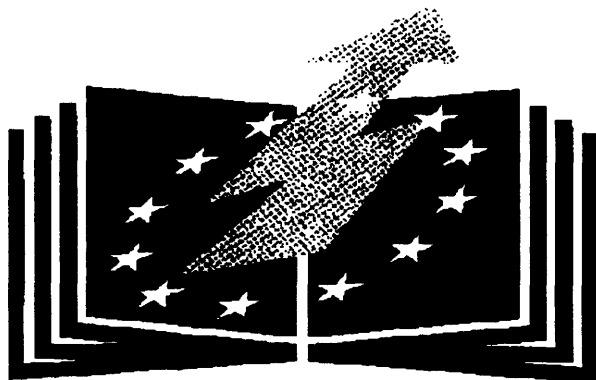


COMMISSION OF THE EUROPEAN COMMUNITIES



TELEMATICS FOR LIBRARIES  
CONCERTATION MEETING

**EUROPAGATE workshop  
SR Concertation  
Proceedings**

Meeting held in Luxembourg on 15 February 1996

Gordon Pedersen  
November 1996

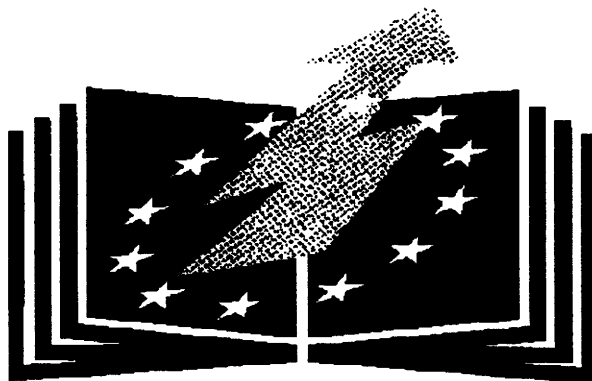
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COMMISSION OF THE EUROPEAN COMMUNITIES  
Directorate General XIII  
Telecommunications, Information Market  
and Exploitation of Research



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## 1 Introduction

The Libraries programme of the European Commission hosted a combined *Europagate workshop* and *SR Concertation meeting* on the 15 February 1996 in Luxembourg. The purpose of this Workshop/Concertation was to demonstrate the Gateway developed by the EUROPAGATE project and, at the same time, to give the projects implementing the SR/Z39.50 protocol (the “SR cluster”) an opportunity to meet and exchange experience and ideas.

The results from one of the technical studies from the Libraries Programme: SR over X.400 was presented, and a overview of the activities of EG-LIB and EFILA were also presented at the meeting - in addition to the presentation and demonstrations given by the EUROPAGATE project.

The meeting was concluded with a panel discussion addressing a number of issues, relevant for implementors of the SR/Z39.50 protocol.

An introduction to the SR and Z39.50 standards and the projects from the SR cluster are provided in Chapter 2. A summary of the presentations and discussions at the meeting can be found in chapter 3. Copies of the slides and other material presented at the meeting are attached as appendixes.

## 2 Background

The Libraries Programme of the European Commission was launched in the beginning of 1991. International co-operation and resource sharing between European Libraries were the overall headlines for the programme from the start. Resource sharing imply resource access and resource sharing which again imply exchange of information between Libraries. Efficient exchange of information's imply interoperability and compatibility between different Library automation systems, and all this leads to a need for technical *standards*. Standards was (and still are) an important part of the programme. One of the action lines from the workprogramme (Fp III), action line II: *International interconnection of systems and related international standards* addresses directly the problems related to the use of technical standards for international interconnection of Library systems. Theme 9 from this action line: *Retrieval function - Interconnected OPAC's*, addresses projects implementing the SR protocol. Theme 9 was reformulated for the third call: *SR target development and their interconnection* (called Theme 9bis) in order to stimulate projects concentration on the development of SR targets.



The international standard for Search and Retrieve (the SR Standard), was developed and approved by ISO in 1991. One could say that this standard was “born” at the same time as the Libraries Programme was born. Libraries had been very active in the definition and development of this protocol as they needed a standard describing how to interconnect Open Public Access Catalogues (OPAC’s). The standard is, however, defined as a general standard for structured information retrieval and can, in principle, be adapted for all types of structured information retrieval from databases.

The standard is based on a client/server model for communication between different computer systems. The requesting part acts as a client and the responding part acts as a server. The normal mode of operation will be to enter a query into the local system using that system's set of menus and command language. The SR client module located in the local system translates the query into a standardised format defined by SR and sends it to a database system acting as a SR server. The SR server module presents the commands and search queries to the database and returns the results in a standardised format to the client who initiated the search. The protocol is designed for communication between computer systems and the person, performing the search, do not need to have any knowledge about the SR protocol.

An American standard with the same purpose: Z39.50, was approved (as an ANSI standard) in 1992. The development of these two standards was co-ordinated closely (the same editor drafted both standards) and the 1992 version of the Z39.50 standard is almost similar to the SR standard (SR is a compatible sub-set of Z39.50-92).

Both protocols are defined as level-7 protocols according to the OSI reference model, so interoperability should, in principle, not be a problem. But the protocols are typically implemented in different environments. Z39.50 implementations uses Internet (TCP/IP) as the transport protocol while SR implementations uses (or used) the OSI protocols as transport protocols.

This problem - or more precisely this potential problem - was the rationale behind the EUROPAGATE project when it was defined in 1992. One could foresee that the interoperability between different bibliographic catalogue systems would be obstructed by non compatible underlying networks. The main objective of EUROPAGATE was to solve this problem by providing a gateway function between these different networks, and, at the same time investigate possible models (business scenarios) for the operation of such a gateway.

The situation today, in 1996, is quite different from the situation in 1992. The need for the basic function of the gateway (gatewaying between different networks) has



more or less disappeared as very few catalogue providers have implemented OSI protocols - the Internet TCP/IP based implementations are dominating.

ISO has now decided, as a consequence of this situation, to forward the Z39.50-95 standard as the next international version of the SR standard. The standard is forwarded using the so called "fast track balloting" procedure and it is expected that the standard will be approved in November 1996. The ISO number will be ISO 23950. Z39.50 (and ISO 23950) are still "true" OSI level-7 protocols but they will be implemented in the TCP/IP environment.

The EUROPAGATE project has managed, over the years, to rescope the project and the functionality of the gateway software accordingly. The gateway can still act as a gateway between ISO and TCP/IP networks but the project has, in the last part of the implementation phase, focused on the implementation of the E-mail and the Web gateway. (*See later for a more detailed description of the GATEWAY.*)

The calls from the Libraries programme have resulted in more than 50 different RT&D projects of which many still are on-going. Many of these projects implement or use the SR/Z39.50 standard as a part of the project, but the projects addressing Theme 9 and Theme 9bis in Action line II have the development and implementation of the SR/Z39.50 standard as the main issue.

## 2.1 ION

One of the pilot projects from the preparatory phase was the ION project (Interlending OSI Networking). This project was one of the first European projects implementing both SR and ILL. The implementation was based on ISO network protocols. This project was conducted by a consortium of three Library organisations in the United Kingdom, the Netherlands and France. These organisations represented more than 40 individual Libraries. The experience gained in this project has provided valuable input to other European projects in this area.

The two first calls: Cfp'91 and Cfp'92 resulted in two theme 9 projects: SOCKER: SR Origin Communication Kernel (Cfp'91) and EUROPAGATE European SR - Z39.50 Gateway (Cfp'92).

Three projects were accepted from the third call (Cfp 93): SR Target: *SR Target development as a Paragon for Catalogue systems* and ARCA: *Access to remote catalogues by implementing SR Target functions* and finally ONE: *OPAC network in Europe.*



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## 2.2 SOCKER

The SOCKER project has developed a “general purpose” SR client called the kernel software. This software implements the “protocol machine” for a SR client. The software provides an API (Application Programme Interface) to be used when integrating the software in other systems. This software has, as a part of the project, successfully been integrated in two different environments: A CD-ROM workstation and a Network Entry Point for DANBIB (The central system from the Danish Library Centre). The CD-ROM workstation has a Graphical User Interface and can access local (CD-ROM) based databases as well as remote OPAC's via a network. The Network Entry Point for DANBIB gives the DANBIB users the possibility of accessing databases (OPAC's) outside the DANBIB system. The first version of the software is based on SR (Z39.50V2) but the project is right now upgrading the software to include facilities from Z39.50V3. A Web gateway will also be developed by the project. The “kernel” software will be available for other implementors.

## 2.3 EUROPAGATE

The purpose of EUROPAGATE was, as mentioned earlier, to solve the foreseeable problem arising from the implementation of SR/Z39.50 Clients and Servers implemented over different networks. The project has developed and implemented a gateway between Clients and Servers (or Origins and Targets) based on different communication stacks (OSI and TCP/IP). The gateway supports also E-mail queries formulated in CCL (Common Command Language) as well as a number of administrative functions necessary for a commercial operation of the gateway. Conversion between a few different MARC formats have also been implemented. The gateway also supports access from WWW browsers and the project has tested the use of “minimal” OSI-software successfully.

## 2.4 SR-TARGET (PARAGON)

SR-TARGET is based on the results from SOCKER and another project from the Libraries programme: JUKEBOX. SR-TARGET has developed and implemented a “General Purpose” SR target software tool box for sound catalogues. The purpose of this “tool box” software is to develop software that implements the target functions of the SR/Z39.50 software. The software will be implemented as a module (with a well defined API) that can be integrated in different existing sound catalogue databases. The software has been integrated in three different sound catalogues. A central client with WWW access has also been implemented.



## 2.5 ARCA

The ARCA project will implement a stand alone SR client with a Graphical User Interface and a general software package (tool) to be used for upgrading existing library catalogues with SR/Z39.50 target functionality. This software "tool-box" will be integrated in two existing library systems (ISIS and SABINI). The interoperability between these systems and the client will be tested.

## 2.6 ONE

The ONE project involves national library facilities in Austria, Denmark, Finland, Germany, the Netherlands, Norway, Sweden and UK.

The purpose of the project is to establish a service infrastructure for searching Library catalogues in Europe which can be extended to include resources worldwide through the Internet, and can be further expanded to allow ordering of publications found through searching.

The project will define the functional requirements for a OPAC network in a European context. The project will also establish a trial service between the users and the database (catalogue) providers participating in the project.. The project will implement the international standards for catalogue access, ISO/SR and Z39.50 in the different technical environments of the participants. A set of software tools, intended to be portable to a wide range of system platforms, will be developed. These tools will provide additional functions such as conversion between different formats for bibliographic records and character set conversions.

The project will also develop and install a *Neutral Entry Point* which can be used as a dial-in facility for terminal-based access. The project will also investigate and define the requirements for international services and legal and financial arrangements between service providers.



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## 3.0 The Meeting

The meeting was opened by Mme. Ariane ILJON who welcomed the participants and outlined the purpose of the meeting.

### 3.1 Introduction to the meeting

Gordon PEDERSEN, who chaired the meeting, presented the agenda for the day and gave an introduction to the "SR" projects from Action line II. The background for the two standards, and the relation between the SR and the Z39.50 standard, were also presented.

The majority of the European implementors are now implementing version three of the Z39.50 standard. A survey, among 27 European projects, done in the start of 1996, showed that nobody plans to implement the whole standard. All the planned (and existing) implementations will support a subset of the standard. *Scan*, *Explain* and *Item Order* are the most popular facilities. A presentation of the different architectural models, used when implementing this Client/Server based protocol, were also a part of the introduction.

### 3.2 The study: SR over X.400

The results from the study: *SR over X.400*, were presented right after the introduction. This study had been undertaken by Level-7, a UK based consultancy company. The presentation was given by Mr. David MILLER and Mr. Tim MAUDE.

The study had been conducted in 1995 and the main purpose was to investigate the possibility of running an interactive protocol like SR over a store and forward based protocol like X.400. The problems from gatewaying between X.400 and Internet based mail systems had also been investigated in this study, as it is most likely that the SMTP protocol will be used as the transport system for SR (Z39.50).

It will always be preferably to have a on-line session available for database searching via the SR protocol, but there are situations where it can be an advantage (or the only possibility) to use e-mail when searching catalogues. E-mail facilities are often cheaper to establish, than on-line connections and some organisations might, for a number of reasons, not want to establish direct connections to computers outside the company.



The study identifies a number of *Usage Scenarios*, were it could be relevant to do catalogue searching via e-mail.

The study concludes that it, from a technical point of view, is possible to implement the SR/Z39.50 over an e-mail protocol. The study identifies, and describe, a number of implementation options. And one of the recommendations from the study is to develop a profile describing how to implement SR/Z39.50 over e-mail.

### 3.3 EUROPAGATE project

The presentation of the EUROPAGATE project was the next point on the agenda.

Mr. Sean PHILLIPS (Librarian UCD Dublin, chair EUROPAGATE steering committee) gave an introduction to the ideas behind - and the background for - the EUROPAGATE project. This introduction was followed by a presentation of the results achieved so far, given by Mr. Mogens SANDFAER. (DTV Copenhagen, Technical project leader Europagate) The implementation phase had been finalised and the trial period (the pilot service) would start now. This meeting marked the launch of the pilot service. The following facilities had been implemented and will be available during the trial period:

A WWW to Z39.50 gateway supporting the following functions:

- Acces to multiple databases, parallel searching
- Support for SCAN (a 39.50V3 function)
- Display MARC records formatted or raw (the entire record)

A E-mail to Z39.50 gateway supporting the following functions:

- Text based queries formulated in CCL
- Single target, multiple databases queries
- Display retrieved MARC records in predefined formats.

The gateway software is written in ANSI C and a number of standard software packages has been integrated in the software (Apache webserver, YAZ client software etc.). The gateway software will be available to other implementors after the trial period.

The functionality of the gateway was then demonstrated by different participants from the EUROPAGATE project. The project had brought PC's with the software installed



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and access to the Internet had been established from the meeting room, making it possible to demonstrate live remote database searching via the gateway.

Three different parts of the functionality was demonstrated: 1) Access from one SR client, via the Gateway, to two different targets (OPAC's). 2) Searching different catalogues via the e-mail gateway and finally 3) Searching catalogues via the central SR Client, using the WWW Interface.

### 3.4 EG-LIB and EFILA

After lunch Mr. Erik Lorenz PETERSEN (Fischer & Lorenz, chair EG-LIB og EFILA) presented the activities of EG-LIB and EFILA.

