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Swiss PTT International Meeting 88

The Swiss Packet Switched Public Data Network Telepac

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1 Introduction

Ten years ago the Swiss PTT decided to introduce a packet switched public data network (PSPDN). At that early point and even during the following pilot tests the entire range of future applications was not yet clearly forseeable. As a result the Swiss PSPDN (Telepac) has evolved in quite a lively manner. Today worldwide interconnected packet networks are forming the foundation for a multitude of national and international data applications for our customers and also configurations of public value added network services (VANS).

Today Telepac can be considered a basic service offered by the Swiss PTT. The standardization of access protocols has reached a degree of high stability. International standardization committees have adopted X.25, the most important recommendation for datacommunication and most of today's communication architectures of computer systems are supporting this recommendation.

The selection of electronic information services today is broader than ever. Such services are widely used in the business environment but also the private sector is being more and more included in this development (e.g. Videotex). To meet actual market needs new approaches to the design of network architectures are to be taken. This also in view of the fact that in this business sector the PTT have to compete with privately offered VANS.

In this contribution the following aspects are being discussed:

a) The importance of Telepac as a national network and the aspects of international networking as well.

b) The expansion of peripheral segments such as

- access technique
- identification and security services
- session services
- network management

to improve existing features and also to offer our customers entirely new possibilities.

c) An overview of the application range.

2 Network

The Swiss packet network – Telepac – is based upon technology supplied by Northern Telecom. Within Switzerland the switches are located at eight different places. Depending upon the subscriber density several individual switches may be provided at one given site. Today we have installed a total of 22 switches, of which three are dedicated to international traffic.

The implemented network configuration provides highest possible availability in case of breakdown of transmission line or packet node. Staggering of service windows is another measure being taken to obtain maximum availability.

International traffic plays a very important role in Telepac. In 1987 the international traffic amounted to 39 % of the total traffic. For this reason special attention is being paid to the international network layout. Telepac has gateways with direct connections to 19 European and Overseas networks.

The worldwide proliferation of the packet technique is remarkable. Today Telepac is part of a worldwide public data network (PDN) with access to more than 160 PDN's.

The interworking aspects between Telepac and ISDN (Swissnet) are also being addressed at this time. With the introduction of Swissnet 2 in 1991 interworking between Telepac and ISDN subscribers will be a reality.

3 Access technique

Access to Telepac is provided via public switched telephone network (PSTN) or direct line. The access protocols for the basic services X.25 and X.28 are in accordance with the respective CCITT recommendations.

Presently 47 % of our Telepac subscribers are using packet oriented direct lines (X.25) and 15 % character oriented direct lines (X.28). The remaining 38 % are accessing Telepac via PSTN.

The increasing demand for information services (e.g. teleservices, public databases or online services in general) is imposing new requirements upon our existing networks; for example:

- access for different types of terminals
- improved man – machine interaction
- connectivity by protocol conversion
- low access charges.

To meet the various requirements new solutions must be found and implemented.

The Swiss PTT is in the process of meeting these new demands by implementing an 'intelligent access network' as part of Telepac. In Europe such access networks are primarily being used for Videotex systems. In Switzerland Videotex is also a driving force for the design and application of new access techniques.

The concept of our access network is based upon numerous geographically distributed access points, ahead of the existing backbone network. This means that such access points will be installed in most of our local PSTN switches here in Switzerland.

The access point is in fact a programmable communications processor, capable of supporting a terminal with its specific characteristic. Application oriented functions such as form editing and protocol conversion can therefore be decentralized in the access network.

An extensive field trial with telematic access points (TAPs) is scheduled for 1989 in several parts of Switzerland. It is the intention to offer the following services:

- X.25 PC-pack (different predefined profiles)
- value added PAD (Packet Assembly/Disassembly; VAP)
- Videotex access service (VAS).

An open transport service for electronic funds transfer at the point of sale (EFT/POS) is being planned as well.

4 Identification and security services

The identification of the network user is protecting the network from unauthorized access and guarantees proper billing.

Users with direct line access are considered identified and no further procedure is necessary. Users with indirect access (e.g. via PSTN) are being identified with a combination of network user identifier (NUI) and password.

In a broader sense the identification can also be considered a service. The expansion into a general security service becomes meaningful if the network operator can cover other service providers with his identification process.

Linking a given user identification with the user specific profile opens new perspectives for a customized network service access. Some of these new features are being discussed next.

5 Session services

The general use of public and private online services also by inexperienced users requires new features in a data network. Intelligent functions like menu driven service selection are commonplace in today's computer networks and should also be made available to users of public data networks. A common user interface to access different services is desirable.

An obvious solution to this problem is the use of a centralized network server. Included in our project 'intelligent access network' is an investigation concerning the implementation of functions such as

- menu driven service selection and
- one-time user identification for his subscribed services.

To achieve this goal we have to negotiate agreements with service providers involved.

As a first step we are upgrading the asynchronous ASCII access to include the features mentioned above. Additional terminal types can also be included. Initially this concept only includes PTT-provided services.

6 Network management

High network availability (24h/7d operation) today is a self evident user request. In spite of extensive quality assurance procedures for all individual network elements it is essential to monitor the network performance constantly. The rapid growth of data networks as well as the technological progress require frequent changes in topology and configuration.

The PTT as the Telepac network operator can only meet this challenge with adequate tools for operation and planning. In general a network management system consists of the elements:

- configuration management
- call accounting
- access management
- performance management
- fault management.

Configuration management and call accounting as the most essential elements were treated with high priority; the design of the other elements is still in progress.

Finally a bridge must be laid between network management systems, customer support and network administration in order to maintain reliable customer support and efficient order processing.

7 Application range

The application range of packet switching is very wide.

Private customers are utilizing the network in addition to leased lines mostly in a closed computer network environment. The trend on the part of user equipment (hosts, terminal controllers) indicates that the communications features concerned are already part of the basic equipment.

The number of public databases accessable via packet networks is considerable. In Europe alone approximately 50 hosts with more than 500 databases (scientific, technical, business oriented) are available.

The PTT-teleservices (Teletex, Videotex and arCom 400) also are using Telepac as transport media.

New services like EFT/POS are being established. The packet technique naturally lends itself to such transaction oriented applications with characteristics like:

- small data volume per transaction
- wide geographical terminal distribution
- high cost sensitivity.

The need to access a variety of applications of teleservices from one given place of work is influencing the design of future data networks. Closed private networks are inhibiting this evolution and therefore a trend towards hybrid network concepts with a closed and an open sector can be observed. The increasing number of private X.25-networks connected to Telepac clearly underlines this trend.

Large corporations frequently operate their networks with their own staff. The resources required are increasing and it often becomes more economical to contract a specialized network management establishment.

The trend even goes beyond this scenario. Virtual private networks for private users will be offered and established by administrations and specialized firms. Such arrangements can free the user from the high investment and operating cost of a private network and allow full allocation of resources for primary business activity.

8 Conclusions

- Ten years have passed since the PTT decided to introduce the PSPDN 'Telepac'. In retrospect the choice of the packet technique was the right one.
- The standardization of access protocols has reached a high degree of stability and the relevant standards have been internationally adopted.
- Telepac has become an established basic service of the Swiss PTT with a heavy international accent.
- New technologies in the areas of network access, intelligent network functions and network management are presently being introduced and tested.
- The expanding application range of the packet switching requires new concepts.
- The Swiss PTT is deeply involved in today's data communications business and will expand its services to meet the user requirement in a competitive market.