National Library of Canada

See Z39.50 in Action:
Z39.50 Information Session

Z39.50 Technical Issues

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Z39.50 Operations

Origin **Target**

Initialization Operation

Init request . . . . . >
< . . . . . Init response

Search Operation

Search request . . . . . >
< . . . . . Search response

Present Operation

Present request . . . . . >
< . . . . . Present response

Z39.50
Operation Types

Initialize

Search

Present

Scan

Sort

(and others)

The Essense of a Search

Search request . . . . . >

Database(s) to search

name to give to new result set

Query

< . . . . . Search response

How may records were identified by the query

The Essense of a Present

Present request . . . . . >

Result set from which to retrieve records

range of records

How you want them:
- **composition**
- **syntax**

< . . . . . Present response

records

The Essense of a Scan

Scan request . . . . . >

Index (or "term-list") from which to obtain terms

Where to start scanning (what term)

How many terms

< . . . . . Scan response

Terms

Example

1. Scan

Scan request . . . . . >

"Scan the title index for the Music database; begin scan with ' mozart chamber music', as the fifth term; return ten terms "

< . . . . . Scan response

mozart & beethoven
mozart & prague
mozart & salieri
mozart & the archbooby
---> mozart chamber music
mozart im hurenhaus
mozart in new york
mozart speaks
(-->) mozart symphonies
mozart und hayden in London

2. Search

Search request . . . . . >

"Search the music database for records with 'mozart symphonies' in the title."

< . . . . . Search response

"27 records found."

3. Present

Present request . . . . . >

"Present the first three records; in MARC format, Brief records."

< . . . . . Present response

1. Mozart, Wolfgang Amadeus, 1756-1791. Symphonies.
Saint-foix, Georges de, 1874-1954
The Symphonies of Mozart, 1968
LC Call Number ML410.M9S172 1968 68-55994

2. Mozart, Wolfgang Amadeus, 1756-1791. Symphonies.
Dickinson, A.E.F. (Alan Edgar Frederick)
A study of Mozart's last three symphonies / 1978
LC Call Number MT138.M8D4 73-181142

3. Mozart, Wolfgang Amadeus, 1756-1791. Symphonies.
Dearling, Robert, 1933-
The Music of Wolfgang Amadeus Mozart, the Symphonies / 1982
LC Call Number MT130.M8D33 1982 78-68625

4. Present

Present request . . . . . >

"Present the second record; in MARC format, Full record."

< . . . . . Present response

	001	73-181142 MN r952
	050	MT130.M8D4
	082	785.1/1/0924
	100	Dickinson, A.E.F. (Alan Edgar Frederick)
	245	A study of Mozart's last three Symphonies / by A.E.F. Dickinson.
	260	St. Clair Shores, Mich.: Scholarly Press, 1978.
	300	58 p. : music ; 22 cm.
	440	The Music Pilgrim
	500	Reprint of the 1927 ed. published by Oxford University Press, london.
--->	600	Mozart, Wolfgang Amadeus, 1765-1791. Symphonies.
	040	.....

5. Scan Again

Scan request . . . . . >

"Scan Subjects (personal name); begin scan with 'Mozart, Wolfgang Amadeus, 1765-1791. Symphonies' as the fifth term; return ten terms"

< . . . . . Scan response

Mozart, Wolfgang Amadeus, 1756-1791. Quintets
Mozart, Wolfgang Amadeus, 1756-1791. Requiem
Mozart, Wolfgang Amadeus, 1756-1791. Serenade
Mozart, Wolfgang Amadeus, 1756-1791. Sonatas
----> Mozart, Wolfgang Amadeus, 1756-1791. Symphonies
Mozart, Wolfgang Amadeus, 1756-1791. Variations
Mozart, Wolfgang Amadeus, 1756-1791. Vocal Music
Mozart, Wolfgang Amadeus, 1756-1791. Works --
Mozart, Wolfgang Amadeus, 1756-1791. Works, chamber
Mozart, Wolfgang Amadeus, 1756-1791. Zaide

eight Z39.50 Operation Types

Init

Search
Present
Scan

Sort

Delete

Resource-report

Extended-services

The Essense of a Search

Search request . . . . . >

Database(s) to search

name to give to new result set

Query

< . . . . . Search response

How may records were identified by the query

Z39.50 Query Types

private:

Type-0 query

required for conformance:

Type-1 query

Also included:

Type-2 query
Type-100 query
Type-101 query

Plus some Under development:

Type-102 query
Ranked List Query

Type-103 query
SQL

Type-1: "Reverse Polish Notation" (RPN) query.

examples:

1. Query : A

Records in database for which A is true

2. Query : A B C AND OR

Records in database for which both B and C are true, or A is true

3. Query : A B AND C OR

Records in database for which both A and B are true, or C is true

4. Query : (Result set R) AND A

Records in result set R for which A is true

Bib-1 Attributes

Use	**1**	**Structure**	**4**
Relation	**2**	**Truncation**	**5**
Position	**3**	**Completeness**	**6**

Use	**Value**	**Use**	**Value**
Personal name	**1**	**Name and title**	**57**
Corporate name	**2**	**Name geographic**	**58**
Conference name	**3**	**Place publication**	**59**
Title	**4**	**Abstract**	**62**
Title series	**5**	**Note**	**63**
Title uniform	**6**	**Name**	**1002**
ISBN	**7**	**Author**	**1003**
Subject heading	**21**	**Editor**	**1020**
Date of publication	**31**	**Music-key**	**1025**

Relation	**Value**	**Relation**	**Value**
less than	**1**	**greater than**	**5**
equal	**3**	**not equal**	**6**