EG-LIB is the Expert Group on Library Applications in EWOS (European Workshop for Open Systems). The purpose of this group is to discuss and define profiles (ISP's) for SR and ILL. A number of profiles has been defined (and approved by ISO/TC/46) but the liaison with other relevant (and active) groups and the sharing of implementation experience has been the most useful part of EG-LIB over the last two years.

EFILA (European Forum for Implementors of Library Applications) were instigated last year as a joint effort between EWOS and the Libraries Programme. The purpose of EFILA is to create a forum where implementors of library automation can meet and share experience and discuss problems relevant for their work.

Four meetings had been organised so far. The meetings are normally organised around one or more technical topics. Implementation of Electronic document delivery services and Z39.50 implementation experience are some of the issues that have been discussed at the meetings. The meetings are typically attended by 40 to 60 participants and more than 200 people are registered on the mailing list. One of the important meetings this year will be the joint ZIG (Z39.50 Implementors group)/EFILA meeting in the start of October this year. This meeting will be held in Brussels.

### 3.5 Panel discussion

The last point on the agenda was a panel discussion. A panel, with some of the experts present at the meeting, discussed a number of issues relevant for the further interconnection of OPAC's in Europe. Mogens Sandfaer (DTV, EUROPAGATE),



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P.G. Maarchetti (ESA), Tim Maude (Level-7), Liv HOLM (BRODD, ONE project manager) and Erik Lorenz Petersen (Fischer and Lorenz) participated in the panel.

The following issues and questions were discussed by the panel:

- 1) Will the availability of “slim” OSI software give OSI implementations a renaissance?
- 2) E-mail gateways to OPAC’s - is there a real need for this service?
- 3) How can we stimulate further OPAC interconnections?

Do we need service agreements and/or implementors agreements?

Could Europagate complement existing interconnections?

ad 1) The EUROPAGATE project had tested some of the “slim” OSI implementations that are available. (“slim” OSI is the common denominator for software who only implement basic communication facilities but still are fully OSI compliant). This software functions very well and can interoperate with other OSI implementations like the ISODE software. However nobody in the panel believed that OSI implementations would be revived by slim OSI implementations - Internet (TCP/IP) implementations will still be dominant in a foreseeable future.

Many new providers of Internet based services has been established (or will be shortly) and the majority of the European TELCO’s do (or will) offer Internet based services. Some mentioned the problems around the organisation of the Internet and the performance problems - and one of the panel participants mentioned that it was recommendable to plan for alternative solutions (e.g. OSI) when the applications are designed. Another panel participant mentioned that we perhaps would see “business class” Internet services in the future (services with a guaranteed performance).

ad 2). Everybody agreed that there is a need for the e-mail gateway. Organisations who don’t want to have on-line sessions outside the organisation (due to security requirements or economical reasons) and users who lacks modern network facilities, are potential “customers” for the a e-mail based gateway service. A service like this would also give persons from outside Europe (placed in regions with less developed communication infrastructure) an opportunity to access remote library catalogues.

ad 3) A need for standard service and/or implementors agreements was also identified during the discussions. Implementors agreements will be necessary to document the



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technical details and the service (commercial) agreements will be necessary as the content of the catalogues represent a significant value. The ONE project develop these agreements for the project participants but others are welcome to comment and contribute.

Europagate will complement existing initiatives to interconnect Library OPACS, e.g. the ONE project. Many Libraries will interconnect their OPAC's directly - but there will be a need for Europagate in situations were technical and administrative problems obstructs direct interconnection. The WWW gateway and the administrative functions are function will be very useful for professional providers of "Library services".





## **Annex I**

### **Agenda for the Workshop/Concertation Meeting**



## Europagate Workshop/SR Concertation Meeting

15 February 1996

Batiment Jean Monnet, Luxembourg

Salle M1

### *Agenda*

- |       |  |                           |
|-------|--|---------------------------|
| 9.15  | Introduction   | Gordon PEDERSEN           |
|       | Purpose, context and scope.<br>Overview of relevant projects.  |                           |
| 9.45  | The EUROPAGATE project   |                           |
|       | Introduction to the project  | Sean PHILLIPS             |
|       | Status and results   |                           |
| 10.30 | Coffee break   |                           |
| 10.45 | EUROPAGATE Demonstration   |                           |
|       | Question/answer session  |                           |
| 13.00 | Lunch  |                           |
| 14.00 | Presentation of <i>SR over X.400</i>   | David Miller/Tim<br>Maude |
|       | Presentation of the results from this study,<br>launched by the Libraries Programme in 1995<br>and conducted by Level-7, UK.   |                           |
| 14.45 | EFILA/EG-LIB   | Erik Lorenz Petersen      |
|       | Overview of the on-going and planned activities<br>of EFILA - The European Forum for Implementors<br>of Library Applications and EG-LIB - The EWOS<br>expert group for Library Applications. |                           |

- 15.15 Coffee break
- 15.30 Panel discussion.
- What is needed to provide OPAC interoperability in Europe?  
How will Europagate contribute? Do we need any thing in addition? (e.g. implementors agreements)  
Is there a need for e-mail based searches?  
How can the results of the Europagate project be exploited?
- 17.00 Summary and preliminary conclusions Gordon PEDERSEN
- 17.15 Closing of the meeting Ariane ILJON
- 17.30 End



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## **Annex II**

### **Participants list**



EUROPAGATE Workshop/SR Concertation Meeting  
held in Luxembourg on 15 February 1996

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DG XIII-E/4  
Chief of Unit

**Pat MANSON**  
DGXIII-E/4

**Ian PIGOTT**  
DG XIII-E/4

**Gordon PEDERSEN**  
Libraries Support Team

**Monika SEGBERG**  
Libraries Support Team

**Martin KINSELLA**  
Libraries Support Team

**Geoffrey STEPHENSON**



**Annex III:**  
**Slides from Introduction**





Libraries Programme



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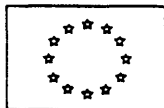
## EUROPAGATE WORKSHOP

### SR CONCERTATION MEETING

Luxembourg  
15 February 1996

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Europagate Workshop SR Concertation 15 February 1996



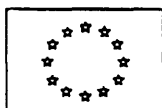
Libraries Programme



- 
- **Background - short introduction to relevant projects/activities**
  - **Europagate Workshop**
    - Demonstration
    - Trial kick-off
  - **SR Concertation**
    - SR over X.400 - presentation of study results
    - EG-LIB/EFILA - overview of activities and results
  - **Panel Discussion**

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Europagate Workshop SR Concertation 15 February 1996



Libraries Programme



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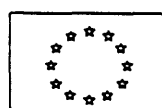
**Action line II (FP3) - International interconnection of systems and related international standards**

**Preferred priority themes first and second call:**

- **Retrieval function - interconnected OPACs**
- Acquisitions function using EDIFACT
- Fast document transfer and delivery
- X.500 directories

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Europagate Workshop SR Concertation 15 February 1996



Libraries Programme



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**Action line II (FP3) - International interconnection of systems and related international standards**

**Preferred priority themes third call:**

- **Retrieval function - SR targets development and their interconnection**
- Bulk data transfer for libraries using networks

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Europagate Workshop SR Concertation 15 February 1996





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### Retrieval function - interconnected OPACs

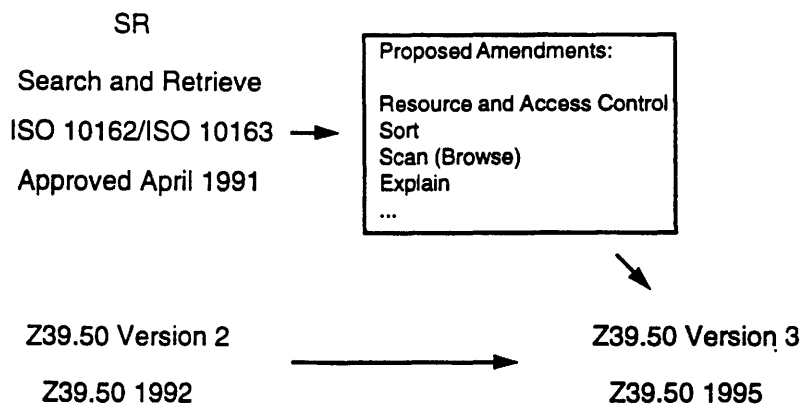
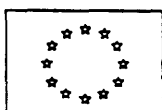
- SOCKER (1050)
- EUROPAGATE (2062)

### Retrieval function - SR targets development and their interconnection

- SR-TARGET (PARAGON, 3034)
- ARCA (3039)
- ONE (3099)

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Europagate Workshop SR Concertation 15 February 1996

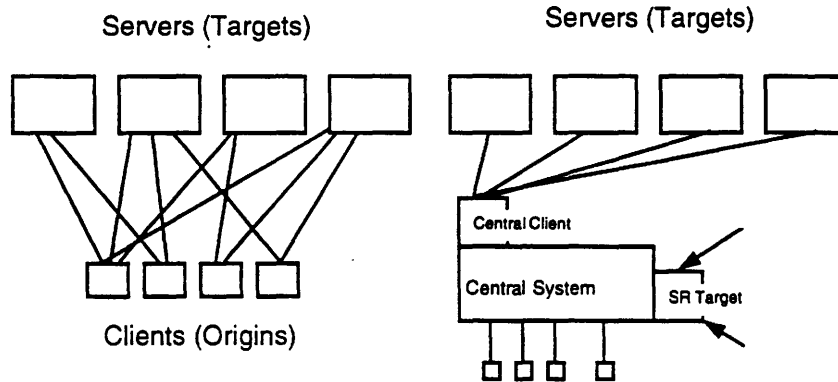


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Europagate Workshop SR Concertation 15 February 1996



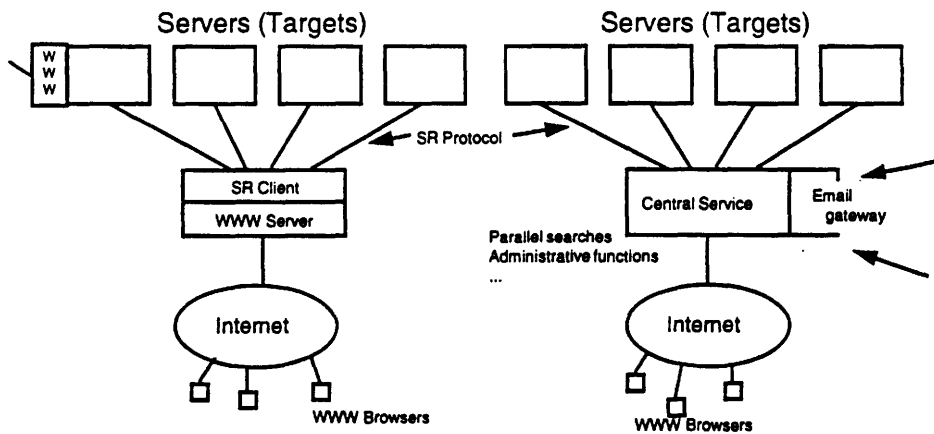
# Libraries Programme



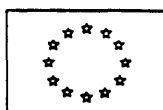
Europagate Workshop SR Concertation 15 February 1996



# Libraries Programme



Europagate Workshop SR Concertation 15 February 1996



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**Accompanying activities:**

**EWOS EGLIB-group**

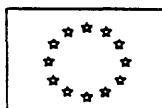
- Profiles
- Implementation guideline (PT031)

**EFILA**

- European Forum for Implementation of Library Applications

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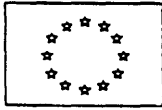
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**A few references:**

- **Z39.50-1995: Information Retrieval Protocol**  
An introduction to the standard and it's usage  
<http://linnea.helsinki.fi/z3950/z3950pr.html>  
Juha Hakala, Helsinki University Library
- **Towards Distributed Library Systems: Z39.50 In a European context**  
Lorcan Dempsey, Rosemary Russell and John Kirriemuir  
Published in *Program* Issue 30, January 1996
- **Models for Open System Protocol Development**  
IFLA series of technical reports  
Liv. A. Holm, 1994

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Europagate Workshop SR Concertation 15 February 1996

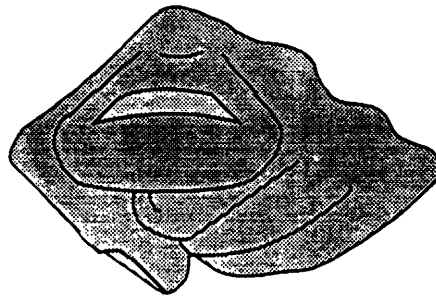


## Libraries Programme



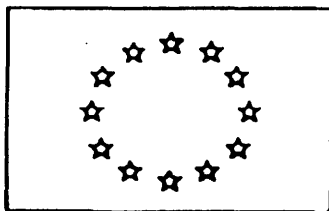
Remember:

The success of this meeting ~~is~~ depends on your active participation!

