

DRAFT DRAFT DRAFT DRAFT DRAFT

September 15, 2001

This document is being made available to the NISO Voting Members and others to indicate the progress and direction of the NISO Standards Committee AV. Comments on this draft document can be sent to the Committee Chair, William Moen <wemoen@unt.edu>.

The U.S. National Z39.50 Profile for Library Applications

Abstract: This standard specifies the use of ANSI/NISO Z39.50-1995 in library applications. It specifies Z39.50 client and Z39.50 server behavior for search and retrieval across online library catalogs, and the interchange of bibliographic holdings information. The specifications included in this standard use *The Bath Profile: A Z39.50 Specification for Library Applications and Resource Discovery (Release 1.1)* as its foundation. Conformant use of this standard will improve interoperability between Z39.50 implementations.

An American National Standard
Developed by the
National Information Standards Organization

Contents

Foreword

Maintenance and Future Development

NISO Voting Members

NISO Board of Directors

NISO SC AV Members

1. Introduction

- 1.1 Scope and Field of Application
- 1.2 Referenced Standards

2. Definitions

3. Requirements

- 3.1 Basic Bibliographic Search and Retrieval in Online Library Catalogs
 - 3.1.1 Basic Bibliographic Search
 - 3.1.2 Browsing Indexes
 - 3.1.3 Basic Bibliographic Retrieval
- 3.2 Bibliographic Holdings Search and Retrieval

4. Z39.50 Specifications

- 4.1 Protocol Version
- 4.2 Z39.50 Objects
- 4.3 Z39.50 Services
 - 4.3.1 Init
 - 4.3.2 Search: Query Type and Attribute Sets
 - 4.3.3 Retrieval: Record Syntaxes
- 4.4 Diagnostic Messages

5. Conformance

- 5A. Functional Area A: Basic Bibliographic Search and Retrieval in Online Library Catalogs
 - 5A.0 Level 0 Search and Retrieval Requirements
 - Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 0
 - 5A.1 Level 1 Search and Retrieval Requirements
 - 5A.1.1 Level 1 Scan Requirements
 - Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 1
 - 5A.2 Level 2 Search and Retrieval Requirements
 - 5A.2.1 Level 2 Scan Requirements
 - Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 2
 - 5B. Functional Area B: Bibliographic Holdings Information Search and Retrieval
[Under development and not included with this draft]

Appendixes

Appendix A: MARC 21 Fields & Subfield Values for Format and Type of Material Searches

Foreword

(This foreword is not part of the U.S. National Profile for Library Applications. It is included for information only).

[To be developed]

*****[page break]*****

Maintenance and Future Development

(This section is not part of the U.S. National Profile for Library Applications. It is included for information only).

[To be developed]

- Character Set and Language Negotiation. There is a desire to include such functionality. This could be especially important functionality and help the Profile's adoption throughout North America (e.g., by Canada and Mexico). Language negotiation will be critically important for such adoption.

*****[page break]*****

NISO Voting Members

NISO Board of Directors*

*****[page break]*****

NISO SC AV Members

William E. Moen, Chair
School of Library and Information Sciences

Brenda Bailey
Colorado State Library

Ira Bray
California State Library

Laurie Davidson
Innovative Interfaces

Dana Dietz
OCLC

Larry Dixon
Library of Congress, Network
Development and MARC
Standards Office

Eric Ferrin
CIC, Penn State University

Matthew Goldner
Fretwell-Downing, Inc.

Dan Iddings
PALCI

Michael Johnson
Follett

Carrol Lunau
NLC/Bath Profile

Slavko Manojlovich
SIRSI

Christina Perkins Meyer
MINITEX

Mark Needleman, NISO SDC
Liaison
Data Research Associates, Inc.

Ling-yuh W. (Miko) Pattie
Kentucky Virtual Library

Christine Peterson
AMIGOS Library Services

Sara Randall
Endeavor Information Systems

Ed Riding
Epixtech

Margaret St. Pierre
Blue Angel Technologies

Phil Williams
GALILEO, Georgia

Mark Wilson
The Library Corporation (TLC)

The U.S. National Z39.50 Profile for Library Applications

1. Introduction

This document identifies a subset of specifications from *ANSI/NISO Information Retrieval (Z39.50): Application Service Definition and Protocol Specification* for use in Z39.50 client and server software. Conformance to this profile's specifications will improve search and retrieval among library catalogs, and the interchange of bibliographic information. The profile will evolve as the environment (e.g., requirements) and the standard change. Use of this profile can improve national library resource sharing.

The foundation for this profile is *The Bath Profile: A Z39.50 Specification for Library Applications and Resource Discovery (Release 1.1)*. As a companion profile to the Bath Profile, conformant applications of the U.S. National Profile will improve international interoperability and library resource sharing.

1.1 Scope and Field of Application

The primary goal of the profile is to increase the semantic interoperability between disparate systems so that end-users can use Z-clients to search catalogs, request bibliographic holdings information, and be confident that they have retrieved valid results.

The purpose of this profile is to identify those features of the Z39.50 standard that are required to allow effective use of Z39.50 software in a range of library applications, including search and retrieval of bibliographic data from library catalogs and the interchange of transfer of bibliographic holdings information. Implementation of this profile by systems developers will improve interoperability among diverse systems.

The profile is structured into Functional Areas that group similar functional requirements, Z39.50 specifications, and levels of conformance. Z39.50 clients (Z-clients) and Z39.50 servers (Z-servers) may claim conformance to the profile at one or more Conformance Levels within one or more Functional Areas. The modular structure of the profile allows future specification for separate but compatible functional requirements involving a range of applications useful to librarians and library users.

This release of the profile defines two functional areas:

- **Functional Area A for Basic Bibliographic Search and Retrieval in Online Library Catalogs:** A definition of required searches, attribute combinations, and record syntaxes for common search and retrieval needs of library users (patrons and library staff) when interacting with online library catalogs.
- **Functional Area B for Bibliographic Holdings Retrieval:** A definition of search and retrieval requirements to provide bibliographic and holdings information adequate to identify a library's holdings.

Other functional areas may be defined in future releases of this profile to address requirements related to searching bibliographic holdings information, abstracting and indexing databases, full-text databases, authority records, etc.

The profile specifies several conformance levels for each functional area. Each higher conformance level inherits the requirements of lower conformance levels. Conformance Level 0 is intended to present the least barriers to conformance while producing meaningful utility and improving interoperability. In general, the conformance levels can be characterized as follows:

- **Conformance Level 0:** Defines minimum requirements and is intended to encompass as many existing Z39.50 products as possible; conformance with Level 0 may require the reconfiguring of existing implementations to produce the desired functionality and improve interoperability.
- **Conformance Level 1:** Defines more robust requirements to extend functionality and interoperability; these requirements can be configured in systems currently under development. It is anticipated that those specifying new or enhanced Z39.50 systems should require adherence to at least this conformance level.
- **Conformance Level 2:** Defines higher-level requirements, some of which may be currently infeasible to require across the board but towards which effort should be directed.

Each Conformance Level defines required Z-client and Z-server specifications and behavior.

Conformance requires a system (Z-client, Z-server, and underlying information retrieval system) to be capable of carrying out all the specified behavior at a given conformance level. A vendor's product may conform at a specific level yet customization for a local implementation may jeopardize conformance. Managers of local implementations should be aware of conformance requirements to realize the benefits of the specifications provided in this profile.

A key component of this profile is the characterization of the types of searching required by librarians and library users. To this end, the profile defines specific searches and how the semantics of those searches are to be expressed in the vocabulary of Z39.50. The profile does not prescribe local indexing decisions or practices; semantic interoperability may be threatened, however, by local indexing decisions that serve local needs. A set of indexing guidelines to support profile-defined searches is available (see Section 1.2). Implementors may use these guidelines for local indexing decisions.

