TERENA/DANTE TASK FORCE FOR TESTING ADVANCED NETWORKING TECHNOLOGIES

Minutes of the 5th TF-TANT meeting held on the 30th of September 1999 at the Steigenberger Airport Hotel, Frankfurt, Germany.

Kevin Meynell - Issue 2

PRESENT

| Name | Organisation | Country |
|---|---|---|
| Luca Dell'Agnello | INFN/GARR | Italy |
| Hamad el Allali | U.Twente | Netherlands |
| Claudio Allochio | GARR | Italy |
| Werner Almesberger | EPFL | Switzerland |
| Kurt Bauer | U.Vienna/ACOnet | Austria |
| Spiros Bolis | GRNET | Greece |
| Massimo Carboni | GARR | Italy |
| Zlatica Cekro | VUB/ULB | Belgium |
| Phil Chimento | U.Twente | The Netherlands |
| Larry Dunn | Cisco | United States |
| John Dyer | TERENA | - |
| Hans Joachim Einsiedler | T-Nova Berkom | Germany |
| Tiziana Ferrari | INFN Bologna | Italy |
| Iphigenie Foumta | GRNET | Greece |
| Ruediger Geib | T-Nova Berkom | Germany |
| Silvia Giordano | EPFL | Switzerland |
| Leon Gommans | U.Utrecht/Cabletron | The Netherlands |
| Christoph Graf (Chair) | DANTE | - |
| Avgust Jauk | ARNES | Slovenia |
| Joop Joosten | CERN | Switzerland |
| Dimitrios Kalogeros | GRNET | Greece |
| Tom Kosar | CESNET | Czech Republic |
| Olav Kvittem | Uninett | Norway |
| Cees de Laat | U.Utrecht | The Netherlands |
| Simon Leinen | SWITCH | Switzerland |
| Lladislav Lhotka | CESNET | Czech Republic |
| Dimitrios Matsakis | GRNET | Greece |
| Kevin Meynell (Sec) | TERENA | - |
| Mike Norris | HEAnet | Ireland |
| Jan Novak | DANTE | - |
| Simon Nybroe | Ericsson Telebit | Denmark |
| Herman Pals | KPN Research | The Netherlands |
| Yiannos Pitas | CYNET | Cyprus |
| Alex van der Plas | Ericsson Telebit | Denmark |
| Esther Robles | RedIRIS | Spain |
| Roberto Sabatino | DANTE | - |
| Trond Skjesol | Uninett | Norway |

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|---|---|---|
| Robert Stoy | RUS/DFN | Germany |
| Celestino Tomas | RedIRIS | Spain |
| Panagiotis Tzounakis | GRNET | Greece |
| Jean-Marc Uze | RENATER | France |
| Guido Wessendorf | U.Muenster/DFN | Germany |
| Bert Wijnen | IBM | The Netherlands |
| Wilfried Woeber | ACOnet | Austria |

Apologies were received from:

| | | |
|---|---|---|
| Michael Behringer | Cisco | United Kingdom |
| Juergen Rauschenbach | DFN | Germany |
| Victor Reijs | SURFnet | The Netherlands |

## 1. APPROVAL OF MINUTES

The minutes of the TF-TANT meeting held on the 17th and 18th of June 1999 were approved.

## 2. STATUS OF QUANTUM & TEN-155

Roberto reported that KPN would be upgrading a number of circuits as compensation for late delivery of other circuits. An STM-1 from Italy to Switzerland would be delivered on the 1st of October, a T3 from Belgium to France would be delivered on the 15th of October, whilst an E3 from Spain to Switzerland would be delivered on the 15th of December. The latter connection would share the same infrastructure as Spain to France.

In May, an Invitation for Tender was issued for an interconnection agreement. This called for connectivity to commercial networks in at least three locations, and would replace existing peering agreements. Replies were received from AUCS, BT, Ebone, IBM, KPNQ and UUNET.

The evaluation criteria was based on the number of available exchange points, the cost of the local loops to TEN-155, transit to all major ISPs, and usage of symmetric routing. As a result of this, AUCS (ATT Unisource Commercial Services) were selected, and from the 1st of October, interconnections will be established at 45 Mbps in Amsterdam and 25 Mbps in Switzerland. At a later date, additional interconnections at 20 Mbps will be provided in London and Stockholm, whilst Amsterdam will be downgraded to 15 Mbps. The contract also specifies that AUCS must peer with any unreachable ISP when traffic to that destination over other routes reaches a certain volume.

An MoU had been signed with UCAID to allow TEN-155 to peer with Abilene. A 45 Mbps line had already been procured to connect the DANTE and Abilene routers in New York. This would enable all countries currently using the TEN-155 US service to use the Internet2 backbone.

European Commission funding for TEN-155 was due to finish on the 31st of May 2000, but the new Head of DG-XIII/G2 (? Campolargo) had verbally assured DANTE that funding would continue until the start of the Fifth Framework Programme. With regard to this, a Call for Proposals had recently been issued with two areas related to research networking: RN1 - interconnection of NRNs, and RN2 - testbed networks. Proposals were due at the beginning of next year.

