
ONLINE ACCESS TO FOREIGN/INTERNATIONAL DATA BASES

SS Murthy*

Introduction

The tremendous growth of literature in various fields of knowledge and the ever-increasing costs of publications have forced the libraries/ information centres to curtail the acquisition of publications. Inflation adds to the gravity of this problem, resulting in reduced purchasing power of the library budgets. Therefore, libraries have to find alternative ways to provide access to publications/documents. Libraries/ technical information centres (TICs) are adopting mainly two methods to ensure access for their users: (i) inter-library cooperation and (ii) providing access to well-known databases. While cooperation among the libraries in the form of inter-library loan of documents and avoiding duplication of purchase of costly publications is an age-old practice, providing access to the databases is a recent development. Libraries/ TICs are able to improve their services in respect of coverage and quality with the help of the databases despite the increasing costs of publications and also the high charges for database searches.

Databases

A number of information processing agencies store the information processed by them in the form of computer memory, and the computer software used by them

enables fast retrieval of the required information. For example, the Chemical Abstracts Service, which covers about 12,000 journals relating to Chemistry and allied subjects for their abstracting periodical Chemical Abstracts, stores all the information covered in the periodical in computer memory. The databases organised with this information include CA Condensates, CA Search, etc.

The term database refers to the collection of information stored in a suitable form, from which specific information can be retrieved when required. A bibliographic database is one which contains bibliographic details (citations/abstracts or even full texts of documents).

Some of the databases organised by various scientific/professional agencies are listed in Table 1.

Databases fall into two categories:

i.. *Reference Databases* : These databases contain bibliographic details like the references of the journal articles, reports, patents, books, dissertations, etc., and sometimes carry their abstracts or even full texts. These databases are also called bibliographic databases. Databases of directories are also included in this category.

Table 1. Some important databases

<i>Name of the Database</i>	<i>Organising Agency</i>	<i>Approx No. of Records (in million)</i>
INSPEC	Inf. Service in Physics, Electro-Technology Computers & Control, UK	2.4
COMPENDEX	Engg. Index Inc. USA	1.3
CA Search	Chemical Abs. Services, USA	6.4
METADEx	Amer. Soc. for Metals, USA	5.6
NTIS	National Tech. Inf. Service, USA	1.1
SCI Search	Inst. of Scientific Inf. USA	5.6

ii. *Databanks* : These contain statistical information like experimental data for certain materials, compounds, etc., physical constants, economic or demographic data, etc. The data available in such databases can be manipulated to obtain answer to a specific query.

Online Databases

Most of the well-known databases function 'online'. The term 'online' implies that the searcher is in direct communication (online) with the database he wishes to interrogate and the computer on which the data is loaded. The search is conducted as a two-way conversation between the searcher and the system (computer). For this reason, the online system is frequently referred to as 'interactive' or 'conversational'. This is a very flexible mode of search, offering the user the option to modify his query at any point during the search.

Online access to remote databases is possible only when suitable communication links between the terminal (used for searching) and the databases are available. In fact, data communication networks, such as Tymnet and Telenet, connecting various databases and user terminals in USA, UK and some other countries are already in use.

Advantages of Online Searching

Online searching offers many advantages over the printed information sources. Some of these advantages are :

- i. *Speed* – Online searching is much faster than manual searching.
- ii. *Comprehensiveness* – The user can cover a wide range of databases promptly, which is not possible with the traditional library system

- iii. **Currentness** – The facility of frequent updating of the databases makes them more current compared to printed publications.
- iv. **Flexibility** – The user can alter or modify his query at any point of search to make the best possible use of the available information.
- v. **Convenience** – The user, operating on a terminal is able to overcome geographical barriers and can have access to any amount of information.
- vi. **Cost-effectiveness** – Through savings in man-hours needed in manual search of printed sources, in-depth online search has the potential to be relatively cheaper.

Accessing/Searching Databases

For meeting the urgent requirements of academic/research organisations and also for conducting high precision searches, online searching is desirable because of the interactive nature of the search.

