Focus on Interoperability

This issue of Information Standards Quarterly has a special focus. Although NISO works with a broad array of information standards, in recent years, one of the most influential of them has been Z39.50 on interoperability. It is in the process of revolutionizing the information world, and the developments related to it and other interoperability standards are happening constantly. There is currently so much going on in this area, that it seemed useful to focus this issue of NISO's periodical publication on interoperability issues.

July ZIG Meeting Continues Work on Version 3

Peter Ryall, Mead Data Central

The following report captures the key points of discussion at the Z39.50 Implementors' Group meeting held at the St. Louis Airport Radisson on July 7-9, 1993. Special thanks to Jim Michael, Sean Donelan, and all the other fine DRA staff who provided so bountifully and graciously for both the Z39.50 Implementor's Workshop and the ZIG meeting.

Although this report is only intended to cover the ZIG meeting, I would be remiss if I didn't note that the Z39.50 Workshop was a raving success, and that it was masterfully organized and executed. Special thanks should go to Sara Randall and Margery Tibbetts. I would also like to congratulate the presenters for a very lucid, in-depth trek through both the mysterious and mundane elements of the Z39.50 protocol. The examples applied to the real world and were understandable, and the detail service descrip-
Introductions and Status Reports

There were approximately 65 attendees at the July 1993 ZIG meeting. The introductions went so rapidly that I apologize if I missed details:

*Library of Congress* — client and server fully operational, using DLA’s BER code as a base.

*University of California Department of Library Automation* -- new attributes and databases, OPAC later this month.

*Pennsylvania State University* — 70,000 students now have access to RLG databases via Penn State’s Version 2+ clients with some Version 3 features implemented (such as OtherInfo). They are working on other V3 features.

*DRA* — same V2 clients and servers as reported at last ZIG, more databases.

*OCLC* — V2 server and clients in production, new databases, working on V3 features (specifically Scan).

*GEAC* — V2 server and client operational, working on Scan.

*GEAC* -- graphical-oriented client, working on OPAC.

RLG -- Eureka client in production, server now sorts result sets; working on Scan.

*Florida Center for Library Automation* -- current V2 implementation runs over TCP/IP, working on OSI implementation that uses SNACC compiler and run-time libraries (at least the Presentation layer)

*Carnegie Mellon University* — working on V2/V3 clients and server as part of Project Mercury Campus Wide Information System.

*NOTIS* — V2 MS-Windows client in beta test, working on Scan for V3, test servers, and Macintosh client.

*SilverPlatter* — currently have client/server version of CD-ROM system with proprietary protocol. Plan to support Z39.50, possibly via a gateway.

*WAIS Inc.* — current WAIS server and clients based on modified Z39.50 V1. Plans to move directly to V3.

*VTLS* — V2 Windows client.

*DOE (Environmental Health/Safety)* — working on interfaces to email systems and bulletin boards, plans to install Z39.50 (possibly as gateway).

*Acadia University* — V2 Z39.50 server currently in beta test.

*AT&T* — upgrading server and clients to V3D7, currently testing Scan.

*U.S. Geological Survey* — have spent last two years working with federal agencies on evaluating Z39.50 and how it can be used to interconnect agencies with each other and the public.

*Dialog* — planning to implement Z39.50 V2/3 server.

*ESL* — working on Z39.50 clients (V3).

*CARL* — V2 server now has 40 databases accessible, working on V2 Mac client.

*West Publishing* — working on V2 client to act as gateway to Dialog.

*University of California* — Z39.50 between Melvyl and client (now fully operational).

*CNIDR* — V2 server in final testing, MS-Windows client available.

*Chemical Abstracts* — V3 search now operational, Scan completed soon, two clients working (BER and ISODE based), STAS available publicly.

*Dartmouth* — V2 client implemented as a gateway on the backend.

*Gaylord* — V2 client and server currently integrated into Galaxy, Sort and Scan available soon.

*University of California at Berkeley* — V2 server and X Windows client operational, working on V3 features (specifically concurrent operations) and multi-threading.

*Central Intelligence Agency* — using WAIS Inc. client, planning to move to V3.
various pieces of draft 7 pulled together in time for the meeting (and an early email review). We especially appreciated the effort he went through to re-integrate and update the original sections from V2. Having a fully integrated draft is of priceless value to those of us who have had to spend great amounts of time in the past manually (and electronically) cutting and pasting various pieces of V2 into each V3 draft so we could circulate it and incorporate it into company design documents. Now it is all there in one piece — not perfect yet, but 100% better than it was in earlier versions.

Ray commented about the draft getting too large, but there was unanimous agreement that it should not be condensed or split into multiple documents, as its value in an integrated form far outweighs any awkwardness in working with it as a large document.

Ray made some general comments: between the last meeting and this one a subgroup worked on simplifying the record syntax model while separating variants and other sub-record representation requirements into “Composition Specs” (discussed at length in Item 10.5. At first Ray said D7.x would only fix errors, but later he decided to include minor (obvious consensus) corrections; he also was applauded when he mentioned that he would put D7+ up on an FTP server (probably FCLA’s).

In section 2, Ray noted that new V3 definitions are not yet reintegrated with V2 definitions. He may have erred on the side of inclusion, but will remove ones needing deletion. For 3.1.3, Ray suggested that maybe we could put a model section on Search here in the spirit of 3.4 for Retrieval — he welcomes ideas. In 3.2.1.1.1, protocol version is changed to version. Section 3.2.1.1.3 is rewritten. In 3.2.2.1.7, Database/Diagnostic Records are changed to Retrieval Records. Section 3.2.3.1.2 covers Additional Ranges and is new. This supports multiple record ranges in Present.

There was discussion about allowing the origin to select random ranges (overlapping and out-of-sequence); some felt the current structure restricts the origin’s flexibility to select records in any sequence; others felt this was allowing too much flexibility and the order returned by the target would be non-deterministic and inconsistent. The suggestion was made to return a relative record number for each record in the result set. This was rejected as adding too much new complexity to the service description and protocol for V3. We may reconsider in V4. Consensus was to accept the parameter as is.

Sections 3.2.7, -8, and -9 all had minor changes agreed to on the discussion list. Section 3.2.10, Explain, has new Information Categories. Section 3.3 has reworked segmentation algorithms and examples for clarity. Most of section 3.4 was reduced and moved to Section 3.1.2 in the front. Section 3.5 on Concurrent Operations is completely rewritten. Section 3.7 has changed wording (done at the meeting) in the first paragraph at the top of page 52.

In looking at the ASN.1, on page 58, the decision made at the meeting was that AttributeSetId needed only to override main AttributeSetId at the start of RPNQuery. Minor changes were made on page 59. On page 60, it was agreed to move ElementSpec to the end of the main ASN.1, then use EXPORT to make it accessible to Comp Specs in Appendix COMP. On page 60, we changed PreferredRecordSyntax to Object Identifier. On page 65, we added IMPLICITs to RequestPackage and ResultPackage and corrected type to Object Identifier. We changed status under ResultCommon to TaskStatus.

Ray asked whether in section 4.4 we need to change the conformance statement for V3? Especially due to the use of Explain? People need to think about this and get comments to Ray. Finally, in looking at appendices, for Appendix ATR, Ray added attributes from draft 4 inadvertently left out of D7 (pages 85-6). Ray asked if we should revise Larry Dixon’s BIB-1 description and add as an appendix? The consensus was “yes,” and Ray will follow up with Larry.

After the walkthrough, Ray distributed an updated Z39.50 “Register of Implementors.”
The Second Day

IETF Network Information Resource (NIR)

Mark Needleman distributed the latest version of the NIR description of Z39.50 for the IETF working group and asked for comments/corrections. He has since posted the final copy to the list and forwarded it to the IETF chair.

OSI Implementors’ Workshop (OIW)

Ray Denenberg gave an overview of the OIW Library SIG and its purpose: it is a Special Interest Group for the Information Retrieval and Interlibrary Loan protocols. It was started in 1992, and a meeting was held in June of this year. (See below in this issue for more information from this group.) It was noted at this point that federal agencies want to work on federal regulations for standards. Interested parties include the Department of Defense, the U.S. Geological Survey, NISO, OIW, and Ralph Levan and Ray from the ZIG.

Z39.50 Implementation Study

Bill Moen of Syracuse presented an overview of a project he is proposing to undertake; under the proposal, he would gather information from current Z39.50 implementors and assemble a report (or set of reports) listing the services available from each operational target. This would include what Z39.50 services are supported, available databases and what attributes can be used to search them, what formats are available for retrieval records, and other types of data roughly corresponding to what would be available from targets if Explain were fully operational. He could also keep other data such as what software (origin and target) is available publicly, information about new origin/target releases, etc.

Bill was quite flexible as far as what data is kept, how it is gathered, how it is maintained, etc. There was discussion about the mechanics of the process, whether the data is gathered, maintained, and made accessible electronically, or whether some or all of these processes may be manual in the short term. Bill stated that the long-term plan is to automate this entire process and evolve it into an online “server of servers” (which could be built electronically by searching and retrieving information records from each server’s Explain database), but that this is beyond the scope of the short term project he is proposing.

He had spoken with Pat Harris (NISO Executive Director) and she endorsed his plan enthusiastically but said he needed to get the approval of the ZIG in order to proceed. There was a question about who would maintain this data for both short term and long term; Bill agreed to compile the data and keep it up to date on whatever periodic basis seemed appropriate to the ZIG. However, he was not sure who would maintain the data on a long term basis, if this study/survey were continued. Someone suggested that NISO could gather and maintain it in the long term, but it was agreed to defer this issue.

There was much discussion about the level of detail needed, what Information Categories from Explain would be useful, whether it would be possible to use AT&T Directory Services to store/maintain and provide access to this data. It was agreed to allow Bill to proceed in developing a plan to define this study/survey, using input from ZIG members for guidance. If members have any suggestions on the approach to this survey, they should post them to the list.

Reference Implementation Project

Tim Gauslin introduced this agenda item by distributing a project description of the plan (formulated by a task force of government agencies, meeting as a Public Access Forum) to develop both a Profile and a Prototype “Reference” Implementation for a “Locator” service to be used (mainly) by government agencies. Although these agencies may have special needs for a Locator Service which are somewhat less general than the “global server of servers” concept kicked around at length in Z39.50, Archie, WAIS, and other groups, Tim said the goal was to develop a generalized Profile which could be used broadly across the Information Industry -- not restricted to government agencies.

The discussion which followed focused on several major points.

a) The idea of any specialized government or industry forum developing a profile (and even more particularly, a “Reference Implementation”) which would meet the needs of all or even a large subset of the total audience of Z39.50 users, seemed unrealistic at best, and impossible to many on the ZIG. The ZIG was in agreement that the development of a Locator Profile is independent of, and should not be coupled with, the development of any type of specific implementation, and especially not something referred to as a “reference” implementation.

b) References in the document to specific commercial vendors, such as Thinking Machines, WAIS Inc., etc., appeared to commercial members of the ZIG to provide unfair advantage to particular vendors’ implementations, while hurting the adherents to the Profile by limiting their choices of vendors.

It seemed reasonable to most that this project be separated into two separate portions; the first would simply develop the desired Profile, gathering input from ZIG members as well as others in the industry interested in implementing or using such a Profile. This Profile would then be published (as an RFC,
RFQ, etc.) and opened up to any vendors (either for profit or not for profit) wanting to build usable implementations.

At that point, the second portion would start. A number of competing (or in some cases complementary) implementations would be built; these would then be made available for testing and acceptance by users agreeing to use the profile. By using this approach, it is thought that a much richer, stronger set of implementations would develop, including related tools, gateways, and support software needed to make the server of servers (Locator) work across the broad base of Z39.50 public and commercial services available at that time.

The idea of producing a single "reference" implementation seemed very premature to members. It was thought that a conformance suite of functions could be built over time, and that a "reference" implementation could grow out of the effort as it matured, but that to plan on this in advance is unrealistic. On the last day of the ZIG meeting, Mark Hinnebusch produced and circulated a letter to be sent to Eliot Christian of the USGS, stating the criticisms of the Locator Project Description. It was agreed to by the ZIG, finalized and sent by Mark, and as a result, Tim posted a revised project description to the discussion list and some comments were made.

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**Scan**

Les Wibberley expressed a need to have their target return additional information describing each term in a term list, but he needs to be able to send different information for each database in which the term is found (i.e., at the AttributeList, byDatabase level). Currently, the only provision for additional information is at the overall TermInfo level, which is not a fine enough breakdown. Les's proposal was accepted and Ray agreed to put a second otherTermInfo at the byDatabase level. Les also suggested that the entire occurrenceByAttributes structure be made optional, then someone else added that all of the subordinate structures should be optional. Ray will modify this.

