

NETWORK APPLICATION AND SERVICES IN INDIA : REACHES NEW HEIGHT

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ABSTRACT

Network application has come to a long way in India. At present at least 23 networks of different kinds spanning all over the country, doing the criss-cross for various customers weather public sector's and private sector's. This paper attempts to describe their applications and services, which they are offering to the clients. Attempts also made to identify their problems from managerial as well as users point of view. Finally suggestions also made to overcome those barriers. In conclusion various strategy also suggested to usher a new horizon in the networks scenario in India.

INTRODUCTION

Alvin Toffler in his book Powershift says "Third wave money increasing consist of electronic pulses. It is evanescent, instantaneously transferable even it can be monitored on the video screen. It is infact, virtually a video phenomenon itself; blinking, flashing, whizzing across the planet" (1). Today Third wave money is information, the basic of knowledge and Networking is its hypothalmus. Networking is to the nineties, what PCs were to the eighties and mainframes to the seventies. Today, computer network have revolutionised the work culture and the ways it doing business.

INDIAN SCENARIO

In India we witness offices proliferated with computers connected to each other with messages criss-crossing over the view using electronic mail. Though the plan for developing national network was planned earlier, it came as a reality only in the 1980's because concerned government agencies was following very restrictive policy. NICNET was available to only government department, NCERT to selected elite educational and research institutes and RABMN and INET to only the fortunate few who had put their applications early. There was no competition, infact a 'market' did not exist.

But things have been changed enormously. During the recent outbreak of plague in the country, doctors in India effectively used the internet to communicate with their foreign

counterparts. A heartening development indeed. Virtually in the field of networking there has been a deluge. Some exogeneous stimuli (Is the general process of liberalization and globalization ?) have stirred up gaints like the DOT, NIC and DOE and nucleated new endeavours in value added and new services like E-mail, audiotex and videotex etc. Now private enterprises like ICNET, DART and SPRINT have come in and the users have also become more well-informed and there by more choosy. However in the government sector selected use of the overseas developments, India set up NICNET, INDONET, INET, RABMN etc. which are the most sophisticated networks. At present there are at least twenty six networks of various types functioning in India which may be classified into three categories.

- | | |
|--|---|
| 1. General Data / Information Networks | NICNET, INDONET, INET, RABMN |
| 2. Specialized networks | BTNET, ERNET, SIRNET, CALIBNET, DELNET, INFLIBNET, BONET, MALIBNET, PUNET, HYBNET, ADINET, DESINET. |
| 3. Specialized Networks carrying large business Data/ Information etc. | SAINET, RILNET, SBINET, OILCOMNET, INDIAN AIRLINESNET, AIRNET, ONGCENET, GAILNET, COALNET, NTPCNET GAILNET COALNET NTPCNET etc. |

Apart from this BHELNET and ICNET, DART and SPRINT-RPG from private sector are functioning but the concerned authorities are unable to provide data because of security reasons hence they are excluded from the study. Thus the study covers 15 networks which are operational in India. It is worthy to be said that networking activity is fast reaching a state of maturity during the last four to five years. Most of the above mentioned networks have been built up by leasing inter urban and intra urban voice circuits from DOT, Access also has been provided through PSTN and some of them have been connected internationally through VSNL Gateway. Today in India networks permit far flung community of users to share computer resources and the wide range of facilities accessible by networks are in fact becoming more interesting. So let us, have a look at some basic applications and services which are available today via network.

NICNET

SERVICES AND APPLICATIONS

Several types of services are being provided through this network. One of the main service is the value-added 'Electronic mail'. This mail service has been custom-designed taking into consideration the network architecture and operation environment. It provides an individual service with certain privacy measures. It also provides Broadcasting and Bulletin services. In the Bulletin services it provides personnel, employment and transport information especially for NIC officers to plan their visits of the headquarters.

BIBLIOGRAPHIC APPLICATIONS

A major bibliographic application that is available on this network is the bibliographic biomedical information. NIC has established in collaboration with the Indian Council of Medical Research (ICMR) in 1986 a centre called ICMR-NIC Centre. The centre was set up with the broad objective of evolving a method for information acquisition, storage, retrieval and dissemination from international databases. It also conducts training courses, workshops and seminars aimed at preparing a cadre of biomedical librarians, well versed in the latest information technologies.

