Working Implementation Agreements for Open Systems Environment: Part 31 - Application Profile for the Government Information Locator Service (GILS) - Library Applications Special Interest Group

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Foreword

This part of the Working Implementation Agreements was prepared by the Library Applications Special Interest Group (LASIG) of the Open Systems Environment Implementors' Workshop (OIW). See Part 1 - Workshop Policies and Procedures in the "Draft Working Implementation Agreements" for the workshop charter.

Text in this part has been approved by the Plenary of the Workshop.

Future changes and additions to this version of these Implementor Agreements will be published as a new part. Deleted and replaced text will be shown as struck. New and replacement text will be shown as shaded.

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Part 31: Application Profile for the Government Information Locator Service (GILS) - Library Applications SIG

0 Introduction

This document describes an application profile for the Government Information Locator Service (GILS). The GILS Profile includes not only the specifications for ANSI/NISO Z39.50, the American National Standard for Information Retrieval Application Service Definition and Protocol Specification for Open Systems Interconnection (National Information Standards Organization, 1992) in the application but also other aspects of a GILS conformant server that are outside the scope of Z39.50. The GILS Profile provides the specifications for the overall GILS application relating to the GILS Core, which is a subset of all GILS Locator Records, and completely specifies the use of Z39.50 in this application.

Background

The GILS is a response to the need for users to identify, locate, and access or acquire publicly available Federal information resources, including electronic information resources. Christian (1994) is the authoritative document providing an overview of GILS, its objectives, service requirements, and core requirements. According to Christian (1994), the GILS is an overall service and includes information and technology components as well as policy, regulation, people, etc. The GILS is intended to help the public locate and access public information throughout the U.S. government.

The current GILS initiative builds upon a previous study, Identifying and Describing Federal Information Inventory/Locator Systems: Design for Networked-Based Locators (McClure, Ryan & Moen, 1992). That study, which was conducted for the Office of Management and Budget, the National Archives and Records Administration, and the General Services Administration, recommended that each agency establish a network-accessible locator that describes its information resources. The study also recommended that agencies use Z39.50 as the appropriate information retrieval protocol to achieve a distributed, standards-based Government Information Locator Service.

The development work of the GILS Profile is documented in Using Z39.50 in an Application for the Government Information Locator Service (GILS) (McClure & Moen, 1994). The GILS Profil resulted from the work of a group comprising experts in Z39.50 implementations, system implementations, and information organization, and representatives of Federal agencies. The specifications included in the GILS Profile reflect the consensus of this group and input from a range of stakeholders.

1 Scope and field of applications

The GILS Profile fully specifies the use of ANSI/NISO Z39.50 by the GILS. In addition, the GILS Profile provides the specifications for the overall GILS application relating to the GILS Core including other aspects of GILS conformant servers that are outside the scope of Z39.50.

This version of the GILS Profile focuses on requirements for a GILS server operating in the Internet environment. GILS clients will be able to interconnect with any GILS server, and these clients will behave in a manner which allows interoperability with the GILS server. Clients that support Z39.50 but do not implement the GILS Profile will be able to access GILS records with less than full GILS functionality.

The GILS Profile addresses many aspects of the GILS (e.g., intersystem interactions and information interchange) but does not specify user interface requirements, the internal structure of databases that contain GILS Locator Records, or search engine functionality.

Field of Application

The GILS Profile supports search and retrieval of GILS Locator Records contained in GILS servers by users in the Internet environment.

The GILS Profile will be used by developers of GILS servers. It will also be used by client developers to understand expected behaviors of GILS servers. A GILS server accessed using Z39.50 in the Internet environment acts primarily as a pointer to information resources. Some of these information resources pointed to by GILS Locator Records, as well as the GILS server itself, may be available electronically through other communications protocols including the common Internet protocols that facilitate electronic information transfer such as remote login (Telnet), File Transfer Protocol (FTP), and electronic mail (SMTP/MIME). The use of these protocols or other communications paths is outside the scope of the GILS Profile.

Once connected to a GILS server, users supported by appropriate clients that understand the GILS Profile may navigate through single or multiple servers. GILS servers will support searching (i.e., accept a search query and return a result set or diagnostic messages) and may support browsing (i.e., accept a well-known search query and return a list of Locator Records in brief display format). Although the GILS Profile addresses GILS servers only, it is understood that clients have roles in the execution of these activities (e.g., browsing is also a client function in the sense of how it interprets and presents GILS data).

2 Normative References

The following list contains documents that contain provisions which, through reference in this text, constitute provisions of the GILS Profile. At the time of this publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this Profile are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by the Profile to such documents, is that they may be specific to a particular edition. In addition, this list contains other documents that can be consulted for further information, background, etc.

[**1**] American National Standards Institute. (1985). American National Standard 39.2-1985 Bibliographic Information Interchange. New York: American National Standards Institute.

[**2**] Christian, Eliot. (1994, May 2). Government Information Locator Service (GILS): Report Information Infrastructure Task Force. Available on the Fedworld electronic bulletin board (703-321-8020) or by anonymous FTP (File Transfer Protocol) via the Internet at 130.11.48.107 as /pub/gils.doc (Microsoft Word for Windows format) or /pub/gils.txt (ASCII text format).

[**3**] Lynch, Clifford A. (1994, April 30). "Using the Z39.50 Information Retrieval Protocol in the Internet Environment" [Draft RFC for Z39.50 over TCP/IP].

[**4**] McClure, Charles R. & Moen, William E. (1994, may 7). Using Z39.50 in an Application for the Government Information Locator Service (GILS). Available via anonymous FTP at <ericir.syr.edu> as /USGS/profile_background.doc.ps (Postscript format) and as /USGS/profile_background.doc.txt (ASCII text format).

[**5**] McClure, Charles R., Ryan, Joe & Moen, William E. Moen, (1992). Identifying and Describing Federal Information Inventory/Locator Systems: Design for Networked-Based Locators. 2 Vols. Bethesda, MD: National Audio Visual Center [Available from ERIC, document no. ED349031].

