

TRANS-EUROPEAN NETWORKING TASK FORCE

Draft Minutes of the 13th TF-TEN meeting held on the 20th and 21st of November 1997 at ENSAM, Paris, France.

Kevin Meynell 27/11/97

PRESENT

Name	Organisation	Country
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Stefania Alborghetti	INFN Milano	Italy
Michael Behringer (Chair)	DANTE	-
Mauro Campanella	INFN Milano	Italy
Zlatica Cekro	ULB/STC	Belgium
Vegard Engen	BDC/Uninett	Norway
Tiziana Ferrari	INFN Bologna	Italy
Christoph Graf	DANTE	-
Olav Kvittem	Uninett	Norway
Cees de Laat	U.Utrecht	The Netherlands
Simon Leinen	SWITCH	Switzerland
Emanuele Leonardi	INFN Roma	Italy
Ladislav Lhotka	Sth Bohemia/CESNET	Czech Republic
Sebastien Loye	France Telecom/CNET	France
Daniel Michel	Aerospatiale	France
Vassilis Merakoulis	NTU Athens	Greece
Kevin Meynell (Sec)	TERENA	-
Mick Palfrey	BT	United Kingdom
Herve Prigent	CRIHAN	France
Victor Reijs	SURFnet	The Netherlands
Guenther Schmittner	JKU/ACOnet	Austria
Pavel Smrha	West Bohemia/CESNET	Czech Republic
Irfan Soneji	BT	United Kingdom
Robert Stoy	RUS/DFN	Germany
Jean-Marc Uze	RENATER	France
Jose Vilela	RCCN	Portugal

Apologies were received from:

Olivier Martin	CERN	Switzerland
Celestino Tomas	RedIRIS	Spain
Baoyu Wang	UKERNA	UK

1. APPROVAL OF MINUTES

Guenther requested some minor alterations to the minutes of the

previous meeting.

2. STATUS OF TEN-34

Michael reported the TEN-34 connection to Portugal was due to come up in three months time, but would be via satellite to Switzerland rather than Spain as initially planned. A shared 45 Mbps link between SURFnet and Belnet was about to come into service, whilst a 10 Mbps ATM connection between Austria and Germany was being ordered. The 34 Mbps connection to the US was also due to come into service at any moment.

Simon asked whether it would be cheaper to connect Portugal to TEN-34 via the US rather than satellite. Michael replied this might be the case, but would be politically unacceptable as the EU funded 40% of TEN-34.

Michael also reported that an outline specification for QUANTUM (the successor to TEN-34) had been published in the European Journal to invite expressions of interest. This specification was very rough, but the intention was to have the core network provided by one supplier. DANTE did not wish to negotiate with individual PNOs as they did with TEN-34. There was also a requirement for the QUANTUM PoPs to be open, and to support bandwidth from other carriers. It was not yet decided whether the core network would be run over ATM - a lot depended on what was offered. Finally, it was hoped there would be some provision of bandwidth that would allow research to continue after the JAMES network was discontinued.

3. STATUS OF JAMES

Mick reported there were no changes to the JAMES topology. The link to Greece was still not operational, but a number of projects there wanted connectivity. As a result, it was possible that management of the link would be sub-contracted to GRNet. He hoped something could be reported at the JAMES plenary meeting the following week.

A diagram of ATM services provided by each JAMES node was displayed. Whilst CBR was universally available, VBR, IP over ATM, SVCs, LANE and SMDS were only available on certain nodes. Furthermore, nodes providing similar services could not always interwork due to differences in the implementations. There was actually little demand for these advanced ATM services as most projects using JAMES were testing applications and not network performance. It was planned to implement ABR, UBR and multicast services on the network before the end of the project.

The switches currently being used included the Newbridge 36170, the Siemens EWSXpress and ATM-CC62, the GDC Apex, the Cisco LS-1010, the Alcatel A1000AX, the Lucent AXC2000 and the Fore ASX-200. For commercial reasons, it was not possible to reveal the switches each PNO was actually using.

