

# **Z39.50 and XML - Bridging the old and the new**

**Antony Corfield; Matthew Dovey; Richard  
Mawby; Colin Tatham**

**Systems and Electronic Resources Service  
Oxford University Library Services**

## What is Z39.50

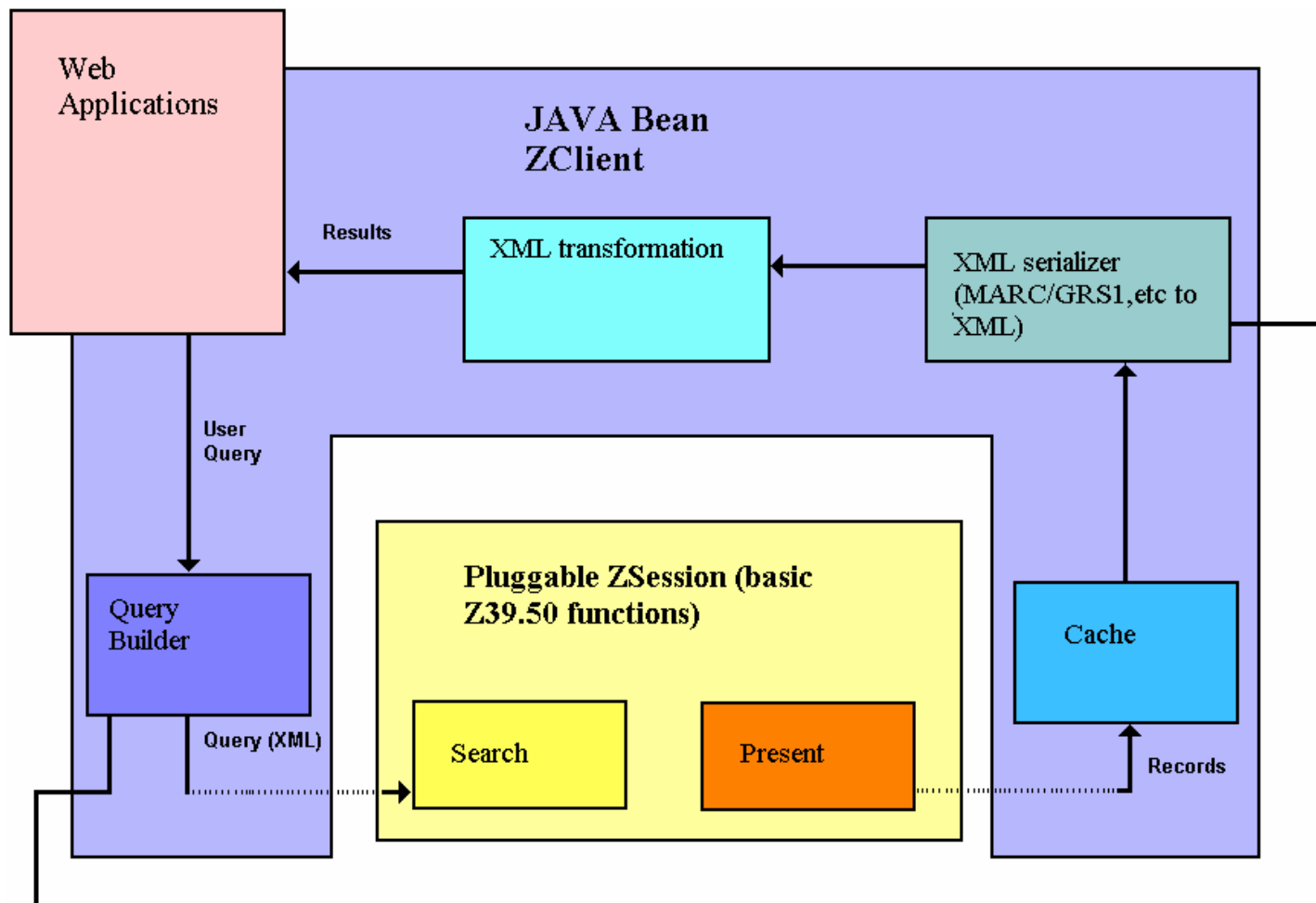
- ANSI/ISO Application Standard for Search/Retrieval (1998;1992;1995;2001)
- ASN.1 Syntax Definition
- BER over TCP/IP for messages
- Session based
- Abstract model of database/information store
- Used by library/archive/museum systems, GeoSpatial, GILS

- Init
  - Establishes session/authentication/negotiation of extended services, charset etc.
- Search
  - Sends query using abstract “attribute set” of search points & Establish server side result set
- Present
  - Requests records in a requested format
- Close
  - Ends session

