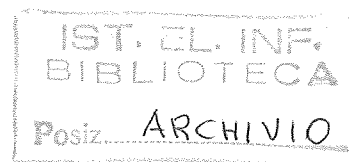
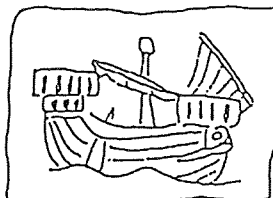


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1. Introduction

This Report describes the work done during Task 1.1 of the ARCA Project in order to define the requirements of the ARCA SR Target System. It is accompanied by the report ARCA/T11/ABD ("Analysis of the BIB-1 Mapping for SABINI and CUT/ISIS").

The ARCA Target system is conceived as a generalized SR Target software. Its function is to make any on-line public access catalog (OPAC) capable to implement the procedures defined for the Target role of the SR Application Service Element (SR ASE) with a minimum programming effort. The portability of the ARCA System is to be verified by interfacing it with two OPACs, i.e. CUT-ISIS (the Union Catalog of Tuscany Region, constructed upon the system CDS/ISIS) and the Catalog of Sancho el Sabio Foundation, managed by the library automation system SABINI (see Annexes 1 and 2).

The main objective of the ARCA SR Target is to pass to the faced OPAC only queries acceptable by that OPAC, while autonomously responding to the Origin requests in all the other cases. Thus the ARCA Target will act as the OPAC itself in a lot of functions, such an ability being provided by the fact that ARCA will contain the description of the OPAC which it is interfaced with.

Because of such particular characteristics, the requirements of the ARCA System will be specified under separate headings, thus distinguishing between the requirements of ARCA when communicating with the protocol functions (which will be termed "General requirements") and the requirements of ARCA when performing its own processing functions (which will be termed "Functional requirements").

In order to assess the requirements of the OPAC description to be stored in the Target System, a review of the characteristics of existing OPACs has been conducted in the literature [CHE 1994], [BRO 1992] through connection with OPACs installed in Pisa (see the ARCA WP2.1 Report) and through connection with Internet accessible libraries [BAR 1994]. The results of the search can be summarized as follows.

Traditional OPACs permit access through the access points defined by the cataloguing rules and praxis. The set of such access points is very small when matched against that defined in the SR Protocol (Annex D in [ISO 1993b]); Boolean searching, when permitted, is mostly limited to the ANDing of author and title values. OPACs, however, allow users pre-searching by browsing/scanning through authority lists or dictionaries.

Most recent OPAC systems offer word access to authors, titles and subjects and free-text searching, i.e. the possibility to express queries with words, that are automatically ANDed by the system before matching them against a dictionary constructed on the entire text of the bibliographic description.

Some OPACs allow some information element (e.g., publication year, language, etc.) to be used only as *selectors* to limit the results of a previous search.

2. General Requirements

The ARCA SR Target implementation shall be independent of any particular client implementation or any information outside the SR protocol [ISO 1993a] [ISO 1993b].

It shall also be independent of any OPAC, provided that i) the OPAC runs on a UNIX machine, ii) the OPAC conforms to the model of remote databases specified at 6.2.1. of ISO 10162 with the restrictions specified in Sec. 2.1.

Moreover, its implementation shall exhibit an external behaviour consistent with having implemented the Type-1 Query (RPN Query) with AttributeSet Bib-1, and encoded APDUs by applying the ASN.1 Basic Encoding Rules.

The ARCA system will accept associations requested by SR Origins and support the following services: INITIALIZE, SEARCH, PRESENT, and DELETE-RESULT-SET; the A-Release and the A-Abort services of the ACSE-Association Control Service Element are assumed. Implementation of the EXPLAIN Service should be considered, as defined in the ANSI Z39.50 Protocol.

As for the syntax and the composition of the records to be transferred from the OPACs, the ARCA Target System shall be able to give values to the parameters to the Present-Response APDU according to the characteristics of any underlying OPAC. However, the UNIMARC record syntax is considered to be the general case.

