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### **Bath Profile Z39.50 Server Compliance Test Results: Preliminary Findings**

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#### **Introduction**

The Bath Profile<sup>1</sup> was released for public review and comment in October 1999 and endorsed as an ISO Internationally Registered Profile (IRP) in June 2000. Recognizing the importance of the Bath Profile for resource discovery and resource sharing, the library community quickly incorporated it as a fundamental Z39.50 server requirement for both new and existing implementations.<sup>2</sup> Not long after the release of the Bath Profile several library vendors were claiming Bath server compliance at major library conferences<sup>3</sup>. In an effort to validate the claims

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<sup>1</sup> See the National Library of Canada's Bath Profile web site: <http://www.nlc-bnc.ca/bath/>

<sup>2</sup> See Atlantic Scholarly Information Network minutes of February 11, 2000 (item 3.1, Common Interfaces – Z39.50  
<http://www.caul-cdbua.ca/minfeb00.html>

and

Consortium on Institutional Cooperation News Release, November 2000:  
<http://www.cic.uiuc.edu/cli/bathprofileendorsenov00.htm>

<sup>3</sup> Bath Profile Vendor Panel Meeting hosted by the National Library of Canada at the Canadian Library Association Annual Conference, Edmonton, June 2000:

<http://novanet.ns.ca/consort/meet99/jun23-00.txt> (item 13)

and

American Library Association Annual Conference, Chicago, June 2000:  
<http://www.ala.org/alonline/ts/ts900.html>

of these vendors and to provide libraries with an indication of the current state of server compliance a series of tests were conducted in January 2000, on a number of servers from a cross-section of vendors. The procedures underlying the testing and the test results are presented below.

### **Bath Profile Compliance Testing Procedures**

A checklist of 41 requirements was constructed for levels 0 and 1 of Functional Area A, Basic Bibliographic Search and Retrieval, with Primary Focus on Library Catalogues (Appendix A). The checklist is not exhaustive. It focuses on the searches described by the profile which covers 29 out of 41 requirements. Perhaps the most difficult task was to find a suitable client to be used for the testing. The client had to:

1. Send all six attribute combinations as specified by the profile.
2. Support the following record syntaxes: XML, SUTRS, and (MARC21 or UNIMARC).
3. Support boolean operators, named results sets, scan searches and character set/language negotiation.
4. Provide extensive logging of messages.
5. Be easy to configure.

The Z Texas Client, developed by Crossnet Systems Limited for the Central Texas Library System, was found to be the most suitable for the test because it satisfied all of the above requirements, except for character set/language negotiation.<sup>4</sup>

The next step was to consult a variety of directories of Z39.50 servers to find the configuration information for the servers available from the various vendors. It was difficult to find configuration information for some servers since vendors and libraries do not typically publish this information<sup>5</sup>. The initial test included 19 servers from 12 vendors (Appendix B). Subsequently, servers from an additional 4 vendors were identified and added to the test.

Each server was tested against the checklist of requirements. Following a connection to a server, the Z Texas client displayed the following server configuration information based on the option bits returned in the initialization response:

1. Server implementation name and version
2. Z39.50 Protocol Version
3. Support for scan and named result sets

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<sup>4</sup> The ICONE client, developed for the ONE project, may be downloaded from the Crossnet Systems Limited web site:

<http://www.crxnet.com>

It is very similar to the Z Texas client except that it does not currently support the XML record syntax.

<sup>5</sup> Good places to start are the Library of Congress and Index Data web sites:

<http://www.loc.gov/z3950/>

and

<http://www.indexdata.dk/targettest/>

29 searches were sent to servers to test the remaining requirements. If a server returned a result set, follow-up searches were performed to determine whether the server was processing the searches as per the conformance requirements of the Bath Profile:

The goals, objectives, and detailed specification of this profile preclude Z-clients and Z-servers from "default" behavior. Z-clients are required to form queries using all attribute types and values listed for specific searches. Z-servers are required to execute the search specified in the query and are not to do a more general or a more specific search than the one specified in the query (e.g., Z-servers will not execute a Name search if the query specifies an Author search and vice versa).<sup>6</sup>

The test results were emailed to each vendor for verification and feedback. When tests revealed unusual problems they were repeated on other installations of the same version of the server in order to remove the possibility that the problems were related to a specific implementation. Tests were also repeated on upgraded and/or reconfigured servers supplied by some vendors.

