

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

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13 December 2003

TO: Distribution  
FROM: David Lapsley  
SUBJECT: 8 December 2003 e-VLBI telecon summary

Attendees:

Lee Foster, Kevin Kranacs, Paul Lang, Pat Gary – GSFC

Dennis Baron - MIT

Tom Lehman - ISI-E

Kevin Dudevoir, Hans Hinteregger, David Lapsley, Alan Whitney – Haystack Observatory

This telecon is one of an ongoing series of telecons to prepare for 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, SuperNet, Max and GSFC/HECN.

**ACTION ITEMS ARE HIGHLIGHTED IN RED.**

Glownet/Bossnet

Changes in Status

Alan Whitney. Problem with BOSSnet gigabit Ethernet(GE) link found and fixed. GE link is back

Tom Lehman. Problem with GE link. Link was unstable. Did not look like a hardware problem, looked like a layer 2 problem. Currently routing through M20 at LL and terminating GE link between ISI and LL. Terry thinks problem is with Summit 5i in LL, replaced it with another switch. Some question regarding Dell/Extreme interaction. We will put Dell back in and see if there is any problem.

Tom. Problem could be a bad summit 5i (that has been replaced) or could be software incompatibility between Dells and Extreme. Network is currently stable.

e-VLBI Testing/Experiments

David. Three experiments over the last month involving large data transfers from Kashima to Haystack. These tests are prototypes for the long term. ~ 8 of these tests lined up for next year. First transfer was CRF22 session, started at the end of October about the same time we had network issues. Total of 442.8 GB of data transferred. Transfer time 92.5 hours. Total time 144 hours. 64% of time spent transferring data. Average rate quite low 11.02 Mbps. 4 parallel BBFTP streams. Data rate intentionally throttled because we were going through Kashima production email gateway (100 Mbps link). Next experiment about the same amount of data. After network had settled down. Total of 489 GB of data transferred. Transfer time 97.2 hours. Total time 105 hours. 93% of time spent

transferring data. Average rate 11.8 Mbps. 4 parallel BBFTP streams. Most recent experiment T2023. Total of 543GB of data transferred. Transfer time 33.8 hours. 98% of time spent transferring data. Average data rate was 33 Mbps because we were using 8 parallel streams and pushed network. Starting to "operationalize" experiments. Developed procedure for doing transfers, developed software for automating them. Documenting this. Made good progress. Thanks to the work in getting the network stabilized.

Another transfer coming up soon (early next week).

Kevin Dudevoir. Kokee little progress. Networking group is in the middle of large FN6 military exercise. Busy for 3 weeks. Same status. Formal turnover of microwave OC3 link hasn't been completed yet. Won't get to it for 3 weeks. We are planning to locate a Mark5 at PMRF itself (which has good connectivity). Observatory staff would transport disc packs to PMRF (~20 km). Experiments are done 4 times per week, so it is feasible.

Kevin. Germany. Have connectivity since this morning. Some firewall and rate limiting problems. Currently getting 5 Mbps to Wetzell. This link has been up and down. Over the last couple of hours, link has been quite stable. Starting to investigate rate limiting. Wetzell tested link to University of Regensburg. 28 Mbps memory to memory. Bottleneck must be somewhere else. Link is a dedicated link. Lot of links in DFN that are rate limited.

### Performance Testing

David. Working with Charles and Ali from Internet2 on BGPerf software. Prototype of E2EPI's software. Ali currently installing and testing it on Turtle. A number of sites signed up to test. Put up some monitoring software. Using MRTG to do monitoring of switches and servers. Open to the world Link to machine is:

<http://192.52.61.34:4242/~mrtg>

Pat Gary. Using MRTG monitoring on GGAO link. Andy Germaine has put up new website. Doing tests once per hour. Interesting traffic. Peaking at 63 Mbps. Result averaged over 5 minutes, two 30 s tests - one in each direction. Ensign website constantly under development. Provides an overview of all of the statistics that Andy is collecting.

David. Andy was kind enough to add Haystack to that website. Turtle is currently on that page as well. We really appreciate Andy doing that. Some of the stats from earlier this morning: ~350 Mbps peak, ~250 Mbps average between GSFC-ESTO and Haystack; ~200 Mbps peak, ~80 Mbps average between GGAO and Haystack. Nice to be up on that page. A lot of good statistics.