**Extended Services Public Packages**

I handed out a document describing a set of six ES Parameter Package types and their respective parameters, then did a high-level walkthrough of each of the ES "Tasks," proposing that some or all of them be accepted by the ZIG for promotion to public Object Identifier status and included as part of Appendix EXP of V3. The point was made that we should try to standardize as many of the common-function ES Packages as possible; otherwise, if implementors went off and developed new private package types whenever they had need for a new feature, we would have rapid proliferation of package types, many of them near duplicates of each other. It will be much better if implementors will share their functional needs with the ZIG before they develop a new package to see if others have similar needs. In addition, implementors who develop private packages could publicize them to the group so that others can use them and they can be considered as candidates for promotion to public package types.

Ray agreed to work with other ES folks to finalize definitions of ES package types targeted for V3. Other contributors are welcome to submit their private types to Ray as well. I will update the handout from the meeting, go through the depressing task of downgrading it to ASCII, and re-post it to the discussion list.

**Document Delivery Requests**

Lennie Stovel brought up this requirement but many others had the same need; it seemed there was a split between those who just had a simple need to deliver documents referenced by a Result Set (in which case an ES Export Task/Packet could be used), and those who had a need to order and deliver documents not contained in a result set (and therefore not discovered via a search). The latter is the one we focused on, as it seemed to be a general need not addressed by any current Z39.50 service.

It was suggested that we could define a new ES package type specifically to handle document delivery/order requests, but because of the complication of already having a standard (ILL) which is specifically designed to do this function, the ZIG decided to take this topic to the list for further discussion.

**Explain**

Ray Denenberg directed consideration of this agenda item. There was a short discussion of the current definition of Information Categories and their related fields as defined in D7, and it was felt that there was still a good deal of work needed before these were solid. However, it was noted that experimentation and use of Explain in the real world would be the only viable way to flesh them out and find the holes in
the structures. Bob Waldstein noted that he is the only server who currently has implemented Explain, and this is not a very large sample set.

It was agreed that certain people be designated to work on new categories within Explain: Ralph and Mark will team up on Explain for Scan, Lennie will work on Sort, and Denis Lynch will focus on Extended Services. Ray will stay involved with all of these subgroups to get consistency.

The Third Day

ASCII Record Syntax

Although Les Wibberley “owned” this agenda item, two separate proposals were handed out — one by Les and one by the team of John and Sean. It appeared that the first syntax needed was one that is totally unstructured.

The ZIG agreed as a group (during the discussion) on the characteristics of the unstructured text record syntax as the following:

a) there will be no interactive specification of options (line length, terminating characters, page breaks, tabs, etc.);

b) the line length will be part of the fixed definition of the syntax, and will be agreed to by the ZIG (72 proposed);

c) the line terminating character will be an ASCII LF (X’0A’);

d) the text will use the GeneralString data type (which allows the sender to “escape out” to a more specific string type if desired).

It was agreed that the structured text record syntax would be discussed and defined on the list.

OPAC and Summary Records (Graubant-Cervona)

Jeff Graubant-Cervona requested that the syntax definitions for both the OPAC record and Summary record (agreed to in previous ZIG and ZIT discussions) be published and made available to anyone who wants to use them. Mark Hinnebusch owns the current definitions and has them registered only on the private tree for FCLA. Mark agreed to post them to the list (again) and Ray said he would assign public OID’s on the Z39.50 branch of the tree.

Bib-1 Attributes

Margery Tibbetts passed out a list of attributes supported by Melvyl which are not currently supported by Bib-1. There was some discussion of these, whether or not we should incorporate the new attributes into Bib-1 or simply create another more specialized attribute set. It was agreed that attributes of general use to folks (more than 1 server?) should be added to Bib-1, but others (such as the special attributes Sara Randall mentioned) might be better in a secondary attribute set. It was noted that this is not a problem in V3 as you can switch attribute sets at the Term level.

In a separate discussion, someone posed a question about whether it would be useful to have a separate attribute set that included all the MARC fields as attributes. It seemed of interest to some, and Joe Zeeman enthusiastically volunteered to enumerate these attributes and post them to the list; he has since done this and is awaiting comments from the group. Once it is approved by the ZIG, I assume it will be assigned an attribute set OID.

Bib-1 Diagnostics (Denenberg)

It was noted that no work has been done on diagnostics since the last meeting and they are starting to be critical for some implementors. It was requested that ZIG participants review their services and document all diagnostics which they expect to need. It was agreed that any new diagnostics will be added to the list defined in Bib-1 (Note: the name of the diagnostic syntax changed from Bib-1 to Diag-1 — see below).

...it was a great opportunity to air our long-suppressed opinions that we hadn’t been able to get edge-wise in the voluminous and fast-moving net interchange. At one point, this Friday afternoon session looked like “dueling whiteboards across a football field” to the casual observer.

A requirement was stated that a target needs to have a way to specify additional (free-form) information when it sends a diagnostic. There needs to be a way to distinguish this information from the information defined explicitly in the syntax definition (such as the database name in “Database Unavailable”). There followed a discussion about whether to add multiple Addlnfo fields, some structured and some not, which seemed unnecessarily complex to most folks. It was agreed that the simplest (and most versatile) way to structure the diagnostic format is to make “Condition” a Choice between an Integer, a VisibleString, and an OID.

It was also agreed that we would create a new diagnostic format type called Diag-1 (and assign it a new OID), and leave the old Bib-1 for use only in Version 2. The details of the new Diag-1 structure are to be worked out on the list.

Access Control Formats

The group did a walkthrough and discussion of the new access control formats defined in Appendix

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Des-1 and Cop-1 were not challenged at the basis (e.g., every 60 days). Sara and Les agreed to change his ID, or when a target had a requirement challenge for a clear text UserID and password— it fields. Sara stated a requirement to send a simple legal input characters), and tags were added to both InfoType were changed to IA5String (to allow only proposed by Bob Waldstein slightly: InfoValue and proposed by Parvis Dousti and was not challenged. The Kerberos AC format Krb-1 was pro-

It was decided to modify the Access-1 format proposed by Bob Waldstein slightly: InfoValue and InfoType were changed to IA5String (to allow only legal input characters), and tags were added to both fields. Sara stated a requirement to send a simple challenge for a clear text userID and password — it was agreed that Bob’s format had no explicit way to ask for a simple userID and/or password. Les stated an additional requirement that the target be able to request that a userID, old password, and new password be returned in the case where the user had asked to change his ID, or when a target had a requirement that the user change his/her password on a periodic basis (e.g., every 60 days). Sara and Les agreed to work together and issue a proposal for another AC format to do this. Since then, Bob and John Kunze have proposed an alternative which enhances Bob’s Access-1 to include support for the ID/password challenge; it is still under discussion on the list.

**Record Model Discussion and Composition Specifications**

These two items were combined together into a single stimulating and mind-expanding discussion which I will not attempt to reconstruct here; in fact, it would probably require a white paper larger than the current Draft 7 of the standard to record this highly interactive discussion. For those of us who couldn’t keep up with the flow of email traffic in the recent subgroup discussion on record syntaxes, it was a great opportunity to air our long-suppressed opinions that we hadn’t been able to get edge-wise in the voluminous and fast-moving net interchange. At one point, this Friday afternoon session looked like “dueling whiteboards across a football field” to the casual observer.

All jest aside, however, much was accomplished (from this observer’s vantage point) in terms of understanding the “retrieval model” for requesting, formatting, subsetting, and receiving records in Z39.50. I’m really at a loss for words to communicate all the model clarifications that happened, but we did develop the first “record model” picture the group has totally agreed on so far. If anyone wants information on this picture, talk to Cliff Lynch, Sean Donelan, Bob Waldstein, Les Wibberley, Mark Hinnebusch, and/or Ray Denenberg. In other words, this was a group product and no one person can explain every detail; the important thing is that we do have a good working consensus on the retrieval record model now.

To wrap up this agenda item, Ray proposed to change Comp-1 to ES-1, and attempt to consolidate the four current Comp specs into one or two generalized Comp specs; he will post these to the list when he starts work on Draft 8. Jeff Graubant-Cervona will also post his alternative scheme for specification of element specs to the list.

**Dynamic PreferredMessageSize for Segmentation**

Parvis Dousti noted that Z39.50 client developers must deal with a wide variety of different types of information (text, images, etc.) on a wide range of different servers. If an origin wants to support Level 2 segmentation and it deals with text information the majority of the time, it has problems when it has to retrieve (present) image data from a database within the same association. There is no way to renegotiate the segment (preferred message) size without closing and starting a new association, which seems quite inflexible.

Parvis proposed that we add PreferredMessageSize to the Present so that the origin would be able to control the preferred size of the typical PDU, as well as the (aggregate) maximum message size and the maximum segment count. His proposal was accepted and Ray will add this as an optional parameter to D8. If included, it will override the PreferredMessageSize specified in the Init, but only for the Present in which it’s specified.

**Action Plan**

Ray restated what he planned to do with Draft 7+ (minor corrections) vs. Draft 8 which he will produce in time to circulate for comment before the next meeting. Ray asked that people send him comments on the new Definitions section—changes, terms which don’t need to be defined, terms which need to be added, etc.

*If an origin wants to support Level 2 segmentation and it deals with text information the majority of the time, it has problems when it has to retrieve (present) image data from a database within the same association.*

Les requested that Ray place a higher priority on producing the new ASN.1 for Draft 8 than on cleaning up minor errors in the current draft. Ray stated that he thought D7+ was important because he plans to make it available electronically for the first time—both in ASCII and WP5.1 versions (most likely via an FCLA ftp server). This was applauded, and Ray said he would have to think some more about whether we had enough definition on D8 changes to code the
ASN.1, especially Comp Spec and ES Specs.

Margery said a top priority for her is to get new diagnostics defined and specified, including the new structure agreed to, fixes to the current diagnostics, and the addition of new diagnostics for scan, sort, and ES. She also suggested we do a walkthrough before the next (and other) ZIG meetings. The format would be a half-day tutorial on a particularly hot and sticky ZIG topic (“the hot topic of the quarter”), presented by one of the recognized foremost experts on that topic, as mentioned above.

Implementation Issues

ASN.1 Coding Guidelines

Les redistributed a paper written and handed out by John Kunze several meetings back; Les had raised the issue on the list just before the meeting so there wasn’t time for anyone to respond yet. There was some discussion which recalled some of the objections raised when it was first proposed. Bob reiterated that doing lots of indirect definition statements to minimize the number of duplicate inline definitions sometimes causes more difficulty with readability, and also complicates the structure fabrication for people not using ASN.1 compilers who are having to trace through the ASN.1 to find out how to build their message structures.

The format would be a half-day tutorial on a particularly hot and sticky ZIG topic (“the hot topic of the quarter”), presented by one of the recognized foremost experts on that topic.

Les pointed out in his memo that by not using these guidelines, it causes more work for developers writing code which interfaces to the Z39.50 request/response structures produced by a compiler. An example was that when you use Choice or Sequence in the middle of a structure, the compiler does dynamic definition generation, which creates labels that change every time there is any change in the request structure. This creates a lot of extra work when moving from one version of the standard to the next, and even causes changes in areas that didn’t change functionally. It was decided that this discussion should be taken to the list since there were many different views and time was running out for the meeting.

ZIG/ZIT Agreements

Mark Needleman handed out copies of the agreements he has documented from previous ZIG and ZIT (Z39.50 Implementors’ Testbed) meetings. He asked that people read them and send any comments back to the list.

Handling Encoding and Protocol Errors

I had already left for my plane when this agenda item was reached, so Ralph Orlik sent me an excellent note to summarize what the agenda was supposed to address. It was so good I thought I’d just include it here. Obviously this discussion needs to be taken back to the list, or deferred ‘til the next meeting.

“I added the [agenda] item at Ray’s urging after we received incorrectly encoded Search and Present Request PDUs. Larry raised the question on the list and we found out that others were doing things from Aborting the connection to ignoring errors (when they could recognize them and there was a reasonable default to take) to sending back diagnostics with additional information (when the Diagnostic was in the normal response to the problem, i.e. Search and Present Responses).

The standard says little about what to do for protocol errors. It assumes that PDUs are correctly encoded, provides no diagnostics to address encoding problems (in those PDUs where diagnostics are present), and leaves the state tables undefined. Encoding errors are one type of protocol error that can sometimes be corrected. Some said that a protocol error is a protocol error and Abort is the only response possible. Whether you can recover from one at all requires that the decoding software tell you what the error is and not quit there. The Presentation layer we had with the IBM product would not let us receive a PDU with encoding errors, while the UC-DLA code we have now does keep on going with the possible loss of data (which data, we don’t know).

I think that there was agreement that in V3 the CLOSE PDU would be the correct response to an encoding error, along with a reason for closing. In V2, one is limited to using User information or the additional information in a non-surrogate diagnostic. Other Information (V3 and V2, too?) might be used with any PDU, including the CLOSE, by those able and willing to provide help to Z39.50 origins or targets which send faulty PDUs.”

