In order to get far...
You must be near

Index

INTRODUCTION

Dreams were necessary to get far

Calderón de La Barca wrote that life is a dream, and that dreams are just dreams. But no, dreams can become true; you only need to have a wish and fight for it; it is just a matter of faith and strength, alliances and loyalties, collaboration, energy; it has to do with building roads, with learning to get back on our feet no matter how many times we fall flat on our faces. Over the years in which the ALICE (*América Latina Interconectada Con Europa* - Latin America Interconnected with Europe) project was developed we learned this lesson. This, together with the strong collaboration commitment in pursuit of the great dream of establishing a Latin American Advanced Academic Network enabling regional unity for the development of science, education, research and innovation as well as paving our way towards developed countries, starting with those in Europe, was what led us to make that great dream come true: our RedCLARA network.

Chapter I
Integration was fundamental to get far
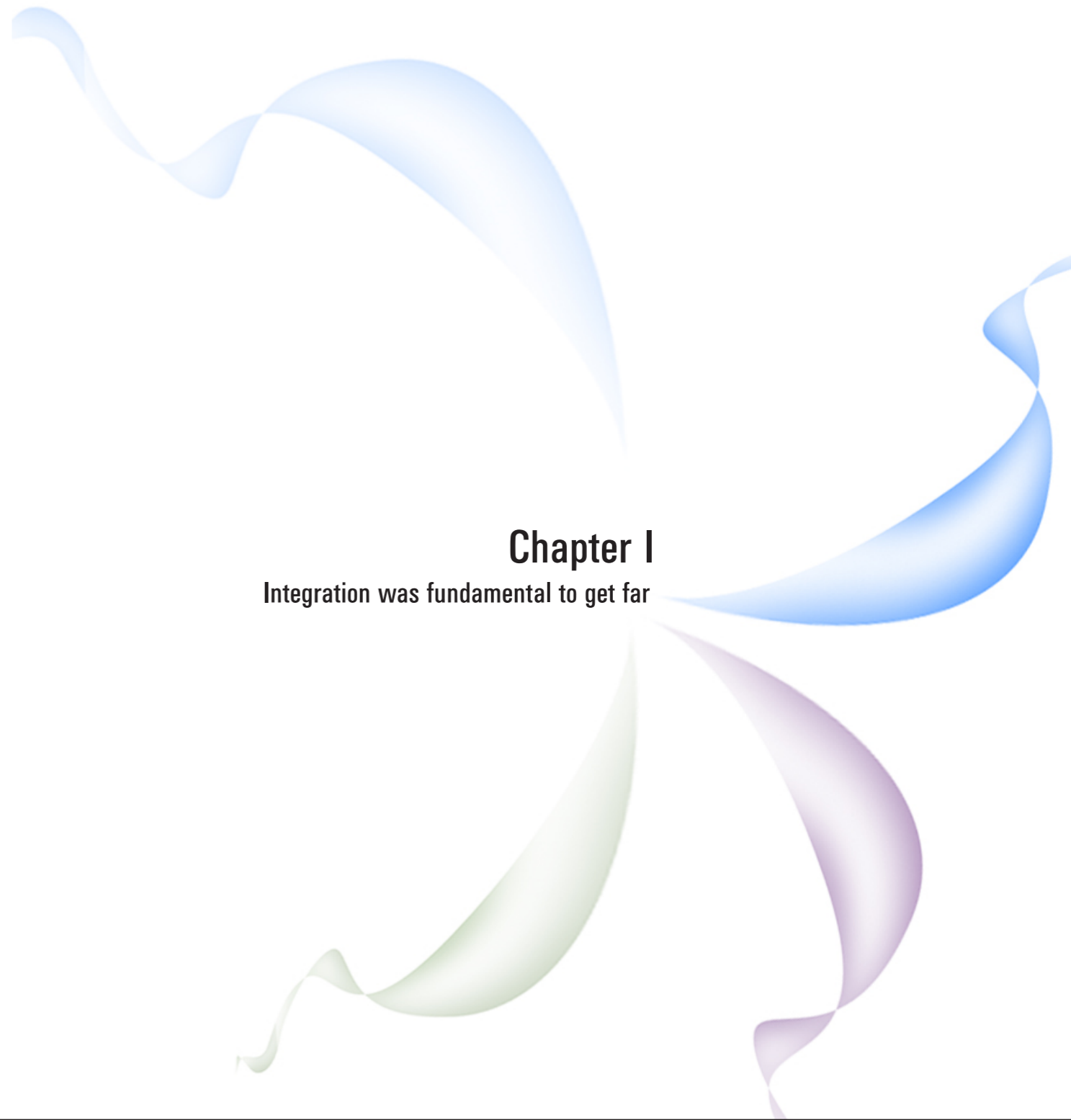
Render to CAESAR the things that are CAESAR'S and they will belong to everybody

"When we used networks to get in contact we virtualised our presence and we did not stop using a substitute for reality but at that moment we were in need of first-class communications, of human communications. The Toledo meeting represent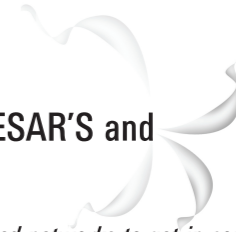ed the immersion of people in a rocky island in the middle of the Tajo river, a melting pot of peoples where the ideas that we all had, but which needed a catalyst, could crystallise. Outside the island, from the distance of Cigarral de las Mercedes we could confirm that the meeting had yielded its fruits and that there would clearly emerge the will to create a Latin American Research Network connected to Europe".
Víctor Castelo [1], Director of Communications and Security at CSIC.

With the objective of analysing the possibilities for direct interconnection between the pan-European research network GÉANT, and its national counterparts in Latin America, the year 2002 witnessed the birth of the union between the National Research and Education Networks (NREN) from Portugal and Spain (FCCN and RedIRIS, respectively) and DANTE [2] to work on the development of a feasibility study called CAESAR (Connecting All European and South (Latin) American Researchers).

Funded by the European Commission through the Directorate General for Information Society Technologies (EC DG IST), CAESAR was developed between March and October 2002. Only eight months were necessary for the vision to be absolutely clear: it was essential to create a regional core network in Latin America and link it to GÉANT.

(1) When the CAESAR feasibility study was conducted , Víctor Castelo was the Director of the Research and Education Network from Spain, RedIRIS.
(2) DANTE (Delivery of Advanced Network Technology to Europe) plans, builds and operates advanced networks for research and education. It is owed by European NRENs, and works with them and in cooperation with the European Commission. DANTE is established in Cambridge, UK, and it is a "Non for Profit" organisation.

During the first CAESAR meeting, held on 1 March 2002 in Madrid, none of the representatives from FCCN, RedIRIS and DANTE could imagine what would happen only a few months later; we are talking about the Toledo Workshop, held on 13-14 June at the Castilla-La Mancha University (Toledo, Spain), with the financial support of RedIRIS. But, let us leave this matter in suspense for a while. Before continuing, it is necessary to go further back in time to find out about the origins of CAESAR. It is the moment of remembering those days in which Victor Castelo, Director of RedIRIS, and Pedro Veiga, President of FCCN, with a visionary outlook went to DANTE to convince them of joining efforts in pursuit of the advanced connection of Latin America with Europe. Clearly, the reply that they received was a positive one. And the good news for Castelo, Veiga, RedIRIS, FCCN, DANTE and Latin America acquired a particular melody in May 2002, specifically on the 21st and 22nd within the context of two events co-organised by the European Commission and GÉANT/DANTE, namely the Research Networks Global Summit and the meeting called GÉANT 'Knows its Users', both held in Brussels. On that occasion, in a private meeting where Latin America was represented by Florencio Utreras, then Executive Director of the Chilean network REUNA, the European Commission stated that they had 10 million Euro, as part of the @LIS Programme, to fund the longed for Latin American network and, of course, its connection to GÉANT. However, the Commission expected Latin America to contribute with an equivalent amount. "Given the conditions of our countries, it was evident that we would not be able to get that sum, so we managed to negotiate a regional contribution of 2.5 million Euro", remembers Utreras, who adds that "the truth is, I think that without the great drive given at first by the father of the idea, Victor Castelo and RedIRIS, and then by Pedro Veiga, FCCN and DANTE, we would have taken a few more years to tell the happy story we are telling today".

Now we can refer to the Toledo Workshop, which gathered and joined together 15 senior representatives from organisations devoted to the development of research and education networks (or other related networks) in twelve Latin American countries, as well as representatives from the Policies Commission of the European NREN, from DANTE and delegates from the European Commission, to discuss around the issue of continental interconnection. Only two days were necessary to produce what seemed a long-term dream: the representatives from the Latin American networks committed themselves to collaborate in the creation and organisation of a regional infrastructure for research, education and innovation.

The momentum was great. Latin Americans had been dreaming for years with establishing a powerful network at a regional level, with the idea of getting directly to Europe, but again and again they bumped into the same hurdle: the serious problem of funding.

The initial impact of this Workshop did not dissolve over time. Quite on the contrary, only two weeks after Toledo, the Latin American networks organised their own association, CLARA (Latin American Cooperation of Advanced Networks) and, joined under this new figure and only one month after the workshop which had motivated their illusions they met up in Rio de Janeiro (Brazil) on 15-16 July in order to further the agreements adopted as part of the Toledo meeting. Such was the progress made that on 16 July, the networks participating in that meeting and which had not participated in the June meeting but already part of CLARA, also adhered to "Toledo Declaration":

Toledo Declaration
On Research and Education Networks in Latin America

"Gathered in the city of Toledo, on the 13th and 14th of June, 2002, as part of a European Commission initiative, the signatories, members of networks from Latin America, acknowledge:
"1. The importance for the Latin American academic and research community of having a regional structure for data communication, based on advanced networks which allow for a better collaboration in the academic and research field.
"2. The efforts made by the European Commission for the development of Global Information Society project, where the academic space is regarded in a special way.
"3. That it is necessary to make a similar effort for integration, not only in our respective countries, but at a regional and global level.
"Because o the aforementioned statements we declare:
"1. That the existence of national research and education networks (NREN) is necessary.
"2. That it is desirable to establish a Latin American research network, based on the existing networks in various countries.
"3. That we agree on collaborating in the development of national networks in those countries where there are no such networks, and in the creation of a space for coordination their coordinated regional integration and development.
"4. That considering the possibility of obtaining funding from the European Commission through @LIS, it is necessary to coordinate efforts in terms of the interconnection of research and education networks, and to propose for this aim the creation of a Latin American regional coordination group. To this end we appoint Nelson Simões (Brazil) and Sidia Sánchez (Panama).
"5. That previous to the next workshop that the European Union proposes to organise with members from the Latin American networks in September, the Toledo representatives agree to hold two regional meetings to establish organisation criteria for the Latin American network. The first of these meetings will be held in Brazil, on 15 July 2002, and the second one a month later."

The Toledo Declaration was signed by: Nelson Simões – RNP (National Network of Education and Research, Brazil), Sidia Moreno de Sánchez – PanNet (National Academic and Research Network, Panama), Carlos Casasús – CUDI (University Corporation for the Development of the internet, Mexico), Carlos Francisco Frank – RETINA (Tele informatics and Academic Network, Argentina), Clifford Paravicini Hurtado – BolNet (Bolivian Network for Data Communication, Bolivia), Florencio Ignacio Utreras Díaz – REUNA (National University Network – Chile), Ida Holz Baird – RAU (Uruguayan Academic Network, Uruguay), Jorge Luis López Presmanes – RedUniv (University Network, Cuba), Pablo José A. G. Herken – UNA/CNC (National University of Asunción, Paraguay) and Sandro Venturo – Peruvian Scientific Network (Peru).

Apart from the signing of the Declaration, the meeting in Rio de Janeiro featured the establishment of work groups to address the themes related to the future presentation of the project of the Latin American network and its interconnection with Europe

for the European Commission's @LIS Programme (Alliance for Information Society). These are: regional connectivity, interconnection with GÉANT, organisational model and funding. As for CLARA, the directives gathered in Brazil agreed that it would have representation and coordination functions, that it would be initially made up of an elected committee and that it would later become a consortium of NRENs, that it would be the starting point for future regional network organisations, an that in March 2003 it would be able to constitute itself as a formal organisation, through a model jointly proposed by the Latin American NREN.

The Workshop organised by the European Commission in Toledo had planted a seed which germinated in an explosive way. It was evident that Latin America was not willing to let more time pass; the rising opportunity was decisive for the future of research, education, science, technology and innovation in the continent. Latin America longed for growth and Europe was making the concept of collaboration acquire its real meaning.

ALICE and the region of wonders

"The momentum generated during the CAESAR meeting in Toledo in 2003 was decisive. Latin America responded CAESAR and the @LIS programme with a clear commitment and political will. The funding from the European Commission, through the ALICE project, served as a catalyst for the creation of CLARA and RedCLARA. It is evident that what Europe brought to Latin America was longed for and necessary in the Latin American network research community."(3)
Cathrin Stöver, Manager of the ALICE Project
November 2006.