### **Bath Profile Test Results**

The initial test results were discouraging.<sup>7</sup> The only servers capable of satisfying 25 or more requirements out of 41 were from SIRSI Corporation (40), OCLC (27) and the National Library Of Canada (25). The remaining servers fell into a group that satisfied 12 or fewer requirements (Appendix B). The requirements satisfied by the majority of servers are listed below:

<b>Requirement</b>	<b>Number of Servers (maximum 19)</b>
Boolean operators: AND, OR, NOT	18
MARC 21 record syntax	16
MARC-8 character set	15
SCAN	14
Z39.50 Protocol Version 3	11
Named results sets	10

The problems identified by the tests include:

1. Improperly structured and/or encoded MARC21 records returned by the server.  
The majority of these problems were subsequently diagnosed by the vendors and attributed to inappropriate server configurations.
2. Unsupported attribute combinations.  
Many searches including "first words in field" and "standard identifier" were not supported by the majority of servers. Support for searches ranged from a low of 2 servers to a high of 9.
3. Default server behaviour  
All servers, except for the one from SIRSI, did not recognize and/or process all 6 attribute

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<sup>6</sup> The Bath Profile: An International Specification for Library Applications and Resource Discovery, Section 5, Conformance:

<http://www.nlc-bnc.ca/bath/bp-current.htm>

<sup>7</sup> The detailed test results for all servers are available at:

<http://nofish.library.mun.ca/bathtest/report.htm>

combinations comprising a search. This is contrary to the Bath Profile's conformance requirement which precludes default behaviour. Examples of default behaviour include substituting "do not truncate" with "right truncation" and interpreting the "word" structure attribute as "phrase" or "word list".

#### 4. Indexing problems.

The majority of servers did not comply with the proposed MARC21 indexing recommendations associated with searches. The most common problem was the inclusion of notes fields and statements of responsibility in title indexes which is contrary to the recommendations of the Bath Profile:

A title search will look for matches in an index(es) derived from data elements containing the general title and alternative titles such as series title, uniform title, and variant titles; statement of responsibility is not generally considered part of a title search.<sup>8</sup>

On a positive note, vendors as a whole responded favourably to the reports even though they revealed serious problems with their servers. A couple of vendors quickly corrected some problems and/or added functionality to their servers for a retest. Other vendors indicated that they were working on addressing the problems identified in the reports. A small percentage of the vendors did not respond at all.

## Conclusions

The test results reveal that most vendors have a lot of development work to do on their servers before they can claim compliance with the Bath Profile. The testing process itself is very time-consuming and requires the development of acceptable test methodologies that could be used in the certification of server compliance with the Bath Profile. The test results for a specific server may not be replicable across implementations of the same version of the server. The extent to which libraries are able to customize the indexing and/or attribute support for a server may impact on the test results.

## Postscript

One of the goals of a recently funded IMLS Z39.50 interoperability testbed project at the University of North Texas is the development of:

... rigorous methodologies, test scenarios and procedures to measure and assess the extent of interoperability between Z39.50 implementations with the goal of improving interoperability.<sup>9</sup>

The test results reported in this paper will be updated as new servers are made available by the vendors and until such time as the research results from the University of North Texas project are published.