OSI Application Context OID

The reason I asked for this agenda item was to request an Application Context OID for an Application Entity which would permit the running of multiple Z Associations over a single A-Association. Unfortunately, I had to leave, but Ray said I could just send him a request through the mail anyway. The only reason I mention this is that I wanted to let other folks know in case they need to use this Context in the future.
Discussion of Alternative Data Types for Search Terms

There was a short discussion (possibly during the Attribute Set item) about supporting other data types in the Search Term field, and how the origin would designate the data type of the Term value, versus the data type of the fields in the databases being searched. It was noted that there is a need to treat a term as a data type other than text in some cases — examples were: numerics, raster/vector graphic components/tiles, and 3D chemical structures.

Ray suggested (as a proposal) that we allow a data type other than Octet String for each Term — possibly a Choice of Octet String, Integer, and External?

The ZIG in Ottawa

Mark H. Needleman

At the Government Conference Center in Ottawa, Canada on October 4-6, 1993, the Z39.50 Implementors' Group had its most recent meeting.

Introductions and Status Reports

University of California-Department of Library Automation — has added support for periodical file — will be using client to search OCLC and RLG databases — is also using Z39.50 for accessing circulation data at UC-Davis' DRA system and in a joint project with Elsevier to provide access to bitmapped images.

Gaylord — server online 24 hours — first production system soon.

Dartmouth — has campus-wide information system — is testing Z39.50 gateway to it.

NOTIS — not much new — has Windows client with Mac client soon — cleaning up server based on errors found by users.

CARL — server online for 4 months — has version 2 client which may be released soon — about to do first offsite release.

OCLC — has production server providing access to about thirty databases — adding more — has support for simple unstructured text records.

CLSI — added Scan — adding Explain and Sort.

RLG — working hard on server — in production by end of month — will have Resource Control and will do document delivery using private PDU's — will be marketed as Zephyr. Also has demo of Eureka client by telnetting to EUREKA-INFO.STANFORD.EDU

Penn State — has production client accessing RLG databases — has production server with Resource Control.

FCLA — has server and beginnings of client in test — in process of reinstalling OSI stack using Thin OSI.

Software Kinetics/National Library of Canada — will have Z39.50 client/server as part of new bibliographic system at NLC. NLC has released public domain tool kits for client and server including a demonstration system.

University of Missouri — has started and is playing with NLC code — is going out with RFP for a temporary client to get going.

Multilis — will be getting going in fall.

VTLS — releasing Windows client and starting on server.

ABall Software — interested in commercial product opportunities.

AT&T — moving back to using gateway to server — looking at World Wide Web — also working with client.

Chemical Abstracts — continuing technical work on server — doing pilot project with U.S. Patent Office — added Scan and proximity query to server — expanding STAS attribute set.

Washington University — primarily a consumer but doing some local development.

Conquest Software — starting out.

Information Access Company — interested in document delivery.

WAIS, Inc. — working on understanding how to use Z39.50 Version 2 to do what WAIS does now — working on developing profile.

Library of Congress — getting client and server ready for production, hopefully by December.

Mead Data — several clients running against server — working with partners.

CNIDR — working on Windows client — starting on server from scratch — also involved in Patent Office project.

MorpCorp — interested in Z30.50 with WAIS.

UC-Berkeley — progress on client — have released production access in client to Melvyl and LIAS.

Westchester County — interested in server.

Memorial University — testing Stanford C Spires server.

Acadia University — server up and being tested by clients — looking for money to work on version 3.

Taliesin Software — wants to add Z39.50 support.

GEAC — working on client using NLC code.

ESL — has client for government information — has working software and is preparing to market it.

SIRSI — working on client and server.

DRA — has stuff in field with customer —
testing server 24 hours a day.

Discussion of next meeting. The next meeting was set for January 26-28, 1994, in Gainesville, Florida. The ZIG tentatively scheduled the following meeting for April 27-29 in Washington DC to be hosted by the Coalition for Networked Information with a Z39.50 tutorial on April 25-26.

Mark Hinnebusch reported on a letter he sent to NISO on electronic availability of the Z39.50 standard and noted that he had gotten no reply; there was some discussion of this issue. LC agreed to provide an electronic version of Version 2 ASN.1. Ray Denenberg also discussed the register of ZIG implementors and passed out a copy for people to mark up with changes.

Global Record Syntax/ES-1 Discussion

An explanation and tutorial for this was given by John Kunze. Much discussion followed. Ray Denenberg will provide revised ASN.1 for ComSpec based on this discussion. More discussion followed, then more discussions of variants. Variant set IDs will be registered as Object IDs and will go into the standard and be given a node on the registration tree. A variant set Variant-1 that meets needs currently expressed will be defined.

Long Discussion of ES-1

A discussion of ranking and dynamic and metaelements was held. This was felt to be a more general problem than just as defined in ES-1; the issue will be taken to the discussion list. Ray (and others) will work to define a standardized schema, and this definition will go into the standard. RankPlease, HitsPlease, NoTagsPlease, and DefaultTagType fields of ElementSetNames in ES-1 got deleted.

The Second Day

Day 2 included more discussion of ES-1 — as an exercise Ray will attempt to pull out functional units from ES-1.

Version 3 Draft 8 Walkthrough

The introductory section on the model was dropped, or rather integrated into section 3.1. Ray will add a section to the model with a description of the client/server model; this will be posted to the list for discussion. A section on Explain will be added to the model description.

Definitions of Implementation ID, Version and Name will be put back, and people should comment on these on the list. Some definitions were modified and corrected. A long discussion of the Any in ID/Authentication was held -- comments will be added to the ASN.1 saying the Any should be replaced by a choice of types, one of which will be the ZIG-defined format that will be included in an appendix. A discussion about the expandibility of Explain was held, and some changes to the ASN.1 will be made to allow extensibility of each record. Ray and a group of people will explore how to do this.

Ray pointed out other changes from V3D7. The USMARC code list for languages was added to the references. In the section on extended services, the Request-Parameter-Package field was renamed to Task-Specific parameters. The comments in the ASN.1 on what the bits mean for the protocol version will be put back in. The Otherinfo field will be put back into the Initialize request. In Explain Attributes, details will be beefed up for things like Scan and Sort. Section 3.6.2 was changed so that if the origin does not specify a Preferred-Record-Syntax or the target is unable to apply the specified one, the target will return

Changes to the diagnostics were discussed — prose will be added to explain why Diag-1 was created and how it is distinguished from the Bib-1 diagnostics. Bib-1 diagnostics will not be expanded; all new diagnostics will come in Diag-1.

versions to the diagnostics were discussed — prose will be added to explain why Diag-1 was created and how it is distinguished from the Bib-1 diagnostics. Bib-1 diagnostics will not be expanded; all new diagnostics will come in Diag-1. It was pointed out that one of the implications of this was that a version 2 server that wanted to implement some version 3 facility would also have to implement Diag-1 since there was no other way to return diagnostics for those new facilities. It was also pointed out that a version 3 client would have to understand Diag-1 since when talking to a version 3 server it couldn’t tell what form of diagnostics it would get back.

Bill Moen discussed his project to create a database of Z39.50 implementations and asked for feedback; he will make the survey form available electronically. Bill also talked about the Government Information Locator project and discussed the paper he distributed on it.

ILL and Document Delivery

Fay Turner gave a tutorial on the ILL protocol, and Joe Zeeman talked about his ILL scenario document and gave a presentation on it. Wayne Davison then talked about some activities going on in Europe involving document delivery including the ION, IDEL and GEDI projects. This lead into a discussion of the Wibberly paper “using ILL Request PDU for Document Order,” which started a general discussion on document delivery and Z39.50.
The Third Day

Discussion of interlibrary loan, document delivery and requesting, the ILL protocol and their relationship to Z39.50 continued. Les Wibberley will write up a proposal for an extended service for document delivery with help from other interested parties and post it to the discussion list. Mark Hinnebusch will establish a liaison with the ARL group working on document delivery. Lennie Stovel will post the data elements RLG uses in its private document requesting facility to the list.

Concatenation and embedding. Ray Denenberg presented this as a mechanism for delivering more than 1 PDU at a time and discussed some of the requirements that caused this to be thought about. Discussion ensued as to how it would be used, what requirements it met and what problems it created.

Intermediate results. Clifford Lynch discussed his proposal for using additional SearchInfo and resource report formats for such things as intermediate results and conveying posting counts. An additional field will be added to Search to convey the type of information that should be sent back. Forms will be registered so that the client can provide templates to the server that will be filled in with the kind of information the origin wants reported back. Part of the intent of this is to allow such things as Presents against intermediate result sets.

Sort and more. Ray posed the question of what people wanted to sort on and does SortElement work. A combination of schema and element specification will be added to SortElement.

Les Wibberley discussed his paper on simple unstructured text record syntax and there was a long discussion on this subject. Some prose will be added to the standard that describes SUTRS. This will be derived from the characteristics section of Les's paper. In addition, the maximum length of 72 characters per line will be relaxed from a hard maximum to a best effort. Other unstructured text formats will be dealt with at the next meeting.

Extended services and attributes. There was a proposal for additional extended services to set parameters on the server. There was a long discussion of this, and it will go into draft 9 for further discussion. Peter Ryall discussed his paper on additional Extended Service package types. Export and Print services will be merged. Further comments should go to Peter. Further work on this will be taken to the list, changes will be made based on comments, then Ray will draft the ASN.1 for these.

Margaret St. Pierre discussed attributes needed by WAIS: 1) Free form text; 2) relevance feedback by text and document identifier; 3) known item. It was decided to add the following attributes to Bib-1: Use attribute of Concept; Relation attribute of Relevance; Structure attributes of free form, doc text, and doc id. This will be taken to the list for further discussion.

New ZIG Documents

The following documents were given ZIG numbers at the meeting:

- ZIG 93-400 Z39.50 Register of Implementors (Denenberg)
- ZIG 93-401 Z39.50 Version 3 Draft 8 (Denenberg)
- ZIG 93-402 Additional ES Package Types (Ryall)
- ZIG 93-403 A Database of Z39.50 Implementation: Data Collection, Database Design, and Data Presentation - Project Description (Moen)
- ZIG 93-404 SUTRS (Simple Unstructured Text Record Syntax) (Wibberly)
- ZIG 93-405 Using ILL Request PDU for Document Order (Wibberly)
- ZIG 93-406 Proposed Extended Services (Wibberly)
- ZIG 93-407 Expanding Research and Development on the NISO Z39.50 Search and Retrieval Standard (Moen).

Z39.50 Internationalization Considerations

Peter Ryall

This paper is intended to give a brief description of the various elements of Z39.50 which must be considered in order for implementors to provide support for Origin systems in different locales to gain a natural level of access to Target information services via Z39.50. ("Locale" includes both language and culture considerations.)

The first aspect of Z39.50 to be considered is the localization of output text sent as part of Z39.50 responses, not including information content being retrieved. This includes text attached as part of any of the following:

- unstructured text contained in diagnostics;
- textual part of responses to Scan requests;
- Resource Control Reports;
- Extended Services Task Packages;
- explanation or prompting dialogue within Access Control requests.

The second aspect is the localization of text
contained in information records (e.g., documents) themselves, which is returned as part of a Present (or “piggybacked” Present) response. This needs to be handled as a separate element of information, as Origin and Target systems may want to distinguish text sent as part of the Z39.50 protocol dialogue, from text returned in the information records retrieved from information service databases. In fact, each database housed by an information provider could support retrieval of data in a different set of languages, or all databases may support the same language (or set of languages) — it’s up to the provider.

In terms of searchable databases, there are two major characteristics to consider: national language and the character encoding scheme used to deliver database record text to a Z39.50 Origin. These are discussed briefly below.

Typically, searchable databases will be fabricated (built) in a particular national language (although some providers may choose to make a single database available in multiple languages) and will be searchable and retrievable only in that language. Language translation of full text will typically be a client function. Thus, an Origin conversing with an information provider could use Explain to determine what language a particular database is accessible in, and then use that language (e.g., US English) to specify the search terms and interpret the document text returned via a Z39.50 Present. If records are available in multiple languages, the Origin would select the desired language as a variant dimension within the Element Specification.

...an Origin conversing with an information provider could use Explain to determine what language a particular database is accessible in, and then use that language (e.g., US English) to specify the search terms and interpret the document text returned via a Z39.50 Present.

The second characteristic mentioned above which affects the interpretation of the text returned by the Target is the character encoding scheme used to encode text sent to the Origin. One possible option here is Unicode, a universal (international standard) encoding scheme which allows the receiver to interpret each character of text received. Unicode identifies the attributes (e.g., accents, punctuation, etc.) of each character within the encoding. This facilitates presentation and translation by the client, if required. Although other encoding schemes are available (other ISO standards, Lotus character encoding, etc.), Unicode is the most versatile scheme, and also the most prevalent among international organizations. It will also handle double-byte languages such as Kanji, Katakana, Arabic, and others.

