



Minutes of 1st TF-TANT Meeting



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From: Kevin Meynell
Subject: Draft minutes of the 1st TF-TANT meeting
To: TF-TANT@TERENA.NL

TERENA/DANTE TASK FORCE FOR TESTING ADVANCED NETWORKING TECHNOLOGIES

Minutes of the 1st TF-TANT meeting held on the 5th and 6th of November 1998 at the DANTE Offices, Cambridge, UK.

Kevin Meynell - Issue 1

PRESENT

Name	Organisation	Country
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Mauro Campanella	INFN Milano	Italy
Brian Carpenter	IBM UK	UK
Zlatica Cekro	VUB/ULB	Belgium
Howard Davies	DANTE	-
Tiziana Ferrari	INFN Bologna	Italy
Christoph Graf (Chair)	DANTE	-
Herluf Hansen	Telebit	Denmark
Dimitrios Kalogeras	GRNET	Greece
Olav Kvittem	Uninett	Norway
Xenia Lecha	DANTE	-
Simon Leinen	SWITCH	Switzerland
Ladislav Lhotka	CESNET/USB	Czech Republic
Jose Manuel de Arce	DANTE	-
Vassilis Merikoulias	GRNET	Greece
Kevin Meynell (Sec)	TERENA	-
Alan O'Neill	BT	UK
Simon Nybroe	Telebit	Denmark

Jan Novak	DANTE	-
Savenio Pangoli	DANTE	-
Victor Reijs	SURFnet	The Netherlands
Esther Robles	RedIRIS	Spain
Roberto Sabatino	DANTE	-
Robert Stoy	RUS/DFN	Germany
Istron Tetenyi	HUNGARNET	Hungary
Jean-Marc Uze	RENATER	France

Apologies were received from:

Joao Nuno Ferreira	FCCN	Portugal
Avgust Jauk	ARNES	Slovenia
Olivier Martin	CERN	Switzerland
Guenther Schmittner	JKU/ACOnet	Austria
Celestino Tomas	RedIRIS	Spain

1. APPROVAL OF MINUTES

The minutes of the TERENA WG-LLT meeting (that discussed the formation of the TF-TANT) held on the 4th of October 1998 were approved.

2. STATUS OF GROUP

Howard Davies, on behalf of DANTE, welcomed the group to Cambridge. He said the TERENA Working Group on Lower Layer Technologies (WG-LLT) had recommended that a new Task Force be formed to undertake the activities of the QUANTUM Test Programme (QTP), and to test other relevant lower layer technologies. As DANTE had responsibility for the QTP, TERENA and DANTE had agreed to run the Task Force as a joint activity. This would allow limited resources to be pooled, and would ensure there would not be any unnecessary duplication of effort. There were still some political issues to resolve, but these should not prevent the group from starting work.

The WG-LLT had asked Christoph Graf to lead the new Task Force, and DANTE were happy for him to undertake this role. Whilst he was employed by SWITCH, he was currently seconded to DANTE for 80% of his time. This would reduce to 20% in 1999, but as the QTP was a priority, it would not be a problem for him to continue as the Chair.

Terms of Reference had been drafted which proposed the name 'TF-TANT' for the Task Force; TANT meaning 'Testing Advanced Networking Technologies'. Howard asked whether this acceptable, and the meeting gave its approval.

Christoph said the TF-TEN mailing list (run from TERENA) was currently being used to discuss issues relating to the new Task Force. He suggested it should simply be renamed. Kevin said he would do this, and would also create a 'TF-TEN' alias that redirected postings to the renamed list.

ACTION 1.1 - Kevin Meynell

Christoph said some WWW pages had been established at DANTE with information about the new Task Force. He asked Kevin to link the TERENA WWW pages to these.

ACTION 1.2 - Kevin Meynell

Kevin said the location of the current WWW pages made the Task Force appear as a QUANTUM Sub-Project (<http://www.dante.net/quantum/qtp/jointTF/>). As Task Force activities were not confined to the QTP, he requested that a more neutral URL be used. Christoph agreed to do this.

