TRANS-EUROPEAN NETWORKING TASK FORCE

Minutes of the 14th TF-TEN meeting held on the 2nd and 3rd of February
1998 at Universitat Politecnica de Catalunya, Barcelona, Spain.

Version 3

Kevin Meynell 04/02/98

PRESENT

Name	Organisation	Country
Stefania Alborghetti	INFN Milano	Italy
Michael Behringer (Chair)	DANTE	-
Zlatica Cekro	ULB/STC	Belgium
Vegard Engen	BDC/Uninett	Norway
Olav Kvittem	Uninett	Norway
Simon Leinen	SWITCH	Switzerland
Ladislav Lhotka	Univ. Sth Bohemia	Czech Republic
Kevin Meynell (Sec)	TERENA	-
Victor Reijs	SURFnet	The Netherlands
Guenther Schmittner	JKU/ACOnet	Austria
Karel Slavicek	CESNET	Czech Republic
Pavel Smrha	CESNET	Czech Republic
Robert Stoy	RUS/DFN	Germany
Celestino Tomas	RedIRIS	Spain
Jean-Marc Uze	RENATER	France
Jeroen Venema	Univ. Utrecht	The Netherlands
Jose Vilela	RCCN	Portugal

Apologies were received from:

Mauro Campanella	INFN Milano	Italy
Tiziana Ferrari	INFN Bologna	Italy
Cees de Laat	Univ. Utrecht	The Netherlands
Baoyu Wang	UKERNA	United Kingdom

1. APPROVAL OF MINUTES

    The minutes of the last meeting held on the 20th and 21st November
    1997 were approved.

2. STATUS OF TEN-34 & QUANTUM

Michael reported the long-awaited TEN-34 connection to Portugal was due to come up during the next month. A new 10 Mbps VP between Austria and Germany had been made available for testing. In addition, Unisource were migrating their backbone network to ATM which meant some minor reconfigurations to TEN-34 would be necessary.

A Call for Tender had been issued for QUANTUM on the 23rd December, with the response deadline being the 13th February. The member NRNs would then have a month to shortlist the bids, before a second phase of more detailed evaluation. Rollout of the network would start from July, and was expected to be completed by the end of 1998. Approximately twenty bids had already been received, although not all offered to supply a complete network.

The Call for Tender had an open specification, with the minimum requirement being an STM-1 interconnected core. A managed IP service had not been specified as there had been too many commercial problems with a shared IP service on the TEN-34 network. In any case, the current TEN-34 NOC worked well, and DANTE felt they were capable of running an IP service themselves. Depending on the bids that were received, it might also be necessary for QUANTUM to purchase and manage it's own ATM switches. Unfortunately, the QUANTUM consortium was currently unable to agree whether the network should be based on ATM.

QUANTUM aimed to bridge the period between the end of TEN-34, and the next generation network outlined in the European Commission's Fifth Framework Programme. The Fourth Framework Programme had not specifically provided funding for a European research network, but TEN-34 was justified on the basis that it supported other applications in the Telematics sector. The success of TEN-34 persuaded the European Commission that it was important to fund such a network in the Fifth Framework, but this did not start until 1999 at the earliest. Nevertheless, the European Commission had informally agreed use residual Fourth Framework funds for an interim network. The actual name of this network had still to be decided as there had been objections to using 'QUANTUM'.

Ladislav asked whether non-EU countries could join QUANTUM. Michael thought this would be possible, although non-EU countries would have to pay full costs as they could not be subsidised by the EU. The Czech Republic and Slovenia were certainly being included in the plans for the network.

Victor asked why some countries did not wish to use ATM for QUANTUM. Michael believed this was a result of the slow progress being made in ATM technology. ATM networks suffered a 20% overhead, yet the promised advantages were still not available. People were

essentially losing faith in ATM.

Michael added some rumours suggested IP over ATM would never be
supported at rates higher than 155 Mbps. Apparently, the necessary
SAR chips were too complicated to manufacture. Guenther however, did
not believe this. He said this might be true at the present time,
but manufacturers would almost certainly resolve the problems.
Workstations were already capable of running at 622 Mbps, and
routers would be no different.

3. STATUS OF JAMES

Michael said there was little to report about JAMES. The project
ended on the 31st of March, and there seemed little likelihood the
connections would remain after this date. The JAMES overbooking
tests were believed to have started, but these would not affect the
TF-TEN Overlay Network.

Jose mentioned he was still waiting for JAMES to contact him about
the joint security experiment.

