- The client might expand the search to apply to superior collections and/or subordinate collections.

The user might identify an object of interest and wish to locate other objects, related in a specific way. The client may assist the user by listing the various collections to which the object belongs, including descriptions of criteria used to aggregate objects in each collection.

For example, consider a collection of digitized theater costumes, with various subcollections. One of the objects is a digitization of an eighteenth century, yellow, Shakespearean costume. That single object might belong to a number of collections, including "18th century costumes", "yellow costumes" and "shakespearean costumes". A user interested in that object might select one of these collections to search, based on the specific aspect of interest.

Note that the scenarios above suggest that a collection may know of subordinate collections and objects, and a collection or object may know of superior collections; correspondingly, a client might build a collection-map bottom-up or top-down. It must be emphasized that this profile does not mandate nor does it intend to favor either approach. A companion profile may choose to favor or mandate either approach.

4. Descriptive Record Schema

This section defines a schema for the Descriptive Record. The object identifier for this schema is {iso (1) member-body (2) US (840) ANSI-standard-Z39.50 (10003) schema (13) descriptive record (3)}.

4.1 Abstract Record Structure

The abstract record structure for a Descriptive Record is defined as follows:

Element	Occurrence	Repeat-able	Datatype
typeOfDescriptiveRecord	mandatory	no	INTEGER
briefDescription	optional	no	BriefTextDescription
collectionInfo	optional; occurs only if typeOfDescriptiveRecord is 1	no	CollectionInfo
objectInfo	optional; occurs only if typeOfDescriptiveRecord is 2	no	ObjectInfo
associatedDescription	optional	yes	AssociatedDescription
relatedCollection	optional	yes	relatedCollection

Element *typeOfDescriptiveRecord* distinguishes whether the Descriptive Record describes a collection or an object, i.e., it distinguishes a Collection Descriptive Record from an Object Descriptive Record. It is one of the following:

1 = Describes a collection
2 = Describes an object
3 = Unspecified

Note: 'Unspecified' in included cases when there is a unit of information, possibly an Associated Description, where it is unclear whether that information is a collection or object, yet the information is interesting enough to warrant a descriptive record.

Element *briefDescription* is intended for use in a brief record, for display to the user. It is a brief description of the collection or object that the Descriptive Record describes.

Element *collectionInfo* consolidates elements that occur only in a Collection Descriptive Record (as opposed to an Object Descriptive Record). It includes the name of the collection, the databases that pertain to the collection, and an enumeration (possibly partial) of the members of the collection.

Element *objectInfo* consolidates elements that occur only in an Object Descriptive Record (as opposed to a Collection Descriptive Record). It indicates the type and category of the object, as well as the Digital Object itself (or a pointer to the Digital Object).

Each occurrence of element *associatedDescription* represents an Associated Description. Multiple occurrences of this element represent different Associated Descriptions (to represent multiple representations of the same Associated Description, see 4.2.3).

Each occurrence of element *relatedCollection* identifies a parent-, superior-, related-, or context collection. The name of the collection and the database where Collection Descriptive Record resides are indicated, as well as the nature of the relationship.

When the Descriptive Record is an Object Descriptive Record (typeOfDescriptiveRecord = 2), this element may indicate the collections to which the object (described by this Descriptive Record) belongs.

4.2 Datatype Definitions

This section defines the following datatypes:

- CollectionInfo
- ObjectInfo
- AssociatedDescription
- CollectionAndDb
- RelatedCollection
- ServerAndDb
- EnumeratedMember
- DigitalObject
- Description
- RecordPointer
- BriefTextDescription

4.2.1 CollectionInfo

Datatype *CollectionInfo* is structured as follows:

Element	Occurrence	Repeatable	Datatype
collectionName	mandatory	no	InternationalString
database	optional	yes	ServerAndDb
enumeratedMember	optional	yes	EnumeratedMember
fullyEnumerated	optional	no	BOOLEAN
childrenKnowThisParent	optional	no	BOOLEAN

Element *collectionName* is the name of the collection.

Each occurrence of element *database* identifies a database. The collective set listed is the set of databases that pertain to the collection. The set of databases may span servers.

When this element is omitted, the client should infer that it was omitted either because the server did not know, or did not wish to indicate, the pertinent databases. When one or more occurrences are included, the client should not infer that all of the pertinent databases are necessarily included.

