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**DANTE-
Organisation and
Activities**

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This paper was presented at the NATO Advanced Networking Workshop in Yaroslavl, Russia in June 1998. The workshop addressed the Management and Policy Issues in running a National Research and Education Network, and was aimed at managers of national research networks from Central and Eastern European countries (including all countries of the former Soviet Union).

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1. Introduction

This paper describes briefly the structure and role of DANTE (Delivery of Advanced Network Technology to Europe Ltd). The benefits and difficulties of adopting a commercial structure for an organisation which provides services to the academic and research community is also discussed. Although DANTE operates international services across Europe and beyond, many of the principles discussed here apply equally to national research and education networks (NRNs).

2. What is DANTE

Put simply, DANTE is a non-profit, limited liability company registered in the UK with eleven Western and Central European NRNs as shareholders. Its role is to provide international services to national networks.

DANTE has a standard commercial structure under UK law with, in addition, limitations on the issue and transfer of shares. This ensures that no single NRN shareholder can exercise undue influence over DANTE's activities and that shares cannot be sold, for example, to a commercial organisation that wished to take over the company. DANTE also has "Research Association" status in UK; this is available to companies whose principal activities are related to, or in support of, research and development. With this status, which has to be confirmed annually, DANTE avoids tax on surpluses which can then be applied in full to support devices in future years.

The reason DANTE does not have more shareholders is that NRNs in several countries found it difficult or impossible to acquire shares in a limited company. In general, NRNs are either part of a government department or are otherwise subject to government expenditure procedures which do not provide for share purchases. DANTE services are available to all NRNs whether or not they are shareholders.

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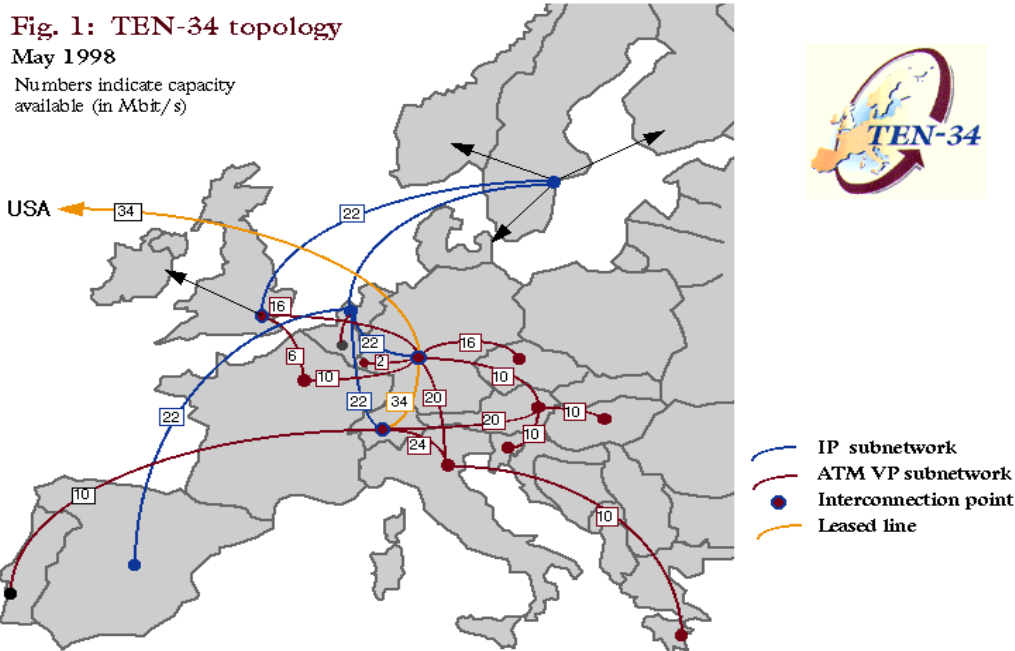
The need for an "Operational Unit", with a structure geared to providing services, was identified by members of RARE (one of the parents of TERENA) in 1991/92. The absence of such a body was impeding the development of international connections between the NRNs. Earlier procedures involving informal collaboration and bilateral agreements between pairs of NRNs were breaking down as the scale of demand increased; the RARE structure, designed to provide a common discussion forum and to coordinate the NRNs' development activities was not suitable for the management of operational services. DANTE was therefore set up as a complementary organisation in 1993.

3. DANTE Activities

DANTE's principle current activity is as the Coordinating Partner in the TEN-34 and Quantum projects.

TEN-34 has been in operation since March 1997; it provides access capacities up to 45 Mbit/s in 16 countries and is the international IP backbone for the European research and education community. TEN-34 is supported by the Esprit and Telematics Programmes of the European Commission (EC) which contribute funds equal to about 40% of the network cost. As Coordinating Partner in the EC contract for TEN-34, DANTE is responsible for all formal communications between the TEN-34 Consortium and the EC, including the submission of project deliverables, and for financial management of the project, including the distribution of EC funds. In addition, DANTE provides project management and has overall responsibility for operations management, the day-to-day aspects of which are sub-contracted to UKERNA.