For obtaining access to the databases of the National Library of Medical (NLM), USA, NIC has

signed a memorandum of understanding with NLM. This has facilitated the establishment of the Medical Literature Analysis and Retrieval System (MEDLARS) in India by NIC. The MEDLARS has over 24 Databases such as MEDLINE, CHEMLINE, TOXLINE and POPLINE. MEDLINE contains MEDLARS citations which are directly accessible to any one using his local terminal connected to the MEDLARS computers at NLM.

A unique feature of the MEDLARS is that the contents of articles are systematically analysed for major and minor concepts and view points of laboratory techniques, and indexed according to a structured thesaurus is revised annually and published every January as Part II of Index Medicus.

India is one of the 18 countries in the world and only the South-East Asian region receiving MEDLARS information.

However online searching by connecting Washington, D.C., USA, is not very cost effective if a large number of users needs have to be fulfilled. For making MEDLARS information available to the users in India, the least expensive methods are used by acquiring the tapes and using them on the mainframe computer system and disseminating via NICNET. In order to be at par with other international partners of NLM in dissemination of information quantitatively and qualitatively, the Indian centre is in the process of acquiring suitable software and trained manpower of operating the databases.

PATENT INFORMATION SYSTEM

NIC also developed a computerized online patent information system based on bibliographic data available from the International Patent Documentation Centre (INPADOC), Vienna. The system creates information and multi-valued index directory files which facilitate faster and efficient retrieval of patent documents according to the International Patent Classification Code, date and year of publication, applicant's and inventor's name, the country of publication and title of the document. These bibliographic information can be obtained interactively or in batch mode.

DOORMATICS SERVICE

Doordarshan and NIC have together launched a telematics project called INTEXT. "It is India's

CMC has also developed special applications for customers, are hosted on the network. Some of the more important applications are :

- (a) The online Real-Time Reservation System of the Welcome-group Chain of Hotels through which anybody can reserve/cancel or get information on rooms in any hotel of the chain or anyone of the other specified locations.
- (b) TOURNET a tourism information database, commissioned by the Department of Tourism Government of India has also been tested on the network and is planned to be completed early next year.
- (c) A major function of CMC is to provide hardware maintenance services to over 700 machine installations in India. The complexity of machine types, spare parts, stocking data, purchase and import procedures distributions problem etc. are of enormous magnitude. OLPICS-online parts inventory control system operation on INDONET permits the company to manage the maintenance support at a high level of system availability.
- (d) CMC's corporate management information system comprising finance, personnel, projects, marketing and message/EMAIL enables widely distributed databases to be managed in a most contemporary manner.

RABMN SERVICES AND APPLICATIONS

The net work provides the following types of services :

- i) Computer messaging.
- ii) Connection to Public Telex Network.
- iii) Connection to Packet Switched Public Data Network (I-NET)
- iv) Connection to Informational Gateway Packet Switch.

The network provides connectivity to the national and international telex networks through appropriate interfaces at master earth station. By this, any data terminal connected to a VAST in any location can access any national / international telex subscriber or can access any VAST customer.

The Packet Switched Public Data Network-Phase

I (I-NET) is interconnected to this network through the Delhi node. Customers of either network can access those in the other network and exchange data.

The Gateway Packet Switch Bombay commissioned by "Videsh Sanchar Nigam Ltd" is connected to a number of overseas data networks. Thus Remote Area Business Message Network is linked to the Gateway Packet Switch to provide access to international data network.

Now let us have a look at the addressing scheme of RABMN. The addressing scheme for the terminals is as per CCITT, X.121 recommendation. Each terminals has a 12 digit address with 2 more digits for sub-addressing. The first 3 digit indicate Data country code like-404 for India. The fourth digit indicate Data Network Identification Code-DNIC.

4041

>DCC<

>DNIC<

Digits 5 to 7 indicate the geographical location of the customer and the last 5 digit give customer's identity. So by this system anyone can set up an access to any foreign networks for getting information from various foreign databases.