The occurrences of element *enumeratedMember* enumerate the members of the collection. Each occurrence corresponds to an object or subcollection. The enumeration may or may not be inclusive, as indicated by the element fullyEnumerated. Each occurrence may include a pointer to an Object Descriptive Record, to a Digital Object, or to a Collection Descriptive Record.

Element *fullyEnumerated* indicates whether or not the enumeration of members, as enumerated by the occurrences of element enumeratedMember, is a complete enumeration of the members of the collection. If this element is not supplied no default should be inferred; it should be omitted only if the target does not know or does not wish to indicate if the enumeration is complete.

Element *childrenKnowthisParent*, if 'true', means that every member of this collection lists this collection as a parent. If this element is not supplied no default should be inferred; it should be omitted only if the target does not know or does not wish to indicate its value.

Note: A value of 'true' for element fullyEnumerated indicates that the client may discover the members of the collection via retrieval (by retrieving occurrences of element enumeratedMember). A value of 'true' for element childrenKnowThisParent indicates that the client may discover the members via search (see 4.7.1, Collection-1 Use attribute Parent-collection). If both elements have value 'false', this indicates that there is no straightforward way to discover the members of the collection.

4.2.2 ObjectInfo

Datatype *ObjectInfo* is structured as follows:

Element	**Occurrence**	**Repeatable**	**Datatype**
typeOfObject	mandatory	no	INTEGER
categoryOfObject	optional	no	InternationalString
digitalObject	optional; may occur only if typeOfObject less than 4	yes	DigitalObject

Element *typeOfObject* is one of the following:

0 = Unspecified.
1 = Object is a Digital Object.
2 = Object is a Digital Object for which there is a Physical Object.
3 = Object is a Digital Object for which there is no Physical Object (for example when an object is originally created electronically).
4 = Object is a Physical Object.
5 = There is no (separate) object.

Element *categoryOfObject* may be included to indicate that a Digital Object is, for example, an exhibition catalog or cataloging record (these examples are purely illustrative and not intended as inclusive). This profile does not define any categories. It is anticipated that companion profiles will do so.

Note: See also categoryOfAD within AssociatedDescription. A given object in one collection might be treated as an Associated Description in a different collection (perhaps managed by a different institution). Therefore, there may be categories of objects in common with categories of Associated Descriptions.

Each occurrence of element *digitalObject* includes the actual Digital Object, or a pointer to the Digital Object. Multiple occurrences of this element identify different representations of the Digital Object, such as variant resolutions, color depths or encodings (they do not represent different Digital Objects; datatype ObjectInfo represents a single, logical Digital Object).

4.2.3 AssociatedDescription

Datatype *AssociatedDescription* is structured as follows:

Element	Occurrence	Repeatable	Datatype
briefDescriptionOfAD	optional	no	BriefTextDescription
categoryOfAD	optional	no	InternationalString
description	mandatory	yes	Description

Element *briefDescriptionOfAD* is a brief text description of the Associated Description, for display purposes.

Element *categoryOfAD* may be included to indicate that the Associated Description is, for example, an encoded archival description, exhibition catalog, or cataloging record (these examples are purely illustrative and not intended as inclusive). This profile does not define any categories. It is anticipated that companion profiles will do so.

Note: See also categoryOfObject (and its note) within ObjectInfo.

Each occurrence of element *Description* includes the actual Associated Description or a pointer to the Associated Description. Multiple occurrences of this element represent different representations of the Associated Description (they do not represent different Associated Descriptions; multiple occurrences of associatedDescription in the main structure may be used to represent different Associated Descriptions).

4.2.4 RelatedCollection

Datatype *RelatedCollection* is structured as follows:

Element	Occurrence	Repeatable	Datatype
collection	mandatory	no	CollectionAndDb
relationship	optional	yes	INTEGER
relativeLevel	optional	no	INTEGER
descriptionOfRelationship	optional	no	InternationalString

Element *collection* identifies the related collection.

Element *relationship* is one of the following:

1 = superior collection
2 = context collection
3 = collection may be of interest (no familial relationship implied)

Notes:

(1) The subordinate relationship is not included here, because subordinate collections are enumerated within element enumeratedMember of collectionInfo.
(2) Relationship is repeatable, and the valid combinations are 1; 1,2, and 3; and 3.

Element *relativeLevel* indicates the level of this collection relative to the (subject) object or collection. A value 0 means "sibling" (or "same level"), 1 means "parent", and a value greater than 1 means "superior but not parent".

