

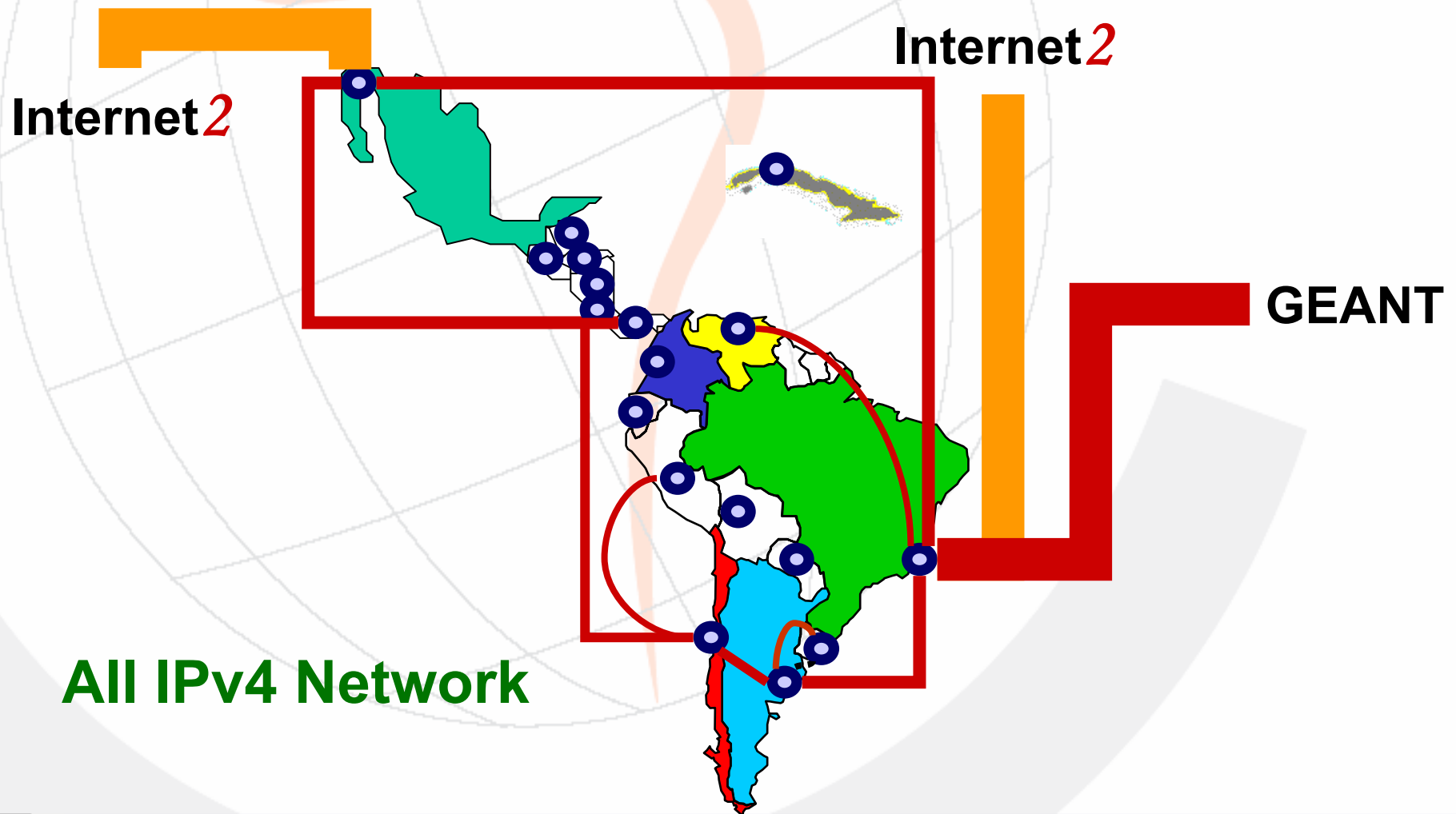


Hybrid Networking in Latin America

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June 4, 2005



RedCLARA as of May 2005





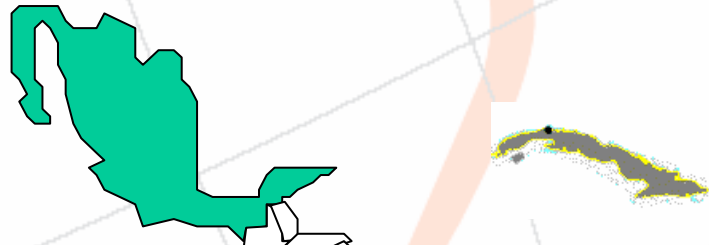
Background on Telecom Operators in LA

- Most operator networks in Latin America are still using PDH or SDH/SONET for their production networks
- In few countries: Argentina, Brasil, Chile, Mexico, there exists a DWDM network installed to provide services
- No “lambda” services available
- Regulations do not allow anyone to operate its own network in most countries

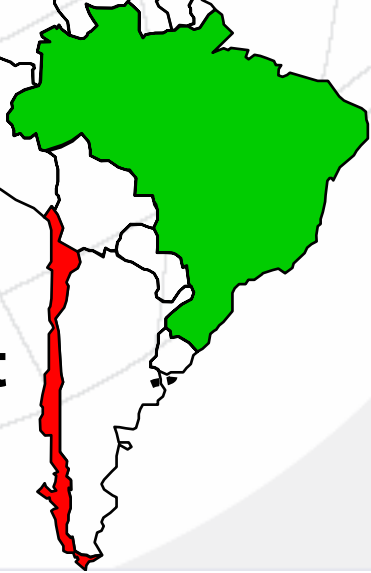


Optical Experiences in LA

LILA Link



Project GIGA



WDM Project



GIGA Testbed Network - objectives

- **explore user control of optical fibre infrastructure**
 - **interconnect 20 academic R&D centres in S.E. Brazil**
 - **use of IP/WDM with Ethernet framing**
- **provide Networking Research Testbed (NRT) for optical and IP network development**
- **provide Experimental Infrastructure Network (EIN) for development and demonstration of applications**

(NRT and EIN are terms defined by NSF in 2002)

Network was inaugurated in May 2004



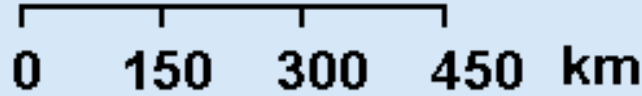
GIGA Testbed Network

Two
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- Universities**
- IME
- PUC-Rio
- PUC-Campinas
- UERJ
- UFF
- UFRJ
- Mackenzie
- UNICAMP
- USP
- R&D Centres**
- CBPF
- CPqD
- CPTEC
- INCOR
- CTA
- FIOCRUZ
- IMPA
- INPE
- LNCC
- LNLS

