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A. Summary of Technical Activities

A.1. Euro-Link Network Status and Institutions

A.1.a. CERN

Direct BGP peering between UIC/EVL and CERN in order to run Reliable Blast UDP (RUDP) bandwidth tests over CERN's 100Mbps link is expected in August. See Section B.1.c.

In July, the European Union accepted the "DataTAG" (Research and Technological Development of a Trans-Atlantic Grid) proposal to fund applied Grid network research; CERN and other groups involved in the proposal are now working with the EU to finalize the budget. The project will last two years, with a starting date of January 1, 2002. DataTAG partners are CERN (prime contractor), Particle Physics And Astronomy Council (PPARC) in the United Kingdom, the Italian National Physics Network (INFN) and the University of Amsterdam in The Netherlands.

CERN is preparing an RFP for two circuits between CERN and StarLight (details and delivery of which are still confidential.). Delivery of the first circuit (production) will be hopefully take place in mid-March 2002; delivery of the DataTAG circuit will be July 2002.

1. A production SONET/SDH circuit at 622Mbps. (Although this circuit is labeled "production," it is really research production traffic between IN2P3 and CERN to vBNS, ESnet, Abilene, etc. Note that IN2P3 is the National Institute of Nuclear and Particle Physics, a CNRS (French National Center for Scientific Research) institute that currently sends traffic over the CERN link to STAR TAP.)

2. DataTAG, a research circuit, hopefully a 2.5Gbps lambda, between CERN and StarLight, over which CERN will carry out various network measurements, demonstrations and experiments.

A.1.b. IUCC
No activity to report.

A.1.c. NORDUnet
NORDUnet's connection into the 710 N. Lake Shore Drive facility over I-WIRE fiber (recently installed by QwestLink), scheduled to be operational on July 24, experienced a major setback. KPNQwest informed NORDUnet's Peter Villamoes that the subcontractor delivered dark fiber for Stockholm's local loop between the KPNQwest PoP and KTH, and not an STM-4c circuit. The distance is about 25 km and too long for a dark fiber link. The STM-4c loop requires terminating equipment at the KPNQwest PoP and at KTH, and KPNQwest estimates it will take three weeks from August 1 to bring the loop into operation. Meanwhile, NORDUnet's router in New York is scheduled for installation August 2.

A.1.d. Renater2
RENATER's peering with the STAR TAP Router continues to be disrupted. It is expected to resume once France Telecom circuit arrangements are made. Linda Winkler is still waiting on PVC information.

A.1.e. SURFnet
SURFnet has not closed its New York PoP yet, as originally scheduled for July 1.

Teleglobe is in touch with QwestLink Chicago to use its I-WIRE fiber into 710 N. Lake Shore Drive for SURFnet's OC-12. STAR TAP engineers expect this will move up the original October due date to mid-to-late August. Teleglobe is also engineering the 2.5G lambda from Amsterdam, and expects the connection to take place September 1, as contracted.

Global Crossing met with QwestLink July 20 to discuss connecting SURFnet's second OC-12.

A.2. Engineering Services

A.2.a. StarLight/Abilene Connectivity
Internet2 agreed to put an OC-48 router in the Qwest PoP at the NBC Tower building in Chicago in September. In addition to peering at the AADS NAP, Abilene will connect to 710 N. Lake Shore Drive using I-WIRE fiber.

A.2.b. StarLight/STAR TAP Connectivity
STAR TAP contracted for two OC-12 connections from the StarLight facility at 710 N. Lake Shore Drive to the Ameritech NAP. [Ameritech does not yet offer OC-48 service.] One of these OC-12s will be dedicated to SURFnet/Abilene traffic. The second link is to be shared by SURFnet (for non-Abilene traffic) and other NRNs that co-locate at 710. [Note: If Abilene comes to the StarLight facility over I-WIRE fiber, then the second OC-12 may be used instead by MREN universities, who are discussing the possibility of upgrading their MREN connectivity to 1GigE and co-locating at 710.]

