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## MARC USERS: A STUDY OF THE DISTRIBUTION OF MARC TAPES AND THE SUBSCRIBERS TO MARC

### MARC DISTRIBUTION SERVICE

My paper covers two aspects of MARC: 1) the MARC Distribution Service and 2) the MARC users themselves. The MARC Distribution Service is the arrangement by which the MARC data are sent off every week to each of the users. Each weekly issue of MARC is complete on one 300-foot reel of magnetic computer tape. Thus each user receives one reel of tape containing the MARC data for that week and a printed listing showing the LC card order numbers in the shipment, their status (new, correction or deletion), and the number of new, correction and deletion records, plus a total record count.

The MARC tapes may be obtained in either of two recording modes. Most users receive the tape that is written 9-track, 800 characters per inch and is directly usable by popular third-generation computers such as the IBM 360 and the RCA Spectra 70 machines. About one-third of the users receive the tape that is recorded 7-track, 556 characters per inch. If the lower density of the 7-track tapes and the fact that more characters are required to record the same information on the 7-track than on the 9-track tapes (because escape codes must be used) are considered, then it is apparent that the 7-track tapes will always consume more length per record. One 300-foot tape will accommodate about 1,800 7-track records. The 7-track tapes are copied on an IBM 1401 system with 729-V tape drives. The 9-track tapes are copied on an IBM 360-30 system using an IBM 2401 9-track tape drives. When Argonne began the distribution program, the system had IBM 2415 tape drives and caused no end of misery. The 2415 apparently does not perform full error analysis on records written and read. This means that it can write defective records and read them back through the same device very nicely, but a 2401 or similar tape drive, with full error-checking capability, will refuse to read error records written by the 2415.

Many MARC Distribution Service users never become aware of problems occurring with their equipment until they receive some sort of input which is generated *outside* of their own computer center. Only then is it discovered that the tape drives being used are not properly adjusted to specification. This is one of the most serious problems in the effective interchange of information by magnetic tapes. One user with non-IBM tape drives runs on a small computer system and has had much difficulty reading the 7-track tapes. Testing on our 1401 and 360 equipment, we find that the tapes read perfectly well and that they are written within specification. This is of little direct comfort to the user, however, who insists that they are not readable on his equipment. His problem, although he does not want to admit it, is that *his* tape drives are out of adjustment. This tends to be verified because no other 7-track user has had any real problems reading the 7-track tapes. Since discarding the 2415 tape drives we have had no reported problems with the 9-track tapes, and the problems seem to be almost nonexistent except for the user with the low-cost tape drives.

Another procedure which we follow with the tapes is that of cleaning each reel. We feel that dirty tapes might have caused some early problems, and in fact we normally clean new tapes before introducing them into our system. One might assume that brand new tape, fresh from the supplier, would be without peer for accuracy and flawlessness. I think that this was probably so in the case of second-generation equipment that used 7-track tapes. The third-generation equipment, however, writes nine tracks on the same physical tape simply by using more of the tape surface from edge to edge. This means that data are being written closer to both edges of the 9-track tapes than on the 7-track tapes. It follows, then, that one needs more complete contact of the tape with the read-write heads from edge to edge.

Consider a new piece of magnetic tape. It has been slit from a larger sheet of coated mylar and spooled, usually without further cleaning. There is some debris remaining on both edges of the tape from the slitting operation. This debris will tend to lift the edges of the tape as it travels over the read-write head, and will prevent proper recording at constant amplitude across the full recording surface. We have removed a lot of junk in this cleaning operation. Sometimes, in fact, we will even clean a new reel twice because of the high level of debris accumulation from the first pass. A tape cleaner has become a necessity in the computer center, if for no other reason than to enable the cleaning of the tape upon which the master file is written since the computer may reject the tape because of errors probably caused by dirt.

