

Z39.50 Server Documentation

Credo Reference provides two methods for metasearch vendors to access and search our content:

1. **Z39.50:** Provided below is detailed technical information that system integrators need to know in order to connect to and search Credo Reference via the Credo Reference Z39.50 server.
2. **XML Gateway:** Information about the XML gateway can be found at xml.xrefer.com

Searching via the Credo Reference Z39.50 Server

These are the configuration guidelines for using the Credo Reference Z39.50 server. The Z39.50 server is available for searching by any active Credo Reference account.

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What is Z39.50?

Z39.50 is an [international standard](#) for search and retrieval. Software systems that conform to Z39.50 include many library systems, metasearch gateways and custom user interfaces for database searching. Using the Credo Reference Z39.50 server, subscribers may use alternative user interfaces to search and display the Credo Reference content. Typically these systems will use Z39.50 to seamlessly search and retrieve data from multiple vendors simultaneously.

How to Connect to the Credo Reference Z39.50 Server

Configure your Z39.50 client or gateway to use the following host address:

Host name: z3950.xrefer.com

Port: 210

Authentication is performed either via TCP/IP address checking or via username & password. The Credo Reference Z39.50 server uses the same login credentials as used on the credoreference.com web site. See the section below on the Initialization Service for more details.

Z39.50 Services Supported

- Initialization
- Search
- Present
- Scan

Z39.50 Profile Conformance

The Credo Reference Z39.50 server is a version 3 server and accepts connections from version 2 and version 3 clients. It conforms to the level 1 requirements of [Z39.89](#) *The U.S. National Z39.50 Profile for Library Applications*.

As required by the Z39.89 profile, the Credo Reference Z39.50 server provides support for the following:

- ID/Pass authentication
- BIB-1 attribute sets and diagnostics
- Named result sets (allowed in a present request, but not as a query parameter)
- Record syntaxes for MARC21 and SUTRS. (GRS-1 and XML also supported)
- Scan

The Credo Reference Z39.50 server offers additional functionality beyond what the Z39.89 profile requires such as multi-database searching and additional record syntaxes. Refer to the technical details below for more information.

Credo Reference predominantly consists of entries from books. Many of the profile access points defined by the profile are related to books but do not apply at the entry level. However, to improve interoperability, the Credo Reference Z39.50 server accepts many of the use attributes in Z39.89 defined as required by level 1 conformance. There is for many of these a lenient mapping to the search modes allowed by Credo Reference.

Database Names Used in Search Requests

Search requests should use one or more of the database names defined below.

Database Name Scope

default	All volumes
xreferplus	All volumes
art	All Art volumes
bilinguals	All Bilingual dictionaries
biography	All Biography volumes
business	All Business volumes
dictionaries	All Dictionaries
encyclopedias	All Encyclopedias
food	All Food & Beverage volumes
geography	All Geography volumes
history	All History volumes
language	All Language volumes
law	All Law volumes
literature	All Literature volumes
medicine	All Medical volumes

music	All Music volumes
philpsych	All Philosophy & Psychology volumes
quotes	All Quotations volumes
religion	All Religion volumes
science	All Science volumes
socsciences	All Social Sciences volumes
technology	All Technology volumes

Notes:

1. Multiple databases may be searched simultaneously.
2. The volumes that are searched will be limited to the volumes included in your subscription to Credo Reference. Your subscription may not include titles in every category.
3. See the [Title List](#) page for the titles included in each category

Technical Details for Client and Metasearch Developers

Initialization Service

Authentication is performed using either username & password or TCP/IP address checking. Usernames and passwords are obtained by contacting [Credo Reference Support](#). If your institution already has a username & password on credoreference.com, then this same username & password will work with the Credo Reference Z39.50 server. Also, if you have notified Credo Reference of your institution's IP address ranges, these same ranges will authenticate your Z39.50 client or gateway.

For IP authentication - send an anonymous init request. If the IP address of the client is recognized the session will be accepted.

For username & password - the Credo Reference Z39.50 server accepts init request authentication values sent either within the Id/Pass parameters or within the 'Open String' Id/Pass parameter.

The Credo Reference Z39.50 server will respond with Implementer ID 194.

Session timeouts are currently set to 10 minutes. Please send a close request when the search session is done.

Search Service

The Credo Reference Z39.50 server accepts Type-1 and Type-101 queries. It accepts the 'AND', 'OR' and 'AND-NOT' operators. It does not accept PROXIMITY. Result set names are allowed in the Present Service as a means for referring back to earlier searches; result set names cannot be used as an operand in a new query.