A.2.c. StarLight/STAR TAP Documentation
The StarLight web page is being redesigned and will soon contain connection and engineering information. <http://www.startap.net/starlight/>

A.2.d. International Transit Network (ITN)
A list of International Transit Network participants will soon be added to the STAR TAP networks web page <http://www.startap.net/NETWORKS/>. ITN members will also be added to the STAR TAP map graphic and color-coded to distinguish them from STAR TAP member networks.

A.2.e. STAR TAP Router and Peering

Ameritech is processing orders from Belgium's BELnet, Ireland's HEAnet and Korea's KISTI for OC3c ATM connections into STAR TAP. Expected turn up dates for all three is mid-August.

Brazil's RNP network's DS-3 is ready for testing on the Ameritech end; however, RNP's New York router won't be ready until late July or early August.

The July 12 connection date of Brazil's Sao Paulo research network FAPESP-ANSP has been pushed back due to FAPESP inter-office delays; 30 days is a conservative estimate. The Saõ Paulo/Brazil Foundation for the Advancement of Research (FAPESP) 155 Mbps link to Miami has been operational since December 2000.

The new STAR TAP/TransPAC Juniper M5 router installed in May at the AADS/NAP is still having stability problems. Linda Winkler has had ongoing discussions with Juniper technical support people to diagnose the problem.

A.2.f. 6TAP

Bob Fink and Marc Blanchet will provide a second IPv6 Router for 710; eventually, Linda Winkler will remove the one at STAR TAP and backhaul any IPv6 traffic from the NAP to 710.

A.2.g. DiffServ

No updates to report.

A.3. NOC Services

In July, the NOC announced its new trouble ticket reporting system <www.startap.net/ENGINEERING/NOC>. Online "snapshot" reports of open trouble tickets are available for each network that the NOC supports (TransPAC, STAR TAP, Euro-Link, AMPATH, and Abilene). The report is updated twice an hour, and details ticket title and number, priority and status, date created, and a short summary of the ticket's information.

In addition to accessing information from the STAR TAP Engineering page, these reports can also be accessed from the Global Research NOC home page <http://globalnoc.iu.edu>. Select the network you are interested in, and from that main page, click on "Network Monitoring." Reports are organized as: currently open, diagnosed, undiagnosed, or pending.

The NOC also added a 24x7 NOC staffing chart to its "Contacts" page, listing technician schedules.

Ongoing activities: The Global Research NOC is preparing to issue a regular, online newsletter in the next few months. John Hicks is working on adapting MIRnet-type traffic graphs for the Euro-Link and TransPAC projects.

B. Euro-Link Performance Analysis Tools

B.1.a. Network Monitoring Tools

Bandwidth Utilization Radar Map

EVL student Brenda Lopez is designing a vital statistics monitor (VitaMon) for collaborators to use while running networked applications. She is also designing a graphical optical traffic map that will show all incoming/outgoing bandwidth between StarLight sites.

uCAN: unified Collaboratory for Analyzing Networks

EVL student Naveen Krishnaprasad continues to work on the unified Collaboratory for Analyzing Networks (uCAN). uCAN enables remote network researchers and application developers to collaboratively execute an application and monitor network utilization, as well as other application-specific parameters. uCAN also allows users to correlate, in real time, how the actions taken by an application directly impact the underlying networks, and vice versa. A network researcher can also alter router configurations, such as a router's queuing algorithm, to determine how it might improve application throughput.

Development proved to be more difficult than anticipated, however, the resulting solution is general enough that it will be relatively simple to develop future collaborative desktop applications. This capability will be embedded in a future release of CAVERNsoft to allow tele-immersive applications to work with 2D desktop applications.