Terminology issues are ever-present in a document such as this. An example of such an issue is with terms such as "access points," "indexes," "fields," and "data elements." Often, the library community uses the phrase "search a particular field or fields," when at the system level, the search may be executed by matching the search term with entries in a system-generated index. Access points can be considered searchable fields of a record as represented by the index created from data from those fields. In defining searches for library catalogs, the description references fields and indexes.

1.2 Referenced Standards and Documents

[under development with additional listings likely]

Bath Profile: ***The Bath Profile: An International Z39.50 Specification for Library Applications and Resource Discovery*** (Release 1.1). February 2001. <<http://www.nlc-bnc.ca/bath/bp-current.htm>>.

Bib-1 Attribute Set: **bib-1 Attribute Set** <<http://lcweb.loc.gov/z3950/agency/defns/bib1.html>>.

Bib-1 Attribute Set Semantics: **Attribute Set bib-1 (Z39.50-1995): Semantics (September 1995)**

Diagnostic Messages: **Appendix B: Diagnostics: Suggested User Display and Message Logging Using Bib-1 Diagnostic Set** <<http://www.nlc-bnc.ca/bath/bp-app-b.htm>>.

Indexing Guidelines: **Indexing Guidelines for MARC 21 Records to Support Z39.50 Profile Searches**. <<http://www.unt.edu/zinterop>>.

MARC 8 Character Encoding: **MARC 21 Specifications for Record Structure, Character Sets, and Exchange Media: Character Sets**. January 2000. <<http://lcweb.loc.gov/marc/specifications/speccharintro.html>>.

MARC XML DTD: **MARC Bibliographic/Holdings/Community Information Record XML DTD**
<<http://lcweb.loc.gov/marc/marcsgml.html>>

Z39.50: **ANSI/NISO Z39.50–1995. Information Retrieval (Z39.50): Application Service Definition and Protocol Specification.**

Z39.50 Maintenance Agency: Provides listing of registered objects and other resources relevant to this profile <<http://lcweb.loc.gov/z3950/agency>>

2. Definitions

[to be developed]

3. Requirements

This section identifies the functional requirements to which the Z39.50 specifications in this profile respond. These requirements focus on search and retrieval across library catalogs, and the interchange of bibliographic holdings information. The requirements detailed in the sections below comprise two functional areas:

- Functional Area A for Basic Bibliographic Search and Retrieval in Online Library Catalogs
- Functional Area B for Bibliographic Holdings Search and Retrieval.

Section 5, Conformance, details the Z39.50 specifications for each functional area and levels of conformance.

3.1 Basic Bibliographic Search and Retrieval in Online Library Catalogs

Library users conduct a variety of search and retrieval transactions. The functional requirements for basic bibliographic search and retrieval delineate a number of core searches, the browsing of indexes, and the appropriate retrieval mechanisms needed by library users when interacting with library catalogs.

3.1.1 Basic Bibliographic Search

Librarians and library users engage in a wide range of searching behaviors. Agreements on a core set of bibliographic searches have evolved through various Z39.50 profiling efforts:

- Author searches that include searching for names under authority control, searching for names not under any authority control, and searching where only part of a name is used as a search term
- Title searches that include searching for the entire title, the first part of a title, and searching using one or more words from a title
- Subject searches that include searching for a complete subject heading, the first part of a subject heading, and searching using one or more subject words as search terms
- Keyword searches that provide high recall searches using one or more words from author, title, subject, and other common access points
- Boolean searches that combine search terms with the Boolean operators of AND, OR, NOT
- Truncation searches where the user wants the system to truncate a search term.

Given these basic bibliographic search behaviors, the profile specifies three conformance levels for searching online library catalogs:

- Level 0 defines very basic search and retrieval requirements for Z-clients and Z-servers. Level 0 presents the lowest threshold for conformance while resulting in meaningful interoperability. Keyword searches with no truncation for author, title, subject, and general keyword searching enable recall-oriented searches across library catalogs and serves as a basic resource discovery application. Level 0 searches are likely to be available in existing implementations.
- Level 1 inherits all search and retrieval requirements from Level 0. Level 1 defines more robust search and retrieval requirements for Z-clients and Z-servers. Level 1 enables more precision-oriented searches for author, title, and subject. It adds truncation for keyword searches. A number of new searches provide for standard number searching, and qualifying searches based on date, language, and format of material. Implementors are encouraged to provide Level 1 searches.
- Level 2 inherits all search and retrieval requirements from Levels 0 and 1. Level 2 defines additional requirements including a variety of more specialized searches, including searches using controlled vocabularies, specialized author and title searches.

The modular structure of the profile allows implementors to develop products that conform to the most appropriate level for a particular market or local implementation.

3.1.2 Browsing Indexes

Librarians and library users often use a browse function on a local system to identify appropriate search terms to use in a query. Browse-based searching can assist users in improving their selection of search terms for the query. This is a useful feature, often used in conjunction with known-item searching. Such browse-based searching can be seen as an alternative searching strategy for some search requirements listed in 3.1.1. Browsing indexes is a requirement for Z39.50 implementations and can be achieved through the Z39.50 Scan service. The profile introduces this requirement as part of Functional Area A, Conformance Level 1.

3.1.3 Basic Bibliographic Retrieval

The profile supports the retrieval of bibliographic records from library catalogs. MARC 21 is the standard record format for interchanging bibliographic records in the U.S. Current systems also support the Z39.50 Simple Unstructured Text Record Syntax (SUTRS), used to interchange a plain text, preformatted record. The development of the Extensible Markup Language (XML) and the interest of librarians to utilize XML present yet another requirement for interchanging bibliographic records. For international interoperability, however, implementations may be required to support UNIMARC.

The profile assumes that a Z-server responds to a specific set of users (i.e., its implementation responds to a business case and market) while a Z-client may search many Z-servers. Because of this, the profile assumes increased requirements for supporting multiple record syntaxes is the responsibility of the Z-client to assure interoperability.

Level 0 has the lowest barriers to entry and requires only the support of the MARC 21 record syntax by Z-clients and Z-servers. Higher conformance levels include support for MARC 21, SUTRS, and XML.

3.2 Bibliographic Holdings Search and Retrieval

Identifying which collections contain certain information resources is a key factor in creating an infrastructure for resource sharing among libraries. Librarians require holdings information for resource sharing, and library users need holdings information for knowing where to go to use or borrow a resource.

The holdings information should provide sufficient identification and description of an item to give the user adequate information to make decisions about requesting or retrieving the item.

Mechanisms are available to improve interchange of holdings information in a standard way. Specifically, the XML Schema for Holdings Information (based on the approved Holdings Schema) provides both structure and semantics for interchanging bibliographic holdings information. The profile requires Z-clients and Z-servers to support the XML record syntax, the XML Schema for Holdings Information, and a limited set of element set names to provide library users with useful holdings information.

4. Z39.50 Specifications

This section summarizes the general Z39.50 specifications to address the functional requirements identified in Section 3.

4.1 Protocol Version

The profile requires Version 2 or Version 3 of Z39.50-1995, depending on Functional Area and Conformance Level. All implementations are encouraged to use Version 3, but in the near term, conformance to certain specifications prescribed by this profile is available to Version 2 implementations.

4.2 Z39.50 Objects

The profile uses a number of Z39.50 registered objects. The following table summarizes all Z39.50 objects referenced in the two Functional Areas.

Object	Z39.50 Object Identifier (OID)
bib-1 attribute set	1.2.840.10003.3.1
bib-1 diagnostic set	1.2.840.10003.4.1
holdings schema	1.2.840.10003.13.7
MARC21 record syntax	1.2.840.10003.5.10
Simple unstructured records syntax (SUTRS)	1.2.840.10003.5.101
Generic record syntax (GRS-1)	1.2.840.10003.5.105
XML record syntax	1.2.840.10003.5.109.10

Section 5, Conformance, specifies the support for these registered objects by Z-clients and Z-servers. For information on Z39.50 registered objects, see the Z39.50 Maintenance Agency's Z39.50 Registry of Object Identifiers.