The configuration of TEN-34 is shown in Fig. 1; further details of the network are available from <http://www.dante.net/ten-34/>.



The TEN-34 Project with the EC will terminate on 31 December 1998 and the TEN-34 service will be replaced during the second half of 1998 by a new service with the name TEN-155 and with access capacities up to 155Mbit/s. A major DANTE activity at present is preparing for the TEN-155 service as the successor to TEN-34. A public tender for components of the TEN-155 service was issued in December 1997 and the evaluation of tenders is at an advanced stage. In parallel with this activity, DANTE and the NRNs have made a proposal for a project named QUANTUM as a new EC project to support the TEN-155 project until the start of the EC's Fifth Framework Programme.

Separately from TEN-34, DANTE provides US connectivity to five NRNs which use part of their TEN-34 capacity to send traffic to and from the termination point of a shared 34 Mbit/s circuit (due to be upgraded to 45 Mbit/s) in Frankfurt. Mainly because the cost of international circuits in Europe is high compared with the cost of transatlantic links from most countries, many NRNs in large countries have provided their own US connectivity.

In addition DANTE is, or has been, involved in a number of other connectivity projects. It managed PHARE 1994 R&D Networking Programme, an EC/DGI Programme which provided for new and improved network connections

to the Central and Eastern European countries, and currently holds two NATO Network Infrastructure grants which will fund the installation of satellite links and local networking services in Kyrgyzstan and Tajikistan.

A set of applications services cover X.400 mail coordination (MailFLOW), coordination of an X.500 directory service (NameFLOW/Paradise), Mbone distribution and security. They represent only a small proportion of DANTE's total activity.

4. How does DANTE work

DANTE's basic method of working is through the bulk purchase of services from multiple suppliers, integration of these services and "re-sale" of integrated service to NRNs. The day-to day operation of all services is sub-contracted although DANTE retains overall responsibility.

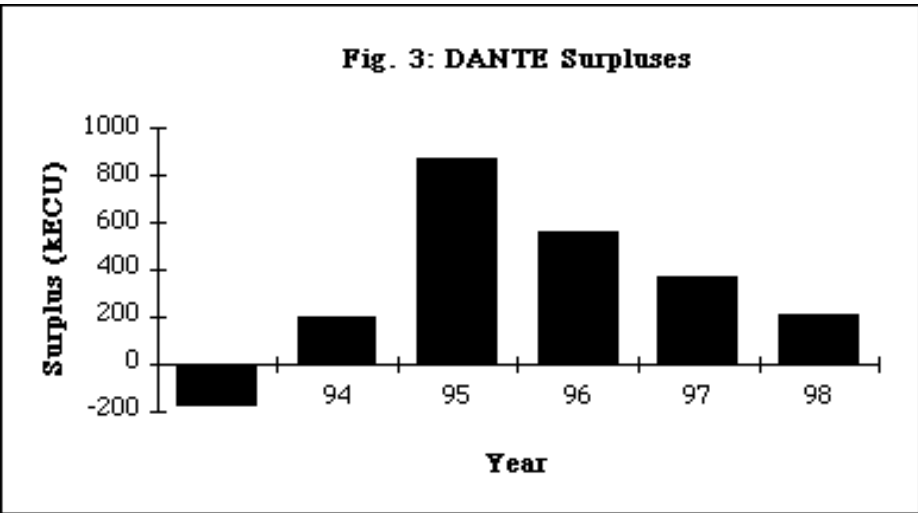
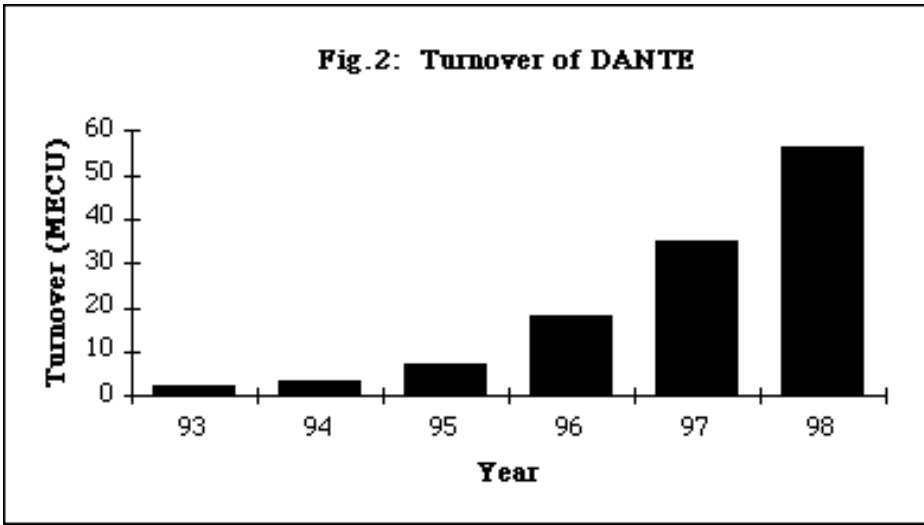
DANTE's purchasing can be effective in two ways: negotiating the provision of new services before they are commercially available; and combining the purchasing power of several NRNs to get bigger discounts on commercially available services.