Tom. Doing some MRTG monitoring on Juniper router, gigabit ethernet switch, Juniper M20 at LL. Have a web page that runs ping and shows a graphical map of results. Allows you to see if network is up or down as well as MRTG graphs on certain nodes. Currently password protected, not that sensitive, shows SNMP read values. Tom will send a link out to the network page.

### Funding Opportunities

Alan. We have been working intensively with people from Internet2 to devise a program of work with respect to a new astronomy project - Square Kilometer Array (SKA). Won't be built for a while, but groundwork needs to be laid to show that it can be done technically as well as economically.

International project. Currently half a dozen different concepts. Location not decided. Various concepts currently working out feasibility cost, performance etc. over the next couple of years, followed by a concept "shoot-out". Work on 2 or 3 survivor concepts will continue after this. Working with Internet2 is very productive in laying the groundwork for this type of project. Putting in USSKA proposal with other institutions to NSF. Haystack is partnering with Internet2.

### Miscellaneous

Alan. Wednesday, in College Park - DRAGON kickoff meeting. David and I will be there. Pat will also be there.

Tom. College Park at UMD, Jerry Sobieski's shop. Get together people participating in DRAGON project. DRAGON is metro DC area optically switched lambda network. One application will be e-VLBI. Tie in GGAO, USNO, BOSSnet and Haystack. One day event to get everyone on same page for 6 - 12 month plan. Jerry is going to call Kerry Kingham from USNO to see if he can come as well.

Pat. Bought 10 GE switch from Force10. Switch has arrived. 6 slots. 2x10 GE blades and some 1 GE feeder blades. Looking forward to doing some experiments with 10 GE. On campus, positive reaction to NSF cyber-infrastructure and also to existence of national lambda rail. Trying to envision Goddard connecting in to Scripps Institute of Oceanography on the west coast. Looking at how to leverage technologies. Need to understand how to effectively use new national backbone in addition to BOSSnet and Internet2.

Alan. Dennis and David had a conversation a week or two ago about possibly using MIT NOX connection for e-VLBI work.

David. I've started investigation into connectivity between Haystack and NOX. At this stage I don't have any additional information, but we are going to meet internally and find out more about our connectivity and see if it is feasible/possible to upgrade our connectivity.

Dennis Barron. Need to get more information about the configuration at Haystack and then work out how to open up the pipe.

Alan. Quite surprised to hear that the limit might be here at Haystack. Still to be determined. If the limit is here in the RPE building, then we can do something about that.

David. M10 router loan from Caltech physicists looks like it will go ahead. May be able to take delivery of router at the end of January. Harvey Newman, router owner, needs to check with some of his other DataTAG partners to see if they are ok with loaning us the M10. He doesn't foresee any problems with this. The M10 will come with three 1xGE SX cards and 1xOC48 card. Sounds like we should be able get that around the end of January.

David. VSI-E specification. We have what we believe is a final draft that will be acceptable to both the application community as well as the astronomy community. We had a draft out in July, it has taken us this long to work through some of the issues with transporting VLBI data. There are some difficult issues to get around. We believe we can get around this. We should have the specification released to the VSI-E committee for review and then for standardization in the IETF soon.

### Next telecon

Next telecon is scheduled for Monday, 2 February 2003 at 2 pm EST.

cc: Steve Bernstein, LL  
Jim Calvin, LL  
Rick Larkin, LL  
Lorraine Prior, LL  
Peter Schulz, LL  
Leslie Weiner, LL  
Herbert Durbeck, GSFC  
Bill Fink, GSFC  
Lee Foster, GSFC  
Pat Gary, GSFC  
Andy Germain, GSFC  
Chuck Kodak, GSFC  
Kevin Kranacs, GSFC  
Paul Lang, GSFC  
Aruna Muppalla, GSFC  
Mary Shugrue, GSFC/ADNET  
Bill Wildes, GSFC  
Dan Magorian, UMCP  
Tom Lehman, ISI-E  
Jerry Sobieski, MAX  
Guy Almes, Internet2  
Charles Yun, Internet2  
Richard Crowley, Haystack  
Kevin Dudevoir, Haystack  
Hans Hinteregger, Haystack  
David Lapsley, Haystack  
Arthur Niell, Haystack  
Joe Salah, Haystack