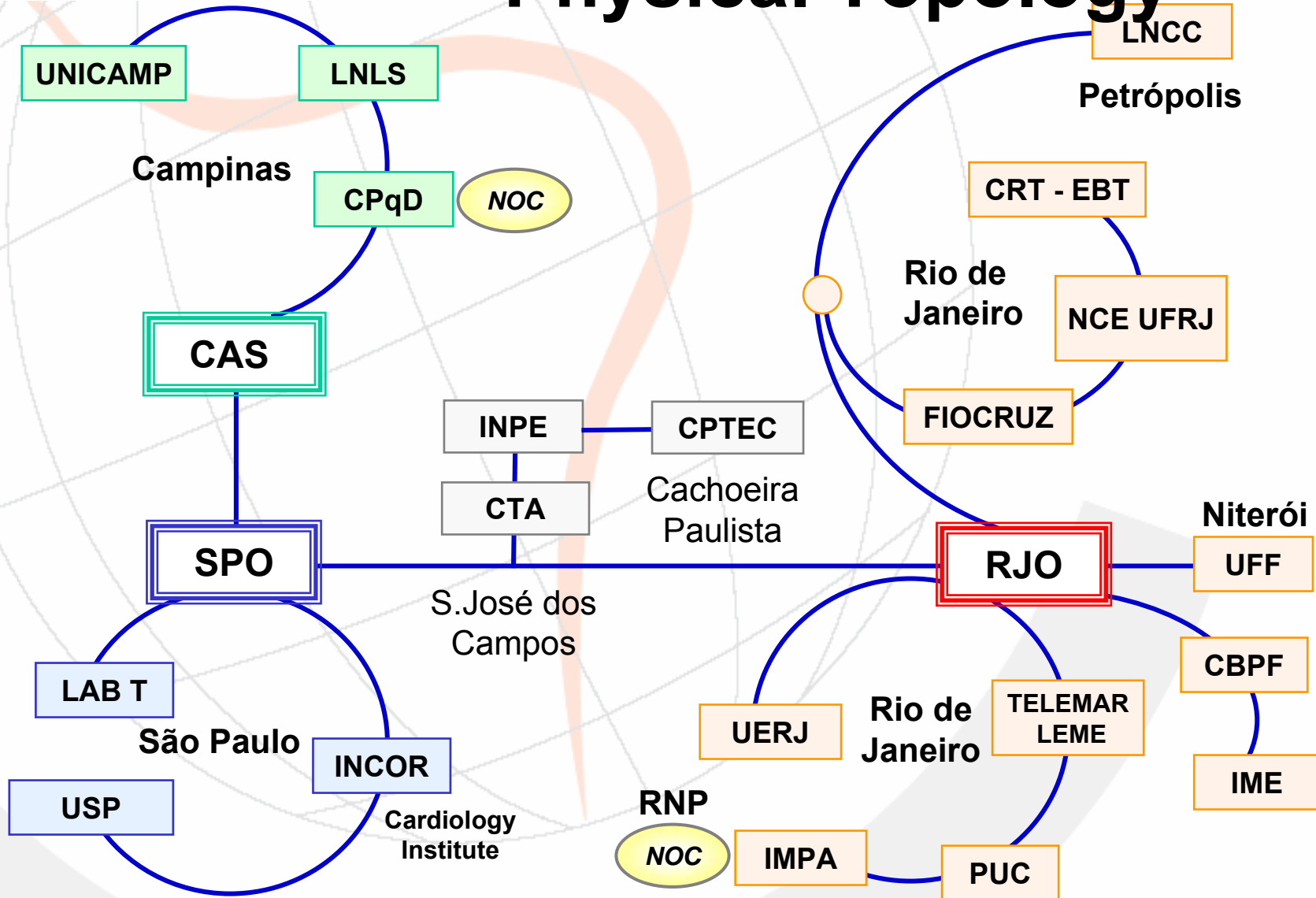


- 1 : Campinas
- 2 : São Paulo
- 3 : S.José dos Campos
- 4 : Cachoeira Paulista
- 5 : Rio de Janeiro
- 6 : Niterói
- 7 : Petrópolis