[**6**] National Information standards Organization, (1992). ANSI/NISO Z39.50-1992, Information Retrieval Application Service Definition and Protocol Specification for Open Systems Interconnection. Gaithersburg, MD: NISO Press.

[**7**] National Institute of Standards and Technology. (1992). FIPS No. 173, Spatial Data Transfer Standard (August 28, 1992). Gaithersburg, MD: National Institute of Standards and Technology.

[**8**] Office of Management and Budget. (1993). Circular No. A-130, "Management of Federal Information Resources" (58 F.R. 36068, July 2, 1993).

[**9**] Open Systems Environment Implementors Workshop/Special Interest Group on Library Applications (OIW/SIGLA), (1993). OIW/SIGLA Document #1: Using Z39.50-1992 Directly over TCP.

[**10**] RFC 1521, MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for Specifying and Describing the Format of Internet Message Bodies.

[**11**] RFC 1522, MIME (Multipurpose Internet Mail Extensions) Part Two: Message Header Extensions for Non-ASCII Text.

[**12**] Uniform Resource Locators (URL): A Unifying Syntax for the Expression of Names and Addresses of Objects on the Network, (1993, October). [Internet Draft]. The latest URL draft is: <url:ftp://info.cern.ch/pub/www/doc/url7a.txt>.

[**13**] Uniform Resource Names, (1993 October). [Internet Draft]. The latest URN draft is: <url:ftp://ds.internic.net/internet-drafts/draft--ietf-uri-resource-names-01.txt>.

[**14**] USMARC Format for Bibliographic Data. Washington, DC: Library of Congress, Cataloging Distribution Service.

3 Definitions and terminology

For purposes of this Profile, the following definitions apply.

Client: An initiating application. This application includes the Z39.50 origin.

Electronic Information Resource: Information resources that are maintained in electronic, digital format and may be accessed, searched, or retrieved via electronic networks or other electronic data processing technologies (e.g., CD-ROM).

GILS Core: A subset of all GILS Locator Records which describe information resources maintained by the U.S. Federal government and comply with the defined GILS Core Elements and are mutually accessible through interconnected electronic network facilities without charge to the direct user.

Government Information: Information created, collected, processed, disseminated, or disposed of by or for the Federal government.

Government Information Locator Service (GILS): A decentralized collection of locators and associated information services used by the public either directly or through intermediaries to find public information throughout the U.S. Federal government.

Information Resource: Includes both government information and information technology.

Interoperability: A condition that exists when the distinctions between information systems are not a barrier to accomplishing a task that spans multiple systems.

Locator Record: A collection of related data elements describing an information resource, the information available in the resource, and how to obtain the information.

Mandatory: An element in a GILS Core Locator Record that must have a value provided by the record source. The GILS Profile does not specify which elements must be present from the perspective of GILS servers.

Origin: The part of a client application that initiates a Z39.50 association and is the source of requests during the association.

Profile: The statement of a function(s) and the environment within which it is used, in terms of a set of one or more standards, and where applicable, identification of chosen classes, subsets, options, and

parameters of those standards. A set of implementor agreements providing guidance in applying a standard interoperably in a specific limited context.

Registered Object: An object that is identified by a name-to-thing relationship in which the name is recorded by a registration authority to ensure that the names can be used unambiguously.

Server: An application that responds to an initiating application (i.e., a client). The application that includes the Z39.50 target.

Target: The part of an server application that accepts a Z39.50 association.

Uniform Resource Identifier (URI): A set of related standards for encoding resource location and identification information for electronic and other objects. Examples include Uniform Resource Locators (URLs) and Uniform Resource Names (URNs).

USMARC: An implementation of ANSI/NISO Z39.2, the American National Standard for Bibliographic Information Interchange. The USMARC format documents contain the definitions and content designators for the fields that are to be carried in records structured according to Z39.2. GILS records in USMARC format contain fields defined in USMARC Format for Bibliographic Data. This documentation is published by the Library of Congress.

4 Z39.50 Specifications for GILS

This section details the required services available from Z39.50, describes an Attribute Set for searching and four Element Sets Names by which the server presents some or all the elements, defined in the Schema, of the Locator Records, and prescribes the Record Syntaxes to be supported by GILS servers for the transfer of Locator Records.

4.1 Version

GILS clients and servers support Z39.50 Version 2 as specified in Z39.50-1994. GILS requires support of various objects, some of which are not defined in Z39.50-1992. These are listed in 4.2.

4.2 GILS Objects

The following object identifier (OID) is assigned to the Z39.50 standard:

{iso (1) member-body (2) US (840) ANSI-standard-Z39.50 (10003)}

This OID is abbreviated as: ANSI-standard-Z39.50.

Several object classes are assigned at the level immediately subordinate to ANSI-standard-Z39.50, including:

- 3 = attribute set definitions;
- 4 = diagnostic definitions;
- 5 = record syntax definitions;
- 13 = database schema definitions;
- 14 = tagSet definitions.

GILS requires support of the following objects:

- GILS attribute set: {ANSI-standard-Z39.50 3 3};
- bib1 diagnostic set: {ANSI-standard-Z39.50 4 1};
- USMARC record syntax: {ANSI-standard-Z39.50 5 10};
- SUTRS record syntax: {ANSI-standard-Z39.50 5 101};
- GRS-1 record syntax: {ANSI-standard-Z39.50 5 105};
- GILS schema: {ANSI-standard-Z39.50 13 2};
- tagSet-M: {ANSI-standard-Z39.50 14 1};
- tagSet-G: {ANSI-standard-Z39.50 14 2}.

4.3 Communication Services

When Transmission Control Protocol (TCP) is used as the transport service, the specification for use of TCP is found in OIW/SIGLA Document #1, "Using Z39.50-1992 Directly over TCP." The use of other communication services is not yet defined.

4.4 Z39.50 Services

There are three Z39.50 (Version 2) services that are required for conformance: Init, Search, and Present. No additional services are required for conformance to the GILS Profile. Other Z39.50 services, however, may be provided optionally by servers and used by clients.

