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Autor: Iseli, Daniel

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THE FEDERAL ADMINISTRATION ON THE INFORMATION HIGHWAY

With the implementation of KOMBV 3 through the SwissWAN services of Telecom PTT, the Federal Administration now has a high-performance data network, a so-called information highway. The flexibility in the bandwidth as well as the integration of various dedicated networks on a single network service have a positive effect on the costs. Despite the higher performance, a saving of 30 % has been achieved.

With the KOMBV 3 project (communication of the Federal Administration, phase 3) Telecom PTT implemented a Swiss high-performance communications network for all

tion services in the federal offices that operate corresponding EDP centers. The data communication with the computer centers is implemented on separate networks with different

technologies (leased-line networks, router networks, SNA networks, Frame Relay, X.25). In addition, there is a large base of autonomous computers that exchange data with external offices via Unidata Telepac Service or use the call-back procedure via switched lines. Overall, the Federal Administration has a large number of leased-line and Telepac connections; this represents a large optimization potential. The maximum bandwidth currently being utilized in some cases is 2 Mbit/s for backbone connections. Most leased lines and connections required 64 kbit/s or less. Most applications are dialogue-oriented, but file transfer is increasingly gaining in importance. From the development of new applications a strong increase in the required bandwidth can be expected (animated picture communication such as video conference or multimedia applications, digitized im-

DANIEL ISELI, BERN

administrative offices of the Swiss Federal Government. This network is the basis for integrated communication within the administration. The long-hedged desire of combining and simplifying the federal communication and making it more cost-effective has now been realized with KOMBV 3. In August 1995, the first connections were put into service. The Federal Administration now has a modern, flexible and expandable ATM-based network.

Background

The Swiss Federal Government has implemented a number of applications that require data exchange with external federal offices, cantonal authorities, and in the future even communal authorities. These applications are principally used by the informa-

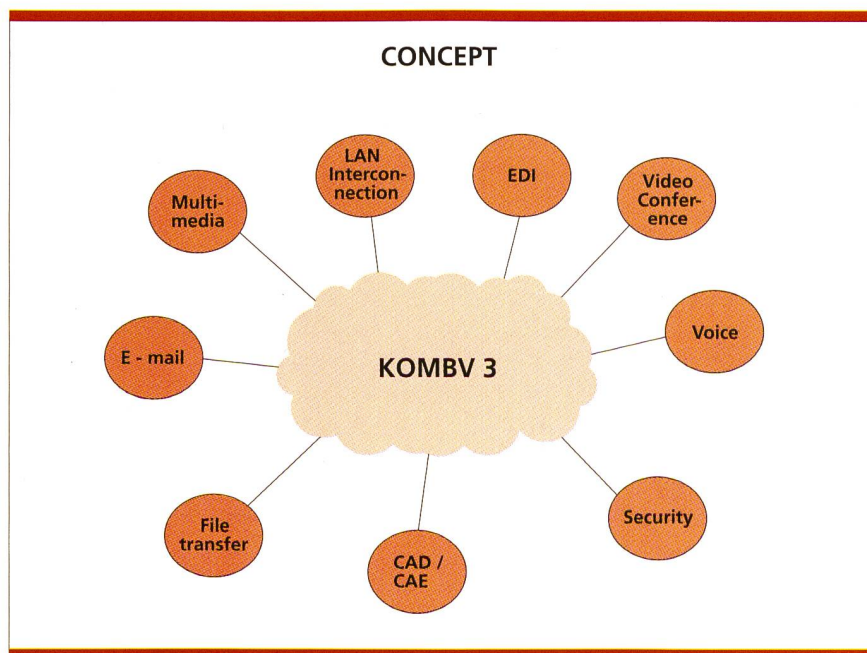


Fig. 1. Integrated communication with KOMBV 3.



Fig. 2. KOMBV 3 locations, 1st phase.

ages, etc.). With the exception of the Bern region, the nationwide telephony traffic within the general Federal Administration is based on the public network of Telecom PTT.

Objectives

The communication objectives of the Federal Administration have been defined as follows:

- The networks and information systems of the Federal Administration shall be combined into a single network that is coordinated by the Federal Office for Information Processing.

- The network shall allow nationwide communication within the Federal Administration and the cantonal authorities.

- The existing networks and individual connections shall, during the transition phase, be incorporated into a systematic network that is more economical and is easier to plan.

- The nationwide network of the general Federal Administration for interlinking the federal and cantonal offices shall be implemented within the scope of the existing laws, taking into consideration the national defence requirements and economical aspects.

This higher ranking network shall satisfy not only today's requirements but also provide the future transmission capacities and services and fulfil the stringent data protection and uptime requirements.

The KOMBV network shall support the following applications:

- Connection of word processing systems that allow the exchange of large documents across long distances.
- Integration of voice and data communication in a nationwide network. This nationwide network shall be implemented according to economical aspects and reduce the present costs per transmitted data unit (Fig. 1).
- Transmission of digitized images such as area maps, photos, fingerprints, video conferences and multimedia applications.