ACTION 1.3 - Christoph Graf

Victor commented that Section 4 of the Terms of Reference defined Christoph Graf as the Leader of the Task Force, but did not define a procedure for determining a replacement. He asked whether this could be added. Howard replied this could be discussed off-line.

3. STATUS OF QUANTUM & TEN-155

Roberto reported the Unisource contract for TEN-34 would expire on the 4th of December, and the FUDI circuits would be cancelled when TEN-155 was commissioned. The STM-1 connections for TEN-155 were due to be delivered on the 1st of December, followed by a 45 Mbps connection to Belgium and a 10 Mbps connection to Luxembourg on the 7th of December. The connections that were not being provided by Unisource were due to come on-line in January, and finally in April, the STM-1 between the UK and the Netherlands would be exchanged for an STM-1 between the UK and Sweden. The installation programme was still on schedule with the exception of the connection to Italy which may be delivered a few days late.

The equipment at the TEN-155 PoPs consisted of Ascend CBX-500 ATM switches provided by the service provider, Cisco 7507 routers, Sun Ultra 2s for operational services, and Sun Ultra 5s for experimental services. Test routers from vendors and NRNs would also be installed in the PoPs.

It was planned to establish a full mesh of ATM VCs between the core routers in order to load balance, improve IP stability and reduce the number of interfaces. PVCs would be used initially, but SPVCs and/or SVCs were planned to be introduced after six months. VPNs would also be established for the production IP service, the QTP and other research collaborations. One concern was that the Cisco 7507 routers would theoretically be unable to handle all the TEN-155 backbone traffic, but these were scheduled to be upgraded anyway.

Brian asked how much TEN-155 bandwidth would be allocated for research purposes. Howard replied this was not yet defined, but would be in the range of ten to twenty percent on the backbone. The NRNs had discretion on their own access links to TEN-155.

Brian also asked whether a LAN arrangement would be used at each PoP. Christoph replied the routers and workstations would be connected by Fast Ethernet.

Dimitrios asked whether the advanced features of the Ascend switches (such as frame discard and SVCs) would be used. Howard replied the contract for TEN-155 only specified requirements and did not specify a particular switch. Under the terms of this contract, Unisource were obliged to provide signalling after six months, but how they did this was their concern.

4. REVIEW OF EXPERIMENT DESCRIPTIONS

4.1 RSVP

Simon L felt much of the activity in this experiment would already be part of the other QoS experiments. It basically continued the functionality tests that had been conducted under TF-TEN. He was therefore open to suggestions about what else could be included.

Tiziana said that many RSVP functions went untested during TF-TEN and there were a lot of compatibility problems between equipment from different vendors. She would also like to run tests using a more complex testbed.

Victor mentioned it would be possible to run tests over the Qbone as SURFnet was obtaining a connection to STARTAP (and hence to Abilene). Brian however, said the Qbone concentrated more on DiffServ technology although RSVP could be used at the edges. It was not certain that RSVP would ever be used over a network backbone.

Mauro asked whether any NRNs was planning to implement RSVP. Victor replied an RSVP overlay network was being established in the

Netherlands.

Dimitrios asked whether RSVP was better suited to IPv6 than IPv4. Brian replied it did not make any difference.

It was agreed the previous TF-TEN experiments should be continued with a larger topology. There would also be investigations into how RSVP integrated with DiffServ and multicast technologies. SWITCH (as leader), INFN and SURFnet were confirmed as the experiment participants, with Uninett joining if they could obtain a connection to the TEN-155 test network.

4.2 Multicasting (IP and ATM)

Robert reported that RUS would be participating in the MECCANO project which aimed to establish a high-quality multicast service. Monitoring tools would be used, and the use of QoS mechanisms would be investigated. They were also interested in looking at mapping IP to ATM multicast mechanisms. This was the currently the only method to provide multicast facilities on end-systems because there were no applications that natively supported ATM multicasting.