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<sup>8</sup> The Bath Profile: An International Specification for Library Applications and Resource Discovery, Section 5, Conformance:

<http://www.nlc-bnc.ca/bath/bp-current.htm>

<sup>9</sup> The project website is: <http://www.unt.edu/zinterop/>

## Appendix A

### Bath Profile Release 1.1 Compliance Checklist FUNCTIONAL AREA A - BIBLIOGRAPHIC SEARCH AND RETRIEVAL

#### Level 0

<b>General Requirements</b>
<b>1. Record Syntaxes</b>
MARC21
SUTRS
XML
<b>2. Named Results Sets</b>
<b>3. Boolean operators: AND, OR, NOT</b>
<b>4. Character Sets</b>
ISO Latin-1
MARC-8
<b>5. Complies with MARC21 Indexing Recommendations</b>
<b>6. Recognizes and processes all 6 attributes, no default behaviour</b>
<b>Searches</b>
<b>1. Author Search - Precision Match for Established Name Heading</b>
<b>2. Title Search - Keyword</b>
<b>3. Subject Search - Keyword</b>
<b>4. Any Search - Keyword</b>

#### Level 1

<b>General Requirements</b>
<b>1. Z39.50 Protocol Version 3</b>
<b>2. SCAN</b>
<b>3. Character Set / language negotiation</b>
<b>Searches</b>
<b>1. Author Search - Precision Match for Established Name Heading with Right Truncation</b>
<b>2. Author Search - Keyword</b>

<b>3. Author Search - Keyword with Right Truncation</b>
<b>4. Author Search - Exact Match</b>
<b>5. Title Search - Keyword with Right Truncation</b>
<b>6. Title Search - Exact Match</b>
<b>7. Title Search - First Words in Field</b>
<b>8. Title Search - First Characters in Field</b>
<b>9. Subject Search - Keyword with Right Truncation</b>
<b>10. Subject Search - Exact Match</b>
<b>11. Subject Search - First Words in Field</b>
<b>12. Subject Search - First Characters in Field</b>
<b>13. Any Search - Keyword with Right Truncation</b>
<b>14. Standard Identifier Search</b>
<b>15. Date of Publication Search</b>
<b>Date &lt;</b>
<b>Date &lt;=</b>
<b>Date =</b>
<b>Date &gt;=</b>
<b>Date &gt;</b>
<b>16. Scan Author - Exact Match</b>
<b>17. Scan Title - Exact Match</b>
<b>18. Scan Title - Keyword</b>
<b>19. Scan Subject - Exact Match</b>
<b>20. Scan Subject - Keyword</b>
<b>21. Scan Any - Keyword</b>

## Appendix B

### Bath Profile Release 1.1 Compliance Checklist Summary Of Support For Requirements In Functional Area A - Levels 0 and 1 (Updated March 16, 2001)

Detailed reports for each server are available at: <http://nofish.library.mun.ca/bathtest/report.htm>

Vendor (Server)	No. Of Supported Requirements (Maximum 41)
SIRSI (Unicorn Version 2000 Bath Profile)	40
OCLC (WorldCat - Z39.50 Cataloguing Service)	27
National Library of Canada (AMICUS Version 3.0)	25
Endeavor Voyager (LMS Version 1.13)	12
epixtech (Horizon Marquis Version 3.0)	11
Geac (Test Advance Version 6.8)	11
epixtech (Dynix Version 2.0)	9
Geac (Advance Version 6.8)	9
III (Innopac Version 1)	9
III (Millenium with Oracle Version 1)	9
epixtech (New Reconfigured Dynix Version 2.0)	8
Ex Libris (Aleph 535.12.3 Version 1.4p12+)	7
Follett (Z39.50 Server Version 4.1.0)	7
Ex Libris (Aleph 505.12.4 Version 1.4p12+)	6
epixtech (iPAC 1.6)	6
Best-Seller (PortFolio Best-Seller V 1.0)	5
DRA (Taos Test Version 2.5-2 Release 2.8)	4
DRA (MultiLIS Version 11.1, Dec. 11, 2000)	3
Talis (BLCMP Target Development Version 0.0.0.1)	3