Structure	**Value**	**Structure**	**Value**
phrase	**1**	**date**	**5**
year	**4**	**string**	**108**

Bib-1 Use Attributes

Personal name	1	PA subject	26
Corporate name	2	LC subject heading	27
Conference name	3	RVM subject heading	28
Title	4	Local subject index	29
Title series	5	Date	30
Title uniform	6	Date of publication	31
ISBN	7	Date of acquisition	32
ISSN	8	Title key	33
LC card number	9	Title collective	34
BNB card no.	10	Title parallel	35
BGF number	11	Title cover	36
Local number	12	Title added title page	37
Dewey classification	13	Title caption	38
UDC classification	14	Title running	39
Bliss classification	15	Title spine	40
LC call number	16	Title other variant	41
NLM call number	17	Title former	42
NAL call number	18	Title abbreviated	43
MOS call number	19	Title expanded	44
Local classification	20	Subject precis	45
Subject heading	21	Subject rswk	46
Subject Rameau	22	Subject subdivision	47
BDI index subject	23	No. nat'l biblio.	48
INSPEC subject	24	No. legal deposit	49
MESH subject	25	No. govt pub.	50

No. music publisher	**51**
Number db	**52**
Number local call	**53**
Code-- language	**54**
Code-- geogr. area	**55**
Code--institution	**56**
Name and title	**57**
Name geographic	**58**
Place publication	**59**
CODEN	**60**
Microform gen.	**61**
Abstract	**62**
Note	**63**
Author-title	**1000**
Record type	**1001**
Name	**1002**
Author	**1003**
Author-name -- personal	**1004**
Author-name -- corporate	**1005**
Author-name -- conference	**1006**
Identifier	**1007**
Subject -- LC children's	**1008**
Subject name -- personal	**1009**
Body of text	**1010**
Date/time added	**1011**
Date/time modified	**1012**
Authority/ format id	**1013**
Any	**1016**
Server-choice	**1017**
Publisher	**1018**
Record-source	**1019**
Editor	**1020**
Bib-level	**1021**
Geographic-class	**1022**
Indexed-by	**1023**
Map-scale	**1024**
Music-key	**1025**
Related-periodical	**1026**
Report-number	**1027**
Stock-number	**1028**
Thematic-number	**1030**
Material-type	**1031**
Doc-id	**1032**
Host-item	**1033**
Content-type	**1034**
Anywhere	**1035**
Author-Title-Subject	**1036**

Back to the Present

Present request . . . . . >

Result set

range

syntax

composition

Example: Retrieve records 1-10 from result set R; retrieve 'brief' records, in USMARC format

Syntax

Object Identifier 1.2.840.10003.5.x

Marc Record Formats:

Unimarc	1
Intermarc	2
CCF	3
USmarc	10
UKmarc	11
Normarc	12
Librismarc	13
Danmarc	14
Finmarc	15
MAB	16
Canmarc	17
SBN	18
Picamarc	19
Ausmarc	20
Ibermarc	21

Record Syntaxes

Content Specific

- **Marc** **1-23**
- **OPAC** **102**

Facility Specific

- **Explain** **100**
- **Extended Services** **106**

Generic

- **SUTRS *(unstructured)*** **101**
- **GRS-1 *(structured)*** **105**

And Now:

