

Protocol Z39.50 and Libraries

➤ Definitions →

- LYNCH, CLIFFORD A. :Z39.50 properly “Information Retrieval (Z39.50); Application Service Definition and Protocol Specification, ANSI/NISO Z39.50” – is a protocol which specifies data structures and interchange rules that allow a client machine (as called an “origin” in the standard) to search databases on a server machine (called a “target” in the standard) and retrieve records that are identified as a result of such a search.
- FINNIGAN, SONYA AND WARD, NIGEL :ANSI/NISO Z39.50 – 1995 (ISO 23950) is one of a set of standards produced to facilitate the interconnection of computer systems. The standard specifies formats and procedures governing the exchange of messages between a client and server, enabling the user to search remote databases, identify records which meet specified criteria, and to retrieve some or all of the identified records and is concerned, in particular with the search and retrieval of information in databases. One of the major advantages of using Z39.50 is that it enables uniform access to a large number of diverse and heterogeneous information sources. (PIERRE 1997)

➤ Overview →

The Z39.50 is a search and retrieval protocol at the application level. Z39.50 standard defines a way for computers to communicate in a distributed client/server environment for the purpose of information retrieval. It enables uniform access to large number of diverse and heterogeneous information sources. In other words , information store in large databases can be searched and retrieved independently from the servers operating system , database managers , clients or users interface.(GAUVIN ,1999).

Name Z39.50 comes from the fact that the National Information Standards Organization (NISO), the American National Standards Institute(ANSI) accredited standards development organization serving libraries, publishing and information services, was once the Z39 committee of ANSI. NISO standards are numbered sequentially and Z39.50 is the fiftieth standard developed by NISO.

Z39.50 had its roots in the OSI efforts of the 1980s. Within the OSI model, it is an application layer protocol. The protocol is stateful and connection oriented. The protocol defines interactions between two machines only. “Broadcast Search” applications that permit a client to search multiple servers in parallel, these applications are built on top of Z39.50 and use multiple concurrent Z39.50

connections to multiple machines. Z39.50 does not specify an Application Program Interface (API) to the services of the protocol on either the client or the server. It deals only with the interactions between the client and server machines. (LYNCH, CLIFFORD A. and etal.)

This stated that the American National Standard Z39.50 , Information retrieval service defination and protocol specifications for library applications is a standard composed of specifications for computer to computer linked between different information retrieval system. It's purpose is to encode the message required to communicate between two computer systems for the specific purpose of information searching and retrieval.

As an information user, consumer, or provider you need tools to keep up with the explosive growth of networked information. An essential tool is ANSI/NISO Z39.50, an open standard for Information retrieval. Z39.50 is a computer-to-computer communications protocol designed to support searching and retrieval of information full text documents, bibliographic data, images, multimedia in a distributed network environment. (MOEN, 1995). Based on client/server architecture and operating over the Internet, the Z39.50 protocol is supporting an increasing number of applications – fulfilling the searching demands of the emerging information age. (FINNIGAN, SONYA AND WARD, NIGEL)

Z39.50 has it's roots in efforts dating back to the 1970s to allow standardized means of cross database searching among a handful of (rather homogeneous) major bibliographic databases hosted by organization such as Library Of Congress, the Online Computer Library Center (OCLC), and the Research Libraries Information Network. At the time the primary application was to support shared cataloging using a logical national bibliographic database constructed form this small number of bibliographic utilities rather than to offer end users a common view of large numbers of autonomously managed databases. This program was called the Linked Systems Project. Initially the participants both wrote protocol specification and worked on implementation, however by the early 1980s the focus of the project had shifted to almost exclusively to implementation, and the work on the specifications had been moved into a formal standards development effort under the auspices of the National Information Standard Organization (NISO).

➤ **Features Provided By Z39.50 →**

◆ **Initializing →**

When a session is first established between a client and server it provides means for initiating options that are to be used through the remainder. This includes the default character set, default language and protocol. It also provides the means of authenticating the user.

◆ **Searching →**

Provides means of searching one or more databases using a structural query using a well known search format. The query may contain booleans operators, fielded search terms, proximity searching, weight search terms, truncation specification, relation specifiers etc.

◆ **Presenting Records →**

An extensive means of accessing information from a set of search results is provided through the protocol. This includes requesting specific ranges of search results, specific elements in records, specific variants in records, search term highlighting etc.

◆ **Maintaining Multiple Search Results →**

Z39.50 provides the capability of creating, naming storing and retrieving from one or more search result sets. This also provides facility to client to apply a search criterion to previously created results set.

◆ **Browsing →**

Z39.50 provides the ability to browse a window of index term or fields within the database.

◆ **Sorting Of Results →**

Z39.50 offers a means to sort a set of search results based on any given sort criterion.

◆ **Controlling Access →**

Not only does Z39.50 enables authentication on per-session basis but it also allows authentication on a per-operation basis for the cases where the access to specific databases or records is controlled.

◆ **Controlling Resources** →

Z39.50 provides a means for clients to cancel a search or a presentation request in the middle of an operation while continuing to maintain an open session with the server. It also permits clients to request resource reports that include accounting information on the number of searches, retrievals etc performed by the user.

◆ **Extended Services** →

Z39.50 provides the ability to perform database maintenance operations, such as database updates, record insertion deletion etc. It also includes persistent result sets, queries and period queries.

➤ **How Z39.50 Works ??** →

In this process the server is known as standard as the “**target**”.

A client is known as an “**origin**” in the standard.

User selects the target library from the menu.