The wide variety of switches being utilised had resulted in some management problems. This was the reason for developing the X-Coop management utility that ran on HP OpenView. It was expected to be in operation shortly.

Some testing of SVCs with UNI 3.1, NNU 3.1 and IISP had been conducted across the network. There were three clusters of SVC-capable nodes: Telecom Finland, FinnNet and Telia using E.164 NSAP addressing; BT, Belgacom, Tele Danmark, PTT Nederlands, Telecom Italia and Telecom Eireann also using E.164 NSAP addressing; and Deutsche Telecom and Swiss Telecom using E.164 addressing. A Fore ASX-200 switch at Deutsche Telecom was also being used to test address translation.

Performance measurements to the I.356 were also being conducted. Good results had been achieved, although the fact the network was currently under-utilised should be considered. Other tests included traffic profiling for VBR, IP over ATM and network planning/dimensioning. The security work however, had been scaled down as the JAMES partners preferred to conduct this internally. The three PNOs still working on security in a JAMES context were Swiss Telecom, Tele Danmark and France Telecom.

Mauro asked whether JAMES had experienced more problems with SVCs over long distances than short distances, and whether they had experienced problems when setting-up multiple VCs. Mick replied SVCs were simply being tested for compliance, and were not being subjected to any stress testing. Switch efficiency was not yet considered an issue as SVC-based services were unlikely to be provided in the near future. He suggested contacting Dirk Hetzer for more information.

4. STATUS OF EXPERIMENTS

4.1 ATM Routing

Guenther reported that PNNI had been enabled between Austria and Switzerland during the last meeting of the TF-TEN. Since then, Germany, France and Norway had also joined and PNNI seemed to be running successfully between all the countries. Unfortunately, the

Cisco LS-1010s currently only supported a single peer group which meant all switches had to be configured with a 1-bit prefix.

The UK, Portugal and Spain would join the experiment once they had upgraded their Fore switches to ForeThought 5.0. The Netherlands were currently unable to participate as their GDC switch did not support PNNI, whilst Belgium had an LS-100 that couldn't be upgraded. The status of Luxembourg was uncertain, but they could theoretically join as they also had a Fore switch.

One strange phenomena had been noticed. The forward and backward links between Austria and other countries seemed to have different parameters, but no-one seemed to have configured parameters on their switches. This might have an effect on the ATM Resource Reservation experiment. Simon suggested the less-strict policing policy of the PTA (Austrian PNO) switches may be responsible for this effect.

Stefania said a bug in the version of IOS running on their LS-1010 prevented PNNI from working. Guenther replied they should upgrade to IOS 11.2.8.

Olav asked whether it was possible to determine if the routes announced by a remote site were static or dynamic. Guenther said PNNI simply provided details of reachability in a similar manner to IP routing protocols.

Guenther asked how RCCN had managed to obtain ForeThought 5.0. Jose replied they had pressured their supplier. Whilst it was not generally available, it was in Fore's interest for the TF-TEN to test this release.

4.2 ATM Resource Reservation

Guenther said the ATM Resource Reservation tests should wait until PNNI was running on the Fore switches. This would probably be during mid-December. Nevertheless, the relevant connection parameters could be sent to the mailing list prior to this.

ACTION 13.1 - Guenther Schmittner

4.3 Label-based Switching

Jean-Marc presented the results of the Tag Switching tests over the France Telecom network. The initial tests in the local environment had shown that VCs were not always set-up correctly, but the switch software had since been upgraded and the problem did not manifest itself again. There were however, still problems with route

aggregation as the LS-1010s insisted on creating a separate VC for each route. Cisco said the solution was to use BGP behind the routers.

The next step was to test Tag Switching over JAMES. As Tag Switching does not use signalling, all other experiments would need to be suspended on the TF-TEN Overlay Network. Alternatively, TF-TEN could apply for separate VPs.