The third aspect of Z39.50 internationalization considerations is the localization of input text sent by the Origin as part of either of the following:

- search term values within search requests;
- task-specific parameters within Extended Services requests.

Most of the items in the categories listed above could also contain structured data fields (such as dates) which vary based on locale (e.g., European dates reverse the month and day of the month), so these must be included in the scope of any locale context setting which impacts the language of text fields.

As inferred from the previous discussion, there are two major elements involved with the interchange of locale-variant information:

- specifying the language/culture (e.g., UK English) of textual information to be sent and received;
- specifying the character encoding scheme.

Thus, the types of locale-variant information described above drive the following Z39.50 requirements:

- the need for a global specification of the locale context (language and culture preference) desired by the Origin (this will most likely be passed as part of the Init sequence) (As an alternative, this could specify a dynamic encoding scheme, if one is chosen in the future, which would allow Origin and Target to dynamically specify and interpret the language of information fields being interchanged);
- the need for a way to specify the character encoding scheme (e.g., Unicode) at the global level (probably within a Presentation Layer Context);
- a way to specify the language of search terms and other text input by the user (a good solution here would be to specify the locale at Init time, Unicode as the presentation context, then encode the specific character variants as part of each search term character);
- a way to identify the locale and character attributes of outgoing data fields which are part of Z39.50 responses, either within the text of documents or within standard protocol fields of Z39.50 responses (as above, one mechanism would be to allow Unicode to encode the specific character variants as part of each text field character);

Using this scheme, the locale would provide a global specification for all fields within the actual protocol of the Z39.50 messages, but would still allow textual information to be retrieved from information databases fabricated in different national languages. One way to identify the language of the information would be to include a “language” element
Z39.50 should be able to handle structured date field types by using the primitive ASN.1 types defined for date fields. Any variants on these could use constructed ASN.1 types which combined primitive date types with other variants. This would allow the client behind the Origin to handle the actual localization of dates and other structured fields.

Some text and structured data fields are “locale invariant,” meaning they do not change based on changes of Origin locale. Examples of “locale invariant” fields are:

- authentication ID’s and authorization tokens (e.g., user ID’s, passwords, Kerberos tickets);
- “object” identifiers of various types (e.g., document ID’s, URL’s, result set ID’s);
- resource ID’s (e.g., system/node names, Origin ID’s, printer/device names).

Please contact me as PETERR@MEADDATA.COM to comment on these concepts.

New Discussion List on Hypertext and Z39.50

Peter Ryall

A new Internet discussion list which would address synergy between emerging hypertext “standards” (specifically but not exclusively World Wide Web) and Z39.50 has been announced. Interesting areas of synergy could be record interchange between the two systems, retrieval from WWW into Z39.50 (e.g., ALA document delivery requesting), translation gateways between the two, or import/export vehicles, just to name a few possible topics.

To subscribe, simply send a message to the author at WWW.Z3950-LIST-REQUEST@GOTHIC.MEADDATA.COM and I’ll make sure you get added to the list. On the flip side, if anyone decides the group is totally boring and useless, send me a note at the same address and I’ll drop your name from the list.

The address of the list itself is: WWW.Z3950-LIST@GOTHIC.MEADDATA.COM, but please don’t send subscribe and unsubscribe messages there as it will just clog up the list. I may have to change the list address in the future, so if you can’t get to the address above, just send your note to me directly (PETERR@MEADDATA.COM) and I’ll see if I can fix the problem.

OIW SIG/LA Meets

Ray Denenberg

Report on Meeting of August 19, 1993

A meeting of the OSI Implementors’ Workshop Special Interest Group on Library Applications was held August 19 at the U.S. Geological Survey. There were 23 people in attendance.

An overview, including the history and background of the group, focusing on the concept of profiles, and the evolution of that concept, was presented by Ray Denenberg (see article below).

A discussion of WAIS was led by Margaret St. Pierre of WAIS, Inc. (see article below) and Kevin Gamiel of CNIDR. The discussion was oriented towards WAIS use of Z39.50.

Margaret described how the early version of WAIS utilized the 1988 version of Z39.50, and plans to migrate to the 1992 version, and possibly to version 3. It is intended that a draft Z39.50 profile for WAIS will be developed, collaboratively by CNIDR and WAIS, Inc. for discussion at the next meeting.

Eliot Christian, USGS, presented an overview of the Federal Locator application. More information on that application will be provided in a later report, when we better understand its relationship to Z39.50, and are able to begin to draft a profile.

Robbie Rand (NAL) was scheduled to discuss the Thesaurus Pilot project, but unfortunately she was ill and unable to attend. George Blair of ConQuest Software attended and there was some discussion of the project, and we hope to discuss it further at the next meeting.

Fritz Schwartz, Faxon, discussed EDI, and its potential as a library application, and there was discussion of EDI’s relationship to Z39.50 and the ILL protocol. We will include more detail in a subsequent report.

Mark Needleman, UC/DLA, provided and discussed a draft Internet RFC for Z39.50 over the Internet (directly over TCP). A draft profile has been derived from the RFC (see attachment 4), and will be proposed for the OIW agreements when finalized. Joe Zeeman and Brad McLean gave an overview of the ILL protocol and ILL scenarios. We will include more detail in a subsequent report.

The meeting concluded with a discussion of the SIG’s scope, work, future, and charter. The SIG will participate, either actively or in a supporting role, in the development of “implementor agreements”; i.e. profiles, ISPs, application contexts, FIPS, or other
formal and informal agreements.

For some areas the SIG will play an active role, either developing or actively promoting the development of profiles; for other areas the SIG will play a liaison role, supporting the profile development of other groups. There are four broad categories of interest:

1. Applications of wide interest within the U.S. and Canada which employ a library application protocol. Examples are WAIS, Federal Locator, and Thesaurus Pilot, all of which use Z39.50.

2. Applications/issues of wide interest within the U.S. Federal community. Examples are the Federal Locator application, and the proposed FIPS for Z39.50.

3. ISPs for SR or ILL.

4. Profiles for supporting stacks, not covered by 3.

For categories 1 and 2 the SIG will play an active role. Initially, however, the SIG will focus on Z39.50 applications (and will play a liaison role for ILL applications). For categories 3 and 4, the SIG will play a liaison role, supporting the work of EWOS EGLIB and IFOSB to develop ISPs, and the work of the ZIG and IETF, developing profiles for supporting stacks, including the current draft RFC for Z39.50 over TCP.

The current charter of the SIG (which is over a year old) and a proposed revised charter are included in articles below. The next meeting of the OIW SIGLA will be September 14 in Gaithersburg.

Report on Meeting of September 14, 1993

A meeting of the OIW SIG on Library Applications was held September 14, 1993, at the National Institute for Standards and Technology in Gaithersburg. There were 10 people in attendance.

There was discussion of the nature of the profiles we will develop, and the criteria for determining that a profile should be developed. Ralph LeVan compared the process to the methodology used in developing software; there should be high-level requirements expressed, technical requirements, and then functional specifications. (The customer brings high-level requirements; technical requirements are agreed upon between customer and developer; finally, the developer produces functional specs from the technical requirements.) Applying this to profiles, for example, high level requirements might be to retrieve documents, but it is necessary to specify technical requirements such as what type of documents and for whom. Functional requirements refer to tools, e.g. Z39.50 and ILL protocol. There must be "traceability"; ensure that the functional requirements meet the requirements, and that there are no functional specifications except those necessary to meet the requirements.

The two most important criteria for commitment to develop a profile are: (1) there must be a customer for the profile (i.e. a customer base for products to be developed based on the profile) and, (2) the customer must be part of the process. It is also desirable that potential developers of products based on the profile (i.e. implementors) be identified and part of the process, and it is essential that the process be open to all customers and implementors who wish to participate.

WAIS, Inc. and CNIDR are potential implementors of products based on a WAIS profile, and they will be part of the process of developing the profile. Finally, the process is explicitly open to all customers and implementors who wish to participate.

WAIS was then considered as a test case, and it certainly seems to meet the criteria. Eliot Christian stated that the locator application will need to use WAIS (not just Z39.50), and of course the developers of the locator application (i.e. the WAIS customer in this case) will be part of the process in developing a WAIS profile. WAIS, Inc. and CNIDR are potential implementors of products based on a WAIS profile, and they will be part of the process of developing the profile. Finally, the process is explicitly open to all customers and implementors who wish to participate.

Federal Locator

Eliot Christian described progress on the locator project, which is now referred to as GILS (Government Information Locator Service). Some of the research for the project will be directed by USGS and Syracuse University, specifically, an application profile for GILS. This project is described below.

WAIS Profile

There was extensive discussion of WAIS requirements, with respect to Z39.50. This included discussion of relevance feedback, document identifiers, ranking, record syntax, element specification, and retrieval of records identified in previous Z-associations.

Thesaurus Project

The National Agricultural Library is coordinating an interagency pilot project aimed at improved Global Change Master Directory (GCMD) access. With the vast amount of information being collected, "meta" tools are needed to enable and extend the full use of existing retrieval tools. The intention is to expand the existing GCMD controlled vocabulary by
using an interactive semantic network combined with natural language understanding, by linking existing distributed vocabularies and dictionaries, using keyword mapping, and by adopting other mechanisms to provide concept-based searching. ConQuest Software will be the basis for the pilot project, using their text and image retrieval system. Documents for the pilot database will be contributed by the participants.

The project, though short term, is expected to provide a basis for further definition and development of a client/server thesaurus application, in which clients and servers may be developed by different vendors, and will interoperate. The basis for interoperation will be Z39.50 as well as a Z39.50 profile to be developed for the application.

Robby Rand, who heads the project, was unable to attend the meeting, but provided an overview of the project, included below.

**Z39.50 over TCP**

The draft profile for Z39.50 over the Internet (Z39.50 directly over TCP) based on a draft RFC, was included as an attachment to the report of the August meeting. There was discussion and general agreement on the content. When the developers of the RFC say that it is stable, the profile will be submitted to the OIW for addition to the implementors agreements.

**Charter**

The draft charter was discussed and revised. The revised draft will be voted upon at the next meeting, to be held during the week of December 6-10, at NIST, and if approved will be submitted for approval to the OIW.

**OIW SIG Proposed Charter**

**Draft Revised Charter, September 1993**

**General**

The OIW Library Applications SIG will participate in the development of implementor agreements for library application protocols. The term “implementor agreement” as used in this document refers to a profile, ISP, application context, or related set of agreements. The term “library application protocol” as used in this document refers to ANSI Z39.50, the corresponding ISO standard Search and Retrieve (SR, ISO 10162/10163), the Interlibrary Loan protocol (ILL, ISO 10160/10161), or a related protocol.

For some areas the SIG will play an active role, either developing or actively promoting the development of profiles; for other areas the SIG will play a liaison role, supporting the profile development of other groups. There are four broad categories of interest:

1. Applications of wide interest within the U.S. and Canada which employ a library application protocol. An example is WAIS, which uses Z39.50.
2. Applications of wide interest within the U.S. Federal community. An example is the federal locator.
3. ISPs for SR or ILL.
4. Profiles for supporting protocol stacks, not covered by 3.

For categories 1 and 2 the SIG will play an active role. Initially, however, the SIG will focus on Z39.50 applications (and will play a liaison role for ILL applications). For categories 3 and 4, the SIG will play a liaison role, supporting the work of EWOS EGLIB and IFOBS to develop ISPs, and of the ZIG and IETF, developing profiles for supporting protocol stacks, including the current draft RFC for Z39.50 over TCP.

**Scope and Terms of Reference**

1. To provide an open forum for development of stable implementor agreements, between vendors and users, pertaining to library application protocols, for the implementation of interoperable products.
2. To examine library application protocols' use of and relationship to other protocols as appropriate.
3. To develop application context definitions for library application protocols.
4. To support the development of ISPs for SR and ILL.
5. To identify the need for OSI objects for Z39.50 applications, including attribute sets, diagnostic sets, syntaxes, resource report formats.
6. To conduct liaison with:
   - ZIG;
   - Z39.50 Maintenance Agency;
   - IETF;
   - IFOBS;
   - Standards bodies: NISO, ISO TC46;
   - other regional workshops: EWOS and AOW;
   - other OIW SIGs as necessary;
   - NIST.
7. To provide input to the relevant bodies listed above concerning defects, provide feedback on pro-
posed changes to the standards, and where appropriate, recommend changes and enhancements.

8. To develop interoperability and conformance test scenarios as necessary.

**High Priority Work Items**

- Z39.50 profile for WAIS.
- Z39.50 profile for GILS.
- Z39.50 profile for Thesaurus project.
- Profile for Z39.50 over TCP.

