



CLARA:

Towards a New Era in Advanced Networking in Latin America

*CLARA Executive Committee
June 12, 2003*

Agenda



- Academic Networking in LA
- Ampath: The present of LA Advanced Networking
- Advanced Applications in LA
- ALICE: The EU-LA Networking Initiative
- CLARA: An Organization to Coordinate Efforts in Academic Networking
- RedClara: The Upcoming LA Academic Advanced Network
- Clara Funding Issues



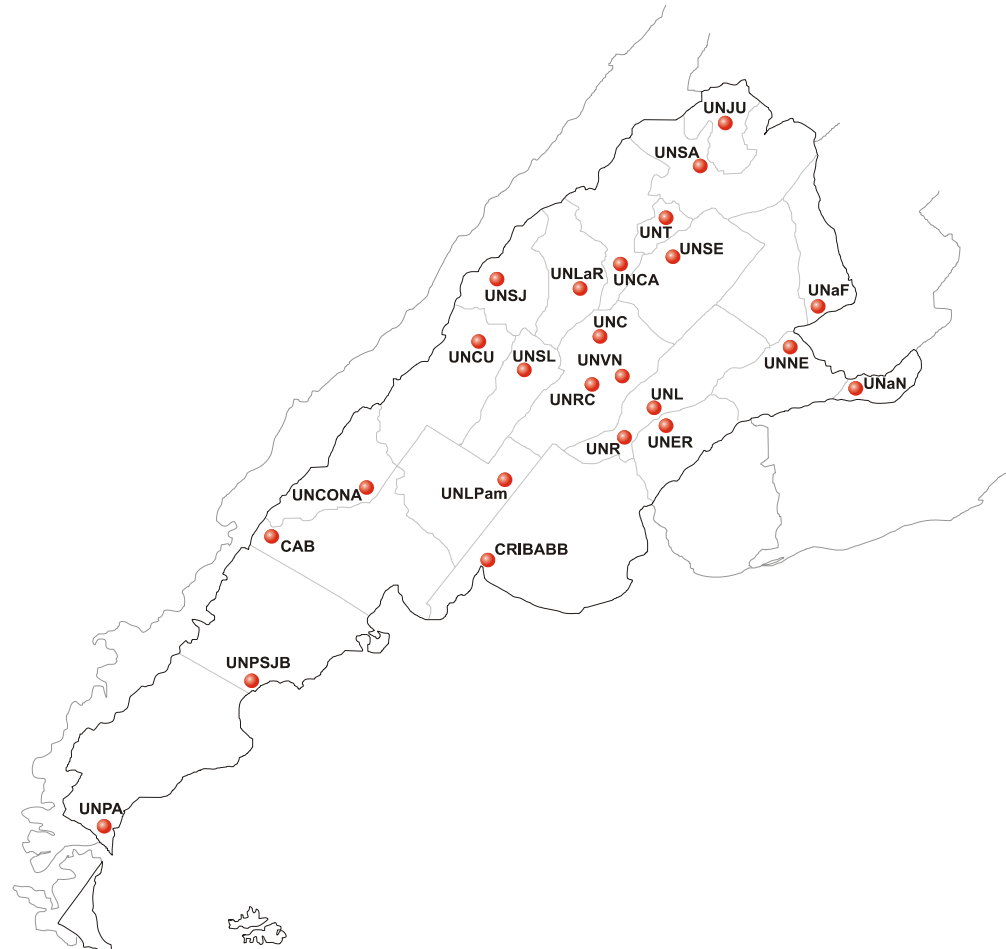
Academic Networking in LA

NREN's Present Status