June 3rd, 2003: The ALICE (Latin America Interconnected with Europe) project, is officially launched, an indisputably demonstrating that the mission developed by CAESAR had been accomplished.

June 3rd was a Tuesday in which the officers from the European Commission and the representatives from DANTE gathered, as part of the @LIS programme, to sing the contract that, with €12.5 million, would serve for the creation of an infrastructure which promised to connect the Latin American research networks at an intra-regional level, and interconnect them with the pan-European network GÉANT. The European Commission was thus giving its final approval to 80% of the funding for the ALICE project (€10 million), committing the Latin American partners to contribute with the remaining 20% (€2,5 million). And the world could see how the declaration made by

the Heads of State and Government during the last Summit between the European Union and countries from Latin America and the Caribbean (Madrid, June 2002) became a reality: "Scientific research and technical development are key elements in our relations and are an essential condition for the successful incorporation of countries into a globalised world. It is advisable to share the knowledge, the technology and the information by taking advantage of the infrastructure's connectivity and by fostering the achievement of universal access".

The signature of the ALICE contract also represented the first definite step towards the establishment of a wider collaboration for the development of the World Research and Education Network, exactly as proposed in the European Commission's Communication on the UN World Summit on the Information Society, which would take place in Geneva in December 2003.

(3) López Pourailly, María José. *Cathrin Stöver*: [online in PDF format] *"The commitment from CLARA and DANTE to suceed was always stroger"*. Interview Published in the DeCLARA bulletin, n° 10, year 2, November 2006, pages. 7-8. See at: <http://www.redclara.net/doc/DeCLARA/DeCLARA_en_10.pdf>.

CAESAR's pretty girl, ALICE, was trying to create a research networks infrastructure in Latin America and interconnect it with its European counterpart GÉANT through the Internet protocol (IP). In order to achieve this great objective, DANTE – institution in charge of GÉANT's management- as part of its role as ALICE project coordinator, associated in Europe with NREN from Spain (RedIRIS), France (RENATER), Italy (GARR) and Portugal (FCCN). On the other side of the Atlantic, in the heart of a Latin America that was about to experience the wonders of transoceanic connection, ALICE associated with CLARA and with the NREN from the 18 countries whose participation was admitted by the regulations of the @LIS programme: RETINA (Argentina), ADSIB (Bolivia), RNP (Brazil), REUNA (Chile), University of the Cauca (Colombia), CRnet (Costa Rica), RedUniv (Cuba), CEDIA (Ecuador), RAICES (El Salvador), RAGIE (Guatemala),

UNITEC (Honduras), CUDI (Mexico), CNU on behalf of RENIA (Nicaragua), RedCyT (Panama), ARANDU (Paraguay), RAP (Peru), RAU (Uruguay) and REACCIUN (Venezuela).

If CAESAR had demonstrated that there was no direct connectivity between the Latin American NREN, even less a connection between them and the pan-European research network GÉANT, and that this lack made research collaboration difficult both within Latin America and between Latin America and Europe, ALICE would demonstrate that those issues could be overcome through collaborative work. To do this, it would have a time frame that extended until April 2006. Certainly, history would have something else to say in this respect and thus the Project obtained authorisation for two time extensions (the budget was maintained according to the contract from 3rd June 2003), and its completion was scheduled for March 2008.

The value of unity was captured in paper

"The enthusiasm generated by ALICE was clearly shown in the creation of CLARA, the Latin American Cooperation of Advanced Networks, created to develop and provide long-term sustainability for this key infrastructure for scientific development, as well as for the creation of virtual spaces for the integration of universities and research centres in the region. It was in June 2003, in the city of Valle de Bravo, in Mexico, where the CLARA Statutes were signed, thus giving birth to a Non Profit International Organisation recognised by the Uruguayan Government in December that same year. Since then CLARA has travelled a fast road of success and consolidation."(4)
Florencio Utreras, Executive Director CLARA
April 2005.

Prior to the signature of the contract which established, within the context of the already established Information Society, the beginning of a new era for Latin America, the leaders from the existing Latin American NREN, and those who had been appointed in their countries to create them, held four meetings during the second half of 2002 aimed at the creation of CLARA: Rio de Janeiro (Brazil) 15-16 June and 25 September, Buenos Aires (Argentina) 10-11 October and Santiago (Chile) 18-19 November. As could be expected given the evident commitment, the members from CAESAR and officers from the European Commission also participated in these meetings.

The agreements had to be established in accordance to the interests of all the parties involved. Nothing could be left up to fate. The future of collaboration in Latin America and between Latin America and Europe was the great bid that was being placed on the table.

On 10 June 2003, barely seven days after the official launch of the ALICE project, great news is launched from the Mexican city of Valle del Bravo towards Latin America, Europe and the rest of the world: CLARA has been born; the Constitution Act has been signed by the representatives from thirteen Latin American countries:

(4) Utreras Díaz, Florencio. *Editorial* [online in PDF format]. DeCLARA, n° 1, year, April 2005, cover. See it at: <http://www.redclara.net/doc/DeCLARA/DeCLARA_english_0405_1.pdf>.

"ACT No.1. In the city of Valle de Bravo, State of México, in the United Mexican States, on the tenth of June two thousand three, the undersigned people gathered in a session chaired by Carlos Casasús López Hermosa, who certifies his personality with the Mexican passport number 00370039662, and where Ida Holz Bard acted as Secretary, certifying her personality with the Uruguayan identity document N° 670.625-8, with the aim of founding a non profit, non governmental organisation which will be called: LATIN AMERICAN COOPERATION OF ADVANCED NETWORKS (CLARA) and whose Statutes, which were previously known by the attendees, and unanimously approved by those present, are transcribed below:

CONSTITUTION ACT OF
LATIN AMERICAN COOPERATION OF ADVANCED NETWORKS,
CIVIL ASSOCIATION
STATUTES
CHAPTER I
DENOMINATION, ADDRESS, NATIONALITY and DURATION

ARTICLE 1. Under the name of LATIN AMERICAN COOPERATION OF ADVANCED NETWORKS, known in abbreviated form as CLARA, we hereby create a Civil Association (henceforth, CLARA or the Association) which will be governed by the present Statutes and by the applicable laws and regulations, with seat in Montevideo, Uruguay. The Association will be able to open, when it finds it suitable, to open offices or any other sort of facilities in any other city in every country in order to meet its aim.
ARTICLE 2.- CLARA is a non profit organization which will be able to perceive income, which will be entirely applied to promote educational, scientific and cultural activities which constitute its aim.
ARTICLE 3.- The duration of the Association is indefinite.
ARTICLE 4.- The aim of the Association is:
a) Coordination between National Academic Networks within Latin America and with other blocks;
b) Cooperation for the promotion of scientific and technologic development;
c) Planning and implementation of network services for regional interconnection, and
d) Development of a regional network (henceforth Red CLARA) to interconnect national academic and research networks, and which will be operated by its Associates.
In order to meet its objectives CLARA will be entitled to perform the following:
a) To collect, via fees contributed by its Associates, the necessary resources for the operation of the network;
b) To promote the integration of academic and research organizations and serve as a link for collaboration, exchange of experiences and information on these;
c) To establish mechanisms for face-to-face or remote participation to have the active engagement of the aforementioned Associates;
d) To develop all sorts of activities which are relevant or related to the development of academic and scientific networks in Latin America and the Caribbean;
e) To acquire, build or possess all sorts of movable and immovable property and necessary rights in rem to meet its aim;

f) To celebrate all the acts and contracts, execute the operations and provide the documents that are necessary for the fulfilment of its aim, all of these in compliance with these Statutes;
g) Receive collaborations and donations to contribute to the fulfilment of its aim. Similarly, to look for funding from organism for scientific-technologic promotion and international technical cooperation;
h) To organise meetings, forums, workshops, congresses and any other sort of event which serves to promote, at a regional level, the activities, projects and developments on academic and scientific networks and
i) To keep and publish updated statistical information on the development of the Internet in the region, in the areas and themes which are part of its jurisdiction and knowledge."(5)

Forty seven articles and four transitory dispositions, agreed upon on 9 June, were signed on that Wednesday 10 of the sixth month of 2003 by the highest authorities in academic networks which, on that date, were outlining the avant-garde path of the Latin American continent, namely:

• Carlos Francisco Frank, RETINA – Argentina.
• Nelson Simões Da Silva, RNP – Brazil.
• Florencio Utreras, REUNA – Chile.
• Guy F. De Teramond, CRNET - Costa Rica.
• Marcos Molina Jurado, FUNDACYT – Ecuador.
• Rafael Antonio Ibarra Fernández, RAICES - El Salvador.
• Ramón Alberto Sarmiento Castro, UNITEC – Honduras.
• Carlos Casasús López Hermosa, CUDI – Mexico.
• Azael Barrera Garrido, REDCYT – Panama.
• Blanca Troche de Trevisan, ARANDU – Paraguay.
• Manuel Burga, RAP – Peru.
• Ida Holz Baird, RAU – Uruguay.
• Jorge Luis Berrizbeitia Ponce, REACCIUN – Venezuela.

Although the inclusion of the signatures of the representatives from Bolivia, Colombia, Cuba, Guatemala and Nicaragua was pending, within ALICE the news was celebrated with the joy and hope people experience at seeing the eyes of the newly born and long awaited baby. The value of the established union in Latin America, reinforced by the strength of a signed paper with legal status, could be measured not only in gold, but also in terms of projections for universities and research centres, potential beneficiaries of the new alliance.

_____

(5) The full text of the CLARA Statutes is available online at the URL: <http://www.redclara.net/doc/estatutos_clara.pdf>. Only in Spanish.

Chapter II
In order to get far: Get connected
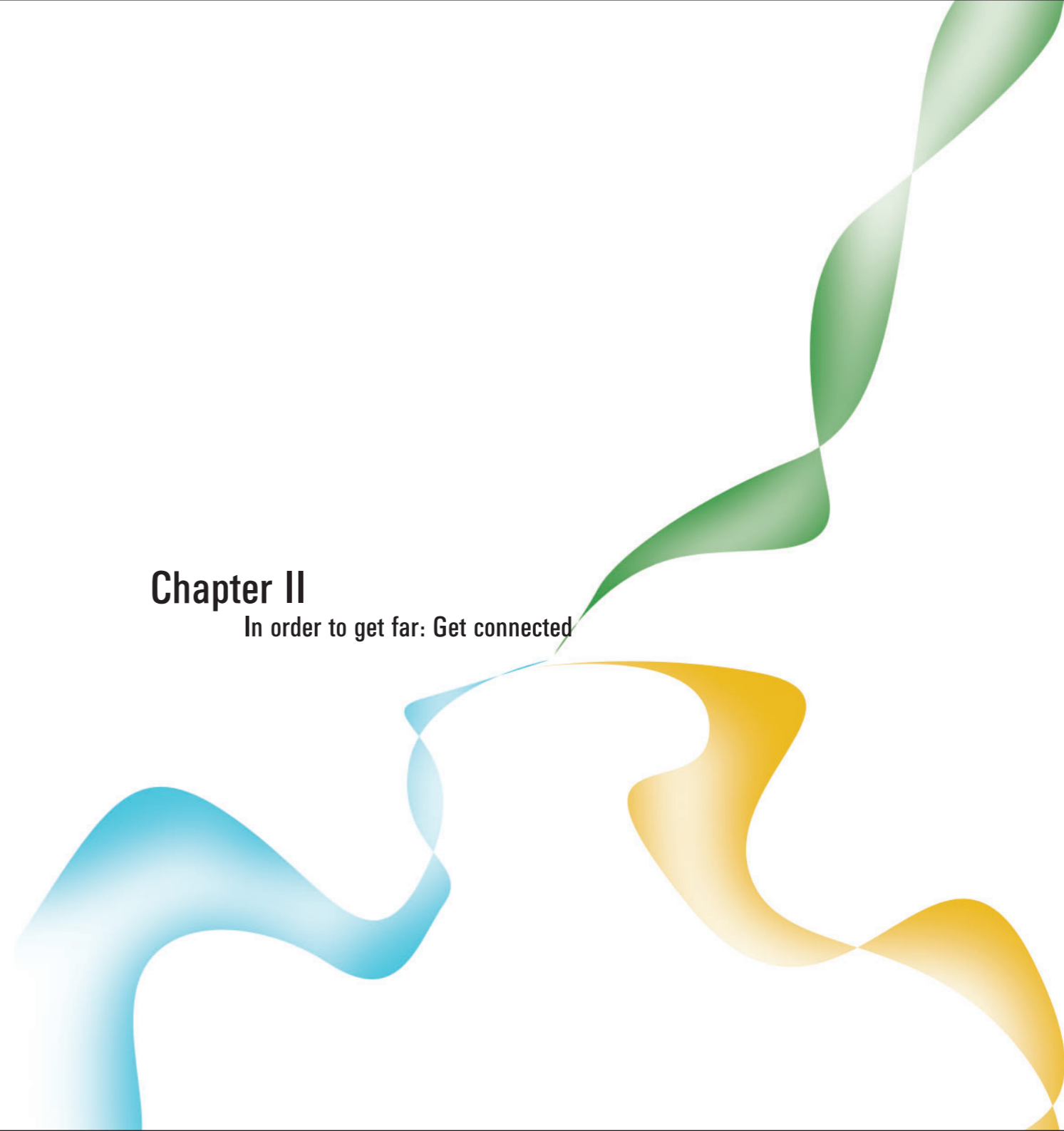
ALICE wove its network in Latin America

"The contribution stemming from the implementation of RedCLARA and the creation of the CLARA organisation has been crucial for local development in the Latin American territory. Our continent keeps on looking for presents and futures which include views, voices and ideas under the light of the world technological scenario, and the existence of RedCLARA, currently a reality and the result of an intense collaboration work, appoints us as protagonists of a local development branded with the distinctive seal of territorial societies from Latin America.