4.3. Z39.50 Services

The profile specifies the use of the following Z39.50 services:

- Init
- Search
- Present
- Scan.

See Section 5, Conformance, for specific requirements related to these Z39.50 services.

No additional services are required for conformance to this profile. Z-clients and Z-servers optionally may use other Z39.50 services. Future releases of the profile may require additional services.

Standard Z39.50 Init Service negotiation procedures control the use of all services.

4.3.1 Init

Z-clients conforming to this profile may use the IDAuthentication parameters to transmit authentication information (e.g., userid and password). Z-servers conforming to this profile may or may not require authentication. The profile specifies no other security requirements. Z-clients may need to know in advance the authentication policy of a given server and be prepared to provide values for userid and password.

4.3.2 Search: Query Type and Attribute Sets

The profile requires Z-clients and Z-servers to use Z39.50 Type 1 queries (i.e., general purpose Boolean query structures).

The Result-set-name parameter is required at certain conformance levels for Z-servers. Z-servers must be able to retain at least two named results sets for the duration of a session. Exceptional server situations may override the "two named results sets" requirement.

[Note: The result set name requirement is still under discussion by NISO SC AV. We will agree at which level to introduce this requirement.]

To accommodate the searching requirements, the profile requires Z-clients and Z-servers to use at least the bib-1 attribute set (OID: 1.2.840.10003.3.1). Conformant Z-clients and Z-servers will support attribute types and values according to Section 5. Conformance. "Support" in this context means:

- Z-clients must transmit the bib-1 attribute combination in a Type 1 Query for each defined search.
- Z-clients must accept the corresponding relevant responses to a query (which may be a diagnostic record) from Z-servers including specified record syntaxes
- Z-servers must recognize the bib-1 attribute set OID
- Z-servers must recognize the bib-1 attribute types and value(s) listed for a conformance level
- Z-servers must accept for each defined search the associated attribute combination if they are relevant in the context of the corresponding databases
- Z-servers must process each defined search using attribute combination sent by the Z-client and produce a valid result set (which could contain 0 hits)
- Z-servers must return the corresponding relevant responses to a query (which may be a diagnostic message) to the Z-client including specified record syntaxes.

This means that all implementations conforming to this profile must have search capabilities for attribute types and values listed at a level for which conformance is claimed (see Section 5, Conformance). Z-clients and Z-servers may also use attribute types and values from other public or private attribute sets in addition to those required by this profile. Z-servers should be prepared to receive queries from Z-clients not specified in this profile. Behavior of Z-servers receiving such queries is not addressed by this profile.

Complex keyword searches can be expressed using Boolean operators to connect one or more operands where the operands are constructed using the searches defined in these specifications.

The bib-1 attribute set plays a primary role in this profile for basic bibliographic searching. Semantics for most of the bib-1 attributes specified for support in this profile can be found in Attribute Set bib-1 (Z39.50-

1995): Semantics (September 1995). Not all current bib-1 attribute values are defined in that document. The complete bib-1 Attribute Set is available at <<http://lcweb.loc.gov/z3950/agency/defns/bib1.html>>.

The following table summarizes the bib-1 Attribute Set types and values referenced in Functional Area A:

Attribute Type	Attribute Values	Attribute Names
Use (1)	4, 5,6, 7, 8, 9, 12, 21, *25, *27, *28, 31, 33, 51, 54, 63, 1002, 1003, 1004, 1005, 1006, 1007, *1008, 1016, 1018, 1027, 1031, *1088, 1209, *1210	title, title series, uniform title, ISBN, ISSN, LC Card number, local number, subject heading, MESH subject, LC subject heading, RVM subject heading, date of publication, title key, no. music publisher, code-language, note, name, author, author-name personal, author-name corporate, author-name conference, identifier-standard, Subject—LC children's, any, publisher, report-number, material-type, Subject—NAL, Identifier—URN, Sears Subject Heading
Relation (2)	1, 2, 3, 4, 5, 104	less than, less than or equal, equal, greater than or equal, greater than, within position
Position (3)	1, 3	first in field, any position in field
Structure (4)	1, 2, 4	phrase, word, year
Truncation (5)	1, 100	right truncation, do not truncate
Completeness (6)	1, 3	incomplete subfield, complete field

* Support for only one of the controlled vocabulary use attributes is required. See Controlled Vocabulary searches in Conformance Level 2.

4.3.3 Retrieval: Record Syntaxes

For interoperability, Z-clients and Z-servers must support at least one record syntax in common. Support of a record syntax means that for every record in a result set, the Z-server can deliver the record in a required record syntax. Exceptional server situations may override this required syntax requirement (e.g., database temporarily not available). Local policies may also restrict access to records in one or more specific record syntaxes to authorized users. In such cases, the server should return a diagnostic; see Section 4.4. Diagnostic Messages.

Z-clients and Z-servers have different responsibilities in their support for record syntaxes. Z-clients will support all syntaxes required in a functional area and at a given conformance level, while Z-servers will normally support only those syntaxes required for their business case and market.

For Basic Bibliographic Retrieval (Functional Area A), the MARC21, SUTRS, and XML record syntaxes are required depending on conformance level.

Interoperability requires use of standard character sets and encoding.

For retrieval of bibliographic holdings information (Functional Area B), XML is required. The Z39.50 Holdings Schema provides the abstract structure and semantics for interchange of holdings information.

Interchange of records in XML requires an associated Document Type Definition (DTD) or Schema. The profile specifies an appropriate XML DTD or Schema for interchanging bibliographic records (Functional Area A) and holdings information (Functional Area B).

See Section 5, Conformance, for specific requirements regarding record syntaxes for the different functional areas and conformance levels. Z-clients and Z-servers may support other registered Z39.50 record syntaxes in addition to those required by this profile.

4.4 Diagnostic Messages

The profile requires that Z-servers return appropriate diagnostic messages from Diagnostic Set bib-1. To assist implementors in sending the appropriate diagnostic for an error condition, the Bath Profile includes an appendix (i.e., Appendix B) that contains a listing of bib-1 Diagnostics to use for specific error conditions. In addition, Z-clients are encouraged to display usable and meaningful diagnostic messages to users. To assist implementors, that appendix includes suggested wording for diagnostic messages intended for display to a user.

For servers that provide records in selected record syntaxes for specific authorized users, the bib-1 Diagnostic #1070: "User not authorized to receive this record in requested syntax" is available.

Diagnostic #1069: "No syntaxes available for this request" can be used in the case where a Z-server conforms to the Profile in supporting MARC21, SUTRS, and/or XML and receives a request for a non-supported record syntax.

Z-Servers should not return a record in an alternative record syntax until requested by the Z-client.

5. Conformance

To address the requirements identified in previous sections and building upon the general specifications listed in Section 4, Z-clients and Z-servers must be configured to support Z39.50 specifications to claim conformance within a functional area at a specific level. This section details the specifications Z-clients and Z-servers must support to conform to this profile. Each Functional Area has its own conformance requirements.

Conformance to the profile involves at least two types of considerations:

- Capability of the system as provided by the vendor, and the specific implementation by a library
- The availability of data in records.

To conform to the profile at a given level, vendors must provide the capability for search and retrieval as defined for a given level (e.g., Z-clients must be able to send all searches properly and Z-servers must be capable of receiving and processing those searches). In addition, the local information retrieval system must be able to execute those searches against its database(s).

A particular library, however, may limit the availability of functionality defined for a particular conformance level (i.e., may not make the full capability of the vendor-supplied system available to all users). This is determined by the business case for Z39.50 access for a given library. A library may provide different levels of service to different user groups. But, the library cannot claim conformance to a given conformance level if it does not have the capability for functionality provided by that level.

