5. Z39.50 Specific Profile Details

Section 6 below defines three levels of conformance. These are briefly summarized here:

Basic Conformance	-	Version 2; support required for the DR schema and the GRS-1 record syntax.
Basic V3 Conformance	-	Basic conformance, plus support required for version 3.
Enhanced Conformance	-	Basic V3 conformance, plus support required for selected additional features.

When a feature is stated to be mandatory, then unless otherwise specified, support is mandatory both for origin and target, and for any conformance level.

5.1 Protocol version

Both version 2 and version 3 of Z39.50 are addressed by this profile. For Basic V3 Conformance or Enhanced Conformance version 3 must be supported.

5.2 Services and Facilities

The Init, Search, and Present services are mandatory. The Segment service is optional for Basic V3 and Enhanced Conformance (and excluded for Basic Conformance). The Explain facility is optional; see 5.5.

5.3 Search

Support for the Collection-1 attribute set (see 4.7) is mandatory. The use and semantics of Type-1 query operands that combine attributes from the Collection-1 set with attributes from a different set is not within the scope of this profile. Companion profiles may specify such usage and semantics.

5.4 Retrieval

5.4.1 Present Parameters

Support for Present parameter CompSpec is mandatory for Enhanced Conformance; it is optional for Basic V3 Conformance and excluded for Basic Conformance.

CompSpec is defined in Z39.50 as follows:

```
CompSpec ::= SEQUENCE{
  selectAlternativeSyntax     [1] IMPLICIT BOOLEAN,
  generic                     [2] IMPLICIT Specification OPTIONAL,
  dbspecific                  [3] IMPLICIT SEQUENCE OF SEQUENCE{
                                        db      [1] DatabaseName,
                                        spec    [2] IMPLICIT Specification} OPTIONAL,
  recordSyntax                [4] IMPLICIT SEQUENCE OF OBJECT IDENTIFIER
                                            OPTIONAL
     }
Specification ::= SEQUENCE{
  schema              [1] IMPLICIT OBJECT IDENTIFIER OPTIONAL,
  elementSpec         [2] CHOICE{
                          elementSetName    [1] IMPLICIT InternationalString,
                          externalEspec     [2] IMPLICIT EXTERNAL} OPTIONAL}
```

When the CompSpec parameter is used for the purpose of retrieving a Descriptive Record, it should be used as follows:

- A value of 'false' for 'selectAlternativeSyntax' should be accepted by the target.
- 'generic' should occur.
- 'dbSpecific' should not occur.
- 'recordSyntax', which is a SEQUENCE OF, should be the single syntax, GRS-1.
- 'schema' should be the Descriptive Record schema defined in section 4.
- For 'elementSpec', when 'elementSetName' is chosen it should be 'b', 'navigation', or 'f' (see 4.6).

5.4.2 Segmentation

Support for level-2 segmentation is optional for Basic V3 and Enhanced Conformance (and excluded for Basic Conformance). Support for level-1 segmentation (without level-2 segmentation) is outside the scope of this profile.

5.4.3 Element Specification

Support for element specification eSpec-1 is mandatory for Enhanced V3 Conformance. See 5.4.10.

5.4.4 Variant Set

Support for variant set variant-1 is mandatory for Enhanced V3 Conformance. A variant specification may occur:

- as a variant request in an element specification using eSpec-1, and as such the usage of variant-1 is detailed in 5.4.10;
- as an appliedVariant in a GRS-1 record, and as such the usage of variant-1 is detailed in 5.4.11; or
- as a supportedVariant in a GRS-1 record, and as such the usage of variant-1 is detailed in 5.4.11.

5.4.5 Fragmentation

Support for fragmentation is mandatory for Enhanced V3 Conformance. See 5.4.10.

The term *fragmentation*, as used in this profile, refers to the use of Z39.50 variants to retrieve a fragment of an element (see 5.4.10). A fragment is a logically contiguous piece of the element not necessarily distinguished as a subelement (i.e. if the entire element were to be retrieved, considering that element as a string of bits, a fragment is any substring of that string). Criteria for defining fragments are determined by the target. For example the target could define fragments based on number of bytes, or could define a page or screen to be a fragment.

For the purpose of this profile, fragmentation applies to either an Associated Description or Digital Object, and is used to retrieve either the "first" or "next" fragment.

5.4.6 Record Syntax

Support for GRS-1 is mandatory. See 5.4.11.