4. STATUS OF EXPERIMENTS

4.1 ATM Routing

Guenther reported that PNNI had been re-enabled across the TF-TEN
Overlay Network following the conclusion of the Tag Switching
experiment. As PNNI seemed fairly stable, those with PNNI-capable
switches should no longer use static routes. The next stage would be
to test multi-level PNNI which was supported by Cisco IOS 11.3.
Unfortunately, this was initially only available as a Beta release
and it was probably not wise to run it on a production switch.
ForeThought 5.1 was also supposed to support multi-level PNNI, but
again this software release was untested. It was understood that
switches would probably require at least 32 Mb to run the new
software.

In order to determine who might run multi-level PNNI, Guenther asked
for details about the switches in each country. These were as
follows:

Country	Type	Memory	Software	Function
Austria	LS-1010	16/32	11.2(10)	Test
France	LS-1010	16/64	11.2(8)	Test
Germany	LS-1010	16/32	11.2(8)	Test
Italy (Bologna)	LS-1010	32	11.2(5)	Production

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Italy (Milano)        LS-1010      32        11.2(5)     Production
Netherlands           ASX-200c     ?         5.1         Test
Norway (Oslo)         LS-1010      16        11.2(8)     Production
Norway (Trondheim)    LS-1010      ?         ?           Production
Portugal              ASX-200BX    16?       5.1         Production
Portugal              LS-1010      32        11.2(10)    Test
Spain                 LS-1010      32        11.2(8)     Test
Switzerland           LS-1010      32        11.2(10)    Test
UK                    ASX-200BX    16        5.1         Test
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Jeroen mentioned the University of Utrecht also had a Digital switch, but this did not support PNNI at all.

Guenther said switches would probably use a 24-bit PNNI prefix, unless there were reasons to do otherwise. This currently only applied to the Netherlands and Spain who would use a 40-bit prefix.

4.2 ATM Resource Reservation

Guenther reported that it had not been possible to progress this experiment as the LS-1010s did not currently support different classes on service on the same physical interface. The Feature Card III upgrade was supposed to resolve this problem, but it did not seem likely these could be obtained in time. A workaround was possible by looping fibre between different physical interfaces, but this obviously meant it was necessary to have spare interfaces.

Guenther asked whether anyone had enough spare interfaces on their switches to participate in this experiment. This was the case in Italy, Norway and Switzerland, whilst France only had a single VP on each interface. It was therefore agreed Guenther would propose an experiment involving these countries that would run CBR and VBR in parallel.

ACTION 14.1 - Guenther Schmittner

Guenther also asked what should be used to test the SVCs. Simon suggested Arequipa.

Michael suggested this experiment should be the next major activity on the TF-TEN Overlay Network.

Jose added that he would investigate whether the ForeThought 5.1 could support different classes of service on the same physical interface. In theory, this was supported by the hardware.

4.3 Label-based Switching

Jean-Marc reported on the Tag Switching experiment that had been conducted a couple of weeks earlier. A Tag network had been temporarily set-up over the TF-TEN Overlay Network to test scaleability, IP traffic performance and resilience. TCP and UDP were used with and without tags, over single and multiple connections. Packet loss was measured with Mgen, which revealed throughput decreasing with higher rates on certain connections. In both directions of the Italy to Switzerland link, and one direction of the Italy to France link, packet loss was only experienced when the data rate of the link was exceeded (as expected). In the France to Italy direction however, packet loss was experienced before this point. This phenomena may be attributed to the fact that LS-1010s did not shape.

Jose asked why OSPF was the only routing protocol used for the experiment. Jean-Marc replied BGP was not currently supported by the IOS. This was expected in a future release.

Olav asked whether more tests should be conducted. Jean-Marc replied it would be useful to test VC merging, sparse and dense mode PIM, QoS over Tag (CAR and RSVP) and support for Virtual Private Networks. Unfortunately, most of these features would not be available before the end of JAMES.

Jean-Marc added he was uncertain about the future of the IP-Switching technology now that Ipsilon had been purchased by Nokia. Furthermore, the Digital solution appeared to have been cancelled since it's networking division was absorbed by Cabletron.

4.4 IP Resource Reservation

Simon reported there had been little activity since the last meeting as the Tag Switching experiment had taken priority. When Tiziana returned to work, he hoped to conduct some tests with multicasting and the more recent releases of Cisco IOS. There was also an RSVP implementation for the PC that supported controlled load.

Unfortunately, SWITCH did not have any PCs so it would be necessary for these tests to be conducted by someone else. The requirements were a Windows 95 PC and a Cisco router capable of running IOS 11.2(1). This should preferably be directly connected to an ATM switch. It would also be necessary to set-up a new VP that would be used as a dedicated leased line.