Christoph added there were plans to establish a multicast network on TEN-155. This would initially be tunnelled over the production traffic, but they hoped to eventually run it as a separate VPN.

Mauro asked how a better multicast network could be established. Most of the current applications were old and inefficient and there was nothing new to try. In addition, m routers did not seem to work well above 2 Mbps as Mbone tunnels were generally restricted to this speed.

Brian said that new multicast applications were becoming available, but the real problems concerned bandwidth management. New protocols such as MBGP and BGMP were being developed, but a great deal of investigation and development was still required.

Robert said that MBGP was likely to be implemented in gated before being integrated into routers, and could be run on workstations at the TEN-155 PoPs. Simon L mentioned you needed to be a member of the MGBP consortium before you could obtain MBGP, but Roberto did not believe this would present a problem.

It was agreed that Robert should prepare a proposal on what should be tested.

ACTION 1.4 - Robert Stoy

4.3 RSVP to ATM Mapping

Tiziana presented her proposal that aimed to determine whether the integration of IP and ATM QoS mechanisms was viable. They hoped to start work in January or February, but the main concern was whether RSVP and ATM SVCs were going to be supported by the equipment at the TEN-155 PoPs.

Christoph said that Telebit routers could be used, but would require support as people were not familiar with them. End-systems running Solaris would support mapping, but signalling would not be supported on the TEN-155 backbone for at least six months. Tiziana however, did not believe this would prevent work from starting.

INFN (as leader), GRNET and SWITCH were confirmed as the experiment participants.

4.4 Differentiated Services

Tiziana reported there were three methods of implementing differentiated services, one of which could be tested in a short period. The IP precedence method was supported by Cisco and some NRNs were already using this.

Victor mentioned that SURFnet had been running DiffServ on their US connection for two weeks to give priority to cache traffic. These appeared to be working correctly although logging was not functional. He added the SURFnet connection to the Qbone could be made available to other European participants provided DiffServ was implemented in the TEN-155 routers, and addresses in a specific IP range were used.

Brian commented this experiment should be closely linked to the investigations into policy control. The real problems were not related to DiffServ running over a backbone, but about determining who could request particular levels of service.

INFN (as leader), GRNET, HUNGARNET, RedIRIS, RENATER, SURFnet and SWITCH were confirmed as the experiment participants. Christoph added that ARNES had also expressed an interest in participating.

Kevin mentioned there would be a CCIRN meeting relating to QoS at the next IETF in Orlando. The Internet2 consortium was looking for project partners in this area, and anyone that was interested in setting-up a joint activity was encouraged to attend the meeting.

4.5 IP Version 6

Simon N said that Telebit were a member of the QUANTUM consortium and specialised in IPv6 routers. They were therefore interested in

establishing a native IPv6 network over TEN-155 and requested ideas on what could be achieved.

Christoph believed that efforts should be concentrated on implementation of the backbone, and testing the tunnelling of IPv4 over IPv6. A connection should also be established to the existing 6bone which tunnelled IPv6 over IPv4. Roberto added there were already some applications available for IPv6 that could be used to test the network.

Christoph asked whether anyone had proper IPv6 addresses. Brian said these were not available until January 1999, but suggested that DANTE apply to become a Top Level Authority.

It was agreed that Telebit should produce a proposal for establishing an IPv6 network over TEN-155.

ACTION 1.5 - Telebit

4.6 155 Mbps ATM Performance

Christoph reported that DANTE would be monitoring the TEN-155 Managed Bandwidth Service (MBS) in order to provide feedback on its performance. This was necessary as it was unclear how well such a service would operate.

Olav asked whether TF-TANT would be involved with this monitoring process. Howard replied the group was more a customer of the MBS and should not become too concerned with operational issues.

Dimitrios asked whether any research project could request bandwidth for testing. Howard replied in principle this was the case, but a charge would be made for such bandwidth. The charging mechanism however, had not yet been defined.

