QUANTUM

Progress

as reported in The Works of DANTE

December 1999-December 1997

December 1999

TEN-155: UPGRADES

As a result of the yearly TEN-155 service reviews which DANTE carries out with the suppliers of the TEN-155 network, significant upgrading is expected to be carried out on TEN-155 next year. The centr al ring connecting Germany, France, the Netherlands and the United Kingdom will be upgraded from 155 Mbps to 622 Mbps. Additionally, Belgium will become part of the ring. Italy, Sweden and Switzerland will each be connected via 2x155 Mbps links to each of two different locations. Further upgrades to the current services will also be carried out on the lines linking Budapest to Vienna and Athens to London. A new circuit will be added for Vienna to Geneva. All of these circuits are planned to then have 155 Mbps bandwidth.

TEN-155 ACCESS PORT AVAILABILITY

The figures for TEN-155 in November show an average access port availability of 99.54%, with ten of the nineteen connected networks enjoying 100% availability.

However, the average access port availability in October reached only 99.10%, with five of the ninet een networks enjoying 100% access port availability. The decline in the figures, compared to the pre ceding month, is mainly linked to two major service interruptions; BELNET (Belgium) suffered a long break, due to a problem with their local equipment. As a result of a loss of the local loop at the P aris PoP, RENATER (France) suffered a loss of connectivity of about 76 hours between 29 October and 1 November, which reduced their global access availability to just 89.78% for the month of October.

TEN-155 PERFORMANCE INVESTIGATION

Poor end-to-end performance between workstations at end user sites in Germany and the Netherlands we re reported at the beginning of autumn, with packet loss occurring. In a joint effort with KPN, Cisc o and Lucent, DANTE has thoroughly investigated the problem in the past weeks in order to find solut ions quickly. The investigation has uncovered a number of contributory factors, such as CRC errors o ccurring in Cisco routers, the lack of tuning of buffer parameters in ATM switches to exactly match the requirements of TEN-155 and faulty configuration of the switches used in the network.

DANTE is currently involved in intense discussions with KPN and the KPN ATM NOC to investigate how t o prevent similar situations in the future.

As of now, the problems seem to be resolved on the ATM switches, and the current upgrade of the ATM hardware on the Cisco 7500 routers is expected to cure those still remaining.

TEN-155 MBS SUPPORTED AWARD-WINNING PROJECT AT SUPERCOMPUTING '99

At the SuperComputing'99 "HPC Games", an intercontinental team consisting of computational scientist s, networking and systems specialists in Stuttgart (Germany), Manchester (UK), Pittsburgh (USA) and Tsukuba (Japan) was awarded the top prize for the most challenging scientific applications. During this exhibition, a molecular dynamics simulation with over two million particles ran concurre ntly on a Hitachi SR8000 at ETL (Tsukuba), and on CRAY T3E's at the Pittsburgh Supercomputing Center , CSAR (Manchester) and HLRS (Stuttgart), with the TEN-155 Managed Bandwidth Service providing a Vir tual Private Network between Stuttgart, Manchester and the DANTE New York PoP. This Teracomputer spa nning more than 10,000 miles had a total peak performance of 2.2 Tflops.

TEN-155 MBS USER "SUSIE" A SUCCESS

One of the projects using the TEN-155 Managed Bandwidth Service regularly, SUSIE, enthusiastically r eported on the success of a row of videoconferencing sessions which took place between 29 November a nd 3 December. SUSIE works by setting up remote teaching sessions, in which a virtual classroom is c reated by establishing connections (shared white board, audio and video) between classrooms in Canad a, Dublin, Germany and Switzerland.

QUANTUM TEST PROGRAMME

Activity on the QUANTUM Test Programme (QTP) started in November 1998 and is being carried out by a joint DANTE/TERENA taskforce called TF-TANT. One year later, substantial work has been performed on MPLS, Differentiated Services and IP multicast, while a more limited amount of work has been done on flow-based monitoring, route monitoring, IP over ATM, IPv6, QoS monitoring, policy control and ATM signalling, for all of which some results are nonetheless available. Finally, there are a few activi ties that have been defined but have not yet been developed, such as RSVP to ATM signalling mapping, ATM multicasting, WDM and STM-4 concatenation issues.