Element *descriptionOfRelationship* provides a text description of the nature of the aggregation, relationship, or context, and may indicate why the collection might be of interest.

4.2.5 CollectionAndDb

Datatype *CollectionAndDb* is structured as follows:

Element	Occurrence	Repeatable	Datatype
collectionName	mandatory	no	InternationalString
database	mandatory	no	ServerAndDb

Element *collectionName* is the name of a collection.
Element *database* identifies a server and database.

4.2.6 ServerAndDb

Datatype *ServerAndDb* is structured as follows:

Element	Occurrence	Repeatable	Datatype
server	optional; if omitted, the indicated database is assumed to be on this server; must be supplied if indicated database is not on this server	no	InternationalString
db	mandatory	no	InternationalString

Element *server* identifies a host and port.
Element *db* is a database on the indicated server.

4.2.7 EnumeratedMember

Datatype *EnumeratedMember* has the following structure:

Element	Occurrence	Repeatable	Datatype
briefDescriptionOf Member	optional	no	BriefText Description
pointer	optional	no	RecordPointer
whatPointerPointsTo	occurs if and only if pointer occurs	no	INTEGER

Element *briefDescriptionOfMember* is a brief text description of the object or subcollection.

Element *pointer* is a pointer to an Object Descriptive Record or Digital Object, if the member is an object, or to a Collection Descriptive Record if the member is a subcollection.

Element *whatPointerPointsTo* is one of the following:
1 = element *pointer* points to an Object Descriptive Record
2 = element *pointer* points to a Digital Object
3 = element *pointer* points to a Collection Descriptive Record
4 = type of pointer is Unspecified

4.2.8 DigitalObject

Datatype *DigitalObject* is structured as follows:

Element	Occurrence	Repeatable	Datatype
briefDescriptionOfDOVariant	optional	no	BriefTextDescription
actualDO	occurs if and only if pointerToDO does not occur	no	variant or category dependent; default is OCTET STRING
pointerToDO	occurs if and only if actualDO does not occur	no	RecordPointer
authoritative	optional	no	BOOLEAN

Element *briefDescriptionOfDOVariant* is a brief text description of this particular variant or representation of the Digital Object. It is intended to allow the user to discriminate among variants or representations of the Digital Object. It is not intended as a description of the Digital Object itself; that description is provided either from element briefDescription in the Descriptive Record (when the object is obtained via an Object Descriptive Record) or from element briefDescriptionOfMember in enumeratedMember (when the Digital Object is discovered via a Collection Descriptive Record).

Element *actualDO* is the actual Digital Object.

Element *pointerToDO* identifies a retrievable information object that is (or contains) the Digital Object. It may be retrievable via Z39.50 or via other mechanisms outside the scope of this profile.

Element *authoritative* indicates whether the server deems this representation of the digital object to be an authoritative representation. The server may provide several representations of the Digital

Object (represented by multiple occurrences of element digitalObject within ObjectInfo) some considered authoritative and others not considered authoritative, as reflected by the value of this element.

4.2.9 Description

Datatype *Description* is structured as follow:

Element	Occurrence	Repeatable	Datatype
briefDescriptionOfADVariant	optional	no	BriefTextDescription
actualAD	occurs if and only if pointerToAD does not occur	no	variant or category dependent; default is InternationalString
pointerToAD	occurs if and only if actualAD does not occur	no	RecordPointer
authoritative	optional	no	BOOLEAN

Element *briefDescriptionOfADVariant* is a brief text description of this particular variant or representation of the Associated Description, intended to allow the user to discriminate among variants or representations of the Associated Description. This element is not intended as a description of the Associated Description itself; that description is provided by element briefDescriptionOfAD within associatedDescription.

Element *actualAD* is the actual Associated Description.

Element *pointerToAD* identifies a retrievable information object that is (or contains) the Associated Description. It may be retrievable via Z39.50 or via other mechanisms outside the scope of this profile.

Element *authoritative* indicates whether the server deems this representation of the Associated Description to be an authoritative representation. The server may provide several representations of the AssociatedDescription (represented by multiple occurrences of element description within associatedDescription) some considered authoritative and others not considered authoritative, as reflected by the value of this element.