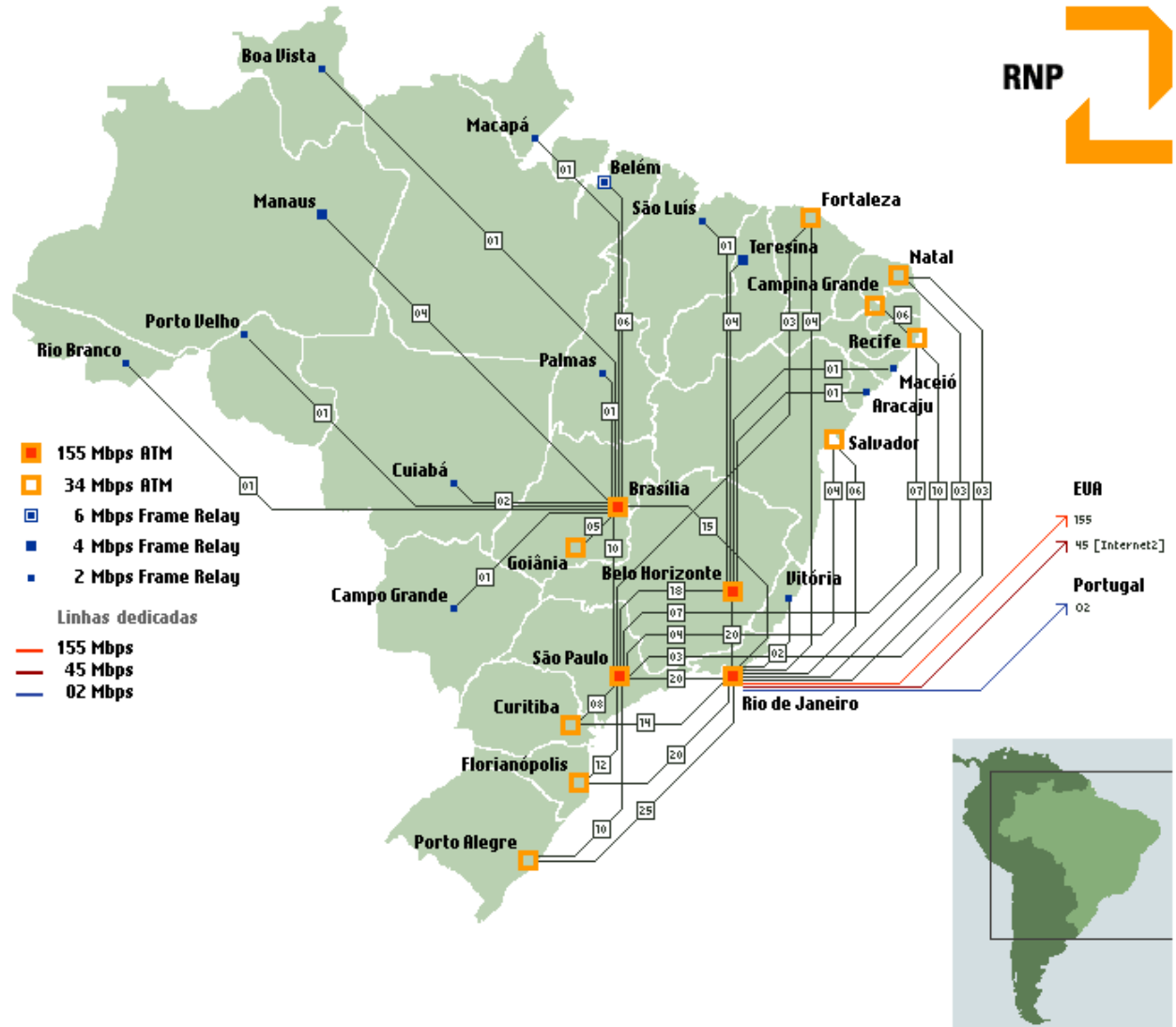


• Argentina	RETINA	Operational
• Brazil	RNP	Operational
• Bolivia	BOLNET	Operational
• Colombia	-	Organizing
• Costa Rica	CRNet	Operational
• Cuba	RedUniv	Operational
• Chile	REUNA	Operational
• Ecuador	CEDIA	Organizing
• El Salvador	RAICES	Organizing
• Guatemala	-	Organizing
• Honduras	-	Organizing
• Mexico	CUDI	Operational
• Nicaragua	-	Organizing
• Panamá	RedCyt	Organizing
• Paraguay	-	Organizing
• Perú	RAP	Organizing
• Uruguay	RAU	Organizing
• Venezuela	REACCIUN	Operational