**Other Work Items**

- Support the work of IFOBS and EWOS in the development of ISPs, including:
  - ALD11, for SR using ACSE.
  - ALD21, for ILL using ACSE.
  - ALD22, for ILL using IPMS.
- Profile for ILL using SMTP.
- Profile for Z39.50 using OSI upper layers over TCP/IP.
- Profile for ILL in connection mode over TCP.

**Overview of OSI Profiles**

*Ray Denenberg*

The concept of an “OSI (Open Systems Interconnection) profile” evolved from the early NBS (now NIST) OSI (now OSE) Implementors Workshop in the US. The workshops began in 1983. Originally, they were primarily intended for manufacturers, and focused on refining the OSI standards to reach a set of implementable and interoperable agreements. “Refining” meant to choose subsets, options, classes, and values for parameters for a given protocol; essentially, to make concrete choices where these choices are left open in the protocol standard. The decisions from these workshops are documented in the form of so-called “OSI (or OSE) Implementors’ Agreements.”

Around 1987, the UK government developed a set of specifications which it called UK GOSIP, for “Government OSI Profile.” It was a procurement specification covering OSI-based communication for UK government civil administration. Its stated objectives were to facilitate procurement and testing of communication products, to ensure that separately-procured department systems can interwork, and to provide specification to manufacturers on which to base strategic product development. Its stated premise was that the base OSI standards were too broad and not, in themselves, sufficient to achieve these objectives.

Meanwhile in the US, during the same period, NBS began development of U.S. GOSIP, which initially meant Government OSI Procurement — the “P” stood for “procurement,” not “profile.” However, early in the process the “P” was changed to “Profile,” following the UK lead. So both the UK and U.S. GOSIP were called profiles, but they were really procurement specifications. U.S. GOSIP was keyed very closely to the NBS OSI Workshop Agreements. It was intended for use by a procuring agency and it initially addressed two applications (FTAM and X.400) operating over several network technologies.

**EWOS and IFOBS**

EWOS, the European Workshop for Open Systems, was established around 1987 to develop OSI profiles where the term “profile” was more contemporary, referring to an ISP (International Standardized Profile, described below), or an EN (European Standard) developed by EWOS. In 1988, IFOBS, the International Forum on Open Bibliographic Systems, was formed, and its mandate includes the charge to develop ISPs for bibliographic OSI protocols.

**Functional Standards**

On a rather different thread, the concept of “functional standard” also led to the concept of a “profile.” Around 1985 people began to seriously consider functional standards for OSI. The premise behind the term was that a base standard alone does not provide specific enough detail to be “functional”. A base standard is simply a particular protocol standard — Z39.50, SR, ILL, FTAM, etc. There are two major areas in which any particular base standard may be inadequate. First, a protocol standard requires an implementor to make choices among options and parameter-value ranges. Second, a protocol must be used in combination with other protocols — for example Z39.50 might be used together with ACSE and Presentation, or it may run directly over TCP. It is beyond the scope of an individual base standard to specify details of how it is to be used in combination with other standards.

Around 1987, the Special Group on Functional Standardization, SGFS, was established within ISO to sort out the issues of functional standards. It developed a new type of publication, the “International Standardized Profile,” ISP, which has the status of an ISO International Standard. The SGFS also produced ISO Technical Report TR-10000, “Framework and Taxonomy of International Standardized Profiles” which describes in detail the pur-
### Standards Status: October 1, 1993*

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<td>Z39.72-199x Format for Submission of Data for Multimedia CD-ROM Mastering (SCAE)</td>
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<td>Z39.73-199x Single Tier Steel Bracket Library Shelving</td>
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<td>Revision</td>
<td>Z85.1-1980 Permanent and Durable Library Catalog Cards</td>
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<td>Development</td>
<td>SCMM Env. Conditions for the Exhibition of Library... Materials</td>
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<td>Development</td>
<td>SCQQ Physical Preparation of Theses and Dissertations...</td>
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<td>Formation</td>
<td>SCSS Information to be Included in Ads [etc.] for Products Used for the Storage, Binding or Repair of Library Materials</td>
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<td>Development</td>
<td>SCZZ Library Binding and Library Prebound Books</td>
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<td>Development</td>
<td>SCAC Guides to Microform Sets</td>
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<td>Development</td>
<td>SCAD Interface-Independent Retrieval Protocol for CD-ROM</td>
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<td>Formation</td>
<td>SCAF Acquisitions Data Elements</td>
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*Note: this list does not include current, approved standards not being revised.*
pose and structure of an ISP and the taxonomy of ISPs.

TR-10000 discusses the SGFS concept of a profile in detail, and the discussion is extended to describe an International Standardized Profile. A profile is defined as: “a set of one or more base standards, and, where applicable, the identification of chosen classes, subsets, options and parameters of those base standards, necessary for accomplishing a particular function.”

And an ISP is: “An Internationally agreed to, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions”.

There is an important difference between the concepts of profile and ISP: An ISP is a document, and it has the status of an international standard. A profile is an abstract object with no particular concrete representation.

A profile definition includes the following elements:

A set of base standards to be used together; how they are to be used together; and particular details of each of the base standards.

A statement of scope, function, and purpose.

Scenarios of interoperation.

“A set of base standards” might be a “horizontal” or “vertical” slice (or a combination of the two), for example, a profile might specify how Z39.50 and ILL (a horizontal slice) may be used together, or Z39.50, ACSE, and Presentation (a vertical slice).

The scopelfunction/purpose could be the application that the profile is to support, for example, WAIS, Federal Locator, Thesaurus Pilot, or Interoperability Testbed; or it might be a generic profile which one of the above profiles might reference.

The scope/function/purpose could be the application that the profile is to support, for example, WAIS, Federal Locator, Thesaurus Pilot, or Interoperability Testbed; or it might be a generic profile which one of the above profiles might reference.

For ACSE, Presentation, and Session, but no other specific application protocol.

“Scenarios of interoperation” might be applicable, for example, when combining Z39.50 and ILL, and describing how one uses Z39.50 to retrieve a citation and ILL to order the corresponding document.

**Taxonomy**

In TR-10000 the SGFS has established a taxonomy for ISPs where profiles are divided into two primary classes: A-profiles (for OSI layers 5-7) and T-profiles (for the lower four layers). An SR or ILL profile will fall into the A class (for use with a T-profile). It is important to note that the SGFS has allocated a top-level node in the taxonomy hierarchy for “Library Applications”:

- EWOS in collaboration with IFOBS, has established a draft sub-taxonomy and begun work on several ISPs defined within. It is expected that the OIW would use these profiles wherever practical. It is not expected that the OIW would participate actively in the development of ISPs, except in a liaison capacity to EWOS and IFOBS, when appropriate. It is expected however that ISPs developed by EWOS/IFOBS will be reviewed by the OIW SIG/LA for adoption into the OIW agreements.

**PICS, Proformas, and Profiles**

The concepts of a PICS and PICS Proforma are important here because of their relationship to ISPs and profiles. A PICS (Protocol Implementation Conformance Statement) is a statement made by the supplier of an implementation of a protocol stating what capabilities have been implemented.

A PICS Proforma is a document, in the form of a questionnaire, designed by the protocol developer which when completed for an implementation becomes the PICS.

Thus the PICS Proforma is a questionnaire and the PICS is the filled out questionnaire, which serves as documentation, for a particular implementation, of conformance to a particular protocol.

A PICS proforma is often developed as a companion standard to an OSI protocol standard. An ISP may be developed by filling out a PICS proforma, not for an implementation, but rather for a profile.

The Z39.50 Implementors Group has found several flaws with this process. The PICS proforma for Z39.50/SR is too detailed, and cumbersome to fill out. Serious questions have been raised whether a proforma for a profile is necessary. The prevailing view is that if a profile can be documented in a paragraph, it should be. The question also arises as to the utility of an ISP. By definition, it must be very
formally documented, and it must be internationally harmonized, which could mean that it will be too general to be useful.

On the other hand, there may be significant benefit to profiling Z39.50 for use by a specific application. Three applications come to mind immediately: the Federal Locator, WAIS, and the Thesaurus Pilot. For example, for the Thesaurus project, there has been misunderstanding between the application developers and Z39.50 experts concerning how the Thesaurus project actually intends to use Z39.50. Misunderstanding like these could be avoided if there were a concise profile. There are similar misunderstandings for WAIS.

WAIS Use of Z39.50

Margaret St. Pierre, WAIS Inc.

The development of the network publishing system, Wide Area Information Servers (WAIS), began in October 1989 with the first Internet release occurring in April 1991. From the beginning WAIS committed to use the Z39.50 standard as the information retrieval protocol between WAIS clients and servers. The implementation is still in use today by existing WAIS clients and servers resulting in over 50,000 users of Z39.50.

The purpose of this presentation is to initiate a discussion to establish a migration path of the WAIS technology from Z39.50-V1 to Z39.50-V2 and then to Z39.50-V3. It is planned that the eventual result of this dialogue will be a profile describing how a WAIS implementation makes use of the Z39.50 standard.

Presentation Outline

This presentation begins with a historical overview of WAIS and its original use of the Z39.50-V1 standard. Next, the operations WAIS implemented as extensions to Z39.50-V1 are presented, and how these extensions could be addressed in Z39.50-V2 and V3. Further discussion of these extensions will be the subject of future OIW meetings. Finally, a few of the future directions of WAIS are listed, with an eye toward using the Z39.50 standard as a basis for these future directions.

Background Information on WAIS

WAIS is designed to serve the expanding network publishing industry. The principles guiding WAIS development are that it is:

1. A wide area network-based information system for browsing, searching, and publishing.
2. Based on standards.
3. Easy to use for everyone on every possible platform.

From this basis, a large group of developers, publishers, standards bodies, libraries, government agencies, schools, and users have been helping further the WAIS system.

In WAIS, a query consists of three components: natural language, Boolean operators, and relevance feedback. Relevance feedback is the ability to select a document, or portion of a document, and find a set of documents similar to the selection. A search returns a relevance-ranked list of headlines, document identifiers (doc-ids), and document formats. A headline is a set of words that convey the main idea of a document. A doc-id is a unique identifier for the document containing information such as its location. The document formats are a list of the formats, or variants, of the documents, e.g. text, Postscript, TIFF, etc. Each document is scored, or ranked, according to its relevance to the original query. This rank is used to determine the order in which the information is returned from a search.

Retrieval is performed as part of the search operation. The search request specifies a doc-id, a document format, a start-byte position, and an end-byte position. The server response contains the requested full text or image document, or a portion thereof, in the specified format.

Historical Design Goals of WAIS

As an aid to understanding the original WAIS implementation of Z39.50, it is important to take a look at the historical design goals and the reasoning behind these goals.

Primarily Non-Bibliographic Documents in Multiple Formats

WAIS was designed to serve primarily non-bibliographic data, such as full text and images, although bibliographic data could also be used. Since a non-bibliographic document may exist in multiple formats, WAIS was designed to handle multiple
document formats.

Stateless Server

The WAIS server was designed to be "stateless," meaning that result sets are not stored by the server. Relaxing this constraint may prove the most prudent path.

Simple Client

The implementation of a WAIS client was designed to be simple, and independent of the functionality supported by the server. This resulted in a client that did not parse queries into a Type-1 RPN query, but instead would send the query as a single string to the server, where the server would be responsible for parsing the query. Thus the client software did not require modification to support changing functionality of the server.

Segmentation

Because full text and images are often larger in size than the receive buffer of the client, clients were designed to retrieve documents in "segments." Since retrieval was implemented as a search, the client was designed to append a start- and end-byte position of the segment to the query. An example of a fully-specified retrieval query is: (doc-id AND format=text AND startbyte=0 AND endbyte=2000). Segments of documents used in relevance feedback were specified in the same manner.

TCP/IP

Due to the popularity of TCP/IP and the Internet, WAIS was designed to run over TCP/IP. WAIS has also been designed to run over other transports such as ISDN, X.25, IPX, Modems, etc.

Historical Use of Z39.50 in WAIS

By working with the ZIG, the WAIS developers used a recommended subset of Z39.50-V1 and a recommended approach for extensions to fulfill its requirements. Over time, many of these requirements have then gone into the definition of future versions of Z39.50. As new requirements become apparent, WAIS again will use the standards in an extended way based on recommendations from the Z39.50 groups to help understand how future versions should proceed. WAIS supported the Init and Document services. Document retrieval was implemented using the Search service.

Operations Supported with Z39.50

Recommended Extensions

Many of the operations WAIS historically supported as extensions to the Z39.50-V1 standard are now supported within Z39.50-V2 (and/or V3). The exact details of how each of these operations will be performed within the Z39.50 standard are not all resolved. Suggestions from all implementors are welcome!