In some cases, a database may not contain data in records to support a given functionality (e.g., a database with no ISSNs). In that case, the system may still claim conformance at a profile conformance level. It can receive the search and return a diagnostic indicating that a particular Use attribute/Search is not supported by a given database because there are no data in the records for that search.

5A. Functional Area A: Basic Bibliographic Search and Retrieval in Online Library Catalogs

Functional Area A specifies three levels of conformance for Z-clients and Z-servers. Each level is based on the specifications from the Bath Profile. The U.S. National differs in a limited way from the Bath

Profiles. The conventions of **BL** (Bath Profile) and **US** (U.S. National Profile) indicate profile-specific conformance requirements. To claim conformance at a specific level means that the Z-client or Z-server supports all specifications listed for that conformance level.

All conformance levels of Functional Area A uses the following Z39.50 objects:

Object	OID	Z-client	Z-server
bib-1 attribute set	1.2.840.10003.3.1	X	X
bib-1 diagnostic set	1.2.840.10003.4.1	X	X
MARC21 record syntax	1.2.840.10003.5.10	X	X
SUTRS	1.2.840.10003.5.101	*	**
XML	1.2.840.10003.5.109.10	*	**

* The support of Record Syntaxes varies by conformance level with Z-clients required to support more syntaxes than Z-servers.

For retrieval, record syntax "support" means that the Z-server can deliver any record in a result set formatted in a required record syntax, and a Z-client can receive and process for display or other uses any record formatted in a required record syntax. For example, Functional Area A Level 0 Conformance requires that a Z-client must be able to receive and a Z-server must be able to deliver any record in MARC21. Exceptional server situations may override this required syntax requirement (e.g., database temporarily not available). Local policies may also restrict access to records in one or more specific record syntaxes to authorized users. In such cases, the server should return the appropriate diagnostic. For servers that provide records in selected record syntaxes for specific authorized users, Bib-1 1 Diagnostic #1070: "User not authorized to receive this record in requested syntax" is available to indicate this condition.

The profile requires that Z-clients formulate queries using all the attribute types and values specified in the searches (below), and requires Z-servers to process all of the attribute types (i.e., servers cannot ignore any attribute types or values in the query). Z-servers that do not support specific attribute types and values must return a diagnostic message (e.g., in the case of the Level 2 Controlled Vocabulary searches where the profile provides options of Use attributes). The Bath Profile, Appendix B: Diagnostics: Suggested User Display and Message Logging Using Bib-1 Diagnostic Set, lists appropriate diagnostics to return for specific error conditions.

Z-clients and Z-servers may support additional searches that use attribute types and values not specified in this profile. Z-servers may receive queries from non-conformant Z-clients. The profile does not prescribe Z-server behavior for searches not defined here.

A keyword search in this profile is defined as a search that matches the specified character string (i.e., the search term) against a word in the record as characterized by the use attribute value. A word may be a single alphanumeric character or a string of characters bounded by spaces or characters treated as spaces by the server. Where a keyword search contains multiple words, each word is a separate query term with associated bib-1 attributes to form an operand within the query. Searches with multiple operands are combined with a Boolean operator. Operands can be formulated using searches defined for specific levels of conformance claimed (e.g., in Level 0 an operand to express a Title Keyword Search combined with an operand to express a Subject Keyword Search).

This profile does not specify data elements or indexes to be mapped to the required bib-1 use attributes. It recognizes that indexing practices may vary based on local needs. However, it assumes that in library catalog implementations:

- An author search will look for matches in an index(es) derived from data elements containing names used as main entry, added entry, or series author
- A title search will look for matches in an index(es) derived from data elements containing the general title and alternative titles such as series title, uniform title, and variant titles; statement of responsibility is not generally considered part of a title search
- A subject search will look for matches in an index(es) derived from data elements containing subjects (e.g., topical subject, geographical subject, title as subject, and names as subject) with no expectation that the search term is from an authoritative subject heading list
- An "any" search will search commonly used access points defined by the server; for each level of searching that specifies author, title and subject searches, an "any" search should look for matches in at least the indexes related to those access points.

Guidance documents on indexing practices to support searches defined in this profile are available (see Section 1.2, Referenced Standards and Documents).

Since servers are required to support a minimum number of well-defined searches for each conformance level, they should be able to process a query that combines operands that express searches across different indexes (i.e., cross index searching).

The Profile uses the Bib-1 Attribute Set when specifying searches; however, information retrieval systems work with indexes and access points. Throughout this section, where the terms field and/or subfield are used in Attribute Names (e.g., Incomplete Subfield), the term should be interpreted to mean access point.

5A.0 Level 0 Search and Retrieval Requirements

Level 0 defines very basic search and retrieval requirements for Z39.50 clients and servers. Level 0 presents the lowest threshold for conformance while resulting in meaningful interoperability. Keyword searches with no truncation for author, title, subject, and general keyword searching enable recall-oriented searches across library catalogs and serves as a basic resource discovery application.

Z39.50 Version 2 is required; Z39.50 Version 3 is recommended.

Level 0 Retrieval requires the support of MARC 21 by Z-clients and Z-servers, and the use of the MARC 8 character set.

Level 0 searching requires the following bib-1 Attributes Types and Values:

Attribute Type	Attribute Values	Attribute Names
Use (1)	4, 21, 1003, 1016	title, subject heading, author, any
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

Combinations of these Attributes Types and Values express the semantics of the following four Level 0 searches (more completely specified below):

US0.1. Author Search – Keyword [Note: This is currently a Bath Profile Level 1 search]

BL0.2. Title Search – Keyword

BL0.3. Subject Search – Keyword

BL0.4. Any Search – Keyword

US0.1. Author Search – Keyword [Note: This is currently a Bath Profile Level 1 search]

Use: Searches for complete word in fields that contain the name of a person or entity responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1003	author
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL0.2. Title Search – Keyword

Use: Searches for complete word in a title of a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL0.3. Subject Search — Keyword

Use: Searches for complete word in subject fields in a record.

Attribute Type	Attribute Values	Attribute Name
Use (1)	21	subject heading
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL0.4. Any Search — Keyword

Use: Searches for complete word in fields that are commonly used as access points (as defined by the server). Any searches comprising more than one keyword are interpreted in such a way that the terms may exist in the same or different attributes. Example: a search on "Dickens AND Twist" might conceivably find "Dickens" in the Author Use Attribute (1003) and "Twist" in the Title Use Attribute (4).

Attribute Type	Attribute Values	Attribute Name
Use (1)	1016	any
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 0

- **The Bath Profile Level 0 search, Author Search – Precision Match for Established Name Heading is not included in this profile. SC AV is requesting a change to remove this search from the Bath Profile Functional Area A, Level 0.**
- **Including the Author Search – Keyword that is currently a Bath Profile Functional Area A, Level 1 search. SC AV is requesting the Bath Profile move its search from Level 1 to Level 0.**
- **Because of its international status, the Bath Profile requires support for several record syntaxes at Level 0:**
 - **Z-clients to support (UNIMARC or MARC21) and SUTRS and XML.**
 - **Z-servers to support (UNIMARC or MARC 21) and (SUTRS or XML).**

The U.S. National Profile only requires that Z-clients and Z-servers support the MARC 21 record syntax. SC AV is requesting that the Bath Profile removes the requirement for support of non-MARC syntaxes at Level 0.

- **This profile is silent on Latin-1 character set for encoding query term.**

5A.1 Level 1 Search and Retrieval Requirements

Level 1 inherits all search and retrieval requirements from Level 0. Level 1 also defines additional requirements.

