International Committee for Future Accelerators (ICFA)
Standing Committee on Inter-Regional Connectivity (SCIC)
Chairperson: Professor Harvey Newman, Caltech

ICFA Digital Divide Update on US-Latin American Networking: CHEPREO, WHREN and LILA

Prepared by Heidi Alvarez heidi@fiu.edu; Julio Ibarra julio@fiu.edu;

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Introduction

Since our last update, we would like to bring the committee up to date on activities between the US and Brazil under the auspices of the Center for High Energy Physics Research and Educational Outreach (CHEPREO[1]), including the link between Miami and Sao Paulo, the Sao Paulo cluster, the outlook map for the Brazilian GIGA project. Additionally, we will report on (1) developing synergies between CHEPREO and the UltraLight program; (2) a network monitoring research grant from CISCO; (3) a proposal for a Western Hemisphere Research and Education Networking (WHREN) governance structure and Links Interconnecting Latin America (LILA), in response to the National Science Foundation International Research Network Connections (IRNC) program; and (4) a grant from the National Science Foundation to conduct a 1-week Pan-American Advanced Studies Institute (PASI) on Grid Computing and Advanced Networking Technologies for e-Science High-Energy Physics and Astronomy.

CHEPREO Cyberinfrastructure

CHEPREO cyberinfrastructure improvements between the US and Brazil include the purchase of two Cisco ONS 15454 transparent optical muxes for Miami and Sao Paolo. This active equipment will support an STM-4 (622 Mbps) circuit[2] between Miami and Sao Paulo. We will operate Layer 2/3 Gig-E ports and WAN-PHY functionality in support of the Grid3 cluster in Sao Paulo. The circuit is being provisioned to Sao Paolo, and not to Rio de Janeiro as originally proposed. This change is the result of funding coming from the Academic Network of Sao Paulo (ANSP), a program funded through FAPESP, the state's science foundation. Additionally, Sao Paolo has emerged as the aggregation and international exchange point for the CLARA backbone, as a result of a project between Latin American countries in response to the European Commission's @LIS call for proposals[3] issued by EuropeAid for the implementation of demonstration projects in the field of the Information Society. The significance of STM-16 ports on the hardware and an agreement with the circuit vendor to burst up to STM-16 will allow the HEP collaboration to participate in special events, such as SC2004 at world-class networking speeds for the first time. We are also working with ANSP to provision an STM-1 (155M) channel for commercial Internet usage from Sao Paolo to U.S. The remaining available capacity (467M) is allocated for research and experimental traffic. Mechanisms will be deployed to dedicate bandwidth to experimental traffic. Below is a map illustrating this new link topology.

Clusters under the management of Alberto Santoro of UERJ in Rio de Janeiro and Sergio Novaes UNESP in Sao Paulo will be interconnected using Brazil's GIGA project facilities-based optical infrastructure. The GIGA project provides a network research testbed for optical and IP network development. It is a collaboration between RNP (Brazilian NREN), CPqD (telco industry R&D center in Sao Paulo), and the R&D community in industry and universities. In Brazil, an implementation of national and

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[1] http://www.chepreo.org

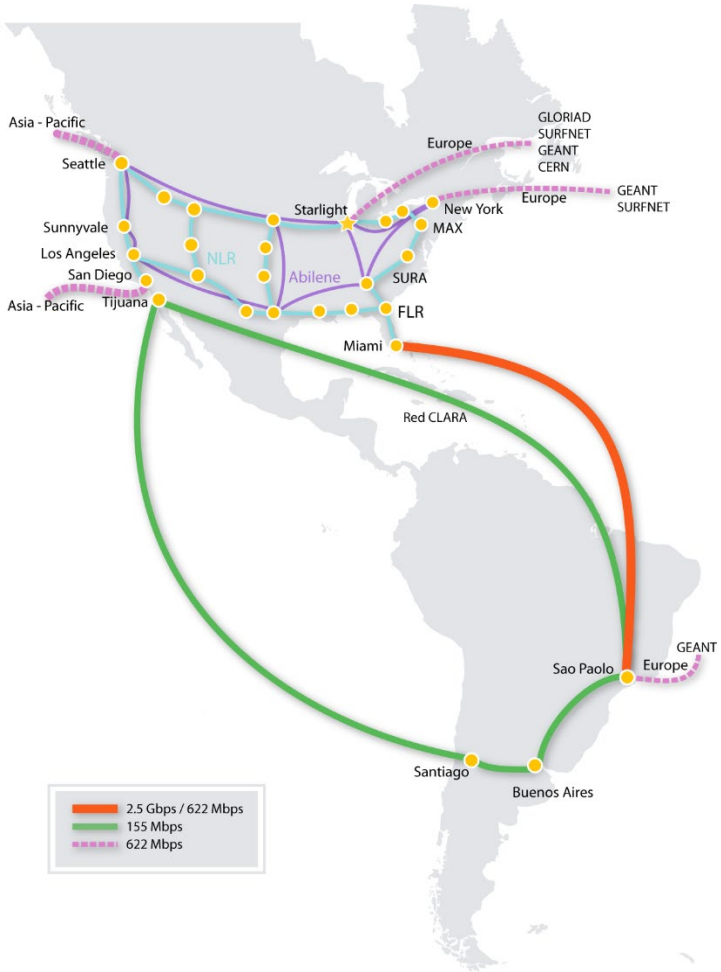
[2] An important characteristic to report is that the circuit is being provisioned on STM-16 (2.5 Gbps) ports. Terms have been negotiated with the carrier to allow bursting above the STM-4 circuit limit. The estimated ready-for-service timeframe is mid to late August.