As Jeroen was interested in participating, Michael agreed to ask JAMES for a new VP between the Netherlands and Switzerland.

ACTION 14.2 - Michael Behringer

4.5 ATM Point-to-Multipoint

Robert reported the initial tests with one leaf between Germany, Austria and Portugal had been conducted successfully. Unfortunately, they needed to upgrade their LS-1010 with Feature Card III before they could test more than two leafs.

Michael asked why the LS-1010 was limited to running two multicast leafs. Robert replied they were experiencing the same problems as the ATM Resource Reservation Experiment. They only had two physical interfaces available, and logical multicasting was not supported on these.

4.6 ATM Signalling

Michael said he would take over this experiment from Christoph Graf who had left DANTE. As this was closely related to the PNNI tests, Michael would contact Guenther to set things up.

ACTION 14.3 - Michael Behringer

4.7 ATM Policy and Accounting

Victor reported that four papers had now been written about ATM policy control and accounting, and he was now looking for feedback. These papers were available on the WWW, and their URLs would be sent to the mailing list.

ACTION 14.4 - Victor Reijs

4.8 ATM Traffic Management

Jeroen reported they had planned to test ABR in a multi-vendor environment, but the Digital ATMWorks 3.51 was the only NIC that currently supported this and there were not yet any drivers available. A small German company claiming to manufacture NICs that supported all three classes of ABR had also been contacted, but they had not replied. As the WWW site had also disappeared, they were assumed to have become defunct.

A Feature Card III had been obtained for the LS-1010, but could not be tested without a NIC. One possibility was to write the necessary device driver for the ATMWorks NIC, and permission to undertake this had been sought from Digital.

Jeroen asked whether anyone knew of other NICs that supported ABR. Jean-Marc replied Efficient Networks claimed to have such a card, and he also believed Fore had a beta card available.

4.9 ATM Address Resolution

Vegard reported a five-node NHRP network had been established between Austria, France and Switzerland. The intention was to conduct some reliability and timing tests, and to investigate routing behaviour. As static routing had already been tested to some extent, the tests would start directly with dynamic routing. More complexity would also be introduced to the network by adding additional nodes in Austria, Germany, Spain and Norway.

Jean-Marc said he was also interested in conducting some performance tests. He asked Vegard whether a standard set-up script could be prepared that everyone could use.

ACTION 14.5 - Vegard Engen

Olav asked whether any protocols other than IP should be tested over NHRP. It was unanimously agreed the group should concentrate on IP.

Vegard added there very little literature about NHRP. Much of the documentation on the WWW had been written by the TF-TEN group itself. Simon however, said some IETF drafts relating to IP Neighbour Discovery over NHRP were available. He would send some information about these to the mailing list.

ACTION 14.6 - Simon Leinen

Olav did not believe it was practical to run NHRP on large networks. Whilst there did not appear to be any physical reason why NHRP would not scale, it was impossible to authenticate trust relationships.

4.10 ATM Addressing

Kevin reported he had been contacted by Dave Sutherland (BT) who said JAMES now had a Fore switch in Germany capable of address translation. He therefore asked whether anyone was interested in running an address translation experiment.

Michael and Robert indicated their interest, and it was proposed to initially test the encapsulation of NSAP addresses over the JAMES (E.164) network. Testing the translation of E.164 to NSAP addresses and vice-versa was not considered to be of interest to the TF-TEN group at present.

Kevin said he would contact Dave Sutherland at BT with an experiment proposal.

ACTION 14.7 - Kevin Meynell

4.11 Native ATM Performance

Stefania reported she had managed to conduct some native ATM tests between INFN Milano and ENST in France. There had been some initial problems with connectivity, but it had been possible to ping using TCP/ONIP. A Web Server and Client (modified X-Mosaic) were due to tested next.

Victor mentioned the MESH project which ran high-quality video-conferences over ATM, was being demonstrated at the forthcoming Telematics Conference. This supported M-JPEG running at 2 Mbps (30 fps), accompanied by 1.5 Mbps audio for each stream - up to six streams in total. It had been developed at the University of Enschede, and was funded by SURFnet for use on their ATM network. A Pentium-class PC running Windows NT was required, together with a high specification video-capture card ($10,000). Future plans included support for MPEG-2, but this was not yet practical as current video capture cards were too slow.

Jose asked how multiple-user conferences were supported. Victor replied a central MCU was required which resulted in a lot of data replication. This however, did not present a problem in the Netherlands as SURFnet was not overloaded.