Argonne obtains the tapes on a bid basis. We ask tape manufacturers to bid on specification and quantity. Our first 1,000 reels cost

\$4.75 per reel, but we had bids up to \$7.00. The next round brought a low bid of \$4.25 per reel, including a plastic can and a more sturdy shipping container, and this price seems to be holding. All of the tape we use is new and is certified full width at 800 characters per inch (1,600 fci). One of the recurring questions raised by the users concerns a possible swapping arrangement for used tapes. Users would like to have the MARC Distribution Service take back their old tapes for credit and reuse these tapes in the distribution cycle, such as was done in the MARC I program.

Reuse of tape introduces bookkeeping problems and additional expense in the operation. Since the environment in which the tape has been used and stored is unknown (and in some cases, unbelievable), the distributor would have to clean and recertify each reel of tape simply to assure himself that the new records written on the tape for shipment to another user would be readable. These costs would approximate the cost of new tape and would consume machine time which is usually not available. I realize that the accumulating supply of used MARC tapes in libraries around the world has potential for environmental pollution which I do not want to consider here. Perhaps when the first MARC tape is dredged from the mud of Lake Michigan or Lake Erie, we will be forced to consider other ways for their disposal. I might say that we regularly have requests from the programmers in our accounting department to sell them these mini-reels in dozen lots. They find that the reels are ideal for program testing and the storage of small files of data. In any event, I feel that the reuse of MARC tapes in the MARC Distribution Service is not justified at present cost levels.

The MARC Distribution Service consists of three programs written in PL-1 and assembly language. One program writes a user list, tape-reel labels, and address labels for the tape shipments. The user file is maintained on punched cards because users change their addresses frequently. The reel labels and address labels are printed in sets—7-track and 9-track—for convenience, but the user file is maintained in strict alpha sequence, also for convenience.

The 9-track tape that we receive from the Library of Congress is in an interim format. It is an IBM 360 form "V" record with the control number (the LC card number) in EBCDIC in a leader record of fixed length, to which is appended the MARC ASCII record. The use of this interim format lets us handle the MARC record rapidly in the distribution programs without having to translate character-form ASCII record lengths to EBCDIC binary form record lengths to tell the channel the record length for data transmission to the output device. It also lets us block these records. The second program in the distribution reads these intermediate MARC records, makes blocked form "V" records of them, picks up the LC card number and puts it into an index page array in core, and then passes the form

“V” records (now blocked) to a 2311 disc. The index pages are dumped to a spool disc as the page array is filled, page by page. At the conclusion of this phase of the program a second phase dumps the index records from the index spool to the printer at write speed in the number of copies called for in the program load card. This provides sufficient index copies (plus some overrun) for all 7- and 9-track users, and for stock.

The next program writes form “U” records on tape for distribution. Since we only have two tape drives, it is most efficient to carry the master file on disc, blocked (to conserve channel time and reduce the number of input/output calls), and to unpack the form “U” MARC record from the intermediate, write it on the two tape drives, and then call for the next input record, which is probably already in core and needs only to be deblocked. This makes the operation move very rapidly. It moves so rapidly, in fact, that the program is generally either rewinding the completed reels in low-speed rewind (it never copies enough tape to get into a high-speed rewind), or waiting for the operator to demount the completed tapes and mount new blanks for the next copy cycle. This is where the time really goes—into demounting and mounting the tapes. The copying goes very rapidly, so rapidly in fact that sometimes the operator has not had time to get the last tapes into the cans and the next tapes out of the cans.

After the copying has been completed the indexes are decollated and returned with the tapes to the library. We retrieve the 7-track tapes from the other computer center where they have been copied on the IBM 1401. We box the reels and indexes, label the boxes, and ship them out. The shipment generally gets to the post office air mail facility at O’Hare Airport during the afternoon or early evening. Some users receive delivery of their tapes the next day. O’Hare is an excellent shipping point since there is a flight to almost anywhere in the world leaving within any given four-hour period during the day or evening. Even when problems have arisen and the tapes have not reached O’Hare until Sunday afternoon, no one on this continent has failed to receive Monday delivery.