- **HTML** **108**

OPAC Record Syntax

102

MARC record

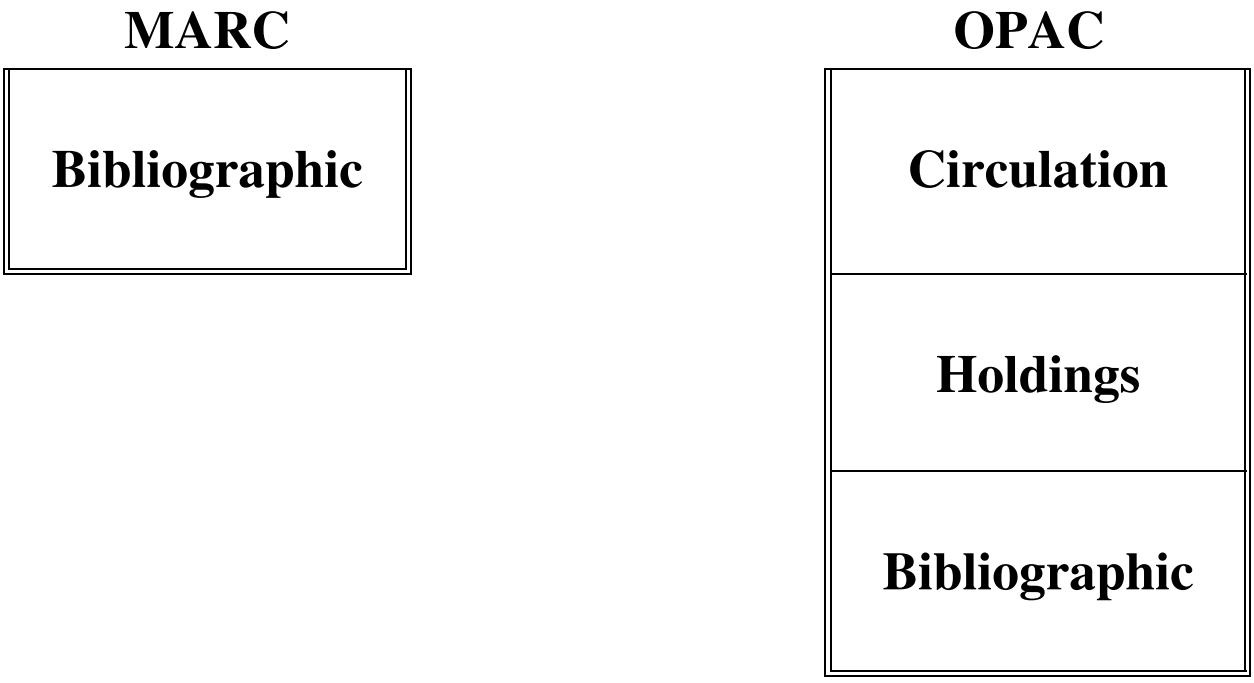
+

1 or more holdings

and/or

holdings + circ records

Syntax and Element Sets

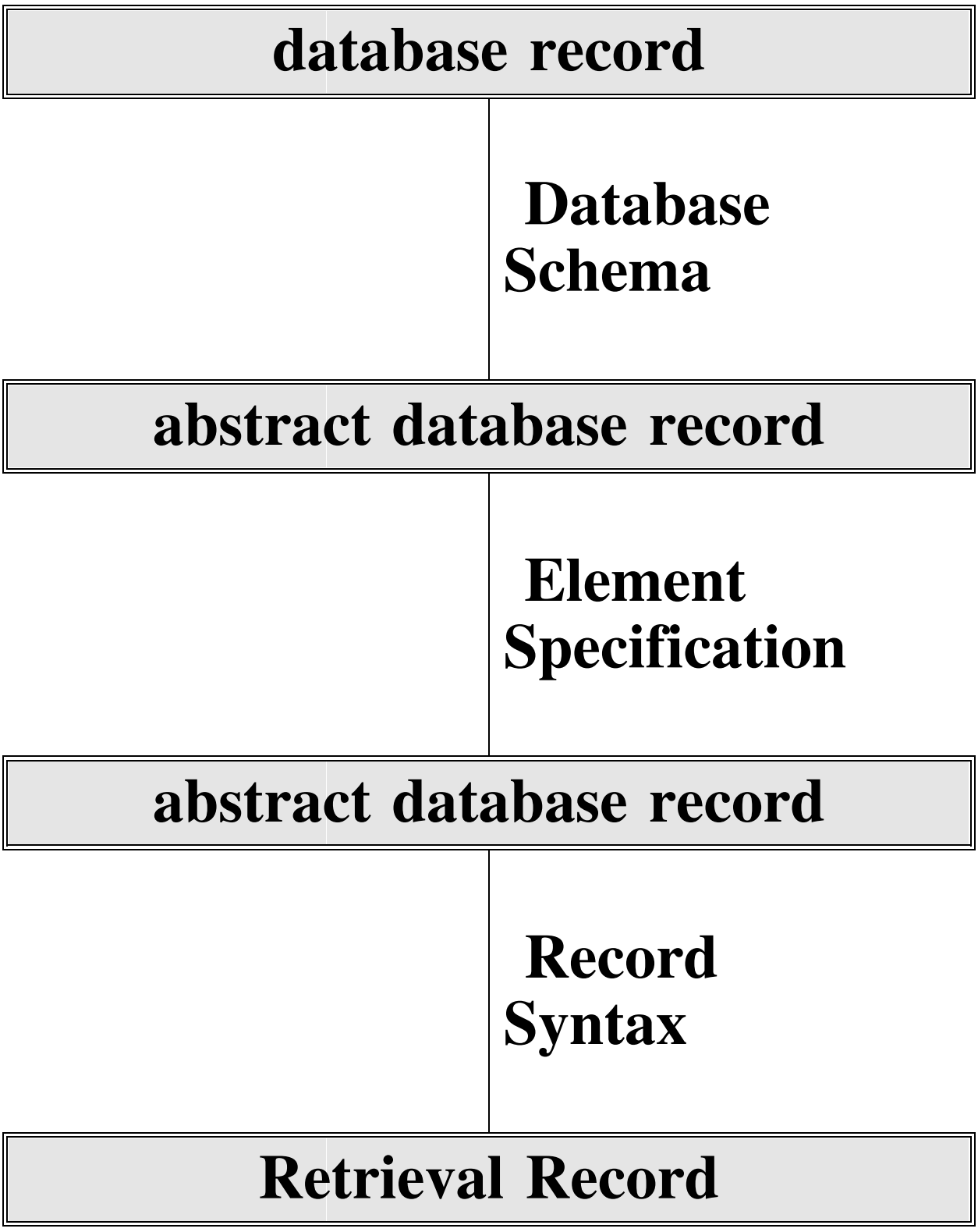


Element Sets

MARC	OPAC
Full	Full
Brief	Circ
Brief-1	holdings
	circ+holdings
	bib+circ

Result Set

Result set item 1	**Database:** ***Bibliographic***
	Record: ***1000***
Result set item 2	**Database:** ***Text***
	Record: ***10***
Result set item 3	**Database:** ***Text***
	Record: ***20***
Result set item 4	**Database:** ***Bibliographic***
	Record ***2000***


database record
Database Schema
abstract database record
Element Specification
abstract database record
Record Syntax
Retrieval Record