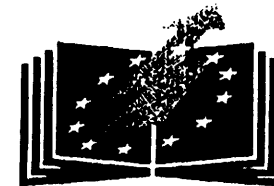


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Europagate Workshop SR Concertation 15 February 1996



Libraries Programme

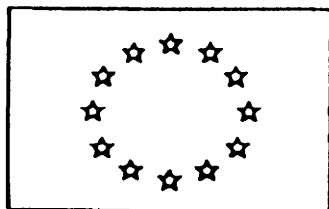


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# European Z39.50 V3 Implementation Plans

## Mini Survey

Gordon PEDERSEN  
The Libraries Programme, EC



# Libraries Programme



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**27 Questionnaires Distributed**

**Covering Approx. 35 Projects/Systems, involved in Projects  
from the Libraries Programme of CEC**

**23 Answers received**

Fax: +352 4301 33 530

Att: Gordon PEDERSEN

### Z39.50 V3 Survey

Project:				
<input type="checkbox"/> Service <sup>1</sup>		<input type="checkbox"/> Library System <sup>2</sup>		
Name of service/system:				
Estimated number of Implementations:			Estimated number of users:	
<input type="checkbox"/> No Z39.50 V3 Functionality planned, <input type="checkbox"/> but Z39.50 V2/SR will be supported				
Planned Z39.50 V3 Functionality: <input type="checkbox"/> Origin <input type="checkbox"/> Target <input type="checkbox"/> Both				
<b>Planned Z39.50 V3 Services:</b>				
Service	Origin	Target	Will be available (planned)	Comm:
Scan				
Sort				
Proximity (In the Search facility)				
Explain:				
- All facilities				
- Subset of facilities				
- <sup>3</sup>				
Extended Services:				
- Save a result set				
- Set a periodic query schedule				
- Export a document				
- Order a document				
- Update a database				
- <sup>3</sup>				
Segmentation <sup>4</sup>				
Multiple concurrent operations <sup>4</sup>				
General comments:				
This form was completed by:				

<sup>1</sup> Services provided on behalf of Libraries: e.g. LIBRIS and DBC (Danish Library Center)

<sup>2</sup> General purpose Library systems: e.g. DYNIX and VTLS

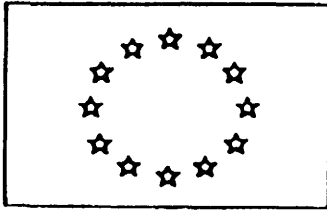
<sup>3</sup> Other services to be implemented, please specify

<sup>4</sup> Technical facility - do not provide any additional functionality

	Scan	Sort	Prox	Exp - all	Exp - sub	Exp - oth	Ext - save	Ext - peri	Ext - exp	Ext - ord	Ext - upd	Ext - oth	Segmen.	Mul. Concur.
ELISE	•	•	•		•		•	•		•				
DECOMATE	•	•	•		•		•	•		•				
AIDA														
ELVIL	•	•	•				•		•		•			
FASTDOC														
DBV-OSI-II	•	•		•						•	•			
Steier. Landesbib.	•	•	•		•					•	•			
Landesm. Joanne.	•	•	•							•	•			
British Library		•			•		•		•	•			•	
PICA	•	•			•					•	•			
BIBSYS	•	•			•					•	•			
SABINI	•	•	•		•									•
ISIS	•	•	•		•									•
LIBRIS	•	•	•		•					•	•		•	
ELITE	•	•	•		•		•			•	•			
RAMA	•	•	•		•					•	•			
PARAGON	•													
DALI														
UNIVERSE														
CASA														
OPAC-SBN Index														
EUROPAGATE	e <sup>2</sup>													

ORIGIN/TARGET





# Libraries Programme



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<b>15</b>	<b>Scan</b>
<b>10</b>	<b>Sort</b>
<b>10</b>	<b>Prox</b>
<b>1</b>	<b>Exp - all</b>
<b>12</b>	<b>Exp - sub</b>
<b>5</b>	<b>Ext - save</b>
<b>2</b>	<b>Ext - peri</b>
<b>2</b>	<b>Ext - exp</b>
<b>11</b>	<b>Ext - ord</b>
<b>2</b>	<b>Ext - upd</b>
<b>2</b>	<b>Segmen.</b>
<b>2</b>	<b>Mul. Concur</b>



Libraries Programme

Luxembourg 13 February, 1996

**Search and Retrieve Protocols  
and  
The Libraries Programme of EC**

Gordon Pedersen

This paper gives a short description of the activities, with relation to the use of standard search and retrieve protocols, in the Libraries Programme. This paper is prepared in connection with the EUROPAGATE Workshop/SR Concertation meeting held in Luxembourg on the 15th of February 1996. The purpose of this meeting is to demonstrate and discuss the results achieved by the EUROPAGATE project so far and, at the same time, to discuss the use of Search and Retrieve protocols by other projects supported under the Libraries Programme.

International interconnection of Library Systems and the use of standard protocols has been a theme in the Libraries Programme from the start. One of the precursor projects started during the preparatory phase: the ION project (Interlending OSI Networking), was one of the first European projects implementing systems for international Search and Retrieval functions based on international agreed standards. The experience gained in this project has provided valuable input to other projects in this area.

Theme 9 from the Libraries workprogramme: *Retrieval function - Interconnected OPAC's* defined under Action Line II: International interconnection of systems and related international standards, addresses the technical and practical problems and issues related to interconnection of Library Catalogues. The two first calls: CfP'91 and CfP'92 resulted in two theme 9 projects: SOCKER: SR Origin Communication Kernel (CfP'91) and EUROPAGATE European SR - Z39.50 Gateway (CfP'92). The theme was reformulated for the third call: *SR target development and their interconnection* (Theme 9bis) in order to focus the projects on developments on the target (server) side. Three projects were accepted under the third call: SR Target: *SR Target development as a Paragon for Catalogue systems*. ARCA: *Access to remote catalogues by implementing SR Target functions* and finally ONE: *OPAC network in Europe*.

Many other projects, from the Libraries Programme, implement and use SR protocols as a part of the system and/or the service they implement. The projects mentioned in this paper are only those projects where the use and implementation of search and retrieve functionality is the main issue.

The SOCKER project has developed a "general purpose" SR client called the kernel software. This software has successfully been integrated in two different environments: A CD-ROM workstation and a Network Entry Point for DANBIB (The central system from the Danish Library Centre). The software is based on SR (Z39.50V2) but the project has asked for a prolongation in order to upgrade the kernel with some version three functionality and to



## Libraries Programme

upgrade the functionality of the network entry point implemented by the the Danish Library Centre.

EUROPAGATE has developed and implemented a gateway between Clients and Servers (or Origins and Targets) based on different communication stacks (OSI and TCP/IP). The gateway supports also E-mail queries formulated in CCL (Common Command Language) as well as a number of administrative functions necessary for commercial operation of catalogue services. Conversion between different MARC records is also a part of this gateway. This project has also been prolonged. The gateway will be upgraded with an access point for WWW browsers and the project will investigate the use of "minimal" OSI-software instead of the current ISODE based implementation.

SR-TARGET is based on the results from SOCKER and another Library project: JUKEBOX. SR-TARGET will develop and implement "General Purpose" SR target software for sound catalogues. This software will be implemented in three different sound catalogues. A central client with WWW access will also be implemented.

ARCA will implement both a SR client and a general software package (tool) to be used for upgrading existing library catalogues to act as SR targets. The project will integrate this software with two existing library systems.

The ONE project will interconnect a number of important OPAC's in Europe. A general tool-kit will be developed and the interconnection of the OPAC's will be tested thoroughly.

The Library Programme also supports standardisation and profiling activities, and the projects are encouraged to participate in EG-LIB, EFILA and other relevant fora.

A lot of Libraries and Library projects will implement functions for remote catalogue searching in the coming years and Z39.50 version 3 will undoubtedly be the preferred protocol. A small survey conducted amongst the Library Projects at the end of 1995 shows that the majority of the projects plan to implement a subset of the functionality from version 3.

The challenge in the coming years will be to establish international *services* based on catalogue searching and, at the same time, to integrate catalogue searching with other Library services (Document delivery, ILL etc.). The existing projects must be moved from the trial/demonstration phases -into real operational services.





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**Annex IV:**

**Slides and Management summary (SR over X.400)**



# SR over X.400

Tim Maude  
Dave Miller

## Contents

- Introduction
- The problem
- Approach
- Results
- Conclusions

## Introduction

- European Commission
- Call for tender - August 1994
- Contract awarded to Level-7 - January 1995
- Interim report - May 1995
- Final report - October 1995



## Level-7

- Management and technical consultancy
- Open Systems
- Relevant projects
  - Management - ION, LIRN
  - Technical - SR over X.400, DFR & Internet
  - Service - EOTC, EWOS, MANDATE

## The Problem

- SR/Z39.50
  - Interactive
  - Relatively small client base
- X.400/Internet mail
  - Non-interactive
  - Relatively high client base

Can SR be run over X.400  
meaningfully?

### Possible Benefits

- No on-line connections necessary
- Non-interactive access cheaper
- Use of low bandwidth
- Use on isolated networks
- Multi-cast queries

## The Approach

- User interviews
- Usage scenarios
- Technical options
- Analysis

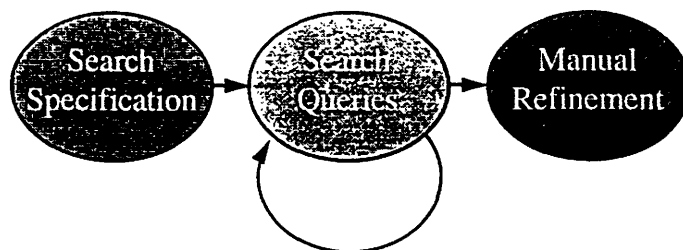
## Interviews

- Interviews in Europe
  - Professional researchers
  - Information scientist
  - Casual users
- Usage dictated by facilities
- Expectations
- Automated and manual searching

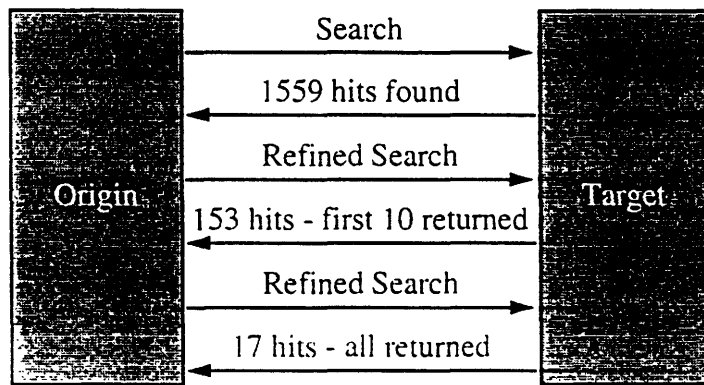
## Usage Scenarios: 1

- Literature search - depends on user
- Information search - depends on user
- Repeated/periodic search
- Specific item
- General/browsing

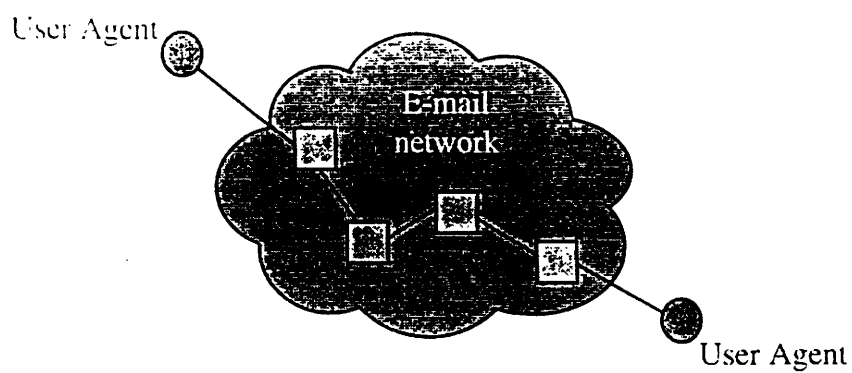
## Usage Scenarios: 2



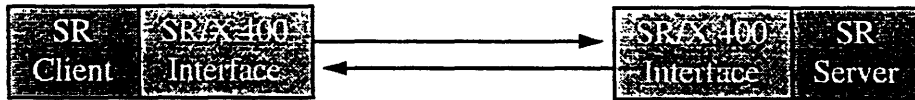
## Search and Retrieve/Z39.50 V3



## Electronic Mail Networks



## Issues and Options



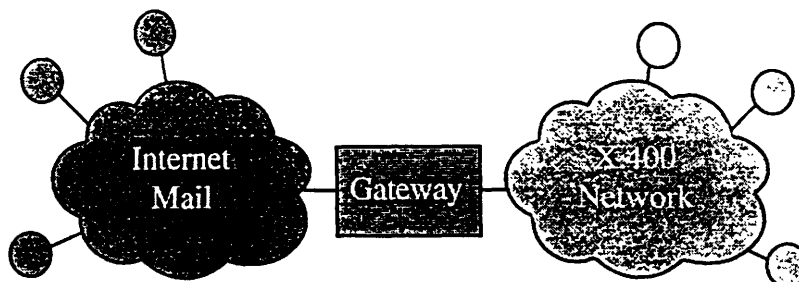
- Issues

- Time Delay
- Context
- Data Volume

- Options

- Full SR service
- Batching Requests
- Single shot
- Wide range of complexity

## X.400 - Internet Mail Interworking



## Analysis

Scenarios	Specification	Iterations	Manual Processing	E-mail?
Periodic/Repeated	High	Low	H/L	✓
General/Browsing	Low	Low	High	✓
Specific Item	High	Low	H/L	✓
Literature Search (casual)	H/L	H/L	High	?
Information Search (casual)	H/L	H/L	High	?
Literature Search (expert)	High	High	Low	×
Information Search (expert)	High	High	Low	×
E-mail Characteristics	H/L		High	

## Changing Working Practice

- Broad queries
  - Low precision/high recall
- Local manual searching
  - PC tools
- Multiple targets
- Store and refine query
  - No context at target

## Client Software

- Distribution of Client software
  - Mainly for casual user?
  - Special software or on-line access?
- Text query language
  - Diverse mail systems
  - Syntax
  - Character sets

Can SR be run over X.400  
meaningfully?



## Conclusions

- Technically possible
- Different usage model
  - “Single shot”
  - Specific query
  - Broad query and refine off-line
- Casual usage
  - Text based query
  - Character set problems

## Recommendations

- Determine level of requirement
- Develop “single shot” SR profile
- Develop/select text based query language
- Standardise language

# SR Over X.400 Final Report

*Name of Client:* European Commission  
Directorate General XIII-E3  
Office C5/64  
L-2920, Luxembourg

*Distribution List:* Gordon Pedersen  
Level-7 File

*Author:* David Miller

*Authorised by:* Tim Maude

*Date of Issue:* 13 October 1995

*Issue:* 1.1

*Reference:* 4024/DEL/03

*Total Number of Pages:* 116

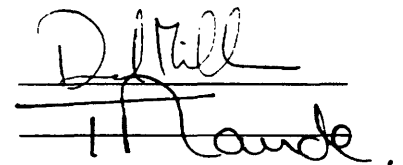
*Contact Details for Level-7:* Level-7 Ltd  
Centennial Court  
Easthampstead Road  
Bracknell  
Berkshire RG12 1YQ, UK

Telephone: (+44) (0) 1344 867199

Facsimile: (+44) (0) 1344 868442

X.400: S= Miller; O=Level-7 Ltd;  
P=Level-7 Ltd; A=Gold 400; C=GB

Internet: miller@level-7.co.uk



Handwritten signatures of David Miller and Tim Maude, each on a horizontal line.

## 1. MANAGEMENT SUMMARY

### 1.1 Introduction

This section summarises the key findings and conclusions of the Level-7 study on Search and Retrieve (SR) over X.400, undertaken under the auspices of the European Commission Libraries Programme.

### 1.2 Study Objectives and Approach

The objective of the study was to investigate whether the ISO Search and Retrieve (SR) protocol can run meaningfully and well over X.400 based Store and Forward messaging services. The study addressed both the technical and usage issues that this question raises. A major part of the investigation included an examination of the protocol interworking issues involved between the various versions of X.400 (1984 and 1988) and interworking with other Store and Forward messaging services such as the Internet.