RETINA2: The Argentinean NREN

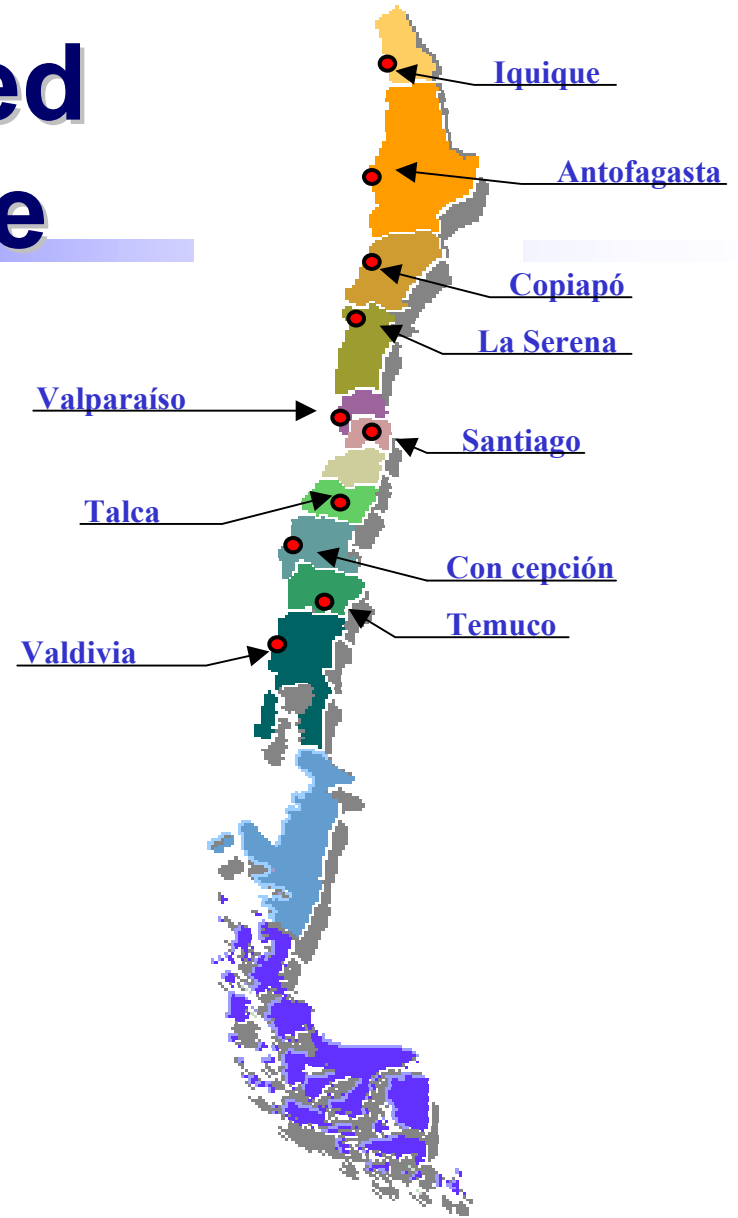


RNP: The Brazilian NREN



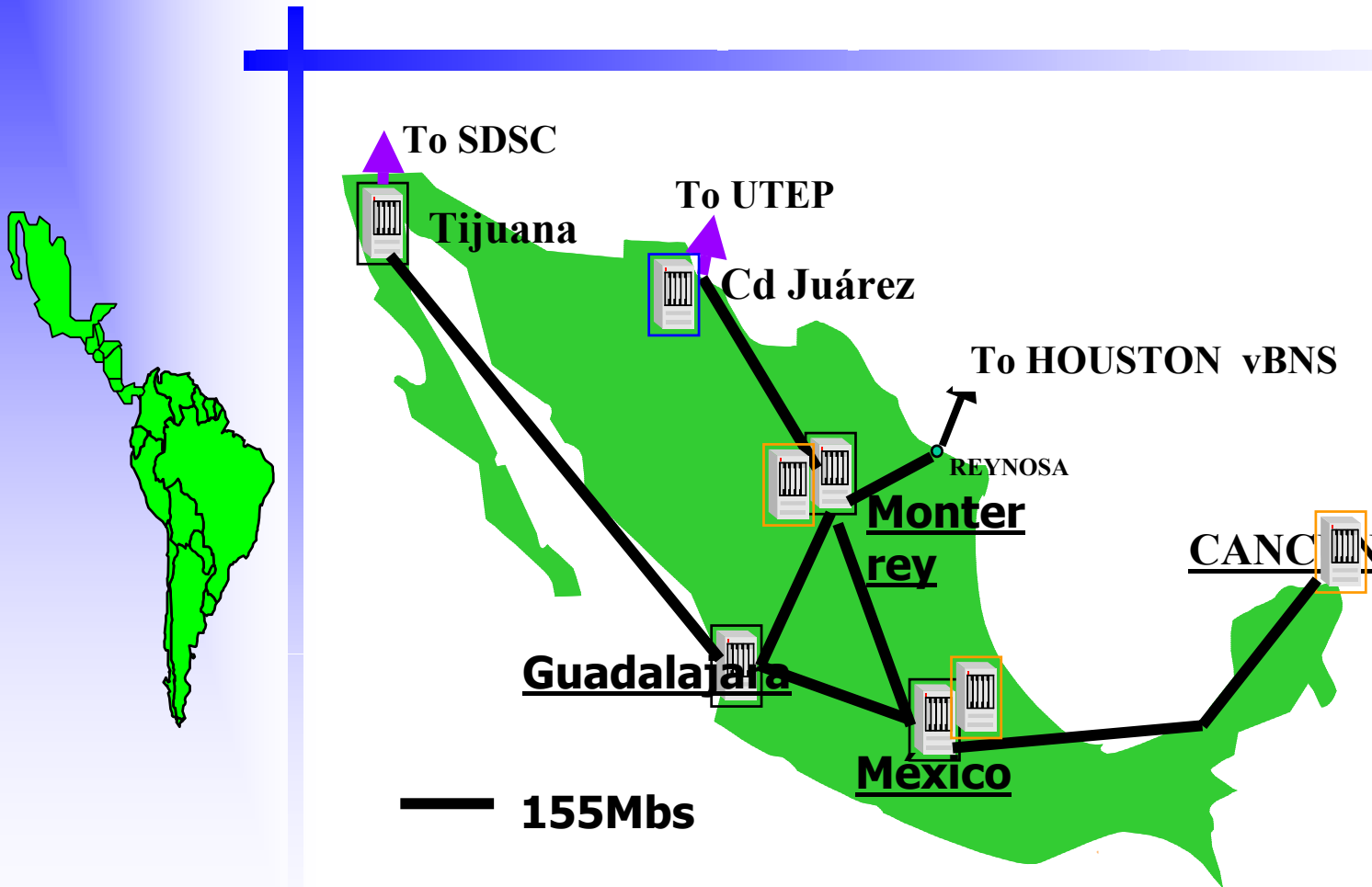
REUNA2: The Chilean High Speed Backbone

- 155 Mbps ATM Backbone
- Covers Chile from Arica to Puerto Montt
- DS-1 Internet2 connection thru Ampath



CUDI: The Mexican NREN

8,000 Kms of STM1 backbone provided by
Telmex and Avantel



NREN's in Latin America are mostly in an embryonic stage



- With the exception of Argentina, Brazil, Chile, Mexico and Venezuela, the NREN's are based on commercial Internet services at low speeds (frequently 256Kbps to 2 Mbps)
- Most NREN's in Latin America are still getting organized, but all countries in the region are betting on developing their organizations and infrastructure in the coming months
- A clear common view exists on the importance of this type of infrastructure for the development of science, technology and education