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

4.4.1 Search

The GILS application will support Z39.50 Type 1 queries which are general purpose Boolean query structures.

4.4.1.1 Attribute Set

The GILS Attribute Set is a superset of the Bib-1 Attribute set and consists of all Bib-1 Attributes and additional Use Attributes that are defined for GILS elements (see Annex A for the GILS Use Attributes). These newly defined GILS Use Attributes are well-known and correspond in name and semantics to the elements in the GILS Schema. The GILS Attribute Set is a registered object.

GILS servers must support a limited number of GILS Attributes. The required GILS Attributes are: (Note: GILS Use Attribute Name is listed followed by the GILS Use Attribute Number and the corresponding GILS Core Element Name):

- Use Attributes: Local Number (12; Local Control Number); Author-name corporate (1005; Originator); Date/Time Last Modified (1012; Date of Last Modification); Record Source (1019; Record Source); Distributor Name (2001; Distributor Name); Index Terms -- Controlled (2002; Index Terms -- Controlled); Local Subject Index (29; Local Subject Term); Any (1016)

- Structure: Word (2), URx (104), Date (5), Word List (6)

- Relation: Greater than (5), Equal (3).

GILS servers should never return any of these four diagnostic messages: "Unsupported Use Attribute," "Unsupported Structure Attribute," "Unsupported Position Attribute," or "Unsupported Attribute Type" when a query includes the combinations of required GILS Attributes listed in Table 1 in Annex A.

4.4.1.2 Well-known Search

To provide support for browsing GILS Locator Records, there is a well-known search consisting of the GILS Attribute Set Use Attribute: Local Number; Structure Attribute: URL; and a term of zero length. GILS servers that support browsing of records will create a result set of one or more GILS Locator Records that provide the necessary information to allow clients to offer menu-like displays of GILS Locator Records or other information and information resources.

The "Browse" in the GILS context involves only the Search and Present Services of Z39.50. "Browse" is used informally in the GILS Profile, and it is not related nor should it be confused with the Browse Facility or Scan Service of Z39.50.

4.4.2 Retrieval

This section describes the components and procedures used by Z39.50 to return records in response to a query.

4.4.2.1 Schema

The GILS Profile specifies a GILS Schema (see Annex D for the Schema). The GILS Schema is a registered object. A schema in Z39.50 can be modified and may evolve over time, and it is reasonable to expect the GILS Schema will evolve.

The GILS Schema uses elements from tagSet-M and tagSet-G and defines in the GILS tagSet additional elements as necessary. The GILS Profile specifies tagTypes to identify tagSet-M elements (tagType = 1), tagSet-G elements (tagType = 2), and the elements defined by the GILS tagSet (tagType = 4). Another tagType (tagType = 3) is used to identify arbitary string tags for locally defined elements.

The GILS tagSet element numbering begins with number 1. Elements can be nested and the tagging notation (i.e., the tag path) will reflect the nesting.

All well-known GILS Schema elements have assigned numeric tags. String-tags (i.e., text) may be used in the GILS Schema to label those elements that are not well-known (i.e., locally defined).

4.4.2.2 Element Sets Names

GILS servers will support four Element Sets Names. GILS servers will interpret the use of the Element Set Names required by the GILS Profile to identify the following elements from the GILS Schema:

- The primitive element set name "B" contains at least: title, control identifier, originator, and local control number;
- The primitive element set name "G" contains: all B Element Set elements and Cross Reference;
- The primitive element set name "W" contains: all B Element Set elements and bodyOfDisplay;
- The primitive element set name "F" contains all elements available in the record.

The server should include in a retrieved record all of the elements specified by the element set name for which there is data available in the database record and which can be encoded in the requested record syntax (e.g., some types of locally defined binary data may not be encodable in a USMARC or SUTRS record).

4.4.2.3 Record Syntaxes

GILS servers are required to support the following three record syntaxes:

- USMARC -- an implementation of ANSI/NISO Z39.2 and maintained by the Library of Congress;
- Generic Record Syntax (GRS-1) -- defined in Z39.50;
- Simple Unstructured Text Record Syntax (SUTRS) -- defined in Z39.50.

Annex B contains a mapping of Core Elements to USMARC for use in the USMARC record syntax. However, since the data transformation is not fully reversible and requires interpretation, the record source is responsible for encoding the USMARC record(s).

The data in GILS Locator Records do not always map clearly into USMARC records, particularly when agencies add their own locally defined fields to the GILS Locator Record. This means that construction of USMARC records is subject to local interpretation. Therefore, GILS Locator Records in USMARC format obtained from other than the original record source should be considered non-definitive. The original source of the GILS Locator Record can be identified by examining the Original Control Identifier field of the record.

For interchange, GRS-1 records are to be treated as the complete and canonical representation; SUTRS and USMARC should be viewed as derivative records from these canonical representations and as such are not as complete or precise.

4.5 Preferred Display Format for Use with SUTRS

The GILS Profile recommends a preferred display format for SUTRS records (see Annex C for the recommended display format). For the SUTRS records, formatting instructions for a preferred display format is a concern of the server.

When the target transfers a GILS record using the SUTRS record syntax, it will encode the GILS record formatted according to the preferred display format, so that the client may present the record directly, without processing. For SUTRS, however, the client should not expect to be able to parse the record to obtain any individual GILS elements.

When the client presents a GILS record formatted by the server using the USMARC or GRS record syntax, it is recommended that the client consider the SUTRS suggested display layout in formatting the received record for presentation to the human end user.

4.6 Diagnostic Messages

The GILS application will use Diagnostic Set Bib-1.

5 Data Elements in the Locator Records

GILS Locator Records consist of a number of GILS Core Elements that contain information to identify and describe Federal information resources. The GILS Core Elements are defined in Annex E.

Annex A (informative)

GILS Attribute Set

The GILS Attribute Set is a superset of the Bib-1 Attribute Set and consists of all Bib-1 Attributes and the additional Use Attributes listed below. Additional Use Attributes that cannot be mapped to Bib-1 Use Attributes are numbered from 2000 through 2999. These are well-known Use Attributes.