INET SERVICES AND APPLICATIONS

At present the network provides the following services :

- i) Interactive data communication.
- ii) Connection to International Gateway-GPSS, through Bombay Node.
- iii) Connection to Remote Area Business Message Network.

The following facilities are available to customers:

- i) Fast select
- ii) Closed User Group (CUG)
- iii) Reverse Charging.
- iv) Permanent Virtual Circuit.

The tariff for the services depends on the volume of data exchanged in both directions of call in

infrastructure. Basically the services provided by INDONET can be categorized in to the following.

- i) Distributed Data Processing facility.
- ii) Computer Services Bureau Consultancy.
- iii) Promotion of advanced networking technologies.
- iv) Providing computer power to users across the country.
- v) Public Database Service.
- vi) Software export.

Now let us have a look on some important service provided by INDONET.

(a) ACME

ACME is CMC's latest product in messaging system. It uses advanced store and forward messaging techniques in order to give the user the convenience of a personal mailbox. ACME offers the following :

- automatic information on pending inward message.
- ticket facility to remind the user regarding important meeting and follow-up jobs.
- providing round-the-clock access to messages, files with added facility to edit and save.
- automatic acknowledge facility.

(b) File transfer

INDONET offers computer-to-computer data interchange facility. This software is very popular among user in the corporate category. The files can be moved across geographically spread locations with ease and speed. And all this could be done from the terminals of PC's available on the users desk.

(c) Distributed Data Processing-Expertise

Distributed online application have been developed on INDONET. This allows the offices in the branches to update the corporate databases as and when the event (transaction) occurs. This application is currently being used on the network and has provide to be successful for usage by organisations which have

geographically dispersed offices.

An international gateway has been commissioned at Bombay via the packet switch of the overseas communication services, VSNL. This gateway facility allows INDONET users access to international computer network. Thus, users can have world wide access to :

- Trade/Business information
- Stock exchange information
- Scientific/Technical databses

This service is very useful for scientists, engineers, academicians and the entire business community who can have access to world wide up-to-date information via INDONET and can also use the gateway to transfer their software abroad.

DATABASE ACCESS

Apart from the access to international databases provided by INDONET through the international Gateway, INDONET users can also access databases hosted on INDONET itself. At present, there are two databases hosted on the computer network namely CMIE (Centre for Monitoring India Economy), a database on financial performance of over 2800 organisations in India and NICRYS, a scientific database on crystallography.

DATABASES ON CORPORATE PROFILE

The country's first commercial online database service on corporate profiles is now available for users through CMC Ltd's INDONET. The database is created by the Centre for Monitoring Indian Economy Financial Information (CMIE) offers latest financial data of over 2000 companies. Beside this the users also have access to other structural and organisational details of the company. CMC has stored the database on to an IBM mainframe model 4361, housed in Bombay office. "The data and coding were created in an MS-DOS environment and updated every quarter of a year. The service can be accessed by any one with a PC of terminal and a telephone for an subscription of Rs. 5,000" (6).

The applications mentioned above used by over 100 customer organisations in India. In fact INDONET's a customers list reads like a corporate WHO's WHO.

CMG has also developed special applications for customers, are hosted on the network. Some of the more important applications are :

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- ii) Closed User Group (CUG)
- iii) Reverse Charging.
- iv) Permanent Virtual Circuit.

The tariff for the services depends on the volume of data exchanged in both directions of call in

addition to call duration charge and rental for the leased lines from the Switch/PAD.

i) Fast Select

Small messages can be transmitted instantly in one packet, i.e. call set up packet itself. This is useful for applications such as credit card system etc.

ii) Closed User Group (CUG)

The closed user group facility enables a set of users located anywhere in the network to form a closed user group by way of which no other subscribers belonging to this group will be permitted by the network to call these users for the group can communicate with other users who are not members of the group.

This is virtually a private network capability within the public network.

iii) Reverse Charging

Reverse charging enables the calls to be charged to the called subscribers provided he has accepted this at the call set up time.

iv) Permanent Virtual Circuit (PVC)

For a subscriber who has need to communicate regularly with another subscriber, continuous connection between two parties can be established with PVC which functions similar to a local leased circuit connection.