Ampath: The present of LA Advanced Networking

Inter-Networking in Latin America

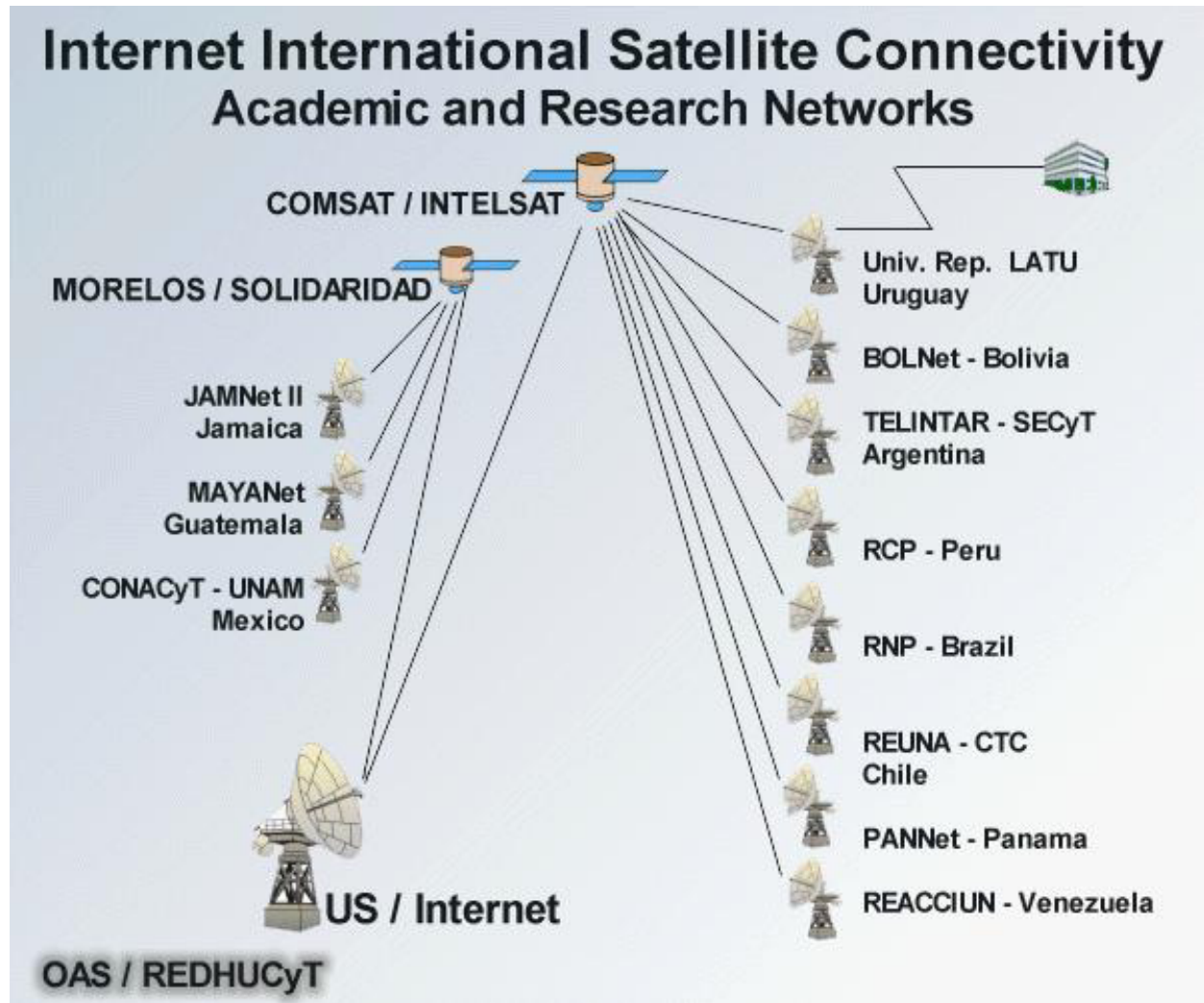


- Political, linguistic and cultural considerations have traditionally led to considerable interaction between countries within the region

However, networking has not followed this model:

- First connections (BITNET) starting 1986 using satellite links between the US and each country separately
- Same topology inherited with transition to Internet
- Even multilateral initiatives (RedHUCyT in mid 90s and AMPATH from 2001) have used traffic hubs in the US.

Satellite communications (1990s)



Telecommunications Technology

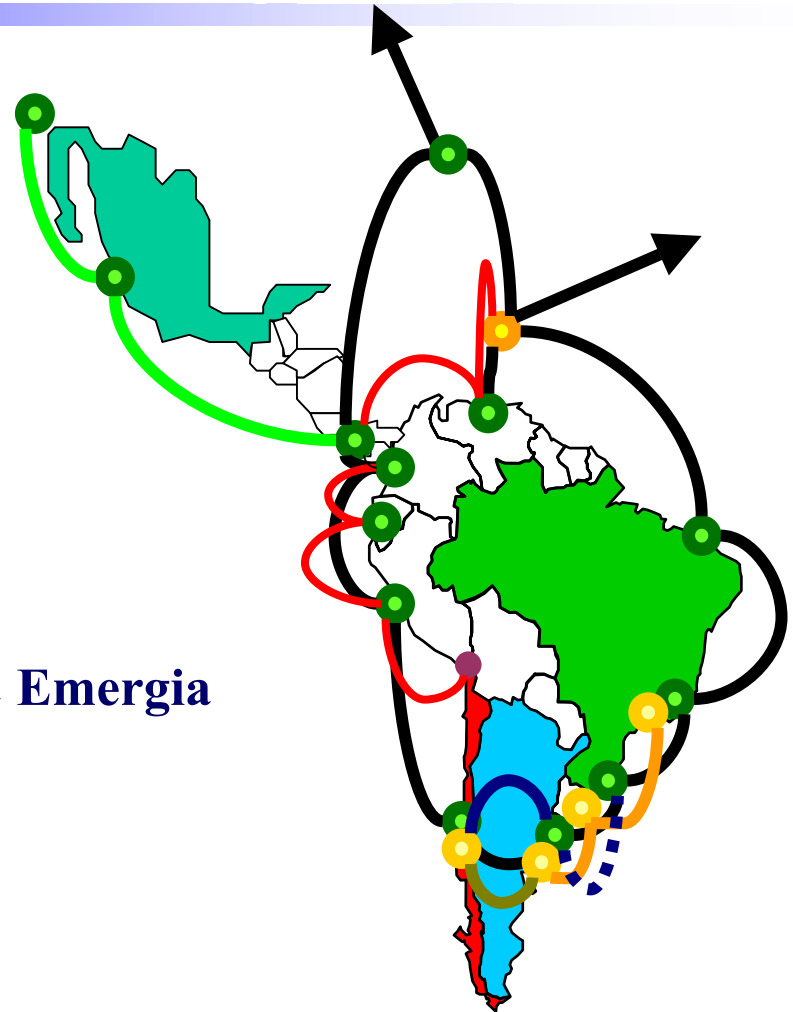


- Until very recently, the only available telecom infrastructure for data communication was by satellite
 - cost independent of distance
 - no incentive for establishing links within the region, as all countries were mainly interested in access to global Internet and interconnection costs were even higher than connecting north
- Recent important changes (since late 1990s):
 - end of state telecom monopoly in many countries
 - competition and lower prices
 - building out of new infrastructure based on submarine fibre optical cables