Level 1 defines more robust search and retrieval requirements for Z39.50 clients and servers. Level 1 enables precision-oriented searches for author, title, and subject. It adds truncation for keyword searches. A number of new searches provide for standard number searching, and qualifying searches based on date, language, and format of material.

Z39.50 Version 3 is required. Level 1 requires Z-clients and Z-servers to support SCAN. Level 1 retrieval requires:

- Z-clients to support MARC21 and SUTRS and XML
- Z-servers to support MARC 21 and (SUTRS or XML).

The use of XML for interchange MARC records requires the specification of a XML Document Type Definition (DTD) or XML Schema. The required XML DTD is the Library of Congress MARC Bibliographic/Holdings/Community Information Record XML DTD (available at: <http://lcweb.loc.gov/marc/marcsgml.html>).

Level 1 searching requirements inherits all searches defined in Level 0, and requires the following bib-1 Attributes Types and Values:

Attribute Type	Attribute Values	Attribute Names
Use (1)	4, 7, 8, 12, 21, 31, 54, 1003, 1007, 1016, 1031	title, ISBN, ISSN, local number, subject heading, date of publication, code-language, author, identifier-standard, any, material-type
Relation (2)	1, 2, 3, 4, 5	less than, less than or equal, equal, greater than or equal, greater than
Position (3)	1, 3	first in field, any position in field
Structure (4)	1, 2, 4	phrase, word, year
Truncation (5)	1, 100	right truncation, do not truncate
Completeness (6)	1, 3	incomplete subfield, complete field

Combinations of these Attributes Types and Values express the semantics of the following 19 Level 1 searches (more completely specified below):

- BL1.1 Author Search – Keyword with Right Truncation**
- BL1.2 Author Search – Exact Match**
- US1.1 Author Search – First Characters in Field**
- BL1.3 Title Search – Keyword with Right Truncation**
- BL1.4 Title Search – Exact Match**
- BL1.5 Title Search – First Words in Field**
- BL1.6 Title Search – First Characters in Field**
- BL1.7 Subject Search – Keyword with Right Truncation**
- BL1.8 Subject Search – Exact Match**
- BL1.9 Subject Search – First Words in Field**
- BL1.10 Subject Search – First Characters in Field**
- BL1.11 Any Search – Keyword with Right Truncation**
- BL1.12 Standard Identifier Search**
- US1.2 ISBN Search**
- US1.3 ISSN Search**
- US1.4 Remote System Record Number Search**
- BL1.13 Date of Publication Search**
- US1.5 Language Search**
- US1.6 Format of Material Search Keyword**

BL1.1 Author Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain the name of a person or entity responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1003	author
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.2 Author Search – Exact Match

Use: Searches for the complete string as specified in fields that contain a name of a person or entity responsible for a resource. This search is needed to conduct a follow-up search when the user selects terms from an author index (e.g., from a Scan).

Attribute Type	Attribute Values	Attribute Names
Use (1)	1003	author
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

US1.1 Author Search – First Characters in Field

Use: Searches for the specified character string in author fields. The field must begin with the specified character string. This search is useful when the searcher wants to retrieve all names beginning with a common stem or when a partial complete name is known (e.g., complete last name, first initial of other name).

Attribute Type	Attribute Values	Attribute Names
Use (1)	1003	author
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.3 Title Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain a title of a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.4 Title Search – Exact Match

Use: Searches in fields that contain a title of a resource for an exact match on the complete string as specified. This search is useful for one or two word titles, often serials, where a less precise search may retrieve a very large result set. This search is also needed to conduct a follow-up search when the user selects terms from a full title index (e.g., from a Scan).

Note: The exact match title search may result in zero results if the server indexes an entire field including the statement of responsibility (i.e., information about the person(s) or entities responsible for the intellectual creation of the resource).

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

BL1.5 Title Search – First Words in Field

Use: Searches for complete word(s) in the order specified in fields that contain a title of a resource. The field must begin with the specified character string. This search is useful when the user knows the beginning words in a title.

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL1.6 Title Search – First Characters in Field

Use: Searches for the specified character string in fields that contain a title of a resource. The field must begin with the specified character string. This search is useful when the beginning words in a title are known to the user but the users is not sure of the form or spelling of a particular word. For example, 'cat behav' will retrieve resources with titles beginning 'cat behavior' or 'cat behaviour'.

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.7 Subject Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in subject fields of a record.

Attribute Type	Attribute Values	Attribute Name
Use (1)	21	subject heading
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.8 Subject Search – Exact Match

Use: Searches in subject fields for the complete string as specified. This search is useful for limiting searches to a precise subject, especially where fields contain subheadings. This search is needed to conduct a follow-up search when the user selects terms from a subject heading index (e.g., from a Scan).

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject heading
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

BL1.9 Subject Search – First Words in Field

Use: Searches for complete word(s) in the order specified in subject fields. The field must begin with the specified character string. This search is useful when the searcher knows the main subject heading but not sub-headings.

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject heading
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL1.10 Subject Search – First Characters in Field

Use: Searches for the specified character string in subject fields. The field must begin with the specified character string. This search is useful when the searcher wants to retrieve all headings beginning with a common stem. For example, 'catalog' will retrieve resources on 'cataloging', 'catalog cards', 'catalog use', etc.

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject heading
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.11 Any Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that are commonly used as access points (as defined by the server). Any searches comprising more than one keyword are interpreted in such a way that the terms may exist in the same or different attributes.

Example: a search on "Dick AND Twi" might conceivably find "Dickens" in the Author Use Attribute (1003) and "Twist" in the Title Use Attribute (4).

Attribute Type	Attribute Values	Attribute Name
Use (1)	1016	any
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL1.12 Standard Identifier Search

Use: Searches standard identifiers such as ISBN, ISSN, Music Standard numbers, CODEN, Superintendent of Documents Item Number, etc., but does not identify a specific standard number scheme. Servers can choose which standard identifiers to index to support this search.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1007	identifier-standard
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US1.2 ISBN Search

Use: Searches for a complete ISBN.

Attribute Type	Attribute Value	Attribute Name
Use (1)	7	ISBN
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US1.3 ISSN Search

Use: Searches for a complete ISSN.

Attribute Type	Attribute Value	Attribute Name
Use (1)	8	ISSN
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US1.4 Remote System Record Number Search

Use: Searches for a complete local system record number.

Attribute Type	Attribute Value	Attribute Name
Use (1)	12	local number
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL1.13 Date of Publication Search

Use: Searches for the year in which a resource is published.

The Date of Publication Use attribute must be used as a search limiter in conjunction with another operand (i.e., used to limit a search using other Use attribute values). Z-servers may reject a query that only includes the Date of Publication Use attribute.

Attribute Type	Attribute Value	Attribute Name
Use (1)	31	date of publication
Relation (2)	1, 2, 3, 4, 5	less than, less than or equal, equal, greater than or equal, greater than
Position (3)	1	first in field
Structure (4)	4	year
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US1.5 Language Search

Use: Searches for a code that indicates the language of the item. Code will be from the MARC21 Code list for languages.

The Language Use Attribute must be used as a search limiter in conjunction with another operand (i.e., used to limit a search using other Use Attribute values). Z-servers may reject a query that only includes the Language Use Attribute.

Attribute Type	Attribute Value	Attribute Name
Use (1)	54	code-language
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US1.6 Format of Material Search - Keyword

Uses: A limiting search based on format of material (e.g., book, cartographic material, visual materials, etc.).

The Material-Type Use attribute must be used as a search delimiter in conjunction with another operand (i.e., used to limit a search using other Use Attribute values). Z-servers may reject a query that only includes the Material-Type Use Attribute.

Attribute Type	Attribute Value	Attribute Name
Use (1)	1031	material-type
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

Searches will use a query term that is a 3-letter coded value associated with a Format. Clients will use the Format Code in a query, not the natural language text of the format. The table identifies codes that can be used in a query. For indexing suggestions to support this search, see Appendix A.