More information can be found in the interim report delivered to the European Commission regarding the progresses achieved in the Programme.

October 1999

TEN-155: NEW AND UPGRADED EUROPEAN CONNECTIONS

The connection between TEN-155 and the national research network of the Czech Republic, CESNET, was upgraded to 45 Mbps on 20 September 1999.

Within the network, the existing circuit connecting the TEN-155 PoPs in Brussels and Amsterdam was s upplemented with a second 34 Mbps line between Brussels and Paris. The new link, which became operat ional on 20 October, will improve the resilience of the Belgian connection. Similarly, an additional 155 Mbps line has been delivered to connect the TEN-155 PoPs in Switzerland and Italy; this

will be of particular benefit to the Italian national research network, GARR.

AUCS (AT&T Unisource Carrier Services) won a tender for the interconnection of TEN-155 and the Europ ean commercial Internet. The interconnection will be rolled-out over the next few months in four TEN -155 PoP locations across Europe.

The average access port availability of TEN-155 in September improved to 99.75% with nine of the nin eteen connected research networks enjoying 100% access port availability. However, failures on the l ink between Switzerland and Germany, as well as Switzerland and the Netherlands led to a 10-hour out age for the Swiss research network, SWITCH and for CERN.

EXPERIMENTS CONTINUE IN THE QUANTUM TEST PROGRAMME

During September and October experiments in the Quantum Test Programme (QTP) continued. The experime nts carried out by a DANTE/TERENA task force, TF-TANT, have focused on MPLS (Multi Protocol label Sw itching), Differentiated Services and QoS Monitoring, ATM Signalling, Policy Control, IP over ATM, M ulticast, IPv6, Flow based monitoring analysis and RSVP to ATM signalling mapping. On 1 October the working group leaders of TF-TANT presented their first results to the Quantum Policy C ommittee in an open workshop organised by DANTE in Frankfurt. The presentations can be found in the TF-TANT pages.

Roberto Sabatino (DANTE) was appointed the new Chairman of TF-TANT by the members of the taskforce d uring their last meeting held in Frankfurt on 30 September 1999. Roberto took over from Christoph Gr af (SWITCH) who chaired the TF-TANT in the last year.

August 1999

TEN-155 Distributes Oslo Sessions To Europe

At the Internet Engineering Task Force (IETF) meeting in Oslo, July 12-16, the TEN-155 network distributed live audio and visual feeds to network participants throughout Europe. UNINETT, the Norwegian academic network for research and education, hosted the IETF and was responsible for the transmission of the sessions.The TEN-155 network provided connectivity to other European countries and NORDUnet, the regional academic research network for the Nordic countries, provided Multi-cast transmissions to the United States The broadcasts consisted of two simultaneous working group sessions each of which was multi-cast over the Internet in one high bandwidth 2 Mbit/s, and one low bandwidth 28 kbit/s stream. This allowed those with access to the multi-cast to follow the sessions without being physically present.

New Connections to TEN-155

The Irish Research Network, HEAnet, connected to TEN-155 with an access capacity of 10 Mbit/s at theTEN-155 PoP in London on June 29. Due to the delay in completing the TEN-155 PoP, in Dublin the 5El circuits which provide the Dublin-London link were connected to the HEAnet switch in Dublin as an interim arrangement until they can be connected to a KPN switch.

The Portuguese Research network, RCCN, migrated from the TEN-34 network to TEN-155 on June 30. The new physical circuit with a speed of 34Mbit/s also terminates at the TEN-155 PoP in London.

RESTENA, the Luxembourg Research Network, completed its migration from TEN-34 to TEN-155 on July 7. The new physical circuits to the Amsterdam TEN-155 PoP replace the previous TEN-155 connectivity, which was obtained by transitting across the German Research Network, DFN.

The overall access availability for July showed an improvement in comparison to the previous three months, although scheduled and emergency maintenance led to some service interruptions. The most serious of these affected RESTENA, the Luxembourg Research Network, and was caused by a faulty SP card on a switch at the Luxembourg node. In June RedIRIS, the Spanish Research Network, and GRnet, the Greek Research Network suffered from an average availability of only 96.62% and 96.36% respectively. RedIRIS' problems resulted primarily from a broken fibre and GRnet's reduced availability was attributable to a problem with a cross-connect in Geneva.

