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A. Summary of Technical Activities

A.1. Euro-Link Network Status and Institutions

A.1.a. CERN
On January 31, CERN's Olivier Martin reported that the new 155Mbps circuit to STAR TAP is operational. For now, it will only be used to peer with Abilene. The old 45Mbps circuit will be retained a few more weeks to support ongoing experiments. Euro-Link funds will cover local loop charges for one of the circuits and CERN will pay for the other. KPNQwest is handling the Geneva-to-Chicago transatlantic circuit.

Due to time constraints and coordination issues, Caltech's Harvey Newman withdrew his suggestion of a global ThinkQuest event at SC 2001.

A.1.b. IUCC
January 3-4. Euro-link Peering with IUCC was unavailable 18 hours and 24 minutes. IUCC technicians reported that AADS techs restored all VC's to re-establish connectivity.

A.1.c.   NORDUnet

NORDUnet's Peter Villemoes reported NORDUnet issued an Invitation to Tender for Network Connections to the USA. [http://www.nordu.net/tender/USA2001] This network connection, to take effect July 1, 2001, would be for 467-622Mbps to the Abilene PoP in NYC and 155Mbps to STAR TAP in Chicago, out of a total transatlantic capacity of 2.5Gbps. NORDUnet is also considering bringing all its research traffic to STAR TAP in Chicago to connect to US and international research networks.

A.1.d.   Renater2

No new information to report.

A.1.e.   SURFnet

SURFnet is reviewing responses to its Call for Proposal for a transatlantic lambda, which they hope to have operational July 2001. In parallel, SURFnet is starting to build a POP at Northwestern University, which will house the Optical STAR TAP (StarLight) facility. The StarLight facility will connect to the Ameritech NAP (and legacy STAR TAP site) via 622Mbps or 1Gb; details are currently being worked out. Kees Neggers plans to visit Chicago on March 5-6.

Jason Leigh, in network performance studies with SARA in The Netherlands, is getting between 32-60 Mbps throughput doing TCP experiments over SURFnet's 155Mbps link; the difference in bandwidth seems dependent on the experiment being run. In January, EVL student Eric He began Reliable Blast UDP (RUDP) experiments, and is currently working to improve his algorithms.

A.2.   Engineering Services

A.2.a.   International Transit Network (ITN)

DANTE has upgraded its NY connection to Abilene from 100Mbps to 622Mbps (OC-12).

By March, the STAR TAP "ABOUT" web page will be updated with ITN service information/pointers.

A.2.b.   STAR TAP Router Peering

In mid-January, the Juniper M5 Router arrived, but with the wrong interfaces. John Jamison is working to correct the problem.

The Saõ Paulo/Brazil Foundation for the Advancement of Research (FAPESP) 155 Mbps link to Miami has been operational since December 2000. Connection to Chicago is pending resolution of Cable & Wireless administrative issues. We have been in touch with FAPESP about issuing a joint press release once the connection to STAR TAP is in place.

A current list of STAR TAP peers appears at [http://www.startap.net/ENGINEERING/].

A.2.c.   6TAP

In December, SURFnet's Wim Biemolt reported SURFnet recently connected to 6TAP, joining Euro-Link partners CERN and RENATER. See [http://www.6tap.net/]

A.2.d.   STAR TAP NLANR Web Cache

The new STAR TAP web cache machine has been installed at AADS and is fully operational.

A.2.e.   DiffServ

DiffServ experiments between EVL and Argonne National Laboratory have been completed. One major finding is that while DiffServ is able to provide bandwidth guarantees to applications, it is unable to provide latency recovery. A draft report is available at [http://www.evl.uic.edu/cavern/papers/DiffServ12_12_2K.pdf] A paper is being drafted for submission to a journal.

See also http://www.evl.uic.edu/cavern/EMERGE/ and http://www.icair.org/inet2000

A.3. NOC Services

The Global Research NOC is preparing to issue a regular, online newsletter in the next few months.

The NOC continues to seek permission from STAR TAP peers to gather host router network statistics for a planned STAR TAP animated traffic map. No accurate or useful statistics beyond MRTG graphs can be gathered for Euro-Link without closer cooperation and coordination among Euro-Link NRN members and the NOC.

John Hicks is looking into adapting MIRnet-type traffic graphs for the Euro-Link and TransPAC projects.

See [http://noc.startap.net] [http://noc.euro-link.org] [http://globalnoc.iu.edu/].