The Latin American network is a vast information motorway implemented in order to promote the exchange of ideas, experiences and opinions, and, above all, to facilitate joint work in scientific and academic research. Today we are incorporated and we are intensely contributing in the main ongoing academic collaboration projects at a global level, which is crucially important in order to move closer towards the horizon of development that we envision in the countries in the continent."

Eriko Porto, Network Engineer, RedCLARA.

Let us make a parody for a while; let us allow ourselves to develop a little metaphorical exercise, with the slight ambition of making a hint at humour:

ALICE, the girl who had succeeded in putting into concrete form the romance between the pan-European advanced network and the rising networks established in Latin America, wanted to seal the bond by weaving a network which would serve not only to dress up the beautiful America, but also to tie it directly to its spouse GÉANT by means of the strength of the fibre. In order to accomplish her self-imposed task, ALICE invited her friend CLARA to weave the network. As these two loyal friends moved forward in their labour, they decided to give a special name to their novel piece of work and they named it RedCLARA. On 31 August 2004, when the dark skin of the beautiful bride was still unfinished, the network, ALICE and RedCLARA met two of their greatest aims; yes, on that day they succeeded in making the long and powerful fibre of RedCLARA go across the Atlantic to definitely join Latin America with GÉANT.

With less romanticism and the same precision, this is exactly how the new story of RedCLARA connections began to unfold, the story of the Latin American advanced network which constituted itself as the paramount result of ALICE.

The first landmark in the network's chronology was dated, by the Network Engineering Group (NEG), on 31 August 2004, the day in which the activation of the provisional backbone was carried out, by means of a link established from REUNA (NREN from Chile) towards the RedCLARA router, located in Sao Paulo (Brazil) and a link to GÉANT by means of a 622 Mbps international link. The link had been made possible thanks to a cross connection performed on the RedCLARA PoP (Point of Presence) locatedin Buenos Aires (Argentina).

Although it is true that the link in Chile had been established on the last day of August, it was not until 15 November that RedCLARA began to provide direct connectivity at 155 Mbps, linking the NREN in Argentina, Brazil, Chile, Panama and Mexico, and linking them to GÉANT at 622 Mbps via the link between Sao Paulo and Madrid (Spain).

But there was still a lot to be done, and ALICE and CLARA were not willing to halt the network's development. Thus, during 2005, the NREN from Uruguay (RAU), Peru (RAAP), Costa Rica (CR2Net), Panama (RedCyT), Guatemala (RAGIE), El Salvador (RAICES) and Ecuador (CEDIA), got linked to RedCLARA, raising the number of linked NREN to twelve by the end of that year. In 2006, the links to RedCLARA continued with Colombia (RENATA), Venezuela (REACCIUN) and Nicaragua (RENIA).

RedCLARA premieres in society

"RedCLARA will open great possibilities for collaboration within Latin America, it will enable the development of research in many areas which today depend on the availability of a fast connection with greater bandwidth. It will enable Latin American researchers to interact with researchers from Europe and the rest of the world. It will enable the rest of the world to have a better access to a great amount of scientific activities carried out in Latin America."(6)
Fabio Colasanti, Director General of the European Commission
Information Society (7)
November 2004.

The word success becomes small when it comes to remembering and evaluating the official launch of RedCLARA.

It was a Monday that 22 November 2004. The guests at the Otton Palace, the hotel chosen by the European Commission and the Brazilian Government as the venue for the 3rd Latin America and the Caribbean – European Union Ministerial Forum on the Information Society: An Alliance for Social Cohesion through Digital Inclusion, had woken up at dawn under the extremely bright sun beams raising from the Atlantic, which gave Copacabana a touch of incandescent light. It was a bright day and the nervousness was so evident and tangible that you could have actually cut it with a knife. Second by second, the directives from DANTE, CLARA and the ALICE member NREN, were staking a piece of their own skin; there were more than one hundred ministers and high representatives from 30 European and Latin American governments, and everybody working in favour of CLARA knew that each of the dignitaries present had to be instructed on the importance of the new network.

Undoubtedly, for the ALICE member countries it was a challenge that gave birth to the first and only Latin American advanced network, the paramount concept, the leitmotiv. This would stem from the Declaration of Rio de Janeiro –document resulting from the 3rd Forum- and from the words expressed at the RedCLARA launch ceremony by Nelson Simões, President of the CLARA Board (2003-2006) and Executive Director of RNP: "We have in our hands the possibility of being actors in this new economy and, at the same time, provide answers to national problems which affect our region. We can integrate our communities

---

(6) Colasanti, Fabio. Speech delivered at the RedCLARA launch ceremony [online in PDF format], on 22 November 2004, as part of the III Latin America and the Caribbean and European Union Ministerial Forum on the Information Society: An Alliance for Social Cohesion through Digital Inclusion. Río de Janeiro, Brazil.
See it at: <http://www.redclara.net/doc/Fabio_Colasanti_LanzaRedCLARA_sp.pdf>. Only in Spanish.
(7) Information Society and Media since 1st January 2005.

of scientists, academics and students, into remote collaboration, the exchange of data, and the treatment of information in a collaborative and distributed way. In short, today in Latin America and the Caribbean we can develop science disregarding the barriers that divide our countries and which separate us from the rest of the world" (8).

At 10:30, on the 22nd, immediately after the opening of the 3rd Latin America and the Caribbean – European Union Ministerial Forum on the Information Society (which would last until 23 November), and as part of the @LIS Programme, the official presentation of the first Latin American research and education network, RedCLARA, and its interconnection with the pan-European network GÉANT, was carried out.

Nelson Simões was in charge of introducing the new network, by means of a speech marked by the acknowledgement of the great challenge that it posed for the research and education community in Latin America:

"With our technical, scientific and cultural potential, we are contributing to the development of knowledge; we are astronomers, biologists, physics, engineers, doctors, musicians; we work with biodiversity, informatics, agriculture, mathematics, climate and the arts. But certainly, it will be easier to translate the value that we produce in favour of society in the field of science, technology and innovation if we use this value to solve our local problems and challenges.

"We have the same roots. We also have, in a wider sense, the same problems. So, what can RedCLARA do to solve the challenges we face in education, research and health? We can provide the most innovative communications and collaboration applications for the improvement of our primary school teachers; we can share expensive and unique tools, such as a telescope in the Andes; we can collect, store and manage information about the weather, for instance in the Amazon or the El Niño Current; we can play and listen to music, dance and see others dancing; we can create and develop contents and applications to support the education of the younger citizens, by exploring the wellbeing and the value of our Latin, American and dark-skinned culture".

Fabio Colasanti, Director General of the European Commission Information Society, and Dai Davies, General Director of DANTE, also represented a fundamental contribution in the official presentation of RedCLARA, and with the seriousness of those who know that each stage accomplished is the onset of a great task, they emphasised the challenges that this network posed. Davies recognised the difficulties that the costs to access telecommunications technologies in Latin America had imposed on the establishment of RedCLARA, and Colasanti expressed the interest of the European Commission that the network can extend itself to all the countries in the region: "Today RedCLARA is starting out with a limited number of countries, but we are very positively impressed at the interest shown from other parts of Latin America. I hope that the extension of RedCLARA to the entire region of Latin America and the Caribbean is something that can soon be accomplished".

The Director-General of the Information Society was even more emphatic regarding the importance which the European Commission gave to the emerging network during the press conference which took place after the launch: "I must explain that, in these days, many areas of science and research require applications enabling the exchange of great bulks of information, which cannot be transmitted over conventional networks. The absence of networks like RedCLARA would imply that the research institutions in Latin America will not be able to collaborate with their peers. The next steps for RedCLARA should be not only the extension already mentioned, but also the increase of bandwidth and a permanent updating, because when the researchers begin to use the network, they will require more and more capacity. With communications at this level, we could even consider this as an absolute need in today's world of science".

Going back to the forum, it is necessary to concentrate on the declaration resulting from the two days of activities. Among the 19 points which constituted the corpus of the document –agreed upon by the Ministries and Heads of State from Latin America, the Caribbean, European Union countries and by the representative from the European Commission, all present at the event- the @LIS Programme from the European Commission and RedCLARA occupied a predominant position. Namely:

"9. They welcome with satisfaction the work done as part of the @LIS Programme (Alliance for the Information Society) from the European Commission, aimed at collaboration between the European Union and Latin America, emphasising its importance and impact.

"10. They welcome with satisfaction the launch of the first pan Latin American education and research network CLARA (Latin American Cooperation of Advanced Networks) and its interconnection with the pan European network GÉANT, as one of the most relevant achievements of the @LIS programme. They support the objective of expanding the network's coverage to the entire region. They trust the potential of the CLARA network as a platform for multiple collaboration initiatives in education, research and development, in areas of mutual interest for both regions, and them emphasise the importance of its future sustainability".

ALICE had materialised a significant portion of its aim, but the work had to continue. The feeling of success did not lead to an excessive craving for success, but to the immediate establishment of new goals. The interconnection between all the countries in Latin America that were members of the project had to be turned into reality.

CLARA, inspired by the enormous advances, used the Assembly that was held right after the 3rd Ministerial Forum to take a new significant step in its path. Since June 2003 CLARA had been headed by a Provisional Directive Council. On 25 November 2004, this figure changed to a Directive Council, elected by the member institutions present at the General Assembly. In parallel, and after a careful selection process, Florencio Ignacio Untreras Díaz was named Executive Director of the institution (this post was taken over on 2 January 2005). The combination of these two events, which shed some light on the articulation of a path aimed at sustainability, generated a very positive response in the international networks community.

(8) Simões, Nelson. Speech delivered at the RedCLARA launch ceremony [online in PDF format], on 22 November 2004, as part of the III Latin America and the Caribbean and European Union Ministerial Forum on the Information Society: An Alliance for Social Cohesion through Digital Inclusion. Rio de Janeiro, Brazil. See it at: <http://www.redclara.net/doc/Nelson_Simoes_LanzRedCLARA_sp.pdf>. Only in Spanish.

And networks were born in our countries

"What I think is that it must be always taken into account that ALICE and CLARA are not ends in themselves, but a means to an end. The Latin American networks and their users' communities will be the pillars which will sustain this initiative in the future with the aim of turning it into a driver for regional development by using it as instrument for international collaboration in the fields of education, science and innovation, for the benefit of the Latin American society." (9)
Elena Vilar Pascual, Officer from the Cooperation Office of the European Commission,
EuropeAid (10)
December 2005.

The CAESAR final report included a state-of-the-art analysis of the situation of the NREN in Latin America. Beyond the evident need for regional interconnection and connection to Europe, the study revealed the existence of a profound digital divide between Latin American countries and, obviously, the enormous distance which separates us from Europe.

The 18 CAESAR member countries, after ALICE and CLARA, were placed under the magnifying glass. Out of them, only nine had a formally established or budding NREN: Argentina, Bolivia, Brazil, Chile, Costa Rica, Mexico, Panama, Uruguay and Venezuela. Within this group, only four NREN –the oldest- were linked to the USA advanced network Internet2: CUDI (Mexico), RETINA (Argentina), REUNA (Chile) and RNP (Brazil). Colombia, Cuba, Ecuador, El Salvador, Guatemala and Peru, declared

they were planning the implementation of a NREN, while Paraguay stated it had a university network (not conceived as NREN), and Honduras and Nicaragua featured no information along these lines.

The situation for ALICE was complicated, albeit auspicious enough to explore the development of a network that would join together seven countries within the region among themselves and with Europe. The number was not impressive and the most critical people thought that it is not coherent with the enthusiasm of the representatives from Latin American countries in the project. Time showed that rather than an attitude of exaggerated prudence, the predictions for ALICE had more to do with the resilient character of those who were leading the project: it was necessary to fix goals which could be met and, once that objective was achieved, fix new goals.

---

(9) López Pourailly, María José. *Elena Vilar Pascual*: [online in PDF format] *CLARA it's a Reference for other Regions with which the European Commission has similar Cooperation Programmes*. Interview published in the DeCLARA bulletin, n° 5, year 1, December 2005, pages. 5-6. See it at: <http://www.redclara.net/doc/DeCLARA/DeCLARA_en_05.pdf>.
(10) Currently, Elena Vilar Pascual is European Commission Delegate in Kenya.

After a short while, it was crystal clear that the combination of commitment, control and challenge of the ALICE and CLARA leaders, and the strong support from each of their members would yield more fruits than expected.