In July eight national research networks had 100% access port availability, while the average availability for the whole of TEN-155 was 99.52%

Managed Bandwidth Service Beta Phase Reaches a Successful Conclusion

The beta test phase of the TEN-155 Managed Bandwidth Service has now been successfully completed. The eight projects that participated in the beta tests were EDISON, TF-TANT MPLS, TF-TANT diffserv, SUSIE, ENCART, RCnet, DYNACORE, and a collaboration between the Czech physicists and CERN. Altogether 11 countries took part in the alpha and beta tests. A meeting with Group Network Managers has been organised for 15 September in preparation for an interim report on the MBS due to be submitted to the EC in October.

The TEN-155 Managed Bandwidth Service allows for the definition of Virtual Private Networks, with committed bandwidth, between sites of specific user groups and research organisations connected to a participating national research network. The service is also available to research organisations taking part in EC co-funded research and development activities at sites in a country which has a participating national research network.

The TEN-155 Managed Bandwidth Service External Procedures is now available and provides a step-by-step guide explaining how a project can qualify for, and make use of, MBS. This document is available from DANTE at the MBS pages.

June 1999

NEW CONNECTIONS TO TEN-155

More of the TEN-155 network is now up and running. The Spanish research network, RedIRIS, migrated t o TEN-155 on 20 May 1999. Madrid is connected to the core of the TEN-155 network via a 34 Mbps ATM c ircuit to the TEN-155 PoP in Paris.

The Israeli research network, IUCC, was successfully connected to the TEN-155 London PoP via a 34

Mb ps link provided by the Israeli operator Golden Lines on 21 May. This connection is the direct resul t of the Q-MED project, a complementary project to Quantum, with the principle objective of connecting the research and development communities of Israel and Cyprus to TEN-155.

Circuits between Lisbon and London, between Dublin and London and between Luxembourg and Amsterdam are already in place and FCCN, the national research network of Portugal, as well as the Irish research network HEAnet and RESTENA, the research network of Luxembourg, are expected to be connected to TEN-155 at the end of June.

MBS - BETA PHASE SUCCESSFUL

The beta test phase of the TEN-155 Managed Bandwidth Service (MBS) will be completed at the end of June 1999. During the alpha and beta phases the MBS was successfully tested between sites in ten out of the 18 participating countries.

The first tester of the MBS in the beta phase was the EC/ACTS co-funded SUSIE project. The aim of the SUSIE project is to investigate, implement and demonstrate charging schemes for a "Premium" (better than best-effort) IP service and to enable "Virtual Classroom" sessions between school classes in Canada and Europe. The first two SUSIE Virtual Classroom events connected schools in Dublin, Basel, Berlin, Ottawa and Edmonton and were carried out successfully on two occasions in March and May. The MBS was used between the schools in Germany and Switzerland with network extensions to Ireland and Canada using national circuits and the CANTAT-3 transatlantic link with the kind co-operation of Deutsche Telekom, Deutsche Telekom Berkom, Teleglobe and CANARIE. For more information on SUSIE, please contact the SUSIE project manager Kevin O'Leary

The TEN-155 MBS allows the definition of Virtual Private Networks (VPNs) between sites of specific user groups at universities and research organisations connected to a participating national research network, as well as to organisations participating in EC supported research and development activities with sites in countries of a participating national research network. More information about the MBS and how to make use of the service can be found on the MBS pages.

EXPERIMENTS CONTINUE IN THE QUANTUM TEST PROGRAMME

Experiments on MPLS (Multi Protocol Label Switching) have been carried out in May and June. Using th e TEN-155 Managed Bandwidth Service, a VPN with circuit capacities up to 2 Mbps has been set up betw een the participating national research network organisations of Austria, the Czech Republic, France , Germany, Greece, the Netherlands, Italy and CERN.

A second VPN is currently being established for experiments on Differentiated Services involving the national research organisations in six countries as well as DANTE.

