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BUSINESS COMMUNICATIONS

# FUTURE OF VIRTUAL PRIVATE NETWORKS (VPN)

VPN will revolutionize business communications in the 1990s; it will take center stage in the portfolio of services offered by telcos to their business customers and will significantly rebalance telcos' service revenues.

In this central role, VPN will:

- replace much of business PSTN; this will occur for business large and small, nationally and internationally
- replace leased line services used for voice communications; this will occur ever where, except at the core of larger corporate networks, nationally and internationally

TITU I. BAJENESCO, LA CONVERSION

- complement leased line services used for data and video communications; VPN will be used for a growing number of applications, particularly on an international basis
- provide the foundation from which telcos can offer their customers broadband services

### Essential ability of the VPN concept

VPN are logical closed user groups implemented on public switched networks. Instead of using dedicated used lines to convey intracompany calls, the public switched networks are programmed to identify, route and charge these calls accordingly. Essential to the VPN concept is the ability of the core network to recognize the companies' internal private numbering schemes and translate them into public network numbers. VPN must also be able to charge calls at special rates based on duration of usage for both voice and data calls. VPN also enables businesses to share in the intelligence of modern switching systems, benefitting from a host of advanced features.

VPN is one of the natural services sup-

ported by an intelligent network (IN) platform. However, most current implementations are proprietary, and these will persist for the next few years. VPN has become the dominant service offering of the carriers (AT&T, US Sprint and MCI) to the top 1000 US corporations. A large proportion of the larger users have created hybrid networks<sup>1</sup>.

### VPN for data communications

VPN for *data communications* has been recently introduced in the USA. It provides switched and highbandwidth connectivity. It is ideally suited to applications which rely on the batch transfer of data. The services which the US carriers are introducing to the market range in bandwidth from 56 kbit/s to 45 Mbit/s.

These higher bandwidths, together with the switched and ubiquitous nature of the service, will make a lasting impression on the data communication traditions of corporations.

*Internationally*, VPN is progressing rapidly through the embryonic stages of development. Its emergence outside the USA has been stimulated by two complementary drivers: 1. US multinationals who use the service in the USA are putting pressure on their carriers to offer the service internationally. 2. US carriers who in the battle to gain world supremacy view VPN as a main weapon in their arsenal of services. Other telcos are reacting by offering their own services, either because they have similar ambitions or to protect their existing markets.

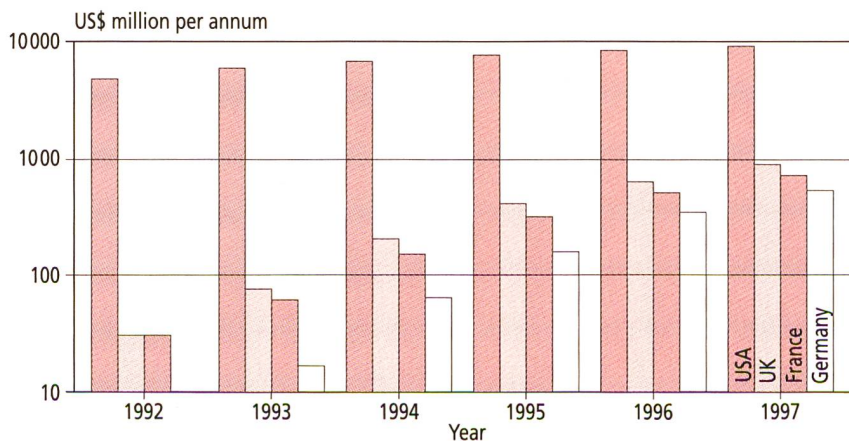


Fig. 1 Market forecasts for national voice VPN, VPNforecasts

<sup>1</sup> In hybrid networks, leased lines are used where they can have optimum effect in terms of capacity, constancy and duration of usage. All other traffic is carried over the virtual network.

## Projections

By the end of 1992 these services have been commercially available in some 20 countries; in future, the services of more than one carrier will be on offer in each country. The US carriers, particularly AT&T, will be prominent among these. (Figures 1 to 4 show the projections for telco revenues from national and international voice and data VPN services; these forecasts are based on expenditure by businesses in the USA and in Europe.) By 1997 international VPN will comprise 21% of telcos' international revenues, amounting to \$2.3 billion for voice and \$0.5 billion for data<sup>2</sup>.