4.7 ATM Signalling

Christoph said that Guenther Schmittner had agreed to lead the ATM Signalling experiment. He hoped to produce an experiment proposal shortly.

4.8 Policy Control (IP and ATM)

Victor reported the experiment proposal was now available on the WWW. Whilst SURFnet had already conducted some theoretical investigation into policy control, they wished to test some IP-based implementations in the national environment during the next year. If these worked successfully, a test over TEN-155 would be the next

stage.

SURFnet (as leader), INFN, RedIRIS, RENATER, SWITCH and ULB/VUB were confirmed as participants. Victor hoped that one of these participants would cover ATM policy control.

Brian mentioned there were three or four policy server products currently available. At least two of these were protocol independent.

4.9 MPLS

Jean-Marc reported the first draft of the experiment proposal was now available on the WWW. He hoped to start during the first quarter of 1999.

In the meantime, he had investigated which products supported MPLS and had discovered it was available on Alcatel, Fujitsu, Toshiba and smaller Cisco routers. This meant it should be easier to establish a bigger MPLS cloud than had been possible in the TF-TEN. A meeting was also planned with the Chair of the IETF group that was working on MPLS to discuss future directions.

Christoph asked whether this experiment would require a large amount of bandwidth, or whether it was more important to have complexity. Brian replied it was necessary to test VC merging otherwise there was no point using MPLS. For this, Ascend would need to be contacted. Simon L added the size of the routing tables needed to be realistic as this was when bugs were likely to be discovered. An unstable routing table would be even better.

Victor asked whether an NRN would require native ATM access to TEN-155 in order to participate in this experiment. Jean-Marc replied this was not a prerequisite.

All NRN representatives at the meeting expressed an interest in becoming experiment participants. Christoph mentioned that Olivier Martin was also interested.

4.10 Flow-based Monitoring

Simon L said he was investigating the use of RTFM to produce network statistics. SWITCH was currently collecting NetFlow data from the international ingress points at Geneva and Zuerich in order to produce total bandwidth and traffic type statistics for each site using cflowd. There were plans to use these statistics to start charging sites for the amount of international traffic they received, similar to what UKERNA had implemented. He asked whether anyone else planned to do something similar.

Victor replied that SURFnet planned to produce such network statistics and it would be useful to standardise tools and procedures. Ladislav and Dimitrios also expressed interest in this work.

4.11 Route Monitoring

Simon L said the idea of this experiment was to become familiar with BGP analysis tools. DANTE and most NRNs needed to monitor routing tables, but there was little impact on production traffic as the routing tables were simply transferred to a workstation for analysis. A workstation a SWITCH could be used for this purpose.

Victor and Roberto expressed interest in participating in this activity. Christoph mentioned that Olivier Martin was also interested.

4.12 QoS Monitoring

Tiziana presented her proposal to utilise network monitoring tools to determine whether requested levels of service were being met. The differing methods of providing QoS however, meant that different tools often needed to be used and there was no specific way to test DiffServ.

Brian said the IPPM probes provided an invasive method of looking at traffic flow. Unfortunately, each incoming line required a probe and these machines needed to have a lot of processing power. This meant it was quite an expensive approach.

Christoph suggested that a more detailed description was required that outlined the tools to be used. Mauro also felt the proposal should define the meaning of QoS more clearly. In the meantime, INFN (as leader), DANTE, GRNET and VUB/ULB were confirmed as participants.

4.13 VPNs

Victor start that SURFnet had started to investigate VPNs over IP. They were mainly concerned with accounting and encryption issues, the performance of VPNs on production networks, and the relationship between VPNs and MPLS.

Brian asked why academic networks were interested in VPNs. Victor replied that some institutions had confidentiality, quality and authentication concerns.

Dimitrios said GRNET was interested in this work, but they were not

sure what they could contribute.

4.14 WDM

Victor said he was really looking to share information and experiences about WDM, particularly with regard to the quality of fibre required. There would not much scope to conduct any testing of the technology over TEN-155 because they would not have access to dark fibre, even though KPN (Unisource) had planned to use WDM next year. It might however, be possible to test WDM on the dark fibre connection they had between the Netherlands and Belgium.