ERNET SERVICES AND APPLICATIONS

Presently ERNET facilitates the following services

- i) Electronic Mail
- ii) File Transfer
- iii) Remote log on (Terminal Access)
- iv) Bibliographic database access.
- v) Audio and Audio plus conferencing.

Now it is supporting a multi-vendor computing environment based on OSI 7 layer model. All the above mentioned services are supported in the first phase. Document and graphics exchange, voice/computer/video conferencing services would be addressed in the next phase. The communication sub-network of ERNET is now going to support a variety of communication

terminal (workstation, CAD/CAM Applications) for specialized services to demonstrate emerging concepts of telematics.

BTNET SERVICES AND APPLICATIONS

Under the BTNET programme, the computerised services are available for retrieval of information related to bibliographic information research articles, report books, patents covered by Biotechnology Abstracts. By scanning current contents (Life Sciences) and Biosis tapes, comprehensive retrieval is ensured by the ability to search the complete abstract text specific by means of title and index words. The DIC centre at NIT, New Delhi, has been identified as a node of Hybridoma data bank and the IMT, Chandigarh, as a collection centre in Micro-organism of MSDN of CODATA. Now the entire repositories of information on Hybridoma data bank will available online through the BTNET. The MEDLINE bibliographic information and IMPADOC Patent services are also available in the NICNET and this information held on the NEC 1000/20 is now readily accessible to the user scientists in the BTNET System.

Some of the large database like Medline, Patent databases, Biosis are currently available in CDROM can be a very effective means for data exchange of biological databases that are now provided on magnetic tape, but may not be cost effective where the data is changing very rapidly or where there are very few users of the data.

On line access to International Databases

On line access has been established at NII, New Delhi CCMB, Hyderabad; and at MKU, Madurai Center for access to DIALOG databases. This facility is also available at the Apex Centre at DBT (Department of Biotechnology). It also uses the PAD installed in Delhi by Videsh Sanchar Nigam for accessing international databases through the VSNL gateway, thus considerably reducing the cost of communication for accessing desired information.

Now, DIALOG, Telnet, TYMNET connected services are also available through VSNL which is supporting the huge demands of our scientific communities. Some of the important information services presently available are as follows :

1. PROPHET
2. SCISEARCH
3. TELEGEN
4. DCI
5. SUMEX
6. ITI DIALOG (Telegen Blent)
7. Agris
8. Current Biotechnology Abstracts.

SIRNET

SIRNET is designed to organize indigenous online database services on such subjects as leather technology, food technology, natural products, chemistry, radio physics etc. So after implementation of the first phase the database scenario of the concerned organisation of the above fields has tremendously boosted up. Presently it also provides international database access through VSNL, Bombay. Apart from this, now it is providing the following services.

- i) Administrative Information Services.
- ii) Financial Information Exchange Services.
- iii) Exchange of Library Resources.
- iv) E-Mail Services.

Works on Bulletin and teleconferencing facility set up is underway and very shortly it will be provided in full scale.

CALIBNET

SERVICES AND APPLICATIONS

CALIBNET is still in implementing stage. Though like DELNET, it is not yet ready to offer E-Mail services but it is expected to become operational very shortly. However, in its feasibility report (7) it is envisaged to provide automation facilities in the areas of

- i) Acquisition and fund accounting.
- ii) Serials control
- iii) Cataloguing
- iv) Circulation
- v) User Services
- vi) Document transfer facilities etc.

DELNET

SERVICES AND APPLICATIONS

"With the launching of DELNET E-Mail on the 19th March 1991, Delhi attained the distinction of being the first metropolitan centre to establish an electronic link among libraries, marking the beginning of resource sharing venture (8)". This E-Mail facility enables libraries to promote library mailing, interlibrary requests, distribution of questionnaires, activation of professional contracts and demonstration of file transfer with

a view to eventually connecting DELNET to national and international databases and networks. However, when it will finally take shape it will provide.