The momentum of international VPN can only be sustained if it is supported by domestic services. Multinational cooperation requires a transparent and seamless service for all communication needs, not just the international and US portions. Furthermore, access to international VPN is only economically viable through a national VPN service rather than via dedicated lines to the international gateways. Consequently, domestic VPN services are emerging in Europe and in the Pacific rim countries, albeit in a fragmented manner. During the next decade, VPN will make a significant contribution to the growth and improvement of global communications. It will also act as a catalyst for the deregulation of world telecommunications markets (Figure 5a).

## Efficiency and effectiveness

Telecommunication is essential to and inseparable from the way companies conduct their business. It is also one of the main cost components of their operations. To gain a competitive edge, companies of all sizes constantly seek to improve two aspects of their communications, its efficiency and its effectiveness<sup>3</sup>.

<sup>2</sup> The networks which support VPN may simultaneously carry several other related services. In revenue terms, the most significant among these are number translation services such as the 800- and 900-services. Our forecasts do not include revenues from those related services.

<sup>3</sup> VPN directly addresses both these needs. VPN provides a better combination of cost and flexibility than any other service. Figure 5a demonstrates the position of VPN in a cost flexibility matrix in relation to PSTN and leased line services. The attractiveness of VPN is further enhanced, as the service's ubiquity is improved. This will result in smaller sites switching from PSTN to VPN, thus improving overall cost effectiveness.