B.1.b. Network Performance Studies for European/US Collaborative Art Project

EVL PhD graduate Dave Pape developed Yggdrasil (YG), a script-based, authoring environment for networked VR applications, which enables non-programmers to create effective, behavior-rich art and science virtual-reality environments. EVL co-director Dan Sandin is extending the library for behaviors, performing network performance tests and developing applications. Sandin is supervising EVL student Joseph Tremonti in the development and execution of network performance tests to Austria, and later Sweden, Hungary and The Netherlands, in anticipation of the Ars Electronica Center's Festival in Austria, September 1-6. [http://www.aec.at] (See Section D, Collaboration Activities)

B.1.c. High-Bandwidth Transmission Over Long Distance Networks

Parallel Socket Experiments

No updates.

Reliable Blast UDP (RUDP)

UIC Laboratory for Advanced Computing's Bob Grossman performed parallel TCP and RUDP tests between EVL and SARA. Results will appear in next month's report.

B.1.d. Ultra-High-Bandwidth Transmission Over Long Distance Networks

In anticipation of SURFnet's 2.5 Gb connection to STAR TAP in September, Jason Leigh has been speaking with Cees de Laat (SURFnet), Paul Weilinga (SARA) and Henri Bal (Vrje University, Amsterdam) to develop ideas for testing bandwidth-intensive applications over SURFnet. SARA and SURFnet are both interested in attempting to stream compressed CAVE video. EVL has ordered a GigE card for its Onyx in preparation for this. Vrje University is interested in testing parallel cluster-to-cluster simulation and visualization codes. EVL shared information about its cluster with Vrje to maximize compatibility between systems. Bob Grossman, director of UIC's National Center Data Mining (NCDM), wants to install a data-mining server in Amsterdam and performing tera-mining queries between Chicago, Amsterdam and Canada.

EVL is also in the process of building and optimizing its Linux cluster to maximize throughput over GigE networks. In the past, EVL was able to only achieve ~500Mbps (local area) out of the box. With appropriate tuning using Interrupt Coalescing and Jumbo frames, EVL has been able to achieve bandwidth of 850Mbps. Other applications that EVL would like to test over SURFnet include VNC for streaming of clustered desktops, WireGL for streaming OpenGL visualizations, and streaming of stereoscopic visualizations.

C. Accomplishments

C.1. Meetings

July 26, 2001. Maxine Brown hosted Tom Prudhomme of NCSA, Peter Ranelli of University of Southern Mississippi's Center of Higher Learning (located at the Stennis Space Center) and Mississippi state senators Terry Burton and Scott Cuevas to discuss EVL's tele-immersion and global networking efforts. The state senators were most impressed by the State of Illinois' I-WIRE initiative.

July 16, 2001. The Advanced Collaborative Environments Working Group met at the Global Grid Forum 2 in Washington, D.C. Meeting minutes and slides to be posted to <http://calder.ncsa.uiuc.edu/ACE-grid/>.

July 10, 2001. Jason Leigh hosted Tor Langeland and Kåre P. Villanger from Christian Michelson Research Laboratory, in Norway, who are interested in working with EVL on research in collaborative virtual environments over Euro-Link. They are also interested in hosting an EVL student as an intern next summer.

C.2. Publications

No new publications to report.

C.3. Software Releases

No new software upgrades or releases.

D. Collaboration Activities

Tom DeFanti and Maxine Brown are talking to people in the Netherlands's GigaPort Project and SURFnet5 about hosting an iGrid event in Amsterdam next September 2002, to showcase 10-Gigabit applications. On July 13, Maxine sent out an invited call for participation to computational scientists and engineers whose sites will be connected to I-WIRE, DTF and StarLight in coming months.

EVL's Dan Sandin is organizing a large, shared VR environment for the Ars Electronica Festival, September 1-6, 2001, in Austria. Participants include artists from Hungary's C3 [http://www.c3.hu/], The Netherlands' V2 [http://www.v2.nl/], The Interactive Institute of Sweden [http://www.interactiveinstitute.se/], and the United States (UIC, Chicago and SUNY, Buffalo).

Working with SARA in The Netherlands to do network performance studies over long, fat networks using various transmission techniques (TCP, UDP, FEC, RUDP).

EVL is working with CERN on RUDP tests. EVL is talking to CERN about DiffServ tests.