

# VALUE ADDED NETWORKS (VANS) AND THEIR BENEFIT TO A HEALTH INFORMATION SYSTEM

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## Abstract

Value Added Networks (VANs) are generally considered as third party services or network facilities bulk-leased from the carriers and made available to companies who wish to buy these services. Some of the services provided by a VAN supplier include security, error checking, data concentration, switching and routing, broadcasting, transit-storing data, translation and handling of a range of user protocols and so forth [1]. There are local, national and global or international Value Added Networks (IVANs). IVANs are assuming particular importance in the current context of globalisation of business and internationalisation of telecommunications. They provide comprehensive interconnecting network services and international Value Added Services (VAS). The main components of the VAN/VAS market comprise high-level services such as management, maintenance, help-desk and single centralised billing functions and enhanced services on and over the public network including Electronic Funds Transfer (EFT), Electronic Document Interchange (EDI), electronic messaging (E-mail), time-shared teleprocessing, information retrieval, voice-mail/audiotex and systems integration.

Because of their flexibility and technical features, VANs provide the means of moving data around national and international networks in an efficient and economic manner. This is of relevance to the health sector, particularly, because of the escalating expenditures in health care.

Some of the benefits resulting from the use of VANs/VASs in health care networks are increased effectiveness, faster access to information, better decision, increased personal efficiency, efficient operations, quality services, faster order delivery cycle, better planning and information exchange (e.g., X-rays, patient

records, graphic display networks and video conferencing).

This paper will describe the potential benefits of a wider use of VANs/VAS in the Health sector by giving examples such as the National Health Information Highway network in New Zealand, the Health Communications Network in Australia, the use of Internet and the National Research and Education Network for exchange of medical research information. It also exploits sophisticated applications such as electronic messaging systems for linking metropolitan hospitals, remote diagnostics and remote doctors offices, medical research, childcare assistance (remote access to doctors) and international connection to other countries especially in the Asia-Pacific Region.

## Introduction

The health sector is a complex mixed environment of markets and services. This environment has traditionally been characterised by escalating costs and major expenditures. In the last decade, it has become imperative the adoption of strategies and policies capable of introducing innovation in the health care delivery processes through technology and principally information technology. Governments are clearly committed to improve the quality of health services by maximising opportunities for individuals to experience good health and decreasing the risks that cause ill health across the community. On the other hand, health services have been innovative in trials of new technologies specially networking technologies for remote imaging and diagnostic services. It is, however, in the areas of administration and operations where the major benefits and efficiency gains can be achieved. The wider use of telecommunications and Value Added Networks (VANs)/Value Added Services (VAS) constitute, indeed, an enabling technology to achieve these goals and objectives.

## The Emergence of VANS/VAS

The phenomenon of liberalisation and deregulation of telecommunications around the world coupled with advances in computing, broadcasting and networking technologies are driving the emergence of a growing number of Value Added Network providers. As PTTs (Postal, Telephone and Telegraph companies) monopolies are

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dismantled throughout the world and the liberalisation of markets reduces the cost of communications, new services and products are offered by the VANs in direct competition or close association with the carriers. The market demands for VAN services are generally driven by the following factors: (1) the deregulation of the telecommunications market and subsequent introduction of new services and business opportunities; (2) globalisation of business and internationalisation of telecommunications; (3) the need for faster and more accurate delivery of services via network intensive applications such as X.400, EDI and EFT to gain competitive edge; (4) the trend in business to migrate into open systems following the open systems interconnection (OSI) model and achieve vendor independence. The VANs provide a migration path from proprietary systems into OSI networking; and (5) the value and services offered by the VANs [2]. In addition, there is a growing market for Value Added Services (VAS). Value Added Services or enhanced services are built upon the basic telecommunication services and they include online databases utility services, electronic document interchange, electronic funds transfer, videoconferencing and so forth. VAS are claimed to be among the most important and fastest-growing parts of the telecommunications industry [3].

### The Importance of VANS for the Health Sector

Value Added Network providers offer a wide range of networks and value added services including: (1) speed and protocol conversion, (2) computer bureau services, (3) database services, (4) voice communication, (5) facsimile and electronic mail services, (6) electronic data interchange (EDI), (7) network management, (8) security and billing systems, and (9) gateways to other networks. In addition, VANs offer advantages of scale, including lower costs, more sophisticated end-to-end network management and the flexibility to add new sites or applications as needs arise. Other important advantages include a single centralised billing system and local support [4].

Today VANs are designed to handle a diversity of business messages and they are a coordinated series of programs and services that allow business to individually tailor these capabilities to meet unique business demands with increased speed, data integrity and security [5].

All these features are particularly suited to a complex environment such as the health care. IT and in particular VANs can have a primordial importance in supporting the health sector in

becoming a more efficient and effective one. For example, EDI and electronic trading can embrace an array of mixed-media data transfer solutions including workflow automation, cross-specialties databases, text, graphics, image and voice/video as well as intelligent co-operative applications such as Quick Response and Vendor Managed Inventory. This will provide enormous benefits and savings in time, improving productivity by effectively eliminating delays in document transit, the probability of data entry errors, improving business communications, reducing demand on capital by better stock management and elimination of other inefficient practices inherent in a paper-based system [6].