Jose also asked whether any problems had been experienced with CDVT. Victor replied this was not noticeable.

Michael asked about the type of ATM encapsulation used. Victor replied they were using AAL5.

4.12 Network Management

Zlatica reported a mesh of PVCs had been established across the TF-TEN Overlay Network for network management purposes. A full mesh required 56 VCs, but it had only been possible to use 10 because the adapter cards only supported a limited number of IP addresses. Nevertheless, this was sufficient to cover all the VPs. Pings were periodically sent across the VCs to determine whether the VPs were still active, and this information was displayed on a colour-coded WWW page. Only the current status of the VPs were displayed at present; an historical database had yet to be implemented.

Michael asked whether it was possible to use OAM to determine the status of the VPs. You could generate periodic OAM messages and check the counters in the switches with SNMP. Zlatica replied OAM was not used by many people as yet, and in any case, Cisco only had a proprietary solution. She did not believe her report should encompass OAM. Jose added that Cisco counters did not seem to be

accurate anyway.

Guenther asked what version of Cisco IOS supported OAM. Zlatica replied she would investigate and send this information to the mailing list.

ACTION 14.8 - Zlatica Cekro

Michael asked everyone to check whether their switch could support OAM.

ACTION 14.9 - All

Zlatica added that she intended to discuss the various MIBs at the next TF-TEN meeting.

4.13 Security

Jose said he had reviewed the draft security recommendations from the ATM Forum. These had been split into two phases, neither of which had yet been approved. The recommendations were expected to be ratified in March or April, but this process had already been delayed several times.

Mechanisms for secure signalling and authentication were under consideration, but new hardware would be required for some features. Manufacturers were therefore not keen to approve the draft recommendations as this would mean their existing equipment would not be ATM Forum compliant. A summary would be sent to the mailing list once the full documents were received.

ACTION 14.10 - Jose Vilela

Jose went on to say there were problems with the LANE protocol as it was impossible to verify hosts on the network. It also did not seem possible to prevent unauthorized users from tearing down VCs. Cisco and Fore however, did currently support access lists in the switches.

Guenther commented that PNNI 2.0 would have some provisions for authentication.

5. HARDWARE UPGRADES

Michael reported that Cisco Europe had been sent a list of those requiring the Feature Card III upgrade. Whilst they were initially positive about this, he had not heard anything for a while. The cards were due for release on the 15th January, but there appeared

to be a huge demand for these. It seemed the TF-TEN group were not high on the priority list as Cisco had started to talk about problems with internal budgets.

Guenther asked whether Cisco were aware of the TF-TEN time constraints. Michael replied this was the case, but he felt the problem was that the TF-TEN request was not specific enough. A more detailed proposal may yield better results.

Jeroen mentioned they had already obtained a Feature Card III from Cisco Netherlands. Michael added his negotiations should not preclude members from approaching Cisco in their own countries if they felt this path would be more productive.

6.   STATUS OF DELIVERABLES

Michael reminded the group there were still two deliverables due under the TEN-34 contract. Deliverable 14.2 would be the results of the current experiments, whilst Deliverable 14.3 would be the group's recommendations.

Deliverable 14.2 was due at the European Commission on the 30th April 1998, but it realistically had to be finalised by the end of March to allow for peer review. This meant there was less than two months to complete all the experiments. Michael asked about the timescales and constraints for these experiments:

The PNNI network was already up and running. Jose and Michael however, said they would upgrade their Fore switches to ForeThought 5.1 and try to join the cloud. It was anticipated this would happen by the 14th February.

ATM Resource Reservation depended on the LS-1010s being upgraded with Feature Card III.

The main label-based switching experiment had been completed, but Jean-Marc had asked Cisco for an extension of the equipment loan until the 16th February. He intended to conduct one further test between France and Italy to validate the findings of the previous tests on this link.

Further IP Resource Reservation tests could be conducted as soon as the new VP from Switzerland to the Netherlands had been configured.

The local ATM point-to-multipoint tests would be completed in the coming week to determine the version of Cisco IOS required. Basic tests with Austria and Portugal would begin after this, and would

take about a week. Extended tests may take a bit longer.

It was decided to merge the Signalling and ATM Routing experiments. A few tests would be conducted after the 16th February.

The ATM Traffic Management tests were awaiting suitable NICs.

ATM Policy and Accounting had been completed, although feedback would be appreciated.

NHRP tests would be conducted in the next couple of weeks.

The Native ATM, Network Management and Security experiments were not reliant on anything else, and were ongoing.