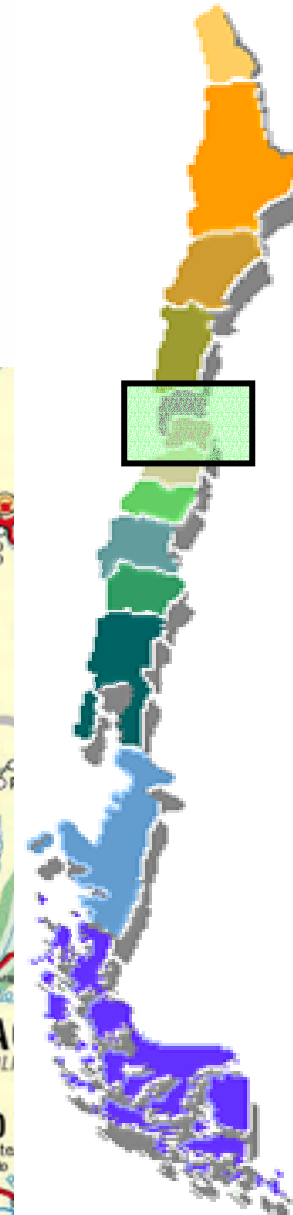
GIGA Network: Physical Topology



NOC – Network Operation Center

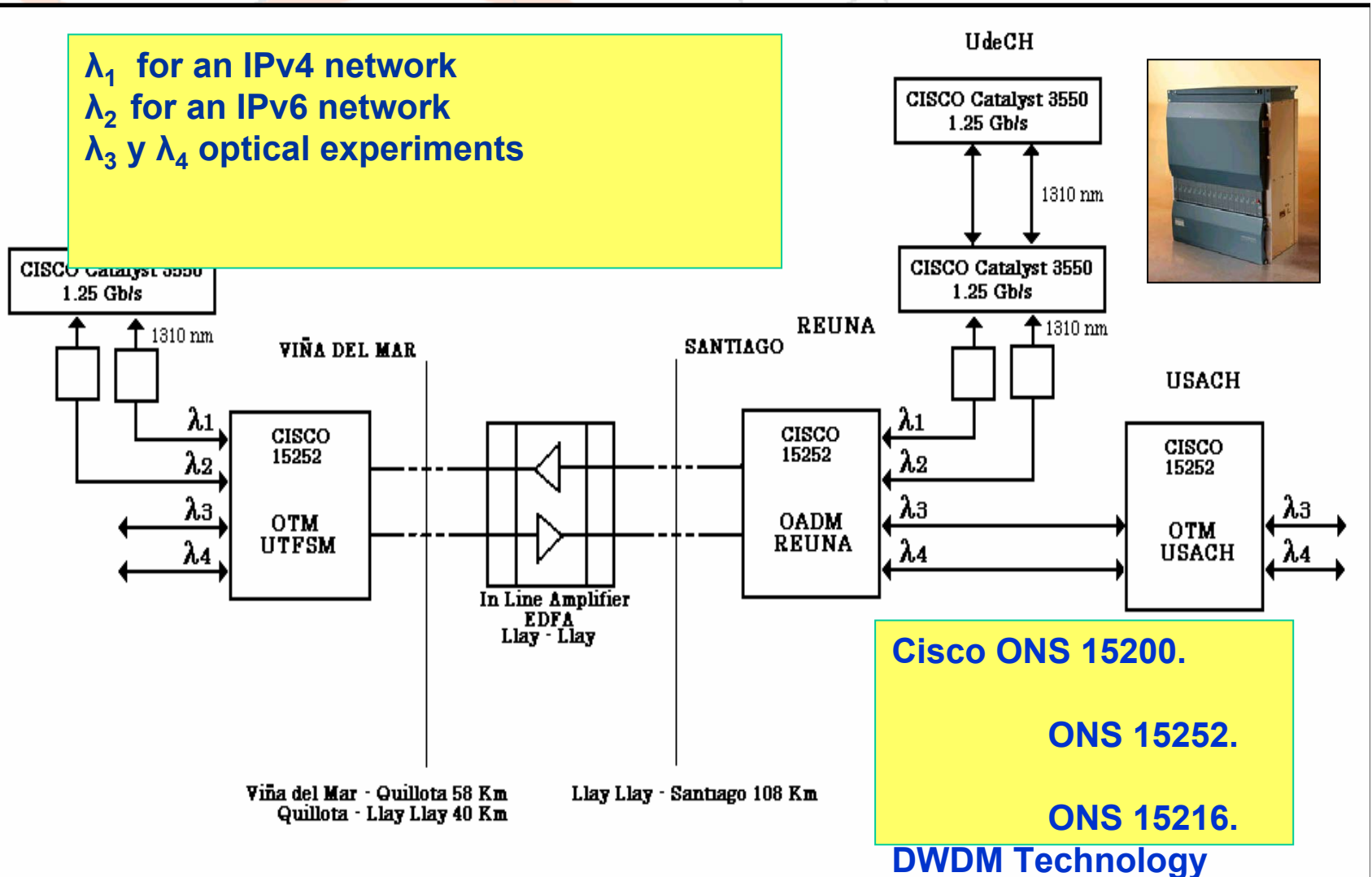


REUNA's WDM Project: 4x2,5 Gbps



Use of the λ 's

λ_1 for an IPv4 network
 λ_2 for an IPv6 network
 λ_3 y λ_4 optical experiments



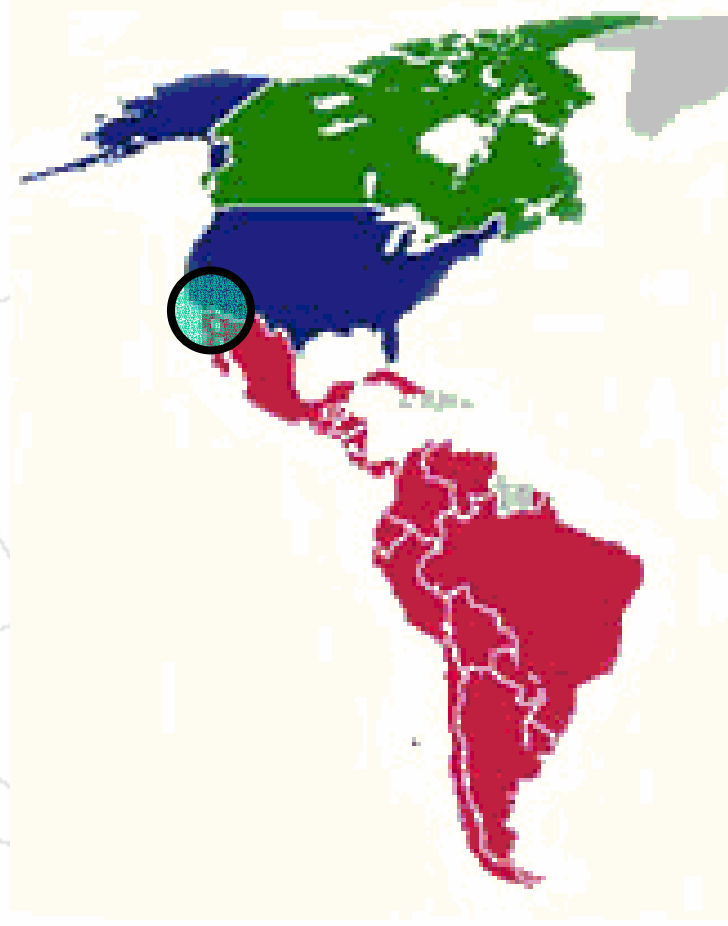


Phases of G-REUNA

- **Phase I: Prototype March 2002-July 2003**
 - Funded by FONDEF-Manquehue Net-ChileSat-Cisco
- **Phase II: First Part of Backbone August 2003-December 2003**
 - Funding FONDEF – Telecom Operator
- **Phase III: Full Backbone Deployment January 2005-July 2005**
 - Funding MECESup – Telecom Operator
 - Under discussion 2 λ 's under consideration, one for IP services, the other for experimentation.