The search process (Fig. 1) involves a terminal connected via a modem to the telephone, which is used to access the required system. The query entered through the terminal gets converted to the analogue mode, travels through the telecommunication lines and reaches the computer system on which the database is loaded. The database is searched, and again, the signal is converted from digital to analogue mode and the search result appears on the display unit of the terminal. All this

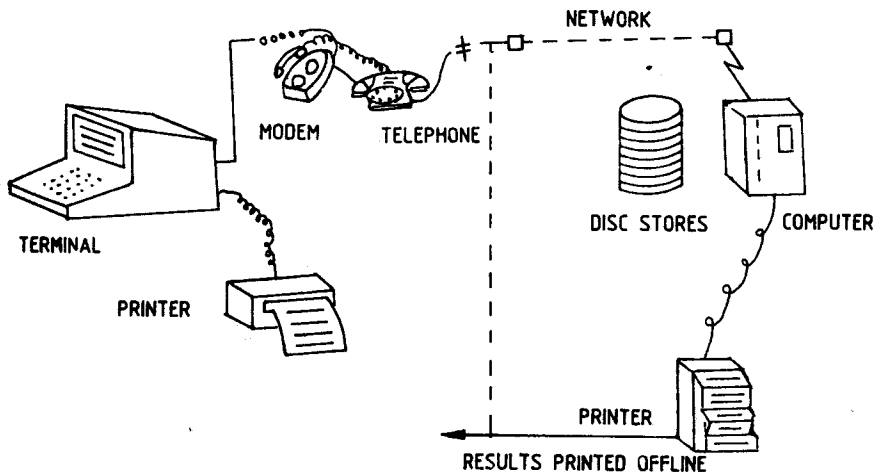


Fig. 1 OVERALL ONLINE SEARCHING PROCESS

happens in a few seconds and the searcher feels that all this is happening instantaneously. The telephone line may be linked either directly to the computer system or to a node of the telecommunication network, which may be connected to the computer centre. The computer system is typically a large time-sharing installation, which might enable access by tens or even hundreds of terminals at the same time. The network node is a microcomputer which is able to handle communications traffic. It carries out preliminary checks and organises exchange of messages between the searchers and the computer.

When the computer centre is nearby, there is no need for a network; it can be dialled directly. However, when the system through which the database is to be searched is far away, telephone lines or the data communication channels are to be used to enter the network from the terminal.

Communication Networks

In advanced countries like USA, some companies organise telecommunication networks and make them available to users for data communication against subscription. They often take telecommunication lines on lease from the telecommunication departments or companies, form a communication network by installing nodes and other necessary message switching systems and make the network available to the subscribers. A large number of online databases are searchable through these networks. The user telephones to the nearest network node and enters the password assigned to him by the database organisers

and conducts the search. After verifying the password, the unit translates all subsequent user entries into a processing code that queues the user entries with those of other users to be transmitted in turn to the computer processing unit.

Well known telecommunications networks like Tymnet and Telenet have over 200 nodes in USA, Europe and some other parts of the world, into which the searcher can dial and have access to nearly all the American online databases.

Speeds of Transmission : The most common data transmission speeds are the telegraphic channel speeds of 45, 50, 75 and 150 bits per second, and speeds derived from voice lines of 600, 1200, 2400, 4800, 7200 and 9600 bits per second.

Analogue and digital signals are interchangeable. Computer data at 4800 bps can be converted into analogue form to travel over telephone channels. On the other hand, telephone signals can be digitalized and represented by a stream of 56,000 bps. Transmission by digital mode gives better transmission speeds and quality than analogue transmission.

Packet Switching : For high-speed data transmission, a technique called packet switching is used. Here, the data items are stored at switching nodes. These nodes are mini-computer which receive the data bursts, store them in their memory, and then forward them to the next part of the network. There is no physical switching of lines; the lines are permanently connected and the switching computer selects the line over which it sends the data. The data are

transmitted in blocks, which are called packets. Each packet contains a header giving routine instructions which each switching computer examines, like post offices examining the addresses on the mail. The packets cannot exceed a certain size. If a long message is to be sent, it is broken into multiple packets, each with its own header. The switching computers pass the packets onward as quickly as they can. Different segments of a message may travel along different routes and get reassembled at the computer at the destination to form the complete message. Figure 2 gives an idea of transmission of messages by packet switching.