Michael said it would not be a problem to use the Overlay Network if the tests could be conducted in a week. Olav however, said the experiments may need to be repeated if problems occurred. Simon added that SWITCH in theory had to pay for additional VPs, but this may not be a problem if the VPs were only required for a limited period.

It was agreed that Jean-Marc should request additional VPs for this experiment. Mick recommended submitting a new TFD to France Telecom.

ACTION 13.2 - Jean-Marc Uze

It was also agreed to schedule the tests over JAMES for the 12th-16th January 1998. Jean-Marc would propose an addressing and routing scheme for this.

ACTION 13.3 - Jean-Marc Uze

Jean-Marc mentioned the results of the tests over the France Telecom network were available on the WWW (URL required).

4.4 IP Resource Reservation

Simon and Tiziana reported on the RSVP tests between SWITCH and INFN Bologna. Three workstations running Solaris 2.5.1 and RSVP 0.4.11 were utilised, along with Cisco routers running IOS 11.2. A maximum bandwidth of 400 Kbps was specified, and the interaction between reserved and best effort traffic was observed.

RSVP appeared to prevent packet loss for reserved traffic, whilst the unreserved traffic packets were dropped. Unfortunately, it could not entirely prevent packet loss due to CPU load and the routers crashed several times. The conclusions drawn were that RSVP did not yet provide the same performance guarantees as ATM.

Nevertheless, Cisco IOS 11.2.9 was believed to be more stable and other implementations of RSVP should be tested. It might also be worth testing multicasting.

Mauro asked whether anyone was working on RSVP policy control. Simon replied the IETF had discussed this at a number of BoF sessions, and had now formed a working group called RAP (Resource Admission Policy). He would send details of this to the mailing list.

ACTION 13.4 - Simon Leinen

4.5 ATM Point-to-Multipoint

Robert reported that as PNNI was running successfully on part of the TF-TEN Overlay Network, this experiment could now commence. Initial tests would be between Germany, Austria and Portugal. Robert would put the necessary configuration information on the WWW.

ACTION 13.5 - Robert Stoy

Jose asked whether anyone knew of good talk client to coordinate testing. He said it was difficult to conduct real-time tests through e-mail, and even the telephone.

Jose also said he intended to upgrade their Fore switch to ForeThought 5.0 which may create problems for this experiment.

Victor mentioned that SURFnet was undertaking some point-to-multipoint tests over PVCs. They were investigating studio-based video-conferencing using the Fore Nemesis codecs. These were capable of providing high quality video at 4-10 Mbps.

4.6 ATM Signalling

Christoph reported the results of the recent SVC tests were great improvement over those from Phase I. All connections worked except those to Italy, which may have been due to overloading of switches/routers in Austria. Occasionally set-up times appeared to be high and it was unclear why this was the case. Some NSAP addresses were also incorrect, but this problem was easily corrected. A complete matrix of results would shortly be put on the WWW.

The next stage was to evaluate the long set-up delays with some SVCs. In addition, it would be useful to test SVCs with CBR and VBR classes of service as connections were currently established with a UBR class of service by default. A proposal for this would be sent to the list.

ACTION 13.6 - Christoph Graf

It was also hoped that tests could be conducted with some of the JAMES SVC-compliant nodes. These could either be brought into the TF-TEN Overlay network, or could be used for transit.

Mick thought tests with JAMES would not be possible because TF-TEN was using UNI Signalling 4.0, whilst the JAMES nodes only supported UNI 3.1. Christoph replied the TF-TEN had intended to use UNI Signalling 4.0, but had not found any end-stations capable it. The TF-TEN was therefore using UNI 3.1 as well.

Guenther asked everyone to ensure their switches were clocked to NTP. This should provide enough accuracy to correlate results.

4.7 ATM Policy and Accounting

Victor reported a paper produced by the University of Twente was now on the WWW. This investigated call control metering, measuring and billing according to ATM Forum specifications; and on Fore, Cisco and GDC switches. The author is also looking at the issues of user identification, as it seemed machine-based authentication (e.g. according to NSAP address) was currently the only option.