Schema Definition

Opac Record

(1): circulation
(2): holding
(3): bibliographic

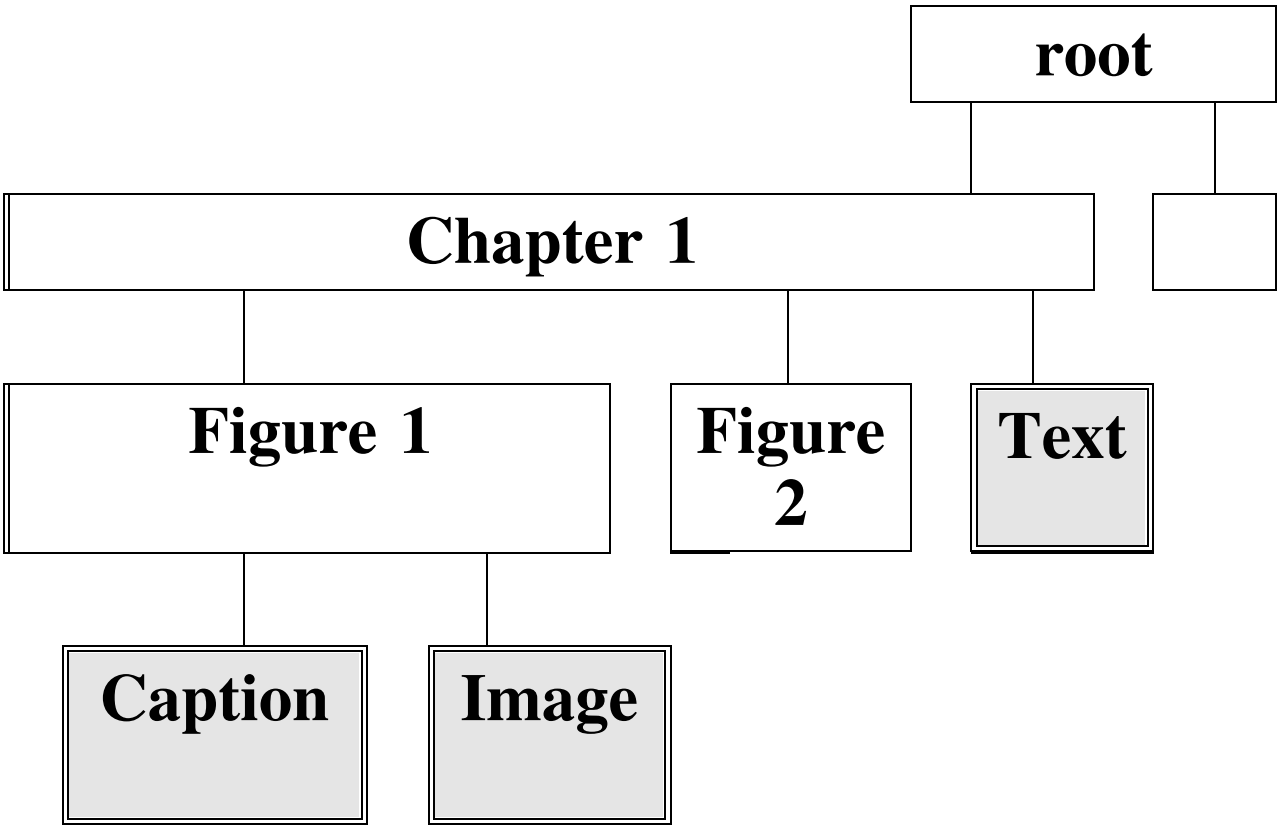
Element Specification

"return result set record 1, assuming the "Opac" schema, circulation, first two holdings, bibliographic information in USMARC, all packaged in the 'GRS' record syntax".

Retrieval Record

(1)	circulation		
(2)	holding	first	
(2)	holding	second	
(3)	bibliographic		usmarc

Version 3 Dynamic Element Specification



Chapter 1, figure 1, caption: ascii

Chapter 1, figure 1, image: tiff

Chapter 1, text: postScript

Access and Resource Control

Origin **Target**

Search request . . . . . >

< . . . . . *Access Control Request*

***Access Control response* . . . . . >**

< . . . . . Search response

Origin **Target**

Search request . . . . . >

< . . . . . *Resource Control Request*

Resource Control response . . . . >

< . . . . . Search response

Origin **Target**

Search request . . . . . >

< . . . . . Resource Control Request

"Search will probably:

- ***take at least an hour, or***
- ***cost at least $100, or***
- ***result in more than 10,000 records***

Want to continue?"

Resource Control response . . . >

"Sure"

< . . . . . Search response

Trigger-resource Control

Origin **Target**

Search request . . . . . >

Trigger-resource-control-request . . . . . >

< . . . . . Resource Control Request

Resource Control response . . . . . >

< . . . . . Search response

Facility	Service(s)	Operation
Initialization	Init	Init
Search	Search	Search
Retrieval	Present Segment	Present
Delete	Delete	Delete
Sort	Sort	Sort
Browse	Scan	Scan
Access Control	Access Control	
Resource control	Resource Control Trigger-Resource control Resource report	 Resource Report
Extended Services	Extended Services	Extended Services
Explain		
Termination	Close	

SR	Z39.50-1992
Init	Init
Search	Search
Present	Present
Delete	Delete
	Access Control
	Resource Control
	Proximity

Z39.50-1992	Z39.50-1995
Init	Init
Search	Search
Present	Present
	Segment
Delete	Delete
Access Control	Access Control
Resource Control	ResourceControl
	Sort
	Scan
	Explain
	Extended Services
	Close

Additional Miscellaneous Features of 1995

- **Attribute Set Enhancements**
- **Extensive Retrieval Tools**
  - **schemas**
  - **dynamic element specification**
  - **variant specifications**
- **Extensibility mechanisms**
- Multiple Present Ranges
- Concurrent Operations

ANSI/NISO

Z39.50-1988

Z39.50-1992 (2)

Z39.50-1995 (2 + 3)

ISO

ISO 10162/10163 (SR) 1991 (1 + 2)

ISO 23950 1997? (2 + 3)

Z39.50 Explain Facility

Provides for Client to Search and Retrieve Information about:

