National Science Foundation, Directorate for Computer Information Science and Engineering
Division of Advanced Networking Infrastructure & Research (ANIR)

NSF Cooperative Agreement No. ANI-9730202
March/April* 2000 Monthly Status Report

Submitted May 8, 2000

Tom DeFanti, Maxine Brown, Andy Johnson, Dan Sandin, Jason Leigh, Linda Winkler, Laura Wolf
Electronic Visualization Laboratory
University of Illinois at Chicago

Doug Pearson, Jim Williams, Stephen Peck
Indiana University

Table of Contents

A. Summary of Technical Activities

A.1. Euro-Link Network Status and Institutions

A.1.a. CERN

In August 1999, CERN connected to STAR TAP via an STM-1 connection from a Cable & Wireless (C&W) PoP in Chicago, where their 20 Mbps transatlantic ATM VP to CERN terminated. Following a call for tender won by KPNQwest in January 2000, CERN upgraded their transatlantic circuit to 45 Mbps (T3). KPNQwest was to connect CERN to Abilene at 60 Hudson Street in New York (CERN is an Internet2 member and a Primary Participant on Abilene), where CERN would then transit to other networks that peer with Abilene, including those peering at STAR TAP. However, the telco hotel at 60 Hudson Street has power capacity problems, so KPNQwest instead offered to temporarily terminate the Geneva-USA circuit at the Qwest PoP in Chicago. In March, CERN's Paolo Moroni started to relocate their equipment in Chicago and acquire a new circuit to STAR TAP. A brief connectivity loss to AS513 at the STAR TAP router occurred March 21 as the switch from the C&W PoP to the Qwest PoP

* The Euro-Link Annual Report and Program Plan was submitted April 1, in lieu of a March monthly report.

occurred. All peerings were restored March 25. Ameritech allowed CERN to keep the existing VP/VC (3/41) in the new configuration.

iCAIR/CERN DiffServ testbed experiments are in progress.

A.1.b. IUCC

The Israel IUCC network has been active since November in Israel; statistics reports are available at [http://www.machba.ac.il/I2/stats.html]. Israel is somewhat concerned that usage is low, but we have found this typical of newly connected networks. Israel is also starting to document their "Internet2" applications (not necessarily STAR TAP-related) at [http://www.machba.ac.il/I2/applications.html].

In February, Israel completed peering with NISN at STAR TAP. Also, they alerted the Abilene and vBNS NOCs that while they can spoof TCP window size over high-delay satellite links and get 20 Mbps TCP streams with no problem, they are noticing that the data flows are not symmetrical – they are sending information to STAR TAP via "Internet2" speeds, but receiving information over the commodity Internet. They asked the NOCs to check their routing tables. Since we have not heard back, we can only assume no news is good news.

In March, the Regional Center for NASA EOSDIS in Israel [http://www.nasa.proj.ac.il/], which does regional meteorological measurements, requested connectivity to NOAA sites in the USA via STAR TAP. Since NOAA doesn't have its own backbone to bring to STAR TAP, they are in the process of getting connected to one of the NGI nets or to Abilene. NOAA is planning to connect to the DC GigaPoP/NGIX at University of Maryland in the next few months. Once NOAA is connected, Israel's connectivity needs should become feasible.

A.1.c. NORDUnet

Peter Villemoes is in the process of designing NORDUnet's US upgrade, which must be operational January 1, 2001. He plans to terminate at a router in New York and connect to Abilene, where, if the "STAR TAP ITN" becomes a reality, Abilene will then provide transit to STAR TAP. If NORDUnet brings commercial and research traffic to New York, an OC-48 will be installed. If it peels off commercial traffic in Stockholm, then one or more OC-3s will carry research traffic to the USA. The call for tender will go out this summer.

A.1.d. RENATER2

Christian Michau of France's CNRS is developing a grid project, to include testbeds in various disciplines: HEP, climate, biology, etc. This project will be closely related to CERN's grid activities. Following a request to meet US collaborators, STAR TAP's Maxine Brown introduced Michau to Ian Foster. They are following up.

