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FIRST INTERNATIONAL SCHOOL ON COMPUTER NETWORK ANALYSIS AND MANAGEMENT

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INTRODUCTION

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In the programme, the three papers I am to read for you are jointly entitled SERVICES.
Under this common denominator, three subjects will be dealt with:

- Features and structure of a national network organization
- The role of the user: user support, strategies and pitfalls
- Services on the network

Why this division?

The presence of a network organization - preferably on a national level - is a good starting point to offer users an extensive package of services. In addition, a national network organization kan keep close contact with the associated institutes and governing bodies, the latter possibly defining regulations. For a stable organization which is to offer services over a long period of time, this is the proper solution.
The partaking institutes, however, should, both formally and in actual practice, be able to exert influence over the organization, in order to formally guarantee the contribution and execution of the users' wishes.

In networks, the user plays an important role, though this often tends to be forgotten. Therefore, user support and the strategies involved in this will be dealt with in a separate reading.

Finally, in the last lecture, an overview - though by no means complete - will be given of the many services available on the network. In so doing, their use will be touched upon, the places where additional information can be acquired will be given, and the future of this kind of services in OSI perspective will be briefly discussed.

At the base of network services: a national network organization

I will describe what a national network organization might look like. This organization is assumed to be independent.

For a national network organization offering a comprehensive set of network services, it is essential to remove all obstacles for customers to partake in network activities. A good starting point in this respect might be the offering of one-stop-shopping facilities. In this situation, the responsibility for implementation and management of a network connection rests with one party. For the customers this means that they have to deal with only one party.

For example, if you have a network, say an X.25 network, with 50 64Kb/s lines (trunk and access lines), you are an interesting customer for PTT Telecom, the recently privatized Dutch telephone company. For 50 individual customers, it will be far more difficult to make arrangements.

Sometimes, however, you will have to invest in advance in order to operate adequately. In the case of small organizations, for instance, which are too small to justify a fixed network connection, you will have to be able to provide dial-up links and mailboxes from stock in order to deliver promptly.
Of course, this cannot be done for all kinds of services.

The facilities

Talking about network services, in the broadest sense of the word, the following division can be made:
Transfer facilities
The carriers for network data. Leased lines between X.25 switching equipment, dial-up facilities and the management of these facilities.
Network services
The complete product from mail, file transfer and access services to advice on the size of connections, access to local infrastructures, user support and strategic network management.
Information services
Licenses and dealings with information suppliers, mailboxes
Development
Costs to prepare the introduction of OSI and OSI-based services (X.400, X.500, FTAM, VT, et cetera).

A number of these facilities lend themselves for volume-based financing, some to license-based financing, while others require individual financing. On the basis of these options it is possible to achieve an adequate management for each of the four services, that is, transfer, network, information and development.

Facilities and financing

Transfer is a cost component which is extremely well-suited for financing on a volume basis: a fast connection costs more than a slower one. The costs involved comprise:
leased lines, switching equipment (such as X.25 switches), modems, operational management and backbone overcapacity. Costs are not incurred on byte level.

Network services is the core of the network organization. The basic services include:
- electronic mail
- file transfer
- access

Around these, the value added services are arranged:
- advice on links
- user information
- strategic network management
- connectivity with other networks
- central helpdesk

Much of the cost generated by these activities is incurred irrespective of the actual number of users. Therefore, preference is given to site licenses, where the potential number of users is paid for.
An advantage of this financing method is that relatively little effort has to be put into registration, payments and validation. Almost all energy can be directed towards delivering high-quality services.
A simple model for a university, for instance, consists in a license that involves a fixed amount to be paid for each student and each staff member.
Sometimes the actual use of the network facilities during the initial period justifies charging on a different basis. An example of this is a long-term contract, whereby the rate increases over, say, four years from 40% to 100% in 20% steps.

Information services: what can be purchased as a license, can be made

available to everybody (capitation basis); what is purchased on volume basis, should be sold on volume basis. A license for a university library that allows use by everybody, will cost only little per user, and the information is also of interest for a large number of network users. The use of a highly specialized data base will cost a considerable sum, while only few users will benefit from it. Therefore, these users could better make individual arrangements with the information supplier.

Development costs usually cannot be funded by the participating institutes themselves. The government should set these costs apart by deducting them from the budgets of the universities and research institutes involved. It would be asked too much from the individual participants to make a contribution to developments that would only show results after a number of years.

