The Swedish LIBRIS System

Lennart Gardvall
Royal Library of Sweden
1. Introduction

Data processing has been used in Sweden since the mid-1960's for library and information retrieval purposes, among which the LIBRIS project (library routines), MIC, IDC and others (information retrieval), and SCANNET (data communication) are worth mentioning.

LIBRIS (LIBRary Information System) has been designed as a computer-based data communication and processing system for the Swedish research library community. The main emphasis has been laid on the integration of routines within and between the research libraries. It is strictly intended for bibliographic data processing with a certain interface to the handling of printed material in libraries. It has primarily been developed to meet the needs of the Swedish research libraries. Since the beginning of this decade development work has been carried out on LIBRIS by the Swedish Agency for Administrative Development SAFAD (Statskontoret) - a government agency - in close cooperation with the Swedish research libraries as represented by the Swedish Council of Research Libraries (Forskningsbiblioteksrådet, FBR).

The initial trial run with LIBRIS - which started in the spring of 1972 at Linköping University Library after a period of system development since 1970 - comprised routines for search, cataloging and catalog production. In the sequel, by government decision, the project has been entirely concentrated to these functions.

In 1976 fourteen research libraries were linked to LIBRIS and no expansion is planned until April 1980 when another seven will be connected, excluding those using the dial-up facilities.

A fundamental idea in the LIBRIS project has been to combine the production of different catalog items with routine bibliographic input from the research libraries. The bibliographic input into LIBRIS is immediately accessible in a real-time environment for on-line retrieval at all libraries in the communications network.

Cataloging of a publication is done at the LIBRIS library which first acquires the publication ("primary cataloging"). A main principle is that this cataloging should be used by other libraries acquiring the same publication ("secondary cataloging").

2. Computer system

The development of LIBRIS in the early seventies was done in cooperation with SAAB who was developing large computer hardware and software. As a result, LIBRIS is at present running on a SAAB 0223 computer.
The computer system is briefly described in table 1.

Table 1. LIBRIS II Computer System Hardware and Software.

<table>
<thead>
<tr>
<th>Hardware</th>
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<tr>
<td>SAAB 0223, 336 Kb core main frame</td>
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<tr>
<td>3 9-track tape stations</td>
<td></td>
</tr>
<tr>
<td>8 85-Kb disc drives</td>
<td></td>
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<td>SAAB 05/30, 48 Kb core front-end</td>
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<th>Software</th>
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<tr>
<td>operating system OS23</td>
<td></td>
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<tr>
<td>COBOL, 50 on-line routines</td>
<td></td>
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<tr>
<td>COBOL, 60 batch routines</td>
<td></td>
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<tr>
<td>terminal controller</td>
<td></td>
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<td>job controller</td>
<td></td>
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<tr>
<td>data communication routines</td>
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The capacity of the present computer system, which is used only for the LIBRIS routines is very limited. Very few terminals could be added to the system. The day-time workload is now such that the average response time (9 sec.) is too high at peak hours. Figure 1 presents the on-line workload in percent of the total CPU capacity and shows how it fluctuates on a busy Friday. The effects of coffee-breaks, lunch hours and time of day is clearly shown. But even though the computer is old and slow the LIBRIS system has been used more and more by the terminal operators during the last year, bearing in mind that the number of terminals is still the same 25. The on-line system activity April 1979 presented in table 2 gives us a few clues to explain this fact.

Table 2. System activity April 1979

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<thead>
<tr>
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<tr>
<td>Catalog records input at terminal</td>
<td>3584</td>
</tr>
<tr>
<td>Order of catalogcard sets</td>
<td>8900</td>
</tr>
<tr>
<td>On-line hours scheduled</td>
<td>160</td>
</tr>
<tr>
<td>Percent time available during scheduled hours on central computer</td>
<td>99,7</td>
</tr>
<tr>
<td>Terminals</td>
<td>25</td>
</tr>
<tr>
<td>Total numbers of bibliographic records in the database</td>
<td>391021</td>
</tr>
</tbody>
</table>

Table 2 indicates that very few hours have been lost as a result of hardware or software failure during this particular month. The picture has been very much the same almost a year. The high up-time on the central computer has created productive working conditions for the terminal operators. These stable conditions are partly a result of good library control of the central computer and partly a result of few but coordinated changes in the system software. The awareness of system availability has also been positively improved among the terminal operators with the introduction of such features as an answering service with information on system breakdown time and a high-pitched sound from terminals at system start-up. This improved awareness has in turn led to more effective use of the terminals and the data base.
Fig. 1. Workload on the central processing (CPU) of the SAAB D223 running LIBRIS on-line. Upper dotted line shows workload including operating system. Lower line includes only the on-line routines.
3. Data communication system and terminals

Figure 2 shows the LIBRIS data communication network which consists of three leased four-thread telephone lines, twenty 4800 bps modems and a SAAB D5/30 front-end computer which is responsible for polling the terminals and the opening and closing of the network and terminals. Transmission method in the network is binary synchron (BSC).