GILS servers should never return any of these four diagnostic messages: "Unsupported Use Attribute," "Unsupported Structure Attribute," "Unsupported Position Attribute," or "Unsupported Attribute Type" when a query includes the combinations of GILS Attributes listed in table 1. An "X" in the table means that GILS servers will recognize and support this combination of Attributes.

Table 1 - Recognized and Supported Combinations of GILS Attributes

USE	WORD	URx	DATE	WORD LIST	GREATER THAN	EQUAL
Local Number	X	X		X		X
Author-name corporate	X			X		X
Date/Time Last Modified			X		X	X
Record Source	X			X		X
Distributor Name	X			X		X
Index Term - Controlled	X			X		X
Local Subject Index	X			X		X
Any	X			X		X

As stated in 4.3.1.1, GILS servers are required to support a minimal set of Use Attributes. These are listed first. In the cases where a Bib-1 Use Attribute's Name is used, the corresponding GILS Core Element name appears in parentheses.

Required GILS Use Attributes	
Use #	GILS Attribute Name
12	Local Number (Local Control Number)
29	Local Subject Index (Local Subject Term)
1005	Author-name corporate (Originator)
1012	Date/Time Last Modified (Date of Last Modification)
1016	Any
1019	Record Source
2001	Distributor Name
2002	Index Terms -- Controlled

Available GILS Use Attributes	
USE #	GILS Attribute Name
4	Title
1007	Identifier - Standard (Control Identifier)
62	Abstract
2003	Purpose
2004	Access Constraints
2005	Use Constraints
2006	Distributor Organization
2007	Distributor Street Address
2008	Distributor City
2008	Distributor State
2010	Distributor Zip Code
2011	Distributor Country
2012	Distributor Network Address
2013	Distributor Hours of Service
2014	Distributor Telephone
2015	Distributor Fax
2016	Available Resource Description
2017	Available Order Process
2018	Available Technical Prerequisites
2019	Available Time Period -- Structured
2020	Available Time Period -- Textual
2021	Available Linkage
2022	Available Linkage Type
2023	Contact Name
2024	Contact Organization
2025	Contact Street Address
2026	Contact City
2027	Contact State

2028	Contact Zip Code
2029	Contact Country
2030	Contact Network Address
2031	Contact Hours of Service
2032	Contact Telephone
2033	Contact Fax
2034	Agency Program
2035	Sources of Data
2036	Thesaurus
2037	Methodology
2038	Bounding Rectangle -- Western-most
2039	Bounding Rectangle -- Eastern-most
2040	Bounding Rectangle -- Northern-most
2041	Bounding Rectangle -- Southern-most
2042	Geographic Keyword Name
2043	Geographic Keyword Type
2044	Time Period - Structured
2045	Time Period - Textual
2046	Cross Reference Title
2047	Cross Reference Linkage
2048	Cross Reference Type
2049	Original Control Identifier
2050	Supplemental Information

Annex B (informative)

GILS Core Element to USMARC Mapping

This annex provides a mapping from GILS Core Elements to USMARC for use by the record source and GILS servers. Some of these data elements consist of two or more subelements, and this relationship is noted by the indentation.

Implementors should consult the authoritative documentation on USMARC found in USMARC Format for Bibliographic Data. The document is available from the Cataloging Distribution Service at the Library of Congress. A full description of the USMARC fields and available subfields within each field is in that document.

For some elements new USMARC fields and/or subfields may be incorporated into the USMARC format. New fields and/or subfields in the process of being considered for inclusion in USMARC are noted.

In cases where the 500 Note field is repeated to carry separate GILS Core Elements, the name of the GILS Core Element will be included and precede the data content for that field. A colon will separate the GILS Data Element name from the rest of the content in the field. For example, 500 Purpose: [data for this field]; 500 Agency Program: [data for this field]. Each such GILS Core Element should be carried in separate, repeating 500 fields.

In addition to the variable length fields listed in the mapping, a USMARC record will also include a Leader and field 008: Fixed-Length Data Elements. Certain character positions in each of these fixed length fields of a USMARC record will need to be coded specifically for GILS. In addtion, USMARC records for GILS will include a code in the 042: Authentication Code to identify these USMARC records psecifically as GILS Locator Reocrds. The following sugest values for these fields (or paths of these fields):

Leader: A fixed field comprising the first 24 character positions (00-23) of each record that provides information for the processing of the record. For GILS records, the following character position is specifically relevant:

Character Position: 18 -- Descriptive cataloging form: Value: # [i.e., blank] (Non-ISBD) to indicate when International Standard Bibliographic Description is not followed.

008 Fixed Length Data Elements: Forty character positions (00-39) containing positionally-defined data elements that provide coded information about the record as a whole or about special bibliographic aspects of the item being cataloged. For GILS records that describe electronic information resources, the following character position is specifically relevant:

Character Postion: 26 -- Type of computer file
Values: a (Numeric data)
b (Computer program)
c (Representational)
d (Document)
e (Bibliographic data)
f (Font)
g (Game)
h (Sound)
i (Online system or service) [new code proposed]
m (Combination)
u (Unknown)
z (Other)

042 Authentication Code:
Value: gils [new code proposed]

GILS Data Elements and Corresponding USMARC Tags	
GILS Data Element	USMARC Tag
Title	245$a
Control Identifier	001
Abstract	520
Purpose	500
Originator	710$a
Access Constraints	506
Use Constraints	540
Distributor	
Distributor Name	270$p [proposed field]
Distributor Organization	270$p [proposed field]
Distributor Street Address	270$a [proposed field]
Distributor City	270$b [proposed field]
Distributor State	270$c [proposed field]
Distributor Zip Code	270$e [proposed field]
Distributor Country	270$d [proposed field]
Distributor Network Address	270$m [proposed field]
Distributor Hours of Service	270$a [proposed field]
Distributor Telephone	270$k [proposed field]
Distributor Fax	270$1 [proposed field]
Available Resource Description	037$f
Available Order Process	037$c
Available Technical Prerequisites	538
Available Time Period -- Structured	045$c