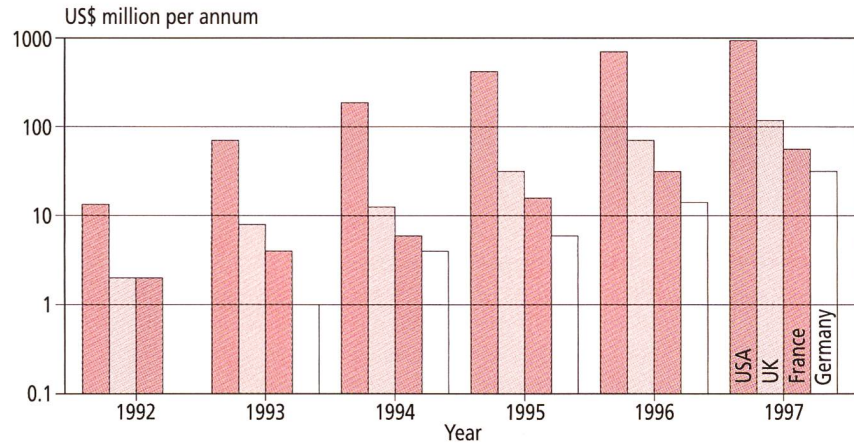


Fig. 2 Market forecasts for national data VPN, VPNdata

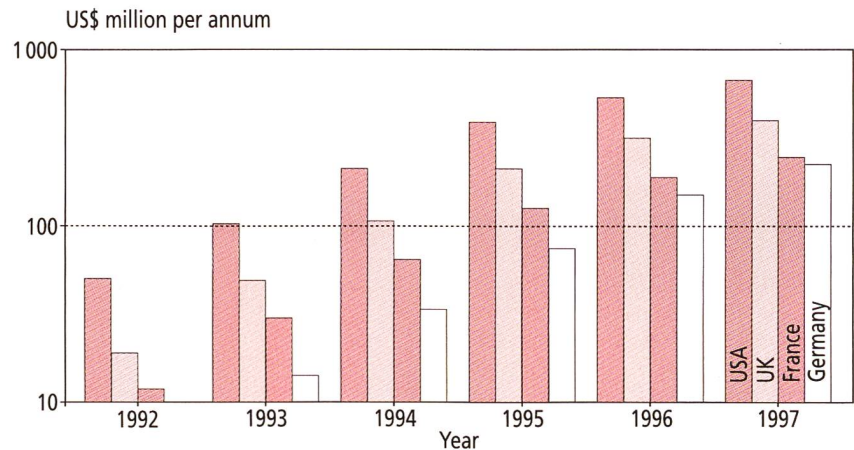


Fig. 3 Market forecasts for international voice VPN, VPNintvoice

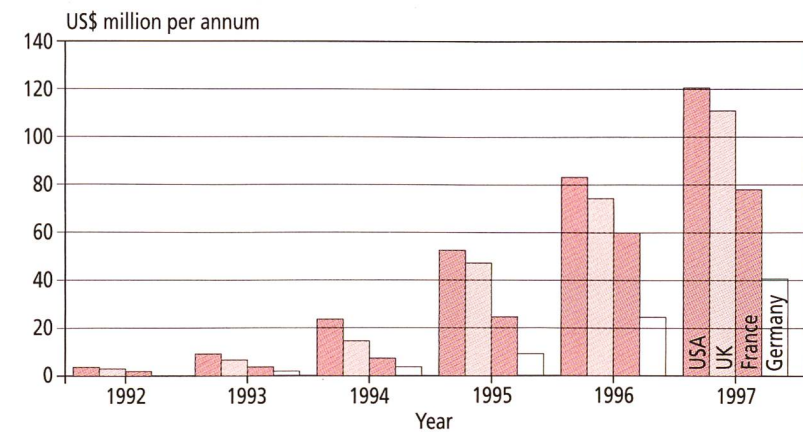


Fig. 4 Market forecasts for international data VPN, VPNintdata

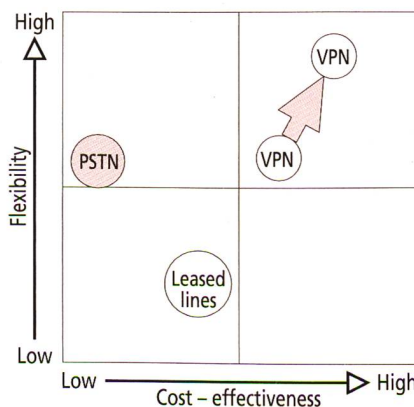


Fig. 5a VPN meeting the communication needs

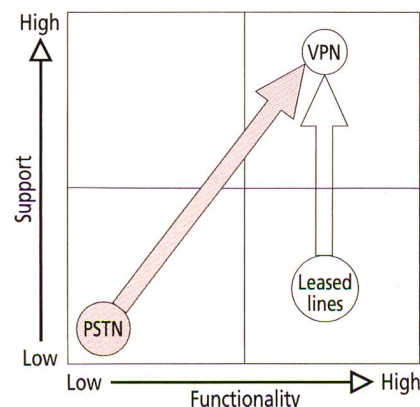


Fig. 5b Value of VPN versus other products

Through the use of VPN, not only do users reduce their costs, but they also obtain a service which is better supported and offers increased functionality. *Figure 5b* compares VPN, leased line private networks and PSTN in terms of the functionality that they offer and the support that is provided by the telcos. The functionality and support of private networks based on leased lines is provided by the companies themselves. This is achieved through hiring their own communications staff and investing in their own private networking equipment. VPN on the other hand relies much less on self-provided expertise and equipment, whilst at the same time providing a better level of functionality. VPN improves the effectiveness of companies' communications because it directly helps to improve the responsiveness and flexibility of their core businesses. This is achieved through: a) enabling businesses to flexibly and quickly add or remove sites; b) providing the network and its associated facilities to all employees on all sites (leased line private networks only serve the largest sites); c) providing networkwide features which enable employees to perform their functions more effectively (there is a considerable variation in the uniformity of features on private networks, and these features are often restricted to individual sites). *Figure 5b* demonstrates the completeness of the VPN solution in meeting the communication requirements of businesses.