The creation of networks in those countries that did not have one, and the formal opening of those recently emerging at the time the CAESAR study was conducted, were the great landmarks in 2005 and 2006.

2005:
- 02 February: Nicaragua launches the final countdown with the signature of the constitution statutes of RENIA (Nicaraguan Advanced Internet Network).
- 25 April: In Honduras RHUTA, the Honduran Network of Universities with Advanced Telecommunications, is created.
- 29 September: The Peruvian NREN premieres it new name –RAAP: Peruvian Academic Network)- and corporate image in its official launch.
- 29 November: Uruguay celebrates the launch of RAU2, the Uruguayan Academic Network.

2006:
- 23 January: REACCIUN2, the Academic Network of Research Centres and National Universities from Venezuela, is officially launched.
- 24 January: RENATA, the National Academic Network of Advanced Technology from Colombia, is launched.
- 22 July: CEDIA, the Ecuadorian Consortium for the Development of Advanced Internet, celebrates its official launch.
- 24 November: Salvadorans launch RAICES – Research and Science Academic Network from El Salvador.
- 27 November: RAGIE, the Guatemalan Research and Education Network, celebrates its launch.

At the end of the 2005-2006 period, ALICE and CALARA, @LIS and the European Commission, and Latin America, make a joyful balance. Except for Cuba, all the countries that by 2003, at the onset of the project that would link Latin America with Europe did not have their own NREN, are able to establish one. Moreover, the great majority of them obtain effective connection to RedCLARA.

The progressive advance of the network over the surface of dark-skinned America offers results that cannot do anything else but to fill with pride those people who have fought for the creation and sustainability of RedCLARA. With twelve connected countries until January 2008 (Nicaragua and Costa Rica had to suspend their connections temporarily), today RedCLARA interconnects 729 universities and research centres, reaching more than four and a half million academics, researchers and students (11).

In terms of the conformation of the network's topology, at the end of February 2007 RedCLARA's backbone was structured in a ring topology which linked five nodes located in the cities of São Paulo (Brazil), Tijuana (Mexico), Panama City (Panama), Santiago (Chile) and Buenos Aires (Argentina). The ALICE Project funded the 155 Mbps links for the five nodes of the backbone's ring and the 622 Mbps link which connects RedCLARA with GÉANT2. The WHREN/LILA (12) Project, supported by the USA National Science Foundation (NSF), provided the funds for two other links which connect RedCLARA to the North of America: one is a 2.5 Gbps link from São Paulo to Miami (which was built in alliance with the CHEPREO (13) Project) and the other one is a 1 Gbps link running over segment of dark fibre established between San Diego and Tijuana. Each WHREN/LILA link gives RedCLARA access to an International Structure for Traffic Exchange (International Peering Fabric), located in both coasts of the USA: the points of exchange called AtlanticWave and PacificWave.

In 2007, with the aim of developing economies that allowed for an extension of the ALICE project, RedCLARA installed a sixth node in Miami, to which the countries from Central America were connected. With the connectivity established between the RedCLARA router in Miami and the WHREN/LILA Project Node in Miami, and using the LILA capacity between Miami and the PoP in Sao Paulo, the backbone's ring was partially closed with all the PoPs –except the one in Tijuana- which provides a redundant step for all those internal routings in the network, enabling RedCLARA to offer an alternative passageway for the traffic flowing from Central America and Mexico towards Latin America, Europe and the USA.

Finally, thanks to new negotiations, there was an agreement which allowed for the replacement of the 155 Mbps STM-1 links between the nodes in Panama City – Miami, Panama City – Santiago, and DS-3 links between Caracas and Panama. The changes implemented in the network have made it possible to maintain RedCLARA despite the reduction of the ALICE contributions predicted for 2007 and 2008.

At the beginning of 2008, the topology of RedCLARA is structured as shown on the map of the next page.

(11) The figures correspond with study conducted, in September 2007, by CLARA for the Group 10 of eLAC: Advanced Networks. The document is in the printing process.

(12) WHREN/LILA: Western Hemisphere Research and Networking – Links Interconnecting Latin America: Latina (NSF - Award #OCI-0441095).
(13) CHEPREO: Center for High Energy Physics Research & Education Outreach.

AR: Argentina
BO: Bolivia
BR: Brazil
CL: Chile
CO: Colombia
CR: Costa Rica
CU: Cuba
EC: Ecuador
ES: Spain
SV: El Salvador
GT: Guatemala
HN: Honduras
MX: Mexico
NI: Nicaragua
PA: Panama
PE: Peru
PY: Paraguay
US: United States
UY: Uruguay
VE: Venezuela

RedCLARA PoPs:
BUE: Buenos Aires, AR
MIA: Miami, USA
PTY: Panama, PA
SAO: Sao Paulo, BR
SCL: Santiago, CL
TIJ: Tijuana, MX

ES — PoP GÉANT - Madrid (ES)
PoP — RedCLARA PoPs
□ — Connections established
□ — Connections planned
US — PoP Pacific Wave - Los Angeles (US)
US — PoP Atlantic Wave - Miami (US)

- 622 Mbps, ALICE
- 155 Mbps, ALICE
- 90 Mbps
- 45 Mbps
- 34 Mbps
- 10 Mbps
- 1 Gbps, WHREN-LILA
- 2.5 Gbps, WHREN-LILA
- 155 Mbps, LAUREN
- 155 Mbps, LAUREN, planned

Links of collaboration and friendship

"The operation of RedCLARA, as of 2004, and the connection of countries, from Mexico to Argentina, was possible thanks to the strategic collaboration between Latin America and Europe, to the support from the Information Society programmes in those countries, and to the links and relations with the institutions that were customers of international networks and international partners.

Its value as an instrument for cohesion and collaboration was recognised by the hemispherical agendas for science and technology, as well as in the plans and projects from international organisations which promote the advancement of Latin American inclusion through the reductions of regional and global asymmetries.

The initial result of this common view can be measured through new collaboration projects in e-Science, strongly based on information and communications technologies, with European groups that stemmed from the existence of RedCLARA".
Nelson Simões, General Director of RNP.

No one can deny that RedCLARA had been conceived under a lucky star. And what a star. Europe had provided exceptional god parents, FCCN, GARR, RedIRIS, RENATER and DANTE, five institutions with vast knowledge on advanced academic networks, on the needs of scientists, academics and researchers, as well as on the importance of collaboration. The best part of all this: the direct connection with GÉANT. And GÉANT was in charge of opening many doors; it was only necessary to include CLARA in the circuit of international meetings, such as the launch of GÉANT2 (14-15 June 2005 (14)), for CLARA and RedCLARA to start incorporating new partners.

(14) On the occasion, the Executive Director of CLARA, Florencio Utreras, was invited to make a presentation on the advances of ALICE in Latin America, at the II Session, day 15, dedicated to Global Research Networks. See URL: <http://www.geant2.net/server/show/nav.1156>.

But the trust towards networks and institutions which were neitrher part of the initial study by CAESAR nor part of the ALICE project had started to consolidate shortly after the signature of the CLARA Statutes. The faith in the advanced networks community, in relation to the objectives that ALICE and CLARA would achieve, was not meagre.

On the night of 15 October 2003, CLARA, represented by its President, Nelson Simões, and Internet2, the US advanced network, represented by its President and Director, Douglas Van Houweling, signed a collaboration agreement within the context of the Internet2 Members Autumn Meeting. Under the name of a MoU (15), the alliance provided the bases for the joint work of both institutions in the establishment of a connection of the high performance networks in their respective communities (USA and Latin America), in order to provide researchers with the best network infrastructure for international collaborative work.

During the first week in July 2004, CLARA sealed an integration alliance with APAN (Asian-Pacific Advanced Network (16)), the Asia-Pacific consortium of advanced networks. The agreements, signed within the context of the eighteenth APAN meeting (held in Australia, between 2-7 that month), integrated the Latin American Consortium into the Asian corporation as associate member, in equality of conditions with DANTE (Europe), Internet2 (USA), Canarie (Canada), and the European networks consortium, TERENA.

In the exclusive world of advanced networks, right from its birth CLARA was welcomed and integrated into the Coordinating Committee of Intercontinental Research Networks, CCIRN, which recently celebrated the establishment of a RedCLARA node in the USA. A key evidence of this integration is represented by the commitment undertaken by CLARA and CCIRN to organise the 2009 Committee's annual meeting in a Latin American country.

"Thanks to CLARA we introduced a new backbone into our network, and the potential for its expansion throughout the region is unlimited; its high speed support and low cost will enable us to reach more people and expand our programmes". On 5 July 2005, in the Peruvian capital (Lima), David Gray, Regional Coordinator of GDLN (17) in Latin America and the Caribbean celebrated with these words the signature of the Collaboration Agreement established between GDLN LAC and CLARA, within the context of the Fifth GDLN – Latin America and the Caribbean Workshop: Lima-Peru 2005. In general terms, the agreement aimed at the promotion of collaboration activities in teaching, outreach and the access to RedCLARA as platform for the execution of programmes related to various areas involved in regional development.

In the very same month and year, RedCLARA gained two new links with the USA. Yes, since as part of the WHREN/LILA project a dark fibre link was established between the RedCLARA node in Tijuana and the CalREN node in San Diego (the Research and Education Network from California, designed, implemented and operated by CENIC (18)), and a 1.2 Gbps link between the RedCLARA node in São Paulo and the WHREN/LILA node in Miami. The latter project funded the fibre infrastructure between the nodes, thus providing RedCLARA with a port of entry towards networks in the USA. Then, RedCLARA needed to go from San Diego to Los Angeles to reach PacificWave (19), and this was accomplished thanks to the help from CENIC, who lent CLARA its optical network capacities and infrastructure; the agreement with CENIC, which allows CLARA to extend the connection of RedCLARA from San Diego to Los Angeles, is crucial, since it serves to increase the capacities of the Latin American network through the use of the infrastructure of the Californian corporation at no additional cost. However, the PacificWave membership is funded by CLARA.

Apart from the natural benefits represented by the additional traffic capacity which the alliances with WHREN/LILA and CENIC have provided for RedCLARA, this has allowed for the establishment of direct traffic exchange agreements with several networks which are present at the Los Angeles-PW point of exchange: Pacific Northwest Gigapop, Energy Sciences Network (ESnet), the NASA Integrated Services Network (NISN), the Research and Education Network from Australia (AARNet), National Lambda Rail, the networks from Asia Pacific and the list continues to grow.

2006 also witnessed CLARA establishing new alliances in favour of its community and its sustainability. In practical terms, the agreement established –thanks to the support from Professor Juan Quemada- with the Polytechnic University of Madrid (UPM) for the massive use of the videoconferencing platform ISABEL, represented a qualitative progress for the members of the NREN linked to RedCLARA, in terms of the enormous possibilities for participation in international events and in meeting for the development of collaborative projects. The agreement with the UPM not only considered the installation of an Isabel Streaming Server in RedCLARA, but also the access to technical material.

An enormous amount of activities have already been developed, linking Latin American NREN with Europe by means of Isabel, such as the @LIS Day (28 September 2006), the UN Internet Governance Forum (November 2006), the Global FP7 Information Day (6 March 2007) and the First Virtual Research Communities Global Forum – FP7 (12 July 2007).

A great incentive for the work developed by CLARA was the official notification sent from the Inter American Bank for Development (IDB) on 25 April 2006: CLARA will receive funds for the execution of the project called "Strengthen of Regional Advanced Academic Networks through CLARA as a Regional Public Good", which had been submitted in October 2005 in the IDB Competition for Regional Public Assets. The project, initiated in 2007, was awarded a funding of USD$ 600,000, which will have to be destined to the development of activities aiming at the elaboration of a Regulatory Framework of Reference, the institutional articulation of CLARA and of the network of national institutions that are part of it, the strengthening of NREN and the drive for the development of regional thematic networks and the creation of content. According to what was established in the project, CLARA and its members would complement the BID contribution with contributions in kind, particularly working hours. This important support will materialise a great deal of the activities requested by partners in the Strategic Plan 2005-2010.

In terms of sustainability, on 17 November 2006, CLARA established with CIEMAT (Centre for Research on Energy, Environment and Technology Research) from Spain, leader of the EELA Project, an agreement which confers the Spanish institution the character of Strategic Ally of the Latin American Consortium of Advanced Networks (CLARA). The agreement involves both institutions to jointly collaborate in the promotion and implementation of grid technologies in Latin America and in fostering the development of projects which enable the application of this technology to various fields of scientific and technological applications in the interest of the region, particularly based on the mentioned technology. Apart from all the engagements related to CLARA's support via RedCLARA and its Projects and Communications areas, by means of the agreement CIEMAT committed a Ř 250,000 contribution to back up the funding of the activities included in the agreement.

As for the near future, in November 2007, within the context of the bimonthly meetings of ALICE, CLARA-TEC and the CLARA Assembly, there was a Cyber Infrastructures Workshop, developed in collaboration with the USA National Science Foundation (NSF) and aimed at analysing the requirements of applications with a high bandwidth demand which are necessary for collaboration

---

(15) MoU: Memorandum of Understanding. The MoU between CLARA and Internet2 is available online [PDF format] at the URL: <http://www.redclara.net/doc/i2_Clara_MoU_141003.pdf>

(16) Asia-Pacific Advanced Network.