In April, France Telecom (FT) ordered an upgrade of its current DS-3 connection (to OC-3) to Ameritech's NAP in Chicago. Delivery of this link, expected at the end of March or beginning of April, was delayed. Upon investigation, STAR TAP and Ameritech determined that FT ordered its upgrade from an Ameritech-authorized distributor instead of Ameritech directly (they identified themselves as an ISP wanting a NAP connection), and that the provisioning of the circuit was incorrectly ordered. Ameritech says that the circuit will not be enabled before the first week of May. FT met with the distributor in mid-April to try to expedite the connection.

A.1.e. SURFnet

On April 26-27, SARA reported an extended service outage. STAR TAP peering with SURFnet has been reestablished. Engineers at SURFnet, Ameritech, and Teleglobe are continuing to investigate the cause, which is believed to have been a Teleglobe problem.

At the beginning of April, SURFnet began working with Teleglobe to upgrade its connection to STAR TAP. That upgrade should be completed within two months.

A.1.f. DANTE

On April 11, as the first instance of the "STAR TAP International Transit Network (ITN)," CA*net3 carried DANTE's Ten-155 pan-European research network traffic from New York to STAR TAP in Chicago. On April 13, this link temporarily shut down until DANTE provisioned more bandwidth for its connection to CA*net (currently 10 Mbps). This is now under consideration by DANTE management, Howard Davies and Dai Davies. Tom DeFanti and Bill St. Arnaud are following up. See Section B.1.

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. The ITN service will transit NRN traffic to various destinations within North America to optimize routes; full details are currently under discussion. The email alias "itn@startap.net" has been created to facilitate discussion among STAR TAP, CANARIE and Internet2 engineers.

A.2.b. STAR TAP Router Peering

The latest Peering Matrix information is posted at [http://www.startap.net/ENGINEERING/]

A.2.c. 6TAP

On March 24, Marc Blanchet of Viagénie Inc. reported the successful installation of the Cisco 7204VXR, Tunnel Server and Stats Server at Ameritech, as part of new services for the 6TAP[www.6tap.net]. Linda Winkler, René Hatem (CA*ne2), Vui Le (ESnet) and Régis Desmeules (Viagénie Inc.) participated in the two-day installation.

A.2.d. STAR TAP NLANR Web Cache

NAP.NET is providing gratis 1 Mbps ISP service to STAR TAP. Duane Wessels has integrated the cache into NLANR's Global Caching Hierarchy.

A.2.e. DiffServ

See [http://www.evl.uic.edu/cavern/EMERGE/]. The STAR TAP DiffServ router is now installed and can accept connections from STAR TAP participants. [See iCAIR/CERN collaboration (section A.1.a).]

A.2.f Renting Co-Location Space at Ameritech

Unable to lease two additional racks from Ameritech due to space constraints, we requested (and received) space from the UIC Computer Center. The 7507 DiffServ Router is installed at UIC.

A.3. NOC Services

On April 20, STAR TAP/Euro-Link engineers met at Indiana University to discuss the specific responsibilities of groups and personnel supporting STAR TAP and Euro-Link, the STAR TAP ITN, network traffic and monitoring tools, and the status of NOC services. The development of several new tools will be announced in May. Attendees included Linda Winkler, Jim Williams, Steve Wallace, Steve Peck and various Indiana University engineers, software developers, and NOC personnel. The group plans to reconvene in the coming months.

On April 24, the Euro-Link NOC web team announced the Euro-Link NOC web page is up [http://noc.euro-link.org]. More network tools, statistics, maps are being planned. Current active features include:

- An online Problem Reporting form to create a trouble ticket for the NOC
- An online Change Management submission form
- Status Monitoring
- BGP Session Monitoring

An "International Networks at Indiana University Weekly Report" has been created, and is distributed to NOC and engineering lists for TransPAC, STAR TAP and Euro-Link.

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] has been released on the web for IRIX and Linux. QoSIMoTo is a program to view, in real-time, latency, bandwidth and jitter of multiple flows in Netlogger format. The program runs in the CAVE, and on SGI desktop workstations and Linux PCs running in CAVE-simulator mode.

A.4.b. Network Monitoring

Netlogger-formatted network monitoring has been integrated into CAVERNsoft G2. This feature will appear in the next official release of the system.