Available Time Period -- Textual	037$n [proposed field]) (for non-electronic resource 856$z (for electronic resource)
Available Linkage	856$u
Available Linkage Type	856 1st indicator/856$2
Point of Contact	856$m (for electronic resources)
Contact Name	270$p [proposed field]
Contact Organization	270$p [proposed field] 535
Contact Street Address	270$a [proposed field] (for non-electronic resources)
Contact City	270$b [proposed field]
Contact State	270$c [proposed field]
Contact Zip Code	270$e [proposed field]
Contact Country	270$d [proposed field]
Contact Network Address	270$m [proposed field]
Contact Hours of Service	301$a [proposed field]
Contact Telephone	270$k [proposed field]
Contact Fax	270$1 [proposed field]
Record Source	040
Date Last modified	005
Agency Program	500
Sources of Data	537 [proposed field]
Index Terms -- Controlled	650
Thesaurus	650 1st indicator/ 650$2
Local Subject Term	653$a

Methodology	567
Spatial Reference	
Bounding Rectangle	255$c
Western-most	034$d
Eastern-most	034$e
Northern-most	034$f
Southern-most	034$g
Geographic Name	
Geographic Keyword Name	651
Geographic Keyword Type	655
Time Period -- Structured	045$c
Time Period -- Textual	513
Cross Reference Title	787$t
Cross Reference Linkage	787$w
Cross Reference Type	856 1st indicator/856$2
Original control identifier	035
Supplemental information	500

USMARC Tags and Field Names (from USMARC Format for Bibliographic Data)		
USMARC Tag	Subfield	Field Name
001		Control Number
005		Date and Time of Latest Transaction
034		Coded Cartographic Mathematical Data
	$d	Coordinates - westernmost longitude
	$e	Coordinates -- easternmost longitude
	$f	Coordinates -- northernmost latitude
	$g	Coordinates -- southernmost latitude
035		System Control Number
037		Source of Acquisition
	$b	Source of stock number/acquisition
	$c	Terms of availability
	$f	Form of issue
	$n	Note (proposed)
040		Cataloging Source
042		Authentication Code
245		Title Statement
	$a	Title
255		Cartographic Mathematical Data
	$c	Statement of coordinates
270	$a	Address
270	$b	City
270	$c	State or province
270	$d	Country
270	$e	Postal code
270	$k	Telephone number
270	$1	Fax number
270	$m	Electronic mail address
270	$p	Contact person

301	$a	Hours
500		General Note
506		Restrictions on Access Note
513		Type of Report and Period Covered Note
520		Summary, Etc. Note
537		Source of Data Note [proposed]
538		System Details Note
540		Terms Governing Use and Reproduction Note
567		Methodology Note
650		Subject Added Entry -- Topical Term
1st indicator		Level of subject
	$2	Source of heading or term
651		Subject Added Entry -- Geographic Name
653		Index Term -- Uncontrolled
	$a	Uncontrolled term
655		Index Term -- Genre/Form
710		Added Entry -- Corporate Name
	$a	Corporate name or jurisdiction name as entry element
787		Nonspecific Relationship Entry
	$t	Title
	$w	Record Control Number
856		Electronic Location and Access
1st indicator		Access method
	$m	Contact for access assistance
	$u	Uniform Resource Locator
	$z	Nonpublic note
	$2	Source of access

Annex C (informative)

Preferred Display Format for GILS Records

GILS servers will transfer records in three record syntaxes:

- USMARC
- Generic Record Syntax (GRS)
- Simple Unstructured Text Record Syntax (SUTRS).

In SUTRS, the formatting of the record contents is handled by the server, and the client receives a record devoid of structure. In USMARC and GRS, the record, whose structure is defined by the record syntax, is passed from the target to an orgin, and the client software has more flexibility in processing the record contents for display.

The recommended guidelines in this Annex describe how records should be displayed, whether formatted by the server or the client (but this does not preclude display formats in addition to the Preferred Display Format).

Record Organization:

The record should be organized so that the elements first viewed by the user provide adequate information to either choose or eliminate the record from further consideration. These elements are: Title, Originator, Controlled Vocabulary, Local Subject Index and Abstract.

Next in the order of presentation are elements that give detailed information about the information resource being described: Spatial Reference, Time Period, Availability, Sources of Data, Methodology, Access Constraints, Use Constraints, Point of Contact, and Supplemental Information.

The elements describing the reason for the existence of the data are next: Purpose and Agency Program.

Related information resources are listed next in the element: Cross Reference

The final elements provide bibliographic control information: Control Identifier, Record Source, and Date of Last Modification.

General Instructions for Formatting Full Element Set Name Records:

All displayable elements are to be labelled with the full title of the field followed by a colon. Label mnemonics should only be used in situations where the user can ask for an explanation of the mnemonic. Mnemonics should not be used in SUTRS records, since it should be assumed that the client knows nothing about the server and is incapable of interpreting the mnemonics.

The subelements of constructed elements (i.e., locally defined fields, Availability, Spatial Reference, etc.) should be indented to reflect their association and structure within a well-structured element. Labels on subelements can eliminate the redundant leading parts (e.g., the word Available on the Availability

subelements).

In the Controlled Vocabulary element, the Thesaurus subelement can be presented in parentheses, followed by the Index Terms. Multiple Index Terms should be separated by a semi-colon and a space (e.g., Controlled Vocabulary (MeSH): Kidney; Kidney Disease). Alternatively, the Thesaurus and Index Terms can be indented under the Controlled Vocabulary label, as is done with the other well-structured fields. Local Subject Terms should be separated by a semi-colon and a space.

Display Format for Brief Element Set Name Records:

Brief Records consist of the Title, Control Identifier, Originator, and Local Control Number fields. For display purposes, the Control Identifier and Local Control Number can be omitted. Brief Records may be formatted to fit on a single line. This may require that one or both of the displayed fields will be truncated. Truncation can be indicated with ellipsis (...).

