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A NEW CONCEPT OF NETWORK: THE IBINET Project.

THE INDUSTRIAL AND TECHNOLOGICAL INFORMATION BANK (INTIB) PROJECT*

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In the current transformation of the informatics industry, telecommunication is the key to success or indeed to failure. The IBINET project, based on high technologies but using conventional telecommunication satellites, is considered to be an interesting option, particularly to countries without appropriate terrestrial infrastructures, offering them the possibility of access to international information and by extension the opportunity of creating and developing their own data transmission networks.

See CRP.2 for the IBINET Project Presentation (Revised version March 1984).

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Introduction

An interesting article appeared a few weeks ago in the American business press, restating the thesis that the mastery of telecommunications will be, in the short term, the key to determining which informatics companies will survive and which will disappear.

In effect, the article continued, a service bureau or a software or hardware manufacturer must prove to have a sound experience in the use of telecommunication means; even more so if it is directly involved in the development and operation of these means.

What was considered hazardous four years ago - IBM's decision to participate in the creation of the SBS - is now an accepted route and is followed to a certain extent by the most dynamic firms (ATT-OLIVETTI to cite a European example).

After all, data transmission may be included under the general heading of information processing.

IBI (Intergovernmental Bureau for Informatics) was already aware, though perhaps not as clearly as today, of the important role which telecommunications was going to play in the development of informatics, when it began in 1980 a series of studies and reflection meetings on the links between the two disciplines and the possibilities of undertaking actions or creating projects with a view to fostering a synergy between them.

In May 1982 a first study, prepared by experts, was presented to IBI authorities (2). In their opinion, a good opportunity existed for developing countries to create and develop data transmission networks at affordable prices, using artificial telecommunication satellites.

While modern transmission techniques, enabling the cost of ground equipment to be reduced, and the wide natural coverage of satellite beams were the most important factors for deciding to launch the IBINET project, the technological and political opportunity which made the project reasonably feasible also underlined this decision.

As better described in the project's presentation documents (3), the main source of this article, the technological opportunity comprises the current microinformatics phenomenon, the increased local capacities with regard to microcomputer software and the more and more widespread introduction of informatics techniques in the design and operation of telecommunication networks.

The political opportunity was evident in the willingness of international telecommunication organizations to explore new avenues, as the recent creation of regional bodies (ARABSAT, PALAPA, EUTELSAT, etc.) shows.

The physical network

It is not uncommon today that the so-called database/bank access networks are confused with the physical networks that convey the exchanges. Even greater confusion arises when dealing with international networks, servers and information providers in one corner of the world and users in another, who use varied telecommunication means managed by a number of national administrations.

Our wish in the IBINET project has been to treat each case as clearly as possible, without however achieving full success.

The new network concept in the IBINET project essentially involves however the material, technical and technological aspect which up to now has been the main object of tests and demonstrations.

Based on the principle which has been put to the test in all data transmission networks, namely of imbalance in the volumes of information which circulate in one direction and those circulating in the other direction, the IBINET type network is a point-to-multipoint unindirectional selective data distribution network, using traditional telecommunication satellites.

It however also offers an interesting cost-effectiveness compromise adaptable to the conditions of any country or region which has decided to

use it. It is not adapted to all the applications, but the portability of the receiver stations and the fact that it can be easily installed even in remote sites, with the current microcomputer "off-line" processing potential, provides a true opportunity of quickly setting up information networks in countries which lack developed telephone infrastructures.

In fact, the proposed transmission technique, called "spread-spectrum" (4) enables a distinct reduction in the radiation power, at the expense of a loss in passband, generally therefore making it possible to use very small sized antennas and hence less costly ones in comparison to traditional equipment.

Moreover, the very low transmission power which reduces the possibility of interference with other land telecommunication systems, has facilitated the adoption of this technique for the direct dissemination of data within the strict norms for satellite use laid down by INTELSAT (5).

The up-link, however, must be effected through INTELSAT installations with standard A type (32m.) or B type (11m.) antennas.

Finally, selectivity in dissemination via the transmitter using individual codes for each subscriber (making it possible to easily set up "sub-networks" for different simultaneous information distribution services) complete the list of the most important features offered by the IBINET type system.

Applications

Technically valid, the IBINET type system has demostrated its advantages and enabled us to analyze its drawbacks. It is by far the best option currently operational for the distribution of news items for example, in countries where the telex or telephone networks are not widely spread or not particularly reliable.

Moreover, it has also proven to be valid for the selective distribution of data bases and banks. In fact, the current microcomputers' storage

capacity makes it possible to record on average a specialized section of a large data base for use a posteriori.