The study concluded with an assessment of the technical feasibility of SR over X.400, its usability in the context of the way library users work, and recommendations on the next steps to be taken to provide E-mail access to library catalogues.

A thorough investigation of the SR protocol, Store and Forward messaging services and existing projects in this arena has been performed, from which, the major technical issues for implementing SR over X.400 have been identified. This investigation enabled a number of specific technical options to be developed for supporting SR over X.400. The consequences of operating these options in the Internet environment, or a mixed environment of X.400 and Internet have also been explored.

Apart from conventional desk research and consultation with industry experts, an interview programme was undertaken with a range of library users and librarians in Europe. These interviews aimed to provide an understanding of the way library users currently search for information in library catalogues in order to develop a set of usage scenarios against which the technical options could be analysed.

It was then possible to assess the merits of the available technical options and produce recommendations on the best approach to implement SR over X.400 and next steps to be taken to progress this approach.

The study was undertaken between January and August 1995.

### 1.3 Library Usage

Five interviews were performed in three European countries with a range of library users including librarians, sophisticated professional researchers, and infrequent users with a limited knowledge of the search facilities. The libraries that the interviewees used included general public libraries, academic libraries and technical libraries. With a sample of this size, the results must be used cautiously. However, they do provide enough information to develop a number of usage scenarios and to describe the characteristics these scenarios are likely to have.

A number of findings are implied by the interviews:

- Almost all the interviewees consider automated library search tools as only one of many techniques at their disposal to find information. Any requirement to search for information will involve a component of 'manual' searching, which may take the form of scanning library catalogue indexes, reading abstracts or lists of references in bibliographies.
- The interviewee's understanding of the tools available to search for information, and the structure of the information itself, plays a significant role in shaping the way information is sought, particularly with respect to the balance between automated and manual searching.
- The specific searching techniques used by the interviewee's are strongly influenced by the level of sophistication of the library system available. Some systems allow complex query statements to be constructed using Boolean operators and parentheses, which encourages the user to perform many iterations

of the search, refining the query each time. Other systems only allow simple queries on a single keyword, consequently the user is obliged to continue the search manually by browsing through the output provided by the query.

Analysis of the results of the interviews identified seven distinct scenarios each depicting different requirements of library users which were used to assess the merits of the technical options for implementing SR over X.400. The seven scenarios are:

- a professional researcher or librarian searching for a specific piece of information;
- an infrequent or ad hoc user searching for a specific piece of information;
- a professional researcher or librarian performing a literature search;
- an infrequent or ad hoc user performing a literature search;
- any user locating a specific item;
- performing a frequently used (repeated) query;
- browsing for items on a general interest topic.

#### 1.4 Technical Investigation

The two key standards for library search and retrieve are the International Standards Organisation's (ISO) SR and the American National Standards Institute's (ANSI) Z39.50. However these are now both converging on Z39.50 version 3 which is due to be ratified as an ISO standard shortly.

The services of the SR protocols are designed to be used interactively, where the user logs on to the host system, issues a command, receives a response, issues another command based on this response, and so on until the user has extracted the required information and logs off. These protocols therefore assume the use of an on-line communications connection from the user system to library host system and not a Store and Forward messaging system.

Store and Forward messaging networks can be used to convey much more than interpersonal mail, and in the case of X.400, it was designed with this in mind. However, messaging services provide a 'connectionless' transport service and SR is a connection oriented protocol, therefore, any technical solution for implementing SR over X.400 needs to take this into account. Also the performance of messaging networks can not be guaranteed to be as fast as on-line connections, particularly if public services are used, and so any protocol using X.400 as a transport mechanism needs to be able to accommodate the potential delays.

#### 1.5 Technical Options

Each element of the SR protocol was examined in turn to assess its suitability for use over X.400. The main conclusion derived from this exercise is that implementing SR over X.400 will necessarily involve defining a limited subset of the protocol. This implies that some kind of gateway is required between the subsetted SR protocol and existing SR server systems. The nature and complexity of this gateway depends on how much of the original functionality of the SR protocol needs to be preserved, therefore, it is likely that a compromise will be reached between over simplifying the SR service and trying to implement an excessively complex gateway.

In the course of this study, a number of options for implementing this gateway were identified as well as options for producing a subset of the SR protocol.

#### 1.6 Interworking Issues

Exchanging text based E-mail in the Internet environment, and between X.400 and Internet environments, is now well understood and tested in practice. However, implementing SR over X.400 requires the transmission of binary messages containing the SR protocol. Exchanging binary messages over Internet is possible and frequently performed using MIME. However, although gateways between MIME and X.400 are well defined by various

Internet specifications. gateway technology conforming to these specifications is not currently widely implemented.

Projects that have implemented servers that respond to mail based queries, such as CONCISE or EZGATE, use text based queries and consequently avoid this problem.

## 1.7 Analysis of the Options

Analysis of the technical options in the context of the user scenarios reveals that there is not a great difference between them in terms of how well they meet the users' requirements. This suggests that there is little benefit in implementing the more complex options.

The technical options do not satisfy all the user scenarios equally and even the most appropriate are not as satisfactory as the conventional on-line use of SR.

The results of this analysis show that SR over X.400 is more likely to be of use to infrequent users who would not ordinarily have a high level of expertise of using library catalogue searching facilities. It is likely that this type of user would have an existing E-mail system, probably proprietary, with gateways to Internet or X.400, and due to the infrequency of access would be unlikely to want to procure additional special software to access library catalogues. If the user's frequency of access increased to a point where the procurement of additional software could be justified, given the superior service provided by an on-line connection, it is likely that assessment of the costs and benefits involved would lead the user to the on-line solution rather than SR over X.400.

## 1.8 Conclusions and Recommendations

It is technically possible to implement the SR protocol over X.400. However, the SR protocol assumes a certain usage model which is more appropriate to an on-line connection, i.e. an iterative series of requests refining a search query.

The most practical solution is to use a subset of the SR protocol in a way that corresponds to the usage model for E-mail, i.e. the user sends a single request and receives a single reply.

Analysis of the user scenarios shows that in some cases, if an on-line connection is not possible, this usage model may be adequate. Specifically these cases are:

- the user (e.g. a relatively unsophisticated user) performs a search with a relatively broad search criteria, and then browses off-line through the resulting output for the required information;
- The user performs a well defined search, such as one that has been used before, e.g. 'all new information on a specific topic', or a request for information on a known item, e.g. 'what is the ISBN for a particular title'.

If a user only has a casual requirement to perform library searches a text based search and retrieve language, similar to that used by the EZGATE project, is most appropriate. The main disadvantage of this approach is that, unless the user has access to MIME<sup>1</sup>, European character sets (non-ASCII) cannot be used.

Based on these findings Level-7 makes the following recommendations:

***Recommendation 1: Determine the level of requirement for a standard text based E-mail interface to SR servers.***

As the availability of networks (supporting on-line access) spreads throughout the world, more users have the potential to make on-line connections to library catalogue systems. A survey needs to be carried out to establish the size of the potential user base for this facility. All the evidence currently available suggests that if users have a choice of E-mail or interactive access they will nearly always use interactive. However if they do not have a choice some will use E-mail but this needs to be further qualified.

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<sup>1</sup> MIME (Multi-purpose Internet Message Extensions) is the Internet specification for including non-ASCII information in Internet mail. This allows other character sets to be used in message headers and for multiple binary body parts to be enclosed as one mail item.

***Recommendation 2: The development of a standard or profile for a simple 'one pass' version of SR.***

The analysis of the technical options revealed that increasing the complexity of the gateway between E-mail based SR and standard SR does not provide significant benefits to the user. The recommended technical option is therefore to produce a simple 'one pass' version of the protocol that only allows users to perform search requests without reference to result sets from previous searches.

***Recommendation 3: A text based encoding of the SR protocol should be developed***

In order to produce the widest possible access to library catalogues via E-mail, it needs to be accepted that many users only have access to public messaging networks through X.400 or Internet gateways from proprietary PC based E-mail packages. Information needs to be encoded in a form that is acceptable to all these systems and this implies ASCII text. Also, many potential users of SR may not want to procure special software in order to E-mail library catalogue queries and so the text based SR protocol should be defined as a human readable text based query language.

Although the query language should be simple and intuitive to use it should also allow more complex functions to be used if necessary. It should also allow the transmission of non-ASCII queries and responses (via MIME or X.400) if the user has the necessary software to support them.

CCL (Common Command Language) should be considered as the basis for this language. But it needs to be recognised that to make the best of a situation that is not ideal, i.e. an interactive protocol like SR running over a non-interactive communication mechanism like E-mail, the query language should be tailored to maximise its effectiveness and efficiency.

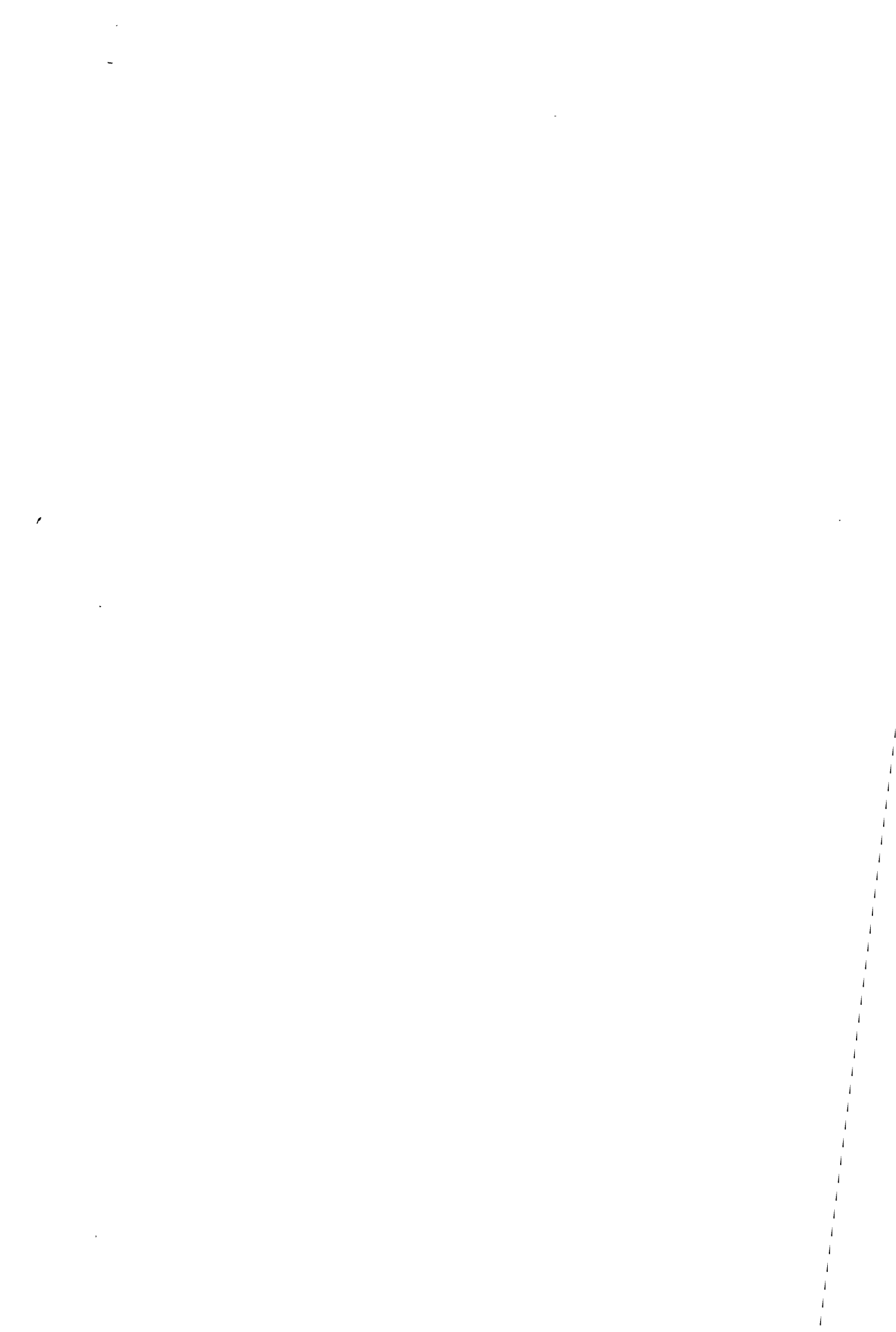
***Recommendation 4: The text based query language should be standardised.***

If CCL is not used as the query language a standard needs to be produced to define the new language so that users only have to learn one language and software developers can produce products that will interwork. This would also encourage products to be developed to 'front-end' the language with GUIs that provide error checking and support different national languages.



