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August 1, 2004

TO: Distribution
FROM : David Lapsley
SUBJECT: 12 July 2004 e-VLBI telecon summary

Attendees:

Lee Foster, Pat Gary, Marty Shugrue, George Uhl, William Wildes – GSFC
Kevin Dudevoir, Hans Hinteregger, David Lapsley, Arthur Niell, Alan Whitney – Haystack
Tom Lehman – ISI-E
Terry Gibbons – Lincoln Laboratory

This telecon is one of an ongoing series of telecons to prepare for 10 gigabit/sec e-VLBI demonstrations between NASA GSFC and MIT Haystack Observatory using a combination of network facilities including all or part of Glownet, Bossnet, ISI-E, DRAGON, MAX and GSFC/HECN.

ACTION ITEMS ARE HIGHLIGHTED IN RED.

Bossnet

Terry Gibbons reported on the status of the Bossnet upgrade. OADM Mux/Demux equipment has been put together and in place. Movaz equipment has been racked in Terry's lab powered and ready to go. Movaz equipment on Lincoln side in place. Haystack Movaz equipment to be installed after Russ gets back from vacation next week.

David Lapsley reported that August 13th is the next maintenance window scheduled on Glownet.

Tom Lehman reported that DRAGON just got Qwest fiber installed. Jerry's guys doing OCDR characterization. Not yet installed equipment at Eckington. Thinks that it would take 2 weeks to get fiber characterized.

General discussion over the upgrade schedule. It was felt that at least two weeks before wavelengths will be up on Bossnet. Should be possible to have wavelengths in place in time for August 26/27 installation. We are good to confirm with Movaz engineer (Richard Solis) to have him come up here on August 13th to assist with install.

ACTION ITEM: Tom to check with Jerry/Chris about installation of equipment at Eckington.

Pat Gary reported that DRAGON fiber from College Park to Goddard in from Fibergate. Fiber testing is scheduled for tomorrow. Goddard Movaz equipment is still tied up in interoperability testing. Looking at extending out to McClean to connect to Level3 and NLR POP. Hope that this can occur in September/October time frame. Goddard now member of Mid-Atlantic Tera-scale partnership. Starting to plan with them details. PRs out to Force10 and Extremenetworks.

Bill Wildes reported that there has been no progress on getting second fiber out to GGAO. Line is installed, but equipment has not been installed. Waiting for money to buy terminal equipment.

General discussion over the second line to GGAO. Intent is to use it to achieve 1024 Mbps. Still need to nail down the best way to do this. Path from Eckington needs to be determined, equipment/technique to transport data needs to be determined. One issue is how to terminate the OC48 POS connection from Haystack at GSFC. Action item to draw up a detailed network diagram of DRAGON infra-structure to enable architecting of solutions. Tom will have access to a couple of loaner Juniper M10 routers.

e-VLBI Experiments

David reported that there were a few more e-VLBI experiment completed in last few weeks. Completed an intensive experiment between Westford and Kashima. Repeat of experiment that was done in June of last year. Tried to get an estimate of UT1 offset as quickly as possible. In June last year did it in 21 hours. Repeated experiment a couple of weeks ago and able to get the data uploaded to Kashima and UT1 offset calculated in under 4.5 hours. 13.9 GB of data transferred. 50 Mbps data transfer. Major limitation on throughput was getting through NFS file system on destination, looking at bottleneck there. A few other experiments as well. Similar to experiments done in the past. T2030, 230 GB of data at 50 Mbps. Completed an additional experiment last week 380 GB of data, average data rate roughly the same.