4.15 SDH Issues

Victor believed it was necessary to investigate the issues related to STM-4, because many PNOs were unable to provide equipment that properly concatenated the STM-1 channels. If it could be shown that problems existed, it would then be possible to lobby regulatory bodies.

Howard agreed, but said this issue may become irrelevant as providers were likely to move to Gigabit speeds in the near future.

Jean-Marc asked whether anyone was actually offering STM-4 in Europe. Howard replied that some providers in the UK had price lists for this.

5. MONARCH PROJECT

Mauro said the next generation of high energy physics experiments at CERN would generate around 1 Terabyte of data per annum. This data needed to be analysed and it would only be possible to do this through distributed computing. The MONARCH Project was therefore developing an intelligent database to facilitate this, and was looking for assistance to help test its performance.

Mauro said he would send the URL of the project to the mailing list.

ACTION 1.6 - Mauro Campanella

6. PRESENTATION ON PERFORMANCE MONITORING

Ian Pratt from the University of Cambridge gave a presentation on their performance monitoring project. Their aim was to investigate goodput, number of retransmissions, RTT and congestion control in a non-invasive manner. This could be achieved in three ways:

monitoring the ATM layers, splitting the optical fibre, or scanning the SDH layer. They had settled for scanning the SDH layer as this was a relatively well-used and reliable technique.

They were utilising a Linux PC with standard interface cards which was adequate for monitoring 155 Mbps connections, and may even be suitable for 622 Mbps connections. A number of software modules had been developed, one for each protocol they wished to monitor (e.g. TCP, HTTP), and new modules could be produced as necessary. For privacy reasons, only the headers were examined and the source/destination addresses anonymised. They also had a legal commitment not to publish data that identified individuals, institutions, NRNs or IP addresses.

Christoph asked whether they wished to cooperate with the TF-TANT. Ian replied they would be interested to have at least one monitoring station on TEN-155. Howard however, said they would need to get permission from Unisource to tap the SDH, and this was unlikely to be forthcoming as the fibre provided production services to many customers other than QUANTUM.

Mauro commented he had not been able to make a Linux platform measure more than 30 Mbps. Ian replied the problem lay with the regular Linux protocol stack, and they had custom written their own.

Brian said it was unclear how this project differed from the RTFM efforts of the IETF. He suggested they contacted Nevil Brownlee at the University of Waikato to investigate areas of commonality.

7. REVIEW OF REQUIREMENTS

Christoph asked all experiment leaders to produce a list of requirements for their activities. This should specify the switches, routers and workstations that would be necessary, where they should be located, and what type of network topology would need to be established. If participants already had equipment that could be utilised, this should also be mentioned. The overall requirements of the Task Force could then be determined and additional equipment could be procured from vendors if necessary. Where possible, experiments should not specify equipment from a specific vendor.

It was agreed the lists of requirements should be produced by the 1st of December and then reviewed on the mailing list.

ACTION 1.7 - All Experiment Leaders

Simon L asked whether it was possible to grant remote access to TEN-155 PoPs. During TF-TEN, it had been quite difficult to

coordinate experiments and it would help if some tasks could be conducted from one site. Christoph replied that as dedicated test equipment was being installed in the PoPs, it should not be a problem to grant remote access on a per-experiment basis.

Jean-Marc proposed that a permanent overlay network should be established over TEN-155, similar to that established over the JAMES network for TF-TEN. Christoph had no particular views about this, but said the TF-TEN Overlay Network had been established because it was complicated to obtain VPs from HAMES. Howard added that the TEN-155 Managed Bandwidth Service would hopefully be much more flexible than JAMES. Mauro however, believed it was advisable to establish a permanent overlay because it would make experiments easier to debug.