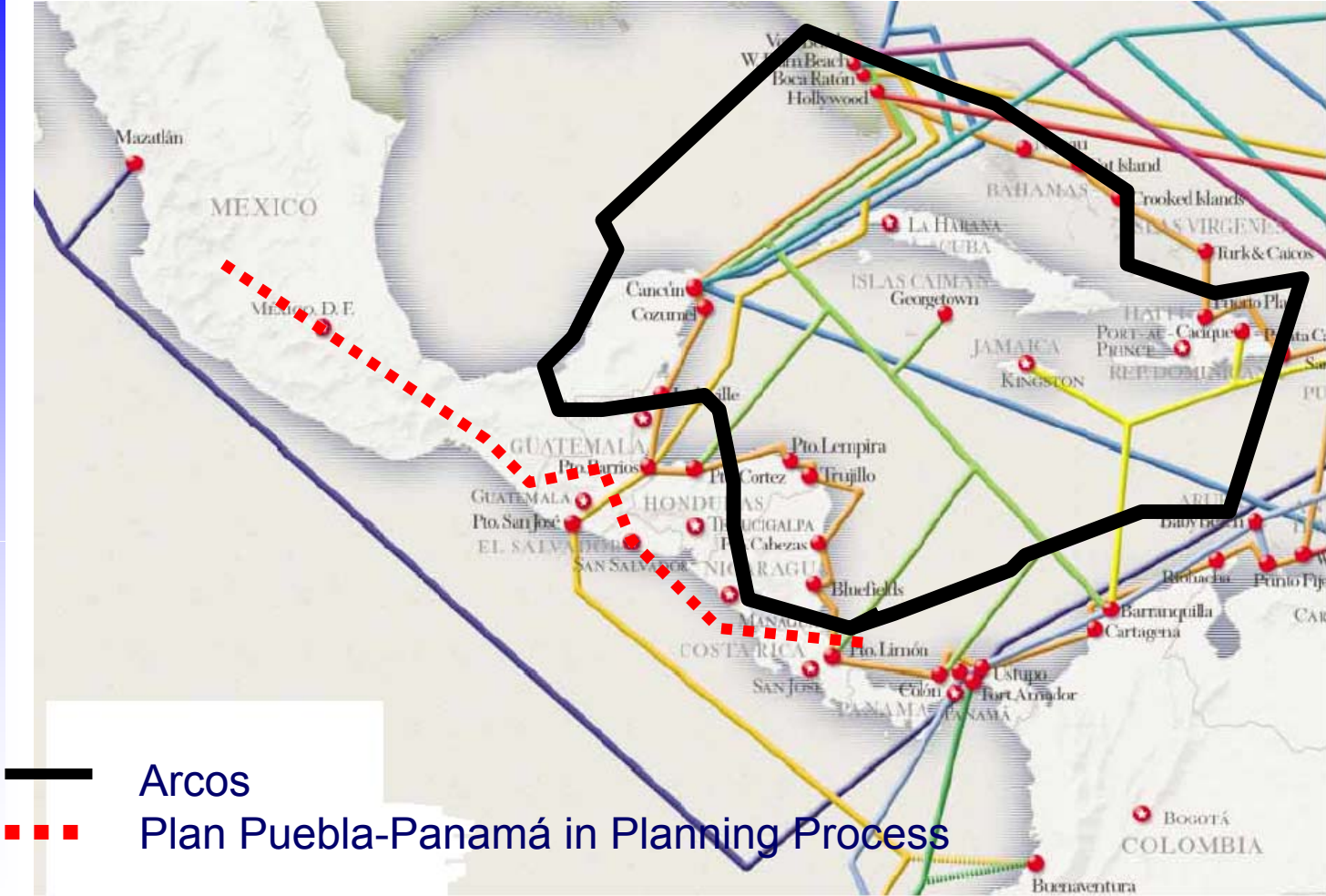
New Submarine Cables in Latin America



-  Panamerican
-  Global Crossing & Emergia
-  ImpSat
-  Transandino
-  UniSur
-  Global Crossing



Central America & Caribbean

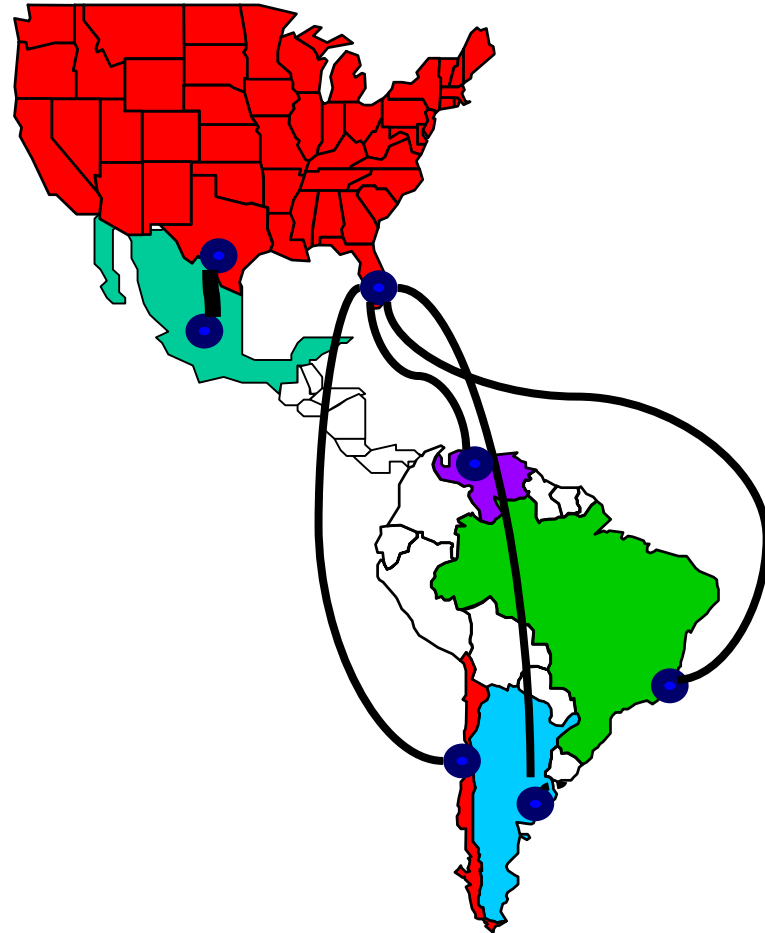


Ampath: The GC-FIU Initiative



- In 2000 thanks to an initiative by FIU, Global Crossing donates 10 DS-1's to be used by 10 countries in LA to connect to the Internet2 thru a POP located in Miami
- In June 2001, Chile's REUNA becomes the first LA NREN to get connected to the Ampath POP
- In December 2001, both Argentina (RETINA) and Brazil (RNP) get connected to Ampath
- In January 2002, FABESP from Brazil connects to Ampath separately from RNP
- In April 2003, Venezuela's REACCIUN gets connected to Ampath
- All links are DS-1
- All connections are free of charge from GC for 3 years

