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A. Summary of Technical Activities

A.1. Euro-Link Network Status and Institutions

A.1.a. CERN

Beginning August 6, CERN connectivity to STAR TAP was interrupted for two days due to an erroneously provisioned Ameritech ATM switch card. A card reboot fixed the problem. The problem affected performance to all the main North American academic networks, but did not affect commodity Internet connectivity via the transatlantic line. On August 16, CERN upgraded to a faster RSP on their backbone router.

CERN plans to upgrade its transatlantic 45 Mbps circuit to OC3/STM-1 around the end of November. CERN plans to upgrade its transatlantic 45Mb circuit to OC3/STM-1, from Switzerland to the Qwest NBC building in Chicago, at the end of November.

CERN peering with the STAR TAP EMERGE (DiffServ) Router enabled CERN and iCAIR to conduct STAR TAP Router-enabled DiffServ QoS tests during iGrid 2000. See section A.2.e. Also, Jason Leigh of EVL started discussions with Harvey Newman at Caltech and Olivier Martin at CERN about using DiffServ to get better, more consistent performance on their link between Caltech and CERN. He is conferring with Joe Mambretti now to better understand their CERN/DiffServ tests.

A.1.b. IUCC

EVL's Jason Leigh, Greg Dawe and Michael Lewis are finalizing details to attend Telecom 2000, November 6-9 in Tel Aviv, to showcase tele-immersive applications. Possible real-time collaboration between Israel and the Alliance booth at SC00 in Dallas, Texas, is being explored. Telecom 2000 is Israel's largest annual telecommunications conference. EVL was invited to participate at the request of Israel's Ministry of Industry and Trade's Jo van Zwaren, who wants universities in the IUCC network to acquire VR equipment for scientific collaborative research.

STAR TAP is multicast peering with IUCC.

A.1.c. NORDUnet

Tom DeFanti and Maxine Brown, as well as Mark Ellisman of UCSD, Bill St. Arnaud of CANARIE and Kees Neggers of SURFnet, will be speakers at NORDUnet 2000, to be held in Helsinki, Finland, September 28-30 <www.csc.fi/nordunet2000/>.

A.1.d. RENATER2

Renater2 has a 45Mb DS-3 into STAR TAP, and has ordered an upgrade to 155Mb OC-3.

A.1.e. SURFnet

On August 7, SURFnet upgraded its New York to STAR TAP connection to 155 Mbps, causing a brief outage while Teleglobe placed an ATM PA-A3 adapter in BR1.Newyork.

A.1.f. DANTE

No updates to report at this time.

A.1.g. BELNET

No updates to report at this time.

A.2. Engineering Services

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

STAR TAP ITN is a new service currently being developed by STAR TAP, CANARIE and Internet2 to facilitate connectivity among international National Research Networks (NRNs) that now connect to one of the coasts of North America. A meeting among the three groups was held in August 2000 to discuss relevant issues. Report pending.

A.2.b. STAR TAP Router Peering

CERNET peering expected in early September. Peering information is at [http://www.startap.net/ENGINEERING/].

A.2.c. 6TAP

Due to limited rack space, v4 addressing/global routing, and out-of-band management issues at the 6TAP, Marc Blanchet will move 6TAP pc servers to the CANARIE premises. He will replace them with the route servers after testing is complete.

A.2.d. STAR TAP NLANR Web Cache

The STAR TAP NLANR web cache has been experiencing some instability and is being repaired. Its serial port will also be enabled for out-of-band access.

A.2.e. DiffServ

Joe Mambretti reports: In July at INET2000 in Yokohama, Japan, one of the iGrid 2000 demonstrations, the Global Internet Digital Video Network (GiDVN), showcased DiffServ-enabled media streaming between iCAIR

(International Center for Advanced Internet Research) in Chicago and CERN in Switzerland, using the STAR TAP DiffServ EMERGE Router and Euro-Link. (iCAIR is part of the EMERGE activity.)

iCAIR and CERN, with support from STAR TAP and the Asia Pacific Advanced Network (APAN), established a testbed that linked CERN and iCAIR to Yokohama. A variety of experiments were conducted, involving mgen UDP flows, with BE baseline streams and contending traffic streams, and with measurements for throughput, delay and jitter. Because of the limited number of routers available, the full EMERGE model was not implemented. Instead, the CERN iGrid link was established as a dedicated broadband 5 Mbps PVC. A constant UDP flow was established with a Poisson distribution of 2.4 Mbps, which was preserved because of the a) ingress control b) link control and c) congestion control at the APAN-JP NOC and the network control points established for iGrid. The delay results showed a desirable consistency. On a scale of 100ms, equal service was delivered to every part of the flow. Jitter variations (closely clustered average jitter of 1.65 ms) resulted from variations in flow source. The success of these tests has led to plans for a more complex series of experiments. (Another set of DiffServ-based experiments for the GiDVN was conducted by the APAN group in Korea in conjunction with collaborators at Korean universities.)

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

A.3. NOC Services

On the last day of iGrid 2000 demonstrations, Litton CAMVision systems were used to send a broadcast-quality, edited half-hour program from the iGrid booth to University of Washington, then bridged to community-access educational cable TV in the Seattle area. The NOC plans to post it online by Sept 29.
http://www.indiana.edu/~video/igrid2000/home.html#litton

The NOC is still seeking permission from STAR TAP peers to gather host router network statistics for a planned STAR TAP animated traffic map.

A.4. Euro-Link Performance Analysis Tools

A.4.a. Network QoS of Real-Time Multimedia

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

Jason Leigh has started discussions with Harvey Newman at Caltech and Olivier Martin at CERN about using DiffServ to get better, more consistent performance on their link between Caltech and CERN. He is conferring with Joe Mambretti now to better understand their CERN/DiffServ tests.

A.4.b. Network Monitoring

CAVERNsoft G2 is available on the web; see [http://www.evl.uic.edu/cavern/cavernG2/].

A.4.c. Low Latency State Transmission Over Long Distance Networks

No updates to report at this time.

B. Accomplishments

B.1. Euro-Link Applications

Active US/European collaborations utilizing high-performance research networks have been documented for CERN, Renater2, SURFnet and NORDUnet. IUCC applications to appear soon.
http://www.euro-link.org/APPLICATIONS/

B.2. Meetings Attended

August 2, 2000. Networking people from STAR TAP, TransPAC, Internet2 and CANARIE met to discuss the issues and procedures for an International Transit Network (ITN). A document is being drafted for distribution.

B.3. Publications

Y. Zhou, T. Murata, T. DeFanti, "Modeling and Performance Analysis Using Extended Fuzz-Timing Petri Nets for Networked Virtual Environments," IEEE Transactions on Systems, Man and Cybernetics (SMC), to appear.

Y. Zhou, T. Murata, T. DeFanti, and H. Zhang, "Fuzzy-Timing Petri Net Modeling and Simulation of a Networked Virtual Environment – NICE," Institute of Electronics, Information and Communication Engineers (IEICE) Transactions in Japan (Special Section on Concurrent Systems Technology), to appear.

B.4. Software Releases

CAVERNsoft G2, version 1.1 [http://www.evl.uic.edu/cavern/cavernG2/].

QoSIMoTo (QoS Internet Monitoring Tool) [www.evl.uic.edu/cavern/qosimoto].

C. Collaboration Activities

- Working with SARA in The Netherlands to experiment with an EVL-designed packet-level Forward Error Correction scheme.
- Beginning discussions with Harvey Newman at Caltech and Olivier Martin at CERN on DiffServ tests.

D. Summary of Award Expenditures (August)

Spending is within budget.