**Annex V:**

**EUROPAGATE: Edited report, promotional leaflets and Slides.**



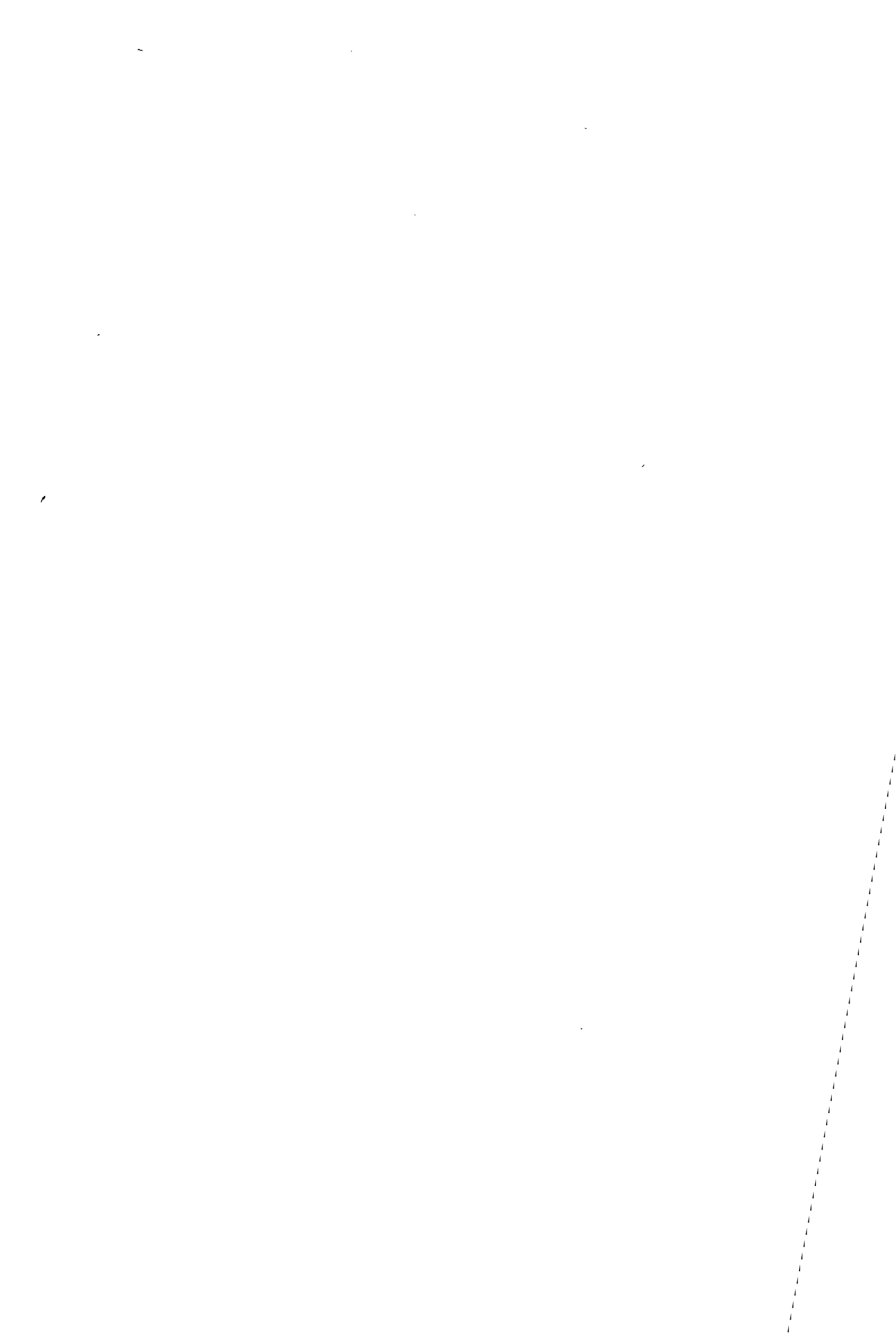




## **FIRST EDITED REPORT**

*EUROPAGATE (1994-1996) is a EU Libraries Programme Project*





# **EUROPAGATE**

*PROJECT: LIB - EUROPAGATE/2 - 2062*

*National and International Bibliographic Information and  
Catalogue Access Service*

*First Edited Report*

**Date: January 1996**

**Availability: Public**

**Publicly available deliverables can be obtained from: <http://europagate.dtv.dk/>**

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## **CHAPTER 1: INTRODUCTION**

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### **INTRODUCTION**

This report is the first edited report of the EUROPAGATE project, which is partly financed by the European Commission Libraries Programme under Action Line II, theme 9 (Retrieval function - interconnected OPACs). The report outlines the objectives of phases I and 2 in the context of the overall objectives of the project, and summarises progress and achievements, covering the period from January 1994 to July 1995. The partners in the EUROPAGATE project are:

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## **BACKGROUND**

The purpose of the project is to build and operate a pilot gateway service through which different clients (implemented with different communication stacks) can access Z39.50 and SR servers. The gateway will also provide e-mail access to these servers as well as a number of administrative facilities.

The computerisation of library catalogues and the availability of OPACs has meant that users of a library can search its stock relatively easily and thoroughly.

In order to access the OPACs of other libraries however, the user must learn the search algorithms of other catalogues on an individual basis. The only way in which the user can access a number of library catalogues is to connect to each one separately or to access the combined holdings through a centrally maintained union catalogue where such exists.

The development of the information retrieval standards ISO SR/ANSI Z39.50 and the widespread adoption of client/server computing systems suggest that in the future a number of catalogues may be accessed using a single client. However, Z39.50 has typically been implemented in a TCP/IP environment, whereas SR has been implemented in an OSI environment. This means that users and implementors were split between two incompatible approaches. The objective of the EUROPAGATE project is to unite these approaches by providing a gateway between them.

### **PROJECT PLAN**

The initial activity of the project was a meeting of the partners to confirm the structure of the project and to define the management structure and information exchange mechanisms (e.g. email, word processing packages, reporting procedures, schedule of meetings).

*The project has 3 phases which are divided as follows:*

Phase 1 consists of investigation, analysis and specification. Phase 2 consists of design, development and testing. Phase 3 consists of the operation of the pilot service and evaluation.

The first tasks in phase 1 involved an information gathering exercise which determined the functionality of the service and how it would be implemented. These studies were used to ascertain the current state of the art, and also to identify software development which could be used in the project.

Based on the findings of the background research, the functional specification of the gateway and client systems and of the operational characteristics of the service was completed.

The next stage involved the design and implementation of the gateway, which was undertaken by the technical teams at DTB and UCD.

### ***Background Studies***

**Technical/standards environment** - Three studies were undertaken

- Current implementations (WP1.1);
- Servers in operation (WP1.2);
- Developments and future trends (WP1.3).

**Development environment** - Two studies were undertaken

- Identifying reusable software (WP5.1);
- Preparing development infrastructure (WP5.2).

**Markets, services and users** - Two studies were undertaken

- Existing services and users (WP2.1)
- Commercial and legal aspects (WP2.2).

### ***Development***

**Software design and development**

- Functional Specification (WP3)
- Implementation of design and installation guidelines (WP6)

### **PROJECT OBJECTIVES**

The EUROPAGATE project aims to increase the interoperability of bibliographic catalogue systems using the search and retrieve protocols standardised by ANSI (Z39.50) and ISO (ISO-SR). These two protocols are very similar but have been developed and implemented in different environments. This has led to difficulties in achieving universal access for users to server systems supporting the two protocols. The project set out to construct a gateway which would allow such interoperation in as transparent a manner as possible, thus allowing users the maximum degree of flexibility in accessing networked catalogues. The project includes the operation of the gateway as a pilot service in order to stimulate use of, and demand for such services and to gain experience in the operation of the gateway with a view to possible commercialisation.

*The interoperability difficulties arise for two major reasons:*

- differences in the search and retrieve protocols themselves
- different underlying protocol stacks (TCP/IP and OSI).

The project attempts to address both of these difficulties. In the near future it is hoped that the search and retrieve protocols will converge and thereby remove one cause of incompatibility, but there will continue to be a need for gateways between the OSI and TCP/IP environments. In addition, a number of other issues such as data formats (notably MARC record differences and character sets) are being addressed by the project, although resolution of these is very difficult and will depend on future developments in international standardisation activity. It is hoped that the EUROPAGATE project will contribute to an understanding of these problems and to the development of solutions.

### **TECHNICAL OBJECTIVES**

The technical objectives of the project are as follows:

- Transparent SR/Z39.50 protocol conversion
- TCP/IP and OSI interoperation for Search & Retrieve protocols
- Investigation of additional services in the gateway (e.g. data conversion)
- Provision of access to servers via email
- Access to multiple servers
- Support for existing clients
- Use of existing software wherever possible
- Standards-based



- Development of reusable software components and techniques
- Provision of a gateway package for use by others

Through its investigation of the problems and requirements of the interworking and operation of a gateway between Z39.50 and ISO/SR (both clients and servers), the project is identifying practical problems with existing standards in accessing multiple servers with different characteristics. The project seeks to stimulate the provision of a standardized server interface to catalogue and bibliographic information databases.

## **CHAPTER 4 RESULTS TO DATE**

### **LIST OF DELIVERABLES**

<b>Deliverable/Workpackage</b>	<b>Title</b>	<b>Status</b>	<b>Availability</b>
D2/WP1.1	Current implementations of Z39.50 and ISO/SR	Final	Public*
D3/WP1.2	Z39.50 and ISO/SR servers in operation	Final	Public*
D4/WP1.3	Current developments and future trends	Final	Public*
D5/WP2.1	Identification and examination of existing information services and users	Final	Public*
D6/WP2.2	Investigation of commercial, legal and regulatory issues	Final	Confidential
D7-8/WP3	Functional specification	Final	Public*
D9/WP5.1	Identification of reusable modules of software	Final	Public*
D10/WP5.2	Setting up the development infrastructure	Final	Confidential
D13/WP6	Implementation of design and installation guidelines	Final	Public*

\* Publicly available deliverables can be obtained from:

<http://EUROPAGATE.dtv.dk/>

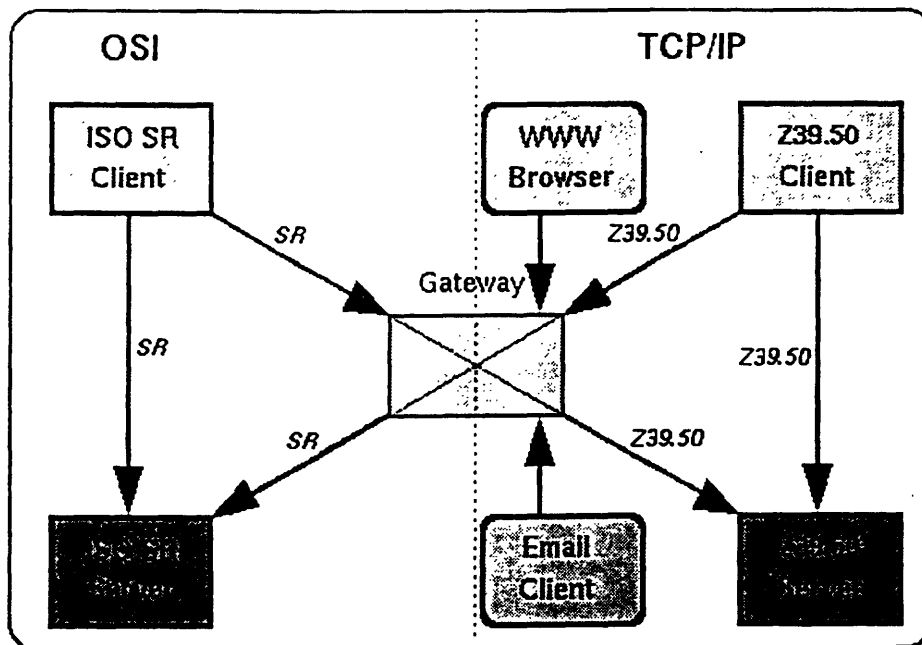
## CHAPTER 5: DEVELOPMENT PROCESS

### TECHNICAL/STANDARDS ENVIRONMENT

It became apparent in early 1994 that the servers which were in operation were generally test or pilot implementations and that there were few end users on the scene. There were many freely accessible Z39.50/TCP/IP servers available but very few SR/OSI servers. It was difficult to locate SR developers. In early 1994, standardization was being driven by a large open lively US-dominated Z39.50/TCP/IP implementation environment. While much attention was devoted to the development of standards in Europe, their implementation was limited to a small number of Nordic and EU projects.

Interoperability issues were addressed and it became apparent that with the different search and retrieve protocols (SR vs Z39.50) a gateway was necessary.

The project evaluated available software and identified that for Z39.50, the National Library of Canada Irtarget or CNIDR Zdist was the most appropriate package. For the SR implementation, the project used Nordic SR-net Versions 6 and 7. Berkeley Sockets were selected for TCP/IP API on the basis that it is popular, stable and used by CNIDR and National Library of Canada. The OSI implementation used ISODE which was selected because it too was popular, stable and used in Nordic SR-net. During the third phase, the OSI implementation will migrate to mOSI and YAZ will replace the above mentioned SR and Z39.50 packages.



**The EUROPAGATE Solution**

Developing the system by integrating different publicly available software packages often created problems due to the modest quality of the software and the documentation. Software support where provided was generally also poor.

The standards which had to be applied in the EUROPAGATE project were ISO SR; ANSI Z39.50 - 1992; CCL; MARC standards; ISO/ANSI C and ESA software engineering.

### **Comparison of Functional Specification (FS) and Actual System**

There were no major changes to the final system compared to the Functional Specification: The final system provides a Z39.50 + TCP/IP to SR+OSI gateway. It has email access, works with existing clients and servers, collects administrative data and provides MARC conversion. The administrative tools are simplified, and there is no administration server. All operational data is logged and can be retrieved and processed. The gateway is available on SunOS 4 and Solaris 2 systems. It requires ISODE, Nordic SR and ZDist. The gateway has minimal performance impact from the user's point of view.

## **Support of Clients and Servers**

Supporting existing clients which do not require changes is generally straightforward. However, configuring the gateway for different servers creates difficulties. Presently, the gateway has to be configured to know each available server (e.g. hostname, databases). An authentication string is used in the client to pass this information to the gateway. The project recognises that the implementation of EXPLAIN in version 3 of Z39.50 will solve the problem of identifying databases.

## **MARC Conversion**

MARC Conversion is based on conversion tables from Nordic SR. The project implemented a separate conversion module. The project supports UNIMARC, USMARC, UKMARC, DANMARC, FINMARC, NORMARC, LIBRISMARC and converts between any combination of the above. A configurable module is used for display of different types of MARC records. Marc formatting is used in the email client to give a user-friendly display of the search results.

## **Common Command Language (CCL)**

The module provides CCL to Reverse Polish Notation (RPN) conversion and provides support for multiple languages in CCL

## CHAPTER 6: THE GATEWAY SERVICE

### EXISTING MARKET

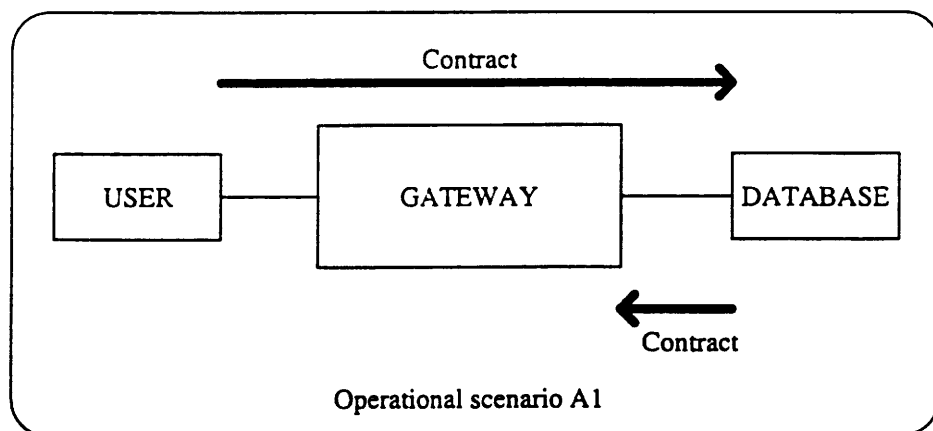
The expansion of new services and distribution methods in the information industry was reviewed, as well as specific services and facilities - online catalogues, bibliographic record exchange, networks, union catalogues, electronic document transfer, abstracting, indexing, and table-of-contents services, bibliographic utilities and gateway services. A summary of the findings of the most recent LIB-2 studies in respect of Denmark, Ireland and Spain was included. An important result of the study was the confirmation that EUROGATE would not replicate an existing service.