Display Format for G Element Set Name Records:

G Records consist of Brief Record elements and additionally, the Cross Reference element. For display purposes, the guidelines for Full Records should be followed.

Annex D (informative)

GILS Schema

The GILS Schema describes and defines tagSets and an Abstract Record Structure used with the Generic Record Syntax (GRS). The GILS Schema defines a GILS tagSet that associates a numeric tag with one or more GILS Core Elements.

Some GILS Core elements correspond to tags already defined in tagSetM and tagSet-G, these tags are used to identify GILS Core elements in the Abstract Reocrd Structure. When the tagType is 1, the tag value is from tagSet-M. When the tagType is 2, the tag value is from tagSet-G. When the tagType is 3, the tag value is an arbitrary string tag. When the tagType is 4, the tag value is from the GILS tagSet.

There are two general classes of schema elements in the GILS Schema:

1) Primitive -- these elements cannot have locally defined subelements;

2) Constructed -- these elements have one or more subelements any of which may be well-defined or target-defined; in the latter case, these locally defined subelements are identified with string tags.

This Annex first presents first the GILS tagSet that identifies the element, its unique tag, and a recommended datatype . This is followed by the GILS Abstract Record Structure that shows the full tag path for each element.

GILS tagSet		
Tag	Element	Recommended Datatype
1	ControlIdentifier	InternationalString
2	streetAddress	InternationalString
3	City	InternationalString
4	state	InternationalString
5	zipcode	InternationalString
6	hoursOfService	InternationalString
7	resourceDescription	InternationalString
8	technicalPrerequisites	InternationalString
9	westernMost	intUnit
10	easternMost	intUnit
11	northernMost	intUnit
12	southernMost	intUnit
13	geographicKeywordName	InternationalString
14	geographicKeywordType	InternationalString
15	timePeriodStructured	GeneralizedTime
16	timePeriodTextual	InternationalString
17	linkage	InternationalString
18	linkageType	InternationalString
19	recordSource	InternationalString
20	controlledTerm	InternationalString
21	thesaurus	InternationalString
22	localSubjectTerm	InternationalString
23	originalControlIdentifier	InternationalString

NOTE - The element "wellKnown" from tagSet-M (1,19) and referred to below has the following definition:

When an element is defined to be "structured into locally defined elements," the target may use this tag (i.e., wellKnown) in lieu of, or along with, locally defined tags. For example, an element named "title" might be described to be "locally structured." The target might present the element structured into the following subelements: "wellKnown," "spineTitle,"

and "variantTitle," where the latter two tags are target defined. In this case, "wellKnown" is assumed to mean "title."

GILS tagSET		
Tag	Element	Recommended Datatype
50	title	Constructed as follows--
	This element may include the element wellKnown and may also include locally defined elements.	
51	purpose	Constructed as follows--
	This element may include the element wellKnown and may also include locally defined elements.	
52	originator	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
53	accessConstraints	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
54	useConstraints	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
55	orderProcess	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
56	agencyProgram	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
57	sourcesOfData	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
58	methodology	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	
59	supplementalInformation	Constructed as follows --
	This element may include the element wellKnown and may also include localy defined elements.	

70	availability	Constructed as follows --
	This element may include any of the following as well as locally defined elements: distributor, resourceDescription, orderProcess, technicalPrerequisites, timePeriod, linkage, linkageType.	
71	spatialReference	Constructed as follows --
	This element may include any of the following as well as locally defined elements: boundingRectange, geographicName.	
90	distributor	Constructed as follows --
	This element may include any of the following as well as locally defined elements: name, organization, streetAddress, city, state, zipCode, country, networkAddress, hoursOfService, phoneNumber, faxNumber.	
91	boundingRectangle	Constructed as follows --
	This element may include any of the following as well as locally defined elements: westernMost, easternMost, northernMost, southernMost.	
92	geographicName	Constructed as follows --
	This element may include any of the following as well as locally defined elements: geographicKeywordName, georgraphicKeywordType.	
93	timePeriod	Constructed as follows --
	This element may include any of the following as well as locally defined elements: timePeriodStructured, timePeriodTextual.	
94	pointOfContact	Constructed as follows --
	This element may include any of the following as well as locally defined elements: name, organization, streetAddress, city, state, zipCode, country, networkAddress, hoursOfService, phoneNumber, faxNumber.	
95	controlledVocabulary	Constructed as follows --
	This element may include any of the following as well as locally defined elements: indexTermsControlled, thesaurus.	
96	indexTermsControlled	Constructed as follows --
	This element may include any of the following as well as locally defined elements: controlledTerm.	
97	localSubjectIndex	Constructed as follows --
	This element may include any of the following as well as locally defined elements: localSubjectTerm.	
98	crossReference	Constructed as follows--

	This element may include any of the following as well as locally defined elements: title, linkage, linkageType.

GILS Abstract Record Structure

NOTE - The element "bodyOfDisplay" in tagSet-G(2,9) may be used by the target to combine into this single element (i.e., bodyOfDisplay) one or more of the elements from the following abstract record structure into a display format.

Tag path	Element	Mandatory	Repeatable?
(1,10)	rank	N	N
(1,12)	url	N	N
(1,14)	local control number	Y	N
(1,16)	dateOfLastModification	Y	N
(4,50)	title	Y	N
(4,1)	controlIdetifier	Y	N
(2,6)	abstract	Y	N
(4,51)	purpose	Y	N
(4,52)	originator	Y	N
(4,53)	accessConstraints	Y	N
(4,54)	useConstraints	Y	N
(4,70)	availability	Y	Y
(4,70)/(4,90)	distributor	Y	N
(4,70)/(4,90)/(2,7)	distributorName	Y	N
(4,70/(4,90)/(2,10)	distributorOrganization	Y	N
(4,70/(4,90)/(4,2)	distributorStreetAddress	Y	N
(4,70/(4,90)/(4,3)	distributorCity	Y	N
(4,70/(4,90)/(4,4)	distributorState	Y	N
(4,70/(4,90)/(4,5)	distributorZipCode	Y	N
(4,70/(4,90)/(2,16)	distributorCountry	Y	N
(4,70/(4,90)/(2,12)	distributorNetworkAddress	Y	Y
(4,70/(4,90)/(4.6)	distributorHoursofService	Y	Y
(4,70/(4,90)/(2,14)	distributorPhoneNumber	Y	Y
(4,70/(4,90)/(2,15)	distributorFaxNumber	Y	Y
(4,70/(4,7)	resourceDescription	N	N
(4,70/(4,55)	orderProcess	Y	N
(4,70/(4,8)	technicalPrerequisites	N	N
(4,70/(4,93)	timePeriod	N	Y
(4,70/(4,93)/(4,15)	timePeriodStructured	N	Y