Uses the BIB-1 attribute set. See the sections below that document the search attributes allowed. Diagnostics will be returned in the BIB-1 diagnostic set.

Multiple database names may be sent in the search request.

The Credo Reference Z39.50 server allows piggybacked records in the search response if the client sets the small set upper bound, large set lower bound and medium set present number.

Note that the Credo Reference Z39.50 server accepts Boolean conjunctions but the underlying search service does not interpret nested Boolean operations.

In a non-nested Boolean conjunction, here is how the Boolean operators map to the Credo Reference prefix-operator query syntax. All AND operands are prefixed with the Credo Reference "+" (MUST) operator. All OR operands are prefixed with the Credo Reference "^" (SHOULD) operator. The right operand of the AND-NOT operator is prefixed with the Credo Reference "-" (MUST NOT) operator. Nested Boolean operations of mixed types are likely to map to a conflicting set of prefix operators and so should be avoided.

Present Service

Record element sets supported are "B" (brief) and "F" (full).
Record syntaxes supported are MARC21, SUTRS, GRS-1 and XML

Format	OID
MARC21	1.2.840.10003.5.10
SUTRS	1.2.840.10003.5.101
GRS-1	1.2.840.10003.5.105
XML	1.2.840.10003.5.109.10

For formats 'SUTRS' and 'GRS-1' entry full text is included in the record when the element set is "F". For MARC records, a URL to the entry full text is provided in the 856\$u field. When XML is requested, a Dublin Core metadata object is returned conforming to the [Guidelines for implementing Dublin Core in XML](#)

MARC Tags

The following MARC tags are used to store the entry data when the requested format is MARC21:

001	The Credo Reference entry id which uniquely identifies this entry.
008	Publication year
046\$t	Copyright
021\$a	ISBN (Note: although this would be more appropriately stored in the 776\$z, placing the ISBN here improves interoperability.)
072\$a	Entry type
245\$a	Entry heading
246\$a	Entry subheading
260\$b	Publisher
520\$a	Extract (the sentences around the hits)
546\$a	Language
650\$a	Subject (from a limited set of defined book categories.)
773\$t	Book title the entry is contained in.
856\$u	URL to the full entry on Credo Reference
901\$s	Relevancy score
956\$u	Thumbnail image URLs. Images from the entry are included in thumbnail form here, suitable for display in a search result listing. This field will repeat for each image.

XML Tags

The following Dublin Core tags are used to store the entry data when the requested format is XML:

<code><metadata xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dcterms="http://purl.org/dc/terms/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"></code>	The document element wrapping the metadata
<code><dc:identifier></code>	The Credo Reference entry id which uniquely identifies this entry.
<code><dcterms:issued></code>	Publication year
<code><dc:rights></code>	Copyright
<code><dcterms:isPartOf></code>	ISBN (with URN:ISBN: prefix)
<code><dc:title></code>	Entry heading
<code><dc:title></code>	Entry subheading
<code><dc:publisher></code>	Publisher
<code><dc:description></code>	Extract (the sentences around the hits)
<code><dc:language></code>	Language
<code><dc:subject></code>	Subject (from a limited set of defined book categories.)
<code><dc:source></code>	Book title the entry is contained in.
<code><dc:identifier xsi:type="dcterms:URI"></code>	URL to the full entry on Credo Reference
<code><dc:identifier xsi:type="dcterms:image"></code>	Thumbnail image URLs. Images from the entry are included in thumbnail form here, suitable for display in a search result listing. This field will repeat for each image.

Scan Service

The Credo Reference Z39.50 server supports scan as a means for obtaining book-level information. Clients can scan for Volume Title, ISBN, Volume Abbreviation and Publication Date. See the section on use attributes for the values that support scan. Scan terms returned from these lists can be used as a limiter operand in a search query. The occurrence count returned by the scan service indicates the number of volumes with the scan term value (not the number of entries).

You can also use scan to obtain a list of publishers, although the publisher value cannot be used as a limit operand in a search.

When using scan to start at the top of the list, supply a use attribute term of space ' '.