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

We are working to identify the overhead imposed by our Forward Error Correction (FEC) codes, in order to improve the algorithm. We also identified a bottleneck in our local area network that was preventing high-throughput transfers between EVL and SARA in The Netherlands.

B. Accomplishments

B.1. DANTE

On April 11, as the first instance of STAR TAP's new ITN service, CANARIE's CA*net3 carried DANTE's TEN-155 pan-European research network traffic [www.dante.org] from New York to Chicago to exchange routes and traffic with other NRNs at the STAR TAP Router [www.startap.net/ENGINEERING/ROUTER.html]. This terminated April 13, due to congestion, and more bandwidth between DANTE and CA*net3 has been requested. (See A.1.f.)

DANTE's TEN-155 interconnects the research networks of 21 European countries, including Belgium, the Czech Republic, Germany, Greece, Hungary, Ireland, Italy, Israel, Luxembourg, Poland, Portugal, Slovenia, Spain and Switzerland. [http://www.interact.nsf.gov/cise/html.nsf/html/ani_newsletters?OpenDocument].

B.2. Euro-Link Applications

Active US/European collaborations utilizing high-performance research networks have been documented for CERN, Renater2, SURFnet and NORDUnet. Brief summaries of SURFnet and NORDUnet applications now appear at [http://www.euro-link.org/APPLICATIONS/]. Renater2 and CERN will be uploaded by May 12. Documentation of IUCC applications is ongoing.

B.3. Meetings Attended

April 25, 2000. Professors Andrew Johnson and Tom Moher of EVL/UIC hosted a visit from visitors of The Netherlands, who were traveling to various high-performance computing sites in the USA to discuss center operations. They requested a visit to EVL since SARA has a CAVE. Attending were:

- Dr. Wim Liebrand, Director of Computing Center, Univ. Groningen
- Dr. Rene van Lier, IT consultant, Dutch Meteorology Office
- Dr. Kees Nieuwenhuis, Managing Director, SARA
- Luc van der Ham, SGI sales manager for The Netherlands

April 20, 2000. A STAR TAP / TransPAC / Euro-Link engineers meeting was held at Indiana University to discuss relevant engineering and NOC issues. Meeting attendees include Linda Winkler, Jim Williams, Steve Wallace, Steve Peck, and various IU engineers, software developers and NOC personnel.

March 28, 2000. While attending the I2 Members Meeting in Washington DC, Linda Winkler, Chris Stelter (AT&T), Jim Williams and Steve Peck met to discuss operational and engineering issues such as the TransPAC and STAR TAP router configuration, and the status of TransPAC AT&T circuits.

March 27, 2000. Maxine Brown, Linda Winkler and John Jamison attended the Internet2 Members Meeting in Washington DC to report on the status of the STAR TAP International Transit Network (ITN). Brown also gave a short presentation on iGrid 2000.

B.4. Publications

Tomoko Imai, Zhongwei Qiu, Sowmitri Behara, Susumu Tachi, Tomonori Aoyama, Andrew Johnson, Jason Leigh, "Overcoming Time-Zone Differences and Time Management Problem with Tele-Immersion," Proceedings of INET 2000, Yokohama, Japan, July 18-21, 2000, published by Internet Society (ISOC). (Accepted for publication) [http://www.startap.net/PUBLICATIONS/pubs.html#Application Papers].

B.5. Software Releases

CAVERNsoft G2, a C++ toolkit for building collaborative networked applications or "logistical networking" applications, is now available. It has low and mid-level networking classes to support general collaborative applications building, and high-level modules to support tele-immersion (or collaborative virtual reality.) The distribution includes full source for SGI, Linux and Win9x/NT/2000. Currently, graphics support is only supported on the SGI through IRIS Performer. The distribution comes with the full source of Globus 1.1, and allows the user to generate both Globus and non-Globus versions of CAVERNsoft. For more info and download, visit [www.evl.uic.edu/cavern/cavernG2]; for more info on Globus visit [www.globus.org].

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

C. Collaboration Activities

- Ongoing with SARA in Amsterdam. The upgrading of Saranav to CAVERNsoft G2 is complete.
- Working with SARA in The Netherlands to experiment with an EVL-designed packet-level Forward Error Correction scheme.

D. Summary of Award Expenditures (March/April)

The spending rate is within budget.