Implementation concept

After a comprehensive evaluation, the Federal Office for Information Processing decided to set up the national communications network not as a private network but to procure the required network services from Telecom PTT. The Federal Office for Information Processing is following the general trend to obtain wide area networks from reliable telecommunication providers. With a virtual network based on the infrastructure of Telecom PTT, the customer can profit from the latest technology without any capital outlay and obtain communication connections and bandwidths as required, which is essential for a cost-optimized solution.

The agreement concluded a year ago between the Federal Office for Information Processing and Telecom PTT called for the set-up of KOMBV 3 as the first project of the new SwissWAN ATM network service. In parallel with the definition and the set-up of the SwissWAN service, the planning of the first phase of KOMBV 3 has been initiated.

Based on the infrastructure that existed already in the test phase of the ATM pilot project of Telecom PTT, the cities of Zurich, Bern, Lausanne, Geneva and Lugano have been selected as the initial sites with KOMBV 3 services (Fig. 2). A survey among the Federal Administration users defined the expected requirements for these locations as well as the corresponding pri-

Network	Locations	Service	Connection	Bandwidth
Federal Administration	Bern, Zurich Lausanne, Lugano, Geneva	SMDS (AAL 3/4)	E3, 34 Mbit/s	2 Mbit/s 10 Mbit/s peak
Intercantonal service	Bern, Zurich Bellinzona, Geneva, Lausanne	SMDS (AAL 3/4)	E3, 34 Mbit/s	1 Mbit/s; 2 to 5 Mbit/s peak
Federal Justice and Police Department	Bern, Geneva, Zurich Bellinzona	Circuit Emulation	E1	2 Mbit/s
University network	ETHZ, EPFL, CERN, CSCS Manno	ATM VP	STM 1/ATM UNI	up to 155 Mbit/s

Table 1. Network of the first phase.

orities. In the first phase, the following networks are migrated to KOMBV 3:

- router network of the Federal Administration
- router network of the intercantonal service
- multiplexer network of the Swiss Federal Justice and Police Department (EJPD)
- university network

The two router networks will use the SMDS service. The required bandwidth is between 2 and 10 Mbit/s. The multiplexer network of the EJPD operates via 2-Mbit/s E1 circuit emulation interfaces. For the university network, STM 1 ATM interfaces will be made available that operate with bandwidth of 155 Mbit/s (*Table 1*). At the individual sites, the local KOMBV 3 customers are interfaced through star-connected optical links to one or several SwissWAN POPs (points of presence). The POPs correspond to the ATM service multiplexers, which can accommodate up to eight interfaces.

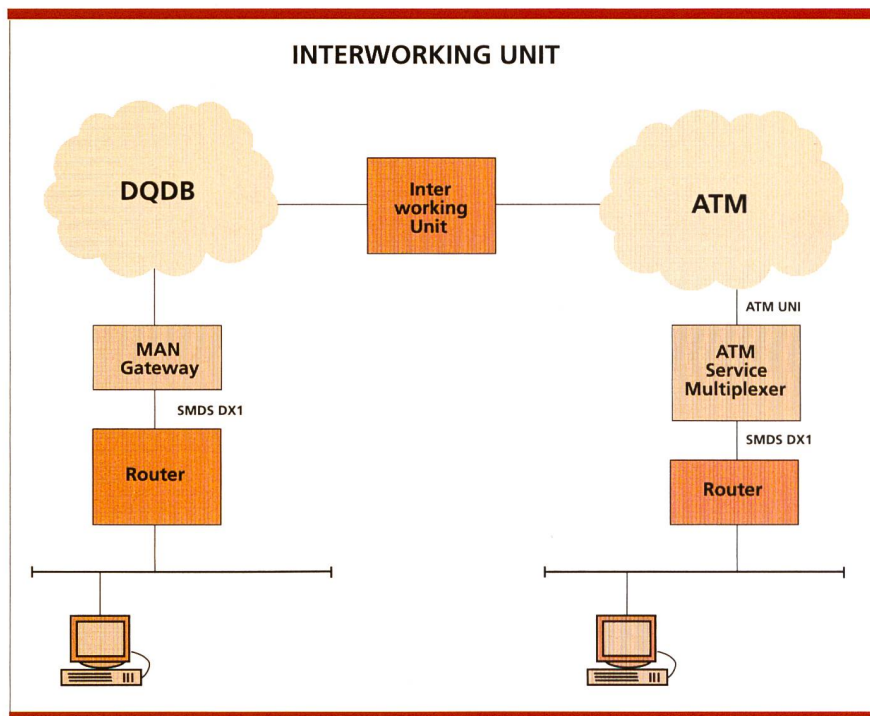


Fig. 3. Interworking unit.

Interworking with KOMBV 1

For the local distribution within the City of Bern, the MAN KOMBV 1 owned by the Federal Government must be used. KOMBV 1 has been set up in and around Bern for networking voice and data of all government offices and has been in operation since 1994. KOMBV 1 has been implemented as a DQDB MAN, a technology that has been especially developed for Metropolitan Area Networks, which

have been standardized by IEEE 802.6. Although the cell structure of DQDB is quantitatively identical with the one of the ATM technology (53 bytes), a DQDB/ATM interworking unit has to be used for interconnecting the KOMBV 1 and KOMBV 3 networks. The function of the interworking unit is to transform single-cast and multi-cast SMDS data streams into ATM-compatible cells and vice versa and to through-connect isochronous links (*Fig. 3 and 4*).