(17) GDLN: Global Development Network.

(18) CENIC: Corporation for Education Network Initiatives in California (USA).

(19) PacificWave (PW) is a joint project between CENIC and Pacific Northwest Gigapop (PNWGP), which is operated with the collaboration of the University of Southern California and Washington University. PW has been defined as a modern service of distributed international points of exchange of traffic (peering), designed to service research and education networks from the Pacific Rim and the world. In addition, it services optical network infrastructure initiatives at metropolitan, national and international level.

between Latin America and the USA. The activity was part of the next call for competition from NSF IRNC (20). DANTE also participated in this activity.

There is little left to be said. Alliances, and even more the friendships that CLARA and RedCLARA have gained along their path, are not only a source for pride and joy. Above all, they are the reflection of this network's commitment towards the development of science, academia, research and innovation in Latin America, which cannot be accomplished without the support from neighbour continents and nations. Growth is everybody's business and year after year CLARA renews its commitment towards it.

Data flowed along the networks and Latin America joined Europe in favour of development

"Latin America houses seven of twenty-five Biodiversity Hotspots of the world and five of the top ten countries identified as megadiverse. Maintenance of the biodiversity and environmental services provided by the Amazon Basin, the world's biggest tropical forest and water basin, are critical for the control of global warming. Technical collaboration and coordination among countries of the region in collecting, sharing, and using biodiversity information relevant to decision-making on natural resources management and conservation, and education will be critical for the sustainable development of the region. RedCLARA, therefore, has a key role to play in the provision of networking infrastructure for collaborative activities focused on open access and improved use of digital biodiversity information."
Dora Ann Lange Canhos
Director of the Reference Centre for Environmental Information (Brazil).

Since its creation RedCLARA has been fundamental for research and education in Latin America, linking twelve countries and 729 universities (which altogether comprise more that 671,986 academics, 104,607 researchers and 3,763,142 students; summing up, more than 4,539,735 people potentially connected) across the continent, at speeds of up to 622 Mbps. RedCLARA has provided Latin American scientists and researchers with an infrastructure which enables them to collaborate effectively, at a regional and international level, with the global scientific community through its links with GÉANT2, in Europe, with Internet2 in the USA, with APAN in the Asia Pacific rim, etc.

The benefits which RedCLARA has brought to Latin America are greater. Today several projects aimed at bridging the digital divide and reducing poverty in the region are developed over the network. As for the overcoming of poverty, it is necessary to highlight the Consultative Group on International Agricultural Research (CGIAR (21)), which supports the work of 15 international agricultural research centres. This work, in collaboration with national agricultural research systems and organisations from the civil society and

(20) IRNC is a programme aimed at supporting the connection objectives for research networks which link the USA with the rest of the world, in this case, with Latin America.

(21) Website: <http://www.cgiar.org/>.

the private sector, drives agricultural scientific research to "reduce poverty, improve human wellbeing, promote agricultural growth and protect the environment". CGIAR bases its actions on the following message: "In a world in which 75% of poor people survive thanks to agriculture, it is not possible to reduce poverty without investing in that sector". Malaysia, Sri Lanka, the Philippines, Italy, among other nations are part of this project, whose Latin American representation is accomplished by the International Centre for Potatoes (Peru), the International Centre for Maize and Wheat Improvement (Mexico) and the International Centre for Tropical Agriculture (Colombia), all three linked to RedCLARA via the NREN RAAP, CUDI and RENATA, respectively. This organisation aims at using genetic diversity, advanced genomics and compared biology to develop tools and technologies which help green houses to produce, at a global level, better agricultural varieties and resources for the most deprived in the rural areas.

Photo courtesy of the International Centre for Potatoes.

Photo courtesy of the National Meteorology and Hydrology Service from Peru.

Researchers working on climate change and adaptation to the crises produced by the high climatic variability also use RedCLARA for data exchange and processing. As of 2007, the Uruguayan Centre for Environmental Studies is analysing effective adaptation and risk-reduction strategies in relation to economic and climatic impacts, based on the lessons learned from the coffee crisis in Central America; the study analyses the experiences of Mexico, Guatemala, Honduras and Costa Rica. Climate change is a matter of study in CLARIS, a project which joins together Europe and Latin America –via the link between RedCLARA and GÉANT2– for the construction of a European-South American network, dedicated to the promotion of common research strategies to observe and predict climate changes and their socio-economic consequences; led by the French National Centre for Scientific Research (CNRS), the Latin American countries participating in the project are Argentina, Brazil, Chile and Uruguay, all of them linked to RedCLARA. The El Niño Phenomenon affects climatic variability at a global level. However, the effects on Chile and Peru have been enormous. To understand the phenomenon, analyse it and find patterns that

enable them to predict variabilities; this is what they are trying to find at the University of Cantabria in Spain (linked to GÉANT2 via RedIRIS), the National Meteorology and Hydrology Service from Peru (linked to RedCLARA via RAAP), and the University of Concepción, in Chile (linked to RedCLARA via REUNA), through the climate application they are developing as part of the EELA (22) project (with secondment in EELA-2).

Photo courtesy of the National Meteorology and Hydrology Service from Peru.

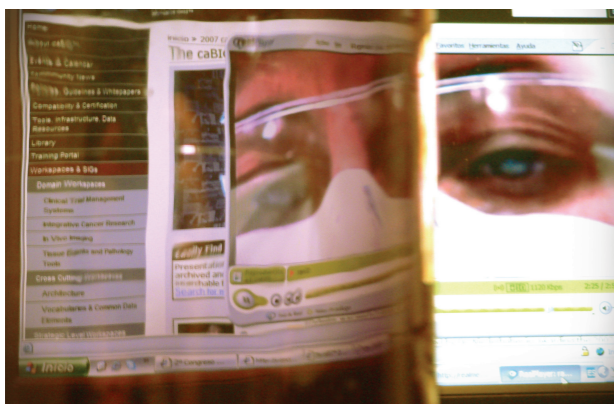(22) E-Infrastructure shared between Europe and Latin America <http://www.eu-eela.org>.

Photo by María José López Pourailly.

In health and disease control, there are multiple initiatives being developed though RedCLARA. The T@lemed initiative is taking remote medical diagnosis and prescription to isolated regions in Brazil and Colombia via the RNP and RENATA links, respectively. Thanks to the infrastructure provided by RedCLARA and GÉANT, this initiative is contributing with great health benefits for Amazonia rural regions, the Pacific coast and villages which are far from urban centres in both countries. In Colombia, T@lemed is also providing medical services for Malaria treatment. As for this disease, the health applications area of the EELA project actively participates in the processes of WISDOM (Wide In Silico Docking of Malaria), whose aim is the creation of inhibitors for a family of proteins produced by *Plasmodium falciparum*. The development of e-Health applications in areas of oncology, dermatology, radiology,

surgery, cardiology, psychiatry, rehabilitation, podiatry, obstetrics, gynaecology, neurology and domestic care, are the objective of the Telemedicine University Network (RUTE) which, based in Brazil, collaborates with similar initiatives in Mexico and Ecuador; here RedCLARA provides connectivity through RNP, CUDI and CEDIA, respectively. SICOT, the World Orthopaedic Organisation, has developed over RedCLARA various educational activities by means of videoconferences devoted to traumas caused by traffic accidents. The development of perinatal studies in the Argentinean city of Rosario (linked to InnovaRed), in collaboration with Vit@lis; the development of virtual surgeries at the Caracas Clinical Hospital (linked to REACCIUN2) in Venezuela; the fight against malaria in pregnant women, through the study conducted by Spain, Switzerland, India, Papua New Guinea, Brazil, Colombia and Guatemala, in a collaboration sustained on GÉANT2 and RedCLARA; the health reform in Uruguay; the development of new antibacterial applications, carried out by the University of La Frontera in Chile, in collaboration with the Federal University of Sao Paulo in Brazil; and the Telehealth programmes in Ecuador and Telehealth Policies in Latin America, where institutions connected to the NREN from Brazil, Eduador, Colombia and Mexico are collaborating. This is the end of a long and relevant list of projects which have been implemented and developed in the Latin American scenario thanks to the implementation of RedCLARA and its connection to GÉANT2.

Photos courtesy of T@lemed.

Photo by Christian Waiser Souyet.

In education, it is impossible to overlook the creation of LACLO, the Latin American Community of Learning Objects, which CLARA helped to found and which currently operates in the region via RedCLARA. This is the evidence of the synergies in the region stemming from the network originated by the ALICE project. Along the same lines, RedCLARA complements the programme for the development of higher education Erasmus Mundus, funded by the European Commission. Additionally, the following educational projects developed by universities and research centres, which are members of the Latin American NREN, are sustained on RedCLARA: Advanced Networks to support Primary Education (Tabasco region in Mexico, CUDI), Integration of educational communities via information and communication technologies to improve content development and the quality and equality in education (Chile – REUNA, Argentina – InnovaRed, Spain, RedIRIS); Use of free software for education improvement (RedCLARA: Brazil –RNP, Chile – REUNA, Colombia – RENATA, Mexico – CUDI; GÉANT2: Portugal – FCCN, Spain – RedIRIS); IP Wireless Multimedia Diffusion (Chile – REUNA); Methodologies and processes for the design, development and use of Learning Objects (Mexico – CUDI, Argentina – InnovaRed and Chile – REUNA); Implementation of a digital interuniversity channel using HDTV (23) technology over IP (24) (Panama – RedCyT and Spain – I2Cat); and Implementation of e-Education platforms (Panama – RedCyT and Mexico – CUDI).

(23) High Definition Digital Television.
(24) Internet Protocol.

Environmental sustainability is also an object of research in Latin America. In this context, the following initiatives operate over RedCLARA: LBA (Large Scale Biosphere- Atmosphere Experiment in Amazonia), international research project led by Brazil, which has been designed to create the new knowledge required to understand the climatologic, ecologic, biochemical and hydrological functionalities of the Amazonia, the impact on the soils with the change of those functionalities, and the interactions between the Amazon and the ecosystem; nearly 150 institutions take part in the project, which uses the RedCLARA capacities to transmit data across Brazil and other countries in the region. In Ecuador, the network is used for the development of applications which help prevent the problems generated by climate

Photo courtesy of Marinez Ferreira de Siqueira, *Centro de Referência em Informação Ambiental* – CRIA.

and environmental changes. Along the same lines, Venezuela is tryingto develop a network of bioclimatic stations across the State of Merida; six stations for the study of climatic, environmental and ecologic information are already part of this network. Mexico, in turn, is already developing the Mexican Network for Ecologic Research.

Photo courtesy of Marinez Ferreira de Siqueira, CRIA.

Projects in Geodesy, such as EXPReS and on Cosmic Rays, like AugerAccess, are linking observatories in Chile and Argentina with peer institutions in Latin America and Europe. EXPReS is a radio astronomy project for geodesy, which supports the movement of earth layers and other earth phenomena by means of Very Long Baseline Interferometry, eVLBI, across Europe and beyond; the Chilean NREN, REUNA, via RedCLARA, links the radioastronomic observatory TIGO in Chile with EXPReS members in Europe. AugerAccess is a project to link the Cosmic Rays Observatory Pierre Auger, located on the eastern side of the connection in Argentina, and which requires an increase of its link via InnovaRed from its premises in Malargüe to Mendoza, in order to support international collaboration with European observatories. Approved for execution by the FP7 at the end of 2007, the EVALSO project aims to link the ESO (European Organisation for Astronomical Research in the Southern Hemisphere) observatories located in Cerro Paranal (North of Chile) to advanced networks, through REUNA and its link to RedCLARA, for the development of new forms of astronomic research, enhanced by the use of information and communication technologies.

Photo obtained from the presentation of Astronomy given by Eduardo Unda-Sanzana (Chile) during the Workshop of Cyberinfrastructure Applications in Latin America NSF-CLARA (Panama, November 2007).

RedCLARA is part of two international projects which are based on computing grids technology: EELA and RINGrid. EELA, (E-Infrastructure shared between Europe and Latin America, SSA Project of the FP6 (25)) through a Grid implemented between Europe and Latin America –which operated during 2006 and 2007 over RedCLARA and its link to GÉANT2- established a human collaboration network, dedicated to the development and testing of advanced applications in High Energy Physics, Biomedicine, Climate and Education in a grid environment. Funded by the European Commission with €1.7 million, EELA helped identify and promote a sustainability framework for e-Science in Latin America, strategic objectives to boost the collaboration between Latin America and Europe. EELA was coordinated by CIEMAT (Spain) and included seven European members (from Spain, Italy and Portugal, as well as from CERN) and 13 Latin American ones (CLARA and institutions from Argentina, Brazil, Chile, Cuba, México, Peru and Venezuela). In April 2008 it will be the beginning of EELA-2 (26) (E-science grid facility for Europe and Latin America), based on the success built up by EELA and, certainly, through the link between RedCLARA and GÉANT2. On 1 October 2006, the RINGrid project started out its 18-month challenge. Funded by the Sixth Framework Programme (for the development of Research Infrastructures and Communication Networks) of the European Commission, RINGrid (27) (Remote Instrumentation in Next-generations Grid) is a Specific IST (Internet Society Technologies) Support Action project, which is constituted by ten partners (including two consortia: one from Italy and CLARA) from eleven countries (Poland, Austria, Greece, Bulgaria, Rumania, Mexico, Chile, Brazil, Italy and the United Kingdom). Its main objective is to validate and make proposals for the standardisation of the remote use of scientific instruments by means of grids. The connection of RINGrid with the Latin American countries which are members of the project is accomplished via RedCLARA; in Europe, the connection is provided by GÉANT2.