The Quantum Test Programme (QTP) has the objective of testing and validating new technologies, produ cts and services with a view to introducing them into the operational TEN-155 service at some future date. A DANTE/TERENA task force, TF-TANT, is in charge of carrying out the experiments of the QTP. For many of these experiments, the QTP makes use of the VPN (Virtual Private Network) facilities off ered by the TEN-155 Managed Bandwidth Service. More information on the QTP, TF-TANT and links to all experiments can be found at the group's webpage.

April 1999

POLAND CONNECTED TO TEN-155

The rollout of the TEN-155 network entered its final stage in March, after the circuits Austria-Hung ary, Austria-Germany and Germany-Italy had been brought into service in succession on 2 and 3 Februa ry 1999. Except for Luxembourg, Portugal, Slovenia and Spain all participating national research net works have now completed the migration from TEN-34 to TEN-155. These countries are expected to migra te to proper TEN-155 PVCs or lines within the next six weeks.

With the transition from TEN-34 to TEN-155 in its final stage, TEN-155 is becoming more and more sta ble and the first trends can be observed. For the transit countries high availability is recorded wh ich is related to the design of the network, especially to the rings and the dual links. In spite of a number of circuit problems, most transit countries had 100% ATM availability with the overall ATM availability calculated at 99.83% in March. IP access port availability for eleven of the seventeen to TEN-155 connected networks was higher than 99.94%.

Joining TEN-155 as a newcomer, the Polish research network POL-34 was connected with a 34 Mbps link to TEN-155 on 10 March 1999.

MBS - NOW IN BETA PHASE

The TEN-155 Managed Bandwidth Service (MBS) allows the definition of Virtual Private Networks (VPNs) between sites of specific user groups at universities and research organisations connected to a par ticipating national research network, as well as to organisations participating in EC supported rese arch and development activities with sites in countries of a participating national research network . The TEN-155 MBS is being introduced in three successive phases with the alpha test coming to a suc cessful end at the end of February. The alpha test report will soon be available from the DANTE MBS pages.

At the beginning of March the beta test phase started. The objective of the MBS beta test is to exte nd the scope of the MBS to more users in more countries and to verify the MBS procedures. For the mo ment three user groups have successfully made use of the MBS as beta testers. The beta test phase wi ll continue until the end of May. The MBS is expected to become fully operational by mid-99.

QUANTUM TEST PROGRAMME

The Quantum Test Programme (QTP) has the objective of testing and validating new technologies, produ cts and services with a view to introducing them into the operational TEN-155 service at some future date. A DANTE/TERENA task force, TF-TANT, is in charge of carrying out the experiments of the QTP. For many of these experiments, the QTP makes use of the VPN (Virtual Private Network) facilities off ered by the TEN-155 Managed Bandwidth Service.

Using the TEN-155 Managed Bandwidth Service, a 2 Mbps VPN has been set up in April between the parti cipating sites for experiments on MPLS (Multi Protocol Label Switching). Label-based switching is a technique based on the integration of layer 2 switching and layer 3 routing. This technique has been designed for high-speed networks to combine the performance of switching with the scalability and f lexibility of IP routing in a more efficient way.

Experiments will also soon start on Differentiated Services and Multicasting (IP and ATM). The goal of the differentiated service (diffserv) architecture is the enhancement of the IP protocol for the support of Quality of Service in a scalable manner, i.e. without relying on either signalling protoc ols or per flow state information.

Results of these experiments and also IP over ATM should become available in May. More information a bout TF-TANT and experiments in other areas of advanced technologies can be found at the group's webpage.

February 1999

TEN-155 AT THE STARTCONFERENCE OF 5 FRAMEWORK PROGRAMME

The European Commission launched its 5 Framework Programme at a two day event in Essen in February 1 999. TEN-155 was officially demonstrated during the launch activities and attracted considerable int erest and attention. The TEN-155 stand was visited by the German Federal for Research and Education Edelgard Bulmahn.