5.4.7 Descriptive Record Schema

Support for the Descriptive Record schema (section 4) is mandatory.

5.4.8 Brief and Navigation Descriptive Records

Support for element set names 'b' and 'navigation' (4.6) are mandatory.

5.4.9 Digital Objects and their Variants

A server providing access to different versions, instances, or representations of a given Digital Object may represent these as:

- distinct Digital Objects, using separate instances of ObjectInfo;
- a single logical Digital Object, using a single instance of ObjectInfo with multiple occurrences of digitalObject; or
- a single logical Digital Object, using a single instance of ObjectInfo and a single instance of digitalObject, with Z39.50 variant information provided for element actualDO.

The server may also use a combination of these. For example, the server might provide several variants of a Digital Object (using Z39.50 variant capabilities) and also provide a pointer to another representation of the Digital Object (perhaps on a different server). For the latter representation, the server would have to provide the pointer in a separate instance of digitalObject.

In any case, whenever a server provides a Digital Object via element actualDO (rather than pointer), whether only a single variant or multiple variants are provided, the server should use the Z39.50 variant capabilities including variant-1 and (for Enhanced V3 conformance) should support a request to list the available variants, including body part type. In addition a server may choose to indicate a level of *integrity* for a variant. (The variant may be a derived object, created on demand, and as such may be a conversion or reduction of the genuine object. See 5.4.11, ElementMetadata, supported variants MetaData -- integrity.)

5.4.10 Element Specification eSpec-1

For Enhanced V3 Conformance, usage of element specification eSpec-1 is defined as follows:

In the main structure, the parameter 'elements' must be supported, and none of the other parameters should be included (elementSetNames, defaultVariantSetId, defaultVariantRequest, or defaultTagType).

ElementRequest may select 'simpleElement' or 'compositeElement':

- 'simpleElement' must be supported, and within SimpleElement the variantRequest must be supported. A variant request will use the variant-1 definition and consist of one or more of:
  - a variantId;
  - Piece, where Piece is 'start' or 'next' of 'what-fragment wanted'.

  Within TagPath, specificTag will always include tagType and tagValue. 'occurrence' is mandatory, for retrieval of the following repeatable elements:
  - associatedDescription in the main structure of the descriptive record,
  - enumeratedMember of CollectionInfo,
  - digitalObject of ObjectInfo, and
  - description of AssociatedDescription.

  Within Occurrences, 'values' should be supported, and within 'values', 'start' and 'howMany' should be supported. This is useful when the origin wishes to scroll through enumerated Associated Descriptions or collection members, or multiple versions of a given Associated Description or Digital Object.
- Support for 'compositeElement' is optional. Companion profiles may mandate its support, for use with Associated Descriptions or Digital Objects which, though opaque to this profile, might not be opaque to a companion profile. For example, an origin might request specific elements of an Associated Description to be packaged as a single SGML element within a GRS-1 transfer record.

5.4.11 GRS-1

Usage of record syntax GRS-1 within this profile is defined as follows: In the GRS-1 main structure, the following parameters must be supported: tagType, tagValue, tagOccurrence, and content. In addition, for Enhanced V3 Conformance, metaData and appliedVariant must be supported.

For ElementData:

octets	Support mandatory.
numeric	Support mandatory.
date	Optional.
ext	Optional.
string	Support mandatory.
trueOrFalse	Support mandatory.
oid	Optional.
intUnit	Optional.
elementNotThere	Support mandatory for origin, optional for target.
elementEmpty	Support mandatory for origin, optional for target.
noDataRequested	Support mandatory for Enhanced V3 Conformance.
diagnostic	Support mandatory for origin, optional for target.
subtree	Support mandatory.

For ElementMetaData:

Series order	Optional. (Useful for enumerated collection members or Associated Descriptions when they are arranged in a meaningful order that the target wishes to convey.)	
usage right	Support mandatory for origin, optional for target. See 5.4.14.	
hits	Optional. (Not within the scope of this profile, however, companion profiles that model the content of Digital Objects might specify its use.)	
display name	Optional.	
supported variants	Support mandatory for Enhanced V3 Conformance.	
	variantId	Always supplied.
	bodyPartType	Always supplied.
	formatting	Optional.
	language	Optional (if applicable; see 5.4.12).
	character set	Optional (if applicable).
	piece	Not supplied.
	metaData -- cost	Optional.
	metaData -- size	Optional.
	metaData -- integrity	Optional. If supplied, zero represents highest integrity; higher values indicate progressively less integrity.
	metadata -- (all other)	Not supplied.
	(other)	Not supplied.
message	Support mandatory for origin.	
element descriptor	Optional. (Not within scope of this profile; however companion profiles might specify its use, for example to include an SGML DTD.)	
surrogate for	Optional. See 5.4.13.	
surrogate element	Optional. See 5.4.13.	