- Enters search terms, the query is then sent to server by client.
- The client's user interface will help to build the query and will translate it in the proper syntax.
- There is a primary negotiation between the client and server.
- This particular query will ask the server for records where the terms are found.
- The server translates the search request for the target library's database and receives a response about the numbers of machines. The client's user interface will tell how many records are in the set but not transferred at this point.
- If the client decides to ask for the records in the result set a transfer is initiated. Client receives the records.
- Records get presented in the interface for the user. (GAVINN,1999)

The protocol provides generalised facilities for the communication of queries and results. One important feature is the attribute set. This allows terms and various of their characteristics to be defined. They capture semantics of a particular area. Z39.50 Protocol also uses generalised search syntax. The user application will convert queries accepted on the interface into the form required by Z39.50, these will be communicated from client to the server. At the server end, another application will take this and convert them into an appropriate form for running against databases. Results are communicated as number of records, a number of record formats are acknowledged. (LORCAN DEMPSEY, RUSSEL, KIRRIEMUIR 1996)

Clients can send requests to several libraries simultaneously either same request or different ones. This feature allows tremendous time saving when searching for an item on large number of records. (BIBLOTECH,2001)

➤ **Implications For The Libraries →**

The Z39.50 Protocol is now becoming the main communication standard between various library systems. The implication for the library and the information services is becoming important work and will result into effective system as Z39.50 enabled after few years.

✓ **OPACS →**

Z39.50 Protocol to web gateways has been around for a few years. They allow OPACS to be available through web. Z39.50 Protocol provides access any and all the of the worlds major library catalogues or just local sources with a single search.

✓ **Cataloguing →**

Original cataloguing was expensive and time-consuming for libraries. Because of Z39.50 searching for and downloading bibliographic records is becoming simple and efficient since multiple sources can be searched simultaneously and records easily compared. Currently libraries are often “locked in” via service agreement and proprietary software to a bibliographic utility. A Z39.50 Protocol will allow user to establish relationships with a variety of sources without penalties.

✓ **Union Catalogues →**

Union Catalogues – combined catalogues of several libraries have been a valuable tool for decades within group of otherwise separate libraries wanting to co-operate for the inter-lending, co-operative purchase and general service. But they were difficult and expensive to manage. The Z39.50 allows libraries within dissimilar catalogues to be grouped together without having to physically replicate their databases. A user may sit at OPAC screen and search several catalogues simultaneously. Useful material and its location can be displayed with no additional work.

✓ **Inter Library Loan (ILL) →**

Because of Z39.50 it is possible to search multiple catalogues with a single query and easy to locate documents. The extended service of Z39.50 allows systems to arrange for delivery, including

account information and billing of the item to the enquirer. Librarians in future will be able to search and order items in one operation and deal directly with library which serves their needs, due to Z39.50.

✓ **CD-ROM access →**

The steady migration of CD-ROM information provides the web based service , CD will be feature of library services for some time. CD-ROM having practical problem of different software interfaces and searching database separately. The Z39.50 will make it possible to search each database with single familiar interface and additionally several other databases at the same time. It also solves the problem of using different clients.

✓ **Selective Dissemination of Information →**

Due to Z39.50 user may identify useful library and information resources and setup a SDI profile using single interface. Searches can be automatically run when required and the results downloaded from the database to a specified destination.

✓ **Web Searching and Filtering →**

Searching the web is frustrating for many times, because many different search engines and interfaces. By adding an optional Z39.50 interface to the search engines much of the frustration and time consumption could be reduced. Unwanted areas of web could be attacked through an extended service. Each library could set its own filter parameters on the Z39.50 client used to access major search engines.

➤ **Versions Of Z39.50 →**

The Z39.50 standard was originally proposed in 1984 to provide a standard way of interrogation bibliographic databases. Next six years 1984-1990 many drafts were prepared and reviewed and revised. As a result of ISO-SR has become compatible with Z39.50 also supports access control and resource control where as ISO-SR did not.

Version 2 in 1992 also improved and became compatible with an ISO standard called search and retrieve. Version 2 also provides new query types in addition to private and RPN , these new query types includes proximity searching. To increase compatibility version 2 also registered all information objects that are registered by ISOSR , application context abstract syntax ,attribute set ,diagnostic set,and record syntax definitions.

Version 3 in 1995 extended the features of the protocol –it is version that most suppliers are now implementing. The major new services developed for version 3 were scan and explain. Scan allows the origin to obtain a list of access point surrounding chosen access point from an index to the database to browse. While explain allows the origin to obtain details of the implementation of the target system such as information on databases to be searched , specified data elements of database , supported attribute sets and record syntaxes.

Version 4 also got developed with new services. This is maintained by Z39.50 maintenance agency administered by library congress. (ILTIS,1995) (TURNER ,1995)

➤ **Limitations Of Z39.50 →**

- 1) Lack of agreed structure for representation of local holdings and availability data which is crucial to the completion of most end user searches i.e. user wants to know not that a remote library has a copy of given item in its catalogue but whether the item itself is available and at which location.
- 2) Loss of branding so that the originator cannot guarantee acknowledgement on the end-users display. This could make Z39.50 approach unacceptable to some commercial companies.
- 3) Complexity and thus high overheads to use. (BROPHY,2001)

➤ **Conclusion →**

Z39.50 is a standard for client/server architecture in which a search engine and interface are divided into independent parts. If both the client and server conform to the standard then the Z39.50 client can search any brand of Z39.50 server. Widely dispersed databases on different native systems can be searched with the same local client or interface. It does not address the issue of what this interface should look like or how it should behave it is up to the user to choose an interface. The linkage of library systems to the internet and the maturation of the Z39.50 protocol offered the prospect of accessing an ever-increasing array of bibliographic databases and full-text databases through the local automated system. This ability to directly link users with resources that represented different computing platforms reinforced the attractiveness of the Z39.50 protocol for libraries engaged in linking interinstitutional or multivendor systems.

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