Formats	Code
Book	bks
Printed or Manuscript Music	mus
Cartographic Material	cmt
Visual Materials	vis
Sound Recording	rec
Computer File	com
Archival/Mixed Materials	mix
Serial	ser

5A.1.1 Level 1 Scan Requirements

The Z39.50 Scan Service is required at Functional Area A: Level 1 Search and Retrieval. The following requirements apply for SCAN:

- Z-clients must support Term and DisplayTerm, and display DisplayTerm if sent. If DisplayTerm is not sent, Term must be displayed.
- Required values for parameter *preferredPositionInResponse* are 0 and 1.
- Stepsize is 0.

To maintain parallel with the searches defined in Level 1, three Scans are defined:

- Author – Exact Match
- Title – Exact Match
- Subject – Exact Match

Unlike the searches specified in this Profile, it is not necessary to specify the Relation, Completeness and Truncation attributes of a Scan.

BL.1.SCAN.1 Author – Exact Match

Uses: To browse an ordered list of author names.

The termlist for an Author Exact Match Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	1003	author
Position (3)	1	first in field
Structure (4)	1	phrase

BL.1.SCAN.2 Title – Exact Match

Uses: To browse an ordered list of complete titles.

The termlist for a Title Exact Match Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Position (3)	1	first in field
Structure (4)	1	phrase

BL.1.SCAN.3 Subject – Exact Match

Uses: To browse an ordered list of complete subject terms and headings.

The termlist for a Subject Exact Match Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject
Position (3)	1	first in field
Structure (4)	1	phrase

Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 1

- The Bath Profile requirement that Z-clients and Z-servers support Character Set and Language Negotiation is not included in this Profile. SC AV is requesting that the Bath Profile reconsider and remove its requirement for this functionality.
- The Bath Profile requires the support of the UNIMARC record syntax. The U.S. National Profile has the following requirement for record syntaxes at Level 1:
 - Z-clients to support MARC21 and SUTRS and XML
 - Z-servers to support MARC 21 and (SUTRS or XML).
- This Profile specifies the use of the MARC XML DTD developed by the Library of Congress. The Bath Profile is currently silent on a MARC XML DTD or Schema.

- The Bath Profile Level 1 Author Search – Precision Match for Established Name Heading with Right Truncation is not included in this profile. SC AV is requesting that Bath remove this search and the Level 0 Author Search – Precision Match for Established Name Heading and consider defining phrase-based searches to achieve the same objectives.
- The U.S. National Profile defines a search not in Bath to provide a precision-based author search: US1.1 Author Search – First Characters in Field (Left-Anchored with Truncation). SC AV will propose to Bath this single search to accommodate the searching requirements that Bath addresses with its normalized name searches.
- The Bath Profile Level 1 search Author Search – Keyword is included in the U.S. National Profile Level 0 and is not listed here in Level 1.
- This Profile defines two specific standard identifier searches not include in Bath Level 0 searching: ISBN and ISSN.
- This Profile defines a local number search, US1.4 Remote System Record Number Search, not defined in Bath.
- This Profile defines as a Level 1 search, US1.5 Language Search. The Bath Profile defines this at Level 2.
- This Profile defines as a Level 1 search, US1.6. Format of Material Search – Keyword. The Bath Profile defines this at Level 2.
- The Bath Profile defines keyword Scans for Title, Subject, and Any at Level 1. This Profile moves these keyword Scans to Level 2.

5A.2 Level 2 Search and Retrieval Requirements

Level 2 inherits all search and retrieval requirements from Level 0 and Level 1. Level 2 also defines additional requirements. Level 2 defines a variety of more specialized searches, including searches using controlled vocabularies, specialized author and title searches.

Level 2 searching requires the following bib-1 Attributes Types and Values:

Attribute Type	Attribute Values	Attribute Names
Use (1)	5, 6, 9, *25, *27, *28, 31, 33, 51, 63, 1002, 1004, 1005, 1006, *1008, 1018, 1027, 1031, *1088, 1209, *1210	title series, uniform title, LC Card number, MESH subject, LC subject heading, RVM subject heading, date of publication, title key, no. music publisher, note, name, author-name personal, author-name corporate, author-name conference, Subject—LC children's, publisher, report-number, material-type, Subject—NAL, Identifier—URN, Sears Subject Heading
Relation (2)	3, 104	equal, within position
Position (3)	1, 3	first in field, any position in field
Structure (4)	1, 2, 4	phrase, word, year
Truncation (5)	1, 100	right truncation, do not truncate
Completeness (6)	1, 3	incomplete subfield, complete field

* Support for only one of the controlled vocabulary use attributes is required. See Controlled Vocabulary searches below.

Combinations of these Attributes Types and Values express the semantics of the following 38 Level 1 searches (more completely specified below):

- BL2.1 Key Title Search – Keyword**
- BL2.2 Key Title Search – Keyword with Right Truncation**
- BL2.3 Key Title Search – Exact Match**
- BL2.4 Key Title Search – First Words in Field**
- BL2.5 Key Title Search – First Characters in Field**
- US2.1 Uniform Title Search – Keyword**
- US2.2 Uniform Title Search – First Characters in Field**
- US2.3 Series Title Search – Keyword**
- US2.4 Series Title Search – First Characters in Field**
- US2.5 Title Search – Unanchored Phrase**
- US2.6 Subject Search – Unanchored Phrase**
- US2.7 Name Search – Unanchored Phrase**
- US2.8 Any Search – Unanchored Phrase**
- BL2.6 Type of Material Search – Keyword**
- BL2.7 Date of Publication Range Search**
- US2.9 LCCN Search**
- US2.10 Music Number Search**
- US2.11 Technical Report Number Search**
- US2.12 DOI/URN Search**
- US2.13 Notes Search – Keyword**
- US2.14 Notes Search – Keyword with Right Truncation**
- US2.15 Publisher Name Search – Keyword**
- US2.16 Personal Author Search – Keyword**
- US2.17 Personal Author Search – Keyword with Right Truncation**
- US2.18 Personal Author Search – Exact Match**
- US2.19 Personal Author Search – First Characters in Field**
- US2.20 Corporate Author Search – Keyword**
- US2.21 Corporate Author Search – Keyword with Right Truncation**
- US2.22 Corporate Author Search – Exact Match**
- US2.23 Corporate Author Search – First Characters in Field**
- US2.24 Conference Author Search – Keyword**
- US2.25 Conference Author Search – Keyword with Right Truncation**
- US2.26 Conference Author Search – Exact Match**
- US2.27 Conference Author Search – First Characters in Field**
- US2.28 Controlled Vocabulary Search – Keyword with Right Truncation**
- US2.29 Controlled Vocabulary Search – Exact Match**
- US2.30 Controlled Vocabulary Search – First Words in Field**
- US2.31 Controlled Vocabulary Search – First Characters in Field**

BL2.1 Key Title Search – Keyword

Use: Searches for complete word in the key title of a periodical.

Attribute Type	Attribute Values	Attribute Names
Use (1)	33	title key
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL2.2 Key Title Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain a key title of a periodical.

Attribute Type	Attribute Values	Attribute Names
Use (1)	33	title key
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

BL2.3 Key Title Search – Exact Match

Use: Searches in fields that contain a key title of a periodical for an exact match on the complete string as specified. This search is useful for one or two word titles where a less precise search may retrieve a very large result set.

Attribute Type	Attribute Values	Attribute Names
Use (1)	33	title key
Relation (2)	3	equal
Position (3)	1	first position in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

BL2.4 Key Title Search – First Words in Field

Use: Searches for complete word(s) in the order specified in fields that contain a key title of a periodical. The field must begin with the specified character string. This search is useful when only the user knows the beginning words.