# What is JAFER

- **Java Access For Electronic Resources (JAFER)**
- JISC Funded Project in the UK
  - Part of its Information Environment Programme
- JAVA + XML = portable CODE, Portable DATA.
- Hides Z39.50 behind XML
- Client – layers XML over Z39.50
- Server – layers Z39.50 over XML

# JAFER Client Bean



## XML query (Not XQuery)

- Based on 'Search' mechanism developed by Global Information Locator Service (GILS)
- Boolean Queries (Z39.50 type 101) represented as XML
- Search Z39.50 Attributes can be defined by Default Search Profile e.g. Bath Profile

# Not XQuery

- XQuery not stable at the time
- XQuery wrong abstraction level
  - Presumes structure of data known in advance
  - Presumes structure of search space same as result space
  - No support of result format negotiation

## Query example

```
<query>  
<and>  
  <constraintModel>  
    <constraint>  
      <semantic>4</semantic>  
      <position>3</position>  
    </constraint>  
    <model>Macbeth</model>  
  </constraintModel>
```

....

**ATTRIBUTES**

**title**

**any position**

**search term**



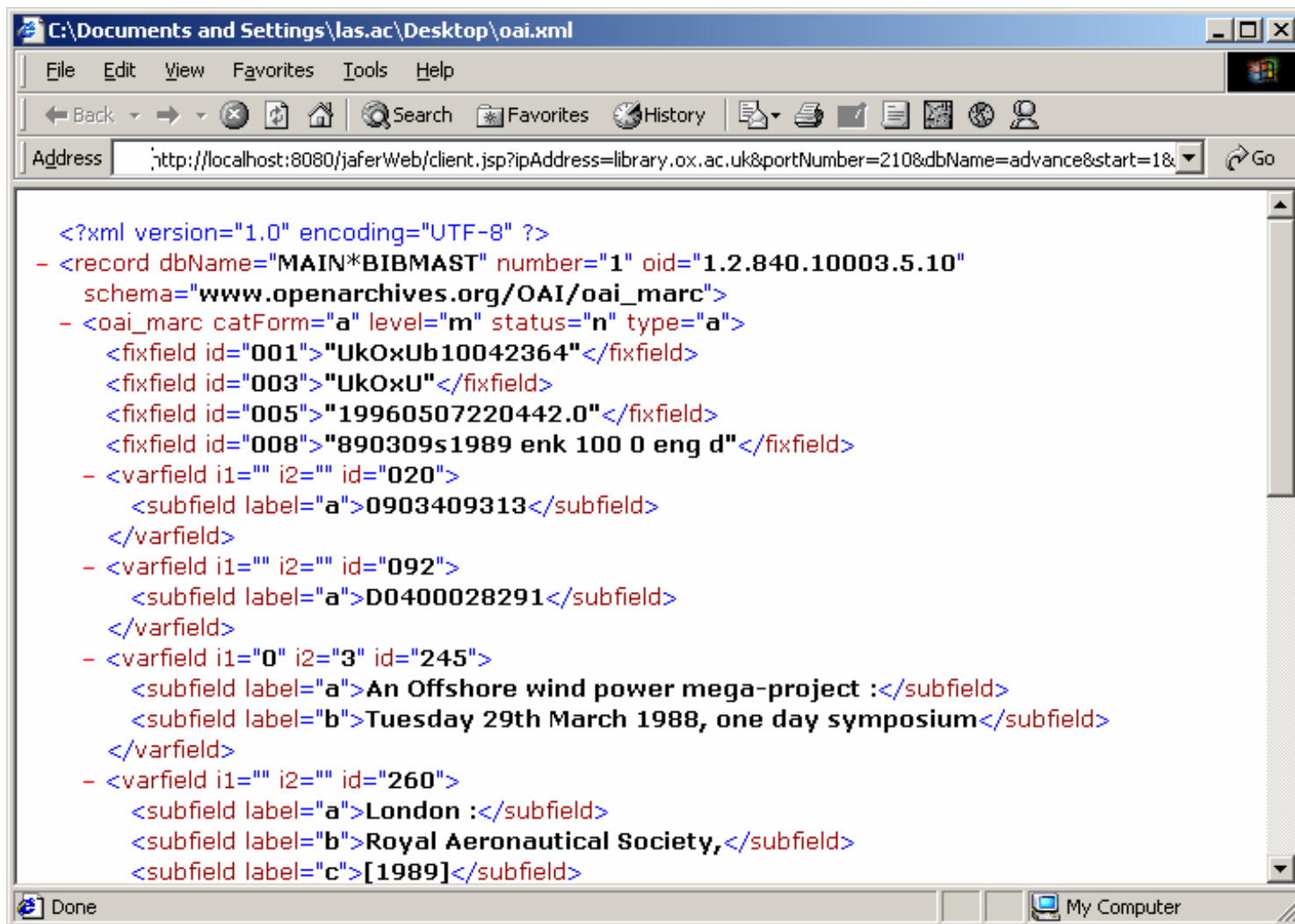
- XML Generated from retrieved Records
- MARC to XML conforms to Open Archives Initiative (OAI) schema for MARC records
- GRS to XML conforms to GILS schema for GRS1 records

