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Corporate-University Collaboration Recipe for Success

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International Connectivity Issues

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Hope, Knowledge, and Opportunity









<u>The AMPATH Project</u>

- AMPATH is a project led by FIU, in collaboration with Global Crossing (GC), to interconnect the R&E networks in South and Central America, the Caribbean and Mexico to US and non-US R&E networks via Internet2's Abilene network.
- GC's terrestrial and submarine opticalfiber networks (SAC, PAC and MAC) are used to build the AMPATH network.



The AMPATH Project

- GC has donated up to 10 DS3s for the AMPATH project representing a \$25M donation over three years.
- Cisco donated a GSR 12012 router valued at \$390,400.
- Lucent donated a CBX-500 ATM switch listing for \$523,000.
- Global NOC at Indiana University will provide NOC Services.
- FIU will operate the AMPATH POP and offer costeffective solutions for bandwidth and operational services.
- FIU offers its commitment, leadership and expertise to the success of the project.

AMPATH Project Goals

- To enable participating countries to contribute to the research and development of applications for the advancement of Internet technologies.
- To extend the Internet2 research and education community for highperformance networking to South and Central America, the Caribbean and Mexico.



Global Crossing

- GC is a world-class telecommunications service provider and a carrier's carrier.
- GC is building and offering services over the world's first global fiberoptic network with over 101,000 route miles, serving five continents, 27 countries and more than 200 major cities.

AMPATH Service Area



- Argentina
- Brazil
- Chile
- Colombia
- Costa Rica ?
- Mexico
- Panama
- Peru
- Puerto Rico ?
- US Virgin Islands
- Venezuela

SAC, with MAC and PAC Fiber Configuration



South American Crossing Cable System

- Total system length of SAC is 18,000 km
 - 16,000 km of submarine cable
 - 2,000 km terrestrial link across the Andes connecting Argentina with Chile
- Self-healing SDH ring architecture
- Segments include 4 undersea fiber
- Each DWDM channel operates at 10 Gbps of capacity (STM-64)
- Each fiber pair will ultimately carry 32 STM-64 wavelengths, or 320 Gbps of capacity, over 4-fiber pairs for a system total of 1.28 Tbps of capacity.

Service Availability of Global Crossing's Network

- Miami, St. Croix, & Brookhaven, NY Available
- Miami Terrestrial Ring Available
- Panama Available
- Mexico Available
- Argentina Dec. 2000
- Brazil Dec. 2000

- Venezuela Jan. 2001
- Chile Eastern Route
 Dec. 2000
- Chile Western Route Apr. 2001
- Peru Apr. 2001
- Colombia TBD
- Grover Beach, CA Dec. 2000





University Network in Country X

- Using an IP router, a university connects to the National or Regional Network Provider using a high-performance connection (DS3 or OC3) using ATM or SDH.
- Recommended IP router would be a Cisco 72xx or 75xx router with appropriate DS3 or OC3 interface.

National or Regional Research Network Provider

- Offers ATM or SDH connections to universities and research organizations.
- Aggregates traffic from universities and research organizations.
- Connects to local Global Crossing POP where AMPATH service is available.
- Offers ATM or SDH connectivity to AMPATH.

AMPATH Network

✓ Flexible and Scaleable ✓ SDH Infrastructure: Avoids ATM overhead Benefits Participant NRNs not using ATM \checkmark ATM infrastructure: ➢PVCs, PVPs Direct peering between Participants

Participation in the AMPATH Project

- What does each Participating country receive?
- Each participating country receives a DS3 of capacity to connect its R&E networks to AMPATH.
- Connectivity to US and non-US R&E networks via Abilene or STAR TAP.

Participant's Responsibilities

- Each participating country is responsible for connecting its R&E networks to a designated Global Crossing POP:
 - Provisioning Local Loop and backhaul (if necessary).
 - ✓ Providing required hardware.
- Signing MoUs with FIU and Internet2.
- Budgeting a cost-sharing component to help pay for bandwidth to Abilene and AMPATH's operational costs. Please contact the AMPATH Project Director for details.

AMPATH's Responsibilities

- Coordinate and assist participants in establishing connectivity to AMPATH.
- Provide 24x7x365 NOC services (Indiana University NOC).
- Provide leadership and coordination to ensure Participants can reach desired US and non-US R&E networks.

Benefits of AMPATH

- Provides high-speed connectivity to Internet2, US and non-US R&E networks at a very low cost:
 - DS3s to Miami are free (most expensive and challenging part).
 - Circuits to transit networks, engineering and operations are costshared among all participants.
- Funding Model includes cost-sharing and aggressive pursuit of grants.



• NAP of the Americas



- Gateway to Latin America and the Caribbean
- InternetCoast strong and growing technology presence
- Distance Learning Initiatives from Research Universities and community colleges offered in English, Spanish and Portuguese
- Positioned to support research collaborations between scientists in the AMPATH Service Area and the rest of the world.

Accomplishments and Project

Dec 1999	NLANR Meeting @ FIU, Miami
Feb 2000	FIU presents proposal to GC & asks for a donation of available bandwidth
Mar 8, 2000	FIU hosted an International Meeting to introduce AMPATH to the Service Area
May 2000	FIU & GC sign an MOU formalizing the donation to the AMPATH project
Jul 2000	FIU & AURA submit a collaborative proposal to NSF to connect Gemini South to Internet2 via AMPATH
Sep - Dec 2000	Sign MOUs with Participants from the Service Area
Nov 2000	Complete AMPATH POP
Dec 2000	Connect Panama, USVI, Mexico, Brazil, Argentina, Venezuela and Puerto Rico
Dec 2000	Provided that GC fiber crosses the Andes in time, test with 20 Mbps from Gemini South to Miami; Connect Chile
Mar 2001	Go Live with dedicated DS-3 bandwidth for Gemini South to Internet2
Apr 2001	Connect Peru; TBD - Colombia, Costa Rica

<u>More Information</u> ...

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Thank You !



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