Avgust enquired how the AUCS peering agreement would be monitored. Roberto replied that DANTE would provide traffic statistics to and from AUCS, but the monitoring of traffic to ISPs not covered by the agreement would be the responsibility of the NRNs.

Tiziana asked whether a Managed Bandwidth Service was available to Abilene. Roberto replied this was theoretically possible as the connection to New York ran over ATM. Nevertheless, Abilene itself did not use ATM, so service could not be guaranteed over this network (unless of course IP QoS was introduced).

Jean-Marc asked about the rationale for using ATM to Abilene. Roberto replied an ATM connection was the best offer they had received.

## 3. QBONE PRESENTATION

Ruediger gave a presentation on the Internet2 QBone initiative (http://www.internet2.edu/qos/qbone/).

In recent months, work had been progressing on producing the necessary specifications for the QBone. The first versions of the Premium Service specification which described an inter-domain EF-based service, and the interoperability test description were now available. The bandwidth broker specification was still being developed.

A number of institutions were currently working on bandwidth brokers; British Columbia Institute of Technology, GLOBUS, MERIT, Telia/University of Lulea and UCLA. Two phases had currently been defined. Local admission control and traffic conditioning would be initially developed, with inter-bandwidth broker signalling to follow.

An operability workshop for bandwidth brokers was due to be held in November. The functionality of different implementations would be compared so improvements could be identified. At the request of the vendors, this event would not be public.

A QCon Interoperability Workshop would also be held from 1-5 November 1999 (http://www.cnl.ncsu.edu/interop/diffserv/). This was being hosted by NCNI, and would feature six vendors. It aimed to validate the conformance of bandwidth brokers to RFCs 2475 & 2598, and the Protocol Implementation Conformance Statement (PICS). This event was also closed to the public, but it was hoped future events would be more open.

Christoph thought the QBone activities seemed rather secretive and wondered how TF-TANT could contribute. Ruediger replied anyone could cooperate with the QBone if they were willing to adopt the defined model. Most of the active development of bandwidth brokers was in Europe anyway, and collaboration would be beneficial to all parties.

Tiziana however, believed TF-TANT should concentrate on its own test programme for now, but could perhaps collaborate with QBone in the new year.

Tiziana also asked why an AF-based service had not been specified. Ruediger replied it was important to keep the QBone simple in the initial phase.

## 4. EXPERIMENT DISCUSSIONS

### 4.1 Flow-based Monitoring

Simon reported that traffic flow data was now being collected at the TEN-155 PoP in Switzerland. This currently only utilised 2-3% of the CPU in the router, but there were still problems collecting multicast statistics. The aim was to evaluate the data with different analysis tools in order to determine which produced the best results, and to provide feedback to developers.

Tom said he would be willing to grant access to the CESNET TEN-155 routers for monitoring purposes.

Dimitrios mentioned a flow replicator that had been written at GARR. Unfortunately, no-one appeared to know who developed it.

Roberto believed there should be some investigation into the accuracy of different sampling rates. It was currently possible to analyse every packet on a 155 Mbps network, but this was unlikely to scale as line speeds increased.

### 4.2 IP Version 6

Wilfried gave a presentation on the IPv6 network at the University of Vienna (URL?). This generally worked well, but as it was being used to test IPv4 and IPv6 interoperability, it was unclear whether IPv6 hosts were communicating with the DNS via IPv6. There were also issues relating to the default routes for both IPv4 and IPv6.

Guido gave a presentation on JOIN (http://www.join.uni-muenster.de/). This was a German project to establish both an IPv6 interoperability testbed, and a native IPv6 network over the B-WiN network.

Bert asked whether anyone had investigated renumbering. Wilfried replied they were interested in renumbering, but DNS and particularly reverse DNS implementations were not yet available. These would be necessary before a pilot service could be offered.

Wilfried requested input from DANTE about what should appear in his final report.

ACTION 5.1 - DANTE

### 4.3 Differentiated Services

Tiziana reported this activity had started at the end of June and currently involved nine sites. There were some problems with the GPS antennas on the SmartBits equipment, but NTP could be used if absolutely necessary. Netcom had also agreed to extend the loan period. The next stage was to increase the number of nodes, and test equipment from other vendors.

Tiziana suggested the interim test results could be documented in an Internet draft for IETF46. This would need to be submitted before the 22nd of October 1999, and she asked participants for input.

ACTION 5.2 - DiffServ Participants

## 5. REVIEW OF EXPERIMENTS

### 5.1 RSVP to ATM Mapping

Tiziana said this activity had been constrained by the availability of SVC signalling on TEN-155. Nevertheless, tests could now commence.

Larry mentioned that Laura Cunningham (lcunning@mci.net) and John

Jamison (jjamison@mci.net) had a lot of experience in this area and it might be an idea to contact them for advice.

5.2 MPLS

Jean-Marc said an interim report was now available on the Web (URL?). Unfortunately, a bug in the Cisco architecture had meant some of the tests could not be completed. This had been reported, but no solution was forthcoming as yet.