## MARC to XML example

MARC 21 Field 260

**260###\$a**New York, N.Y. : **\$b**Elsevier, **\$c**1984.

```
<varfield id="260" i1="" i2="">  
  <subfield label="a">New York, N.Y. :</subfield>  
  <subfield label="b">Elsevier,</subfield>  
  <subfield label="c">1984</subfield>  
</ varfield >
```



The screenshot shows a web browser window with the address bar containing the URL: `http://localhost:8080/jaferWeb/client.jsp?ipAddress=library.ox.ac.uk&portNumber=210&dbName=advance&start=1&`. The main content area displays XML data for a record. The XML is as follows:

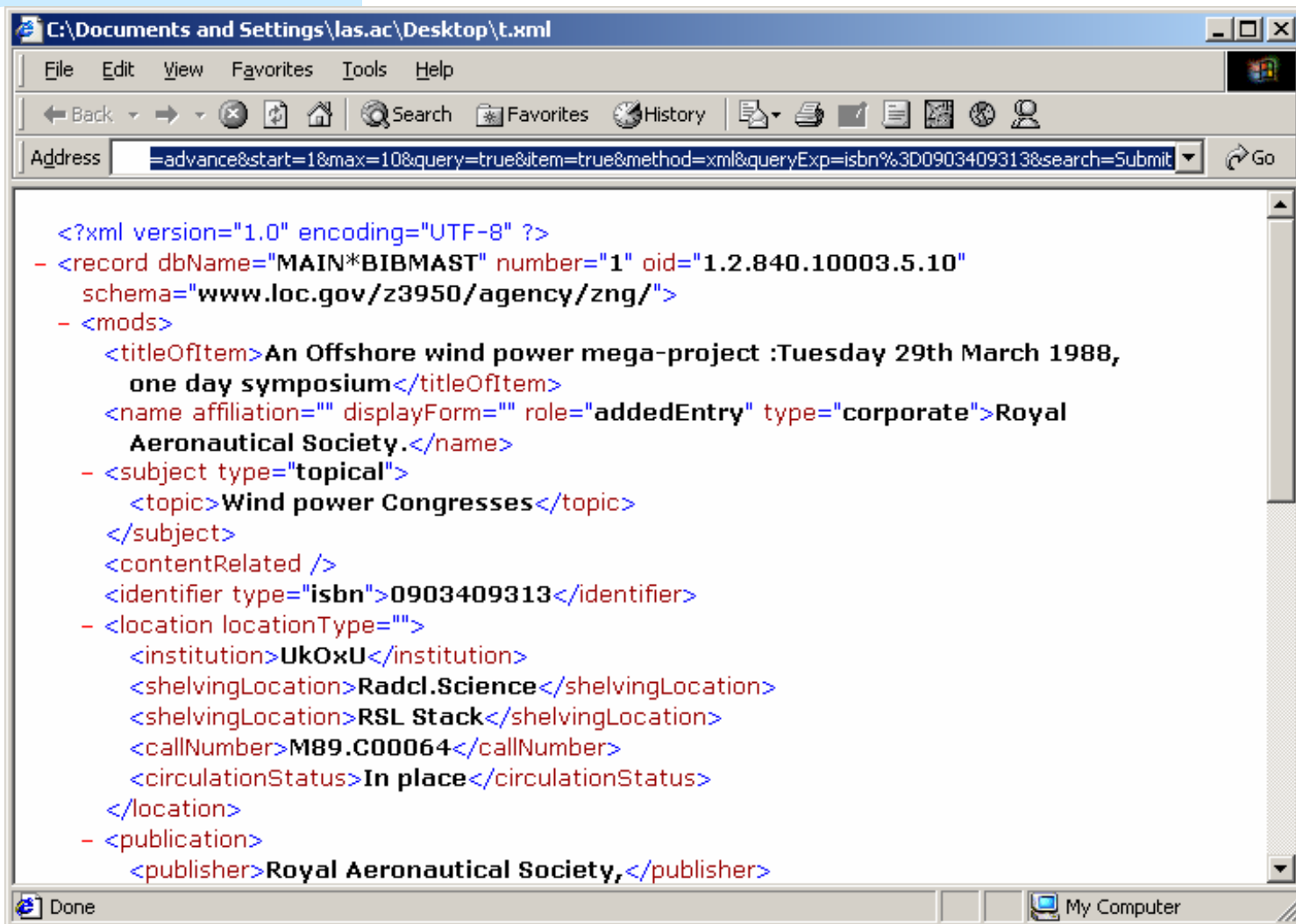
```
<?xml version="1.0" encoding="UTF-8" ?>
- <record dbName="MAIN*BIBMAST" number="1" oid="1.2.840.10003.5.10"
  schema="www.openarchives.org/OAI/oai_marc">
- <oai_marc catForm="a" level="m" status="n" type="a">
  <fixfield id="001">"UkOxUb10042364"</fixfield>
  <fixfield id="003">"UkOxU"</fixfield>
  <fixfield id="005">"19960507220442.0"</fixfield>
  <fixfield id="008">"890309s1989 enk 100 0 eng d"</fixfield>
- <varfield i1="" i2="" id="020">
  <subfield label="a">0903409313</subfield>
</varfield>
- <varfield i1="" i2="" id="092">
  <subfield label="a">D0400028291</subfield>
</varfield>
- <varfield i1="0" i2="3" id="245">
  <subfield label="a">An Offshore wind power mega-project :</subfield>
  <subfield label="b">Tuesday 29th March 1988, one day symposium</subfield>
</varfield>
- <varfield i1="" i2="" id="260">
  <subfield label="a">London :</subfield>
  <subfield label="b">Royal Aeronautical Society,</subfield>
  <subfield label="c">[1989]</subfield>
```