4.2.10 RecordPointer

Datatype *RecordPointer* has the following structure:

Element	Occurrence	Repeatable	Datatype
database	occurs (in conjunction with recordId) if and only if alternativeIdentifier does not occur	no	ServerAndDb
recordId	occurs (in conjunction with database) if and only if alternativeIdentifier does not occur	no	OCTET STRING
alternative Identifier	occurs if and only if Database does not occur	no	OCTET STRING
typeOf Identifier	optional; occurs only if alternativeIdentifier occurs	no	OBJECT IDENTIFIER or InternationalString

RecordPointer is used in the following element: pointer within EnumeratedMember, pointerToDO within DigitalObject, and pointerToAD within Description. It points to a database record or other retrievable information object corresponding respectively to: the Descriptive Record for an object or collection enumerated by EnumeratedMember, a Digital Object, or an Associated Description. It takes one of the following two forms:

(a) a database (serverAndDb) and unique identifier of a record within the database (recordId),
(b) some alternative identifier.

In case (a) the format of recordId is local to the server. In case (b), the alternative identifier might be, for instance, a URL. It might self-identify its type, but in any case its type may optionally be indicated by the element typeOfIdentifier.

Elements *database* and *recordId* occur together and identify a database and record.

Alternatively, element *alternativeIdentifier* occurs if elements database and recordId do not, and it identifies a database and record.

Element *typeOfIdentifier* indicates the type of identifier, for example a URL or URN, for element alternativeIdentifer.

4.2.11 BriefTextDescription

Datatype *BriefTextDescription* has type InternationalString.

4.3 Schematic Representation of Descriptive Record

```
typeOfDescriptiveRecord
briefDescription
collectionInfo
        collectionName
        database (repeatable)   (server and db)
        enumeratedMember (repeatable)
            briefDescriptionOfMember
            pointer (database and recordId) XOR (alternativeIdentifier and typeOfIdentifier)
            whatPointerPointsTo
            fullyEnumerated (BOOLEAN)
            childrenKnowThisParent (BOOLEAN)
objectInfo
        typeOfObject
        categoryOfObject
        digitalObject  (repeatable)
            actualDO  XOR pointerToDO
                    (database and recordId) XOR (alternativeIdentifier and typeOfIdentifier)
            authoritative (BOOLEAN)
associatedDescription
        briefDescriptionOfAD
        categoryOfAD
        description (repeatable)
            actualAD XOR pointerToAD
                    (database and recordId) XOR (alternativeIdentifier and typeOfIdentifier)
            authoritative (BOOLEAN)
relatedCollection (repeatable)
        collection  (collectionName, server, and database)
        relationship  (repeatable)
        relativeLevel
        descriptionOfRelationship
```

4.4 Tag Types

For this schema a GRS-1 record will use the following tagTypes:

TagType	**Usage**
1	Elements from tagSet-M defined in Z39.50-1995, Appendix TAG, TAG.2.1. A target may include an element from tagSet-M at its discretion, and an origin may ignore it.
2	Elements from tagSet-G defined in Z39.50-1995, Appendix TAG, TAG.2.2. A target may include an element from tagSet-G at its discretion, and an origin may ignore it.
3	Reserved for tags locally defined by a target. This profile does not define the usage of tagType 3, but companion profiles may do so.
4	The tagSet defined in 4.5.

4.5 Descriptive Record TagSet

This section defines a tagSet for the Abstract Record Structure defined in 4.1. The object identifier for this tagSet is {iso (1) member-body (2) US (840) ANSI-standard-Z39.50 (10003) tagSet (14) digital collections (5)}

Tag	Element	DataType
1	typeOfDescriptiveRecord	INTEGER
2	briefDescription	BriefTextDescription
3	collectionInfo	CollectionInfo
4	objectInfo	ObjectInfo
5	associatedDescription	AssociatedDescription
6	relatedCollection	relatedCollection
7	collectionName	InternationalString
8	database	ServerAndDb
9	enumeratedMember	EnumeratedMember
10	fullyEnumerated	BOOLEAN
11	childrenKnowThisParent	BOOLEAN
12	typeOfObject	INTEGER
13	categoryOfObject	InternationalString
14	digitalObject	DigitalObject
15	briefDescriptionOfAD	BriefTextDescription
16	categoryOfAD	InternationalString
17	description	Description
18	collection	CollectionAndDb
19	relationship	INTEGER
20	relativeLevel	INTEGER
21	descriptionOfRelationship	InternationalString
22	collectionName	InternationalString
23	database	ServerAndDb
24	server	InternationalString
25	db	InternationalString
26	briefDescriptionOfMember	BriefTextDescription
27	pointer	RecordPointer
28	whatPointerPointsTo	INTEGER
29	actualDO	variant dependent; default is OCTET STRING
30	briefDescriptionOfDOVariant	BriefTextDescription
31	pointerToDO	RecordPointer
32	authoritative	BOOLEAN
33	briefDescriptionOfADVariant	BriefTextDescription
34	actualAD	variant dependent; default is InternationalString
35	pointerToAD	RecordPointer
36	database	ServerAndDb
37	recordId	OCTET STRING
38	alternativeIdentifier	OCTET STRING
39	typeOfIdentifier	OBJECT IDENTIFIER or InternationalString