This paper was available in HTML and postscript. Victor said he would send the URL to the mailing list.

ACTION 13.7 - Victor Reijs

Guenther suggested contacting vendors with ideas about policy control. Victor however, said it would be better to see the recommendations of the ATM Forum first. Jose agreed, and added Cisco wouldn't implement something that wasn't a standard.

4.8 ATM Traffic Management

Irfan said JAMES Work Package 6 was concerned with testing ABR. They were currently trying to procure equipment from AMP that supported Explicit Rate (ER) ABR. Testing was due to commence in late-December 1997 and they were looking for user participation.

Jean-Marc asked how ABR would be tested over JAMES. Irfan replied trials would have to be tunnelled over CBR as the JAMES core switches did not support ABR.

Victor commented that Cisco LS-1010s did not support ER ABR. Cisco only supported on their Stratacom switches. He therefore asked whether it was possible to obtain an AMP card. Irfan replied that

AMP would be happy to supply these to relevant test partners.

Cees mentioned that tests using a Cisco LS-1010 with Feature Card III would be conducted in the Netherlands within the next couple of weeks.

4.9 ATM Address Resolution

Olav said this experiment could begin as soon as PNNI was stable. The initial plan was to connect routers in Norway, Germany, Switzerland and Austria with direct VCs, and then get NHRP to set-up additional VCs on demand. Each node should have two connections, and the tests would investigate the results of taking down individual links.

Olav also encouraged all TF-TEN members to participate in the NHRP cloud. Only a Cisco 4000 series router was required and configuration was very simple. Configuration details and an addressing plan would be circulated on the mailing list.

ACTION 13.8 - Olav Kvittem

Simon mentioned that the Class C IP address used for the original ARP experiments had been sold off by SWITCH to a commercial customer. Nevertheless, they were only part of a routing block and could probably still be used. Christoph added that DANTE had a spare Class C address that could be used if necessary.

Simon also mentioned an OSPF extension that used ATM addresses had been proposed to the ATM Forum by Juha Heinanen. This looked very interesting, and may be available in the next few months. Olav said he would be interested if it was available in time.

4.10 ATM Addressing

Kevin said he had produced a paper about ATM addressing that was available on the WWW (http://www.terena.nl/personal/meynell/Addressing_Policy.html). He had also been contacted by Dave Sutherland (BT) who said JAMES now had a Fore switch in Germany capable of address translation, and asked whether the TF-TEN were interesting in running a trial. Further details would be sent to the mailing list.

ACTION 13.9 - Kevin Meynell

4.11 Native ATM Performance

Stefania presented the results of her native ATM tests using

NetPerf. As yet however, she had been unable to start tests with ENST in France as Telecom Italia had not yet set-up the necessary VP. She was also looking to test Arequipa which ran on a Linux platform. A Fore SBA-200E adapter had been ordered and tests would commence once this arrived.

4.12 Network Management

Zlatica reported the JAMES Customer Management Interface Demonstrator was available with a WWW interface. She did not wish to announce this on the TF-TEN mailing list, but would contact parties that would be interested in testing this.

Victor assumed that such a management interface would require policy control. Zlatica replied this was not in the demonstrator, but would be incorporated at some stage.

Christoph asked whether work had ceased on the X-User Management Interface. Zlatica replied this was the case.

Zlatica also reminded the group that SunNet Manager was being used to estimate cell error ratios of the edge devices on the TF-TEN Overlay Network. This showed cell loss to be conforming to the I.356 standard of 4×10^{-6} . The data was available on the WWW (URL required)

The next step was to set-up a mesh of PVCs on the network for management purposes. These would be used to display the status of VPs (OK, attention required, trouble, no report) on a WWW page, and would allow problems to be identified more easily. A topology had been produced in conjunction with Christoph to indicate where VCs had to be configured. This would be circulated on the mailing list.