The German Minister was accompanied by Robert Verrue, Director General of DG XIII, when she visited the TEN-155 stand during the exhibition in Essen. Dai Davies and Cathrin Stover welcomed the Ministe r and the Director General to the stand and introduced the TEN-155 network. Mrs Bulmahn and Mr Verru e then participated in a live-video session between the partners of the MECCANO Project. The MECCANO Project is the first user of the TEN-155 Managed Bandwidth Service. For the first time a group of E uropean researchers benefited from dedicated bandwidth made available in the TEN-155 network. Mrs Bu lmahn said: "Offering guaranteed bandwidths, TEN-155 constitutes an example of an innovative step wh ich prepares the ground for new applications, above all real-time applications." Mrs Bulmahn also fo llowed a tele-teaching session, another MECCANO application supported by the TEN-155 network.

TEN-155 MIGRATION CONTINUES

As expected, the migration of the national research networks from TEN-34 to TEN-155 continued in Jan uary and February. Altogether 14 of the 20 TEN-155 circuits are today carrying production traffic. T he link between the German and Nordic research networks was brought into service on 6 January. The F rench research network, RENATER, was connected on 15 January, as was the Czech research network CESn et. Greece was linked to TEN-155 after the line between the Netherlands and Greece passed acceptance testing on 21 January.

On 3 February, the links between Austria and Germany, as well as between Italy and Germany came into service. The connection between Austria and Hungary became operational on 2 February. A link connec ting the Polish research network POL-34 to the TEN-155 PoP in Frankfurt will become operational shor tly.

In January access port availability for seven of the then ten to TEN-155 connected national research networks was 99.99% or higher. RedIRIS, the Spanish research network, suffered some unscheduled con nectivity loss due to various problems, including power failure, line and configuration faults. The

bad weather which affected the satellite connection was still the main cause of a few long-period in termittent losses of connectivity for the Portuguese research network, resulting in a 99.12% connect ivity.

Immediately after TEN-155 succeeded TEN-34, DANTE's Network Planning and Engineering team carried ou t an analysis of the impact of providing more capacity to the European research community. The analy sis compared inter-NRN traffic measurements on TEN-34 in November 1998 (the last month of full opera tion of TEN-34) and on TEN-155 in January 1999. The measurements (daytime averages expressed in Mbps) were derived from DANTE's inter-NRN statistics package, Purgatorio.

The analysis emphasises that inter-NRN traffic had increased by almost 50% which outlines both the b enefits and need for more bandwidth to support the European research community. It is expected that once all national research networks have migrated to TEN-155, the increase of inter-NRN traffic will be even more significant.

More and more co-operative development activities in Europe are based on the use of multi-media serv ices, which are only effective if they can rely on high Quality of Service which cannot necessarily be provided in a "best effort" IP network. The TEN-155 Managed Bandwidth Service (MBS) addresses thi s issue by allowing the definition of Virtual Private Networks with committed bandwidth between nati onal research networks. This service is offered to universities and research institutions connected to a participating national research network, as well as to organisations participating in EC suppor ted research and development activities with sites in countries of a participating national research network. The MBS is being introduced in three successive phases.

The associated contractor ERCIM (European Research Consortium for Informatics and Mathematics) has c hosen the MECCANO project to be alpha tester of the MBS. MECCANO and DANTE have successfully set-up the interconnection of three MECCANO sites across Europe. MECCANO is using 4 Mbps dedicated VCs betw een their sites for their interactive research cooperation.

The beta test phase of the Managed Bandwidth Service will commence by the end of March 1999. It is e xpected that the MBS will be fully operational by mid-1999.

Please turn to MBS, if you would like more information on th e MBS or if you would like to join related mailing lists. Potential users of the MBS are invited to complete a web-based questionnaire.

QUANTUM TEST PROGRAMME

In addition to the operational TEN-155 network, the Quantum project includes a testing programme (QT P) which has the objective of testing and validating new technologies, products and services with a view to introducing them into the operational TEN-155 service at some future date. The QTP is manage d by DANTE and carried out in a joint Task Force (TF-TANT) together with TERENA.

The TF-TANT testing plan has now been finalised and work especially in the area of IP Quality of Ser vice and MPLS (Multi Protocol Label Switching) is progressing. For more information on the QTP and T F-TANT, please visit the TF-TANT pages.