The Latin American Connections to Internet2





Some Examples of Use of Advanced Networking in LA

Many Collaboration Projects in LA



- Distance Learning (ex. math teachers training IMPA/RNP)
- Astronomy (ex. ALMA, GEMINI, SOAR...)
- El Niño
- Biodiversity
- Biology (ex. LACBioNet)
- Virtual Latinoamerican Library
- ...

Case Study - Distance Learning

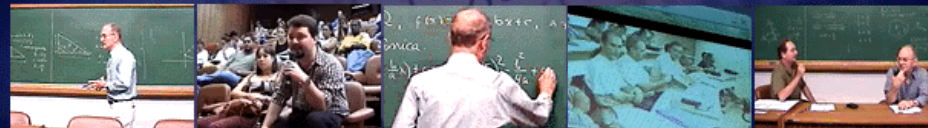
Serviços e Aplicações



Exemplo de uso

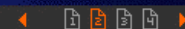
Impa 2002: transmissão do curso de aperfeiçoamento de professores do ensino médio

11 estados conectados



[ver trecho da transmissão](#)

[ver mapa do backbone](#)

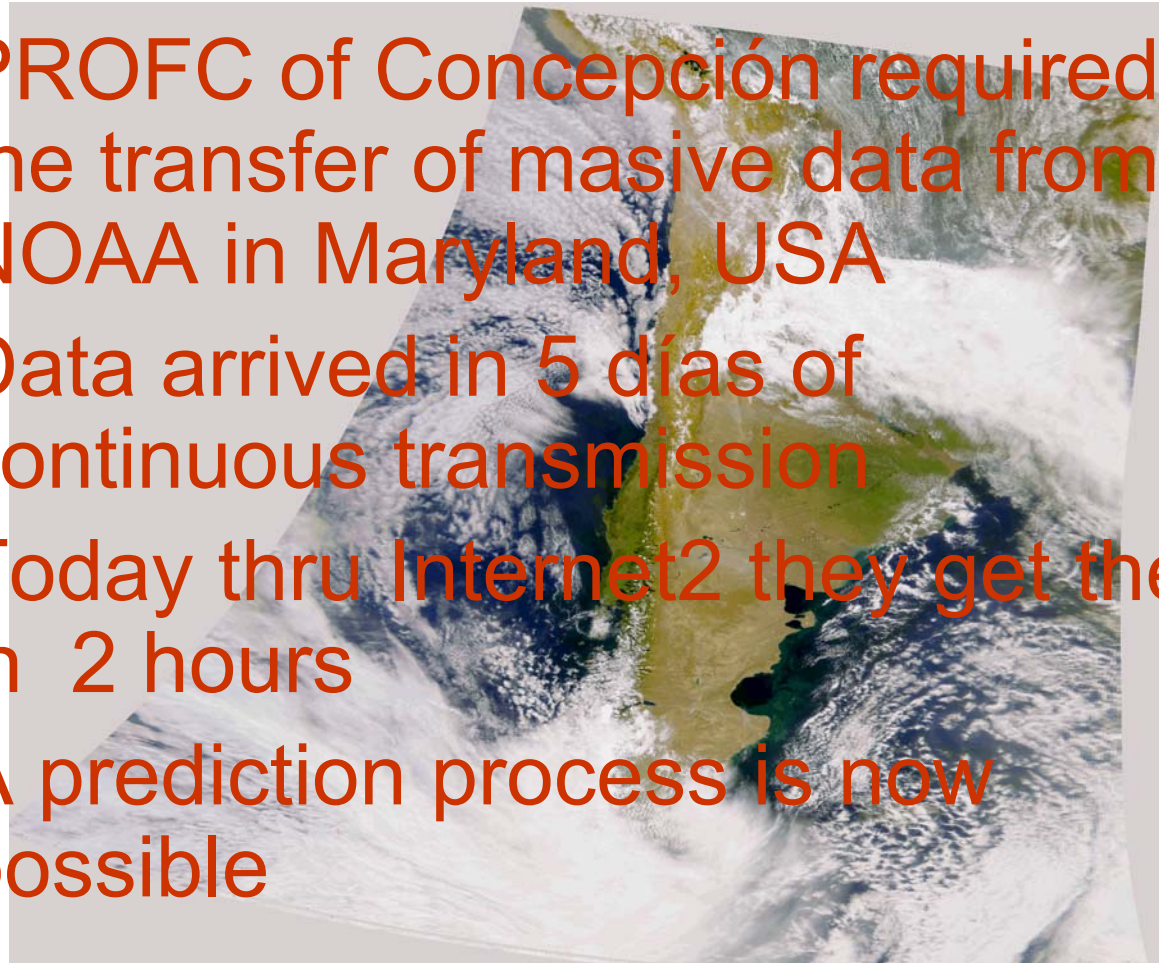


O mesmo se aplica a comunicação por voz pela rede

Physical Oceanography



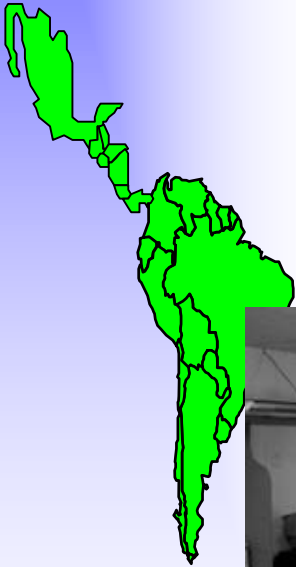
- PROFC of Concepción required the transfer of masive data from NOAA in Maryland, USA
- Data arrived in 5 días of continuous transmission
- Today thru Internet2 they get them in 2 hours
- A prediction process is now possible