- Stylesheet used to Transform 'raw' XML to a form tailored to the user's needs (such as MODS)

e.g.

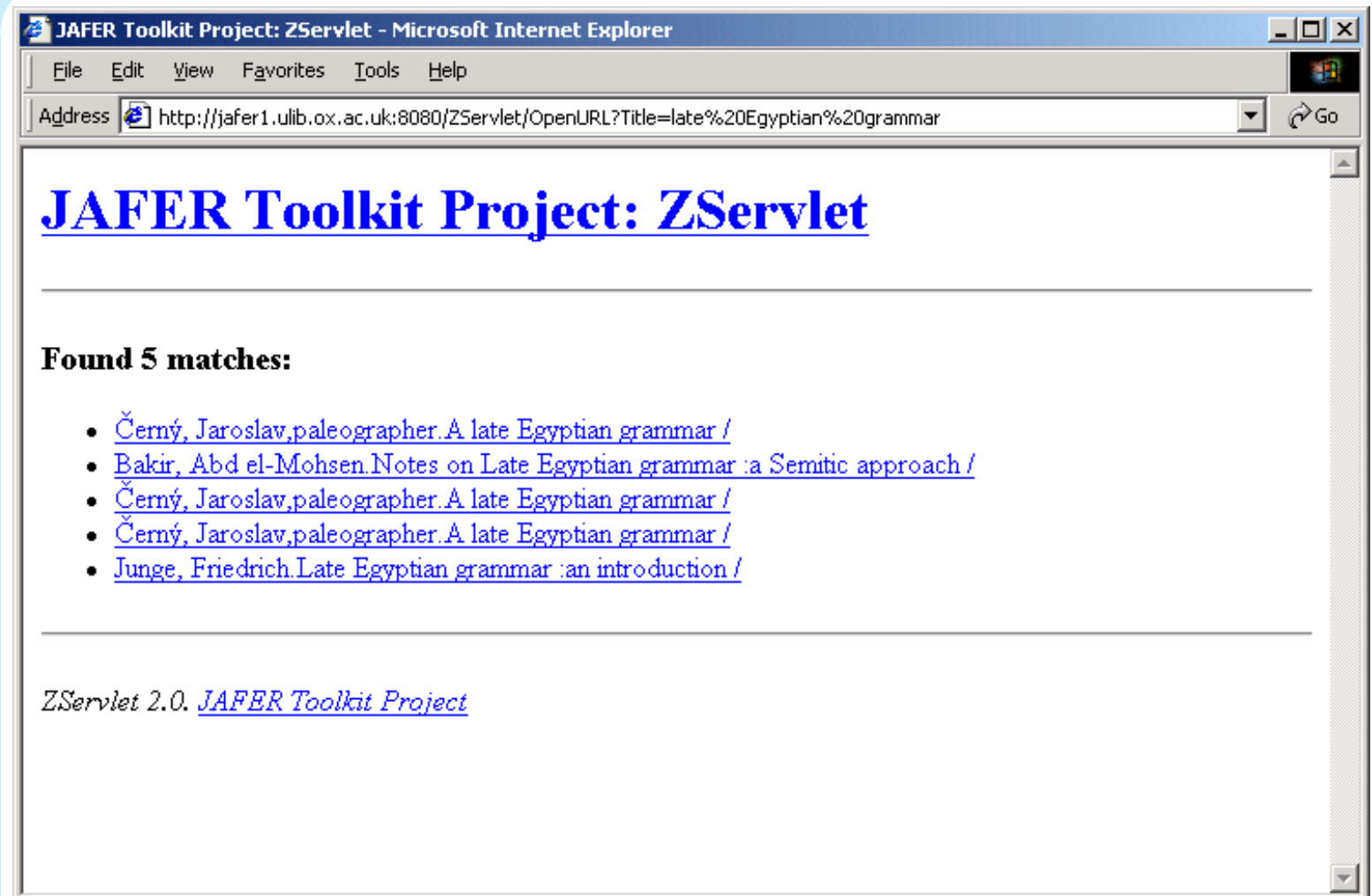
```
<publisher>New York, N.Y. : Elsevier,  
1984
```