December 1998

TEN-155 OPERATIONAL!

TEN-155 became operational on 11 December 1998. First production traffic was flowing in the 155 Mbps SDH-ring connecting France, Germany, the Netherlands and the United Kingdom, as well as in the link s connecting the Nordic countries (via a node in Sweden) and Switzerland to Germany and the Netherla nds. Acceptance testing is currently being carried out on the 45 Mbps connection between Belgium and the Netherlands and we expect this link to become operational during the next week. The national re search networks of Austria, the Czech Republic, Greece, Hungary and Italy will migrate to TEN-155 pr ogressively before the end of January 1999. Luxembourg, Portugal, Slovenia and Spain will follow soo n after that. A connection to Ireland is also planned for 1999. TEN-155 is the first network to trul y support advanced applications and will create a new dimension in European research cooperation.

Although much of the capacity of the TEN-155 network will be dedicated to a 'best efforts' IP servic e, the network will also offer guaranteed Quality of Service using a combination of ATM and IP techn ology. Specific user groups at universities and research institution can make use of this "Managed B andwidth" Service which allows for the technical setup of pan-European connections with committed ba ndwidth. The TEN-155 Managed Bandwidth Service will be introduced in three phases. The alpha phase h as started in December 1998 with ERCIM (European Research Consortium for Informatics and Mathematics) as the alpha tester. It is anticipated that the alpha phase will last for two to three months. Thi s will be followed by a beta test phase with approximately four to five different user groups and a broadened geographical scope. The full Managed Bandwidth Service should become operational by mid-19 99.

The TEN-155 network will be enhanced by a 155 Mbps link to the United States. The national research networks of Belgium, the Czech Republic, Greece, Hungary, Italy, Luxembourg, Portugal and Slovenia h ave subscribed to this DANTE service with the Spanish research network, RedIRIS, also expressing an interest to sign up to the DANTE US connectivity. CERN and the German research network, DFN, are pla nning to co-locate with DANTE in Telehouse, New York. Peering has so far been arranged with ESnet an d DANTE is currently investigating a connection to STARTAP as well as looking into possible peering arrangements with the American academic and research networks vBNS and Abilene.

More information on the TEN-155 network, including a topology map, frequently asked Questions and An swers as well as web order forms for the TEN-155 brochure and poster can be found on the TEN-155 page.

All TEN-155 routers now distribute information on their geographical location via DNS LOC records; f or more information see http://www.ckdhr.com/dns-loc/

QUANTUM TEST PROGRAMME (QTP)

In addition to the operational TEN-155 network, the Quantum project will implement a testing program me (QTP) which has the objective of testing and validating new technologies, products and services w ith a view to introducing them into the operational TEN-155 service at a future date. A joint DANTE/ TERENA Task Force under the name TF-TANT has been established to carry out the experiments in the QT P using the Managed Bandwidth Service of the TEN-155 network.

TF-TANT will experiment on new IP and ATM technologies such as RSVP, multicasting, differentiated

se rvices, IP version 6 and ATM signalling. The participation in the Quantum Test Programme and TF-TANT is open to any individual or organisation able to make a contribution in the form of manpower, equi pment or services.

October 1998

TEN-155: EUROPE JOINS THE FAST LANE

Starting in December this year, DANTE, together with the national research networks of 16 European countries and with the support of the European Commission, will replace the current TEN-34 network with the new TEN-155 network. TEN-155 will have access capacities of 155 Mbps in 8 European countries and will be the largest operational pan-European network. For the first time, and as a direct result of the liberalisation of the European telecommunications market, pan-European bandwidth will equal bandwidth available within the national research networks.

TEN-155 will provide researchers across Europe with a core transmission network of 155 Mbps circuits and nodes in Austria, France, Germany, Italy, the Netherlands, Sweden (as the connection point for the Nordic regional network service), Switzerland and the United Kingdom. Belgium, the Czech Republic, Greece, Hungary, Slovenia and Spain will be connected to the core at 34/45 Mbps. There will be 10 Mbps links to Luxembourg and Portugal and an extension of the service to Ireland is currently planned. The design of the TEN-155 network also provides for extension of the service to the United States and other Continents.