ACTION 13.10 - Zlatica Cekro

ACTION 13.11 - All

Mick urged caution when interpreting the output of SunNet Manager as it was also measuring the performance of local loops and non-JAMES equipment. Michael said this was appreciated, but it was basically being used to determine whether VPs up or down for TF-TEN purposes.

4.13 Security

Jose reported the investigation of security features implemented on ATM switches was ongoing. There was currently no signalling and management security although manufacturers were aware access control measures were necessary. The ATM Forum proposals had proved

too complicated to implement, and their publication had been delayed until February 1998.

4.14 LAN Emulation

Mauro presented the results of the LANE performance tests. This experiment was conducted with Sun and DEC Alpha workstations, and demonstrated that server CPU utilisation increased on a LAN with high bandwidth.

Cees mentioned he had conducted some experiments with LANE about a year previously. The results were on his WWW Homepage (<http://www.fys.ruu.nl/~delaat/>), and had been published in the August 1997 issue of 'Nuclear Science'.

5. HARDWARE UPGRADES

Michael said he was negotiating with Jane Butler at Cisco to obtain Feature Card III upgrades for the LS-1010s, which were required for conducting certain experiments. He was currently compiling requirements, and he asked everyone to ensure the equipment list on the TF-TEN pages was up-to-date.

ACTION 13.12 - All

Michael also asked Jean-Marc whether he could send the Feature Card III specifications to the mailing list as he had already obtained one for his LS-1010. Jean-Marc replied a non-disclosure agreement had been signed, but he thought circulating the general specifications wouldn't be a problem.

ACTION 13.13 - Jean-Marc Uze

Guenther asked whether it was also possible to obtain memory upgrades for the LS-1010s that were necessary to run some of the more advanced features. Michael replied he would include this in the list of requirements.

6. PRESENTATION ON CESNET

Pavel gave a presentation on CESNET, the Czech academic network. This was funded by the Ministry of Education and consisted of nine MANs interconnected by an ATM backbone. The ATM backbone was provided by Czech Radio Communications and ran over E3 microwave circuits. It was necessary to utilise microwave links because the Czech Republic does not yet have sufficient fibre infrastructure. A

10 Mbps link to TEN-34 was provided by Global One, whilst US connectivity would be provided through TEN-34.

The backbone network had been running for a year. The exact technology used by CRC was unclear, but CESNET used Cisco LS-1010 switches and 7000 series routers in their parts of the network. PNNI was being run in the backbone, whilst the MANs were using LANE. The only service currently running over the backbone was IP (using OSPF as a routing protocol), but experiments with Fore video-conferencing equipment, Mbone applications and distributed supercomputers had been conducted. Unfortunately, they had found a lack of ATM-aware applications.

Mauro asked whether CESNET had experienced problems with the microwave transmitters in snow conditions. Ladislav replied this was not a specific problem, although they did have other problems with some of the transmitters. The acceptance test for the network had simply been no errors within a 72 hour period.

Cees commented that the use of LANE meant that multicasting would be ineffective. Pavel agreed this was the case, but added LANE was being run for simplicity.

Victor asked whether CESNET intended to use video-conferencing across the entire network. Pavel replied this was the case.

Pavel added that CESNET was keen to participate with the TF-TEN. Whilst they did not currently have a connection to JAMES, their connection to TEN-34 was actually a 34 Mbps leased line and it may be possible to utilise the spare capacity. Michael said he would try and arrange a Czech connection to JAMES through Germany.

ACTION 13.14 - Michael Behringer

7. CO-OPERATION WITH JAMES

Mick said joint experiments between JAMES and TF-TEN had previously been discussed at the meeting in Cambridge, but he provided an updated summary of the areas where cooperation was possible:

ATM Traffic Management - Irfan Soneji (BT) and Victor Reijs (SURFnet). Victor was interested if JAMES were utilising ER-based ABR, but they did not have equipment that could support EFCI-based ABR.