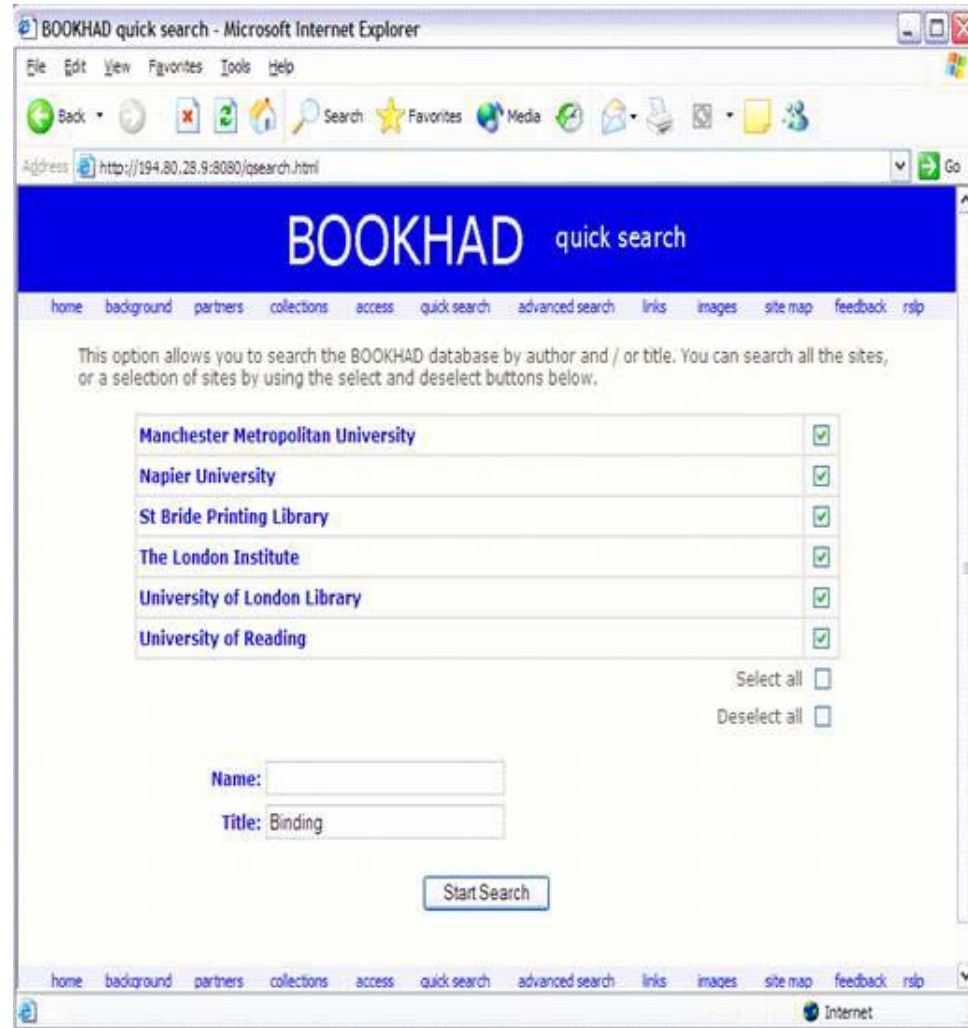
```
</publisher>
```



The screenshot shows a web browser window with the address bar containing a search query. The main content area displays an XML record for a book. The record includes details such as the title, publisher, subject, and location.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <record dbName="MAIN*BIBMAST" number="1" oid="1.2.840.10003.5.10"
  schema="www.loc.gov/z3950/agency/zng/">
- <mods>
  <titleOfItem>An Offshore wind power mega-project :Tuesday 29th March 1988,
    one day symposium</titleOfItem>
  <name affiliation="" displayForm="" role="addedEntry" type="corporate">Royal
    Aeronautical Society.</name>
- <subject type="topical">
  <topic>Wind power Congresses</topic>
</subject>
<contentRelated />
<identifier type="isbn">0903409313</identifier>
- <location locationType="">
  <institution>UkOxU</institution>
  <shelvingLocation>Radcl.Science</shelvingLocation>
  <shelvingLocation>RSL Stack</shelvingLocation>
  <callNumber>M89.C00064</callNumber>
  <circulationStatus>In place</circulationStatus>
</location>
- <publication>
  <publisher>Royal Aeronautical Society,</publisher>
```





BOOKHAD Website - Advanced search results page - Microsoft Internet Explorer

Address: <http://194.80.28.9:8080/asearch.jsp>

## BOOKHAD search results

home background partners collections access quick search advanced search links images site map feedback rsp