The project was concerned with identifying non-technical issues that would affect the provision of the gateway service.

The functional specification, set out a number of possible scenarios for the gateway. These depend on who operates the gateway, where it is located, who its users are and what value added services it provides to those users. Some figures are given as a possible model.

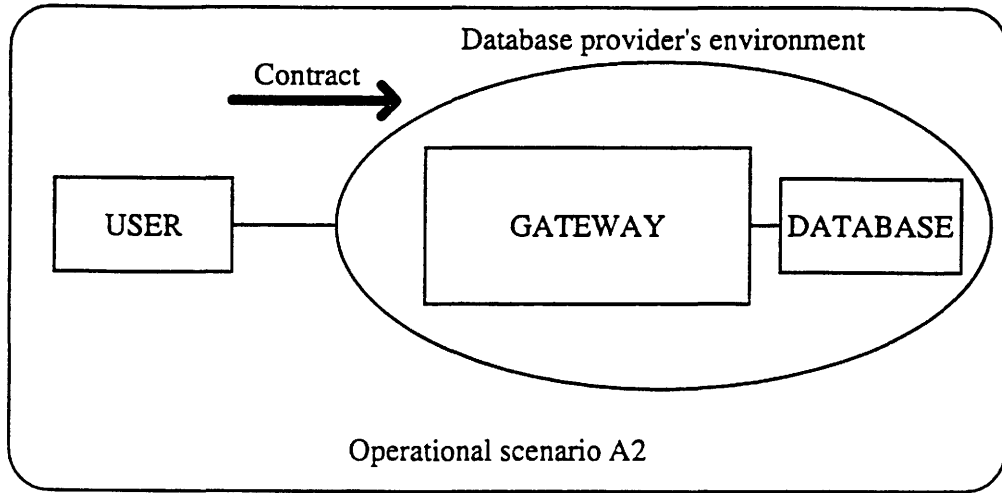
#### *Markets, services and users*

- The EUROGATE project prepared 4 operational scenarios
  1. Operational Scenario "A1"  
Shared gateway service paid by database providers



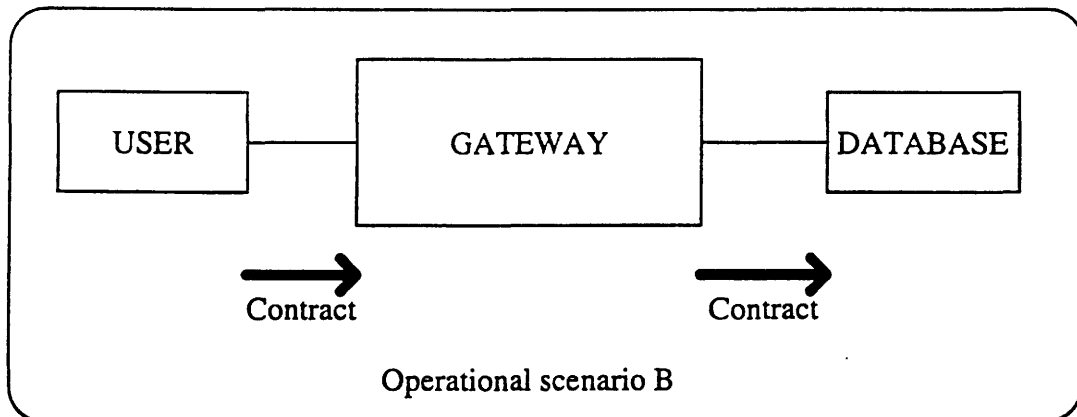
2. Operational Scenario "A2"

Gateway as an integral part of database provider's environment

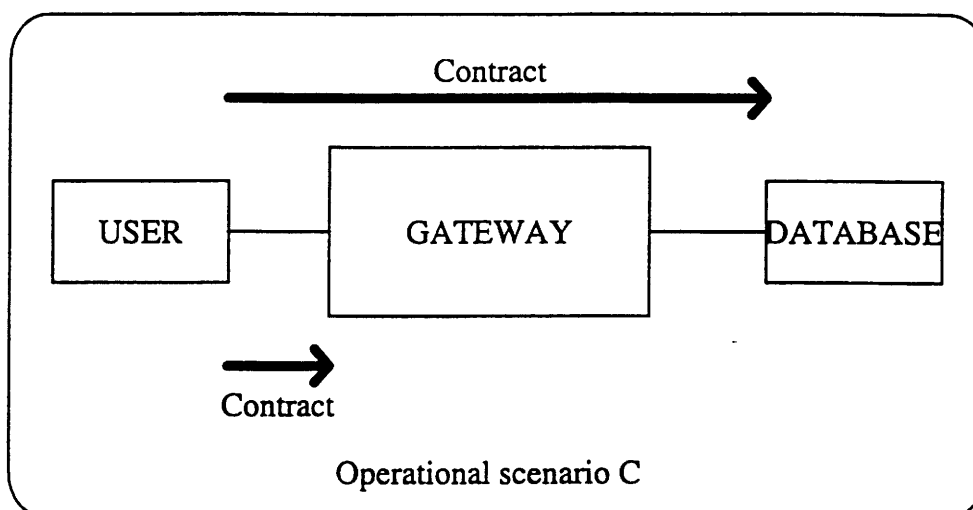


3. Operational Scenario "B"

Gateway as a (value-added) reseller of database service



4. Operational Scenario "C"  
Gateway as a part of network provider's service



Quality of service measures were identified. The most likely service scenario was identified as "Special Service Provider". Viability of the service, based on estimated charging, costs to run the service and profit services were also considered. Dialog and IRIS are described as existing service models.

Finally, the results of a gateway questionnaire compiled and completed by fourteen different institutions helped to define the requirements for the EUROPAGATE Gateway.

### ***Legal Implications***

The project examined the legal and regulatory issues associated with a gateway service. It also considered the legal implications concerned in the transmission of bibliographical data among European Union countries through a gateway.

For the purposes of Europagate, the research concentrated on three EU countries: Spain, Ireland and Denmark, and considered the European Union situation in general.

The legal situation was reviewed on the basis that:

- (1) data for transmission through the service is defined as bibliographic records or abstracts.
- (2) The legal profile of the gateway is as described in Operational Scenario B.

### ***Regulatory Implications***

Depending on the country in which the pilot services are hosted, there may be a need to obtain special licences to operate the services.



Spanish and Irish annexes were provided by legal experts from each country which focused on:

- Protection of bibliographic data bases
- Protection of software
- Protection of personal data

Particular stress was placed on the following items:

- object of protection,
- content of protection,
- duration of protection,
- infringement of protection,
- registration of rights and transfer of rights.

The judicial status of the gateway service was considered in addition to liability for online data distribution, civil liability in tort, liability in contract, product liability, and possible legal standardization through European Union directives.

*The Legal issues considered were:*

- How intellectual property law or copyrights would apply to the distribution of bibliographic database information and conversion of specific format software.
- Personal data protection in database records or in files set up and maintained by the gateway.
- Juridical status for a gateway
- Contracts and licenses among parties involved
  - (I) Gateway/database provider
  - (ii) Gateway/end user
  - (iii) Gateway operator/software owners
  - (iv) Contracts of telecommunications carriers
  - (v) Liability for the on-line distribution of data

## **CHAPTER 7: EXTERNAL CONTACTS AND PUBLICITY**

Advantage was taken of the fact that a number of persons involved in the project are members of, or attend, the meetings of other relevant organisations and groups to publicise the project, to establish contacts, and to liaise with those organisations and groups. In one way or another, project personnel participated in the following meetings:

### *Standardization*

Danish Standards Committee (=ISO/TC46+SC4)  
EWOS EG-LIB  
European SR Implementors Meeting  
Z39.50 Pre-implementors Group (PIG) Meeting  
European Forum for Implementors of Library Automation (EFILA)  
ZIG

### *Dissemination of Results*

Information about the project was disseminated through papers and presentations at the following meetings and conferences:

NORDUNET meeting, Umeaa 01-06-94  
INTEROP meeting, Berlin 09-06-94  
UNICA/FACE conference, Dublin 09-09-94  
Joint Eurofocus/Library Association of Ireland Conference, Dublin 22-23/09/94  
European Copyright Users Platform, Dublin 13-02-95  
National Focal Point Workshop, Lisbon 27-04.95  
EFLC conference, Brussels 13-10-95

The public availability of the project deliverables via ftp, gopher and www was notified by email to the ZIG list, the ESRIG list, and to the comp.techreports newsgroup.

A short publicity leaflet is also available.

Published articles: The EUROPAGATE project. In Vine 97, December, 1994.

## **CHAPTER 8: CONCLUSIONS**

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The EUROPAGATE project results to-date have shown that it is possible to construct a gateway as originally envisaged; that the standard of existing software (state of the art) is not as good as was expected and that the state of the infrastructure (servers, directories, etc.) is poor and needs to be developed.

EUROPAGATE has successfully implemented a system to meet the technical objectives, developed useful and reusable software components and a gateway which others can install and use.

The project will pilot a service which will provide access for users to international catalogues with minimal equipment or service registration requirements.

In summary, the objectives of phase 1 and 2 have been achieved and this has been confirmed through a formal review process. The project has now developed the basic gateway technology to support

- interoperability between Z39.50 + TCP/IP and SR+OSI systems;
- access to either type of system from email.
- mapping between various MARC standards

The take up of networked catalogue services has been slower than anticipated, and at the present time the majority of servers are still experimental and use Z39.50. In 1995 , Z39.50 Version 3 was forwarded to ISO for approval as Search and Retrieve Version 2. As a result, the project has been refocused with particular emphasis on the e-mail gateway, the administrative functions, and to some extent, the mapping between the different protocol stacks.

The future direction of the project will include -

- Developing a web to the SR/Z39.50 gateway. This will enhance the functionality of the gateway and increase the number of potential users of the service.
- Replacing the ISODE software with mOSI. This will ease the installation and maintenance of the gateway software.

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- Turner, Fay (1993).** Z39.50 Public domain software. Announcement, National Library of Canada. Email from [fay.turner@nlc-bnc.ca](mailto:fay.turner@nlc-bnc.ca) to Z3950IW list, 22 September 1993 and 20 July 1994.
- Z39.50 Maintenance Agency (1995).** *Z39.50 Register of Implementors*, URL=<ftp://ftp.loc.gov/pub/z3950/register>
- Zeeman, J. (1994).** Document Delivery Scenarios. Posted to the Z3950IW list by Fay Turner, 21 January 1994 (2 messages). To become part of a report for the National Library of Canada.

### *Electronic conferences*

EFILA - [request@dkuug.dk](mailto:request@dkuug.dk)

Z3950IW list at [nervm.nerdc.ufl.edu](mailto:nervm.nerdc.ufl.edu). Send email with the command 'help' on a line by itself to [listserv@nervm.nerdc.ufl.edu](mailto:listserv@nervm.nerdc.ufl.edu).

Closed LISTSERV conference for registered users of Z39.50 Public Domain Software from National Library of Canada.

UKZIG at [UK-zig@mailbase.ac.uk](mailto:UK-zig@mailbase.ac.uk)

ESRIG list at [net-cs.ucd.ie](mailto:net-cs.ucd.ie). To join, send email with subject 'subscribe' to [esrig-request@net-cs.ucd.ie](mailto:esrig-request@net-cs.ucd.ie). Send postings to [esrig@net-cs.ucd.ie](mailto:esrig@net-cs.ucd.ie).

### *Miscellaneous information sources*

There is a WWW page on Z39.50 resources at <http://ds.internic.net/z3950/z3950.html>. This includes pointers to many other information sources.

## **GLOSSARY**

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<b>ANSI</b>	American National Standards Institute
<b>API</b>	Application Programming Interface
<b>ASN.1</b>	Abstract Syntax Notation One (ISO 8824)
<b>CCL</b>	Common Command Language
<b>CNI</b>	Coalition for Networked Information
<b>CNIDR</b>	Clearing House for Networked Information Discovery and Retrieval
<b>DANMARC</b>	Danish MARC Format
<b>DIS</b>	Draft International Standard
<b>DIALOG</b>	DIALOG Information Services - a database host
<b>EFLC</b>	European Foundation for Library Co-operation
<b>EG-LIB</b>	Expert Group on Libraries (EWOS)
<b>ESA</b>	European Space Agency
<b>ESRIG</b>	European SR Implementors Group
<b>EXPLAIN</b>	Service in Z39.50 Version 3
<b>EWOS</b>	European Workshop for Open Systems
<b>FACE</b>	Framework for Academic Cooperation in Europe - A project of UNICA
<b>FINMARC</b>	Finnish Marc format
<b>GILS</b>	Government Information Locator System
<b>IESG</b>	Internet Engineering Steering Group
<b>IETF</b>	Internet Engineering Task Force
<b>IFOBS</b>	International Federation for Open Bibliographic Systems
<b>IP</b>	Internet Protocol
<b>IRIS</b>	An information retrieval and document delivery service in Ireland
<b>ISO</b>	International Organization for Standardization
<b>ISODE</b>	ISO Development Environment
<b>ISP</b>	International Standardized Profile
<b>LC</b>	Library of Congress

<b>LIB2</b>	State of the Art of Automation in Libraries in Europe. 1987-1988 (12 Reports) Update 12 reports 1992
<b>MARC</b>	MAchine Readable Catalogue
<b>NISO</b>	National Information Standards Organization
<b>NLC</b>	National Library of Canada
<b>NORMARC</b>	Norwegian Marc format
<b>NORDUNET</b>	International network operator providing international connectivity to the Nordic national research networks
<b>OIW</b>	Open Systems Environment Implementors Workshop
<b>OPAC</b>	Online Public Access Catalogue
<b>OSI</b>	Open Systems Interconnection
<b>PIG</b>	Z39.50 Pre-Implementors' Group (UK) now UKZIG
<b>RLG</b>	Research Libraries Group
<b>RLIN</b>	Research Libraries Information Network
<b>RPN</b>	Reverse Polish Notation
<b>SR</b>	Search and Retrieve
<b>TCP</b>	Transmission Control Protocol
<b>UKZIG</b>	Implementors Group, UK
<b>UNICA</b>	Universities of the Capital Cities of Europe
<b>UNIMARC</b>	Universal MARC format
<b>USMARC</b>	US MARC format
<b>UKMARC</b>	UK MARC format
<b>WWW</b>	World Wide Web
<b>YAZ</b>	Yet Another Z39.50 toolkit (from Index Data)
<b>ZIG</b>	Z39.50 Implementors' Group



# ***Press Release***

## **EUROPAGATE PILOT SERVICE**

**15th February - 31st May 1996**

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**EUROPAGATE** is a EU Libraries Programme Project.