(4,70/(4,93)/(4,16)	timePeriodTextual	N	Y
(4,70/(4,17)	linkage	N	N
(4,70/(4,18)	linkageType	N	N
(4,94)	pointOfContact	Y	N
(4,94)/(2,7)	contactName	Y	N
(4,94)/(2,10)	contactOrganization	Y	N
(4,94)/(4,2)	ContactStreetAddress	Y	N
(4,94)/(4,3)	ContactCity	Y	N
(4,94)/(4,4)	ContactState	Y	N
(4,94)/(4,5)	ContactZipCode	Y	N
(4,94)/(2,16)	ContactCountry	Y	N
(4,94)/(2,12)	ContactNetworkAddress	Y	Y
(4,94)/(4,6)	ContactHoursofService	Y	Y
(4,94)/(2,14)	ContactPhoneNumber	Y	Y
(4,94)/(2,15)	ContactFaxNumber	Y	Y
(4,19)	recordSource	Y	N
(4,56)	agencyProgram	N	N
(4,57)	sourcesOfData	N	N
(4,95)	controlledVocabulary	N	Y
(4,95)/(4,96)	indexTermsControlled	Y	N
(4,95)/(4,96)/(4,20)	controlledTerm	Y	Y
4,95)/(4,21)	thesaurus	Y	N
(4,97)	localSubjectIndex	N	N
(4,97)/(4,22)	localSubjectTerm	Y	Y
(4,58)	methodology	N	N
(4,71)	spatialReference	N	N
(4,71)/(4,91)	boundingRectangle	N	N
(4,71)/(4,91)/(4,9)	westernMost	N	N
(4,71)/(4,91)/(4,10)	easternMost	N	N
(4,71)/(4,91)/(4,11)	northernMost	N	N

(4,71)/(4,91)/(4,12)	southernMost	N	N
(4,71)/(4,92)	geographicName	N	Y
(4,71)/(4,92)/(4,13)	geographicKeywordName	Y	N
(4,71)/(4,92)/(4,14)	georgraphicKeywordType	Y	N
(4,93)	timePeriod	N	Y
(4,93)/(4,15)	TimePeriodStrutured	N	N
(4,93)/(4,16)	TimePeriodTextual	N	N
(4,98)	crossReference	N	Y
(4,98)/(4,50)	CrossReferenceTitle	Y	N
(4,98)/(4,17)	CrossReferenceLinkage	Y	N
(4,98)/(4,18)	CrossReferenceType	Y	N
(4,23)	originalControlIdentifier	Y	N
(4,59)	supplementalInformation	Y	N

Annex E (informative)

GILS Core Elements

GILS Locator Records consist of a number of GILS Core Elements that contain information to identify and describe Federal information resources. The term "mandatory" as used in this Profile applies to administration of the subset of GILS Locator Records that have been identified by the record source as participating in the GILS Core. GILS servers are not required to distinguish "mandatory" from other elements.

TITLE (Mandatory, Not Repeatable): This element conveys the most significant aspects of the referenced resource and is intended for initial presentation to users independently of other elements. It should provide sufficient information to allow users to make an initial decision on likely relevance. It should convey the most significant information available, including the general topic area, as well as a specific reference to the subject.

CONTROL IDENTIFIER (Mandatory, Not Repeatable): This element is defined by the information provider and is used to distinguish this locator record from all other GILS Core locator records. The control identifier should be distinguished with the record source agency acronym as provided in the U.S. Government Manual.

ABSTRACT (Mandatory, Not Repeatable): This element presents a narrative description of the information resource. This narrative should provide enough general information to allow the user to determine if the information resource has sufficient potential to warrant contacting the provider for further information. The abstract should not exceed 500 words in length.

PURPOSE (Mandatory, Not Repeatable): This element describes why the information resource is offered and identifies other programs, projects, and legislative actions wholly or partially responsible for the establishment or continued delivery of this information resource. It may include the origin and lineage of the information resource, and related information resources.

ORIGINATOR (Mandatory, Not Repeatable): This element identifies the information resource originator, named as in the U.S. Government Manual where applicable.

ACCESS CONSTRAINTS (Mandatory, Not Repeatable): This element in some cases may contain the value "None." It describes any constraints or legal prerequisites for accessing the information resource or its component products or services. This includes any access constraints applied to assure protection of privacy or intellectual property, and any other special restrictions or limitations on obtaining the information resource. Guidance on obtaining any users' manuals or other aids needed for the public to reasonably access the information resource must also be included here.

USE CONSTRAINTS (Mandatory, Not Repeatable): This element in some cases may contain the value "None." It describes any constraints or legal prerequisites for using the information resource or its component products or services. This includes any constraints applied to assure the protection of privacy or intellectual property and any other special restrictions or limitations on using the information resource.

AVAILABILITY (Mandatory, Repeatable): This element is a grouping of subelements that together describe

how the information resource is made available.

DISTRIBUTOR (Mandatory, Not Repeatable): This subelement consists of the following subordinate fields that provide information about the distributor:

DISTRIBUTOR NAME
DISTRIBUTOR ORGANIZATION
DISTRIBUTOR STREET ADDRESS
DISTRIBUTOR CITY
DISTRIBUTOR STATE
DISTRIBUTOR ZIP CODE
DISTRIBUTOR COUNTRY
DISTRIBUTOR NETWORK ADDRESS
DISTRIBUTOR HOURS OF SERVICE
DISTRIBUTOR TELEPHONE
DISTRIBUTOR FAX

RESOURCE DESCRIPTION (Optional, Not Repeatable): This subelement identifies the resource as it is known to the distributor.