- i) Acquisition and fund accounting.
- ii) Serials control
- iii) Books and Journals maintenance
- iv) Circulation
- v) User service
- vi) Calculation and maintenance of bibliographic database.
- vii) Inter Library user services.
- viii) Document copy and transfer facilities
- ix) Access to national and international databases
- x) Union catalogue
- xi) Current awareness and SDI
- xii) Authority profiles
- xiii) Abstracts etc.

INFLIBNET

SERVICES AND APPLICATIONS

In INFLIBNET the actual realtime services started from 1991-92. Right now its Computer Development Committee (CDC) of UGC started providing funds to universities for procuring computers. Till April 1995, 54 universities have got funds for this purpose. Data pertaining to 4 lakh books and 20,000 serials, 35,000 thesis/dissertation have been integrated to central **databases**. This database is speedily growing and will lead to an online Public Access Catalogue (OPAC). However, when it will be in final stage it will offer mainly five types of services. They are as follows :

A) CATALOGUE BOARD SERVICES

1. Shared cataloguing of books, serials and non-book materials
2. Union catalogue of books serials and non-book materials.
3. Online catalogue access for shared cataloguing and location identification

4. Catalogue production in card, book, magnetic tape/floppy, CD-ROM form, book processing and preparation.

"The final aim is to gather 9 million retrospective catalogue record of 179 universities into a common catalogue. The end result is a machine readable catalogue (MARC) of a standardised pattern. For this CD-ROM technology will be used" (9).

B) DATABASE SERVICES

1. Bibliographic database service
2. Retrospective searches, SDI, Current Awareness Services
3. Database of non-bibliographic information such as ongoing and completed projects, institutions and specialists.

C) DOCUMENT SUPPLY SERVICES

1. Interlibrary loan request processing
2. Document delivery (Fax/Non fax)

D) COLLECTION DEVELOPMENT

1. Acquisition and assistance in selection and procurement

E) COMMUNICATION BASED SERVICES

1. Electronic mail
2. Transfer/Receive messages
3. Bulletin board view/update bulletin board
4. Academic communication through electronic mail, bulletin board, file transfer, computer/audio/video conferencing etc.

SAILNET SERVICES AND APPLICATIONS

SAILNET at present is providing the following services :

- i) Voice connectivity among various zonal officers and corporate office at Delhi.
- ii) Store and forward telex messages up to the level of regional offices.
- iii) Interactive communication between plants and corporate office.
- iv) File transfer facilities for large quantity of data.

- v) Transfer of financial information.
- vi) Fax connectivity among corporate office, plants, CMO, regional offices and zonal offices:
- vii) E-Mail facilities

OILCOMNET SERVICES AND APPLICATIONS

Between Delhi and Bombay node, OILCOMNET is now offering the following three services in its phase.

A. ELECTRONIC MESSAGE SYSTEM

This comprises the following :

- i) Word Processor for message composition.
- ii) Facsimile system (for document transmission).
- iii) Telex services.
- iv) Private computer based E-Mail services.
- v) Public Service.

B. INFORMATION MANAGEMENT SERVICE

This comprises of the following :

- i) Public Information Databases.
- ii) Computing Services.
- iii) Viewdata and teletext (in the final stage).
- iv) Administrative Information System.
- v) Personal Information System.

C. DOCUMENT PREPARATION SYSTEM

- i) Word processing
- ii) **Text processing**, Business Graphics and **Spread sheet** facilities etc.

The network hardware and software are fully equipped for meeting all the applications and all the advanced services will be provided in due course.

SBINET SERVICES AND APPLICATIONS

At present SBINET is providing the following services.

- i) Speedy customer remittances.
- ii) Fund transfer messaging.
- iii) Administrative Communication.

iv) Management Information System.

v) Transfer of Statistical data.

However for administrative instruction communication, fax are usually used. For financial transaction between important branches store and forward technique also adopted. Very recently SBI established a hookup with SWIFT (Society for World wide Interbank Financial Telecommunication) which is a cost effective global electronic fund transfer network designed to work round the clock. Thus SBINET is able to send and receive messages any where in the world where the SWIFT'S international receiving centre is located.

RAILNET SERVICES AND APPLICATIONS

Indian Railway is presently providing two computer based services IMPRESS and FOIS through the RAILNET system throughout the country.

