Cyberinfrastructure Update

- Highlights and Introductions – Heidi Alvarez, FIU
  - ✓Grid installation update for FIU
  - ✓FIU CSC participation for Chi Zhang
  - ✓Internships
- US Brazil Networking – Julio Ibarra, FIU
- International Update with Brazil – Sergio Novaes, UNESP
- Network Monitoring – Xun Su, Caltech
- Grid Coordination and Educational Outreach – Paul Avery, UF

Cyber Highlights

- 22 Node Cluster at the NAP
- Internship opportunities at the NAP are posted
- Experimental VC system for the PLC on order
- Chi Zhang, Asst. Professor of Computer Science at FIU joins CHEPREO
- 2.5G (STM-16) circuit being provisioned between Miami and Sao Paolo
- Cisco ONS 15454s, one for Miami and one for Sao Paolo, being ordered

Year 2 Cyber Milestones

Y2.1- Tier 3 Data Center in NAP
Y2.2- Hire IT Support Person Phased over 3 years
Y2.3- Purchase and install active equipment
Y2.4- Provision circuit thru FLR to NLR Y2
Y2.5- Bid, Award and Provision circuit to Rio Y1 & Y4 15%
Y2.6- Establish/Cont. Network Engineering Internships) (NAP Funded)

Grid Installation at FIU

- 17 new nodes being added to the first 5 Grid3 Cluster
  - Gigabit Ethernet (GigE) fabric interconnecting worker nodes and front end node
  - Delivering GigE connectivity to AMPATH's I2 network
  - Installed Rocks 3.0.0 Cluster software
- 22 node Cluster is located at the NAP of the Americas
- FIU officially accepted as an International Virtual Data Grid Laboratory (iVDGL) member
  - obtained security certificates as a Grid3 trusted user/administrator [Ernesto Rubi, CHEPREO IT Support]

IT Support for CHEPREO

- CCGrid2004 in Chicago by CHEPREO team members
  - Xun Su (Caltech) and Ernesto Rubi (FIU) attended
  - Educational Outreach Workshop provided templates for:
    - Collaboration between higher ed. Institutions
    - Grid Tutorial initiatives
    - integrating grid concepts and practical exercises into CS curriculum
- Grid3 participation includes weekly operational meetings
  - CHEPREO provided testbed for Virtual Data Tools (VDT release 1.1.14)
  - Grid3v2.1 released and installed May, 2004
- CHEPREO team scheduled to visit Sao Paulo to assist with Grid3 installation to take place this summer

Network Monitoring Research & Grid Teaching at FIU

Chi Zhang, Assistant Professor

FIU School of Computer Science

NSF AWARD 0312038

Networking Research Supplement

- Improving TCP Performance over High-Speed Networks
- Implementing Intelligent Network Troubleshooter (INT) based on MonALISA
- Introducing Grid computing into a graduate course at FIU
- One graduate student will be recruited and provided with a tuition waiver
  - in collaboration with the CHEPREO and the AMPATH teams.

Improving TCP Performance over High-Speed Networks (1)

- The AIMD (Additive Increase and Multiplicative Decrease) transmission control of TCP cannot fully utilize the available bandwidth over high-speed networks.
- AIMD oscillations degrade bandwidth utilization at the bottom of the AIMD saw-tooth.
  - addressed by FAST TCP
- Packet loss can be caused by congestion as well as random bit errors.
  - Multiplicative decreases are triggered unduly with packet losses caused by bit errors.
  - we have developed TCP-Real, which employs mechanisms that can distinguish error natures and improve TCP performance over lossy networks

Improving TCP Performance over High-Speed Networks (2)

- Participate in the testing of transport protocols over high-speed networks, in collaboration with Xun Su and Sylvain Ravot at Caltech
- Make various traffic measurements to build some predictive traffic models.
- The error-classification mechanism of TCP-Real can be implemented in the transport layer for high-performance computing.
  - Port TCP Real source code to Linux

Implementing Intelligent Network Troubleshooter based on MonALISA (1)

- The MonALISA framework provides a distributed system of monitoring services
- Applications will be developed to utilize the information provided by MonALISA and justify its value.
- Intelligent Network Troubleshooter (INT).
  - In the current network, a user has to use primitive tools to identify the problem of network connectivity
  - not all users are familiar with network protocols and the usage of various tools.
  - A graphic and knowledge-based INT can help users identify the possible problems of connectivity and performance.

Implementing Intelligent Network Troubleshooter based on MonALISA (2)

- Hide the usage of primitive diagnosis tools.
  - make a comprehensive analysis.
  - The results of the analysis will be will be associated with a confidence level.
- Usability is the key concern of INT
- Information collected through primitive tools is often imprecise. The client-side INT should discover and utilize monitoring services provided by MonALISA.

Introducing Grid Computing into a Graduate Course at FIU

- A Grid tutorial emphasizing grid services is developed at University of Florida as part of the CHEPREO project.
- The tutorial will be used in a graduate course “Advanced Operating System” (mainly about distributed computing) at FIU
  - will be taught by Chi Zhang in Spring 2005.
  - interesting course projects related to Grid computing will be developed.

Project Milestones over a 12 Month Period

- Led by Chi Zhang, Assistant Professor of Computer Science at FIU
  - one graduate student will be recruited to assist the research and teaching.
  - in collaboration with the AMPATH and the CHEPREO teams.
- Research
  - Month 1 – 3: Port TCP Real source code from ns2 to Linux kernel.
  - Month 4 – 12: Design and conduct tests of high-performance transport protocols (including TCP Real)
  - Month 8 - 12: Develop a preliminary version of INT.
- Teaching
  - The Grid tutorial will be used in the FIU graduate course COP6611 “Advanced Operating System” in spring 2005.

INTERNSHIP AVAILABLE

STUDENTS!!!

Looking for Networking and Telecommunications Experience?

Serious Students Wanted For Position:

Project Assistant – Network Migration

Intern, Non-Exempt

Must be able to work flexible hours and have excellent communication skills.

Looking for students majoring in Engineering, Computer Science, Information Technology, Education, and any of the Physical Sciences

Position Summary:

This position will assist with a technical project. The project will require the intern to contact present clients and review advantages to change network. Once the customer has agreed to change network platforms, the intern will schedule the switch during non-peak operational hours. The intern may also be assigned to work on the actual technical cross over.

The position requires excellent communication skills.

Intern must be able to work flexible hours.

Must be a current university student with 1-2 years technical experience.

Please contact Ikam Acosta, CIARA Activities Coordinator, for additional information.
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Networking

Julio Ibarra

Networking Milestones

- Circuit connection between Miami and Sao Paulo
  - Review the initial connection plan to connect UERJ in Rio de Janeiro
  - Evolved into a connection between Miami and Sao Paulo
  - Dependant on the cost-sharing agreement of 2003
    - 85% Brazil + 15% US- NSF CHEPREO Funds

Funding Update

- Funding available will afford the circuit between Miami and Sao Paulo
- RNP is collaborating to provide the required services between Sao Paulo and Rio de Janeiro
- [Santiago/ Julio provide network diagram]
- Last mile link from the RNP Rio POP to UERJ still under negotiation

Brazil Update

Sergio Novaes

Network Monitoring

Xun Su

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Grid Coordination & Educational Outreach

Paul Avery

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