The route is what really matters

"ALICE has created a strong foundation for research and education in Latin America, and has shown the benefits that joint collaboration provides for regional and global development, in favour of a vast community through initiatives such as climate change monitoring, telemedicine and e-Education. We see this work as a model of reference for those who begin to build research communities in other geographical regions".
Antonio Crespo, Coordinator of the @LIS Programme of the European Commission (28).

Clearly, when plotting a story, a good port is the fundamental objective, but the route to access that longed for goal is often as relevant as the attainment of that which you have eagerly sought. Establishing RedCLARA, providing regional connectivity for Latin American countries and link them with Europe via GÉANT2; that was certainly the dream of ALICE and CLARA; sustainability in time, the connections of Bolivia, Costa Rica, Cuba, Honduras, Nicaragua and Paraguay, are the goals yet to be met. It has been a long way, a very important route, and it is absolutely relevant to relive some of its great milestones.

What happened to those countries which did not get connected? Or more precisely, why is it that those who one day celebrated their link to RedCLARA are no longer part of the network? Myriads of reasons could be given in detail for each particular case, such as the high cost of telecommunications services in Central America, which somehow forced the departure of Costa Rica and Nicaragua. Socio-economic and political reasons have also hampered the connection processes of some of the countries referred to. There are as many reasons as people in each country, and it is not appropriate to discus them in detail here. However, certainly CLARA and the ALICE members will not stop their efforts to complete regional connection, since the growth of Latin America is not possible without the participation of all the countries that constitute it.

Argentina saw its connection with RedCLARA seriously threatened. The loss for the continent, in terms of research collaboration, would have been immensurable and, for the capital of Tango itself it would have meant a historic loss. The department of Science, Technology and Productive Innovation of Argentina, headed by Tulio Abel Del Bono, is the organisation which drove the country's reconnection to the Latin American

(25) SSA: Specific Support Action. Funded by the European Commission through the 6th Framework Programme (EC FP6 Programme).
(26) Integrated Infrastructure Initiative – Funded by the European Commission through its 7th Framework Programme (EC FP7 Programme).
(27) Website: <http://www.ringrid.eu/>.

(28) The quote was obtained by *The Works of DANTE*, for the elaboration of the Press Release titled "THANKS TO A NEW EUROPEAN UNION AGREEMENT THE GROWTH OF LATIN AMERICAN RESERACH IS EXTENDED UNTIL 2008", released on 25 April 2007.

advance network; all of this within the context of objectives established in the nation's Bicentenary Plan. In 2007, Argentina replaced the former member of ALICE and CLARA (RETINA) by a new organisation: InnovaRed.

At this point it is important to acknowledge the support from ANTEL –National Administration of Telecommunications-, a Uruguayan state company, which agreed to maintain the link of Uruguay (Montevideo) with the RedCLARA PoP in Buenos Aires (Argentina), for a year, at no cost for CLARA, by means of an agreement with the University of the La República.

The Bolivian case is certainly different: ADSIB is trying to link the country to RedCLARA and in order to do so, in 2007 it signed an agreement with ENTEL Bolivia (local provider) in pursuit of this objective. Among its actions aimed at establishing the longed for link with RedCLARA, the Bolivian institution received the support of UNDP (United Nations Development Programme).

It is now time to talk about those who enable the operation of the national networksthat constitute RedCLARA. We are talking about the engineers and technicians, who have been a major concern for ALICE and CLARA, in the most positive of ways. Here we are talking about access to permanent training in the development and use of network technologies. By means of the implementation of a study which involved each of the national networks that belong to CLARA, the training needs in the technical area came up as a major necessity. In order to address this necessity, in July 2006 a Master Training Plan was presented. This plan highlighted the prioritisation of training needs of network technicians, and of the modalities under which they should be developed and the costs involved. The priorities were: Security, Routing, Measurements, Voice over IP and Videoconference.

In April 2005, within the context of the CLARA-TEC meeting in Veracruz, Mexico, the first training sessions were carried out, basically on the themes of videoconferencing, routing and security. At the end of July 2006, prior to the CLARA-TEC (technical forum of the NREN in RedCLARA) CLARA and ALICE meetings held in Quito (Ecuador), the technical representatives from CLARA member networks had the chance to participate in

the nineth version of the Workshop on Internet Networking Technologies for Latin America and the Caribbean WALC2006, held in parallel with the CLARA-TEC meetings. In November that year, the Training on Security was developed in San Salvador (El Salvador). June 2007 featured the Training on Routing, held in Bogotá (Colombia). In November 2007 the Training on Optical Networks was organised in Panama City (Panama). All these training sessions were developed within the context of the biannual meetings of ALICE, CLARA and CLARA-TEC.

Right before the beginning of the round of CLARA-TEC training sessions, between 15 and 18 May 2006, thanks to the funding from the ALICE Project, and after a careful selection and application process, five engineers from El Salvador, Guatemala, Colombia, Peru and Panama participated in the TNC 2006 event, the TERENA (Trans European Network Association) Network Conference, which brings together the most outstanding European elements in terms of advanced networks.

Now it is the time to ask the audience to get ready for the applause. Yes, because if the story of ALICE, RedCLARA and CLARA, with triumphs and defeats, offers a joyous final balance, in this route there have been moments when that joy reached the highest marks on the scale. We refer to the recognition at political level; we refer to the promises of future, hope and satisfaction.

At the Europe Latin America and the Caribbean Ministerial Forum on the Information Society, held on 28-29 April 2006 in Lisbon (Portugal), the European Union Commissioner for the Information Society, Mrs Viviane Reding, during her closure speech highlighted RedCLARA, the Latin American Research and Education Advanced Network, as "the great story of success of the Summit" in terms of cooperation between Latin America and the European Union in themes related to the Information Society. Commissioner Reding stated that this initiative "must be highlighted, must be continued and must be expanded", since RedCLARA is the basic infrastructure to enhance collaboration between researchers from both regions, facilitating the development of projects and reinforcing the working networks, including ongoing projects and those projects which will be funded by the 7th

Framework Programme for Science and Technology, which begun in 2007.

During the same session, the Portuguese Minister of Science and Technology, Mr José Mariano Gago, emphasised the importance of RedCLARA for scientific-technological development and for cooperation between both regions in these matters. Minister Gago referred to the Final Declaration of the Summit, indicating that the article about the Latin American network was insufficient as it had to be more explicit in expressing the need to maintain and expand RedCLARA, ensuring its sustained and long term funding, so as to definitely consolidate it. In the same sense, the Deputy Minister of Science and Technology from Brazil, Mr Luis Rebelo Fernándes, called for the continuity of the financial support for this initiative which has created the first Research Network in Latin America, interconnecting it with Europe, thus facilitating collaboration between both regions. The same supportive attitude was expressed by the Spanish Minister of Industry, Tourism and Trade, Mr José Montilla, who stated that Spain wants the initiative to be maintained.

The widespread consensus that CLARA arose in Latin America, "a dream come true", in the words of Brazilian Deputy Minister, enabled the inclusion in the Lisbon Declaration of a request for a study on the continuity of European support for the initiative and its extension to the Caribbean. The inclusion of the Caribbean was requested by that region, both in the speech by the Minister of Communications from Barbados, Mrs Lynette Eastmond, at the opening session of the Summit, as well as through the emphatic interventions of representatives from the Dominican Republic and other countries in the Caribbean who thought it was crucial to take part of the collaborative work between the European Union and Latin America.

The strong support which RedCLARA received from representatives from Latin America an the Caribbean in Lisbon, stems from the results of the Latin America and the Caribbean Group for the Information Society (GRULAC), which is putting forward the Information Society Programme for the region –eLAC2007- coordinated by ECLAC. In fact, at the eLAC2007 Plan Meeting, held on 26 April in Lisbon, prior to the 4th Forum,

it was agreed that CLARA would be declared Official Work Group of the eLAC2007 Plan, in pursuit of the fulfilment of the 10th Goal, which aims at "Developing Research and Education Networks".

The great approval found in the Governments from Latin America and the firm support provided by the authorities in Spain and Portugal, as well as the enthusiastic support from Commissioner Reding, were the elements that made it possible that the Summit of European and Latin American Presidents, held on 11-12 May 2006 in Wien, concluded in its No.51 recommendation that "it is important to maintain the political and financial support that is necessary for the initiatives which consolidate a scientific collaboration space, based on information and communication technologies". A top level political mandate had been established, a mandate in which ALICE and CLARA glimpsed signs of hope, a new source of funding coming from the European Union destined to give continuity to RedCLARA. It seemed within reach. It can be reached.

Two extensions granted to the ALICE project, where a careful management of the budget made it possible to extend it a few more months with the same resources, showed the positive evaluation by the European Commission of Latin America Interconnected with Europe, of the benefits of RedCLARA and the CLARA management and the commitment of Latin American NRENs.

RedCLARA is a dream come true. For this dream we have worked for long years. It is a dream that was reached thanks to both the support from the European Commission, as well as the wide consensus in terms of acknowledging it as the road to success to develop greater links which will enable Latin America, and the Caribbean, in the future, to be better partners for European excellence networks and thus participate, in a better way, in joint research.

At the moment of putting an end to the historic compilation aimed at in these pages, ALICE will be approaching its end. The emotional tension will be compensated only by the certainty that we are faced with another dream, a new possibility... by the conviction shared by all those who are part of RedCLARA: our network is worthy, Latin America is worthy, the brains and

the souls in the region are a whole which represents a great contribution to development in global terms. Today more than ever we have the certainty that in order to get far, we must walk together along the same track, the strong supporting the weak, creating bonds, constructing. RedCLARA is our recent past, our present and the great future for our region.

Chapter III
In order to get far: RedCLARA
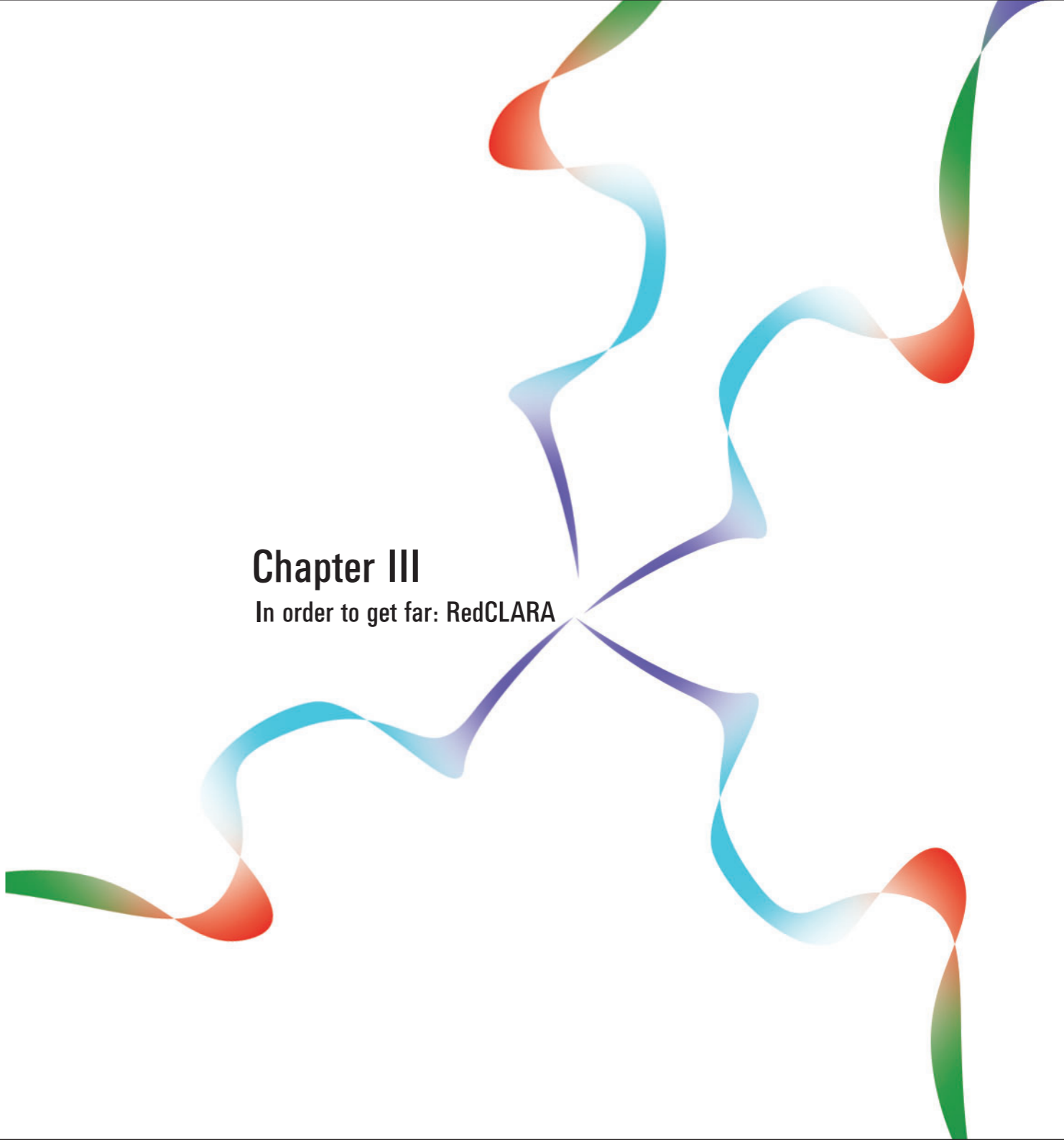
All the voices