Integration of voice traffic

In order to satisfy the objectives of KOMBV 3, all voice connections within the Federal Administration must be routed via KOMBV 3. Within the City of Bern this has been implemented by networking all PBXs via the KOMBV 1 DQDB MAN. With the extension of KOMBV 3 to the rest of Switzerland, 50 additional PBXs of different types must be networked with approx. 55 000 subscribers in Switzerland. The concept calls for concentrating the voice traffic in the principal regions and to transmit it via KOMBV 3 (*Fig. 5*).

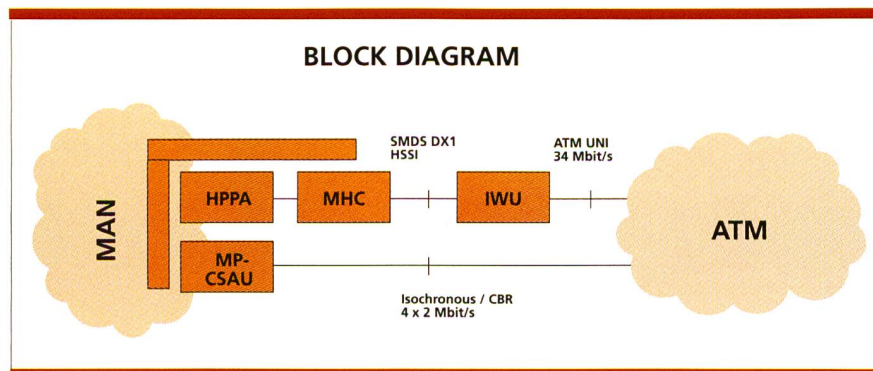


Fig. 4. IWU block diagram.

Capacity stages

Depending on the requirements for large bandwidth, additional locations will be integrated into KOMBV 3, or the capacity of existing links will be expanded in subsequent phases. By the year 2000 the entire Federal Administration with all connected offices will be able to communicate via KOMBV 3. In the final stage, about 35 locations – including the capitals of all the cantons – will be on line.



Daniel Iseli, BSc. electrical engineering HTL, is department manager in the Multinational Corporations (key accounts) Directorate of Telecom PTT.

After his studies at the Engineering School of Burgdorf he worked in various industrial companies where he acquired experience in the fields of project management and sales/marketing. In June 1994 he joined the Directorate for Multinational Corporations where he was assigned to setting up the Government branch unit in Berne. The principal function of this department is to take care of key accounts within the government market (Swiss Federal Government and annexed organisations) so that an optimum customer service can be provided. In this function Mr. Iseli is Telecom's leading project manager for the KOMBV 3 project.

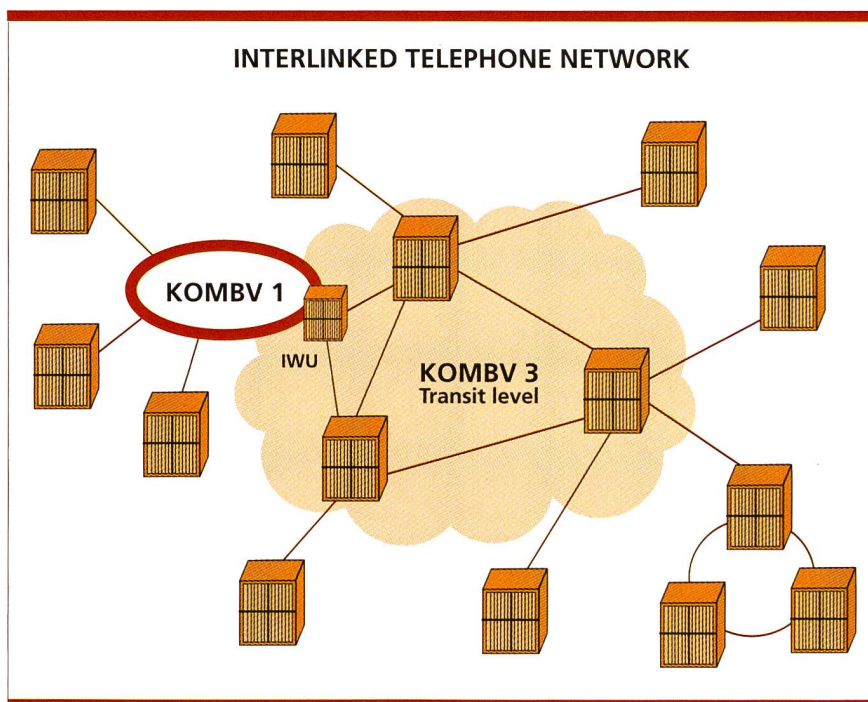


Fig. 5. Telephony network.