Cost effective use of IT is required in the health care sector. The wider use of VAN services can function like a catalyst to achieve significant efficiencies and real benefits in traditional areas such as purchasing, inventory management and financial EDI including bulk billing, ordering, invoicing and paying for goods and services as well as streamlining patient-centred services including laboratory results, medication management and follow up, rapid exchange of information between hospitals, doctors and patients and the ability to transmit X-rays and other imagery over telephone lines.

### VANS Applications in Health Care

With all the tools and benefits provided by VAN services the health care sector will be able to utilise information as an asset and resource as well as to focus on its core business - the provision of quality care to individuals.

The technologies provided by VANs have extensive applications in health care. Some areas include electronic commerce (EDI, EFT, Electronic Mail), supply management, pharmaceutical benefits, reimbursement claims, electronic access to product catalogues, databases and registers, Telemedicine and education, sophisticated e-mail systems linking metropolitan hospitals, remote diagnostics and remote doctors offices, medical research, remote childcare assistance, interactive videotex and international networking.

Examples where VAN services can realise full benefits include the National Health Information Highway Network in New Zealand and the Health Communications Network (HCN) in Australia, the Internet and the National Research and Education Network.

The National Health Information Highway in New Zealand is built around Value Added Networks. The Ministry for Health has established a VAN accreditation process to transport health data. VANs provide communications to the health sector over existing communication networks. This network provides access to online health



information and other databases through a single clearing house [7].

The Health Communications Network in Australia is a joint government and private initiative launched through a series of pilot projects. Some of the pilot projects include an on-line telephone radiology (Teleradiology) which involves the transmission of X-ray images and brain scans as well as access to specialist advice between hospitals located in remote areas and those in the metropolitan area; an asthma management project which links asthma patients to their general practitioners and other specialists giving staff of a local hospital instant access to the patient file; and a project which monitors and reports electronically via EDI, incidents and problems arising from the use of anaesthetics and provide feedback to remote practitioners.

The HCN links electronically doctors, researchers, hospitals, specialists and pharmacists using telecommunications to relate patient information, including X-ray images, lab results and patient files. The network can be connected to biosensors enabling hospital staff to remotely monitor a patient's vital signs and opens the way for more health care to be shifted to the home.

Other VANs include the Internet and the NREN. The Internet is a worldwide community of communicating computers [8] and offers services such as electronic mail, remote login, anonymous File Transfer Protocol, Usenet, Gopher and the Virtual Hospital World Wide Web at the University of Singapore [9]. The National Research and Education Network (NREN) are being established to provide high-speed connections between communities and individual customers. NREN is being developed as a major enhancement to the Internet [10] dedicated to supporting research and education [11]. Both the Internet and the NREN can be very important for the exchange of medical research information.

Finally, the development of Community Health Care Information Networks (CHINs) in the USA - to make patient information available in a cost effective and efficient manner - and the European Health Information Network (EHIN) - which collects and disseminates epidemiological information - constitute a real benefit for the provision of health care services.

### Global VANS and their Importance for the Asia-Pacific Region

Value Added Networks can be considered as parallel transport networks capable of providing value added services and network management anywhere in the world. Global VANs provide comprehensive interconnecting network services and international value added services. They provide a flexible and economic method of moving data around the World and are becoming important, e.g. as financial clearing houses and gateways to provide access across the globe. Also, global data satellite networks are increasing in significant numbers specially across the Asia-Pacific Region. In this context global VANs can become a crucial factor for the advancement of international programs of cooperation, forums, conferences and so forth for the exchange of medical information science, research, health care, informatics education and training.

International networking is a growing need and a requirement for the world advance of health care especially primary health care following the goals of the World Health Organisation (WHO) "Health for all through primary care, by the year 2000" [12].

Global VANs are, therefore, a valuable factor for the continuous development of the Asia Pacific Region in matters concerning health care.

### Conclusion

VANs and Global VANs are emerging as enabling technologies and being used as catalysts for the achievement of significant efficiencies in health care systems. Through improved technology they offer flexibility, customer response time and a wide range of electronic services. They are becoming indispensable tools for the attainment of high quality outcomes and monitoring of the process of health care delivery by obtaining value for expenditure in information technology, improve decision-making by improving data quality and alignment of information to business requirements.

Some of the benefits derived from the use of VANs are increased effectiveness, faster access to information, better decision, increased personal efficiency, efficient operations, quality services, faster order-delivery cycle, better planning and information exchange (voice, data/text, video, image e.g X-rays, patient records, graphic display networks, CAD/CAM networks and videoconferencing).

Value Added Networks offer to a health information system the full advantage of the latest in communication technology and services to achieve information internetworking on both local and global scale.

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