- the Target
- Databases
- Attribute Sets
- Indexes
- Record Syntaxes
- (etc.)
- Categories

Explain **Target-Info** Record

- **Server name**
- **Description**
- **Recent news**
- **"Welcome" message**
- **Icon**
- **Maximum size of a result set**
- **Timeout interval**
- **Contact information**
- **Restrictions**
- **Hours of operation**
- ***(and more)***

Explain **Database-Info** Record

- **Database name**
- **Icon**
- **Description**
- **News**
- **Disclaimers**
- **Currently available for access?**
- **How many records**
- **Biggest record**
- **Hours of operation**
- **Best time to access**
- **Update interval**
- **Restrictions**
- **Cost information**
- **Attribute sets supported**
- **Record syntaxes supported**

- ***(and more)***

Z39.50 Explain Facility

- **Uses Z39.50 Search and Present facilities**
- **Explain database**
- **exp-1 attribute set**
- **explain-1 record syntax**

Example:

Search the Explain database for records where 'explainCategory' = 'databaseInfo'

Extended services

- **Save a result set**
- **Export**
- **Periodic Query**
- **Order an item**
- **Update a database**

Extended Services Facility

- **the Extended-services *service***
- **The extended *services***
- **The ES *database***

The Extended Services *Service*

Origin **Target**

Init request . . . . . >
< . . . . . Init response

Search request . . . . . >
< . . . . . Search response

Extended Service request . . . . . >
< . . . . . Extended Services response

Origin **Target**

Extended Service request . . . . . >

Type
Name
User
Retention
Permissions
Description
Task-specific-parameters

(and others)

< . . . . Extended Services response

"task is queued"

In the ES database, a "task Package" is created

- **Package type**
  - **Database Update**
  - **Item Order**
  - **etc.**
- **Package name**
- **User Id**
- **Retention time**
- **Permissions**
- **Description**
- **Creation date/time**
- **Task status**
  - **pending**
  - **active**
  - **completed**
  - **aborted**
- **"Task Specific" Parameters**

Client can create a task package, then retrieve it (via Search and Present), repreatedly if desired, to montor its progress.

Origin **Target**

Extended Service request . . . . . >

(< . . Extended Services response)

Search request . . . . . >

< . . . . . Search response

Present request . . . . . >

< . . . . . Present response

Profiles

- **WAIS**
- **GILS**
- **ATS (Author-title-subject)**
- **Union Catalog**
- **Item Order/ILL**
- **CIP**
- **Geo**
- **ZSTARTS**
- **Collections**
  - **CIMI (Musuems)**
  - **Digital library**

Two proposed profiles for use of Z39.50 Extended Services

- **Union Catalogue Profile : Using Z30.50 Enquiry and Update**

  management of library collections via a union catalogue.

  Profiles Z39.50 for catalogue update transactions, using Z39.50 **Update Extended Service**.

- **Profile for the Use of Z39.50 Item Order Extended Service for Interlibrary Loan**

CIP

Catalogue Interoperability Protocol

Z39.50 Profile for access to Earth observation and associated data resources.

CEOS -- Committee on Earth Observation Satellites -- ESA, NASA, DLR (Germany), NASDA (Japan), CCRS (canada), BNSC (UK), and CEO (Centre for Earth Observation).

Models collections, permitting complex hierarchical groupings of data organized thematically, distributed, with product descriptors or collection descriptors.

GEO Profile

Z39.50 Profile for the Content Specification for Digital Geospatial Metadata

U.S. Geological Survey

Content, quality, condition, and other characteristics of geospatial information, and to facilitate discovery, query, retrieval, and presentation of geospatial metadata and the spatial data it references.

"Z39.50 Profile for Simple Distributed Search and Ranked Retrieval"

ZDSR

(formerly ZSTARTS formerly Zlite)

Features:

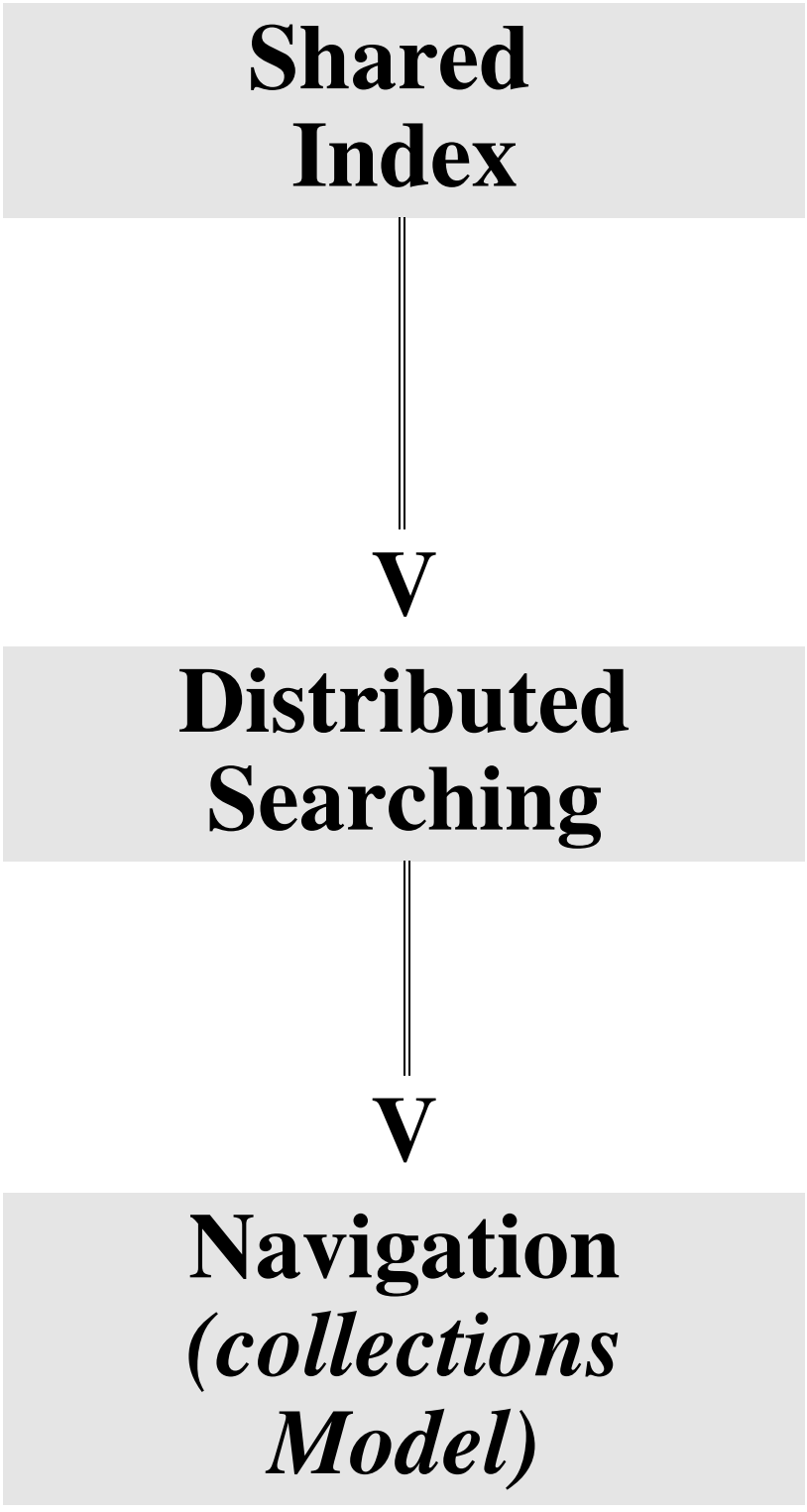
- **Documents.**
- **Document descriptors (metadata).**
- **Search by author, title, language, within body of text, url, date-last-modified.**
- **Relevance feedback.**
- **stem, phonetic, proximity searching.**
- **Result ranking.**

ZDSR Document Metadata

- **title**
- **abstract**
- **publication date**
- **creation date**
- **date last modified**
- **size**
- **score**
- **frequency and weight per term**
- **url**

Z39.50 Metadata

- **Search access points**
- **Retrieval elements**
- **Transient metadata**
  (e.g. score)
- **Variant information**
  (e.g. size, format)
- **User dependent**
  (e.g. terms/conditions)
- **Server/database level metadata**
- **Collection level metadata**


Shared Index
V
Distributed Searching
V
Navigation (collections Model)

A **Collection** is a:

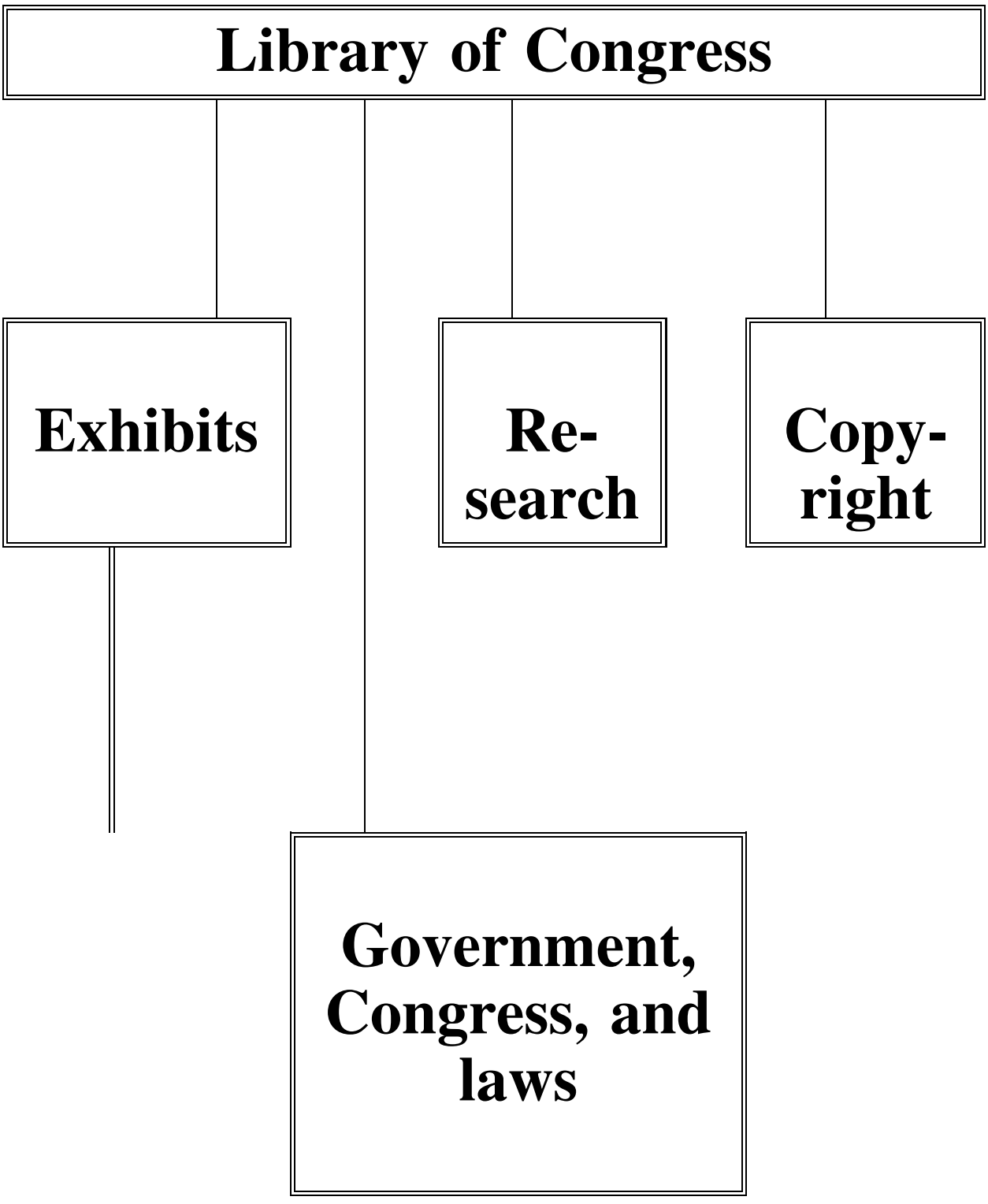
***group of related objects and collections*.**