I might emphasize that this is not a profit-making operation for us. When the MARC Distribution Service was started, consideration was naturally given to who was to distribute the tapes. The Library of Congress felt that their computer capacity was already sorely overtaxed, and that it should be done outside the library. One method was to go out on bid for a contractor. The problem at that time was that no one knew how many subscribers would eventually materialize, what the ratio of 7-track to 9-track subscribers would be, and so forth. The distribution programs also had to be written. Since we had been involved in MARC for some time, we had some interest in seeing that MARC II got off to a good start. Therefore Argonne acquiesced when the Library of Congress asked us to take on the

distribution job, including the preparation of the necessary programs. We assumed the job with the understanding that, when the system had stabilized, we would expect the library to find an appropriate contractor to carry on or else take it under their own roof. I should comment that before we had sent out the first tape, the pessimists had real doubts that we would have more than five subscribers. The optimists felt that we would *surely* have at least ten subscribers—maybe even more. At the end of the first year of MARC II we had nearly eighty subscribers in the United States and abroad. MARC II was truly an international system, and probably the largest system for information distribution in existence.

As we enter the second year of MARC II we have seen a rather dramatic decrease in the number of subscribers to the system. I do not attribute this to MARC as much as to a failure on the part of the library community to become actively involved in using the computer in their own library operations. The number of subscriptions has continued to rise, although not to the number of first year subscribers.

### THE MARC USERS

There exists a MARC users group within the hallowed confines of the Information Science and Automation Division of the American Library Association which meets in mid-winter and in mid-summer for discussions, and is one of the most listener-oriented groups that I have ever encountered. Very few people who attend the meetings are willing to say what they are doing with the MARC tapes they receive. The users group has served as a forum and spawned a committee that is attempting to get some research going on a search key. I believe this committee does have potential for bigger and better things, and I think that this must come to pass.

In November 1969, Lawrence Leonard of the Library Research Center at the University of Illinois sent a questionnaire to the MARC users through the American Library Association. A follow-up went out in December. The survey went to seventy-four users, forty-six (61 percent) of whom replied. Of those who replied thirteen (28 percent) indicated that they were using the tapes. It is probably safe to infer that most actual users were among the respondents, and that few users did not respond. This would lead to the estimate that only 18 percent of MARC II subscribers were making any real use of the tapes, or were close to making any real use. The survey indicated that, of those who replied, the following were actually using or planning to use MARC in the following ways:

	now doing	planned
Accessions list	2	3
Acquisitions	4	12
Bibliographic searching	2	0
Book catalogs	3	20
Bibliographies	1	4
Book processing (cards, labels)	1	6
Book selection	5	5
Catalog cards	3	21
Cataloging	1	7
SDI (selective dissemination of information) system	2	6
Data base		2
Information retrieval		1
Training (library school)		1
Do not know		1

The return is not really sufficient to be statistically significant, but it is interesting. A short time ago I took my own informal poll of some of the MARC users known to me personally. This was a telephone poll, so there was an opportunity to follow whatever line of inquiry developed. Some of the comments that I received from non-users included these:

No access to a computer but want the back files

Working actively on it

Other problems in-house (circulation, etc.)

Not enough priority to get computer time

Don't know what to do with it (i.e., MARC)

No programmer in the library

Can't get programming done

Communications:

Librarians don't know anything about the computer

Computer people don't understand "our" problems

No support

At some institutions the weekly tapes are apparently checked in like journals, shelved and never used. We have sent letters to some subscribers, advising them to return bad tapes, or notifying them of mistakes, etc., and asking for a reply. We have never heard from some of them. The users who receive the tapes and do not use them ignore the problems of print-through on the tapes which they file on the shelves, expecting to pull them out sometime and use them. They also ignore the economics of having to merge (or better, trying to merge) all of those weekly issues when they could obtain a cumulated tape, for the same amount of money, when they are ready to begin in earnest with their MARC applications. One can only wonder why a

library would subscribe to the MARC tapes if there were little or no prospect of using them. I can only conclude that there is probably some prestige associated with being a subscriber library.