[3] http://europa.eu.int/comm/europeaid/projects/alis/avis_en.pdf

regional Clusters (Tiers) is underway. The São Paulo Regional Analysis Center implementation is being carried out in 3 phases. In 3 years there will be 80 nodes[4]. The UERJ Regional Tier2 Center cluster in Rio de Janeiro will consist of 250 nodes, initially, increasing to 2,000 nodes.

CHEPREO and UltraLight Synergies

The CHEPREO inter-regional link between North and South America will interconnect with the UltraLight through Florida LamdbaRail[5] (FLR) and National Lambda Rail[6] (NLR), synergizing the research, education and outreach goals of both programs. CHEPREO will extend the UltraLight community to South America, likewise, UltraLight will enable South America and FIU to fully collaborate with UltraLight partner sites. As the lead UltraLight partner for Education and Outreach, FIU will work with UltraLight partners on programs to attract undergraduates to physics and math, and to inject new important elements of information technology into core graduate science domains.



[4] Dual Xeon 2.4 GHz / 1 GB with Gigabit Switches / Interface

[5] http://www.flrnet.org/

[6] http://www.nlr.net/

Network Monitoring Research Grant from Cisco Systems

With support from Cisco Systems, FIU and Caltech are developing an integrated network monitoring system for CHEPREO project. MonALISA[7] will be used as an integrating framework for Cisco NetFlow data streams, along with data streams from NLANR PMA and AMP systems, and SNMP-based services such as MRTG and CRICKET. To present a comprehensive view of the networking activity within the CHEPREO community, we will develop an interface between MonALISA and Cisco NetFLOW, and between MonaLISA and NLANR PMA/AMP modules. Our effort of integrating powerful network and grid monitoring tools will not only facilitate the efficient network planning and operation within the CHEPREO, but also benefit UltraLight and the networking community at large. In particular, through MonALISA, it allows Cisco NetFlow technology to be extended to the GRID community.

Western Hemisphere Research and Education Network (WHREN) and Links Interconnecting Latin America (LILA) Proposal

In collaboration with CENIC, FIU submitted a proposal in response to the NSF's CISE-International Research Network Connections (IRNC) program for funding to create an all encompassing network for the western hemisphere (WHREN). The network would interconnect established international peering exchanges in North America (Miami, Los Angeles, Seattle, Chicago and New York) with emerging international peering exchanges in Latin America (Sao Paulo, Santiago and Tijuana), resulting in a high-availability production and experimental research network for the Americas. The WHREN-LILA proposal increases the Miami-Sao Paulo link to 1.2Gbps, and adds three links: Sao Paulo, Brazil to Santiago, Chile (155Mbps); Santiago, Chile to Tijuana, Mexico (310Mbps); Tijuana, Mexico to San Diego, CA (dark fiber). Over 5-year proposal period, each link would evolve to 2.5Gbps.

Pan-American Advanced Studies Institute (PASI) on Grid Computing and Advanced Networking Technologies for e-Science High-Energy Physics and Astronomy

The Pan-American Advanced Studies Institute (PASI) programs are short courses that aim to disseminate advanced scientific and engineering knowledge, and stimulate training and cooperation among researchers of the Americas in the basic sciences and engineering fields. With NSF support and collaboration from the HEP and astronomy communities, FIU is organizing a PASI on Grid Computing and Advanced Networking Technologies for e-Science High-Energy Physics and Astronomy. This PASI will bring together students and lecturers from HEP and astronomy communities, and Grid computing and research network researchers-practitioners for a 1-week series of short courses about the use of computational grids and research networks for e-Science and their application in the HEP and astronomy domains. The Grid Computing and Advanced Networking Technologies for e-Science High-Energy Physics and Astronomy PASI will be held in Mendoza, Argentina, with an anticipated timeframe of March, 2005.

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[7] MonALISA is a distributed monitoring service system based on JINI/JAVA and WSDL/SOAP, http://monalisa.cacr.caltech.edu/