In the same way as television channels, it is periodically updated according to a transmission schedule.

According to specialists, with the capacity of a current hard disk, if its content is relatively homogenous or specialized and regularly updated, it can represent a useful and important source of information. Moreover, from an informatics standpoint, these decentralized data bases could boost the development of software which is adapted to the particular language and procedure of local users.

The unindirectional feature of this type of network excludes real time protocol and therefore the possibility of direct consultation at the main source. There again a compromise can be reached, since with a sound interest profile, a server can always transmit periodical information to the decentralized bases which, statistically speaking, will answer the majority of queries.

The servers may find that the system causes a tariff and copyright problem, but on the other hand it simplifies the operations regarding the management and individual monitoring of subscribers. In addition, once the established tariff threshold is reached, practically no further expense in terms of network (regardless of distance and regardless of number of receivers) and in terms of central informatics equipment (no memory extensions, no channel extensions) is incurred with the addition of new subscribers.

Moreover, the very nature of the IBINET type system demands a large number of subscribers in order to appropriately share the price of the satellite repeater. This implies the presence of several transmitters (each offering several simultaneous channels or services) in "programmed" operation with their corresponding "sub-networks" of subscribers.

The operational network

The technical evaluation of the system, at pilot level, has shown the validity of the technology adopted. But it has also shown the complexity of implementing the project at international level.

IBI will therefore have to play the role of promoter, intermediary or mediator between the interests and competences of the various "protagonists": telecommunications services suppliers, equipment suppliers, information users and providers.

Certain strategies can currently be foreseen for the project in three well defined fields: information (or content), the physical network and informatics.

(a) Information is the reason behind the project itself. The possibility of offering developing countries access to scientific, technical or economic information existing in international data banks, without having to develop costly telecommunication or data transmission infrastructures, is one of IBI's goals as an organization.

In this connection, three stages could be imagined: the first, already underway, is a promotional action at international level. This involves making the potential users in certain countries aware of the information content and of the conditions set down by servers and providers in other countries for access to their data banks or bases. It also involves getting services to accept a new formula of selective dissemination of their information via telecommunications satellites.

In the second stage, IBI could play the role of an information "broker" for the purchase and regular transmission of useful information at the request of its member countries.

In the third stage, IBI could become a server or provider of information for its member countries.

(b) Three stages may also be distinguished in a strategy concerning physical networks: this currently involves promoting the adoption and operation of the technology by the PTT authorities of IBI member countries.

A series of agreements in this connection are currently being negotiated with a view to their signature.

A second stage would consist of the creation of a private IBI network, using the IBINET technology, and linking the Organization's regional centres and the central headquarters. The transfer of documents and useful information on projects underway could represent the main interest for promoting this network.

The third stage would be the operation of an international network based on spread spectrum technology with numerous transmitting countries and using more than one satellite. The coordination of its overall operation would be entrusted to a streamlined structure (the IBINET organization) which would be responsible to IBI.

(c) But there is a last domain which is as important as the others: the informatics part. Here, at least two stages can be envisaged, the first being as in the previous cases, a promotional action geared towards informatics hardware manufacturers and software development firms.

In effect, an essential characteristic of the IBINET type network is that it becomes completely transparent for the users. The format of the registers as well as the transmission speed and codes are determined beforehand and established by the server. It is therefore important that for each manufacturer of intelligent terminals or microcomputers, software be developed for the retrieval or visualization (partially programed or complete) of information or its possible "on-line" storage and "off-line" operation.

Efforts for standardization at this level may lead to the promotion of local industries (second stage) of terminal adapted to specific applications.

Final remarks

The path to be taken is still long and difficult, but it is also true that in less than two years we have succeeded in promoting a new concept and having it accepted by the INTELSAT organization thanks to the support of telecommunication authorities of various countries which showed interest in this project because of its possibilities and prospects.

It involves and advanced technology capable of assisting developing countries. It does not represent the solution, but it may be considered as a valid compromise... and not just for the developing countries alone.

Two months ago, one of the largest and most reputed companies involved in the international information market published a report on future trends (6) stating that 35% of the current users of microcomputers installed in corporations down-load information from central computers, and the possibility of sending information in one direction, from mainframes to micros, constitutes the humber onw wish of individual informatics. What is the purpose of having increased power in data processing and storage serve if there is no information to be processed?

Note:

The opinions expressed in this article do not necessarily reflect the official position of the Organization (IBI) for which the author works. In this respect, the reader should consult IBI documentation.

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