Howard was asked whether there would be charge for conducting experiments over TEN-155 (see WG-LLT minutes - 04/10/98). He replied that whilst other projects would certainly be charged, he hoped this would not be the case for activities conducted as part of the QTP. A final decision was due to be taken by the QUANTUM Policy Committee on the 18th of December.

Dimitrios enquired whether the defined list of experiments and their participants was final. Christoph replied that anyone could propose a new experiment or join an existing experiment at any time.

Christoph asked whether there were any other activities that should be added to the experiment list. Victor replied he would like to exchange information about the Year 2000 problem, but this did not warrant inclusion in the list. Kevin mentioned that UKERNA had been investigating the problem.

Brian asked whether there were plans to add the MONARCH Project to the experiment list. Mauro replied they were just looking to exchange information at this stage.

8. VENDOR INTEGRATION

Christoph said that Telebit were contracted by QUANTUM to provide a testbed for experimentation purposes. There was also a joint development agreement with Unisource which specified the introduction of new services such as ATM signalling. It was hoped, this would allow more progress than had been possible with the TEN-34 network. Whilst the TF-TEN had been able to conduct experiments over the JAMES network, this was a separate test network and it was difficult to demonstrate that a technology would work properly with production traffic.

Mauro suggested that a regular window be defined for TEN-155 when pre-production testing could take place. Perhaps this could be one day every three months.

Howard responded that the highest priority on TEN-155 was a reliable production service, but he wasn't adverse to pre-production testing in principle. This would probably have to take place at night and would require close liaison with the NOC.

Victor believed that a regular experimentation window was not necessary. Tests should be approved on a case-by-case basis, and then only with good cause.

Howard added that other commercial organisations were welcome to participate in the QTP. There may be conflicts of interest however, if a company wanted the QTP participants to sign a Non-Disclosure Agreement; the QUANTUM contract with the European Commission meant that certain information had to be made available. Nevertheless, a QTP Participation Agreement had been drafted by DANTE that would clarify the obligations of each party.

Brian mentioned that IBM may be interested in joining some of the TF-TANT experiments as there were some overlaps with the Internet2 activities they were currently involved with. They would however, need to look at the Participation Agreement to determine whether the conditions were acceptable.

9. DATE OF NEXT MEETING

The next meeting will be held on the 25th and 26th of January 1999 at the TERENA Offices in Amsterdam, The Netherlands. This coincides with RIPE 32.

Christoph mentioned that Olivier Martin had asked whether future meetings could be held via video-conference, or at least broadcast on the Mbone so that other people could follow the proceedings. Simon L quipped that it may be advisable to wait until John Glenn had returned on the Space Shuttle before attempting to use the Mbone! Kevin added that TERENA did not have any suitable video-conferencing equipment, so this was unlikely to happen for the next meeting. Nevertheless, it was agreed some consideration should be given to using the TEN-155 multicast network for subsequent meetings.

10. ACTIONS FROM WG-LLT MEETING

- 981004-1 Victor Reijs to send URL of GigaPort Activity Plan to the mailing list.
 - Open. The project had only just been approved.
- 981004-2 Christoph Graf to produce policy document summarising the technical recommendations of the WG-LLT.
 - Done.
- 981004-3 All activity leaders to produce experiment proposals.
 - Done. These were available on the Task Force WWW pages.

OPEN ACTIONS

- 1.1 Kevin Meynell to rename the TF-TEN mailing list.
 - 1.2 Kevin Meynell to create a link from the TERENA WWW pages to the TF-TANT WWW pages.
 - 1.3 Christoph Graf to give the TF-TANT WWW pages a 'neutral' URL.
 - 1.4 Robert Stoy to produce a multicasting experiment proposal.
 - 1.5 Telebit to produce a proposal for for establishing an IPv6 network over TEN-155.
 - 1.6 Mauro Campanella to send the URL of the MONARCH project to the mailing list.
 - 1.7 All Experiment Leaders to produce a list of requirements by the 1st of December.
- 981004-1 Victor Reijs to send URL of GigaPort Activity Plan to the mailing list.

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[November 1998]