2.1. OPAC Reference Model

We consider an OPAC as being a server application which provides access to one or more named bibliographic databases, each one being a collection of one or more files, with a unique name. The unit of information for retrieval is a record. An access point is a unique or non unique key which can be specified either singly or in combination with other access points in a search for records.

A search query may be applied to an OPAC specifying the data base names and the terms to be matched against the access points according to specified operators. The subset of records formed by applying the search query is termed "result set"; it may be referenced in a subsequent search query statement and manipulated to form a new result set. The OPAC must support at least the result set whose name is "default".

Note

In the SR Protocol Service Model definition, the result set is considered to be a local data structure identifying records (i.e. composed by records identifiers, e.g. pointers). The logical structure of the result set is that of a named (by default) ordered list of couples consisting of a) an ordinal number corresponding to the position of the couple in the list, b) a unique record identifier. An item in the result set is referenced by its position within the result set. The result set may be referenced by the origin for subsequential retrieval requests or in a subsequent search query statement to form a new result set.

3. Functional Requirements

The functions of the SR Application Service Element (SR ASE) are defined in the form of Application Protocol Data Units (APDUs). Since the protocol is conceived for a two-way communication (peer-to-peer communication), each APDU specification includes a pair of functions, one for the request and the other for the response; in the case of one-way communication, it needs to read one form and to write the other. Target functions will read requests and write responses; specifically, the target will read INIT- SEARCH- and PRESENT- requests and will write the relative responses. The same should hold for the EXPLAIN Service, but the functions related with such a Service will be analyzed apart, if its implementation will be decided.

The ARCA Target can be viewed as an application process with functions aimed at the following objectives:

- 1) to load specific information about the underlying OPAC or OPAC databases;
- 2) to serve SR requests, i.e.:
 - a) to accept associations requested by the SR origins (The A-Release and the A-Abort services of the ACSE-Association Control Service Element are assumed)
 - b) to interchange the SR protocol Data Units (APDUs) INITIALIZE, SEARCH, PRESENT, and DELETE-RESULT-SET with the origin, according the State Table A3.3 in the SR Protocol Specification ISO 10163
 - c) to interact with the OPAC Interface in order to pass queries acceptable by the OPAC and to receive the results (diagnostic records are included) to be transmitted to the origin via the Search Response APDU

Those in 2a) and in 2b) are communication-related functions, pertinent to OSI, and will be referred to as *application entities*. (AE's).

Functions in 1) and 2c) partly are pure local processing functions, and partly interact with functions in 2b).

As the requirements of the system versus the application entities are defined in the SR protocol specification, in the following attention will be given to the requirements to perform the local processing functions. The following sections describe these functions in more detail. For simplicity, the OPAC is assumed to be composed by a unique bibliographic database; the extension of such a case is easily made.

3.1. Loading

The loading function stores appropriately information which characterize the functionalities that the underlying OPAC offers to process SR requests.

In the following we will refer to such information as *OPAC Abstract Description*. This set comprises: the set of processable RPN queries, the OPAC configuration parameters, the mapping of the OPAC accessible query clauses onto Bib-1 attribute elements sequences and the mapping between the OPAC diagnostic responses and the diagnostic records defined in Appendix E of ISO 10163.

The loading of the data descriptive of the OPAC should be managed by a program with a friendly interface to librarians and data-base managers.

3.1.1. RPN processable queries

The set of RPN queries that an OPAC accepts can be characterized as the subset of the Reverse Polish Notation (RPN) queries satisfying the set of restrictions (hereafter called *constraints*) of that OPAC.

Examples of possible constraints are:

- if the operator within a RPN structure is "AND" then both the left and right arguments are operands
- "AND" is the only operator allowed within an RPN structure
- the possible attribute combinations are: {*set of AttributeLists*}

In Table I examples of Attribute Lists are given, each followed by the description of its meaning. Each pair n-m stands for a pair "AttributeType n, Attribute Value m"; the meaning of the sequences can also be known making reference to the AttributeSet bib-1.