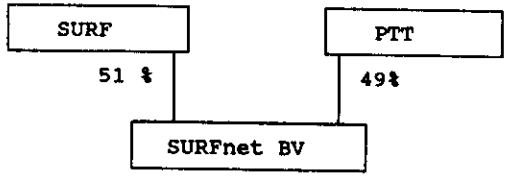
The network organization

As it is difficult to describe a network organization without the help of an example, the Dutch SURFnet BV will be used to illustrate the case.
At the time, three network organizations existed in the Netherlands: an EARN organization; NLnet, a Dutch Unix network organization; and a public Datanet. If network facilities were required, the most appropriate facilities could be selected for the application, but none of the suppliers could deliver a comprehensive package of services.
SURF, the foundation for computer services for higher education and scientific research, started the development of a national research network, in the form of a project.

This project was soon made the responsibility of an independent company, acting on a non-profit basis. The foundation is the main shareholder in this company, while PTT Telecom own the remaining shares.

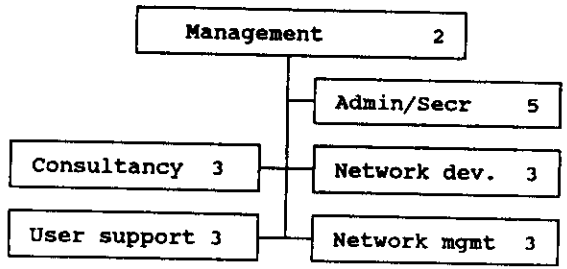
Right from the start, the aim was to supply a comprehensive set of services so that customers would only have to deal with one party rather than with a multitude of suppliers of network services. The continuity of the services is guaranteed by means of good gateways and/or cooperation with NLnet and Datanet1.

The network company SURFnet BV is organized as follows:



SURFnet BV supplies network services to institutes for higher education and scientific research. These institutes in turn form the administration of the foundation. This guarantees the influence of the customers on the policy of the network organization.

Internally, the organization looks like this:



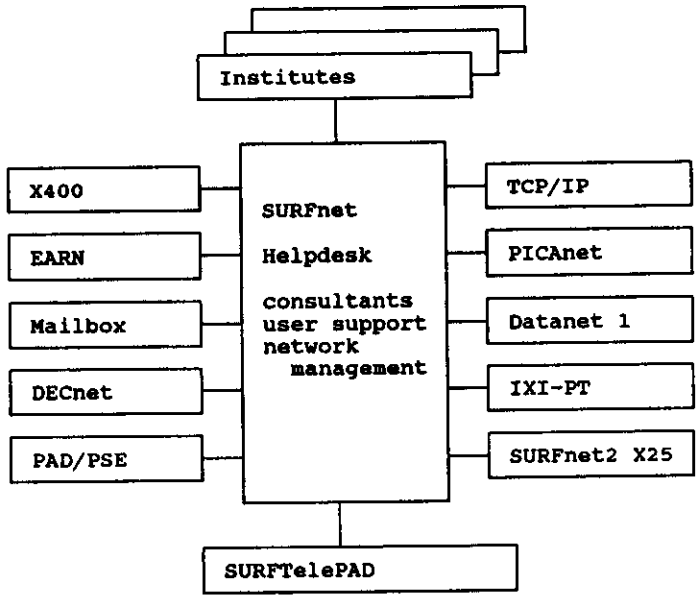
It shows the value attached to good user support. The way in which this user support is organized is the subject of the second lecture.

The network in practice

At the base of the system is an X.25 network (1984) of Northern Telecom switching equipment. This network constitutes the basis for the following transfer services:
- NJE
- IP
- DECnet
- Triple-X

As to functionality, the following division can be made:
- Mail (X400, RFC987, RFC822)
- File transfer (FTP, DECnet-copy)
- Access (Telnet, DECnet, PAD services)

Secondary services include:
- Job
- Conference
- Board
- Directory
- Fax



These services require substantial efforts regarding network management, and since SURFnet wished to remain a small organization, this operational management was put out to a number of management partners, which were selected on the basis of their experience with the facilities mentioned. This also enables SURFnet to quickly catch up with new developments.

In the middle of the management organizations, like a spider in the web, is the SURFnet Helpdesk. Its tasks comprise continuity ensurance and problem handling. It has turned out that the Helpdesk to a considerable extent determines the degree of satisfaction amongst the participating institutes with regard to the network organization.