If we look at the computing power available to the respondents, it looks something like this:

IBM 360 (mostly model 40 or 50)	33
IBM 7094	2
Univac 1108	2
Burroughs B5500	1
CDC 6600	1
PDP/10	1
RCA Spectra 70	1
Sigma 7	1

This rather interesting exhibit indicates that the large majority of respondents have IBM 360 hardware available to them, and that most of *this* group have rather substantial units available to them (model 40 or model 50). The only real difference between these two subgroups is that the model 40 users are probably using the disc operating system. None of the respondents are using the IBM 1401 as the basis of their system, contrary to expectations.

What can be done about this problem? How can libraries use the MARC tapes to help themselves? One solution in which someone else does the work is the sharing of computer programs among libraries. It would appear that the group of 360 users would be in a fairly advantageous position in this regard. The problem arises in trying to fit programs written for the larger machines onto the smaller machines. There generally tends to be rather good upward compatibility, but rather poor downward compatibility. What may be needed is some device for announcement and description of programs which users could make available to others.

This raises the problem that most librarians do not know a program from first base, and are totally incapable of assessing the relevance of the announced program to their operation and computer installation. I can sympathize with those who, having gone to the trouble and expense of generating their own program, would refrain from general announcement simply because they do not have the time to deal with the flood of unenlightened inquiries that will descend upon them. I have received some unbelievable responses from librarians when I asked them what kind of computer was available to them. (One had a computer called a Fortran, for example.) I do not think that it is the program writer's responsibility to provide an education in library data processing to each requestor. Librarians should take it upon themselves to learn the vocabulary, the concepts, and become proficient in this area if they expect to deal with it. I am very frankly

shocked at the lack of competence of many librarians who profess to have responsibility for the application of computer technology to their libraries. They seem to view themselves as middlemen between the library and the computer people, but they seem to have little comprehension of the world of the computer. They are too proud to learn programming and too dignified to learn about the hardware. This is the sort of knowledge that is not taught at one-day or three-day institutes and there is no easy method of "instant enlightenment." Without this knowledge their title of "automation librarian" is an empty one and the advice they provide their institution with may be dangerous in its ignorance of the real problems of the situation. Our library schools make very little contribution to the solution of this problem.

Another solution is a series of ready-made systems which could be purchased by any library. The systems might be available in the form of system flow charts or as program packages. The problem here is that the system should be tailored to an individual library and to the computer facilities available to that library. It would be folly to write program packages for large computer systems because this would preclude their installation on the many available smaller systems. The smaller systems, then, present individual constraints system by system in the availability of direct-access files, tape drives, printers, print trains, and a host of other problems. By the time a system has been designed for the lowest common denominator it really is not worth much to anyone. There is a great deal to be said for systems that are responsive to the needs of those who use and support them. Few off-the-shelf systems meet this need.

Another solution absolves the librarian of any responsibility for the system and guarantees a lack of contact with the computer. This solution is the use of a service bureau and its programs for processing the MARC records; it is somewhat analogous to centralized processing. The service bureau, using its set of programs, processes the MARC records in specified ways, giving the libraries specified output. The NELINET operation, the planned OCLC operation, and the printed card service of Richard Abel and Company are examples of such applications. This enables libraries without computers to obtain the benefits of the MARC record through cost-sharing with other libraries. While they may not obtain a customized and tailor-made product, they do obtain a usable and helpful product which they might not otherwise have. We are planning to share our MARC selection and catalog information programs with a group of college libraries, for example. We hope that, if the program is successful, we may see some kind of centrally based catalog information system, operated jointly by these users for themselves without our intervention. We feel that this sort of centralized processing can be very attractive to smaller libraries, but that libraries with access to



adequate computer facilities should be encouraged to do things for themselves, simply because they can do *more* things for themselves on their own equipment.

This is the cloudy picture as it appears today. Those who are using MARC are using it because they have rolled up their sleeves and done something to solve their problems. I think they should be given a lot of credit. The MARC record is an extremely sophisticated animal, and is extremely difficult to manipulate properly if one has never done this sort of thing before. It is new ground for most programmers, but we are now beginning to see more sophisticated records in many of our data processing applications as we move toward more complex information systems. The MARC format is, in a way, ahead of its time, but it is eminently usable and manipulable for any products which can be defined. As we find more people who are willing to get in and work with it, we will find more successful users. There is really no other road to success than through hard work.