TEN-155 will use a combination of IP, ATM (Asynchronous Transfer Mode) and SDH (Synchronous Digital Hierachy) technologies. The network will be based on SDH circuits with an ATM overlay which allows for bandwidth management and the optimal loading of the SDH capacity. A conventional IP service will run on top of a full mesh of ATM virtual circuits. DANTE will also be able to offer both a Managed Bandwidth Service to specific user groups and the temporary setup of Virtual Paths with guaranteed bandwidth between national research networks.

As announced in an international press event on 17 September 1998, the main supplier of the TEN-155 network is Unisource Belgium who will provide connectivity in Belgium, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom. The contract with Unisource Belgium has been signed for a period of 3 years, with the roll-out of the network starting in December 1998. It is anticipated in the Unisource contract that the network will be upgraded to 622 Mbps by the year 2001!

More information on the TEN-155 network, including a topology map, frequently asked Questions and Answers as well as web order forms for the TEN-155 brochure, poster and mousepads (as long as stock is available :)) can be found on the TEN-155 homepage.

QUANTUM TEST PROGRAMME (QTP)

In addition to the operational TEN-155 network, the Quantum project will implement a testing programme (QTP) which has the objective of testing and validating new technologies, products and services with a view to introducing them into the operational network at a future date. The QTP is managed by DANTE as the Co-ordinating Partner in the Quantum project and carried out in a Joint

Task Force with TERENA.

The working items of the Task Force have been defined during a meeting in September and will include among others RSVP, multicasting, differentiated services, IP version 6 and ATM signalling. Although much of the effort to carry out the QTP is expected to come from the national research networks and the Associated Partner Telebit Communications A/S, the participation in the QTP is open to any individual or organisation able to make a contribution in the form of manpower, equipment or services.

You can find more information on the QTP and the Task Force on the QTP pages.

August 1998

TEN-155: EUROPE MOVES INTO THE FAST LANE

Work on the successor of the TEN-34 network, the new TEN-155 network, has progressed immensely in the past months and is currently DANTE's major activity. The supply contract for the bulk of the capacity was signed at the end of August and will officially be announced during an international press conference in Brussels on 17 September. The press releases and further information on TEN-155 concerning the technology and topology will be made available on the DANTE web after the press announcement.

QUANTUM TEST PROGRAMME (QTP) - THE SUCCESSOR OF TF-TEN

What TF-TEN was for the TEN-34 network, the QTP will be for TEN-155. QTP is the test programme included in the Quantum project which has the objective of testing and validating new technologies, products and services with a view to introducing them into the operational TEN-155 service at some future date. The Quantum Test Programme is managed by DANTE as the Co-ordinating Partner in the Quantum project.

Much of the effort to carry out the QTP is expected to come from the national research networks as the Partners in the Quantum project and from Telebit Communications A/S. Telebit is Associated Partner in the Quantum project and will provide technical support including laboratory testing facilities when appropriate.

In addition to the involvement of the national research networks, participation in the QTP is open to any individual or organisation which is able to make a contribution in the form of manpower, equipment or services. The work of the QTP will be conducted in an open fashion and the results, including the EC Deliverables, will be public.

An initial list of topics which will be studied in the QTP is available from the web here. There are also links to further descriptions of those topics for which more detailed planning has already been carried out.

The last TF-TEN Deliverable 14.3 "Summary Results of the Test Programme" is available now.

June 1998

QUANTUM: MAJOR ISSUES DECIDED

At the end of May, the QUANTUM Policy Committee decided on major issues concerning the QUANTUM network, the successor of the TEN-34 network. Next to a set pricing scheme, the committee members agreed on the principle that ATM will be used as a bandwidth management tool to optimise the use of the SDH circuits. The individual national research networks will have the choice between ATM or IP-over-SDH access to the network.

The QUANTUM network will receive co-funding from the EC ESPRIT and Telematics for Applications programmes. The QUANTUM Policy Committee has also mandated DANTE to negotiate detailed arrangements with the EC ACTS programme for the support of ACTS projects as well as with the Commission in general to prepare the final EC contract for QUANTUM.