For appliedVariant:

variantId	Not supplied.
bodyPartType	Always supplied.
language	Optional. See 5.4.12.
character set	Optional (if applicable).
piece	For Enhanced V3 Conformance, must be supplied if applicable: values 'start', 'middle', 'last', and (optionally) 'whole' of 'what fragment returned'. If not supplied, 'whole' is assumed.
metaData	Optional. (Not within scope of this profile. Companion profiles may specify additional metadata.)
highlighting	Optional. (Not within scope of this profile. Companion profiles may specify highlighting.)

5.4.12 Language

'Language' (type 4 class 1 of variant-1) is applicable for text elements only, when there is a predominant language.

For Digital Objects, 'language' is not within the scope of this profile, however, companion profiles may specify its use.

For elements of type BriefTextDescription, 'language', within an applied variant, is the prescribed mechanism for a target to indicate the language of the description.

For an Associated Description, 'language', within a supported or an applied variant, is the prescribed mechanism for a target to indicate the language.

5.4.13 Surrogates

When a Digital Object is considered to be a surrogate for another Digital Object, and both objects are members of the same collection and thus are both represented as enumerated members within the same Collection Descriptive Record, the surrogate relationships may be expressed via 'surrogate for' and 'surrogate element' of GRS-1. (Note, however, this profile does not define what is meant by a surrogate relationship).

The enumerated member for a surrogate object may indicate via a tagPath the enumerated member representing the Digital Object for which it is a surrogate, and vice versa. The two elements will share the same tagType and tagValue, and are distinguished by tagOccurrence.

5.4.14 Usage Right

Via the 'usage right' parameter of ElementMetaData of GRS (see 5.4.11) a target may either (a) indicate whether a Digital Object is re-distributable or restricted, or (b) supply a license pointer.

When a client product claims to support this parameter, the claim means that the product is implemented with the intention that whenever the client receives what it perceives to be a usage right statement or pointer, it will make a good-faith effort to inform the user. It does not mean that it will follow the pointer, attempt to enforce the usage right statement, or obtain acknowledgement or concurrence from the user.

5.5 Explain

The use of the Z39.50 Explain facility is optional for this profile. Targets that support Explain may wish to distinguish one or more databases as those which provide access to digital collections (i.e. databases which include Descriptive Records). It is recommended that targets assign to those databases the searchable keyword 'collection-descriptive-records', searchable via the exp-1 Use attribute Keyword.

A Target using this feature may apply whatever criteria it deems appropriate in selecting databases to assign this keyword. For example a target may select only databases that include Collection Descriptive Records (as opposed to Object Descriptive Records), or only databases that include Collection Descriptive Records for context collections.

6. Conformance

An implementation claiming conformance to this profile shall indicate:

- that it conforms as an origin or target (or both); and
- that it conforms at one of the following levels:
  - Basic Conformance,
  - Basic V3 Conformance, or
  - Enhanced V3 Conformance.

6.1 Basic Conformance

An implementation claiming conformance at the Basic Conformance level must support version 2 of Z39.50-1995 (see 4.4 of that standard for specific conformance requirements), the DR schema specified in section 4, and the GRS-1 record syntax.

6.2 Basic V3 Conformance

An implementation claiming conformance at the Basic V3 Conformance level must conform at the Basic Conformance level (see 6.1) and in addition must support version 3 of Z39.50-1995.

6.3 Enhanced V3 Conformance

An implementation claiming conformance at the Enhanced V3 Conformance level must conform at the Basic V3 Conformance level (see 6.2) and in addition must support the following features:

- Present parameter CompSpec See 5.4.1.
- Element specification eSpec. See 5.4.3.
- Variant set variant-1. See 5.4.4.
- Fragmentation. See 5.4.5 (and 5.4.9).
- Metadata and appliedVariant of GRS-1. See 5.4.11.