Use Attributes (Attr #1) Supported

Use Attribute	Name	Mapping	Use in a Search	Use in a Scan
4	Title	Heading search (h:)	Yes	No
7	ISBN	Can be used in combination with another search operand to limit results to a selected book title. Provide an ISBN-13 without hyphens.	Only as a limiter	No
12	Local Number	Use one or more xrefer entry ids as a word or word list to retrieve individual records.	Yes	No
21	Subject	Heading search (h:)	Yes	No
31	Publication year	Can be used in combination with another search operand to limit results to entries in books published in a selected year.	Yes	Yes
33	Title key	Can be used in combination with another search operand to limit results to a selected title. See the scan service for obtaining a set of unique short name keys assigned to the titles.	Yes	Yes
1003	Author	Keyword search	Yes	No
1007	Identified standard	ISBN	Only as a limiter	No
1016	Any	Full text keyword search	Yes	No
1017	Server choice	Full text keyword search	Yes	No
1033	Host item	The book title can be used to limit results to a selected book.	Only as a limiter	Yes
1035	Anywhere	Full text keyword search	Yes	No
1018	Publisher	(can only be used in a scan)	No	Yes

Relation Attributes (Attr #2) Supported

Relation Attribute	Name	Support
0	None	Supported
3	Equal	Treated as "contains"
6	Not Equal	Treated as "does not contain"
100	Phonetic	Supported on words and word lists
101	Stem	Treated as truncation
102	Relevance	Ignored
1	Less than	Not supported (diagnostic returned)
2	Less than or equal	Not supported (diagnostic returned)
4	Greater than or equal	Not supported (diagnostic returned)
5	Greater than	Not supported (diagnostic returned)
103	Always matches	Not supported (diagnostic returned)

Position Attributes (Attr #3) Supported

All position attributes are accepted; they are ignored.

Structure Attributes (Attr #4) Supported

All structure attributes are accepted.

Structure Attribute	Name	Support
1	Phrase	Query terms are wrapped in quotes
6	Word list	Treated as a list of independent words
0,2,3,4,5,101-109	All others	Treated as a term

Truncation Attributes (Attr #5) Supported

Truncation Attribute	Name	Support
0	None	Supported
1	Right truncation	Supported
2	Left truncation	Supported
3	Left and Right truncation	Supported
100	Do not truncate	Supported
101	Process # in term	Supported

Completeness Attributes (Attr #6) Supported

All completeness attributes are accepted; they are ignored.

Other Search Processing Details

- Use attribute 12 (local number) is implemented for retrieving individual records by identifier; it cannot be used in combination with other use attributes.
- Truncation attributes can only be used with structure attribute word or word list. Using them in combination with phrases or other structure attributes is not supported.
- Use attributes marked above as limit fields can only be used in combination with another search operand (AND is implied). For example, you can search for entries with the heading "Brain" (use attr 1=4) limited to books published in "2007" (use attr 1=31) but you cannot search use attribute 31 by itself to obtain all entries in books with publication date 2007.
- Many Credo Reference entries contain image links or audio links. These have been removed from the text in the SUTRS record syntax so that the record contains text only. Similarly other display structures like tables and lists have been reduced to line-oriented data. The client should direct users to the Credo Reference version of the record for the highest-quality version available.
- Many Credo Reference entries have non-ASCII characters in them. For broadest interoperability these have been translated to non-accented characters when constructing the Z39.50 response records. The client should direct users to the Credo Reference version of a record via the URL supplied.
- Some book titles returned by the Scan service have non-ASCII characters in them. This can affect search matching when using the title as a limiter. Using ISBN or title abbreviation as a limiter will give more consistent results.

Usage Statistics

Statistics on Z39.50 search and retrieval activity are included in your [statistics reports](#). Z39.50 usage is not distinguished from activity on credoreference.com.

Demonstrating functionality with the YAZ client

The [YAZ client](#) from Index Data, a Z39.50 command-line client available for free download, can be used to demonstrate and experiment with Z39.50 servers. The YAZ Z39.50 client is primarily a testing and demonstration tool. Since it has a command-line interface, it is not suitable for end users. But system integrators can use the YAZ client to explore and test Z39.50 server capabilities prior to configuring their clients or metasearch gateways. It also provides an alternative means for diagnosing problems and as a source base for building Z39.50 systems.

The following [demonstration script](#) shows the YAZ client commands that perform the supported functions of the Credo Reference Z39.50 server.

Follow these steps to demonstrate the Credo Reference Z39.50 server:

- Download and install [YAZ](#)
- Copy the [test script](#) to your computer.
- Edit the "auth" command parameters to conform to your site's username & password
- Start the YAZ client. Click Start->Run... And then enter \Program Files\YAZ\bin\yaz-client.exe
- Using the dot command, read in the test script.
- Z>. xrefer-yaz-demo-script.txt
- The commands in the script will start. The script will pause a few seconds between each test.
- Following the examples in the test script, and other information in the YAZ help documentation, perform other YAZ client commands to determine how the Credo Reference Z39.50 server responds to different client requests. Type help into the YAZ command prompt for a list of available commands.