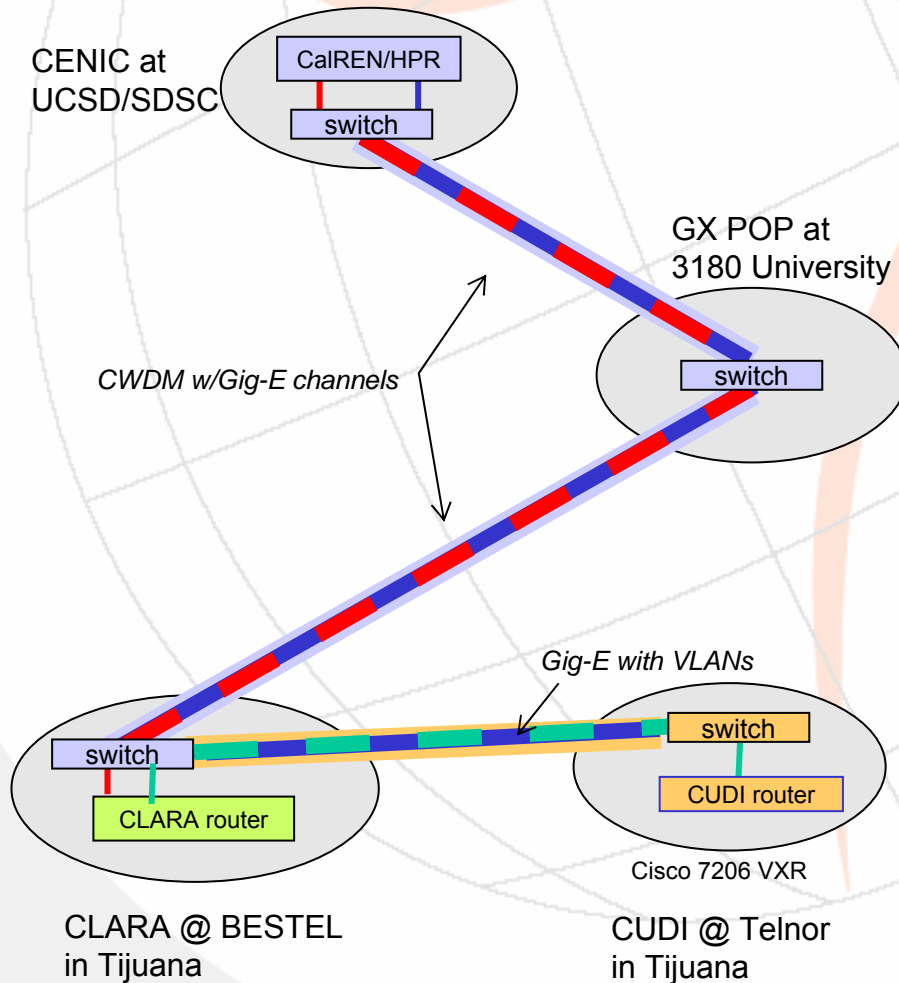
The Tijuana-San Diego LILA Link



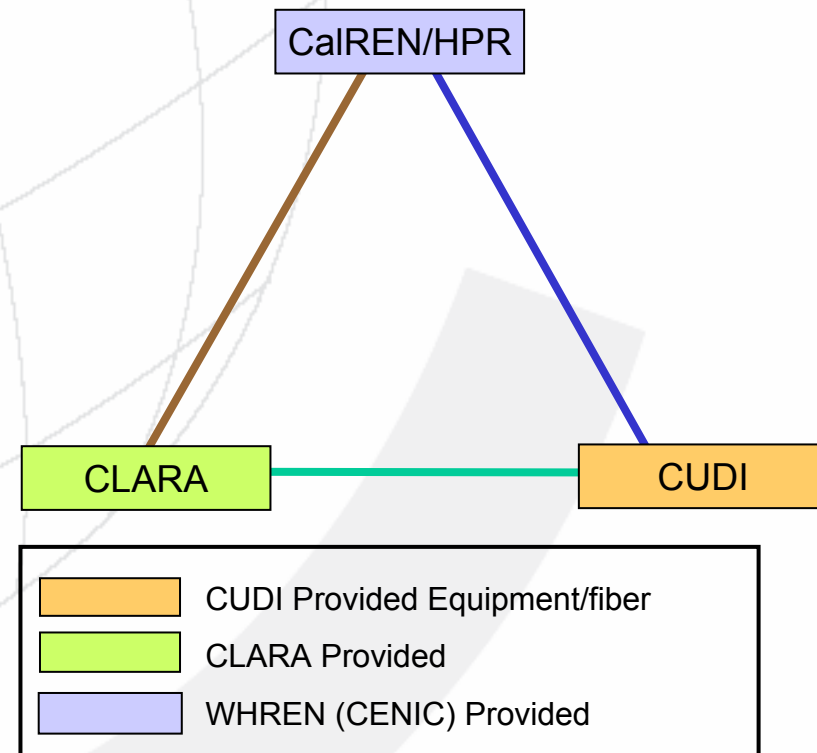


Tijuana-San Diego RedCLARA-CENIC Optical Connection

Physical Diagram



Logical Diagram





Oportunities

- Large infrastructure projects:
 - Power lines interconnection accross borders
 - Gas pipes in deployment
 - New roads
- IADB Promoted IIRSA Initiative (Integration of Regional Infrastructure accross South America)
- Agreements have been reached in Brasil
- Argentina-Chile fiber is currently being negotiated by RETINA-REUNA-CLARA
- Dark fiber is an oportunity to strengthen the RedCLARA backbone
- Regulatory issues will be hard to solve in some countries