4.6 Element Set Names Defined for this Schema

The following element set names are defined for this schema:

- 'b' (brief)
- 'navigation'
- 'full'

4.6.1 Brief Record

The brief record is defined as follows:

Element	Occurrence in Brief Record
typeOfDescriptive Record	Always included.
briefDescription	Included if available.
collectionInfo	(When typeOfDescriptiveRecord is 1) include the element collectionName only.
objectInfo	(When typeOfDescriptiveRecord is 2) include elements typeOfObject and categoryOfObject. Also, optionally, digitalObject: include only actualDO (of DigitalObject), if it is available, and include only the variant information (no content).
associated Description	Optional. Some or all occurrences may be included at target discretion. Include the elements briefDescriptionOfAD and categoryOfAD only.
relatedCollection	Excluded.

Companion profiles may specify additional elements that are to be included in a brief record, including elements defined by tagSets other than the tagSet used in this profile.

4.6.2 Navigation Record

The Navigation record is defined as follows:

Element	Occurrence in a navigation record
typeOfDescriptiveRecord	Always included.
briefDescription	Excluded.
collectionInfo	Occurs if available. All available elements of CollectionInfo occur. All available elements and all occurrences of EnumeratedMember (within CollectionInfo) occur.
objectInfo	Excluded.
associatedDescription	Excluded.
relatedCollection	All occurrences included.

4.6.3 Full Record

In a full record, all available elements for all available occurrences should be included.

4.7 Collection-1 Attribute Set

This section defines attribute set collection-1, for searching databases with records whose structure is as defined by the Descriptive Record schema. The object identifier for this attribute set is {iso (1) member-body (2) US (840) ANSI-standard-Z39.50 (10003) attributes (3) digital collections (7)}.

The Collection-1 attribute set defines the two attribute types: Use (type 1) and Relation (type 2). Semantics for combining attributes from this set with attributes from a different set, within a single operand, are not provided by this attribute set definition.

4.7.1 Collection-1 Use Attributes

The following Collection-1 Use attributes are defined:

Value **Use**

1 Record-id

2 Record-type

This attribute is used to distinguish the types of records of interest, as follows:

Term	**Meaning**
0	record is a Descriptive Record
1	record is a Collection Descriptive Record
2	record is a Collection Descriptive Record for a context collection
3	record is an Object Descriptive Record
4	record is a Digital Object

3 Object-type

This attribute is used to distinguish types of objects, as follows:

Term	**Meaning**
1	object is a Digital Object
2	object is a Digital Object for which there is a Physical Object
3	object is a Digital Object for which there no Physical Object
4	object is a Physical Object

This attribute may be combined with Use attribute Record-type, for example, to search for Object Descriptor Records describing Physical Objects only.

4 Parent-collection

This attribute is used to search for Descriptive Records that list the collection (specified by the term) as a parent.

Note: There is no requirement in this profile that a collection or object know all of its parents, but when it does not, full functionality might not be achieved.

This attribute may be combined with Use attribute Record-type to restrict the search to Collection Descriptive Records or Object Descriptive Records.

5 Superior-collection

This attribute is similar to Parent-collection, used to search for subordinate, but not necessarily immediately subordinate, Descriptive Records.

6 Related-collection

Used to search for Descriptive Records for objects or collections that list the collection (indicated by the term) as a related-collection.

7 Collection-name

Used to search for the Collection Descriptive Record for the collection (indicated by the term).

4.7.2 Collection-1 Relation Attributes

The following Collection-1 Relation attributes are defined:

Value	**Relation**
1	equal
2	always-matches