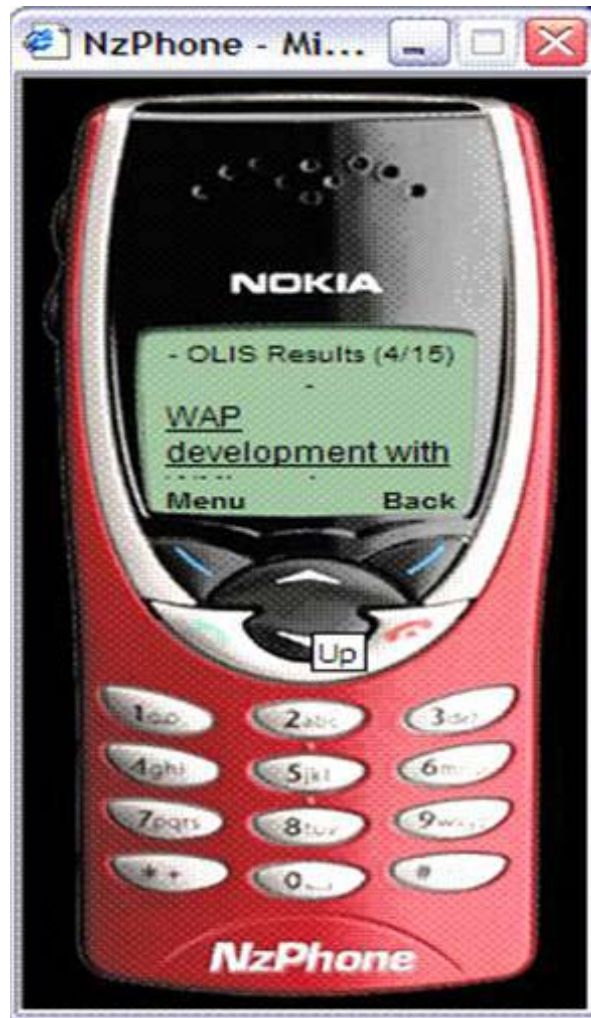
Your search has generated **195** results. Displaying results **1 - 10** of **195**.  
Search results by institution are:

<a href="#">Manchester Metropolitan University</a>	12	<a href="#">Napier University</a>	8	<a href="#">St Bride Printing Library</a>	113
<a href="#">The London Institute</a>	0	<a href="#">University of London Library</a>	56	<a href="#">University of Reading</a>	6

Author	Title (link to details)	Imprint	Format	Institution
Scott Walter Sir 1771-1832	<a href="#">complete in one volume The poetical works of Sir Walter Scott, bart</a>	Robert Cadell 1844	book	<a href="#">Manchester Metropolitan University</a>
Aesop	<a href="#">Fables English</a>	John Murray 1848	book	<a href="#">Manchester Metropolitan University</a>
Brown John 1810-1882	<a href="#">Rab and his friends</a>	Edmonston and Douglas 1863	book	<a href="#">Manchester Metropolitan University</a>
Pollok Robert	<a href="#">a poem The course of time</a>	William Blackwell 1857	book	<a href="#">Manchester Metropolitan University</a>







# Client examples: WAP



# Client examples: WAP



- WSDL/ Encapsulation of Z39.50 ASN.1
  - Z39.50 redefined as WSDL specification
  - Convert ASN.1 Types to XML Schema types (via XER)
  - Webservice as SOAP wrapped XER
  - Issues:
    - Not SOAP encoding rules
    - Full Z39.50 requires state, concurrent operations, solicit/response etc.