1-1 3-1	Access point "Author" is allowed; the term must be the author's last name.
1-1 3-1 5-1	Access point "Author" is allowed; the term must be the author's last name; the term may be a right-truncated one.
1-1 3-3	Access point "Author" is allowed; the term is matched with any of the data element.
1-4 5-1	Access point "Title" is allowed. The term may be a right-truncated one.
1-4 4-6	Access point "Title words" is allowed.
1-31 2-3 4-4	Access point "Publication year" and relationship "equal" are allowed.
1-31 2-5 4-4	Access point "Publication year" and relationship "greater than" are allowed.

Table I

Appendix D of the ISO 10163, Attribute Set bib-1 definition, makes no restriction on the structure of the list of attributes [AttributeList] in the RPN query. We think that the following assumptions and comments are in order:

- a) An attribute of type 1 must always be present, that is, an access point must always be named; this seems to be inferable from the "Model of remote database" at 6.2.1. of ISO 10162.

Comments

However most recent OPACs admits the matching of queries composed of a word (or, more generally, a string of characters) or a word list with the contents of the whole records. A possible exception to the above assumptions is the admittance of sequences such "3-3 4-2 --word, any position" or "3-3 4-6 --word list, any position"

The interpretation of the meaning of the attribute "4-6 -- word list", however, is problematic because it is not inferable whether links exist among the words in the list: are words to be considered as ANDed?

In our opinion, also the following attributes require further specification:

Attribute "1-57 -- Name and title": It is not clear how "name" and "title" can be recognized in the corresponding "term"; is such a term to be matched as a whole?"

- b) Attributes of the same type must not appear in the same AttributeList.
- c) Attributes in a list can be ordered according to their types.

In order to characterize completely the queries which the OPAC supports the initialization must indicate which are the attributes of Type 1 that the OPAC admits only as selectors and specify which is the form of acceptable queries on them.

We assume that the most general structure of the queries which contains selectors is:

RPN Query "AND" SelAttributePlusTerm

where *SelAttributePlusTerm* denotes a simple condition on a selector.

RPN-queries are not suitable to model queries containing selectors. This is because in that representation it is always true that if a query belongs to the set of acceptable queries then also all its parts, i.e. its arguments, belong to the same set. This is not the case of queries containing selectors since, even if a query of the kind *AttributesPlusTerm* which contains a selector can be an argument of a RPN structure, it is not by itself an acceptable query. The OPAC Abstract Description should be able to cover also such a case.

3.1.2. OPAC Configuration parameters

These parameters express OPAC specific characteristics.

Maximum-message-size: the maximum number of octets of a record that the OPAC can return

Preferred-message-size: the sum of the sizes of all the records in a message that the OPAC can return

The initialization must check that *Maximum-message-size* is greater or equal to *Preferred-message-size*.

3.1.3. Mapping Bib-1 attribute elements on OPAC query language

During initialization, information is also provided on how each possible attribute list is encoded by the underlying OPAC.

Comments

This information is based on the interpretation of the meaning of the attributes in the bib-1 set, but interpreting the meaning presents a lot of ambiguities - as the mapping on the client side does. The interpretation and mapping of search APDU's will therefore depend on the characteristics of the logical structure of the specific OPAC (Consider, for example, the set of bib-1 attributes related to "titles" versus the unique access point "Title" generally offered by the OPACs; or the attribute "name personal" versus the various roles which a personal name is joined with to a document: author, editor, translator, etc.). An analysis of requirements of BIB-1 mapping for CUT/ISIS and SABINI is made in the ARCA/T11/ABD document.

3.1.4. Mapping OPAC diagnostics onto SR diagnostics

OPAC diagnostic responses are to be mapped onto the diagnostic record defined in Appendix E of ISO 10163.

3.2. Serving SR requests

The European Procurement Policy specifies that European implementations of SR are based upon the ISO/OSI protocol stack (and not on the TCP/IP stack). Therefore, it is a requirement also for this implementation, to be fulfilled by the use of the ISODE environment. It is currently envisioned to use the SOCKER software for the origin side of the protocol.