Boolean Operators, Proximity Relationship, Right Truncation, and Fielded Search

In keeping with the goal of the simple client model, WAIS used a user-info field of the search PDU in which to specify the query. Compliance with Z39.50 requires support for Type-1 queries, where Boolean operators, right truncation, and fielded search are expressible. Proximity relationships can be expressed in a Type-101 query.

Multiple Document Formats

As a result of a search, WAIS returns a list of records, where each record contains a headline, doc-id, and a list of formats. This facility may be addressed with ES-1 and the Generic Record Syntax of Z39.50. A nomenclature for document formats is also needed. The IETF MIME standard is working to define a process for registering document format names.

Searching Multiple Databases

WAIS was designed with the ability to search multiple databases, but not in the same search request. Searching multiple databases on the same server was performed by either establishing separate sessions, or by sending multiple search requests, one for each database. Z39.50 specifies that multiple databases can be searched in the same search request.

Segmentation of Large Documents

As described previously, large documents were designed to be retrieved as segments (fragments). Segmentation is addressed in Z39.50-v3.

Access-List Security

Before a client connection can be established to a server's database, a WAIS server checks the IP address of the client against an access-list of legal IP addresses. If the IP address of the client is legal, the client is granted access. This facility was implemented in WAIS in the transport layer, not the application layer. Potentially this could be addressed using the Access Control Facility specified by Z39.50.

Forwarder

Client requests and server responses go through an intermediate process called a forwarder that runs on a firewall machine, where the firewall machine connects a secure network to an external network. PDUs from one network destined for the other network must pass through the firewall machine.

Long-Term Plans with Z39.50

There are a number of new functional pieces that...
WAIS users would like to see included in the WAIS system. As WAIS implementors, in addition to conformance with Z39.50, we would like to include this new functionality while also maintaining continued conformance to the standard. Following is a partial list of these functions, along with a brief explanation of each.

**Explain Facility with Dynamic Attribute Sets**

This is the ability for a client to dynamically discover the attributes (fields) available for a database.

**Non-textual Searching**

The US Geological Survey is pursuing standards for searching areas of the globe using latitude and longitude and returning maps. There will be other special cases for non-textual searching that will be put on top of WAIS such as DNA searching, and these will require new query formats.

**Hardcopy Delivery of Documents**

Without widespread page image standards for computers, there is a growing demand for fax and other hardcopy delivery facilities.

**Submission of Documents to a Database**

The number of different types of databases that would work well with WAIS would be greatly increased if it were easy to submit documents.

**Hierarchical Browsing**

This is Gopher-style browsing over small collections of information, but instead using the Z39.50 standard.

**Authentication and Encryption**

A standardized means of authentication and encryption is required in highly secure environments, such as Kerberos and Public Key encryption.

**Document Identifiers**

A document identifier provides a means of uniquely naming documents and giving their location, such as the IETF URN and URL structures.

**Billing Formats**

The server should have the ability to feed usage information into billing systems.

**Network Support**

Use of other networks and hybrid networks involving ISDN, IPX, Appletalk, X.25, modems, etc. needs support.

**Conclusion**

WAIS users look forward to the added capabilities of Z39.50-V2 and future versions. We are now working very hard at defining exactly how the migration path to V2 and V3 will be designed and executed. Thank you for helping with this process.

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**Locator Profile: Profile Development Project for Government Locator Application**

Eliot Christian (United States Geological Survey) and William E. Moen (School of Information Studies, Syracuse University) described a cooperative research project between USGS and Syracuse University to expand research and development on the American National Standard for information searching and retrieval (ANSI/NISO Z39.50). Specifically, the project will focus on developing an application profile for a government information locator service (GILS). (The original project announcement follows this article.)

Federal agencies' staff have outlined the functionality needed for the GILS, and the profile development, which is the goal of this project, will address these user requirements and at the same time provide specific guidance for implementations of the GILS.

Charles R. McClure (Syracuse University) and Moen are co-principal investigators for the cooperative research project funded by USGS. The project will bring together a research team of experts on ANSI/NISO Z39.50 and Federal information resources to carry out the following project objectives:

- Expand research and development on Z39.50 to facilitate public access to Federal information resources and speed the development of interoperable systems.
- Build consensus of major stakeholders on the use of Z39.50 for GILS implementations.
- Develop an application profile for networked-based GILS implementations which references Z39.50 and other standards for use in the Internet environment.
- Support and encourage test implementations of the profile by interested parties to provide evaluations of the profile and for interoperability testing.

The project began September 7, 1993 and is scheduled for completion in February 1994. A summary report of the project will be available in March.
1994 and will document the activities, products, and accomplishments of the project.

Federal agencies' staff have outlined the functionality needed for the GILS, and the profile development, which is the goal of this project, will address these user requirements and at the same time provide specific guidance for implementations of the GILS. Constructing a standards-based GILS, based on a widely accepted application profile, will ensure interoperability and interworking of the agency implementations. As important, the standards-based GILS will ensure wider public access to Federal information resources.

The project coordinators and sponsors will work with the ZIG and the OIW SIG/LA in the development of the profile. The completed profile will then be moved through the OIW process for approval as an implementors' agreement.

Z39.50 Prototype Implementation Project Described

Eliot Christian

Title. Research Toward a Prototype Reference Implementation of a Locator Profile of the National Information Standards Organization (NISO) Z39.50 Search and Retrieval Standard

Purpose. The government wishes to provide support for research toward a prototype reference implementation of NISO Z39.50. The public benefit of this project is that such a reference implementation would promote research, education, government, military, and commercial initiatives to facilitate access to information resources and speed the development of interoperable systems.

This specific profile of Z39.50 should support search and retrieval of locator information on digital networks about data and information sources throughout the government. This research toward a prototype should promote wider acceptance of Z39.50 as an international standard and provide direction for growth for those implementations, eventually leading to a public domain reference implementation that would include a full conformance testing suite and conformance testing services.

Search and Retrieval Standards

Major government programs such as the Global Change Research Program, the High Performance Computing and Communications Initiative, the national spatial data infrastructure, and the proposed National Information Infrastructure have brought a sharp focus on the scientific and economic importance of digital networks. Fundamental to the success of these networks is the availability of tools to help users search among the many thousands of data and information resources becoming available. System designers are now realizing that it is no longer reasonable to expect users to contend with incompatible tools for finding their way among the many different sources they need to access.

Some generalized tools are evolving and gaining widespread use, but these are not fully utilizing the power and flexibility of existing search and retrieval standards. For example, the Internet research environment has generated various search and retrieval mechanisms, including Gopher, Archie, Netfind, and World Wide Web. Although fairly popular, these separate tools are not based on formal standard protocols that would assure interoperability and long term stability. Even now, new search and retrieval mechanisms are being created by leading information system developers without a full awareness of how existing standard protocols for search and retrieval could be incorporated.

An opportunity exists to bring a degree of coherence to the task of information search and retrieval on digital networks by promoting the use of standards.

An opportunity exists to bring a degree of coherence to the task of information search and retrieval on digital networks by promoting the use of standards. Many communities have been attracted to the powerful and flexible standard for information search and retrieval known in the United States as NISO Z39.50. Z39.50 came originally from the library systems committee accredited to the American National Standards Institute (ANSI). This U.S. standard is fully aligned with the International Standards Organizations (ISO) standards for Search and Retrieval (ISO 10162 and 10163).

Locator Profile

The phase of active experimentation with Z39.50 over the last four years has now led to strong public domain and commercial products, and incorporation into production applications. Within the government, the Office of Management and Budget (OMB) has asked agencies to develop and maintain indexes and other tools to make it easier for the public to locate information, and has committed to promote the establishment of an agency-based government Informa-
tion/Inventory Locator System. Many agencies now recognize the public need for a high quality and readily comprehensible reference implementation of a Z39.50 locator profile to support this and other locator applications. Agencies of the Interagency Working Group on Data Management for Global Change (IWGDMGC) are specifically interested in supporting research toward a prototype profile of Z39.50 to simplify access to locator information about data holdings.

Reference Implementation

As with all complex standards for data and information processing, the written documentation of the Z39.50 standard is somewhat ambiguous and profile implementations that comply with the letter of a standard can be drastically incompatible. For this reason, the builders of software systems and the standards organizations themselves now expect that there exist a recognized reference implementation before a profile is considered to be stable and accepted by the community.

A reference implementation should address easy portability, respectable quality and maintainability, and distribution without constraint on its use. It is acceptable that the reference implementation not be optimally efficient since it is more important that the implementation be structured such that its operation is readily discernible.

The reference implementation becomes a basic building block that will strongly influence the design of other products, and will often be directly incorporated. Incorporation of the reference implementation will not be necessary for conformance to this Z39.50 profile, although the prototype reference implementation may form the basis for a conformance testing suite.

Project Tasks

This research project consists of the following tasks which produce specific reports:

1. Identify major stakeholders and constraints, characterize the Z39.50 profile to be prototyped, and document a prototype implementation plan.
2. Build consensus among major stakeholders on the prototype reference implementation.
3. Exercise and validate the prototype reference implementation.
4. Prepare tutorials and other explanatory materials for outreach.
5. Assist in conducting a broad review and establishing a conformance testing suite.

It is recognized that unrestrained effort on any of the specified tasks could itself consume all or more of the resources available in this project. Personnel costs and funding of contractual costs other than personnel will be allotted by the Cooperator.

Reports

The project report for Task 1 consists of three written documents. One document is a list of contacts made to organizations expected to be major stakeholders, together with notes regarding any input provided as constraints or other guidance to the project. Among the major stakeholders with which the project would coordinate may be: the Z39.50 Implementors Group (ZIG), the National Information Standards Organization (NISO), the Library of Congress, the Clearinghouse for Networked Information Discovery and Retrieval (CNIDR), the Internet Engineering Task Force (IETF), the Federal Geographic Data Committee, and the IWGDMGC. These groups, and others as may be identified later, would also serve as focal points for gathering requirements from other affected communities. For example, CNIDR will be expected to represent the interests of the developers of Archie (Bunyip Inc.), World Wide Web (CERN), and Internet Gopher (University of Minnesota), among others.

Included in this second document will be the prototype design considerations, including: support for specific transports (e.g., TCP/IP, OSI, ISDN, X.25, Appletalk, and Novell IPX); operating systems (e.g., DOS, Macintosh, Unix, MS Windows, VMS, MVS, and VM); standards such as Unicode, Abstract Syntax Notation, authentication, and encryption; and extendibility of the reference implementation to support additional Z39.50 objects.

A second document reported from this task will be an explicit statement that characterizes the profile of Z39.50 to be prototyped, and describes the technical prerequisites for using the prototype reference implementation. Included in this second document will be the prototype design considerations, including: support for specific transports (e.g., TCP/IP, OSI, ISDN, X.25, Appletalk, and Novell IPX); operating systems (e.g., DOS, Macintosh, Unix, MS Windows, VMS, MVS, and VM); standards such as Unicode, Abstract Syntax Notation, authentication,
and encryption; and extendibility of the reference implementation to support additional Z39.50 objects. Consideration will also be given to accommodating legal and ethical implications, such as promoting compliance with the Privacy Act.

From the contacts with stakeholders and deliberation among the project participants, a third report document will be developed: an implementation plan suitable for broad dissemination and stating the goals, constraints, and technical approach for the project.

The project report for Task 2 consists of one written document that lists those stakeholders contacted, remarks by stakeholders regarding the project's stated implementation goals, and notes on how the project dealt with the substance of those remarks. Where appropriate, this task may result in suggestions to be forwarded through the ZIG to the Z39.50 Maintenance Agency.

The extent to which a conformance testing suite may be formally established is not known at this time. However, it does seem likely that conformance testing support may be contributed by CNIDR, the United States Geological Survey (USGS) and other IWGDMGC agencies, as well as other institutions. The project participants are encouraged to support such contributions within and external to this project.

Role of the Cooperator

The Cooperator will execute the project primarily by coordinating research work among representatives of several organizations from across the spectrum of stakeholders. These individuals should be engaged in compiling existing documents and computer code that gains the consensus of major stakeholders, and is easy to understand and to incorporate into products that apply Z39.50 in the context of locator applications.

Role of the Government

The government commits Tim Gauslin of the USGS as a Technical Representative to work directly with the Cooperator and designated researchers. The Technical Representative will represent the Federal Government as a stakeholder in implementation of locator applications, as well as the interests of the government in assuring a level playing field among commercial and other affected parties.

Copyrights

All products of this project, including electronic documents and documented computer code, except as provided under Task 4, will be placed into the public domain and will be released without any restrictions on future use. As original authors, some of the personnel participating in this project may hold rights to extant computer code and documentation components that may be incorporated into the products of this project. These individuals and related organizations holding such rights will be requested to forgo their rights to restrict any future use of those components. An explicit stipulation to that effect will be incorporated into each of the contracts or other agreements executed under this project.

