C. T. A. M. de Laat

Faculty of Physics and Astronomy Utrecht

For the DYNACORE collaboration.

Contents

Made With A Mac

- **Collaboratory has soft real-time requirements**
  - **Data connections**
    - » **Certain minimum bandwidth, rtt not important**
  - **control connections**
    - » **Low bandwidth, low rtt is important, high availabillity**
  - **Audio/video**
    - » **Constant bandwidth, rtt, no jitter, multicast**
- **Distributed Computing**
  - **Message passing**
    - » **Medium bandwidth, low rtt**
- **IP-telephony**
  - **Voice over IP**
    - » **Low bandwidth, low rtt, low jitter**
- **Other requirements**
  - **Authentication, Authorisation, Accounting**
  - **Encryption, security, VPN**

Why not ATM

- **Complex**
  - » **AAL, ABR, ATM, AvCR, BUS, CAC, CBR, CDV, CLP, CLR, CLR0, CRM, CTD, DSP, DTL, EPD, ES, ESI, GCAC, IAS, ICR, IISP, ILMI, LANE, LEC, LECS, LES, LGN, MIB, NNI, NSAP, PG, PGL, PPD, PTSE, PTSP, PNNI, PVC, PVCC, PVPC, QoS , RCC, SVC, SVCC, UBR, UNI, VBR, VCC, VCI, VP, VPC, VPI, ...**

- **Did not make it to the desktop**
  - » **Plug and play switched ethernet works**

- **Speed advantage overtaken by packet networks (Ethernet, POS, POF, DWDM)**

- **Overhead counts**
  - » **ATM overhead 10%**

- **That's called progress!**

- **Physics-UU to IPP-FZJ => 7 kingdoms**
  - **Physics department**
  - **Compute Center, Campus network**
  - **SURFnet, NRN-Netherlands**
  - **Dante - ten 155**
  - **WINS/DFN, NRN-Germany**
  - **FZJ-ZAM, Campus network**
  - **FZJ-IPP, Institute of Plasma Physics**

USA line

Amsterdam

Leeuwarden

Groningen

Marknesse

Enschede

Leiden

Utrecht

Den Haag

Delft

Rotterdam

Wageningen

Nijmegen

3 ms

Breda

Tilburg

Eindhoven
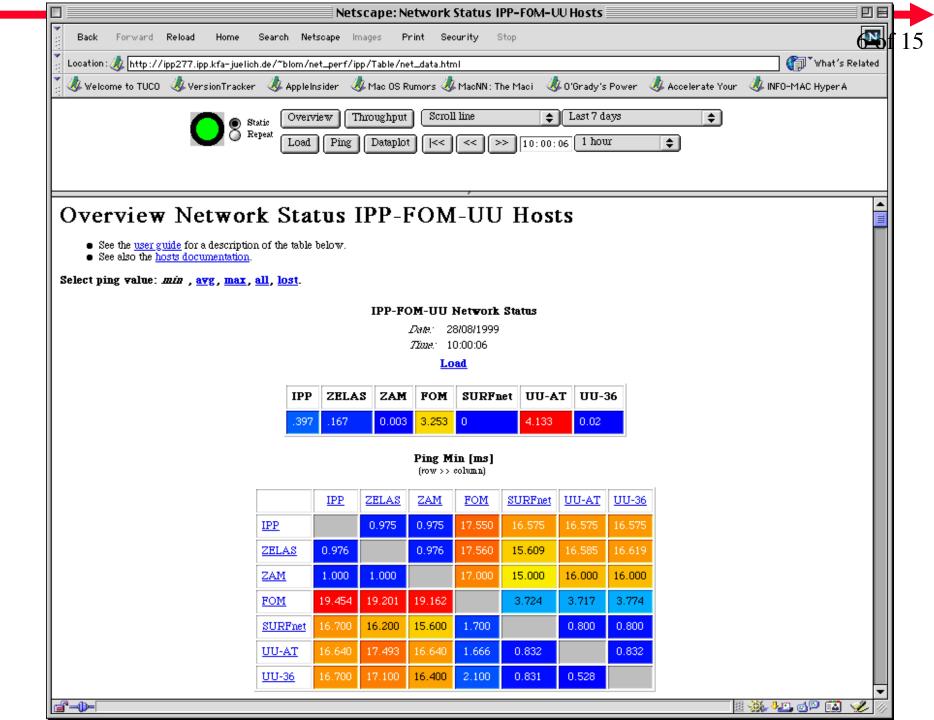
2.5 ms

Maastricht

17 ms
Jülich

MacsBug 6.5.4a6, Copyright Apple Com...