Today, 25 terminals (Incoterm SPD 10/20) are connected to the LIBRIS real-time routine through the data communication network. Figure 3 shows the configuration of a LIBRIS terminal. The LIBRIS terminal can be described as a mini-computer with a visual display unit containing a central unit with a primary and secondary memory, a display unit, a communications adaptor and a key-board, linked to a floppy-disc unit and a printer. The terminal is character oriented and is programmed in an assembler language with about sixty instructions.

The key-board contains 48 alphanumeric keys, keys for editing purposes and keys for calling special LIBRIS functions. With the aid of character combinations, the LIBRIS character set can be very much extended. LIBRIS can store and also correctly represent up to 335 different characters in various alphabets, diacritical marks etc. through the special matrix printer that is supported by the LIBRIS terminal. The LIBRIS terminal can also be used as a dial-up port for teletype compatible terminals. This function is supported by a special software that is loaded in the LIBRIS terminal which permits the teletype to use the LIBRIS search routines but not the cataloging routines.
Fig. 3. LIBRIS terminals

25 Terminals

Visual Display Unit SPD 10/30
Central unit
Primary memory 4 k words
Secondary memory 2 k words

Disc unit SPD-250
9.5 M Characters

Adaptor

Keyboard
SPD 10/20

Printer
P-165A

TTY-terminal
(Alternative Printer)

600 cps

30 cps
This dial-up function is used by libraries outside the family of LIBRIS-libraries and may well be a model also in the next version of LIBRIS going into production next year considering the possibilities to cut down on data communication costs compared with direct dial-up to the central computer.

Another way to offer dial-up facilities to LIBRIS is to connect LIBRIS to packet-switching networks such as SCANNET, but it is not yet clear if the pricing policy of such a network will be the right one for long-distance dial-up connections compared with dialing up of nearby LIBRIS port when the next version of LIBRIS goes into production next year in April on another computer.

4. Library functions supported by LIBRIS

Why LIBRIS was designated as a network system is partially explained by the need for decentralized reporting of library accessions to the union catalog covering accessions of foreign literature in Swedish research libraries (AKB), and for an efficient local use of a centralized cataloging of Swedish literature.

Since 1886 and until the advent of LIBRIS every research library in Sweden cataloged its own foreign acquisitions and also forwarded bibliographical data to the Royal Library (Kungliga biblioteket) where, at the Bibliographical Institute, the union catalogs have been edited. This means that the same item could very well be cataloged several times, by different libraries and this was of course felt as a waste of labour. One of the cornerstones of LIBRIS was therefore to reduce the amount of time spent on cataloging of foreign material. Thus, the library in the LIBRIS network that catalogs a certain publication first is supposed to record the relevant information in the data base. This is so-called "primary" cataloging. Those libraries that subsequently acquire the same book only have to add local classification codes, shelf numbers etc. to the record already established. This has been designated as "secondary" cataloging. Since many research libraries in Sweden lack terminals, reporting by conventional cards to the editorial staff of the union catalog is still considerable. Those holding reports are submitted to the data base by an off-line updating procedure. The number of reported holdings per bibliographic record in LIBRIS is shown in table 3.

Table 3. Number of reported holdings per bibliographic record in the LIBRIS data base April 1979.

<table>
<thead>
<tr>
<th>Number of holdings per bibliographic record</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of all bibliographical records</td>
<td>60</td>
<td>17</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

The number of holdings per record will probably increase rapidly when the updating capacity goes up to 150 terminals in April 1980, with the change-over to a more powerful IBM 3033.

All participating libraries order catalog cards from LIBRIS. The cards are produced by Bibliotekstjänst, a special agency to Swedish public libraries. The full cataloging of Swedish material is normally done at the Bibliographical Institute of the Royal Library which receives copies from the publishers due to a voluntary agreement and copies from the printers as legal deposit. Any library that wishes, is entitled to establish a record for a Swedish publication in LIBRIS on a lower cataloging level. Any deficient record will then be completed by the Institute to a higher level - the national bibliographical level.