Paola Arellano, Executive Director of REUNA — Chile:

The work done by the ALICE project and CLARA has been fundamental. In fact, it changed the regional scenario. Today we see an absolutely different reality in the sphere of academic networks in Latin America and their international connection. There are now 12 networks connected, but a few years ago the situation was quite different, with only four established networks linked to international academic networks. Clearly this change, which was made possible thanks to the establishment of RedCLARA, favourably affects the collaboration activities that can be accomplished within the region. By using these networks, we are now able to interact with a greater number of institutions, through working in joint projects within the region and also with international counterparts. As never before, today we have the possibility to link together, via RedCLARA, institutions which due to their characteristics, are distributed throughout the region; an example of this can be seen in the initial actions with FAO, ECLAC and IDB. Moreover, our partner universities are beginning to appreciate the benefits of this initiative and today we have a significant flow of invitations to participate in projects in Latin America and Europe. This is certainly a huge opportunity.

However, we must bear it in mind that the "physical network" is not sufficient; we need real commitment to work in projects and applications which provide value for the network, and to encourage the existing initiatives so that the network is used. This is a task that requires joint efforts from all ALICE and CLARA partners to motivate their institutions to use this platform.

One of REUNA's strategic objectives and guidelines is the support for the development of collaborative projects. This is why we have been very active in participating in initiatives generated within CLARA –EELA and RINGrid, for instance-, not only through the direct participation of our Chilean corporation, but also by involving our member universities; we are certain that this is the best way to start establishing collaboration networks which make use of advanced communication networks.

Communication networks are important, but they are worthless if there are no concrete activities behind them. In REUNA we are convinced that we must add value to the great endeavour we have made for the creation and sustainability of RedCLARA. This certainly entails the undertaking of major works, which cannot be sustained only by the executive members of CLARA, and which require the real commitment of all its members. There are plenty of opportunities.

Amely Caraza,
Academic Coordinator of the National Centre for Technological Innovation (CENIT), Ministry of Popular Power for Science and Technology (led by REACCIUN) - Venezuela:

Even though in Venezuela there was already an Academic Network since the mid 1990's, (an association which brought together local research centres and universities), it was thanks to the emergence of advanced networks at global level, and particularly to the ALICE Project, the creation of CLARA and the establishment of our Latin American RedCLARA that REACCIUN, the Venezuelan Academic Network, gained momentum. This resulted in new research and education projects, the use of new technologies such as IPv6, multicast and Voice over IP, the implementation of projects which enabled the improvements to the network infrastructure according to the new services and application needs that our users were demanding, and in the development of local telecommunications companies to be able to offer these services. An interesting phenomenon has been the changeover in the way of doing science, increasing the participation of our institutions in collaboration projects with other countries, such as the experience of the EELA Project. Furthermore, communities of users that previously did not see academic networks as a tool to develop their activities, are now interested in participating in the network. Such is the case of the Youth and Children Orchestras System in Venezuela, which will soon be part of REACCIUN.

Carlos Casasus, Executive Director CUDI – Mexico:

After meeting in Toledo to analyse the possibility of creating an advanced network which made it possible to link the organisations that already operated networks in order to provide connectivity for universities in our countries, we agreed that a new meeting was necessary to write and sign the CLARA statutes. I was lucky that we agreed to hold that event in Mexico in June 2003.

We gathered in Valle del Bravo, a lovely mountain village, with a lake, whitewashed housed and slated rooftops near Mexico City. This setting infused in all those present an extraordinary comradeship, which did not prevent, however, very long discussions on the functioning of the organisation we were designing.

At the end of the second day we walked from the venue to a restaurant, to which we arrived several hours later that the time for our booking. The owner asked us "Why so late?" I cannot forget my friend Carlos Frank's answer: "We were changing the world, madam".

I think Carlos was right. For the millions of university students today connected to CLARA, we can say that we opened for them a door to a new world.

Víctor Castelo,
Director of Communications and Security at CSIC - Spain:

My first direct contact with Latin American networks took place in 1996, at the 5th Permanent Forum of Networks from Latin America and the Caribbean, held in Lima. It was an effervescent moment, because of the drive of the Internet in the commercial world, and I noticed great expectations in Latin America. I even thought this would soon be put into practice through a regional network in lieu of the then called EuropaNET, still in the process of becoming TEN-34. Although my interest focused on making contacts with research networks

existing in Latin America and above all, with the people, my hope was to establish a physical connection (29) between Latin America and Spain-Europe. My vision was that in that connection there were many possibilities opening to extend the connections with that great world region, with which we have important linguistic and cultural links. I hoped that by using the networks we would be able to see tangible results in a very short time. But at that time we had to content ourselves with the coordination of common activities, without the physical connection of networks. The networks in Latin America were evolving and in Spain all the efforts were focused on enhancing the connection with Europe.

We had to wait until 2000, when Europe launches a strong initiative for global connection with other regions, for the situation to be favourable for Latin America. Again, in 2001, a personal contact at the 4th Workshop on Internet Network Technologies for Latin America and the Caribbean /5th Latin American Networking School, enables me to strengthen human links. Some of the networks in Latin America begin to have radial connections to a point in the USA connected to Internet2, but without a network of their own in the region, the European intention of interconnecting both sides of the world seemed very difficult to accomplish. It is therefore necessary to promote the creation of Latin American Research Network, managed by Latin Americans and which connects to Europe and other regions, convincing all actors involved about the necessity and feasibility for such network.

After many difficulties, the European will of linking with Latin America, the need for direct communication for several projects between Europe and Latin America, and the European Commission's determination and funding made the rest. The CAESAR project is developed and we celebrate the Toledo meeting, with the important outcome in the declaration that resulted from that event: the clear expression of intentions for the creation of a Latin American research network and the coordination of the networks in the region. During the Toledo meeting I celebrated my

best birthday ever. When I go to Toledo I still cannot stop associating the city with that magical moment, and I remember the places that witnessed those days: I stroll around those streets along the Jewish quarter, along the ring road near the river where our small hotel was located and I visit the room where we held the meetings.

My memories and gratitude for all those people from the Latin American networks, DANTE, the European networks and the European Commission, who obtained the current achievements: CLARA and a RedCLARA connected to GÉANT and also because they gave me the opportunity to participate with them.

Dai Davies,
General Manager of DANTE – Europe (United Kingdom)(30):

Thanks to RedCLARA, Latin American researchers are now an integral part of the global research community. It is well known that high speed research networks encourage cross-border collaboration, creating a global scientific community that pools resources for more efficient and effective research. RedCLARA's interconnection with Europe has created new opportunities for Latin American researchers to work with their European colleagues. I can cite a number of EU-LA projects that have resulted, including EELA (e- Infrastructures shared between Europe and Latin America). EELA is working in close collaboration with a number of EU grid projects, including EGEE, EU-MEDGRID, BalticGrid and SEE-GRID.

Established European projects are also feeling the benefit of connectivity to RedCLARA and access to Latin American partners. For example, the ExpreS project, which is working towards a real-time e-VLBI environment, now has partners in Chile to add to its collection of telescopes connected throughout the world.

---

(29) The summary of the forum is in the RedIRIS Bulletin of July of 2006, available at: <http://www.rediris.es/rediris/boletin/36-37/actualidad.html#V%20Foro>.
(30) This quote corresponds with an interview by Simon Watts, Public Relations at DANTE, for the N° 13 issue of the DeCLARA bulletin, published in July 2007. Currently Simon Watts works as Media and Publicity Officer at Birkbeck, University of London.

Another example is that the Argentinean NREN is a partner in AugerAccess. This initiative is integrating the Auger Observatory in Argentina with European Research Institutions. There are also regional environmental issues which have a wider impact on the world. The effects of the El Niño phenomenon are not restricted to Latin America. National expertise can now be shared at a regional and international level. Other issues such as biodiversity loss in the Amazon and the resulting effects on climate change have a significant impact that extend beyond the region. RedCLARA equips Latin America researchers and scientists with an advanced infrastructure for international collaboration. Global challenges require global facilities, and RedCLARA provides regional access to an increasingly global research community. In addition to its link to GÉANT2 in Europe, RedCLARA interconnects with the United States, and is looking to peer with the TEIN2 network in Asia. Latin American researchers are definitely now part of a wider community of collaboration.

Máximo Escobar F.,
REDCYT – Panama:

For our country, the ALICE Project has been the engine that has driven the emergence of academic and research networks in a time when scientific collaboration is reaching one of its highest levels.

The objectives of the project have been met, both at local and international level. The communication infrastructure is there and is available for researchers, enabling the management of projects in a way which could not be viable through commercial Internet.

ALICE has enabled us to strengthen collaboration links with European countries, particularly with universities in Spain; the ALICE Project has made it possible for our national networks to get a closer view of enriching work models and experiences from European organisations such as DANTE and TERENA.

On a Latin American level, CLARA has given rise to a community of professionals who are willing to exchange experiences in the interest of improving the communication infrastructure and its related services.

For Panama and its Science and Technology Network for Research Centres and Universities (REDCYT), the link with CLARA has opened the doors to an active participation in international forums and has provided a resource with a huge potential for researchers and academics.

Luis R. Furlán,
Executive Director of RAGIE – Guatemala:

One of the major achievements of the ALICE project has been to catalyse the development of new national networks in several countries. The Guatemalan Advanced Network for Research and Education (REGIE) is one of these. Initially, Guatemala did not respond to the invitation from the organisers of this project and therefore we did not attend the meeting held in Toledo (Spain) in 2002. Our participation is the result of the enthusiasm and perseverance to include every country in the region, regardless of their capacities.

Currently the members participating in RAGIE include six of the eleven universities existing in the country, plus two more acting as observers. This participation represents 70% of higher education institutions. However, these six universities represent nearly 95% of all university professors, researchers and students.

Our membership in CLARA has enabled our students to share with local and international lecturers through videoconferences; today, our researchers are participating in multi-institution and multi-national projects; we also have access to instruments which are not available in Guatemala and to bibliographic material which could not be possible to have otherwise.

One of the main challenges that RAGIE faces is to bring this connectivity to the inland of the country. In order to do this, we will rely on the experience of those countries which have already accomplished this. This is another advantage of belonging to CLARA, collaborative participation in all sorts of endeavours.

Aníbal Gatonne,
Executive Director of InnovaRed – Argentina:

RETINA and INNOVA-RED in ALICE and in CLARA... The history of academic networks in Argentina has not been linear, i.e. it had its ups and downs, hence the two names I mention at the beginning of this paragraph which represent the old name of our network and the new one respectively. However, the ALICE project at first and then the constitution of CLARA and RedCLARA were two milestones in our development which marked a before and after for academic communications in our country. The before reflected the efforts by a group of self-summoned scientists and technicians, who worked for more than a decade trying to provide the academic field with communication elements which could enabled them develop their work in a competitive way. The after is the acknowledgement of this activity from the State and its incorporation in the network's activities. The articulation between these two stages was the ALICE project and the "affectio societatis" shown by the people responsible for the communication community in different countries in Latin America and the Caribbean.

I think things were well done in CLARA because there was little to lose and a lot to win, but I acknowledge the fact that the all "big ones" acted with generosity and without arrogance; the "small ones" did not throw any tantrums; they behaved as grown ups and they all agreed with the project, knowing that "in the long run" it would pay for. This "in the long run" has turned into a present state in Argentina, which does not mean that the task has been accomplished. On the contrary, today I have more things to do than before, but I have people from CLARA behind me and by my side, and this is a great support.

Martha I. Giraldo Jaramillo,
Executive Director of RENATA - Colombia:

ALICE made possible what we would have hardly done on our own in Latin American countries: join us together as a region to move forward via a well-structured project in terms of time-frames, agreements and standards, in order to bridge the divide in the field of Advanced Academic Networks that existed between Latin America and other developed regions of the world. Currently, there are twelve member countries, joined and interconnected, through RedCLARA, with GÉANT2 and other international networks.