Taller Cero

Multi-Cultural Architecture Workshop

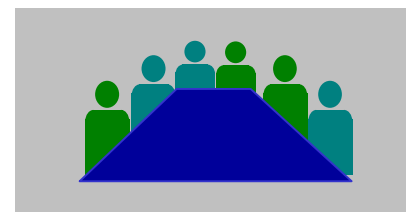
- U. of Bío-Bío
- UNAM
- Texas A&M University



Teaching of English



- Using Video Conferencing thru Advanced Networks high school students from Valdivia and Boston worked in a joint language workshop.



REUNA2 e Internet2





ALICE: The EU-LA Networking Initiative

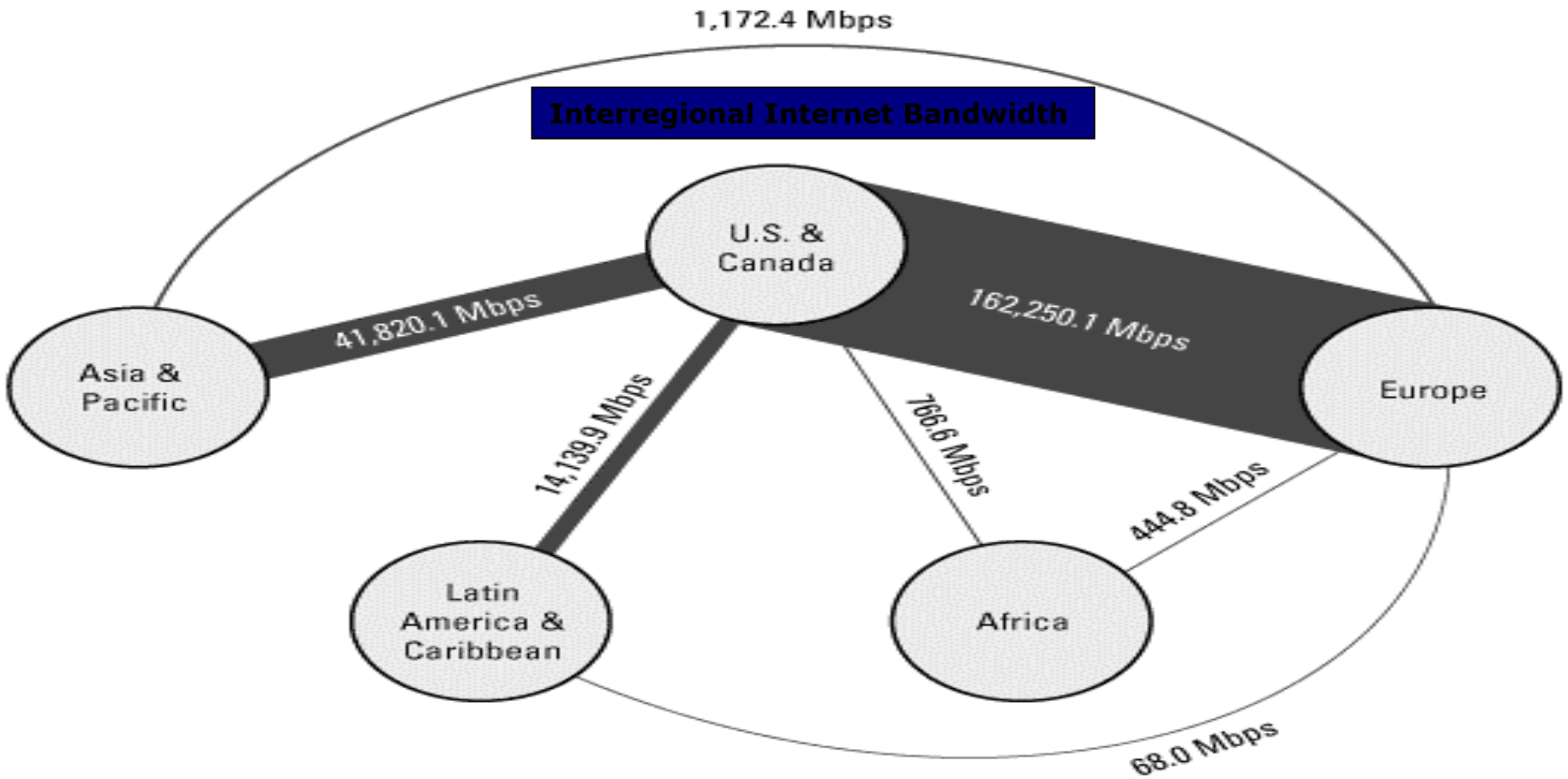
Background



European Initiative @LIS

- New European Initiative - (2003-2005)
@LIS: Alliance for the Information Society
 - 62.5 Million Euros for EU-LA on Information Society Issues
 - 10 Million Euros for Interconnecting Europe & Latin American Researchers
- **Strategy:**
 - Feasibility study: CAESAR
 - Submit a implementation proposal: ALICE

Motivation



CAESAR

Feasibility Study



Connecting All European and South American Researchers

- Promote EU-LA connectivity through regional connectivity within LA plus a large pipe to Europe
- Support collaboration and communication

Results:

- New infrastructure available, cost attractive
- 30 Mbps data flow rate
- A rich set of collaborations projects