Funding

This research project toward a prototype reference implementation of a locator profile of Z39.50 is funded by the U.S. Government, through the IWGDMGC. The USGS represents the IWGDMGC in this project.
Period of Performance

The Cooperator is expected to start work within thirty days of award. The work is expected to be completed within six months.

Administration

Administration of the Cooperative Agreement between the USGS and the Cooperator will be performed by the Project Officer.

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(703)648-7245

Thesaurus Pilot

“Meta-Tools” For Enhanced Access to Global Change Multiple Distributed Metadata Directories and Data Collections

Roberta Rand, USDA

The United States Global Change Research Program (USGCRP) was established to observe, understand, and predict global change and to make its results available for use in policy matters. Activities of the USGCRP are coordinated by the Committee on Earth and Environmental Sciences (CEES), as prescribed by the Global Change Research Act of 1990. Because data and information are of fundamental importance to the USGCRP, the CEES published a program plan where USGCRP members committed to work with each other, with academia, and with the international community to make it as easy as possible for researchers and others to access and use global change data and information. Towards this end, agencies participating in the USGCRP are organizing the Global Change Data and Information System (GCDIS) which takes full advantage of the mission resources and responsibilities of each agency and links the services of these data and information resources to each other and to the users.

These interagency activities, including the GCDIS, are fully coordinated by a subcommittee of the CEES, the Interagency Working Group on Data Management for Global Change (IWGDMGC).

The IWGDMGC, GCDIS Catalog System Subgroup (CSS) and the Library Subgroup (LIS) have been discussing the need for improved Global Change Master Directory (GCMD) keyword access. It is agreed that better and more accurate access is critical to the success of the research agenda. In January 1993, the CSS formally requested assistance from the LIS by asking it to develop a keyword/thesaurus white paper with recommendations.

Librarians and information management professionals have recognized the need to assist researchers in the complex multi-disciplinary research areas. Traditionally, they have developed and applied tools to assist in the storage and retrieval of information. In response to the vast amounts of data and information now being collected, additional retrieval tools are needed. These additional tools can be viewed as “meta” tools enabling and extending the full use of existing tools.

The LIS responded by presenting four options:

1. Elimination of most or all of the DIF keywords
2. Development of a “full blown” thesaurus/lexicon
3. Expansion of the existing DIF vocabulary
4. Development of alternatives to controlled keywords

LIS members recommended Options 2 and 4, whether independently or in combination. In their opinion, implementing these options would offer enhanced and accurate access to datasets with the greatest flexibility.

USDA, the National Agricultural Library (NAL), offered to coordinate an interagency pilot project to implement these options. This method is towards establishing a “proof of concept,” ...that traditional methods currently employed can be greatly improved because of available new technology. It is the intention to follow the mandates of the recommended options as closely as possible.

One mandate is to expand the existing GCMD controlled vocabulary at all levels by using a computerized, interactive, integrated knowledge base that is a semantic network combined with natural language understanding.

One mandate is to expand the existing GCMD controlled vocabulary at all levels by using a computerized, interactive, integrated knowledge base that is a semantic network combined with natural language understanding. This is achieved by linking together existing distributed vocabularies and dictionaries, using keyword mapping, and by adopting other mechanisms to provide concept-based searching.

The result would be enhanced access to multiple, distributed metadata directories and data collections, without ownership, using natural language
queries. The success of this approach will be determined, in part, by the rate of development and the direction of emerging semantic networking technology. The process could be accelerated by procuring currently available off-the-shelf client/server software which adheres to common standards for this technology. Additionally, a user's group will be designated to work actively with the developer.

ConQuest Software, Inc., is the basis of the project. ConQuest has an existing commercially available text and image retrieval system which uses natural language processing techniques, word meaning processing, and concept-based information retrieval built from many electronically available dictionaries and thesauri. The knowledge base contains over 340,000 word meanings, connected by over 3 million links. Additionally, ConQuest has provided for the extension of the delivered knowledge base. ConQuest is currently working under a number of government contracts, with particular emphasis on medical applications through agencies such as NIH, and other organizations.

ConQuest has an existing commercially available text and image retrieval system which uses natural language processing techniques, word meaning processing, and concept-based information retrieval built from many electronically available dictionaries and thesauri.

The database will be comprised of data contributed by the participants. New terminology will be added to the ConQuest knowledge-base for use during the project.

Participants are sharing the cost of the project. Participants include: Argonne Labs, Cambridge Scientific Abstracts, CIESIN, DOC (NOAA/EIS, NOAA/Library, NTIS), DOD (DTIC), DOE, (Oak Ridge Labs), DOI (USGS), EPA, Library of Congress, NASA, Roper Public Opinion Poll, USDA, University of Maryland, Department of Veterans Affairs. Participants will provide data, new terminology, and vocabulary expertise within their disciplines as well as system feedback. When complete the system will be evaluated by the participants both onsite as a standalone system and over the Internet using Z39.50. The adherence and support of standards is essential to this development and application.

The project formally begins in August and will conclude before the end of the calendar year 1993. The project, though short term, is expected to provide a basis for further definition and development of a thesaurus application based on a client/server model, in which client and servers may be developed by different vendors, and will inter-operate. The basis for interoperation will be the Z39.50 protocol as well as a Z39.50 profile to be developed for the application. It is expected that the NIST OIW Library Application SIG will assist in the development of this profile.

**NISO News and Notes**

**NISO to Exhibit at ALA**

If you'll be attending the ALA Midwinter Meeting in Los Angeles, plan to stop by the NISO exhibit table in the small press area of the exhibits. NISO will be at Table T-1660. The latest NISO Press publications will be on display, as well as the draft standards out for ballot. Come say hello and catch up on NISO!

**New Standards Committees Formed**

NISO will be forming three new standards committees in 1994 to draft standards on:

- Standard format for downloading records from bibliographic and abstracting and indexing databases
  The proposed standard would define display formats on terminals in a structured fashion.

- Standard for sorting of alphanumeric characters and other symbols
  The proposed standard would be based on the rules developed for the recently revised standard on indexing (Z39.4-199x) and apply to the sorting of letters, numerals, and graphic symbols including punctuation marks, printed on eye-legible media and displayed on screens.


**Z39.53-1987 to Be Revised**

The NISO-developed American National Standard for language codes, Z39.53-1987, has been revised and will be balloted for approval in November 1993. It was originally planned to reaffirm the 1987 standard with the intention of adopting the international language code standard in its stead. It now appears that the approval process for the international standard will not be completed as quickly as originally hoped, making it important that the domestic standard be revised to incorporate new codes. The ballot is scheduled to commence in November 1993.
Welcome to NISO!

NISO welcomes the following newly appointed voting representatives: Andrew Laurence (George Washington University Law School) representing the American Association of Law Libraries; Lynn Lady Bellardo (NARA) newly appointed voting representative for the Society of American Archivists; Howard Baulch representing Mead Data Central; Bill Russell, now serving as Geac’s alternate voting representative to NISO (replacing John Blackham); Lori Bahrman, replacing Pamela Parry as the ARLIS/NA standards representative; and Mark Needleman, University of California, stepping in as the ASIS voting representative (replacing Nolan Pope).

NAPM to Develop AV Labeling Standard

A national standard for the packaging and labeling of videocassettes will be developed by the National Association of Photographic Manufacturers Technical Committee IT 7 on Instructional Audiovisual System Standards. The proposal for this new national standard was introduced by a NISO member, the American Library Association. Persons interested in monitoring the work of this new IT 7 standards committee should contact the IT 7 secretary: John Gignac, NAPM, 550 Mamaroneck Avenue, Harrison, NY 10528; (914)698-7603.

1993 Balloting and Review Calendar

This calendar replaces the calendar published in ISQ v.5, no. 3. In each case, balloting begins in the month stated. Copies of these drafts may be ordered, for $30 each (purchase order or prepaid, in U.S. funds), from NISO Press Fulfillment. All drafts are sent at no charge to NISO Voting Members and Information Associates.

November 1993

Z39.4-199x: Indexes and Related Information Retrieval Devices
Z39.21: Reconsideration Ballot
Z39.53-199x: Language Codes

January 1994


February 1994

Z39.29-199x: Bibliographic References

Standards Activity

These notes summarize standards activity between July and October 1993.

Standards Being Balloted

Z39.70-199x: Format for Circulation Transactions. The ballot period for this standard closed on May 26, 1993. The results of the balloting have been transmitted to the Standards Committee for resolution.

Final Results:

16	Yes
7	Yes with comments (AJL, Gaylord, INCOLSA, NLM, Palinet, Software AG/NA, SLA)
4	No (ALA, ASIS, Music LA, RLG)
7	Abstain

Upcoming Reconsideration Ballots

What is a “Reconsideration Ballot”? A Reconsideration Ballot is conducted when there is an outstanding negative vote that cannot be resolved by the Standards Committee responsible for the development of the standard. The purpose of the Reconsideration Ballot is to give all of the NISO Voting Members an opportunity to consider the objections and views raised by the negative voter(s). If the voting members support the views advanced by the negative voter, the standard will be returned to the standards committee for further consideration.

Z39.7-199x: Library Statistics. The revision of this standard completed its last balloting cycle in January 1993. The results of the balloting were: 38 votes to Approve, 1 vote to Disapprove, 3 Abstentions, and 6 comments from interested parties. The negative vote was submitted by the
Recent Standards Literature

Below is listed recent standards literature dealing with standards and standards-related issues. Readers are invited to send citations and copies of items to the editor for inclusion. Reviews of any information standards-related books and other literature sources are welcome.

Cataloging
This report on an in interest group discussion meeting describes Julia Blixrud’s talk about efforts to complete work on Z39.71 for serial and non-serial holdings, Karen Coyle’s talk about Z39.50, and Ed Ryding’s and Robyn Greenlund’s talk about X12, the electronic data interchange standard.

Electronic Data Interchange
See under Cataloging.

Images
This article defines and describes video compression, so that a reasonable amount of image information can fit into the CD-ROM format. JPEG (Joint Photographic Experts Group) and MPEG (Moving Pictures Experts Group) standards for still and motion video are described, and research on the use of fractals for video compression is mentioned.

Information Retrieval Interface
This article summarizes the functions included in the CD-ROM Consistent Interface guidelines and examines SilverPlatter and PAIS versions of PAIS on CD-ROM to determine the extent of their compliance with these guidelines. Although both implementations have elements of merit, both also need to have numerous features reviewed for consistency and clarity.

This conference report describes presentations by Mike Rubinfeld on the CD-ROM architecture profile, by Peter Ciufetti on client-server architecture and its implications for CD-ROMs, by Marshall Breeding on CD-ROMs and Z39.50, and by Tom Wilson on the pros and cons, and future, of CD-ROM interoperability.

This meeting report describes presentations on gophers in libraries. As it notes, “Gopher is client and server software that defines an information storage and retrieval system that runs over a TCP/IP network.” Gophers at University of Michigan, University of California at Santa Barbara, UC Santa Cruz, and Virginia Polytechnic & State University are described.

Information Standards
The American Society for Testing and Materials is studying the feasibility of adopting the ISO 9000 series for the operation of ASTM. This article provides an overview of ISO 9000, “a series of five international standards that establishes the requirements for the quality systems of companies and other organizations.”

This regular column reports on the operations of the LITA Technical Standards for Library Automation Committee, dealing in this case with NISO now being on the Internet, EDI, and Unicode. Guest columnist is Joan Aliprand, who provides a Unicode update.

This regular column report on TESLA operations deals in this case with the institution of NISO-L, BISAC and SISAC, and Unicode.
**Interoperability and Networks**


See under *Information Retrieval Interface*.


This article describes a conference program which included presentations on defining Z39.50 and its implementation requirements (Sara Randall), the implications of Z39.50 (James Michael), and the future of library services in light of Z39.50 development (Mark Hinnebusch).


Lynch, who works closely with the Z39.50 Implementors’ Group, details a proposal for Extended Services for the Z39.50 protocol. These are “...a suite of services that are not strictly information retrieval, but support real-world information retrieval application; for example, saving result sets, printing records, and executing queries on a periodic schedule.”


See under *Cataloging*.

**Optical Technologies**


See under *Images*.


See under *Information Retrieval Interface*.


Merran advises buyers of CD-ROM drives for small office computing setups on how to choose a standardized CD-ROM drive, with the widest usability and the greatest likelihood of being viable for future applications.

(Continued from page 27)

Music Library Association (MLA). The MLA recommends that the standard be revised to include data categories for sheet music. The negative has not been successfully resolved so NISO will conduct a default ballot on Z39.7-199x in October.

**Z39.21-1988: Book Numbering.** Withdrawal of Z39.21 and concurrent adoption of ISO 2108 as a domestic standard. A reconsideration ballot will be conducted in November to determine if any NISO Voting Members are persuaded to change their original vote in light of the objections raised by the AJL.