B. Euro-Link Performance Analysis Tools

B.1.a. Network QoS of Real-Time Multimedia

Design is underway to combine CAVERNsoft's network monitoring and EVL's QoSIMoTo (QoS Internet Monitoring Tool) [www.evl.uic.edu/cavern/qosimoto] visualization, to form an integrated problem-solving collaboratory (collaborative laboratory) that supports network management, monitoring, visualization and active testing. The goal is to create the equivalent of the "Microsoft Office" suite for applications developers, network students and researchers to collectively solve network problems.

B.1.b. Network Monitoring

EVL student Brenda Lopez is enhancing the iGrid 2000 STAR TAP network map, (which showed bandwidth utilization of networks participating in iGrid), to illustrate all country-to-country source and destination of packets arriving at STAR TAP/Euro-Link. She is also looking into developing snapshots of network traffic spikes to STAR TAP/Euro-Link, rather than just previous history. See [http://www.evl.uic.edu/cavern/startap]

EVL student Naveen Krishnaprasad started development of the unified Collaboratory for Analyzing Networks (uCAN) software, which allows several remote network researchers and application developers to collaboratively execute an application and monitor network utilization, as well as other application-specific parameters.

uCAN will enable users to correlate, in real time, how the actions taken by an application directly impact the underlying networks, and vice versa. A network researcher could also alter router configurations, such as a router's queuing algorithm, to determine how it might improve application throughput. Estimated completion of a usable version is end of Spring 2001. The prototype currently allows users to initiate bandwidth measurement experiments and perform SNMP queries of routers.

B.1.c. Low Latency State Transmission Over Long Distance Networks

EVL student Chris Scharver is preparing a SARASim test between EVL and SARA. SARASim, developed by SARA, is a Python/CAVELib program that allows users to build script-based VR applications. It uses CAVERNsoft for networking.

C. Accomplishments

C.1. Meetings

January 28-31, 2001. The APAN/TransPAC/NLANR/Internet2 Joint Techs Workshop was held in Hawaii. Linda Winkler, representing STAR TAP and Euro-Link, attended. Steve Peck and the Global NOC held a BOF session on NOC services and interaction between engineering groups. Participants included the Global NOC, APAN, and CA*net3. Special emphasis was placed on sessions relating to Asian networks.

January 21-23, 2001. Joint Workshop on Virtual Intelligent Environments and technology, Universidad Veracruzana in Veracruz, Mexico. Tom DeFanti and Maxine Brown attended this NCSA/Alliance Education, Outreach and Training (EOT) workshop. DeFanti gave a presentation titled, "Virtual Reality over Gigabit Networks." *[Note: While not Euro-Link specific, we continue our efforts to get Central/South America connected to STAR TAP to provide our Euro-Link partners with the best access to researchers worldwide.]*

January 10-12, 2001. Tom DeFanti and Maxine Brown visited Florida International University, where DeFanti gave two presentations, "StarLight: Optical Switching for the Global Grid" and "Virtual Reality over Gigabit Networks," and Brown gave one presentation, "STAR TAP Overview and Applications."

January 8-9, 2001. Tom DeFanti participated in the Extreme Networking Workshop on research and technology needs in High Performance Networks, sponsored by San Diego Supercomputing Center, San Diego, CA.

C.2. Publications

Jason Leigh, Greg Dawe, Jonas Talandis, Eric He, Shalini Venkataraman, Jinghua Ge, Dan Sandin, Thomas A. DeFanti, "AGAVE: Access Grid Augmented Virtual Environment," Proceedings of the Access Grid (AG) Technical Retreat, Argonne National Laboratory, Argonne, IL, January 30-31, 2001.

A. Johnson, J. Leigh, "Tele-Immersive Collaboration in the CAVE Research Network," chapter to appear in the: Collaborative Virtual Environments: Digital Places and Spaces for Interaction, edited by Churchill, Snowdon and Munro, to be published in January 2001, pp.225-243.

C.3. Software Releases

In January, CAVERNsoft was deployed at [openchannelsoftware.org]. On December 22, the latest version of CAVERNsoft G2, version 1.2.1, was released [http://www.evl.uic.edu/cavern/cavernG2/].

QoSIMoTo (QoS Internet Monitoring Tool) [www.evl.uic.edu/cavern/qosimoto] is available on the web for IRIX and Linux.

D. Collaboration Activities

- Working with SARA in The Netherlands to do network performance studies over long, fat networks using various transmission techniques (TCP, UDP, FEC, RUDP).
- Talking with Harvey Newman at Caltech and Olivier Martin at CERN about DiffServ tests.