Michael was still looking for peer reviewers who understood the TF-TEN activities, but were not directly involved with them. Ladislav volunteered for this and Stefania said she would ask Mauro Campanella if he was interested. Whilst Mauro was a member of the group, he was not an experiment leader.

Michael went on to say that Deliverable 14.3 was due on the 30th June 1998. This should not only summarise the work from the last two year's, but it should address whether there was a requirement for a successor to TF-TEN.

Victor suggested this subject should be discussed further at the next TF-TEN meeting. This was agreed.

7.   DATE OF NEXT MEETING

The next meeting will be held on the 20th and 21st of April 1998 in Greece. The actual venue would be confirmed at a later date.

As the TEN-34 project finished in June, it was not certain whether a subsequent meeting was necessary. Nevertheless, it was agreed that the 19th and 20th of June 1998 should be reserved anyway. CESNET offered to host this meeting if required.

8.   ANY OTHER BUSINESS

Kevin mentioned that TERENA currently had a vacancy for a Project Development Officer. Further information was available from:

    http://www.terena.nl/info/jobs/

Robert said the ATV-DSD project wanted to conduct some testing over

the TF-TEN Overlay Network on the 18th and 19th of February. This should not affect TF-TEN activities.

Simon reported the Swiss PTT had started to offer VBR services. He was looking for an exchange of experiences with countries that already had these (France, Netherlands and UK?).

Finally, Michael thanked Celestino and UPC for hosting the meeting.

9.   ACTIONS FROM LAST MEETING

13.1   Guenther Schmittner to propose the connection parameters for the ATM Resource Reservation Experiment.
       - Ongoing. This experiment requires the Cisco LS-1010s to be upgraded with Feature Card III.

13.2   Jean-Marc Uze to request additional VPs for the Tag Switching experiment from France Telecom.
       - Done.

13.3   Jean-Marc Uze to propose an addressing and routing scheme for the Tag Switching experiment over JAMES. In addition, to send a Cisco NDA to each participant.
       - Done.

13.4   Simon Leinen to send details of the IETF RAP group to the mailing list.
       - Done.

13.5   Robert Stoy to put configuration information for the ATM Point-Multipoint experiment on the WWW.
       - Ongoing.

13.6   Christoph Graf to produce proposal for next phase of SVC testing.
       - Ongoing. This action was transferred to Michael as Christoph had left DANTE.

13.7   Victor Reijs to send URL of ATM Policy Control paper to the mailing list.
       - Done.

13.8   Olav Kvittem to circulate configuration details and an addressing plan for the NHRP experiment.
       - Done

13.9   Kevin Meynell to draft proposal for testing ATM address translation.

- Done.

    13.10 Zlatica Cekro to circulate the PVC topology for network
           management.
                - Done.

    13.11 All to configure network management PVCs on their switches
           were necessary.
                - Done.

    13.12 All to check whether the equipment list on the TF-TEN pages
           was to up-to-date.
                - Done.

    13.13 Jean-Marc Uze to circulate the general specifications of
           Feature Card III for the Cisco LS-1010.
                - Done. Michael would put these specifications on the WWW.

    13.14 Michael Behringer to try and arrange a Czech connection to
           JAMES through Germany.
                - Done. It was not possible to obtain this.

    13.15 Kevin Meynell to add Daniel Michel to the TF-TEN mailing
           list.
                - Done.

OPEN ACTIONS

    14.1   Guenther Schmittner to propose an experiment running CBR and
           VBR in parallel.

    14.2   Michael Behringer to ask JAMES for a new VP between the
           Netherlands and Switzerland.

    14.3   Michael Behringer to contact Guenther Schmittner to set up a
           Signalling experiment over PNNI.

    14.4   Victor Reijs to send the URLs of the ATM Policy and Accounting
           papers to the mailing list.

    14.5   Vegard Engen to send Jean-Marc Uze a set-up script for NHRP

    14.6   Simon Leinen to send some information about IETF drafts
           relating to IP Neighbour Discovery over NHRP to the mailing
           list.

    14.7   Kevin Meynell to send a proposal for an address translation

experiment to Dave Sutherland at BT.

14.8 Zlatica Cekro to investigate which version of Cisco IOS
      supports OAM and send this information to the mailing list.

14.9 All to check whether their switch can support OAM.

14.10 Jose Vilela to send a summary of the ATM Forum security
      recommendations to the mailing list.

13.1 Guenther Schmittner to propose the connection parameters for
      the ATM Resource Reservation Experiment.

13.5 Robert Stoy to put configuration information for the ATM
      Point-Multipoint experiment on the WWW.

13.6 Michael Behringer to produce proposal for next phase of SVC
      testing.