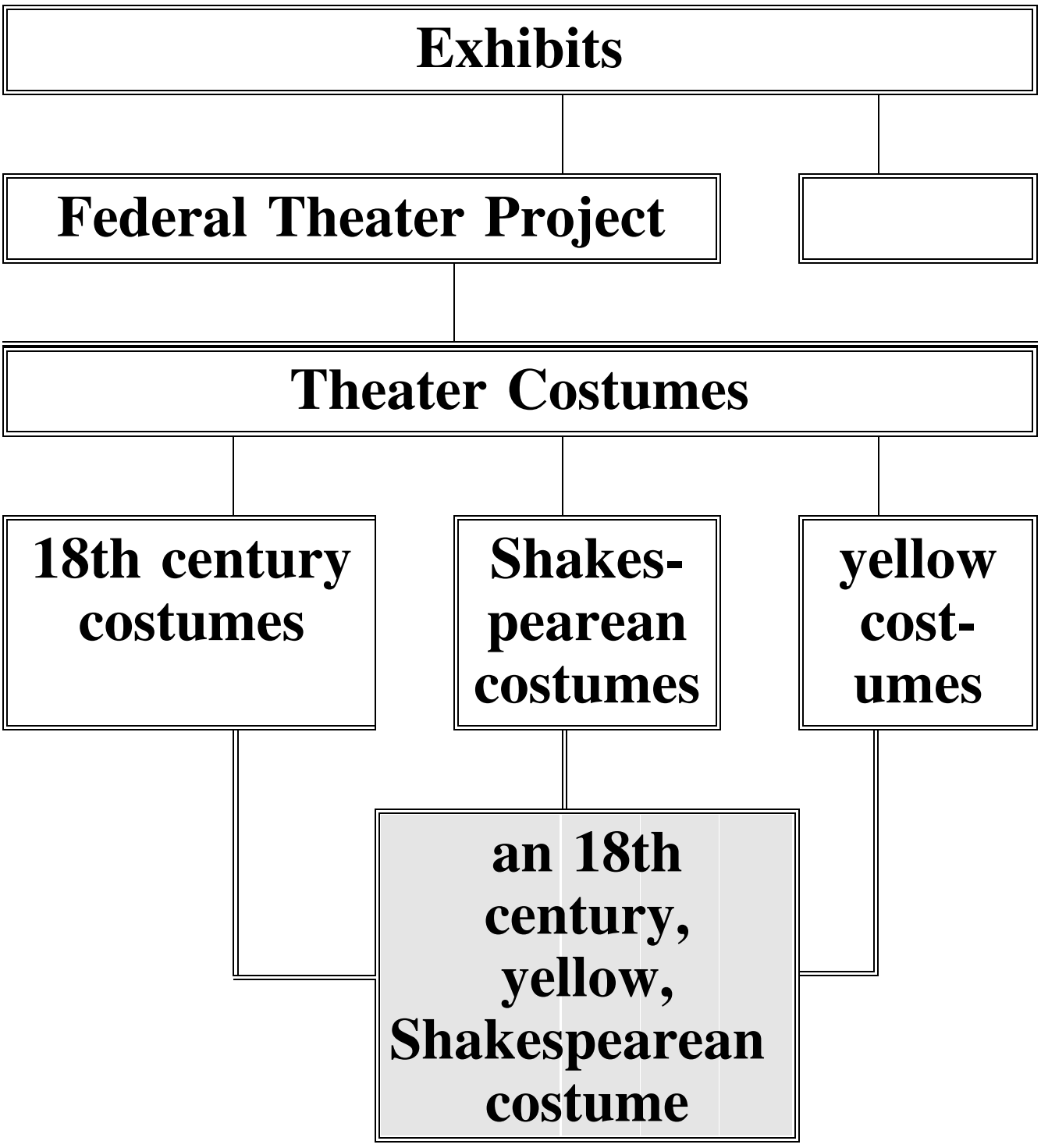
- **Organized thematically (e.g. by subject, creator, historical period),**
- **with diverse objects;**
- **with associated description(s);**
- **hierarchical;**
- **distributed.**

Navigation

Support for navigation generally Requires:

- **Semantic interoperability**
  - **search semantics**
  - **meta-structures**
- **Intellectual resources**
  - **aggregation**
  - **organization**
  - **description**
- **Cataloging Resources**


Library of Congress
Exhibits
Re-
search
Copy-
right
Government,
Congress, and
laws