EC rules for funding Fourth Framework projects mean that TEN-34 and QUANTUM are set up as collaborations with DANTE as Coordinating Partner; because of the EC requirement that projects must be undertaken by collaborations

consisting of at least three partners from different countries, DANTE could not act alone.

5. Scale of Operation

DANTE has a total of 16 members of staff based in Cambridge, UK. In addition, there is one full-time contractor based in Brussels. The turnover of DANTE in each year since its establishment is shown in Fig. 2; annual surpluses are shown in Fig. 3.



Notes on Figs. 2 and 3:

- 1. "93" covers the period 25 March 1993 to 31 March 1994
- 2. "94" covers the period 1 April to 31 December 1994. Subsequently, DANTE's accounting years have been aligned with calendar years.
- 3. Figures for 1998 are estimates.

Turnover in 1997 was 35 MECU. Turnover per employee is very high compared to the average company. This is caused in large part by high telecommunications costs in Europe. Turnover is not expected to grow dramatically in future years; it is more likely that roughly constant amounts of money will be used to purchase increasing amounts of data communications capacity.

Turnover of this magnitude does however require the exercise of strict commercial discipline. Budgeting, accounting, contract management and invoicing are all carried out according to normal business conventions.

6. Benefits of Commercial Structure

The commercial structure of DANTE brings a number of benefits.

DANTE is free to take commercial risks (within the normal constraints of a limited liability company) and is not restricted by the commitment and spending authorisation procedures common to government departments and government-related organisations

Working within a well-established and well understood commercial framework, administrative services can be sub-contracted and specialist expertise, for example legal, taxation and accounting expertise, can easily be called upon when necessary. Bureaucracy is kept to a minimum and the General Managers are authorised to make significant spending commitments without prior authorisation of the Board of Directors. The General Managers and the company as a whole are judged by results rather than having to work within cautiously defined constraints. This allows rapid and effective decision making.

Controls are nevertheless provided by legal processes as well as internal procedures. Under UK company law, the Directors of the company, and in practice the General Managers as well, carry personal responsibility for the financial health of the company. In the limiting case, it is a criminal offence under UK law for Directors to allow a company to continue trading if it is insolvent. The company has a legal responsibility to publish annual accounts in a defined form and containing a standardised set of information as a minimum.

The contract culture of the commercial world also imposes a valuable discipline. Services to be provided, payments to be made, and actions following abnormal events are all specified before commitments are made; it is much easier to deal with

problems for which the procedure for finding a solution is pre-defined than it is to start negotiating such procedures after problems have occurred.

The ultimate control on DANTE's performance is that of the market. The NRNs are not obliged to use DANTE's services and are free to acquire services elsewhere if they believe that would be of benefit to them.

7. Difficulties of Structure

The commercial structure of DANTE does however introduce a number of minor difficulties that constantly need to be addressed.

DANTE is in principle free to offer services to commercial organisations but, as a matter of policy, restricts itself to serving the research and education community. There was - and still is - some confusion about DANTE's position and there is sometimes a perception of DANTE as a competitive threat amongst companies active in the same field. This perception commonly arises because the company concerned has not understood DANTE's role; efforts have continually to be made to show that DANTE's activities are limited to the support of NRNs and the provision of services which are not available on the commercial market.

It frequently happens that DANTE has to tender or otherwise justify again from scratch its suitability to carry out jobs which, to some people at least, appear to be part of its natural role. Some bureaucracies cannot cope with the concept of procuring services from a supplier without competition, even if they have helped to establish the supplier as part of an immediately preceding project because the function was not being fulfilled effectively (or at all). Although this issue is a frequent irritation, it does not represent a serious problem and DANTE simply accepts the need to submit competitive tenders as a fact of life.

A more serious issue is another frequent misperception; namely that DANTE somehow has a monopoly on the provision of services to NRNs and, since monopolies are to be deplored that alternative providers should be used almost as a matter of principle. In practice, the accusation of monopoly is false. An analogy might be made with someone who acquires a mobile phone and signs a contract with a service provider with a minimum commitment period of say, one year. The service provider may be seen to have a "monopoly" with respect to the mobile phone user but such a view is clearly false. The phone user is

in fact free to acquire another phone from a competing provider even though such a course of action is unlikely to be of interest; the second phone brings no additional benefit and in any case the user may not be able to afford it. At the end of the year's commitment, he is free to seek a new contract based on offers from competing suppliers. If he chooses to use the same supplier again, the supplier can still not be accused of operating a monopoly

8. Summary

Despite some minor difficulties, the commercial structure which was adopted for DANTE as a provider of operational network services to the NRNs has proved to be very effective. The ultimate test of the success of the structure and of the performance of DANTE within the structure lies with the NRNs as its customers. TEN-34 and the willingness of the NRNs to allow DANTE to act as coordinating partner in TEN-155/Quantum as its successor, demonstrates the results of such a test.