CAESAR Results



CAESAR Workshop 2002 in Toledo became starting point for CLARA

- cooperative organization for advanced networking in LA
- regional network:
feasibility study showed that @LIS budget sufficient to establish advanced connectivity to all LA countries

The ALICE Project



America Latina Interconectada con Europa

The three years project have just started (june 2003)

- Coordinator: DANTE
- Partners: FCCN, RedIris, Renater, GARR and 17 LA-NRENs
- **Phase A**
 - Network design and procurement
- **Phase B**
 - Implementation and operations
 - training HR, support collaborative projects
- **Total budget: 12.5 M Euros (20% LA, 80% EU)**



CLARA:
An Organization to Coordinate Efforts
in Academic Networking

The Clara Organization

Cooperación Latino-Americana de Redes Avanzadas



- Coordination amongst LA-NREN and other stakeholders
- Cooperation for the promotion of scientific and technologic development
- Planning and implementation of network services for regional interconnection
- Development of a regional network (here called RedCLARA) to interconnect the NRENs operated by its members

CLARA features



- Association of NRENs in LA open to all LA Countries
 - constituted in Uruguay (like LACNIC)
 - Bylaws signed on June 10 in Mexico
- CLARA is not limited to @LIS time scale and restrictions
- RedClara will connect LA to Europe and to other regions
- Costs to connect to the backbone will be the same for every country at equal bandwidth

CLARA Members and users organizations



- Argentina (54)
- Brasil (382)
- Bolivia (6)
- Chile (14)
- Colombia (43)
- Costa Rica (-)
- Cuba (21)
- Ecuador (9)
- El Salvador (7)
- Honduras (-)
- Guatemala (10)
- México(69)
- Nicaragua (-)
- Panamá (10)
- Paraguay (28)
- Perú (11)
- Rep. Dominicana (-)
- Uruguay (7)
- Venezuela (7)

CLARA Activities



- May 2002: Brussels @LIS Interconnection Initiative Launched
- June 2002: EU-LA Meeting in Toledo. *Toledo Statement signed.*
- July 2002: LA Networking Initiatives meet in Rio. CLARA agreement established.
- September 2002: Coordinating Committee of CLARA meets in Buenos Aires
- September 2002: CLARA & ICT TF meeting in Rio.
- November 2002: EU-CLARA meeting in Santiago
- March 2003: DANTE-CLARA meeting in Cambridge
- **June 2003: Clara meeting Mexico**

Statutes: Members and Directive Bodies



- Members: Active NRENs and NRENs in process of formation
- Associates: Financial Contributors
- Bodies: General Members Assembly, Directive Council, Auditing Committee, Electoral Committee, Technical Committee and Working Groups

Comments about CLARA



- CLARA responds to long-standing need for coordination between LA NRENs.
- Builds on trust-building already carried out between major partners
- Offers support for NREN building in other LA countries by provision of support and int'l connectivity
- ALICE permits a strong framework for Clara plans network sustainability after 2006



RedClara: The Upcoming LA Academic Advanced Network

Where do we go from here?



- **AMPATH's achievements**
 - Initial boost for Advanced Networking in LA
 - Stimulus for advanced connectivity inside each country
 - Motivation for collaborative projects
 - Connectivity needs, delayed till now due to high costs, being solved
- **New Initiative - CLARA - ALICE (EU project)**
 - 10 Million Euros for Interconnecting Europe & Latin American Researchers
 - Cost sharing 80-20 between EU and LA - can we build a network for 12.5 Million Euros? Yes!!

CLARA - ALICE network design



- **Main characteristics:**
 - use of submarine cable infrastructure, where possible (except Cuba)
 - single connection to Europe (GÉANT) from the region
 - connectivity to LA NRENs through regional backbone network
 - respect for heterogeneity of NRENs

One possible CLARA network topology



- Major connectivity between AR, BR, CL, MX (at least 45 Mbps, ideally 2x155 Mbps)
- Other countries connect to major nodes (between 10 and 155 Mbps)
- Large pipe to GEANT (at least 155 Mbps, ideally 622 Mbps)
- final topology and capacity will depend on results of tender (August 2003)
- Additional contributions will add to the backbone and int'l links capacity
- Internet2 connectivity thru several points



Backbone Timetable



Project ALICE - América Latina Interconecta Con Europa

- May 2003: technical definitions complete
- June 2003: Open tender for provisioning of links and equipment
- August 2003: Contract(s) assigned
- November/December 2003: Initial network established

Notes:

- DANTE is the project coordinator and will sign contracts with users and providers
- CLARA is expected to represent interests of LA users in the medium term (one year)



CLARA Funding Issues

CLARA Funding Components



- The CLARA Network in the context of the ALICE Project
- The organization, coordination and promotion of the use of advanced networks thru the CLARA Organization
- The NREN's themselves

CLARA Network



- ALICE project provides € 10 Millions
- Counterpart from LA NREN's amount to € 2.5 Million in 3 years
 - € 80,000 during 2003
 - € 2,420,000 during 2004-2005
- Total payment per country from € 50,000 to € 210,000 per year

CLARA Management



- Highly skilled manager
- Offices in some LA country
- Secretary and accounting services
- Budget for travel and communications
- Total expenditure of approximately US\$ 100,000 per year

NREN Budget



- Funding Models and costs are highly dependant on particular country issues
 - Costs of telecommunications
 - Import tariffs
 - Manpower costs
 - Organizational issues
 - Governement contribution
- Example figures:
 - RNP2: US\$ 14,000,000 (2001)
 - REUNA2: US\$ 1,800,000 (2002)
- Clearly a high cost per country

Cost Distribution Principles (Under Study)



- Management Costs equally distributed
- Network costs
 - Backbone costs distributed based on a partial subsidy to higher costs by some countries
 - Access costs distributed according to bandwidth
- NREN Costs assumed by each country
- Total costs are important and difficult to assume at this time by most countries