Attribute Type	Attribute Values	Attribute Names
Use (1)	33	title key
Relation (2)	3	equal
Position (3)	1	first position in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

BL2.5 Key Title Search – First Characters in Field

Use: Searches for the specified character string in fields that contain a key title of a periodical. The field must begin with the specified character string. This search is useful when the user knows the beginning words of a key title but the user is not sure of the form or spelling of a particular word.

Attribute Type	Attribute Values	Attribute Names
Use (1)	33	title key
Relation (2)	3	equal
Position (3)	1	first position in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.1 Uniform Title Search – Keyword

Uses: Searches for complete word in the uniform title for a work.

Attribute Type	Attribute Values	Attribute Names
Use (1)	6	title uniform
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.2 Uniform Title Search – First Characters in Field

Use: Searches for the specified character string in fields that contain a uniform title for a work. The field must begin with the specified character string. This search is useful when the user knows the beginning words of a key title but the user is not sure of the form or spelling of a particular word.

Attribute Type	Attribute Values	Attribute Names
Use (1)	6	title uniform
Relation (2)	3	equal
Position (3)	1	first position in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.3 Series Title Search – Keyword

Uses: Searches for complete word in the series title for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	5	title series
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.4 Series Title Search – First Characters in Field

Use: Searches for the specified character string in fields that contain a series title for a resource. The field must begin with the specified character string. This search is useful when the user knows the beginning words of a key title but the user is not sure of the form or spelling of a particular word.

Attribute Type	Attribute Values	Attribute Names
Use (1)	5	title series
Relation (2)	3	equal
Position (3)	1	first position in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.5 Title Search – Unanchored Phrase

Use: Searches for the specified phrase anywhere in fields that contain a title of a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	1	phrase
Truncation (5)	100	do no truncate
Completeness (6)	1	incomplete subfield

US2.6 Subject Search – Unanchored Phrase

Use: Searches for the specified phrase anywhere in subject fields of a record.

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	1	phrase
Truncation (5)	100	do no truncate
Completeness (6)	1	incomplete subfield

US2.7 Name Search – Unanchored Phrase

Use: Searches for the specified phrase anywhere in fields of a record that contain names.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1002	name
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	1	phrase
Truncation (5)	100	do no truncate
Completeness (6)	1	incomplete subfield

US2.8 Any Search – Unanchored Phrase

Use: Searches for the specified phrase in fields that are commonly used as access points (as defined by the server).

Attribute Type	Attribute Values	Attribute Names
Use (1)	1016	any
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	1	phrase
Truncation (5)	100	do no truncate
Completeness (6)	1	incomplete subfield

BL2.6 Type of Material Search – Keyword

Use: A limiting search based on type of material (e.g., printed music, globe, videorecording, etc.).

The Material-Type Use attribute must be used as a search delimiter in conjunction with another operand (i.e., used to limit a search using other Use Attribute values). Z-servers may reject a query that only includes the Material-Type Use Attribute.

Attribute Type	Attribute Value	Attribute Name
Use (1)	1031	material-type
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

Searches will use a query term that is a 3-letter coded value associated with a Type of Material. Clients will use the Material Type Code in a query, not the natural language text of the format. The table identifies codes that can be used in a query. For indexing suggestions to support this search, see Appendix A.

Material Type	Code
Printed Music	pmu
Manuscript Music	mmu
Printed Cartographic Material	pcm
Manuscript Cartographic Material	mcm
Map	map
Globe	glb
Manuscript Material	mss
Projected Medium	pgr
Motion Picture	mot
Videorecording	vid
Two Dimensional Nonprojected Graphic	ngr
Three Dimensional Object (Artifact)	art
Musical Sound Recording	msr
Nonmusical Sound Recording	nsr
Kit	kit
Periodical	per
Newspaper	new
Microform	mic
Large Print	lpt
Braille	bri

BL2.7 Date of Publication Range Search

Use: Searches for items published between two specified dates.

The Date of Publication Use Attribute must be used as a search limiter in conjunction with another operand (i.e., used to limit a search using other Use Attribute values). Z-servers may reject a query that only includes the Date of Publication Use Attribute.

This search must be based on the Z39.50 Implementors Agreement #1 for Linear Range Searching (see <http://lcweb.loc.gov/z3950/agency/agree/range.html>).

Attribute Type	Attribute Values	Attribute Names
Use (1)	31	date of publication
Relation (2)	104	within position
Position (3)	3	any position in field
Structure (4)	4	year
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.9 LCCN Search

Use: Searches for a complete LCCN.

Attribute Type	Attribute Value	Attribute Name
Use (1)	9	LC Card Number
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.10 Music Number Search

Use: Searches for a complete Music number.

Attribute Type	Attribute Value	Attribute Name
Use (1)	51	no. music publisher (not ISMN)
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.11 Technical Report Number Search

Use: Searches for a complete Technical Report number.

Attribute Type	Attribute Value	Attribute Name
Use (1)	1027	Report-number
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.12 DOI/URN Search

Use: Searches for a complete Digital Object Identifier/Uniform Resource Name.

Attribute Type	Attribute Value	Attribute Name
Use (1)	1209	Identifier - URN
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.13 Notes Search – Keyword

Uses: Searches for complete word in notes fields of a record.

Attribute Type	Attribute Values	Attribute Names
Use (1)	63	note
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.14 Notes Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain notes.

Attribute Type	Attribute Values	Attribute Names
Use (1)	63	note
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.15 Publisher Name Search – Keyword

Use: Searches for complete word beginning with the specified character string in fields that contain publisher names.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1018	publisher
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.16 Personal Author Search – Keyword

Use: Searches for complete word in fields that contain the name of a personal author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1004	author-name personal
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.17 Personal Author Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain the name of a personal author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1004	author-name personal
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.18 Personal Author Search – Exact Match

Use: Searches for the complete string as specified in fields that contain a name of a personal author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1004	author-name personal
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

US1.19 Personal Author Search – First Characters in Field

Use: Searches for the specified character string in personal author fields. The field must begin with the specified character string. This search is useful when the searcher wants to retrieve all names beginning with a common stem.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1004	author-name personal
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.20 Corporate Author Search – Keyword

Use: Searches for complete word in fields that contain the name of a corporate author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1005	author-name corporate
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.21 Corporate Author Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain the name of a corporate author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1005	author-name corporate
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.22 Corporate Author Search – Exact Match

Use: Searches for the complete string as specified in fields that contain a name of a personal author responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1005	author-name corporate
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

US2.23 Corporate Author Search – First Characters in Field (Left-Anchored with Truncation)

Use: Searches for the specified character string in corporate author fields. The field must begin with the specified character string. This search is useful when the searcher wants to retrieve all names beginning with a common stem.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1005	author-name corporate
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.24 Conference Author Search – Keyword

Use: Searches for complete word in fields that contain the name of a conference responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1006	author-name conference
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

US2.25 Conference Author Search – Keyword with Right Truncation

Use: Searches for complete word beginning with the specified character string in fields that contain the name of a conference responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1006	author-name conference
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

US2.26 Conference Author Search – Exact Match

Use: Searches for the complete string as specified in fields that contain a name of a conference responsible for a resource.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1006	author-name conference
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

US2.27 Conference Author Search – First Characters in Field

Use: Searches for the specified character string in conference author fields. The field must begin with the specified character string. This search is useful when the searcher wants to retrieve all names beginning with a common stem.

Attribute Type	Attribute Values	Attribute Names
Use (1)	1006	author-name conference
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

Controlled Vocabulary Searches

All controlled vocabulary searches defined for this level are not appropriate for all servers. For example, some libraries only use Library of Congress Subject Headings (LCSH), and therefore, it would be unreasonable for those systems to support a Medical Subject Heading (MESH) search. To accommodate these differences, the profile specifies:

- Four pattern searches (Keyword with Right Truncation, Exact Match, First Words in Field, First Characters in Field)
- A list of controlled vocabularies and associated Use Attributes

The profile requires that Z-servers support the four pattern searches for at least one of the controlled vocabularies listed below. Z-clients must support the four pattern searches for each of the controlled vocabularies listed below.