SVC Management - Dave Sutherland (BT) and Christoph Graf (DANTE). JAMES now had a number of SVC-compliant nodes.

ATM Point-Multipoint Testing - Irfan Soneji (BT) and Robert Stoy (RUS). JAMES were currently only interested in PVC-based multicasting, but it may be possible to utilise an SVC-capable node to test SVC-based multicasting.

ATM Policy Control - Irfan Soneji (BT) and Victor Reijs (SURFnet). JAMES had conducted a study, but were unable to share the results with TF-TEN. Nevertheless some informal cooperation might be possible.

ATM Addressing - Dave Sutherland (BT) and Kevin Meynell (TERENA). Deutsche Telecom now had a switch capable of translating between E.164 and E.164 NSAP addresses.

Network Management - Reinhard Zagolla (Deutsche Telekom) and Zlatica Cekro (ULC/STC).

Native ATM Performance - Dirk Hetzer (DeTeBerkom) and Stefania Alborghetti (INFN). Some initial contact has been made.

Security - Swiss Telecom and Jose Vilela (RCCN). Some informal cooperation might be possible. The JAMES Work Package leader will contact Jose.

Mick also proposed some new areas where JAMES were interested in cooperating with TF-TEN:

Circuit Emulation - Ruediger Geisse (Deutsche Telekom). This was not generally of interest to the TF-TEN, but Guenther said AConet was currently investigating telephony over ATM.

VBR - Harry van de Vlag (KPN?). Victor said a university in the Netherlands had already investigated this. Mick however, said this was concerned with the effects of overbooking. No overbooking was currently conducted on the JAMES network, but they were looking at trying this for a short period. Michael thought Mick should contact Olivier Martin (omartin@dxcoms.cern.ch) about this.

SMDS - Kevin Flemming (?). The TF-TEN was not interested in investigating this.

8. PRESENTATION ON ATV-DSD

Daniel gave a presentation on ATV-DSD (Automated Transfer Vehicle - Distributed Simulated Demonstration) project. This was part of the ESPERIT project and was using ATM networks to test the feasibility

of distributed simulations in the European space industry.

The ATV is a spacecraft that will be used to supply the International Space Station in orbit. Simulations are necessary to test the docking procedures of the vehicle, but simulators are expensive to construct. The idea of using an ATM network is to allow personnel located in a number of countries to gain experience of docking, but with reduced travel and/or duplication costs.

The distributed simulation currently runs across the France Telecom, Deutsche Telecom and JAMES ATM networks, using a mechanism that hides latency. Video-conferencing, groupware and whiteboard applications are also utilised for project management purposes. There were also plans to expand the scope of the project by involving partners in the Netherlands, France and Italy who could test different simulation paradigms.

Cees de Laat recommended caution when trying to simulate a real-time system with ATM. It would be very difficult to react to unexpected changes.

Jose asked whether it would have been cheaper to build a supercomputer model. Daniel replied this was true, but models lacked accuracy as important variables were sometimes overlooked.

Daniel mentioned ATV-DSD would shortly have a public WWW Page with more information. He also asked whether he could be included on the TF-TEN mailing list. Kevin said he would add him.

ACTION 13.15 - Kevin Meynell

9. DATE OF NEXT MEETING

The next meeting will be held on the 2nd and 3rd of February 1998 in Barcelona, Spain. These dates immediately precede the European Telematics Conference at the same venue.

A subsequent meeting was provisionally scheduled for the 20th and 21st of April 1998 in Greece. The actual location had yet to be determined.

10. ANY OTHER BUSINESS

Michael announced that Christoph would be leaving DANTE for a new position with Sun Microsystems at the end of January. This was therefore his last TF-TEN meeting. The group thanked Christoph for

his contributions over the past two years.

Kevin asked whether anyone was still having problems sending messages to the TF-TEN mailing lists. Vegard replied he had experienced some problems.

Finally, Michael thanked Jean-Marc and RENATER for hosting the meeting.

