Interoperability and Interconnectivity Issues in Multiple Information System : A Special Reference to Z39.50

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Abstract

Information retrieval in digital era especially due to non-compatibility between different systems, disparity of interfaces may lead loss of information in information dissemination & affect the precision. Paper emphasized needs of standards to solve interoperability, interconnection issues that adversely affect the success of an Information Retrieval System. ANSI/NISO Z39.50 discussed elaborately with its application, usage, implementation, its relationship with TCP/IP, as well as Information Retrieval, user interface etc that were proved to be essential for successful Information Retrieval System.

Keywords : Interoperability; Multiple Information System; Z39.50; Digital Library; Information Retrieval

0. Introduction

Information center in the present days should no longer be a physical depository of material but a conceptual gathering where information are distributed al over the globe and accessed, retrieved whatever the form and whenever needed through the electronic media. Handling and organization of information is very vital so that a user can retrieve the desired information quickly and in this way right information to right user in right time is made available. Introduction and evolution of networking technology has changed the concept of globalization from myth towards reality. Internet has changed the concept of library and information center as a place into virtual library (library without wall) shifted the library on to a desktop of someone's office/home. Starting with basic tools like FTP, email, Internet has shifted to navigation aids like WAIS, Netscape, Gopher, and web client's likeWinweb, Cello, Lynx & in recent times the mostly consumer oriented home pages of the web. However despite having access to many new information databases locally & remotely (on the internet-WWW), the disparity of software & hardware demands that information user must learn the specificity of each system. Problem as well as success of any information retrieval not only confined in the level of the user but also in the ability of different DBMS structure & application designs for electronically information exchange.

1. Digital environment & information retrieval

The term 'digital' in digital library signifies the nature of its collection. Digital libraries are electronic in nature, where large number of geographically scattered user can access the contents of fairly large & diverse repositories of electronic objects. Electronic objects include sounds, videos, network text, images, online databases, and hypertext & multimedia compositions.

Khan[(6)] suggested that ' Retrieval' implies the ability to discover document from large collection or specific information from unmanageable dimensions & make it available for the users.

Lancaster[(7)] mentioned 2 viewpoints from which an IR system can be evaluated

- Viewpoint of the system user (Recall, Precision, Effort, Response time, Form of search results etc.)
- Management requirement (Economic & operational efficiency)

Mere use of computer has no more guarantee of success in IR System as because success of any IR System depends on intellectual organization of information content & logical processing of users query.

2. Objective

Paper proposes to study problems in relation to network protocols, standards for information exchange, disparity of software & hardware. It also discussed interconnections & interoperability of information systems without which there must be chance of potential loss of precision in information exchange. It also emphasized the need of standard with special reference to Z39.50, its development, applications & usage, service providers, need, purpose, feature & suggestions to overcome the pitfalls.

3. Needs of standards & interoperability

As electronic resources grow so will the problem of how to access the information from so many disparate systems. The information needs of both the users & the systems demonstrate the current need for new standards to answer interoperability issues among so many different systems, bibliographic & other wise.[5]

Standardization is essential because it standardize the manner in which client and server communicate & interoperate even when there are differences between computer systems, search engines & databases.[2]

Chakraborty & Mahapatra [8] suggested that standards & associated protocols would foster the developments of compatible information resources & the integration of information from disparate sources. In Internet environment computer transfer information using mutually agreed upon rules of communication, called protocols. Most common TCP/IP protocols have two parts[8]

- TCP parts- (error free logical channels between connected computers)
- IP parts- (addressing the TCP Packets)

TCP/IP assures that information created in one computer will be received by another remain unchanged by the process.

Patnaik [9] suggested that object based distributed processing technologies are not enough for making the processing interoperable in the distributed environment. Domain specific objects & protocols have to be defined & standardized. Data interoperability will significantly improved through document type descriptions (DTDs).

Interoperability refers to ability of two systems to exchange data

- Without any loss of precision.
- In clear, precise, unambiguous manner.
- Same interpretation of data without any distortion.
- Common, universally standardized format of data exchange.

4. Z39.50 what & why

American National Standard Z39.50, information retrieval service definition & protocols specifications for library applications is a standard composed of specifications for computer to computer linkage between different information retrieval system.[5]

The National Information Standard Organization (NISO), an American National Standards Institute (ANSI) accredited standards developer that serves the library, information & publishing communities, approved the original standard in 1988(Z39.50-1988, version 1) & revised version in 1992(Z39.50-1992, version-2) [(1)]. Additional function will be included in revised & expanded version 3 that NISO balloted in 1994[(2)] ANSI/NISO Z39.50 defines a standard way for two computers to communicate for the purpose of information retrieval.