The next phase would be to test MPLS with QoS, and to conduct interoperability tests with other implementations such as Juniper, Nortel Networks and Telebit. This would probably take place at the beginning of next year.

5.3 Multicasting (IP and ATM)

Robert reported that MSDP/MBGP was now running on TEN-155 between France, Netherlands, Sweden and the UK (http://www.dante.net/mbone/). The next stage was to migrate the whole of TEN-155 to MBGP.

The MECCANO multicast network over the MBS had also improved dramatically since MBGP had been introduced. There had been some problems initially, but these had largely been resolved. The project might now consider using 'production' multicast services, provided they could reliably obtain 5-10 streams of 500 Kbps.

In the future, MASC/MBGP should be tested now there was an implementation from ISI. In addition, some aspects of BGMP had been integrated in gated.

Christoph asked whether ATM point-to-multipoint had been tested. Jan replied there had not been any progress as the tests were dependent on signalling, and SVCs were only available with CBR. It might be possible however, to conduct some tests in a controlled environment.

5.4 ATM Signalling

Jan reported that signalling (using CBR) was now available on TEN-155, although further tests on connecting NRNs via SVCs still had to be completed. Unfortunately, no NRN currently planned to offer its own signalling service, so experiments would be limited to the backbone.

Christoph said it was unclear whether anyone actually required signalling nowadays. It was considered essential one or two years ago, but lack of availability meant other solutions were now being considered. Wilfried added that unless it could be demonstrated that signalling provided real advantages, it should not be pursued

further.

Cees believed a major drawback of signalling was the lack of policy management. Until this was available, there would be few compelling reasons to use it.

Dimitrios asked whether signalling could be used to configure routing on TEN-155. Roberto replied this would be investigated, but it would be difficult to ensure load balancing and circuit restoration.

### 5.5 Policy Control

Leon reported he was currently investigating policy control for DiffServ. Policy control servers were being developed by Cisco, IBM and Cabletron, and he hoped some trials could be run during the first quarter of next year.

Tiziana (IBM), Philip (Cisco) and Cees (Cabletron) expressed interest in participating in these trials.

### 5.6 Route Monitoring

Simon L reported there had been no progress since the last meeting. Some work was being done for DANTE, but not in conjunction with this activity. It would also be a bit problematic to set-up the testing.

## 6. EXPERIMENT SCHEDULE

Christoph summarised the experiment schedule:

The IPv6 and DiffServ activities were currently competing for network resources so SWITCH and RedIRIS were experiencing problems. They could however, use tunnelling if necessary.

It had been agreed that a permanent overlay test network on the MBS was not particularly useful. This would not be established.

There would be no further MPLS activity until early next year.

It was too early to establish a QoS pilot service. This might be possible in around six months.

The flow-based monitoring, policy control and multicast activities were ongoing.

## 7. DATE OF NEXT MEETING

The next meeting will be held on the 25th and 26th of November 1999 at RedIRIS, Madrid, Spain.

## 8. ANY OTHER BUSINESS

Kevin mentioned that APAN (Asia-Pacific Advanced Network), and SingAREN (Singapore) in particular, were interested in collaborating with TF-TANT. Common areas of interest were identified as: IPv6, Multicasting, DiffServ and Policy Control. Some institutions were interested in a joint testing programme if suitable connectivity could be arranged.

Tiziana suggested the DiffServ participants hold a meeting during the Washington IETF, as most people would be going.

Christoph announced he was standing down as the Task Force Leader due to increased commitments at SWITCH. He proposed Roberto as his successor, and this was unanimously approved by the group.

Cees said he planned to bring a wireless network hub to the next meeting. This used the same technology as the IETF meetings, so anyone with a laptop and appropriate PCMCIA card would be able to interwork.

## 9. ACTIONS FROM LAST MEETING

4.1 Kevin Meynell to contact Advanced Networks about the possibility of loaning some Surveyor equipment.
- Superseded. It was decided to use the SmartBits equipment instead.

4.2 Jean-Marc Uze to approach Netcom about the possibility of loaning more SmartBits equipment.
- Done.

4.3 All IPv6 experiment participants to supply information about their available equipment, bandwidth and manpower.
- Ongoing. Only SURFnet had supplied this information.

4.4 DANTE to create a mailing list for the IPv6 experiment.
- Done.

4.5 Jan Novak to include the KPN addressing plan in the ATM signalling experiment proposal.
- Done.

3.3 Tiziana Ferrari to incorporate bandwidth brokers into the Differentiated Services experiment proposal.
- Done.

3.8 Victor Reijs to draft document expressing the concerns of the research community about STM-4c.
- Status unknown. Victor was not at the meeting.

OPEN ACTIONS

5.1 DANTE to provide input to IPv6 report.

5.2 DiffServ participants to provide input to Internet draft by 22/10/99

4.3 All IPv6 experiment participants to supply information about their available equipment, bandwidth and manpower.

3.8 Victor Reijs to draft document expressing the concerns of the research community about STM-4c.