However other solutions seem to be viable, as "... the international community, CEC policy and potentially EU procurement legislation, driven by user demand and vendor support, is shifting focus from formal, *de jure* standards to *de facto* standards" (quoted from [ASS 1994], i.e., the assessment of the Libraries Programme 1991-1994 carried out by a Panel of Rapporteurs).

The target side must be able to receive ADPUs from an S/R Origin and disassemble them into packets to be passed to the target system software. The packets must be formatted into data structures to be agreed among the implementors of the packet serving software and the target system software. These data structures will form the interface between the two subsystems and be specified either in the architectural or detailed design, as determined to be appropriate.

The APDUs the ARCA Target is to process are INITIALIZE, SEARCH, PRESENT, and DELETE RESULT SET. In the following, only requirements of ARCA local processing are defined.

3.2.1. Query processing (SEARCH and PRESENT)

The query processing consists of:

- extracting the query from the incoming APDU;
- analysing the query (search filtering based on the OPAC abstract description)

- translating the acceptable queries to the OPAC language issuing the appropriate API calls;
- executing the query;
- filling the APDU;
- sending the APDU to the origin using the network services;
- processing the PRESENT RESULT APDUs.

For sake of simplicity, the whole query processing process will be described under the headings "Search filtering" (3.2.1.1.), "Transforming and executing the query" (3.2.1.2), "Processing the result set" (3.2.1.3), grouping together some of these functions.

3.2.1.1. Search filtering

In order to verify whether the RPN queries of the incoming search APDU's can be supported by the OPAC, RPN queries must be matched against the description of the Target OPAC functionalities. In order to provide this function, ARCA shall store the description of the OPAC functionalities according to secs. 3.1.1 and 3.1.2.

Therefore, the whole process of search filtering, will consist of a first step where the RPN query is extracted from the incoming SEARCH APDU, and a second step where the query elements and their combination are compared with the supported patterns. Unsupported queries will generate diagnostic messages as specified by the ISO 10163 standard in Annex E.

3.2.1.2 Transforming and executing the query

Accepted queries must be passed to the OPAC in the OPAC query language. This requires a first step where we transform the query, according to the mapping rules mentioned in 3.1.3. Afterwards, the translated query is submitted to the OPAC. In both steps, appropriate API calls will be issued.

As the incoming and acceptable SR requests are translated into appropriate requests to be sent to the target OPAC, we can identify two kinds of transformation of the incoming query: an "OPAC dependent" and a "site dependent" query transformation. Quite obviously, the two processes will require different kinds of data.

The first one will need the set of information that will allow to map the incoming query (formulated as an *rpn query* according to the *Attribute Set bib-1* defined in ISO 10163) into a query expressed according to the syntax required by the specific OPAC. These data are tightly coupled to the characteristics of the specific OPAC.

The "site dependent" transformation will need the set of information that will allow to transform the incoming query into a query tailored to the specific database structures or naming policies adopted in the single installation. These data are installation dependent, i.e. will be the local database administrator that will specify the fields of the database that correspond to the various <Attribute-type> <Attribute-value> pairs.

The two processes will be performed calling the appropriate API functions, and must not be sequentially ordered, they will be intermixed, instead.

3.2.1.3 Processing the result set

The response from the OPAC will be analyzed in the definition of the OPAC Interface specific to any OPAC. Here it is assumed that the OPAC response will conform the requirements implied in the OPAC model and the requirements of the protocol SEARCH- and PRESENT RESPONSE APDU's.

The result of the query will be managed by the OPAC Interface Process, that will fill the APDU.

Finally, the APDU will be sent back to the origin using the network services.

Subsequently the dialog will continue processing the PRESENT RESPONSE APDU or any other acceptable APDU.

Local processing will operate the conversion of the OPAC diagnostics in the format of diagnostic records defined in Annex E of ISO 10163. It is suitable that these diagnostics will be enriched by additional information taken by the original OPAC diagnostics.