This optionality within the profile is necessary, but it does have implications for interoperability for these searches. When a Z-server receives a query with a Use attribute for a non-supported controlled vocabulary, it should return an appropriate diagnostic (i.e., #114, Unsupported use attribute). A Z-client can retry the search using a different Use attribute for another controlled vocabulary.

Controlled Vocabulary	Use Attribute Number	Use Attribute Name
Library of Congress Subject Headings	27	LC subject heading
LC Subject Headings for Children's Literature (same as: Annotated Card Program, AC Subject Headings)	1008	Subject--LC children's
Medical Subject Headings	25	MESH subject
National Agricultural Library Subject	1088	Subject-NAL
Répertoire de vedettes-matière	28	RVM subject heading
Sears List of Subject Headings	1210	Sears Subject Heading

US2.28 Controlled Vocabulary Search – Keyword with Right Truncation

Uses: Searches for complete word in subject fields in a record that contain the controlled vocabulary identified by the Use Attribute.

Attribute Type	Attribute Values	Attribute Name
Use (1)	*	
Relation (2)	3	equal
Position (3)	3	any position in field
Structure (4)	2	word
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

* A Use attribute value from the table above.

US2.29 Controlled Vocabulary Search – Exact Match

Uses: Searches for the complete string as specified in subject fields in a record that contain the controlled vocabulary identified by the Use Attribute. This search is useful for limiting searches to a precise subject, especially where fields contain subheadings.

Attribute Type	Attribute Values	Attribute Names
Use (1)	*	
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	3	complete field

* A Use attribute value from the table above.

US2.30 Controlled Vocabulary Search – First Words in Field

Uses: Searches for complete word(s) in the order specified in subject fields in a record that contain the controlled vocabulary identified by the Use Attribute. The field must begin with the specified character string.

Attribute Type	Attribute Values	Attribute Names
Use (1)	*	
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	100	do not truncate
Completeness (6)	1	incomplete subfield

* A Use attribute value from the table above.

US2.31 Controlled Vocabulary Search – First Characters in Field

Use: Searches for the specified character string in subject fields in a record that contain the controlled vocabulary identified by the Use Attribute. The field must begin with the specified character string.

Attribute Type	Attribute Values	Attribute Names
Use (1)	*	subject heading
Relation (2)	3	equal
Position (3)	1	first in field
Structure (4)	1	phrase
Truncation (5)	1	right truncation
Completeness (6)	1	incomplete subfield

* A Use attribute value from the table above.

5A.2.1 Level 2 Scan Requirements

Level 2 Scan inherits Level 1 Scan requirements. Three additional Scans are defined:

- Title – Keyword
- Subject – Keyword
- Any – Keyword

BL.2.SCAN.1 Title – Keyword

Uses: To browse an ordered list of words from title fields

The termlist for a Title Keyword Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	4	title
Position (3)	3	any position in field
Structure (4)	2	word

BL.1.SCAN.2 Subject – Keyword

Uses: To browse an ordered list of words from subject fields.

The termlist for a Subject Keyword Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	21	subject
Position (3)	3	any position in field
Structure (4)	2	word

BL.1.SCAN.3 Any – Keyword

Uses: To browse an ordered list of words from server-defined access points.

The termlist for an Any Keyword Scan is:

Attribute Type	Attribute Values	Attribute Names
Use (1)	1016	any
Position (3)	3	any position in field
Structure (4)	2	word

Summary of Significant Differences Between Bath Profile and U.S. National Profile in Functional Area A, Level 2

- This Profile defines searches for Uniform Titles and Series Title that are not included in the Bath Profile.
- The Bath Profile defines two Format/Material Type searches at Level 2:
 - Format/Type of Material Search – Keyword
 - Format/Type of Material Search – Phrase

The U.S. Profile defined a Format of Material – Keyword search in Level 1. In Level 2 this Profile defines a Type of Material Search – Keyword that refines the Bath search. This Profile does not include a phrase search for either Format or Type of Material searches.

- **This Profile defines the Bath Language Search as a Level 1 search and therefore not included at this Level.**
- **This Profile defines many new searches at this level as indicated by the US2 prefix for the searches including:**
 - **Unanchored phrases searches for title, subject, name, and any**
 - **Specific controlled vocabulary searches**
 - **Types of author searches.**
- **Keyword Scans are defined in this Profile at Level 2.**

Appendixes

These appendixes to the U.S. National Profile are non-normative. They are intended to provide additional useful information related to the normative specifications in the body of the standard.

Appendix A

MARC 21 Fields & Subfield Values for Format and Type of Material Searches

The following tables provide information of use to implementors of the U.S. National Profile to support the US1.6 Format of Material Search – Keyword and the US2.# Type of Material Search – Keyword.

US1.6 Format of Material Search – Keyword

The following table identifies the codes to be used in a query and the sources of data in a MARC 21 record to be considered when indexing to support this format search.

Formats	Code	leader/06	006/00	Leader/07	007/00	008/21	008/23	008/29
Book	bks	a OR t	a OR t		t			
Printed or Manuscript Music	mus	c OR d	c OR d		q			
Cartographic Material	cmt	e OR f	e OR f					
Visual Materials	vis	g OR k OR r	g OR k OR r	f OR g OR k OR m				
Sound Recording	rec	i OR j	i OR j		s			
Computer File	com	m	m		c			
Archival/Mixed Materials	mix	p	p					
Serial	ser		s	b OR s				

Note: Any single value in a cell identifies the format (i.e., ORs between cells in the same row are implied), EXCEPT when AND's are used within the same row.

BL2.6 Type of Material Search – Keyword.

The following table identifies the codes to be used in a query and the sources of data in a MARC 21 record to be considered when indexing to support this type of material search.

Material Type	Code	leader/06	006/00	Leader/07	007/00	008/21	008/23	008/29
Printed Music	pmu	c	c					
Manuscript Music	mmu	d	d					
Printed Cartographic Material	pcm	e	e					
Manuscript Cartographic Material	mcm	f	f					
Map	map				a			
Globe	glb				d			
Manuscript Material	mss	d OR f OR t	d OR f OR t					

Material Type	Code	leader/06	006/00	Leader/07	007/00	008/21	008/23	008/29
Projected Medium	pgr	g	g		g			
Motion Picture	mot				m			
Videorecording	vid				v			
Two Dimensional Nonprojected Graphic	ngr	k	k		k			
Three Dimensional Object (Artifact)	art	r	r					
Musical Sound Recording	mnr	j	j					
Nonmusical Sound Recording	nsr	i	i					
Kit	kit	o	o		o			
*Periodical	per	a	AND s			AND p		
*Newspaper	new	a	AND s			AND n		
Microform	mic				h			
		a OR c OR d OR p OR t	a OR c OR d OR p OR t				AND (a OR b OR c)	
			s	b OR s			AND (a OR b OR c)	
		e OR f OR g OR k OR r	e OR f OR g OR k OR r					AND (a OR b OR c)
Large Print	lpt	a OR c OR d OR p OR t	a OR c OR d OR p OR t				AND d	
			s	b OR s			AND d	
		e OR f OR g OR k OR r	e OR f OR g OR k OR r					AND d
Braille	brl	a OR c OR d OR p OR t	a OR c OR d OR p OR t				AND f	
			s	b OR s			AND f	
		e OR f OR g OR k OR r	e OR f OR g OR k OR r					AND f

Note: Any single value in a cell identifies the material type (i.e., ORs between cells in the same row are implied), EXCEPT when ANDs are used within the same row.