The purpose of the gateway is to enable queries from Z39.50 clients to be forwarded to ISO/SR servers and vice-versa.

The service also provides an e-mail, a WWW client, MARC mapping and some administrative features.

During the pilot service, users will be able to use the gateway to search and retrieve information from OPACs using the e-mail facility, the WWW interface or a Z39.50/SR client. The pilot service will be available from 15th February - 31st May 1996.

### **The WWW to Z39.50 Gateway**

The project's web gateway can be reached at: <http://europagate.dtv.dk/>  
<http://olivo.csic.es/egate>  
<http://dallas.ucd.ie/egate>

and the gateway itself at: <http://europagate.dtv.dk/wwwgate.html>

The gateway is not tied to any particular target.

### **The gateway features:**

- ◇ Smooth WWW interface, any client can be used.
- ◇ Single target, multiple databases queries.
- ◇ Multiple targets, multiple databases queries.
- ◇ A history, which allows a user to view earlier queries in the session. If the user creates a bookmark, the history can be retained for following sessions.
- ◇ Support for SCAN.
- ◇ Support for several attributes.
- ◇ Access to any target, previously unknown to the gateway.
- ◇ An easy to configure target list, where new targets can be added. It is possible to allow users of the gateway to do this automatically.
- ◇ Ability to refine queries.
- ◇ Shows USMARC records both formatted and raw as wanted.  
Retains the state between queries, and even reestablishes the connection (and result sets), if broken, so that a true connection-oriented interface is at work.
- ◇ Any URLs in the record are made active, when displayed.

### Technical details:

- ◇ The webserver used is Apache version 0.8.14, No specific webserver is required.
- ◇ The CGI scripts are made based on TCL.
- ◇ The necessary TCL additions are made in ANSI C (gcc).
- ◇ The Z39.50 parts of the code is based upon the YAZ package.
- ◇ The gateway has easily been ported to Solaris, OSF & Linux.

### E-mail to Z39.50 Gateway

The gateway is not tied to any particular target.

The project's web pages can be reached at: <http://europagate.dtv.dk/>

and the gateway itself at:

[gateway@europagate.dtv.dk](mailto:gateway@europagate.dtv.dk)  
[gateway@olivo.csic.es](mailto:gateway@olivo.csic.es)  
[gateway@dallas.ucd.ie](mailto:gateway@dallas.ucd.ie)

### The gateway features:

- ◇ Any e-mail client can be used. Send your query to the gateway and it will return the result by mail.
- ◇ A query language based on CCL. Some additional commands are added, which have to do with the nature of the gateway.
- ◇ Support for several attributes
- ◇ Single target, multiple databases queries.
- ◇ Access to any target, previously unknown to the gateway.
- ◇ An easy to configure target list, where new targets can be added.
- ◇ Ability to display USMARC records in predefined formats. As of now 3 format are used: Full, Compact, Short.
- ◇ Ability to refine queries.
- ◇ Retains the state between queries, and even reestablishes the connection (and result sets), if broken or timed out, so that a user faces what seems to be a continuous session.
- ◇ Help available via mail.
- ◇ Multilingual messages (both error and otherwise).

### Technical details:

- ◇ The code is made in ANSI C (gcc).
- ◇ The Z39.50 parts of the code is based upon the YAZ package.
- ◇ The gateway has easily been ported to SunOS, Solaris, OSF & Linux.

### Helpdesk for the pilot: E-mail [pwh@dtv.dk](mailto:pwh@dtv.dk)

*Further information and user guide available from:*

Annette Kelly,

Project Administrator,

53/54 Upper Mount Street, Dublin 2.

Tel: +353 1 6761963 /6761167 Fax: +353 1 6766721

e-mail: [annkelly@lib1.tcd.ie](mailto:annkelly@lib1.tcd.ie)

# THE PARTNERSHIP

University College Dublin, Ireland (UCD) is responsible for the overall management of the project and shares responsibility for the development of the software with DTV.

Technical Knowledge Center & Library of Denmark (DTV) is responsible for background research and shares responsibility with UCD for the development of the software.

The Library Council, Ireland (LC) is responsible for project administration and background research.

Unidad de Coordinación de Bibliotecas del CSIC Spain (CSIC) is responsible for background research and pilot testing.

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Quality Control Co-ordinator

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e-mail: [annkelly@lib1.tcd.ie](mailto:annkelly@lib1.tcd.ie)



# THE PROBLEMS

The modern world is dependent on information from a diversity of sources. Access to these sources is difficult because of incompatible hardware, software and communications technologies. Compatibility can be achieved by the use of standards, in several ways.

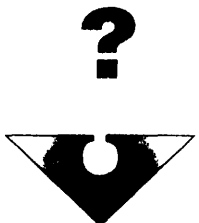
In the early 1990's, two standards (ISO/SR and Z39.50) emerged in the library and information world which, when implemented globally, will allow users to access multiple databases using a single network interface. These standards are converging, but several obstacles to interoperability remain:

- the use of earlier, incompatible versions of ISO/SR and Z39.50
- different underlying network protocols (TCP/IP and OSI)
- different versions of the MARC standard.

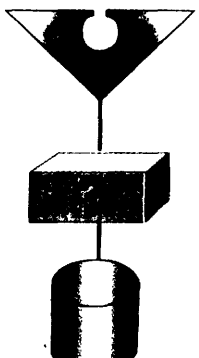
**USER: – which type of client?  
Can e-mail or WWW access be used?**



**How can the user's facilities be  
matched to the information providers?**

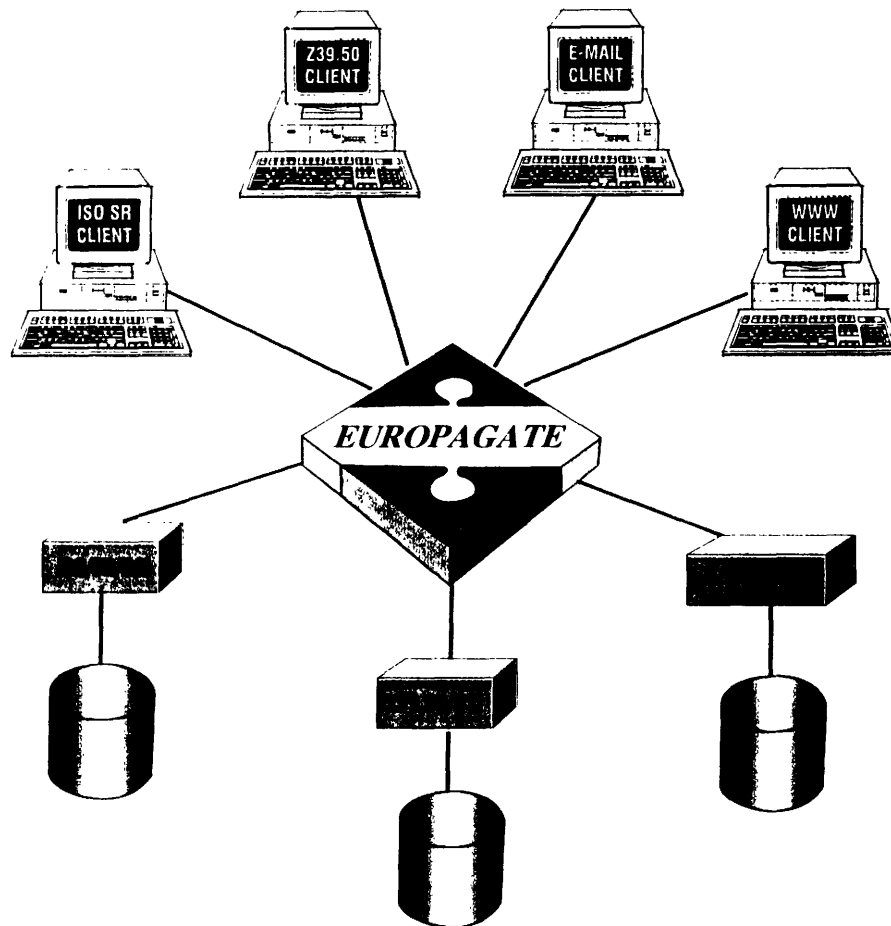


**Information Provider –  
Which protocol and network?**

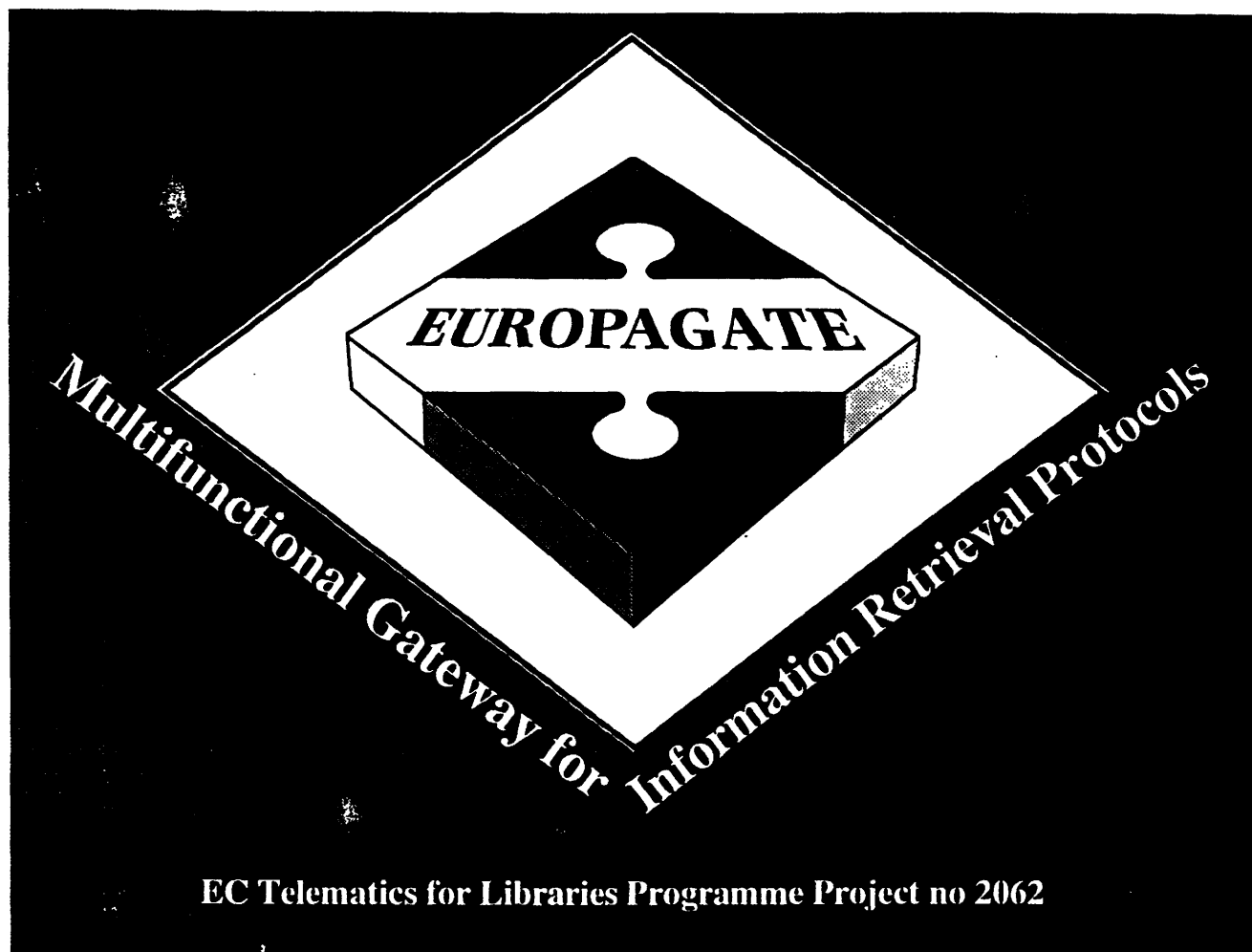


# THE SOLUTION

The EUROPAGATE project team has successfully developed a gateway which is now operating on a pilot basis. The gateway enables users to have direct access to their choice of database by e-mail, WWW browser, or by using their own client.



The gateway software will also be publicly available for others to install and use.