NMI (user entered MacsBug on purpose

17-Jun-1999 11:51:26 PM (since boot =
Current application is "Microsoft Power
Machine = 312 (PowerBookG3Series),
ROM version $077D, $41F6, $0002 (RO
VM is on; paging is currently safe
NIL^ = $FFC10000
Stack space used = -8018882
Address FFC0693A is in the ROM at _PutIcon+037
68020 Registers
 D0 = 00000000   A0 = FEE00000   USP
 D1 = 0000003C   A1 = 0028B9A4   MS
 D2 = 008D49B0   A2 = 00019570   55E4
 D3 = 0B25FAF0   A3 = 00000000   0016D494
 D4 = 746FFF00   A4 = 0B25F754   ACR = 00000001   SFC = 0
 D5 = 0000FFFE   A5 = 0B9F3   CAAR = 00000000   DFC = 0
 D6 = 6C204301   A6 = 0B25   2C   PC = FFC0693A
 D7 = 00010000   7 = 0B 055E4   SR = SmxnzvC   Int = 0

Calling ch   6/R1 links

Back c   r
 0B25F   FD83C EmToNatEndMoveParams+00014
 0B25F   67F8
 0B25F84   C68A8
 0B25F7D8   PPC 1B249B30
 0B25F780   PPC 1B2905DC
 0B25F710   PPC 1B28F3FC
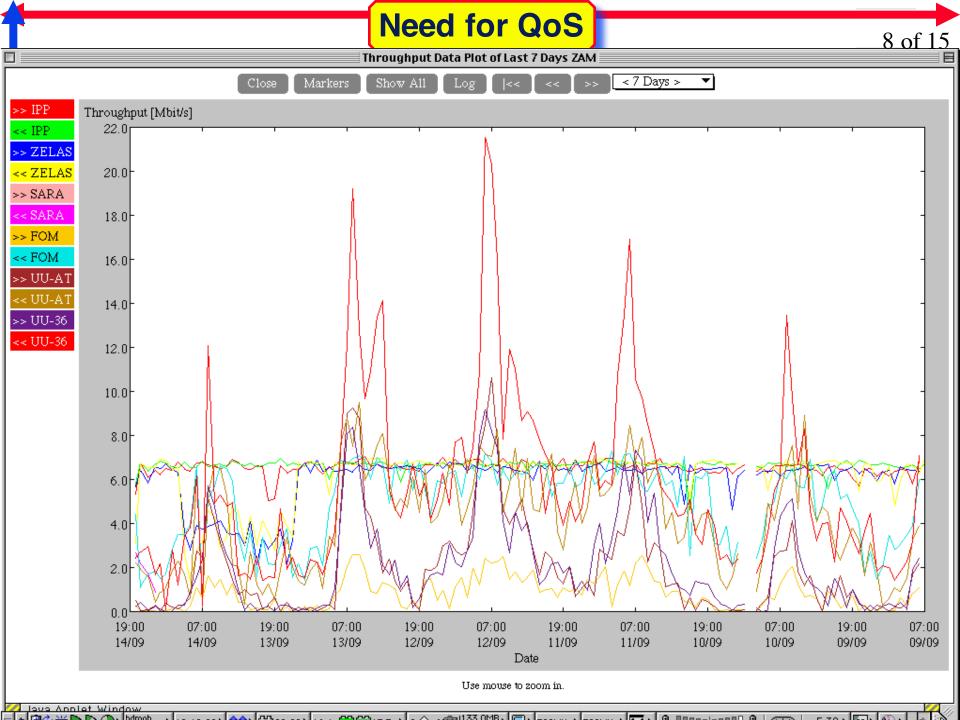 0B25F6A0   PPC 1AE7BE98 AfxWaitNextEvent+00050

Just kidding

Netscape: Network Status IPP-FOM-UU Hosts

Back | Forward | Reload | Home | Search | Netscape | Images | Print | Security | Stop

Location: http://ipp277.ipp.kfa-juelich.de/~blom/net_perf/ipp/Table/net_data.html — What's Related

Welcome to TUCO | VersionTracker | AppleInsider | Mac OS Rumors | MacNN: The Maci | O'Grady's Power | Accelerate Your | INFO-MAC Hyper A

Static / Repeat

Overview | Throughput | Scroll line | Last 7 days

Load | Ping | Dataplot | |<< | << | >> | 10:00:06 | 1 hour

Overview Network Status IPP-FOM-UU Hosts

- See the user guide for a description of the table below.
- See also the hosts documentation.

Select ping value: *min* , avg, max, all, lost.

IPP-FOM-UU Network Status

Date: 28/08/1999
Time: 10:00:06

Load

IPP	ZELAS	ZAM	FOM	SURFnet	UU-AT	UU-36
.397	.167	0.003	3.253	0	4.133	0.02

Ping Min [ms]
(row >> column)

	IPP	ZELAS	ZAM	FOM	SURFnet	UU-AT	UU-36
IPP		0.975	0.975	17.550	16.575	16.575	16.575
ZELAS	0.976		0.976	17.560	15.609	16.585	16.619
ZAM	1.000	1.000		17.000	15.000	16.000	16.000
FOM	19.454	19.201	19.162		3.724	3.717	3.774
SURFnet	16.700	16.200	15.600	1.700		0.800	0.800
UU-AT	16.640	17.493	16.640	1.666	0.832		0.832
UU-36	16.700	17.100	16.400	2.100	0.831	0.528	