Sweden has subscribed to the aims outlined by Unesco in its Unisist program and also to the program for Universal Bibliographical Control (UBC) which is
promoted by Unesco in co-operation with the International Federation of Library Associations (IFLA). The idea of the UBC program is that every country supplies its own national bibliography to other countries. During 1978 Sweden was able to supply its national bibliography Svensk bokförteckning on magnetic tape - SWEMARC-tapes. From August 1978 the weekly printed issues of Svensk bokförteckning are produced with the aid of SWEMARC-tapes and the same technique is used for the semimonthly issues and the annual volume. To facilitate the worldwide exchange of bibliographic information, LIBRIS has been made compatible with international standards to the highest possible degree. The present format LIBRIS II closely follows the UKMARC format and the SWEMARC-tapes comply with ISO 2709. The new cataloging rules for Swedish libraries that were published in the spring of 1974 are modeled on the Anglo-American Rules, British Text of 1967 (AACR/BT) and the International Standard Bibliographic Description for Monographic Publications and Serials (ISBD/M and ISBD/S) of 1974. The Swedish cataloging rules will however in the near future be subject to revision, as the corresponding foreign rules are revised.

All bibliographic records in the LIBRIS data base can be searched and updated in real-time. Searching the data base on-line is done by ISBN, author, corporate author, title or a combination of author and title. The bibliographic records are searched either for cataloging purposes or with the intent to locate a certain known item among the holdings information in the data base. The records are either accessed directly in the central object file if an ISBN is entered on the terminal, or through a central reference file using a special search key containing six characters, if a title and/or an author is entered.

The LIBRIS routines are summarized in figure 4.

5. Present organization for operation and development of LIBRIS

Since January 1, 1978 the Royal Library carries the responsibility for the management, operation and maintenance of LIBRIS. A special section, the LIBRIS secretariat, has been created within the Bibliographical Institute of the Royal Library to meet with the new responsibility. The development of LIBRIS is a task for the Swedish Agency for Administrative Development, the government agency which has been involved in LIBRIS ever since the beginning. Other institutions including the Royal Library, The Swedish Council of Research Libraries and the National Swedish Board of Universities and Colleges (Universitetets och högskoleämnet) as well as certain trade unions are also represented in the steering group for LIBRIS. As a channel for user influence on LIBRIS, a reference group has also been formed. The participating libraries are entitled to appoint one member for every terminal. These people are responsible for day-to-day contacts between the libraries and the LIBRIS secretariat.

6. On-going development work

At present LIBRIS is operated by Saab Univar service bureau. The SAAB D223-computer will be out of use in a few years. In consequence a project for the change-over of LIBRIS to a new computer was started in January 1978. The project work is divided into three sub-projects: The change-over to the new system (LIBRIS III), supplementary work on the present system (LIBRIS II) and the union catalog sub-project.

In a memorandum to the Government (Statskontoret, LIBRIS systemomläggning, PM 1978-10-19), the change-over project gives an account of the now ended investigation work and the plan for the construction and implementation of LIBRIS III. The memorandum sums up the principal decisions concerning the change-over made by the steering group for LIBRIS. The change-over to a new computer will be based on the current functional requirements with a revised system design.
Fig. 4. Library routines supported by LIBRIS
and new programs. LIBRIS III will correspond to LIBRIS II with technical improvements. A specification of user requirements was decided upon in October after having been referred for comments to the reference group for LIBRIS and the trade unions. The change-over will take place in April 1, 1980 and a service bureau will be responsible for LIBRIS during the first years. Libraries outside the research library community will have access to LIBRIS by dial-up connections. In the middle of the 1980s LIBRIS will include a complete printed materials processing system.

In August 1978 the steering group for LIBRIS decided that LIBRIS III for April 1, 1980 will be operated by the governmental DAFA service bureau on an IBM 3033 computer. A contract between the Swedish Agency for Administrative Development and DAFA service bureau was closed in October.

The investigation work on the change-over is now ended and construction of LIBRIS III has started. The change-over project has been reorganized into three groups for construction, organization and purchase. In the construction group the Swedish Agency for Administrative Development has contracted Statskonsult AB for the overall responsibility as well as the responsibility for register transferral while DAFA service bureau is responsible for the technical functions.