## **The Software**

**SR/Z39.50 Gateway**

**Email Gateway**

**WWW Gateway**

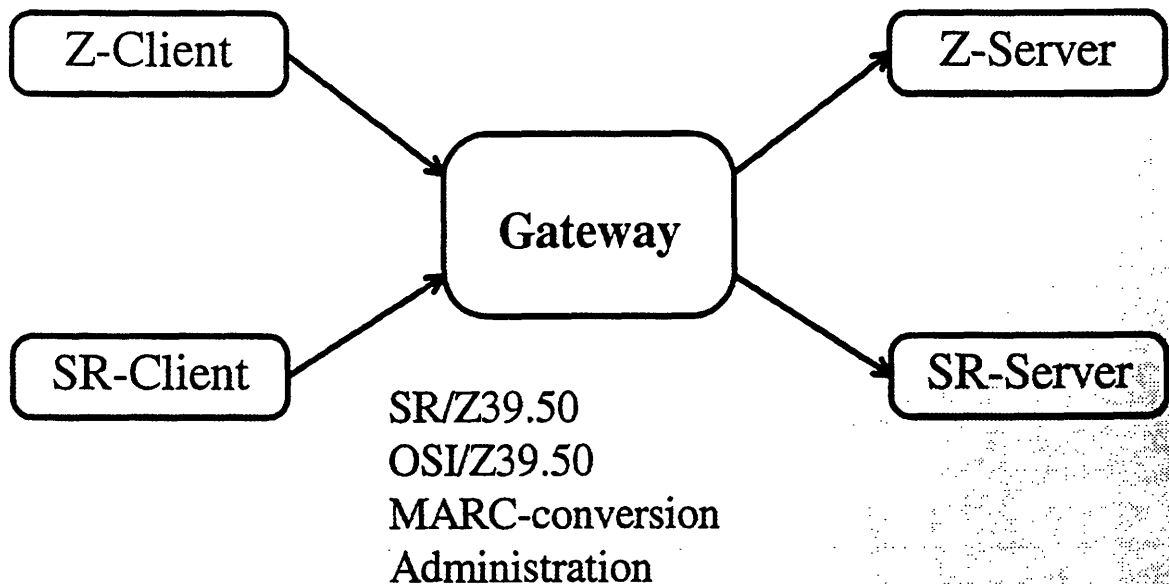
**Europagate Demonstration**

## SR/Z39.50 Gateway

- **Z39.50 and SR**
- **TCP/IP and OSI (mOSI)**
- **Transparent retrieval record conversion**
- **Proxy service**
- **PDU logging**
- **Accounting, access control, ...**

Europagate Demonstration

## SR/Z39.50 Gateway



Europagate Demonstration

## SR/Z39.50 Gateway

Administration

Protocol Logic

PDU Filter (SNACC)

Protocol Switch (YAZ)

TCP

mOSI  
RFC1006

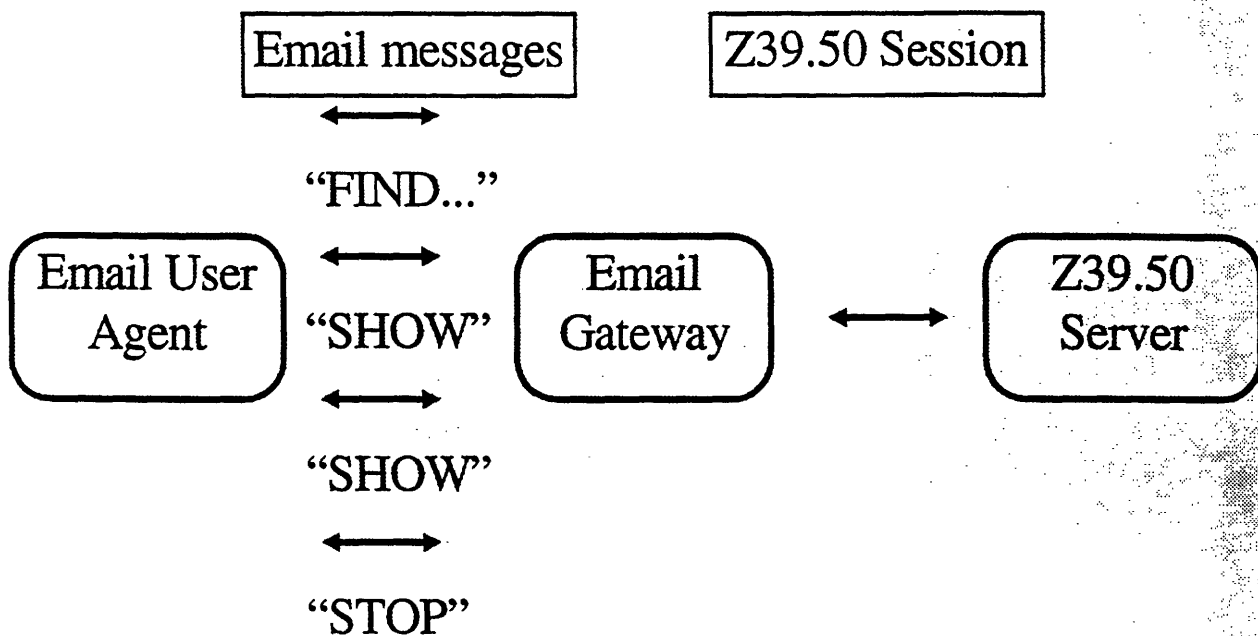
Europagate Demonstration

## Email Gateway

- **Common Command Language (CCL)**
- **Formats USMARC records for display**
- **“Online” help available**
- **Retains session state between messages**
- **Re-use queries and results**

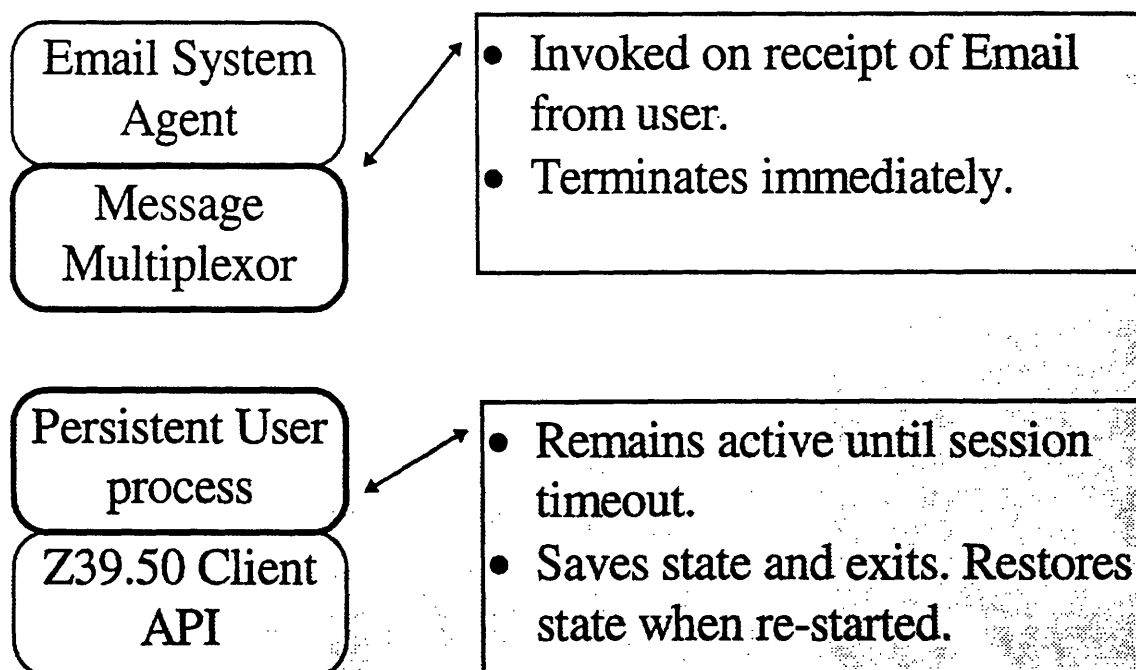
Europagate Demonstration

## Email Gateway



Europagate Demonstration

## Email Gateway



Europagate Demonstration

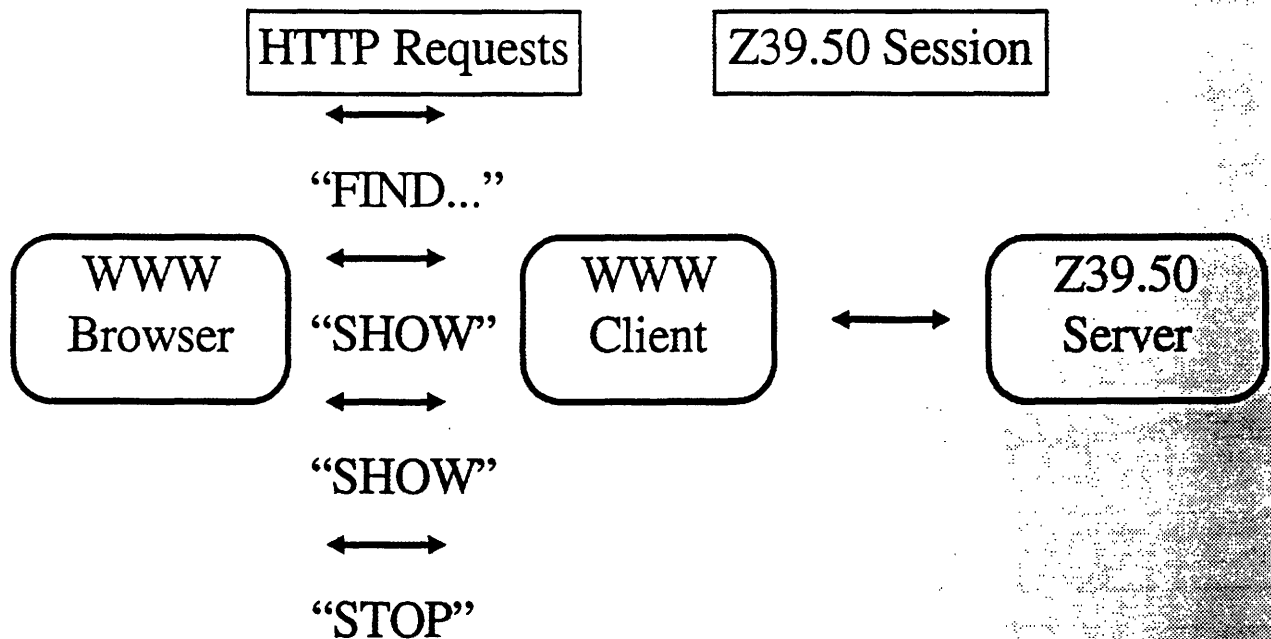


## WWW Gateway

- Multiple concurrent targets
- Search, Present, Scan
- Retains state between operations and sessions
- Refine queries
- Hyperlinks in Records
- Easy-to-change user interface - HTML & Tel

Europagate Demonstration

## WWW Gateway



Europagate Demonstration





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**Annex VI:**  
**Slides from EG-LIB and EFILA presentation**





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FISCHER & LORENZ

## *EG-LIB and EFILA*

**Erik Lorenz Petersen  
Fischer & Lorenz  
European Telecommunications Consultants  
ELP@FL.DK**

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SR Concertation Meeting 960215 Erik Lorenz Petersen

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FISCHER & LORENZ

## *Agenda*

- Introduction to EWOS
- Introduction to EG-LIB
- Introduction to EFILA
- Other Relevant Groups
- Some useful pointers to information
- Future activities

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SR Concertation Meeting 960215 Erik Lorenz Petersen

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## *EWOS Expert Group on Library Applications (EG-LIB)*

- **Instigated in 1991**
  - Target to profile and provide ISPs for SR and ILL standards
  - Profile based on ISO SR and ILL standards passed to ISPs together with IFOBS to ISO/TC/46
  - Profiles now out for ISO ballot and hopefully oblivion...
- **In 1994 EG-LIB looked in the mirror**
  - Did we address the real needs of European Implementors?
  - Did SR over OSI based services have a future?
  - Would formally approved ISPs be of any use to mankind?
  - Was the most useful part of EG-LIB the sharing of implementation experience?
  - Was the ZIG(Z39.50 Impl.Grp) a more relevant group to join?



## *EG-LIB the morning after...*

- **EG-LIB wanted to stay a part of EWOS**
  - Continue to profile, and work within EWOS
- **But we proposed several changes:**
  - Project Team 31 to investigate SR (and ILL) over mOSI
    - » Provides real implementation guidance for implementors over TCP/IP based systems
  - Address the requirements of implementors
    - » Implementors of Z39.50 based systems
    - » Using Internet based protocols
- **Create a new forum targeted for implementors**
  - EFILA European Forum for Implementors of Library Aut.



## *EG-LIB current Programme of Work*

- “Profiling” of ILL over OSI and TCP/IP
- An implementors agreement covering Z39.50 v3
  - ETG Z39.50 v3 Implementors agreement
- Will create useful technical guides in response to real user requirements
- Liaison with
  - Other EWOS groups (EDI, MHS, Char Sets, Security...)
  - With OIW SIGLA and IFOBS
  - Comment on Government Information Locator Service GILS



## *EFILA*

- Inaugural meeting January 1995
  - A joint initiative supported by CEC DG XIII and EWOS
- Ambition to create *the* forum for implementors of library automation in Europe:
  - share global experiences and developments
  - share best practice procedures
  - ensure common understanding of implementation details and options in the standards and profiles
  - influence global developments
  - ensure understanding of European requirements
  - facilitate feedback to profiling efforts in EG-LIB



## *EFILA Results*

- **EFILA has conducted 4 meetings**
  - 3 main meetings addressing:
    - » Inaugural meeting
    - » Z39.50 within the WWW
    - » Z39.50 Implementation experience
  - 1 Special session
    - » Addressing Document Delivery
  - Typically between 40 to 60 participants at each meeting
- **EFILA members register on the mailing list**
  - Currently some 250 experts registered



## *Other Groups*

- **IFOBs**
  - International Forum for Open Bibliographic Systems
- **OIW SIG LA**
  - OIW Special Interest Group on Library Applications
    - » Primary Focus point profile for GILS: Government Information Locator Service
- **Implementor agreements:**
  - European Projects implementing Z39.50 meets informally
  - Profile for CIMI (Computer Interchange of Museum Information)
  - Profile for Digital Collections





## *Some pointers to information*

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• <b>WWW addresses</b></li> <li>• <b>EWOS</b> <a href="http://www.ewos.be">www.ewos.be</a> <ul style="list-style-type: none"> <li>› GOSS <a href="http://goss">/goss</a></li> <li>› EG-LIB <a href="http://eglib">/eglib</a></li> <li>› EFILA <a href="http://eglib/efila">/eglib/efila</a></li> <li>› Tutorial on Char Set <a href="http://tg-cs/home.htm">/tg-cs/home.htm</a></li> </ul> </li> <li>• <b>Library of Congress</b> <a href="http://lcweb.loc.gov/z3950/">lcweb.loc.gov/z3950/...</a> <ul style="list-style-type: none"> <li>› Z39.50 maintenance agency</li> <li>› ZIG minutes</li> <li>› Digital Collections Profile</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Other sources and lists</b></li> <li>• <b>EFILA list:</b> <a href="mailto:EFILA@dkuug.dk">EFILA@dkuug.dk</a></li> <li>• <b>ZIG List:</b> <a href="mailto:Z3950w@NERVM.NEROC.UFL.EDU">Z3950w@NERVM.NEROC.UFL.EDU</a></li> <li>• <b>NIST Special Pub 500-229</b> <ul style="list-style-type: none"> <li>- Z39.50 Implementors Experiences Sept 1995</li> </ul> </li> <li>• <b>EWOS PT 031 report:</b> <ul style="list-style-type: none"> <li>- <a href="http://www.ewos.be/lib/edocs.htm#PTR">www.ewos.be/lib/edocs.htm#PTR</a></li> </ul> </li> <li>• <b>F&amp;L Client/Server Arch. Library Systems Migration Strategies</b> <ul style="list-style-type: none"> <li>- Hopefully soon on the Web</li> </ul> </li> </ul> |
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## *Future activities*

- **EFILA Meetings**
  - March 25 1996: Special Session Document Delivery
  - June 24 1996: Special Session Z39.50 Implementors
  - October 1-4 1996: Joint ZIG and EFILA meeting, Brussels
- **EG-LIB Meetings**
  - March 26 1996
  - June 25-26 1996 21
- **ZIG Meetings**
  - October 1-4 1996: Joint ZIG and EFILA meeting, Brussels
  - April 7-9 1997: Washington LC (exact dates to come)



**Thank you for your attention**