4. Definitions and Acronyms

ARCA	Access to Remote CAatalogues
APDU	Application Protocol Data Unit
AT-AV	Attibute Type-AttributeValue
CNR	Consiglio Nazionale delle Ricerche, Italy
ISO	International Standard Organization
OPAC	On-Line Public Access Catalog
OSI	Open System Interconnection
RPN	Reverse Polish Notation
SR	Search and Retrieve

5. References

- [ASS 1994] An assessment of the Libraries Programme 1991-1994, Volume 1, Executive Summary: A report of the self-assessment of the Libraries Programme carried out by a Panel of Rapporteurs. December 1994.
- [BAR 1994] Barron, Billy and Marie-Christine Mahe, *Accessing on-line bibliographic databases*. [This document, that lists bibliographic data-bases accessible via Internet, can be retrieved from the original Gopher. Point you Gopher browser at the following or have your Gopher administrator update the link to: Type=+1, Name=Internet libraries, Host=libgopher.yale.edu, Port=70. URL: gopher://libgopher.yale.edu:70/11/ .
- [BRO 1992] Brownrigg, Edwin, "Ten Years Later: A Retrospective Prospectus". *Information Technology and Libraries*, 11(1992), 272-277.
- [CHE 1994] Cherry, Joan M., Nancy J. Williamson, Carol R. Jones-Simmons, and Xin Gu: "OPACs in Twelve Canadian Academic Libraries: An Evaluation of Functional Capabilities and Interface Features". *Information Technologies and Libraries*, 13 (1994), 174-191.
- [ISO 1993a] International Organization for Standardization (ISO), *Information and documentation - Open Systems Interconnection - Search and Retrieve Application Service Definition*. . ISO 10162: 1993(E).
- [ISO 1993b] International Organization for Standardization (ISO), *Information and documentation - Open Systems Interconnection - Search and Retrieve Application Protocol Specification*.. ISO 10163-1: 1993(E).

ANNEX 1 - Description of the CUT-ISIS OPAC*

CUT/ISIS is the union catalog of the libraries in the Tuscany Region. The catalog contains ca. 400.000 items and is presently distributed on CD-ROM so that all libraries can search it locally; moreover an experimental version managed by the WAISISIS system is being constructed that will be accessible through INTERNET by any WAIS-client. The construction of a networked CUT accessible through the SR Protocol, which will act as the Tuscan node of the Italian National Library Service (S.B.N.), is one of the objectives of the ARCA Project.

CUT is constructed on the generalized Information Storage and Retrieval System CDS/ISIS. Such a software, freely distributed by UNESCO, has been designed specifically for the computerized management of non-numerical data and runs on MS/DOS and on UNIX platform as well.

CDS/ISIS is able to manipulate an unlimited number of data bases, each of which may consist of completely different data elements. Moreover, it allows selective creation of inverted files for each database, extracting fields, subfields or elements thereof. Postings in the inverted file contain additional information precisely identifying the field from which the data was extracted, as well as the relative word position within the field.

CDS/ISIS supports boolean query language (operators AND, OR, NOT, PROXIMITY) and right truncated search terms. It is capable of importing as well as exporting records structured according to the Standard ISO 2709.

The CUT catalog, which has been realized with the CDS/ISIS software, allows searching and browsing through the access points which are listed in the table which follows together with the Bib1 attributes supported by each of them.

* Drawn from the ARCA/ T11/ABD Report "Analysis of Bib1 Mapping"

CUT-ISIS OPAC

Denomination	type 1: use values	type 2: relation values	type 3: positional values	type 4: term structure values	type 5: truncation values
Title	4, 33-36, 42, 43		1, 3	1, 2, 6	1
Publisher	1018		3	1, 2	1
Place*	59		1,3	1, 2	1
Year*	31	1,2,3,4,5,6		4	
Title-series	5		3	1, 2, 6	1
Note	63		3	1, 2, 6	1
ISBN	7			3	1
ISSN	8			3	1
Author-personal	1004, 1		1, 3	1, 2, 4	1
Author-corporate	1005, 1006, 2, 3		1, 2, 3	1, 2, 4, 6	1
Title-uniform	6		3	1, 2, 6	1
Author-pers. added	1004, 1		1, 3	1, 2, 4	1
Author-corp. added	1005, 1006, 2, 3		1, 2, 3	1, 2, 4, 6	1
Subject	21-29		1, 3	1, 2, 6	1
CDD	13				1
Bib-level	1021			3	
Abstract	62		3	1, 2, 6	1
Code-geogr.-area*	55			3	
Code language	54			3	