In preparation for Westford–Kashima experiment. Ran into usual network performance problems. Experiment data for intensive experiment carried from Westford to Haystack and then transferred from Haystack to ISI-E and then from ISI-E to Kashima. Used multiple hops to segment feedback path and improve throughput. Initial tests showed very bad throughput, so deployed software that Jason Soohoo has been working on: platform and network monitoring software. Part of EGAE software that we are developing. Software acts as a database that uses bwctl wrapper around iperf to create automated testing and store results from tests in a database as well as information about server that software is running on: load averages, cpu averages with time, disk space etc. By storing information in database, transport application can query database, extract information about network behavior and then determine optimal way to transmit data. Long term goal. Currently have enough to collect network stats. Software was rolled out across test network (half a dozen nodes), took an afternoon to roll out software. Put information on website to make information accessible. First time we have been able to see in one place, link utilization from various network operations centers from networks used (e.g. Tokyo XP, Abilene) also have active performance monitoring results from bwctl/iperf test being run. Could see on graphs where good performance ended and where bad performance began. Able to isolate problem, point network engineers to the information, and have them fix it in time for the experiment. Plans to extend to Onsala, Kokee, Wetzell. Important to be able to see as much of network state as possible and

track it to ensure success of experiments.

URL to initial website: http://web.haystack.mit.edu/staff/dlapsley/tsev7.html

Kevin Dudevoir reported on Kokee progress. Roger Hall from PMRF put us on a separate LAN at PMRF coming out of ATM router. Saw significant performance improvements. Loss rate improved. Two long experiments over weekend, 4 hours of data, averaged 20 Mbps during 10 hour window. Other 14 hours of day still saw bad throughput (6 Mbps). Running GridFTP as well as BBFTP. Kevin also looking at UDT and Tsunami. Made modifications to UDT code as it tends to lock up about 50% of the time. Trial production run this week. Mike Titus has agreed to correlate intensives this week. Look at running to USNO this week/early next week. Prefer to use TCP based protocol.

David currently working on getting GGAO, Westford, Onsala and Kashima together for a real-time experiment in late August 26th and 27th. Tom has also suggested doing a demonstration at Supercomputing. Onsala, Kashima/Tsukuba both interested. We may be able to get hold of correlation software to stream data and correlate on-site. However, software currently only able to support non-real time: throughput issues and interfacing software with incoming stream in real-time. We could use hardware correlator at Haystack to do real-time without too much trouble. Alternative to use software correlator running on a cluster in Pittsburgh during the show. Haystack does not write the software, currently done in Australia, Japan and at JPL. Linux cluster would be used to correlate the data. The number of CPUs would depend on the desired data rate. Possible for us to use 12-15 PCs.

Tom mentioned that Jerry had made arrangements for some booth space and working on getting connectivity (10 Gbps time shared) between Washington DC, Pittsburgh and other sites. Interested in discussing more. Interested in how to make it more visual. May want to schedule a smaller group to discuss.

ACTION ITEM: Tom to co-ordinate supercomputing meeting

Miscellaneous

David reported that VSI-E software available this week. Might be a good protocol for Andrea to test as part of her testing.

Tom reported that Chris had sent a note saying that the Ray Express to be installed at Eckington on Thursday.

Next telecon is scheduled for Monday, 2nd August 2004 at 2 pm EDT.

cc: Steve Bernstein, LL
Jim Calvin, LL
Rick Larkin, LL
Peter Schulz, LL
Terry Gibbons, LL
Russ Roberge, LL
Bill Fink, GSFC
Lee Foster, GSFC
Pat Gary, GSFC
Andy Germain, GSFC
George Uhl, GSFC
Kerry Kingham, USNO
Chuck Kodak, GSFC
Kevin Kranacs, GSFC
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Mary Shugrue, GSFC/ADNET
George Uhl, GSFC/ADNET
Bill Wildes, GSFC
Dan Magorian, UMCP
Tom Lehman, ISI-E
Jerry Sobieski, MAX
Dennis Baron,
Guy Almes, Internet2
Charles Yun, Internet2
Richard Crowley, Haystack
Kevin Dudevoir, Haystack
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David Lapsley, Haystack
Jason Soohoo, Haystack
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Joe Salah, Haystack