Towards the end of 1997, the Israeli government signed a scientific cooperation agreement with the EC. One of the consequences is that Israeli organisations now qualify to participate in Fourth Framework projects and can receive funding support in the same way as EU organisations. A more specific consequence is that Israel, via its national network organisation MACHBA/ILAN, expressed a strong wish to join the TEN-34 and QUANTUM projects.

A parallel set of discussions has been proceeding for several months in the context of the EC's MEDA Programme which provides for promotion and support of Internet technology and applications in the Mediterranean region.

These two strands have now been brought together with the preparation and submission to the EC Telematics Programme for a new Q-MED project. Q-MED will be a complementary project to QUANTUM and will provide for the connection of MACHBA/ILAN to the TEN-34 successor (at a location which is yet to be determined and which will depend on the cost of international access circuits) and the connection of the University of Cyprus/CYNET to the Greek node in Athens. DANTE will act as the Coordinating Partner in this complementary project; other partners in addition to MACHBA/ILAN and the University of Cyprus/CYNET are GSRT (Greece), INFN/GARR (Italy) and NTUA (Greece).

The Q-MED proposal is currently being evaluated by the EC.

April 1998

THE QUANTUM PROJECT

The Quantum proposal for EC support of the new network and related activities has been approved by the EC's Esprit and Telematics committees. Altogether 17 M ECU will be made available by the EC towards the building and maintaining of th e new network until the funds from the 5th Framework Programme will take over.

The Quantum Policy Committee agreed on 27 March to DANTE's proposal to prepare t hree alternative costed proposals, based on the tenders we received, for a furth er meeting at the end of May. The speed of decision making after that will depen d on how clear-cut the choice of supplier(s) appears at that stage. There are st ill a large number of technical issues to be resolved with most of the potential suppliers. Delivery commitments, location of PoPs, provision of local access ci rcuits (if necessary), and management of the managed bandwidth service are still major topics which continue to require discussion and negotiation.

February 1998

QUANTUM - TENDER RESPONSES RECEIVED

On February 13, DANTE, acting on behalf of the QUANTUM consortium received 16 responses to the Invitation to Tender issued on 23 December 1997. These respons es are being evaluated under strict confidentiality by a team made up of DANTE s taff and four technical experts from some of the National Research Networks. The responses cover a range of offers from point-to-point connectivity to complete subnetworks and it is expected that a much more cost effective network can be bu ilt from these offers.

December 1997

QUANTUM AND TEN-???

Following the positive evaluation by the EC of an outline proposal for a new project named QUANTUM (Quality Network Technology for User-Oriented Multi-Media), the EC has invited the participants to submit a detailed proposal with a deadline of 25 December 1997.

In parallel with the EC's evaluation process, DANTE and the NRNs have already been planning the successor service to TEN-34 which has the working name of TEN-155. A specification of the service as seen by the NRNs which will use it has been agreed. In addition to a conventional IP-based service with access capacities up to 155 Mbps, the specification provides for additional services with guaranteed Quality of Service which will be supported by a combination of ATM technology and new developments from the IP world. The possibility of creating multiple Virtual Private Networks (VPN), with the highest capacity VPN being used to support the IP service, has been allowed for.

A new consortium has been created to submit the detailed QUANTUM proposal to the EC and to create the TEN-155 network. The consortium includes all the TEN-34 NRNs and again has DANTE as the co-ordinating partner. The proposal for QUANTUM includes a programme of testing of new techniques for supporting defined QoS as well as funding support for the operational network.

DANTE, acting on behalf of the NRNs, issued a Request for Expressions of Interest (the first stage of the standard procurement procedure under EC rules) on 10 November 1997 and will issue an Invitation to Tender on 23 December 1997 to organisations selected from those which have confirmed their interest. The deadline for responses will be early in February 1998.

The intention is to start replacing components of TEN-34 as soon as possible after 31 July 1998 when many of the TEN-34 contracts with PNOs terminate. It is expected however that migration to the new service will extend over several months and it may be that some of the TEN-34 circuits (eg those to countries where there will continue to be a PNO monopoly for international services) will continue to be used in TEN-155.