11. ACTIONS FROM LAST MEETING

- 12.1 Simon Leinen to investigate moving VP from INFN Milano to INFN Bologna.
 - Done, but this had proved difficult.
- 12.2 Jose Vilela and Stefania Alborgheiti to try and obtain Fore PNNI 1.0.
 - Done. Jose obtained ForeThought 5.0, but had experienced some problems.
- 12.3 All to check whether their switch supports Signalling 4.0.
 - Done.
- 12.4 Michael Behringer to contact Cisco TEN-34 Representative about obtaining hardware for the Label-Based Switching Experiment.
 - This was done by Jean-Marc Uze.
- 12.5 Guenther Schmittner to prepare ATM routing tables for all switches on the TF-TEN Overlay Network.
 - Superseded as PNNI was being used.
- 12.6 Christoph Graf to send procedure for obtaining reverse NSAP address zones to the mailing list.
 - Done.
- 12.7 All to send their current NSAP and IP addresses to Christoph Graf for updating the TF-TEN pages.
 - Done.
- 12.8 Michael Behringer to move ATM addresses to a more prominent place on the TF-TEN WWW site.
 - Done.
- 12.9 Victor Reijs to send URL (and access password) of VBR test page to the mailing list.
 - Done.

- 12.10 Kevin Meynell to write discussion paper about NSAP versus E.164 addressing.
 - Done.
- 12.11 Tiziana Ferrari to send URL of Arequipa page to the mailing list.
 - Done.
- 12.12 Christoph Graf to prepare JUD for re-establishing VP from Belgium to Germany.
 - Done. A JUD was not required.
- 12.13 Michael Behringer to speak to Celestino Tomas about arranging a meeting venue in Barcelona.
 - Done.
- 11.1 Mick Palfrey to obtain a map of the JAMES PoPs and the type of switches each partner is using.
 - Done. The JAMES partners were unwilling to release these details.
- 11.2 Mick Palfrey to ask the JAMES consortium whether the performance tests of switches can be made available to TF-TEN group.
 - Done. The JAMES partners were unwilling to disclose the results to TF-TEN.
- 11.4 Mick Palfrey to send an updated list of experiments and JAMES collaborators to the mailing list.
 - Done.
- 11.5 Mick Palfrey to circulate a list of JAMES deliverables on the private JAMES/TEN-34 mailing list.
 - Superseded. These are listed in the JAMES Technical Annex.
- 11.12 All to update the equipment list on the TF-TEN pages, and check whether their NSAP addresses were still valid.
 - Done.

OPEN ACTIONS

- 13.1 Guenther Schmittner to propose the connection parameters for the ATM Resource Reservation Experiment.
- 13.2 Jean-Marc Uze to request additional VPs for the Tag Switching

experiment from France Telecom.

- 13.3 Jean-Marc Uze to propose an addressing and routing scheme for the Tag Switching experiment over JAMES.
- 13.4 Simon Leinen to send details of the IETF RAP group to the mailing list.
- 13.5 Robert Stoy to put configuration information for the ATM Point-Multipoint experiment on the WWW.
- 13.6 Christoph Graf to produce proposal for next phase of SVC testing.
- 13.7 Victor Reijs to send URL of ATM Policy Control paper to the mailing list.
- 13.8 Olav Kvittem to circulate configuration details and an addressing plan for the NHRP experiment.
- 13.9 Kevin Meynell to draft proposal for testing ATM address translation.
- 13.10 Zlatica Cekro to circulate the PVC topology for network management.
- 13.11 All to configure network management PVCs on their switches were necessary.
- 13.12 All to check whether the equipment list on the TF-TEN pages was to up-to-date.
- 13.13 Jean-Marc Uze to circulate the general specifications of Feature Card III for the Cisco LS-1010.
- 13.14 Michael Behringer to try and arrange a Czech connection to JAMES through Germany.
- 13.15 Kevin Meynell to add Daniel Michel to the TF-TEN mailing list.