The IMPRESS (Integrated Multi-train Passenger Reservation System) is a reservation system developed by CMC for Indian Railway. The system was unveiled in Delhi in 1986 and now handles about 60,000 reservations of 200 trains with a success rate of 99.8 percent. Similar system is functioning in Bombay, Calcutta and Madras also. Now it is being expanded to other major cities in the country, thus 80 % of reservation in India is computerized. Now all the system are interconnected through a quasi network system which enables remote log in where by Delhi node can exchange data to its Bombay, Calcutta, Madras, Bangalore, Bhopal, Lucknow nodes instantly. However, the IMPRESS system provides four modules, inquiries, reservation, MIS/Finance and maintenance.

FOIS (Freight Operation Information System) started from 1982. The basic parameters of FOIS are the same the world over Traffic Reporting and Control System (TRACS) or Canadian National Railways for effective transport management. Apart from this RAILNET also provides the following information system through this network.

- i) Personal Management Information System.
- ii) Claims Information and Processing System, and

iii) Tribunal Information and Processing System (TRIPS).

INDIAN AIRLINES NETWORK SERVICES AND APPLICATIONS

Presently INDIAN AIRLINES NETWORK is offering mainly two types of services. They are Passenger Reservation System and Passenger Check-in System. It also supports the following:

- i) Flight control transactions.
- ii) Passenger handling transactions.
- iii) Passenger display transactions.
- iv) Report generating transactions.
- v) Seat map / aircraft display / update transactions.

The comparative study of application and services of various networks are given in tabular form in Table 1.

PROBLEMS

Though India has developed several state-of-the-art networks, a serious question is raised about the commercial ability of the product. Take for example INDONET, they launched several advanced services but the users are not aware of them, except VSNL and recently ERNET none of the Indian Networks never publicized their services. The brochure brought out by INET is also poor quality. On the other hand foreign networks and their Indian counterpart are very much aware of the fact, and are spending heavily for marketing their services. In order to substantiate the finances, the organisation should formulate a marketing strategy of its products and programmes. Recently the Head of ERNET had verbally announced out-of-turn allotment the telephone connection to institutions having a PC and a modem, the offer is still to be made in black and white. Whereas, NICNET has announced 2000 connections free on barter basis to education and research institutions. So naturally one would be apprehensive about any free launch offers. The basic tendency of any market economy is to allow the market forces to play. The big players should care to promote and develop a market that could be sustained in the long run. Moreover the potential users are now a confused lot which boat to ride ? More because the networks in India as-on-date don't

talk to another. If an institute is on NICNET, how does it communicate with another on ERNET. A private enterprises is on ICNET or SPRINT, how does it access the resources on public network. This is perhaps the most pressing and immediate problem and to resolve the problem we should formulate new policy to get universal connectivity.

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Networks	Hq Voice	E-Mail	File Transfer/ updating distributed Data base	Remote logo	Bibliographic Non-Bib. Database access / Database of Project specialist	Audio / Audio plus conferencing	Video Conferencing	Bulletin Board / Referral Ser.	Docu. Delivery Service/ Fax / Non-Fax	Inf. Mngt. activities	Access to International Database through GPSS & Network
NICNET		✓	✓	✓	✓	✓	✓			✓	✓
INDONET			✓	✓	✓					✓	✓
RABMN		✓	✓	✓		✓	✓		✓		✓
INET		✓	✓	✓	✓	✓	✓				✓
ERNET		✓	✓	✓	✓					✓	✓
BTMET		✓	✓							✓	✓
SIRNET		✓	✓		✓					✓	✓
CALIBNET		✓	✓	✓	✓					✓	✓
DELNET		✓	✓					✓	✓	✓	
INFLIBNET		✓	✓			✓	✓	✓	✓	✓	
SAILNET	✓	✓	✓	✓							
SBINET		✓	✓	✓					✓		✓
OILCOMNET	✓	✓	✓	✓		✓			✓		
RAILNET	✓		✓								
INDIAN AIRLINESNET	✓		✓	✓		✓*		✓			

* Information Mngt. Service includes Catalogue Prod. Search, Inter Library, Loan Document Delivery, SDI, CAS.