    - Still very complex

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" SOAP-
  ENV:encodingStyle="http://asf.gils.net/xer" >
  <SOAP-ENV:header xmlns:ez3950="http://www.lib.ox.ac.uk/jafer/ez3950/ezheader.xsd" >
    <ez3950:session >
      <ez3950:id >00001</ez3950:id >
    </ez3950:session >
  </SOAP-ENV:header>
  <SOAP-ENV:Body>
    <ez:searchRequest xmlns:ez="http://asf.gils.net/xer/ez.xsd">
      <ez:smallSetUpperBound>0</ez:smallSetUpperBound>
      <ez:largeSetLowerBound>1</ez:largeSetLowerBound>
      <ez:mediumSetPresentNumber>0</ez:mediumSetPresentNumber>
      <ez:replaceIndicator>true </ez:replaceIndicator>
      <ez:resultSetName>1</ez:resultSetName>
    </ez:searchRequest>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

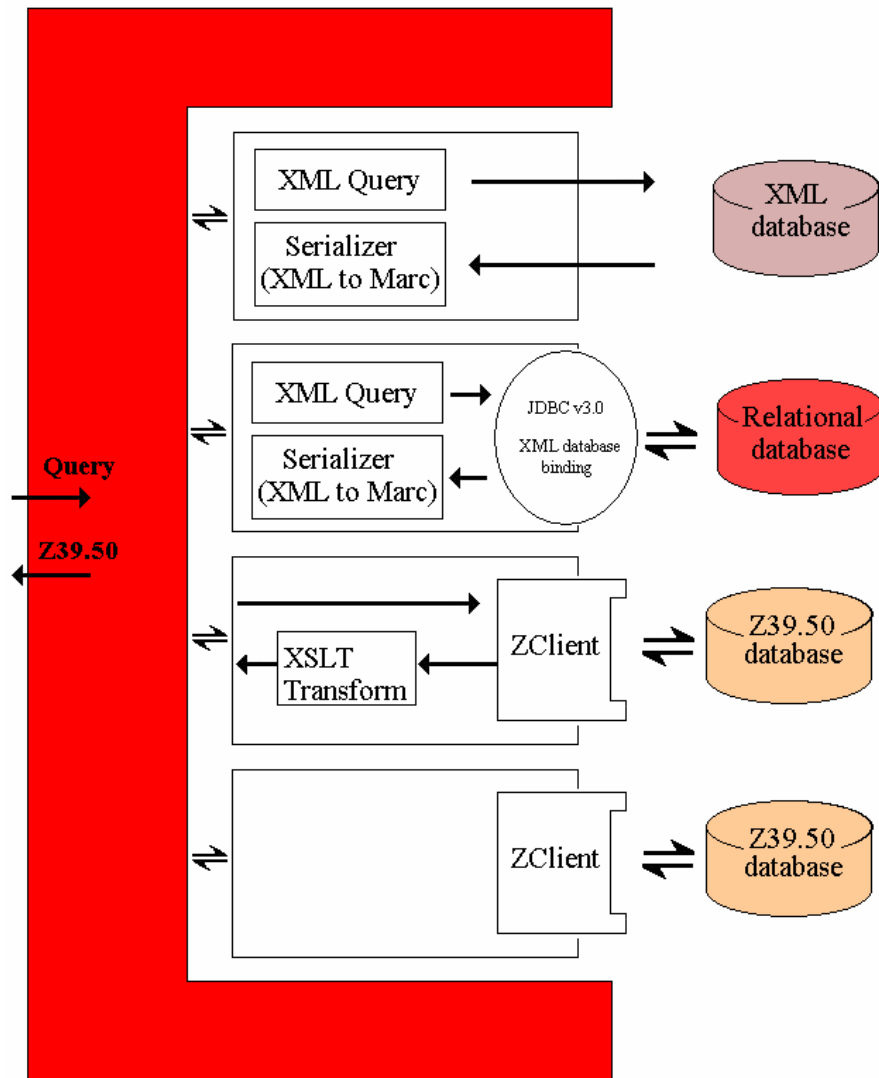
```
<ez:databaseNames>
  <ez:Item>mwcat</ez:Item>
</ez:databaseNames>
<ez:preferredRecordSyntax>1.2.840.10003.5.1</ez:preferredRecordSyntax>
<ez:query>
  <ez:type-101>
    <ez:attributeSet>1.2.840.10003.3.1</ez:attributeSet>
    <ez:rpn>
      <ez:op>
        <ez:attrTerm>
          <ez:attributes>
            <ez:Item>
              <ez:attributeType>3</ez:attributeType>
              <ez:attributeValue>
                <ez:numeric>3</ez:numeric>
              </ez:attributeValue>
            </ez:Item>
          </ez:attributes>
        </ez:attrTerm>
      </ez:op>