ANNEX 2 - SABINI OPAC at Sancho el Sabio Foundation*

Sancho El Sabio Foundation is a private centre, entirely subsidised by the Caja de Ahorros de Vitoria y Alava, aimed at the conservation and diffusion of Basque bibliographical heritage. Its OPAC, which allows access to the bibliographic descriptions of books and serials, is constructed on the library automation system SABINI.

SABINI manages one or more catalogs, each consisting of the master file of bibliographic records and a lot of auxiliary files where access point values are maintained. The set of possible access points is shown in Table I; however the access point set can be tailored according to the needs of different installations. For example, an access point "Author", not comparing in Table I, could be defined by grouping access points "Personal Author", "Corporate Author, and "Conference Name Author".

SABINI allows search, retrieval and browsing facilities through its user interface and through its command language as well. The basic search command has the following structure:

Search, access point, term.

Successful searches result in a result set identifier followed by the number of items retrieved. The result set identifier can be referenced in subsequent commands for i) displaying bibliographic records, ii) limiting the result set through the values of selectors (Language, Year, Nation), iii) combining the result set in boolean sentences using operators AND, OR, NAND.

SABINI is capable of importing as well as exporting records with the following record syntaxes: UNIMARC, USMARC or IBERMARC.

The table which follows lists the access points allowed by SABINI together with the corresponding Bib1 attributes.

* Drawn from the ARCA/ T11/ABD Report "Analysis of Bib1 Mapping"

SABINI OPAC

Denomination	MARC	type1:	type2:	type3:	type4:	type5:
	tags	use	relation	positional	term struct.	truncation
		values	values	values	values	values
Personal author	100,700	1, 1004		1	1, 2, 4	1, 2, 3
Personal name-subject	600	1, 1009		1	1, 2, 4	1, 2, 3
Personal name-series	800	?				
Corporate author	110,710	1005		1, 3	1, 2, 4, 6	1, 2, 3
Corp. name-subject	610	2		1, 3	1, 2, 4, 6	1, 2, 3
Corp. name-series	810	?				
Conf. name-author	111,711	1006		1, 3	1, 2, 4, 6	1, 2, 3
Conf. name-subject	611	3		1, 3	1, 2, 4, 6	1, 2, 3
Conf. name-series	811	?				
Title	245,740	4		1, 3	1, 2, 6	1, 2, 3
Title-heading	245	?				
Title-subject	630	?				
Title-series	440	5, 35-40		1, 3	1, 2, 6	1, 2, 3
Title-uniform	130	6		1, 3	1, 2, 6	1, 2, 3
Title-uniform series	830	5, 6		1, 3		1, 2, 3
Subject	650	21, 29		1, 3	1, 2, 4, 6	1, 2, 3
Descriptor	653	?				
Name-geogr.-subject	651	58		1, 3	1, 2, 4, 6	1, 2, 3
Name-geogr.-heading	151	?				
Place-publication	260 \$a	59		1, 3	1, 2	1, 2, 3
Publisher	260\$b	1018		1	1, 2	1, 2, 3
Date-publication	260\$c	31	2, 3, 4		4	
Place-print	260\$e	?				
Printer	260\$f	?				
Date-printing	260\$g	?				
Classification-CDU	O80	14				1
Classification-local	O81	20				1
Classification-CDD	O82	13				1
ISBN	O20	7			3	1
ISSN	O22	8			3	1
Number-legal-deposit	O17	49			3	
Number-local-call	O90 \$a	53			3	
Number-MARC	OO1	?				
Accession-number	O90 \$b	12			3	
Code-language	OO8/35-37	54			3	
Code-geographic-area	OO8/16-18	55			3	
Year	OO8/	31	2, 3, 4		4	
	8-11,12-15					