**Final Results:**

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<td>32</td>
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**International Update**

**Arabic Transliteration Published**

The ISO standard for Transliteration of Arabic Characters into Latin Characters-Part 2: Arabic Language-Simplified Transliteration, *ISO 233-2: 1993* has been published by the ISO in Geneva. This standard was developed by SC 2 on Transliteration of ISO TC46. ISO 233-2: 1993 is priced at $28, plus $6 shipping and handling; in the U.S. it can be ordered from ANSI, Customer Service Department, 11 West 42nd Street, New York, NY 10036; (212)642-4900.
ISO 8777 Published

Commands for Interactive Text Searching (ISO 8777) has been published. This is the international counterpart to the NISO standard Z39.58-1992 (Common Command Language). The international standard can be ordered from ANSI, Customer Service Department, 11 West 42nd Street, New York, NY 10036; (212)642-4900. ISO 8777 is priced at $54, plus $6 shipping and handling. The U.S. equivalent to this standard will be available from NISO Press in December 1993.

International Standards Out for Ballot

The following proposed international standards are now being reviewed and balloted. Deadlines noted are the close of the ISO ballot period. To request a copy of any of the items listed, contact the NISO office.

Draft International Standards (DIS):


Committee Drafts (CD):

CD 3901 International standard recording code (ISRC). This is a revision of the 1986 edition of the ISRC; this revision expands the code capacity and introduces some streamlined administrative procedures. Developed by ISO TC 46/SC 9. Balloting closes: November 1, 1993.


NISO Press News

NISO Press will publish five new NISO standards before the end of 1993. On the publication line-up are:

- Z39.19-1993 Construction, Format and Management of Monolingual Thesauri
- Z39.47-1993 Extended Latin Coded Character Set (ANSEL)
- Z39.62-1993 Eye-legible Information on Microform Leaders and Trailers and on Containers of Processed Microfilm on Open Reels
- Z39.67-1993 Software Description

In addition, NISO is offering a number of standards-related titles to complement your standards bookshelf:

Standards for Archival Description by Vicki Walch is a comprehensive introduction to standards for both archival description and library and information services. This book provides an excellent overview of how standards work together and interrelate, and is a fact book on NISO and other standards. Vicki Walch served as the Society of American Archivists voting representative to NISO and is truly an expert in this area!

Scholarly Information and Standardization: Proceedings of the 12th NACSIS Open Forum held November 20, 1992, in Tokyo. Edited by William Moen. This collection of eleven papers provides a unique opportunity to learn about standardization in six countries (U.S., Canada, Korea, Japan, China, and Singapore) and at the international level and provides a wealth of information about national and international standardization for in-
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**Draft Standards Issued in 1993**

| Z39.4-199X | Indexes and Related Information Retrieval Devices | 30.00 |
| Z39.53-199X | Language Codes | 30.00 |
| Z39.70-199X | Circulation Transaction Format | 30.00 |
| Z39.73-199X | Library Shelving | 30.00 |

**Other Titles for Your Standards Bookshelf**

| Standards for Archival Description by Vicki Walch | 30.00 |
| Scholarly Information and Standardization: Proceedings of the NACSIS 12th Open Forum | 40.00 |
| Standards: A Resource and Guide for Identification, Selection, and Acquisition by Pat Ricci | 25.00 |
| Practical SGML (2nd ed.) by Eric van Herwijnen | 45.00 |
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formation and documentation.

Standards: a Resource by Pat Ricci is an outstanding reference on national and international standards developers. It provides information on thousands of standards developers and their contact points. Special features: a bibliography on standards resources and a very useful index to the alphabetical prefixes to standards (you may know what a Z39 is, but what about a UL or PSD or SNV?)

Practical SGML (2nd edition) by Eric van Herwijnen is a basic resource on the application of SGML. This book will show you how by using SGML, you can interchange documents and process them on many different systems in many different ways by customizing SGML to your applications.

The attached price list and order form lists all of the publications now available from NISO Press. To order any NISO Press item contact NISO Press at (800)282-NISO (6476).

Standards for OPAC Interfaces is Topic at CILC

At a presentation at the recent Computers in Libraries - Canada conference, Joan Cherry of the University of Toronto raised what turned out to be a controversial topic: standards for Online Public Access Catalog interfaces. CILC, which took place in Toronto on September 21-24, 1993, featured a half-day program which brought together researchers, ILS vendors, and librarians to discuss how vendors "balance the 'bleeding' edge of information retrieval research and client needs, in order to produce a viable commercial product."

OPAC interfaces are proliferating, while OPACs are being used remotely more and more. There is too much variability for the public.

In a presentation on research directions in user interface design for OPACs, Cherry, a member of the faculty of the School of Library and Information Science, pointed out OPAC interfaces are proliferating, while OPACs are being used remotely more and more. There is too much variability for the public. She pointed out that Michael Ridgeway noted in an article in Library Journal on April 1, 1990, that we are now worse off in the area of portability of knowledge about library catalogs than we were in the age of the card catalog. Cherry is working on a standard display for a single bibliographic record. She is doing research to determine what users want in the area of elements displayed and how they are labelled. (She may be contacted on the Internet as CHERRY@FLIS.UTORONTO.CA).

Standards for OPAC interfaces excited the most interest in the panel discussion which followed presentations. Many librarians wanted standardization, while vendors noted that it would not allow creativity in interface design.

EDI Conference Paves Way for Pan-Am Information Superhighway

Electronic Data Interchange, the electronic exchange of business documents from the computer of one company to the computer of another using a standard format, has fueled a revolution in international trade. The "paperless office" has growing implications for international competitiveness.

The impact of EDI on international trade will be the subject of a conference on November 8-10, 1993, in Orlando, Florida. The conference, called "Broadening Horizons: Pan American EDI Users Conference & Exhibit," will be held in the Walt Disney World Dolphin. The conference is being sponsored jointly by the Electronic Data Interchange Association (EDIA) and the EDI Council of Canada.

Electronic Data Interchange, the electronic exchange of business documents from the computer of one company to the computer of another using a standard format, has fueled a revolution in international trade.

"Staying competitive in global commerce requires simplified procedures for exchanging export and import data," says George J. Weise, Commissioner of the U.S. Customs Service, who will be the keynote speaker at the conference. Weise will address the significance of a country's international trade policy as it is related to EDI, and he will be joined by his North America Free Trade Agreement counterparts from Canada and Mexico.

Bernard A. Gorman, Deputy Comptroller General of Canada, will address "The Partnership between the Canadian Government and Electronic Data Interchange." Gorman will discuss how Canada plans to use EDI to "fundamentally change business practices from paper based document processing to a totally electronic environment, with a goal to be
They will be joined by Sr. Francisco Gil Diaz, Undersecretary of Revenue at the Ministry of Finance and Public Credit of Mexico. He will speak on the significant improvements Mexico has made in its customs automation system. Under the leadership of President Carlos Salinas, Mexico has made customs automation a critical priority in preparation for implementation of the NAFTA.

EDI is the computer-to-computer exchange business information, using standard formats that allow businesses using different software and computers to communicate electronically.

EDI is the computer-to-computer exchange business information, using standard formats that allow businesses using different software and computers to communicate electronically. Over 42,000 U.S. companies utilize EDI in their business transactions, according to Earl Bass, one of the originators of EDI, and a member of the board of Washington Publishing Company of Gaithersburg, Maryland, which publishes EDI standards.

"Increasingly, the U.S. government is using EDI to cut costs and increase efficiency. The Custom Services, U.S. Armed Forces, and the Internal Revenue Services, are all exploring ways that EDI can streamline government operations," says Bass.

Vice President Al Gore’s Report of the National Performance Review prominently featured EDI as a way to reduce government paperwork and save billions of taxpayer dollars. One governmental use of EDI -- the electronic filing of wage reporting -- has been projected to save $1.7 billion for government agencies and $13.5 billion for private employers, if it is fully implemented.

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President Bill Clinton’s health care reform package also prominently features EDI in the Administration’s efforts to cut health care paperwork and provide each American with a “Health Security Card” which would simplify billing. Willow Shire, Vice President of Digital Equipment Corporation’s Health Industries Business Unit, will address the conference on EDI’s growing role in the nation’s health delivery system.

"Private industry has been saving millions with EDI for years. EDI is an integral part of paperless communication between trading partners in the automotive, transportation, retail and oil industries, to name a few," says Bass. Levi Strauss & Company uses an EDI system to ensure that retailers are consistently and regularly shipped the sizes and styles that they need, based on their daily inventory -- a kind of “just in time” inventory system for retail sales. Stores that use the system have seen average sales increases of 26% to 30%, with a few approaching a 200% increase, according to a Levi Strauss spokesman.

EDI has revolutionized the way the most competitive American companies do business," explains Bass. “Through this decade, as governments and major corporations insist on EDI communication with their trading partners, we will see EDI become a basic prerequisite to doing business in our modern economy,” Bass predicts.

For inquiries about attending the conference and credentialing, contact: Conference Registrar, Electronic Data Interchange Association, 225 Reinekers Lane, Suite 550, Alexandria, Virginia 22314; (703)838-8042; Fax: (703)838-8038.

ISSN Compact Available on CD-ROM

The following is based on information from Chadwyck-Healey, Inc.

The authoritative world catalog for serial identification, the ISDS (International Serials Data System) Register, is now available on CD-ROM. With more than 600,000 entries from 193 countries in 144 languages, the ISDS Register is heavily used by anyone professionally involved with periodicals for checking records or building their own files. The ISSN Compact contains over 40,000 new entries and receives 60,000 updates per year.

The ISSN (International Standard Serial Number) is universally accepted as the prime means of identifying serials. Its use is essential throughout the chain of supply, from publisher, to subscription agent to library, for the efficient management of research, ordering and cataloging.
identifying serials. Its use is essential throughout the chain of supply, from publisher, to subscription agent to library, for the efficient management of research, ordering and cataloging. Many bibliographic services, particularly some union catalogs of serials, are based on records from the ISDS Register with extra fields added to meet specific needs. This is true of both specialized and general catalogs, at international as well as national and regional levels.

Publication of the ISDS Register on CD-ROM means greater speed of retrieval and more points of access. The bibliographic details of more than half a million serials, unequivocally identified, are now available on a PC—quickly, easily and inexpensively.

The Authoritative ISSN Catalog

ISDS assigns a standard identification code to serials whatever their country of publication, language, contents, or status: new, current, or discontinued. This code is the ISSN.

The purpose of ISDS is to identify each separate serial. At the same time that an ISSN is assigned, a corresponding bibliographic record is created. The two key elements of this record are the ISSN and the key title.

The purpose of ISDS is to identify each separate serial. At the same time that an ISSN is assigned, a corresponding bibliographic record is created. The two key elements of this record are the ISSN and the key title.

The key title is the title of the publication as standardized by ISDS and makes it unique. Usually it is the title as it appears on the publication. If more than one appears it is included as a variant and if other identical titles exist, ISDS adds qualifying information to distinguish between them.

When a serial changes its title in any significant way, ISDS treats it as a new serial and assigns it a new ISSN. ISDS also distinguishes between related serials. A different ISSN is assigned to each language edition of a title, if physically separate; a serial and its supplement; a main series and each of its subsseries, etc. All records remain accessible, and a cross-reference between related records is established through linking fields.

The CD-ROM also contains a List of Serial Title Word Abbreviations (LSTWA), previously only available on paper. This list contains the words of the titles of serials processed by the ISDS network and their abbreviations. The list includes words in about 50 languages. The words are abbreviated in accordance with the ISO 4 standard, for which ISDS is the maintenance agency. Abbreviations conforming to this standard can also be applied to the titles of non-serial publications. The list now contains more than 42,000 words and their abbreviations, processed by ISDS since 1974.

The International Centre records all titles published by international organizations (FAO, OECD, UNESCO, EC, etc.). In fact, the ISDS Register is the most complete listing of such periodicals. The United Nations, in particular, uses the database to create and update its publications lists.

A World Database

ISDS is an intergovernmental organization which functions as a network with an International Centre in Paris and National Centres in more than 50 participating countries. The network provides comprehensive world coverage, including, for instance, countries in Eastern Europe such as Poland, Romania, Czechoslovakia and Hungary and in Southeast Asia such as China, Thailand, and Japan.

The records in the ISDS Register are created at the national level and input to the international database which is checked, controlled and maintained by the International Centre.

The International Centre records all titles published by international organizations (FAO, OECD, UNESCO, EC, etc.). In fact, the ISDS Register is the most complete listing of such periodicals. The United Nations, in particular, uses the database to create and update its publications lists. The International Centre also creates records for periodicals from countries where no National Centre yet exists.

Product Information

The ISSN Compact is available from Chadwyck-Healey at a cost of $1500 annually, with an updated disc issued quarterly. For more information, contact Chadwyck-Healey at (703)683-4890.