Exhibits
Federal Theater Project
Theater Costumes
18th century costumes
Shakes-pearean costumes
yellow cost-umes
an 18th century, yellow, Shakespearean costume

Collection
Descriptive Record

Brief text Description

Associated Description

Related Collections

Enumerated Members

An object or a collection may have one or more Associated Descriptions:

- **Finding Aid**
- **EAD**
- **Cataloging Record**
- **Exhibition catalog**
- **GILS Record**
- **Web Page**

Collection
Descriptive Record

Brief text Description

Associated Descriptions

- brief description
- type
- size
- format
- pointer

Related Collections

Enumerated Members

Related Collections: Relationships

- **Parent (or Superior)**
- **Child (or Subordinate)**
- **Sibling**
- **"might be of interest"**

Collection
Descriptive Record

Brief text Description

Associated Descriptions

Related Collections

- relationship
- pointer to collection descriptive record

Enumerated Members

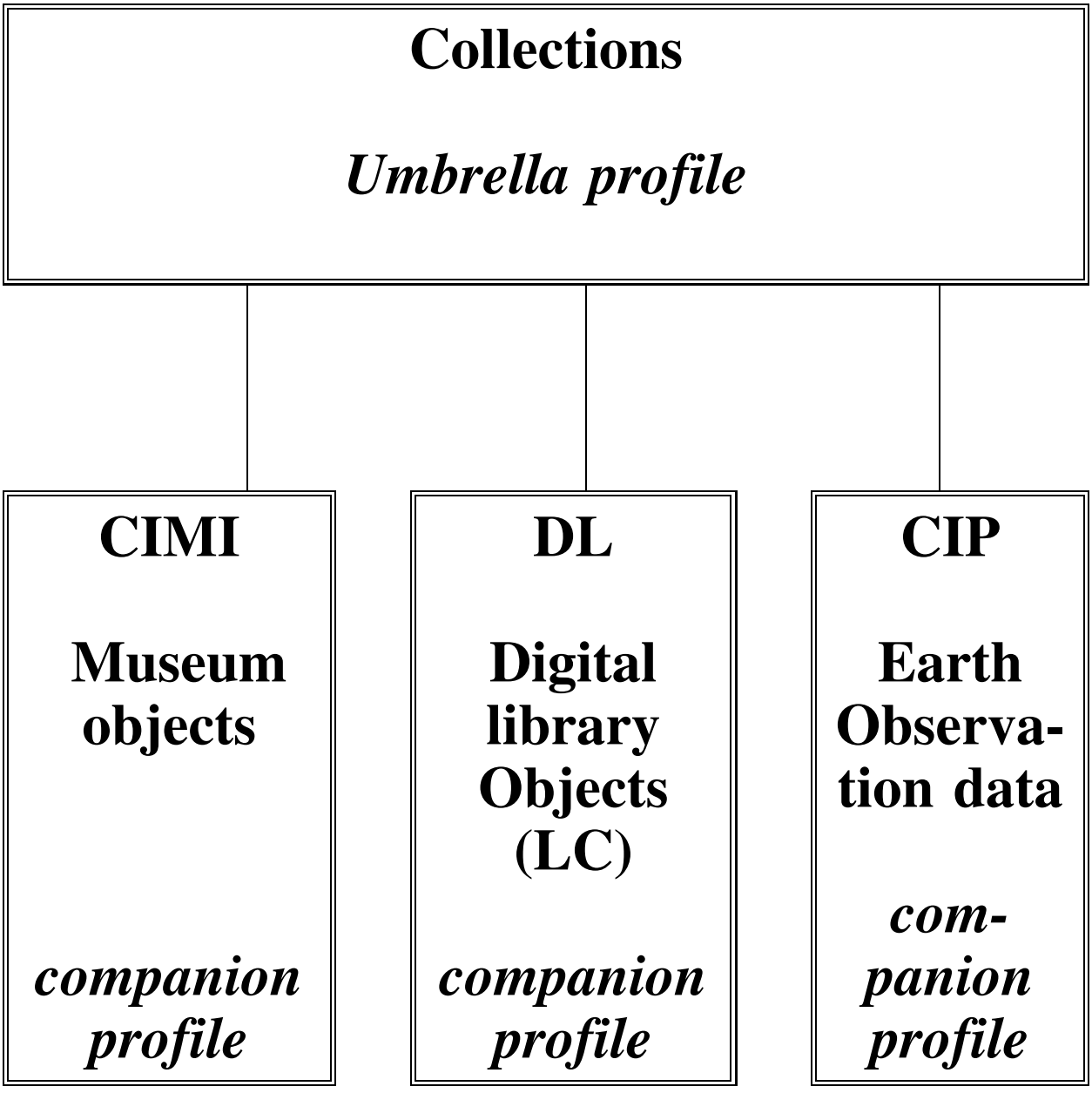
Enumerated Members

First Object
Brief description
pointer

Second Object
Brief description
pointer

Third Object
Brief description
pointer

Collections Suite of Z39.50 Profiles



Maintenance Agency Web Page

http://lcweb.loc.gov/z3950/agency

- **The ANSI/NISO Z39.50-1992 document**
- **The ANSI/NISO Z39.50-1995 document**
- **Register of Implementors**
- **Profiles**
- **Registered Objects and definitions**

- **Extensions**
- **Interpretations**
- **Implementor Agreements**
- **Version 3 Baseline Requirements**
- **Z39.50 Implementors Group**
- **Interoperability Testing**
- **Articles, tutorials, etc.**
- **Bibliography**
- **Changes applied**
- **Version 4 development**