For the National Academic Network for Advanced Technology from Colombia RENATA, the ALICE project results in the consolidation of the particular interest of some academic and research institutions who independently were making their own efforts to be linked to advanced academic network throughout the world.

Thanks to the @LIS initiative and the final support from the Colombian government agencies represented by the Ministry of Communications, which takes over the counterpart to enable us to participate in the ALICE project, RENATA connects to RedCLARA in April 2006 and by the end of 2007 we had 66 institutions connected. We regard this as a success, since we overcame our own initial goal, a success which we attribute in part to:
1. The interest from academic and research institutions in our country.
2. The support provided by the national government, not only from the Connectivity Agenda of the Ministry of Communications but also from the Ministry of Education and the Colombian Institute for the Development of Science and Technology, COLCIENCIAS.
3. The support offered by CLARA, and the regional networks which are part of it, to share with RENATA their lessons learned in all related areas.
4. The resolute interest and constant work from the management in RENATA to put the project forward.

The greatest challenge for RENATA lies in promoting the use and appropriation of the network by academics and researchers, which leads to the establishment, over the physical infrastructure, of real social and cross-institutional networks for local and international collaboration to solve problems and intensely use knowledge in favour of the country.

Joaquín Guerrero,
President of the CLARA Board (member of RAAP, Peru):

During the years in which electronic connection between academic institutions was made possible, thanks to the possibilities offered by reduction in the costs of communications and the emergence of the Internet, with all its potential, the creation of a real national academic network started to be planned. In Peru, there was a project which aimed at integrating academic institutions. However, this did not succeed because of the difficulties in integrating organisations which made great efforts of their own that did not yield any fruits. The creation of the CLARA organisation, responsible for the creation of RedCLARA within the context of the ALICE project, represented the possibility of resuming this endeavour which years ago ended up in failure. This time the academic and research institutions saw a real possibility to be integrated and gain access to the world academic community, interconnected through advanced academic networks.

In Peru, the thrust from CLARA, aided by the support from ALICE in its aim of creating a regional academic network linked to main world networks, favoured the creation of the Peruvian Academic Network RAAP, constituted by those universities and institutions devoted to research which, 10 years ago, suffered the frustration of their hopes for integration.

RAAP, an organisation in the first phase of its functioning, is undergoing a process which is expected to experience an enormous growth. It sees RedCLARA as a strategic tool to foster collaborative research among local scientists, and between them and colleagues from the region and other latitudes. We regard the development of research, accelerated by the possibilities of collaboration with no barriers, as vital for a society that wishes to grow and be competitive. The growth and consolidation of RedCLARA is a guarantee for a similar development of RAAP, which is why it eagerly supports every effort along these lines.

Ida Holz,
Executive Director of RAU2 – Uruguay:

Many times we have talked and written about the origins of the idea of having a Latin American network, and how this idea materialised, years later, through the ALICE project, thanks to the support proposal from the European Commission.

Today RedCLARA is a reality which incorporates 12 countries plus 2 more in the process of incorporation.

But this interconnection reality should turn into a collaboration reality which supports the advancement of our countries' development. Collaboration, what for? How? It is not a simple issue for several of our countries.

The development of networks in Latin America has been dissimilar. Some more advanced countries have felt the need to have suitable structures to promote scientific and technological development with other countries in our continent, Europe and other developed regions. Others, with fewer resources, are just beginning to become aware of this need.

For our country, perhaps located halfway along the road, there is still a lot to be done, considering the underdevelopment caused by a de facto government that expelled its best scientists from the country.

The connection to RedCLARA, the diffusion of its possibilities together with the creation, from the Executive Power, of organisms such as the Agency for Innovation and Research, provide access to a road towards collaboration between many people which will certainly result in a significant change for the country and a step forward in its academic,
research and innovation processes.

There is a lot to be done together, both within and outside our borders.

We thank the multiple supports received, in particular, from the European Commission, which made the ALICE project possible. We have an operating advanced network; now we have to consolidate it and collect fruits for everybody from its existence.

Rafael "Lito" Ibarra,
Executive Director of RAICES – El Salvador:

Both El Salvador and other countries in the region are waking up and becoming aware of the importance of carrying out scientific collaboration work, but the tools to develop such collaboration, especially advanced networks, have not yet been developed to a hundred percent. Traditionally, in El Salvador there has been little culture in terms of our own research and technological development, which is why our take-off may take a bit longer than in other countries. CLARA can be the forum and meeting point where the most advanced countries and networks share some of the clues to further development and research together with those networks and countries which are lagging behind.

This objective can be met through examples, joint projects, links and relationships, an opening towards the scientific world, regional efforts and all sorts of exchanges, most of them coordinated or at least facilitated by CLARA.

Latin American in general and the advanced networks in our region in particular, will always indebted and grateful towards the European Commission's initiative and the involvement of entities such as GÉANT and DANTE because they were one of the most relevant catalysts in the materialisation of the long time Latin American dream of having our own regional network with a Latin touch. We cannot leave aside the influence and the support from some national networks in Latin America, such as CUDI, RNP and RedCLARA, which, with a long-term vision, have given their support, especially in the Central American region. Other fellow national networks in CLARA are still a key reference for the development of each of the other networks which, just like RAICES, are at the dawn of collaborative scientific research and work.

Carlos Monsalve,
Executive Director of CEDIA – Ecuador:

The ALICE Project has been important not only to facilitate the creation of the RedCLARA backbone structure, but also to enable different Latin American countries, especially the smaller ones, to be really integrated into world Advanced Academic Networks. In the case of Ecuador, the support from ALICE has been fundamental for the connection of the Ecuadorian NREN (CEDIA Network) to RedCLARA and, thanks to this, to other advanced networks such as GÉANT2 and Internet2.

That would be enough, but the impact does not finish there. Getting CEDIA to be part of RedCLARA has reduced the distance between researchers in Ecuador and their regional and global counterparts. In addition, it continues to be a learning process, where the activities developed with the support from CLARA and ALICE constantly facilitate the emulation of good practices in management, development and extension of research projects. It has also been much easier to know about what researchers in the region are doing, and to benefit from the knowledge generated by them.

Thanks to RedCLARA it is possible to share resources that are highly useful for research and education. Maybe the most common case for the Ecuadorian academic community is having access to a regional videoconferencing server (Isabel). This resource has made it possible to organise national virtual events, with participation from small Ecuadorian universities which do not have the resources to be part of a videoconference based on equipment.

All these experiences constitute the benefits which keeps Red CEDIA members together, and this is why we believe that ALICE and RedCLARA have been important factors for the scientific and technological development of our country.

Nelson Simões,
General Director of RNP – Brazil:

To materialise the interconnection of RNP to Latin American and European education and research networks represented for Brazil the attainment of a project to approach and integrate with its most important partners in research, education and development.

The opportunity generated by the ALICE Project, the society created by RedCLARA, changed the level of activities in science, technology and education. It also made it possible to include other actors in new areas such as health and culture, who thanks to the user-friendliness and quality of advanced applications became interested taking advantage of the benefits offered by this new remote communication and collaboration paradigm.

Today, when one of the 418 Brazilian user institutions, be it a university, a research centre, hospital or museum, conceives international collaboration programmes and projects, it does so based on the ease of communication available to form consortia with its peers in Latin America and Europe.

The outcome is that new collaboration networks emerged, from major projects with a high demand for information and communication technologies, to the interaction of small research groups. For these people and institutions, as well as for RNP, its value goes beyond the advanced infrastructure for collaboration, integrating partners and initiatives of the same kind.

When it overcame the access (expensive or non-existent) barrier, RedCLARA began to represent a set of new opportunities for the inclusion of students, teachers and researchers into the global collaboration scene. And it will once again be a tool for regional dialogue and integration, based on the generation of a knowledge and on development.

Cathrin Stöver,
Manager of the ALICE project, International Relations Manager of DANTE - United Kingdom:

The objective of the ALICE project was, of course, the creation of a Latin American infrastructure for research and education and to that end, ALICE has fully delivered. However, RedCLARA in itself cannot be the final objective. RedCLARA equips the Latin American research and education communities with the necessary data communications infrastructure and services which enable closer collaboration within Latin American and between Latin America and Europe and other world regions. Now it needs to be ensured that the research and education communities across Latin America make best use of this new infrastructure. ALICE, CLARA and, most importantly, the connected Latin American NRENs have commenced the dialogue with the various educational and research communities, like the astronomers, biodiversity, high energy physicists´ communities and many others. It will be important to strengthen the dialogue with the project partners of the EC´s ALFA III programme so that the synergies between ALFA and ALICE are fully exploited. ALICE and CLARA will follow closely the developments in the growing Latin American telemedicine community and we are committed to give them our full support. At the end, the objective needs to be to fulfill the needs of the end user - be it in education or in research - and by that to foster digital inclusion and regional integration in Latin America.

Florencio Utreras,
CLARA Executive Director:

In May 2002, when the European Commission invited me to Brussels to participate in the launch of GÉANT and present the Latin American academic networks initiatives, I knew, through Victor Castelo, that there was an opportunity for funding from the Commission, through the @LIS Programme. What I did not know was the magnitude of the contribution and did not suspect how that contribution would change the situation within the region.

In fact, in Latin American academic networks we had been dreaming for a long time, since the early 1990's, with the creation of a regional network and connect it to other regional blocks, but we had never been able to access to an adequate funding which could make this dream possible. This is why I could not believe it when I heard about the proposal. Our dream was going to come true. After that there was Toledo, Valle de Bravo and Rio de Janeiro, and the rest is history.

In my view, the essential thing about this project is that it effectively contributes to the construction of a regional identity; it brings together the efforts by researchers in the region; it favours collaboration and eliminates the isolation of huge groups of researchers, virtually placing them in world research facilities, with access to instruments, data, digital libraries, etc. and above all, with privileged access to collaboration with their peers from the developed world. This is why it is more than just a network of computers, optical fibre, instruments and data bases. RedCLARA is a Development Opportunity for Latin America.

Luís Sergio Valle S.,
Executive Director of ADSIB - Bolivia:

The Vice Presidency of the Republic, through the Agency for the Development of the Information Society in Bolivia –ASDIB-, has been promoting the incorporation of the country into the Latin American System of Advanced Telecommunications Networks – RedCLARA Project.

Undoubtedly, this is an initiative that is in its implementation process at present. Its scope it projected to a national level and we are backed by the active participation of the Vice Ministry of Science and Technology, the Executive Committee of Bolivian Universities (CEUB) and the National Association of Private Universities (ANUP), thus incorporating both state and private universities in the network. In this sense, for the first phase we have plans to incorporate the universities in the central axis: the Universidad Mayor of San Andrés in La Paz; the Universidad

Mayor of San Simón in Cochabamba and the Autonomous University Rene Moreno in Santa Cruz. In a second and third phase we plan to incorporate the remaining universities and research centres.

It is important to point out that this is not only about creating or being part of a private network. The important thing is that our state and private universities and scientific and technological research centres in the country have the access, capacities and skills which are necessary to create exchange and collaboration communities in order to develop innovation, research and education processes with their peers throughout the world and in particular with those peers in Latin America and the Caribbean by means of applications such as: videoconferences, virtual libraries, distance education, telemedicine and scientific and academic contents, among others.

Today, more than ever before, there are problems which can only be solved through collaboration and in a distributed and coordinated way. Either because of the great amount of information or its high development speed, high performance research networks have become essential for modern education.

The ASDIB regards research networks and global Internetas basic components for the construction of the Information Society in Bolivia, since our role, rather than just a matter of increasing connectivity, is to promote applications which can foster interaction among people in order to improve innovation, research and education processes within the country. However, we believe that the State initiatives in terms of ICT applied to knowledge development (mainly research) have been insufficient, or have not been formulated in an articulate way and with national scope, and therefore is has not been possible to visualise their actual impact. It is precisely from the coordinated proposal between ASDIB and the Vice Ministry of Science and Technology that we intend to promote such applications and, furthermore, generate policies in close collaboration with state and private universities in the country.

The use of information technologies as tools for development has strengthened the use of commercial Internet, with improvement indicators represented by the modernisation of institutional management, the improvement in the quality of higher

the reasoned, balanced and creative research on the use of new technologies. However, we believe that potential of the Internet for academic use has not been fully taken advantage of; we have a great task in terms of basic digital literacy for the use of the Internet in general. Undoubtedly, all the current initiatives to exchange and articulate the efforts of the local scientific community will have to be based on the use of ICT, with a special emphasis on the use of the Internet and advanced Internet.

One of the main challenges we are currently facing with the Vice Ministry of Science and Technology is to accomplish the full articulation among the actors in the Bolivian scientific community, and between them and the demands from the State, with the support of ICT.

We also wish to foster the development of application in various areas: Education (Higher Education), Biomedicine, Climate, etc. not only through the implementation and operation of the infrastructure, but also though the creation of a human network aimed at collaborative work in the field of Science and Technology.

Finally, we must think of working towards the integrationwith other regions of the globe, starting with Latin America and the Caribbean in order to achieve the same level of Grid development that they have in Europe.