of partners from the European and Latin American R&E networking communities:

- Europe: GÉANT, and the NRENs of France (RENATER), Germany (DFN), Italy (GARR), Portugal (FCT|FCCN) and Spain (RedIRIS).
- Latin America: RedCLARA, and the NRENs of Brazil (RNP), Chile (REUNA), Colombia (RENATA), Ecuador (CEDIA) and Peru (RAAP).

The first half of 2016 will be a crucial period for BELLA and will see significant developments in BELLA work, including the following:

- Funding contracts signed with EC Directorate Generals
- BELLA Consortium formed, with agreements on partner responsibilities, spectrum usage, BELLA operations reflected in the BELLA Consortium Agreement
- Procurement for transatlantic connectivity completed and supplier contract negotiations well advanced.
- Procurement for equipment and optical fibre access in Latin America underway.

## **The Presentation**

Representatives of the BELLA Community will provide an overview of BELLA:

- Setting the scene:
  - A brief introduction to the GÉANT-RedCLARA story
  - GÉANT-RedCLARA connectivity today, and how the proposal for BELLA arose
  - Examples of research collaborations which will benefit from the higher capacities to be provided by BELLA
- A description of BELLA:
  - Objectives
  - A public/private synergy approach
  - Funding
  - The BELLA Consortium
- BELLA Status:
  - Where BELLA is today
  - Next steps
- Lessons learned:
  - What has worked well
  - The challenges there have been
  - Recommendations on how to approach a similar opportunity if one arises in the future...

The presentation will emphasise the innovative and unique solution that BELLA provides for ensuring R&E capacity for long periods into the future, and will demonstrate that BELLA is another milestone in the close relationship between the European and Latin American networking communities.

Representatives of a number of the BELLA Consortium partners are expected to be present in the audience and will be available to answer questions alongside the presenters.

## **The Presenters**

The presenters will be a subset of the authors of this proposal.

## Acknowledgements

The authors wish to acknowledge the essential work carried out by the GARR-led ELLA (Europe Link to Latin America) feasibility study which ended in 2012 and laid the groundwork for the BELLA concept to be formed and made reality.

The authors also acknowledge the representatives of NRENs organisations involved in BELLA: CEDIA (Ecuador), DFN (Germany), FCT|FCCN (Portugal), GARR (Italy), GÉANT (Europe), RAAP (Peru), RedCLARA (Latin America), RedIRIS (Spain), RENATA (Colombia), RENATER (France), REUNA (Chile) and RNP (Brazil).

Finally, the authors wish to acknowledge the funding which will be made available by the European Commission via DG-CONNECT, DG-DEVCO and DG-GROWTH, as well as the counterpart national contributions from the South American countries which participate in BELLA, without which the project would not be possible.

## References

- ELLA, Feasibility Study for a direct Europe Link with Latin America: <http://www.ella-int.eu>
- GÉANT: <http://www.geant.org>
- RedCLARA: <http://www.redclara.net>
- EC Digital Agenda for Europe on BELLA: <https://ec.europa.eu/digital-agenda/en/news/planned-new-submarine-cable-between-europe-and-latin-america-joint-venture-agreement-signed>

## Author Biographies

**Thomas Fryer** is a member of the International Relations Team at GÉANT where he supports international dialogue between the GÉANT community and GÉANT's Partner Organisations outside Europe, and specifically focuses on North America, Latin America, the Caribbean and Sub-Saharan Africa. In addition, he is a participant in the EC-funded MAGIC project which aims to improve global collaboration opportunities through the wider implementation of end user services around the world, and the TANDEM project which supports engagement with stakeholders in West and Central Africa to drive the sustainability of WACREN and NRENs in West and Central Africa. Thomas is a representative of GÉANT in BELLA.

**Dr. Fernando Liello** is a member of the Scientific and Technical Committee of GARR (the Italian Research and Education Network) and has been Chairman of GEANT's Policy Committee. As a member of GARR he has participated in the ALICE and ALICE2 Projects to connect Latin American and European researchers and has been the leader of the AugerAccess and EVALSO projects to connect the astronomical and cosmic ray observatories in South America to the RedCLARA network and Europe. He was the leader of the ELLA Project that carried out the feasibility study of the new submarine cable between Europe and South America.

**Nelson Simões** is Director General of Associação Rede Nacional de Ensino e Pesquisa (RNP-OS), a non-governmental, non-profit organisation, qualified as a

Social Organisation (OS) by the Brazilian federal government for the development of advanced networking for R&E in Brazil. As such he is in charge of RNP, the Brazilian NREN that serves 600 major Brazilian R&E organisations, nationwide. He has taken part in Brazilian Internet governance as a representative of the scientific and technological community. He is also a founder and former director of Cooperación Latino Americana de Redes Avanzadas (CLARA), the regional research network in Latin America. He holds a BA in Computer Engineering from the Catholic University of Rio de Janeiro.

**Michael Stanton** is Director of Research and Development at RNP, the Brazilian national research and education network. After a PhD in mathematics at Cambridge University in 1971, he has taught at several universities in Brazil, since 1994 as professor of computer networking at the Universidade Federal Fluminense (UFF) in Niterói, Rio de Janeiro state, until his retirement in 2014. Between 1986 and 1993, he helped to kick-start research and education networking in Brazil, including the setting-up and running of both a regional network in Rio de Janeiro state (Rede-Rio) and RNP. He returned to RNP in 2001, with responsibility for R&D and RNP involvement in new networking and large-scale collaboration projects.

**Dr. Florencio I. Utreras** is the Executive Director of CLARA, the Latin American Cooperation of Research Networks. Former Full Professor of Applied Mathematics of the University of Chile. Before joining CLARA, Dr. Utreras was the Executive Director of REUNA (the Chilean Research Network which he contributed to create) since 1992. Dr. Utreras has been involved in Research Networking since 1987 and has been awarded several national and international prizes for his contribution to the dissemination of Internet technology and research networking. He is now the Coordinator of the MAGIC project and has also participated in several FP7 Projects, like EVALSO, ELLA and others.