Database Vendors

These are specialised agencies which act as intermediaries between the database producers and the database users. They purchase or license databases from producers and convert the data on the tapes to a uniform format with standardised bibliographic element names, so that the same basic commands and search techniques apply across all the databases. Besides, providing access to numerous databases, they provide several services. For example, they publish user manuals for individual databases and list additional search aids, available from the producers. Vendors

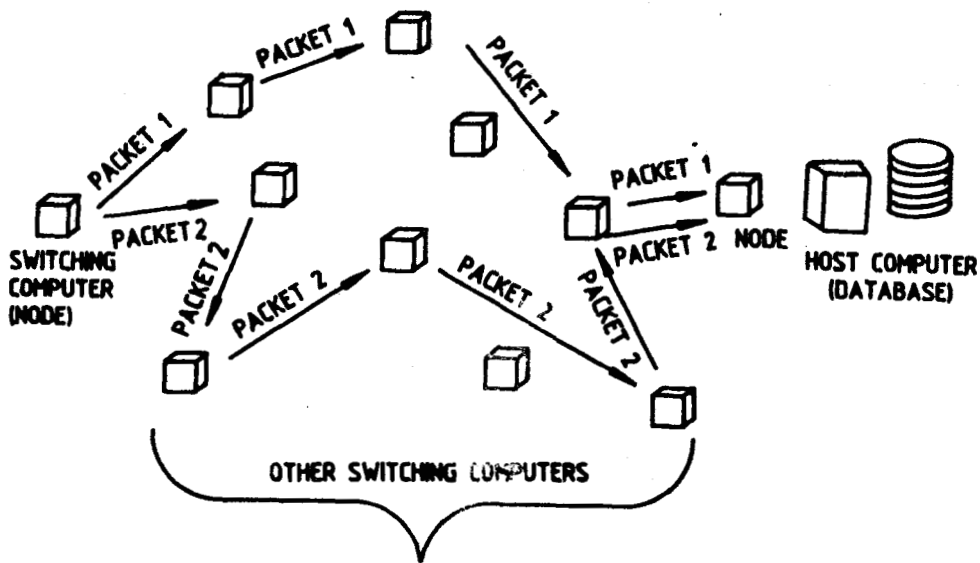


Fig. 2 TRANSMISSION OF MESSAGES PACKET SWITCHING

also offer special services like SDI. The fee quoted (\$ 5 to \$ 10 monthly) generally covers a profile of 15 or fewer descriptors and includes a maximum of 25 items in the print-out. Each additional descriptor increases the monthly cost by about 50 cents. Some database producers offer search services also, so that the user can directly conduct the searches of such databases. However, some database like NTIS, have to be accessed only through database vendors. It is, therefore, important for the database users to be acquainted with the services offered by the database vendors also. In addition to the database producers, SDC Search Service, USA; Bibliographic Retrieval Services Inc. (BRC), USA; and European Space Agency Inf. Retrieval Service, Italy are among the other major commercial database vendors.

Cost Factors

The charges of searching different databases through different vendors or directly vary considerably. For example, the public utility databases like the one of National Library of Medicine (USA) cost less than databases operated by private organisations like the Institute of Scientific Information, USA.

Developments in India

The Department of Telecommunications (Government of India) is understood to have submitted a proposal to the government for the procurement of packet switching equipment for establishing a data transmission network covering various cities in India. This network will be connected

to the gateway exchanges at the Overseas Communication Services (OCS) at Bombay, New Delhi and Madras for transmitting/accessing data internationally. The Computer Maintenance Corporation has also got sanction from the government for establishing a network for data transmission, covering important cities in India. Commercial organisations like banks, airlines, railways, stock exchanges and the press can use the network for online communication of business messages by becoming its subscribers. Apart from these efforts, NAL, Bangalore, has recently entered into an agreement with the European Space Agency (ESA) (through ISRO) for accessing the databases covered by the ESA Information Retrieval Service (ESA-IRS). This is expected to become operational in India by early 1986.

Meanwhile DESIDOC has entered into an agreement with the DIALOG Information Service, USA for accessing about 200 databases currently covered by the DIALOG Service. At the moment, DESIDOC has online access to these databases through telex and it has already conducted some online searches through DIALOG. Since the transmission speed through telex is rather low, efforts are being made to install a modem and a terminal for public switched telephone network (PSTN) system.

Similar efforts are being made by some other organisations in the country for achieving online access to foreign/international databases. In a few years

Contd on page 16

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The paper discusses some of the concepts of database systems and presents an instructional database used by students in the course.

Contd from page 6

from now, significant developments can be expected in the field of data communications in India bringing in vast improvements which would enable the information/documentation scientists to provide much better services to the scientific community.

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