At the purchase of terminals for LIBRIS III the goal is that all library staff in need of terminals for their work shall have access to a terminal. A specification of requirements for terminal equipment in LIBRIS III was decided upon in November. According to this specification, libraries connected to LIBRIS will have terminals able to register special characters. Libraries not connected to LIBRIS will be able to use terminals for dial-up access to LIBRIS in order to make searches and order catalog cards from LIBRIS.

The sub-project concerning supplementary work on LIBRIS II has during the last autumn introduced certain changes in the LIBRIS II system. The reference group for LIBRIS has highlighted various problems in LIBRIS and has come to an agreement regarding the most urgent questions. Certain improvements in LIBRIS was introduced in November.

The union-catalog project will be completed in a few months. The first volume of AKB-bok (a photocomposed three-year cumulation of the union catalog) will be issued during the autumn of 1979. This volume will cover accessions during the period 1971 - 73. The general policy, in short, will be to publish printed volumes for every three-year period. For current information on newly acquired books, microfiches are published every other month and then cumulated successively until the end of the year. These microfiches are then superseeded by the printed three-year volume.

7. Further development

In March this year a Government bill on information provision was presented to the Swedish Parliament. Problems relating to LIBRIS are discussed in this bill and a number of proposals are made which are based on a report submitted by the Swedish Government commissions in 1977. According to this bill the new National Library (the Royal Library, 'Kungl biblioteket', which will be reorganized as of July 1, 1979) is to carry the responsibility for the operation and maintenance of LIBRIS. As for the further development of the system, which is now the responsibility of the Swedish Agency for Administrative Development, a new body to be created, the Delegation for Information Provision, will take over these responsibilities as of the same date, July 1, 1979. In this context it might be mentioned that the Swedish Council of Research Libraries and SINFDOK (The National Council for Scientific Information and documentation) will cease to exist when the National Library and the Delegation start to
function as new agencies. In November 1978 a resolution on this Government bill was passed by the Swedish Parliament in accordance with the general outlines of the bill.

8. References


HERMANSON-SNICKARS, GÄRDVALL, SANDELS and SAGNERT: LIBRIS - an EDP system providing data communication between Swedish research libraries. Tidskrift för Dokumentation 34, 1978/6.

DISCUSSION

Dr. N. Fjällbrant: At Chalmers Library we have found that we can save on some 20-25% of our cataloguing. However, about 80% of our material still has to have primary cataloguing. As we now have to catalogue at a higher level, we do not achieve any saving in cataloguing time at present. Access to MARC records would probably result in a further 10-15% saving in primary cataloguing. We use LIBRIS for searching through the holdings of other libraries, in connection with interlibrary lending.

Mr. C.G. Wood: What happened to the concept of the totally integrated library system?

Gärdvall: Development has been slow due to lack of funds.

Mr. J.E. Skipper: I assume that access to MARC in LIBRIS III will substantially increase the amount of copy (secondary) cataloguing. Is there any provision for quality control of the contributed catalogue posts?

Gärdvall: No!

Fjällbrant: The libraries carry out an unofficial control of each other's entries, resulting in comments of varying degrees of politeness.

Prof. A.J. Evans: There have been some discussions within the BLAISE/MARC system regarding the use of two levels of entry, the primary one of these being the fully acceptable one (i.e. at national level) and the secondary one put in by other users of the system, which is capable of being upgraded to a full entry.

Dr. D. Shaw: Have you a sufficiently large database to justify the expensive software support needed for an IDMS system?

Gärdvall: We would have liked ADABAS but had to be content with IMS. Now we have more money.

Mr. V. Jarc: How much money have you invested in LIBRIS so far, and how much did it cost in the last year?

Gärdvall: $5 million and $0.5 million.
Skipper: How many terminals can be accommodated by LIBRIS III?

Gärdvall: 150.

Skipper: Do you plan to link the LIBRIS database to others.

Gärdvall: Yes.

Dr. R. Kriek: I should like to know how much time is saved per record using this system as compared with manual cataloguing?

Gärdvall: I don't know. It is very dependent on the volume of the system.

Mr. M. Hopkins: Is there any central pressure placed upon libraries to join LIBRIS, or is participation voluntary.

Gärdvall: There is no formal pressure, but there is indirect pressure in that it is unlikely that libraries will receive financial support for joining other systems or establishing their own.

Shaw: Who pays for the system?

Gärdvall: The Royal Library. Participating libraries have to buy their catalogue cards, but we pay for the terminals and on-line communications.