ORDER PROCESS (Mandatory, Not Repeatable): This subelement provides information on how to obtain the information resource from this distributor, including any fees associated with acquisition of the product or use of the service, order options (e.g., available in print or digital forms, PC or Macintosh versions), order methods, payment alternatives, and delivery methods.

TECHNICAL PREREQUISITES (Optional, Not Repeatable): This subelement describes any technical prerequisites for use of the information resource as made available by this distributor.

AVAILABLE TIME PERIOD (Optional, Repeatable): This subelement provides the time period reference for the information resource as made available by this distributor, in one of two forms:

TIME PERIOD -- STRUCTURED: Time described using the USMARC prescribed structure

TIME PERIOD -- TEXTUAL: Time described textually.

AVAILABLE LINKAGE (Optional, Not Repeatable): This subelement provides the information needed to contact an automated system made available by this distributor, expressed in a form that can be interpreted by a computer (i.e., URI). Available linkages are appropriate to reference other locators, facilitate electronic delivery of off-the-shelf information products, or guide the user to data systems that support analysis and synthesis of information.

AVAILABLE LINKAGE TYPE (Optional, Not Repeatable): This subelement occurs if there is an Available Linkage described. It provides the data content type (i.e., MIME) for the referenced URI.

POINT OF CONTACT FOR FURTHER INFORMATION (Mandatory, Not Repeatable): This element identifies an organization, and a person where appropriate, serving as the point of contact plus methods that may be used to make contact. This element consists of the following subelement

CONTACT NAME
CONTACT ORGANIZATION
CONTACT STREET ADDRESS
CONTACT CITY
CONTACT STATE
CONTACT ZIP CODE
CONTACT COUNTRY
CONTACT NETWORK ADDRESS
CONTACT HOURS OF SERVICE
CONTACT TELEPHONE
CONTACT FAX.

RECORD SOURCE (Mandatory, Not Repeatable): This element identifies the organization, as named in the U.S. Government Manual, that created or last modified this locator record.

DATE OF LAST MODIFICATION (Mandatory, Not Repeatable): This element identifies the latest date on which this locator record was created or modified.

AGENCY PROGRAM (*, Not Repeatable): This element identifies the major agency program or mission supported by the system and should include a citation for any specific legislative authorities associated with this information resource. *This element is mandatory if the resource referenced by this GILS Core locator record is a Federal information system.

SOURCES OF DATA (*, Not Repeatable): This element identifies the primary sources or providers of data to the system, whether within or outside the agency. *This element is mandatory if the resource referenced by this IS Core locator record is a Federal information system.

CONTROLLED VOCABULARY (Optional, Repeatable): This element is a grouping of subelements that together provide any controlled vocabulary used to describe the resource and the source of that controlled vocabulary:

INDEX TERMS -- CONTROLLED (Optional, Not Repeatable): This subelement is a grouping of descriptive terms drawn from a controlled vocabulary source to aid users in locating entries of potential interest. Each term is provided in the subordinate repeating field
CONTROLLED TERM.

THESAURUS (Optional, Not Repeatable): This subelement provides the reference to a formally registered thesaurus or similar authoritative source of the controlled index terms. Notes on how to obtain electronic access to or copies of the referenced source should be provided, possibly through a Cross Reference to another locator record that more fully describes the standard and its potential application to locating GILS information.

LOCAL SUBJECT INDEX (Optional, Not Repeatable): This element is a grouping of descriptive terms to aid users in locating resources of potential interest, but the terms are not drawn from a formally registered controlled vocabulary source. Each term is provided in the repeating subelement:

LOCAL SUBJECT TERM

METHODOLOGY (Optional, Not Repeatable): This element identifies any specialized tools, techniques, or methodology used to produce this information resource. The validity, degree of reliability, and any known possibility of errors should also be described.

SPATIAL REFERENCE (Optional, Not Repeatable): This element is a grouping of subelements that together provide the geographic reference for the information resource. Geographic names and coordinates can be used to define the bounds of coverage. Although described here informally, the spatial object constructs should be as defined in FIPS 173, "Spatial Data Transfer Standard."

BOUNDING RECTANGLE (Optional, Not Repeatable): This subelement provides the limits of coverage expressed by latitude and longitude values in the order:

WESTERN-MOST
EASTERN-MOST
NORTHERN-MOST
SOUTHERN-MOST.

GEOGRAPHIC NAME (Optional, Repeatable): This subelement identifies significant areas and/or places within the coverage through two associated constructs:

GEOGRAPHIC KEYWORD NAME
GEOGRAPHIC KEYWORD TYPE.

TIME PERIOD OF CONTENT (Optional, Repeatable): This element provides time frames associated with the information resource, in one of two forms:

TIME PERIOD -- STRUCTURED: Time described using the USMARC prescribed structure
TIME PERIOD -- TEXTUAL: Time not described in the USMARC prescribed structure.

CROSS REFERENCE (Optional, Repeatable): This element is a grouping of subelements that together identify another locator record likely to be of interest:

CROSS REFERENCE TITLE (Mandatory, Not Repeatable): This subelement provides a human readable textual description of the cross reference.

CROSS REFERENCE LINKAGE (Mandatory, Not Repeatable): This subelement provides the machine readable information needed to perform the access (i.e., URI).

CROSS REFERENCE TYPE (Mandatory, Not Repeatable): This subelement occurs if there is a CROSS REFERENCE LINKAGE AND provides the data content type (i.e., MIME) for the referenced URI.

ORIGINAL CONTROL IDENTIFIER (Optional, Repeatable): This element is used by the record source agency to refer to another GILS locator record from which this locator record was derived.

SUPPLEMENTAL INFORMATION (Optional, Not Repeatable): Through this element, agencies may associate other descriptive information with the GILS Core locator record.