Throughput [Mbit/s]
(row >> column)

	IPP	ZELAS	ZAM	FOM	SURFnet	UU-AT	UU-36
IPP		6.35	5.97	.52	2.59	4.06	3.99
ZELAS	6.09		6.81	.17	2.24	4.99	4.61
ZAM	6.87	6.53		2.05	1.59	2.15	2.73
FOM	4.92	5.6	5.69		7.93	6.97	7.49
SURFnet	2.22	3.32	4.05	3.88		26.44	26.03
UU-AT	4.22	4.51	7.33	.9	20.81		64.53
UU-36	4.2	4.1	6.62	4.78	23.8	65.16	

In order to support group meetings we asked for 5 Mbit/s each Monday morning 7h30 - 13h00

It did not happen

Why?

At the first MBS meeting DANTE told us that:

- **they would be the interface for the users to the NRN and TEN-155 network.**

- **we have to say which two doorsteps the connection must be made. Thats all. (local loops to non research networks should be taken care to by users)**

- **they had some form of agreement with the nrn's about amount of bandwidth available for these projects**

- **filling in the forms was still a little cumbersome, certainly in the beginning of the beta-test and certainly for "real end users without knowledge" but that improved. See also Tiziana's comments.**

- **Organisational: SURFnet wants the user (customer) to come to SURFnet directly and not via a third party. So much for one contact point.**

- **a strategy problem: ATM is clearly moving out, customers are encouraged to go to IP layer solutions. ATM is "not done", however, in SURFnet for special cases possible.**

- **Deutsche Telecom can/will only allocate connections with a minimum of one week duration. We requested 5 mbit for every monday morning to start group meeting videoconferences via the network. Even one minute every week means continuous. KPN allocates with resolution of minutes.**

- **What we already found out in Dynacore a long time ago still applies: DFN regards these kind of connections as extra and orders them as such from DT. DT then calculates the price compared to their services. So we got back from DANTE to contact DFN and ask them for an offer for the costs of the bandwidth. Again so much for one contact point.**

- **Moreover, we had to ask for full time 5 mbit, not for just 5 hours per week due to scheduling resolution ===> price runs into 5 digits at most currencies. Although Juelich is just across the border we had to ask for connectivity to Frankfurt (long distance).**

- **We had no problems in getting cooperation from the local institutes.**

- **We never got the MBS service up due to the costs on German side**

- **It works in the TF-TANT case because the NRN's themselves are the customers. SURFnet made no problem whatsoever there. DFN to Stuttgart??**

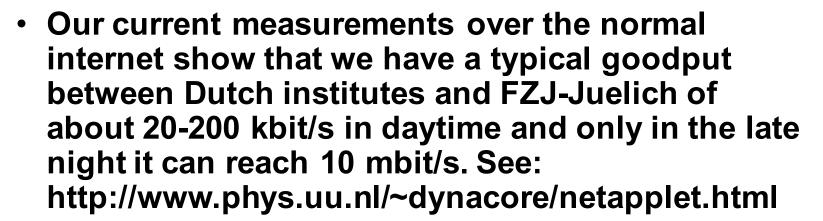- **Technically it seems to me that MBS adds to fragmentation of installed bandwidth and as such potentially a waste of resources. It can be argued that using UBR links for the regular services and CBR for the MBS allows use of idle capacity by the regular service. However, I do not know, but would not be surprises if lost cells in the ATM core destroy AAL5 packets and have negative influence on the regular service (needs to be investigated?).**

- **MBS as buissiness case is interesting, since we will probably in some form get similar issues in a future rollout of DiffServ + bandwidth broker + AAA.**

- **Our current measurements over the normal internet show that we have a typical goodput between Dutch institutes and FZJ-Juelich of about 20-200 kbit/s in daytime and only in the late night it can reach 10 mbit/s. See: http://www.phys.uu.nl/~dynacore/netapplet.html**

- **We already ruled out the end institutes and the connectivity from Dutch institutes to SURFnet backbone and that backbone itself (see DAS project applet). We are currently investigating together with SURFnet the rest of the traject. Bottom line for Dynacore is: to do collaboratory work an improvement is necessary.**

- **VPN establishment** — **never**
- **VPN performance** — **none**
- **Usefulness of the service** — **Useful**
- **Problems encountered** — **several**
- **DANTE's interaction with the beta user,** — **good**
- **National Research Networks' ability to provide the service nationally,** — **Oke if..**
- **including any constraints or limitations,**
- **Interaction with the relevant National Research Networks** — **Tough**
- **Your MBS experience in general**
- **Recommendations to DANTE** — **Good**
  - **Politics**

- **We are all nice guys but in the end we wanted free high bandwidth -> WAN costs may still be prohibitive for real rollout**

- **I have no doubt that everybody works at their best and has the best intentions. However, the combination does not (yet) work out for us. Thanks for the efforts up to now.**