    </ez:rpn>
  </ez:type-101>
</ez:query>
<ez:term>dog</ez:term>
```

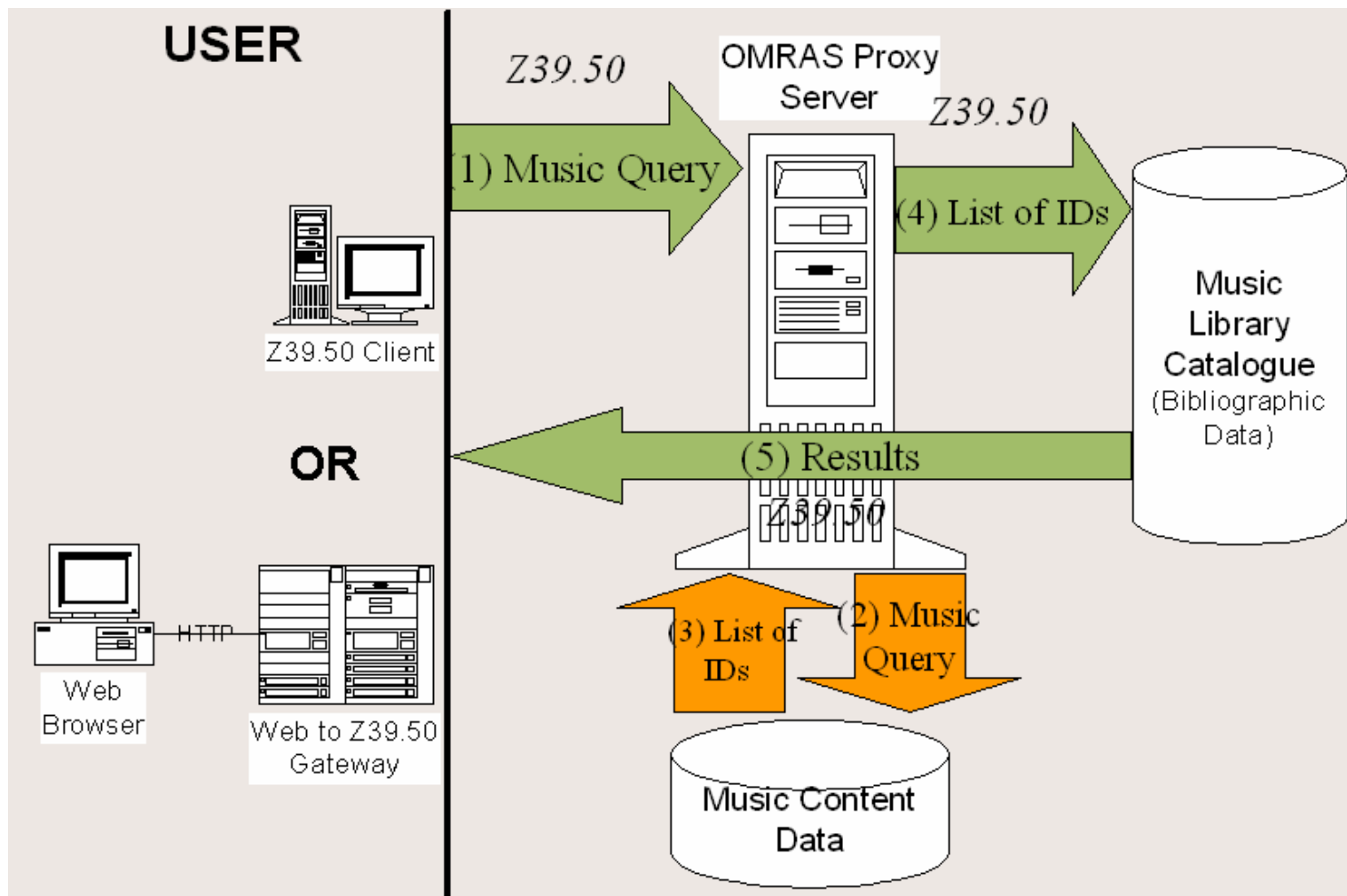
- Two simplified Search only WebServices
  - ZiNG
    - Sub group of the Z39.50 community
    - SRU – URL request
    - SRW – SOAP Request
  - GILS Search Service
    - Similar to ZiNG but
    - Multiple database query
    - Query syntax closer to Z39.50



25

- Component Architecture
  - ZServer
    - Manages Connections
    - Query Translation
    - Record Generation
  - databean
    - Maps Attributes to Database Tables/Information Source
    - Appropriate Database Driver/Information Source
- Configuration of Components provides different functions
  - Access to non-Z39.50 Information Sources
  - Distributed Searches (re-uses ZClient components)





- UDDI to Z39.50 Gateway
  - Searches GILS Locator records for resources
  - Returns information via UDDI
- Z39.50 to UDDI Gateway
  - Converts Z39.50 queries to UDDI via JAXR

- **Development Website**  
  
[www.jafer.org/](http://www.jafer.org/)
  - Downloads
  - Join mailing lists

- **General Website**  
  
[www.lib.ox.ac.uk/jafer/](http://www.lib.ox.ac.uk/jafer/)

- **Project Director**

[Matthew.Dovey@sers.ox.ac.uk](mailto:Matthew.Dovey@sers.ox.ac.uk)

- **Project Developers**

[Antony.Corfield@sers.ox.ac.uk](mailto:Antony.Corfield@sers.ox.ac.uk)

[Colin.Tatham@sers.ox.ac.uk](mailto:Colin.Tatham@sers.ox.ac.uk)