## ZUSAMMENFASSUNG

### Die Zukunft virtueller Privatnetze

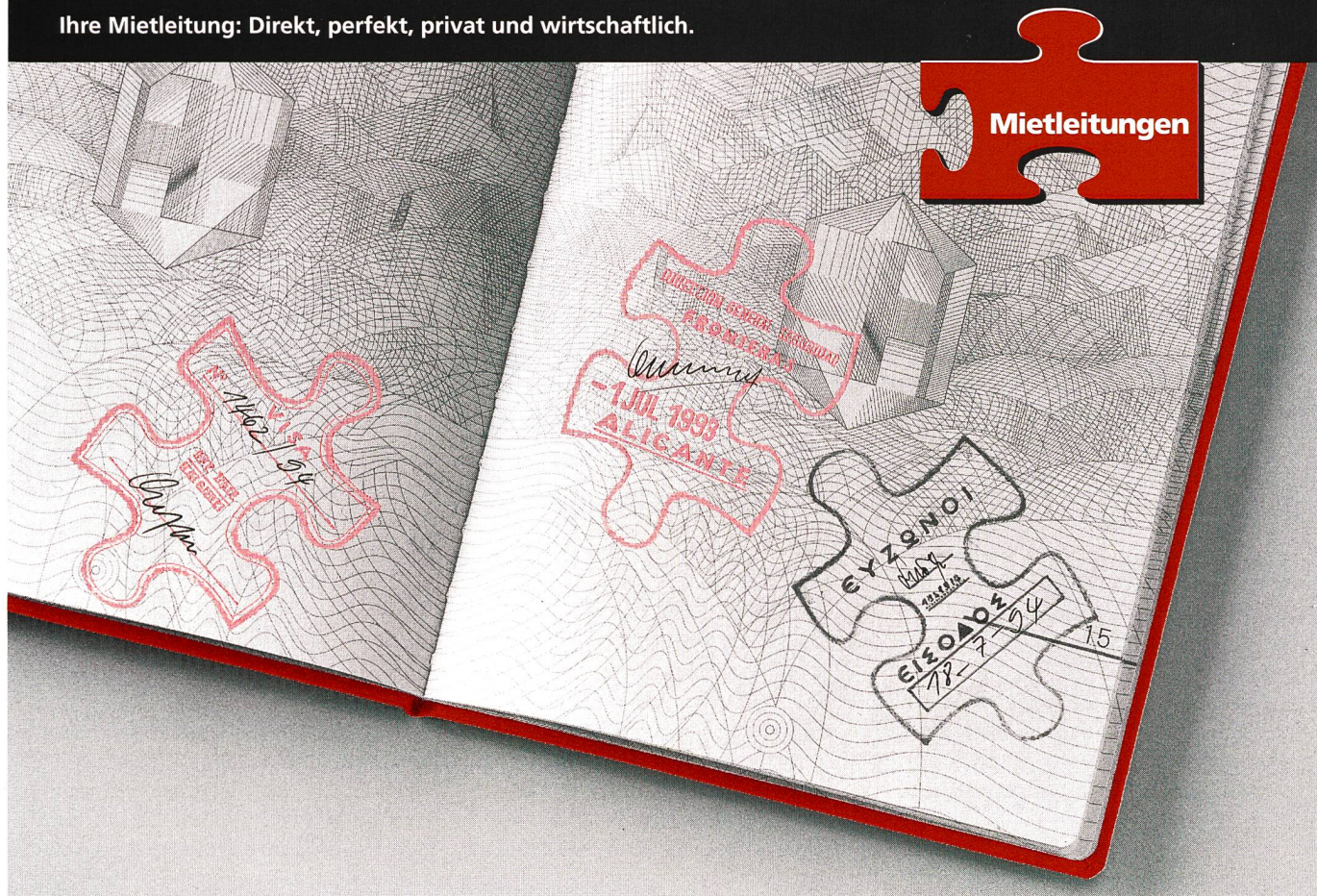
Virtuelle Privatnetze (VPN) werden die Unternehmenskommunikation in den 90er Jahren revolutionieren. Im Portfolio der von den Telekommunikationsunternehmen den Geschäftskunden angebotenen Dienste werden sie eine Hauptrolle übernehmen und massgeblich dazu beitragen, die Einkünfte aus Telekommunikationsdiensten wieder ins Gleichgewicht zu bringen.

VPN sind logisch geschlossene Benutzergruppen, die auf dem öffentlichen Wählnetz beruhen. Anstatt für innerbetriebliche Verbindungen fest zugewiesene Leitungen zu benutzen, werden die Wählnetze so programmiert, dass diese entsprechend identifiziert, gelenkt und taxiert werden. Bezeichnend für das VPN-Konzept ist die Fähigkeit des Grundnetzes, die internen Numerierungspläne der Firmen zu erkennen und sie in Nummern des öffentlichen Netzes umzusetzen. VPN müssen zudem in der Lage sein, diese Anrufe zu besonderen Tarifen, beruhend auf der Belegungsdauer von Sprach- und Datenverbindungen, zu taxieren. VPN erlaubt den Firmen auch, an der «Intelligenz» moderner Wählsysteme teilzuhaben und sich einer ganzen Anzahl fortschrittlicher Leistungsmerkmale zu bedienen.



**Titu I. Bajenescu, M.Sc., MBA, MQRA, Prof. Eng.** – Member of the New York Academy of Sciences, Senior Member IEEE, International Expert and Consultant – was involved in the management of international and national telecommunications projects, in the feasibility studies, development and design of advanced telematic systems, systems integration with LANs, MANs and WANs, in joint ventures, liberalization and privatization, master plan for the future development of national telecoms, etc. His previous experience includes reliability and quality engineering of microelectronic components and complex telematic systems, especially in the field of advanced telecommunications systems. He holds two patents, is author of many technical books and papers written in six different languages, and has received international managerial citations for his work.

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