4.1 Z39.50 and TCP/IP

Z39.50 is defined over the OSI seven application layer protocol. TCP/IP is a five-layer protocol with its layers closely corresponding to the OSI layers. Functionally the similar layers of OSI & TCP/IP are equivalent but not compatible. TCP/IP are developed as a defacto standard (It has proven before its establishment as a standard) OSI was leaving the proof for after establishment of the need to implement Z39.50 Interoperability Tested (ZIT) was begun by the coalition for network information to facilitate implementation.[(2)]

5. Usage

Z39.50 now a day used for information retrieval. While the standard had its origins in the bibliographic community of libraries & bibliographic utilities. Increasing awareness by other organization can never be ignored.[(10)]

- Government Information Locator Service (GILS)-Seam less connection between distributed GILS server, help the public to locate & retrieve information throughout the US Govt.
- Consortium for the Computer Interchange of Museum Information (CIMI)- For developing museum resources on digital networks & standards based upon interchange of museum information.
- National Special Data Infrastructure- For discovery & retrieval of geospatial data.
- Gate ways for www & Gopher- Enables the users of these 2 popular network tools including Mosaic clients to search Z 39.50 servers.[(3)]

Specifically Z 39.50 supports information retrieval in a distributed client-server mode where a computer acting as a client submits a search request (query) to another computer used as an information server.

It separates the user interface on the client side from information servers, search engines, & databases & provides a consistent view of information from a wide variety of sources.[(1)]

6. Online Service Providers

Data Research Group (DRA) used it to connect the University of California MELVYL system to local DRA library system on the UC Davis campus.[(5)]

A good number of online service providers include

- Aball software
- Ameritech Library services Academic Division
- CDP Technologies (BRS Search sevices-fulltext & graphics)
- Chemical Abstracts Services

- Data Research Associates
- Knight-Ridder
- Silver Platter Information etc.

Several organizations offer source code for Z39.50 clients & servers

- National Library of Canada
- Stanford University
- University of Washington Information System etc.

7. Salient features of Z39.50

Z39.50 is an application-layer protocol originally modeled within the open systems interconnection (OSI) basic reference model developed by ISO. It supports the communication requirements of & interacts directly with computer programmes residing on clients & servers that perform specific operations. It is independent of transport mechanisms that underlie it.[2]

ANSI/NISO Z39.50 can be implemented on any platform & will be responsible to the needs of the implementers that use the standards & the client that benefit from its implementation.[10]

ANSI/NISO Z 39.50 has the following features [2]-

- Result set delete facility- Client instruct the server to delete one/ more result sets that have been created from searching the databases.
- Access control facility- Server to require the client to provide information such as passwords & authentication.
- Accounting/ resource control facility – Client & server to ask for & provide information related to the resources that will be or are being expended to carry out specific search & retrieval activities such as cost of search.
- Ways for either client or server to end a session.

8. Problems of user & the interface

Disparity of interfaces becomes a burning problem specially when databases accessible through the www. Survey of several interfaces for Z39.50 databases or gateways on www showed that not very much recommendable for end user. Effort has been inverted in how the computer-to-computer communication will occur with the result of high power search engines. However interface fails to utilize the power of database when offering services to user.[5]

Major problem arises out is lack of interaction for searching the database by the user. Burning questions raised here what is the urgency of establishing a gateway to multiple databases through an interface when no or little instruction is given on how to search?

9. Suggestions & Recommendations

- Clear precise definition of object identifiers for improved access to non-bibliographic information over the network using the wide varieties of access mechanisms are advisable.

- Domain specific objects & protocols have to be defined & standardized.
- Seminar, workshops organized by different institution on Interoperability, Interconnectivity issues, standards& protocols etc might be beneficial.
- Information in relation to emergence, development, and applications of ANSI/NISO Z39.50 should be communicated to the people.
- Emphasis should be given to the standard by bibliographic utilities.
- Detailed help menu for search facilitate effective information retrieval.
- Works on other related standard like transfer format for documents, images, various types of database records will be available.

10. Conclusion

The value of Z39.50 extracts from the capacity to explore its implementations to exchange information beyond bibliographic information.Z39.50 provides a common language for selection of information based on some criteria and retrieval of information. The essence of Z39.50 derives from the ability to explore its implementations to exchange information beyond bibliographic information. In information retrieval system standardization of terminology & command structure is important for user satisfaction. Lack of standardization over multiple system & services forced library & information science professionals to invest more time and energy in order to render qualitative services. Z39.50 is indispensable to achieve interoperability with information system & networks outside the library community & over net. In order to achieve the goal of a cooperative information network through interoperability the shift from the importance of a standard to its usability in terms of its implementation needs to continue. It is essential that in ideal future network must be interconnected so that service must be interoperable & information must be exchanged.

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