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NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1

Version 2.02

Abstract: A practical implementation structure for the NISO Circulation Interchange Part 1: Protocol (NCIP) is defined.

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Contents

Foreword

(This foreword is not part of the *NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1*, ANSI/NISO Z39.83-2-2012. It is included for information only.)

About This Standard

This Implementation Profile (IMP1) has been developed to provide a practical implementation structure for the NISO Circulation Interchange Part 1: Protocol (NCIP).

The Foreword to Part 1 provides a complete description of the reasons for the NCIP's development and the reasons for describing the physical implementation of the NCIP within an Implementation Profile rather than within the NCIP itself. In brief, the committee decided that this approach would improve the extensibility of the NCIP. This approach also allows the community of application providers and users to adapt the implementation profile to changing technology.

Version 2.00 includes radical changes to the protocol. It is not backward compatible with Version 1.00, as it is based solely on an XML Schema. The Version 2.00 changes build on changes made since original publication of NCIP and known collectively (if inaccurately) as version 1.01, the version several implementers are already using. There are a few other changes that also break backward compatibility. The most significant are in error handling and extensibility. A summary of the changes made in Version 2.00 is included in the Foreword to ANSI/NISO Z39.83-1-2008, *NISO Circulation Interchange - Part 1: Protocol (NCIP)*. A complete change list for Version 2.00 (including the incorporated changes from version 1.01) is posted on the NISO website at: www.niso.org/standards/z39-83-1-2008/.

In 2009, the NCIP standard (parts 1 and 2) moved from a periodically maintained standard that requires reaffirmation every five years to a continuously maintained standard. Under continuous maintenance, a process is put in place for submittal and review of proposed changes on a published schedule. Requests for change must be submitted to the NCIP Standing Committee (NISO-SC) prior to its semiannual in-person meetings. At each meeting, the group will review all of the change requests and decide to accept the change for inclusion in the next revision, accept the change for further study and additional discussion at a future meeting, or reject the change. The complete procedure for the continuous maintenance is available at the NISO website (www.niso.org/workrooms/ncip/continuous). When a sufficient number of changes have been accepted by the NCIP-SC—or one or more changes is deemed to be to significant enough—the NCIP-SC will prepare a revision for ballot and approval by a NISO voting pool of interested NISO voting members.

The NCIP-SC believes that Continuous Maintenance will permit the NCIP standard to adapt more quickly to the ever-changing needs in the implementer community. The group is, however, sensitive to the tension that exists between frequent changes, interoperability, and backwards compatibility. Therefore, the NCIP-SC is committed to maintaining backwards compatibility in minor revisions and reserving more significant structural changes for major revisions. For example, Version 2.00 and 2.01 will be compatible, but there is no guarantee that Version 2.01 and Version 3.0 will be. Of course, a Version 2.0 implementation exchanging with a Version 2.01 implementation will not understand any changes introduced in Version 2.01. It should be noted, too, that the effective version used in any specific transaction is governed by the Initiator.

In December 2010, Version 2.01 was issued by the NISO-SC and treated as a draft for trial use. It was not officially balloted or approved as a revision to the standard. The changes in this standard (*Implementation Profile 1*) include updates for the proper URIs for the 2.01 schema and inclusion of what is the proper XML header for a conforming document. For a full list of the Version 2.01 changes to NCIP, see the Foreword to NISO Z39.83-1-2008 (Version 2.01), *NISO Circulation Interchange - Part 1: Protocol (NCIP)*.

This is Version 2.02. The changes in this revision are primarily corrections to earlier versions. Most notably, the reference in Section 5.3 to ISO 8601 for the format for dateTime elements has been

adjusted to reflect changes in the structure of that standard. Also, the location for the NCIP Version schema (Section 6.3.2) has been restored to what it was in Version 1.0 of the standard. The schema for the Version element was intended to remain static across versions and should not have changed with each revision. The URIs of the schemas given in Appendix C, too, have been restored to the values from Version 1.0. A note has been added to explain that the schema URI should not change unless the content of the referenced schema itself changes. In addition, these schemas have been normalized to have a consistent format. Finally, new values have been added to the Bibliographic Item Identifier Code scheme and the Medium Type scheme.

Instructions for Submittal of Proposed Change to ANSI/NISO Z39.83 Under Continuous Maintenance

If a provision of the standard is proposed to be added, deleted, or modified, the text of the provision must be submitted in writing. Comments or proposals for revisions to any part of the standard may be submitted to NISO any time. Submissions must be accompanied by the submitter's name, affiliation, telephone number, and e-mail address.

Written comments are to be sent to:

National Information Standards Organization (NISO)
Attn: NCIP Standing Committee
3600 Clipper Mill Road, Suite 302
Baltimore, MD 21211
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866-957-1593 (toll-free)
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E-mail: nisohq@niso.org

Comments may also be submitted to NISO online at www.niso.org/contact. In addition, the following person may be contacted by those interested in submitting changes:

Robert Walsh
ANSI/NISO Z39.83 Maintenance Agency Representative,
EnvisionWare
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Principles

In making decisions about this Implementation Profile 1 (IMP1) the committee examined ways to facilitate rapid and widespread implementation of the NCIP. Two goals drove decision-making: 1) make it easy for service providers to use NCIP in a variety of applications, and 2) make it easy for them to build those applications quickly. From these goals, the committee developed the following principles:

- Use technology that is widely supported. This dictated choosing options that offered the most robust support for application development.
- Stay with the curve. NCIP will be embedded in applications that last an average of several years, if not longer. This requires choosing technology likely to stand the test of time. In some cases, this meant rejecting very promising technology when it was not clear that the technology would be widely adopted. As noted below, the committee deliberately built bridges to emerging technology where possible.

These were judgment calls, not matters of precise calculations. Several areas deserve particular mention:

- **Message Encoding and Structure** – The committee chose Extensible Markup Language (XML) over ASN.1/BER, which has been widely used in library applications. XML is supported by a large number of organizations and tool providers. This provides implementers with a choice of tools. In addition, the expectation is that it will be the dominant encoding

method used in Internet communication. This widespread usage will help those using the NCIP for library applications to connect libraries to the broader stream of information services available in today's electronic environment.

- **Extensibility** – The Foreword to Part 1 discusses the variation in circulation practice and the need for a flexible mechanism for supporting variation in practice and local policy. The business rules that enforce these policies often use enumerated data types to characterize those policies. In some cases these are defined in existing authoritative lists; in other cases, the lists are maintained locally by an agency or a consortium. In either case, the expectation is that the definition of the enumerated types will be independent of the XML Schema definition for NCIP messages.

  The committee has adopted a data structure that allows for an optional Scheme attribute on data elements that tend to be values drawn from lists of values (authoritative or local) while leaving implementers free to use values without the mandated constraint of pre-defined lists."

- **Character Encoding** – The committee chose Unicode (UCS-2) for character encoding because the protocol messages may carry character data unsupported by the ASCII character set (American Standard Code for Information Interchange, ANSI X3.4-1 986).

  UTF-8 was chosen as the encoding scheme. Using UTF-8 is consistent with the Internet Engineering Task Force (IETF) mandate for the use of Unicode in Internet standards. UTF-8 will allow applications that only require support provided by ASCII encoding to use ASCII and remain compliant with this IMP1.

- **Message Transport** – The committee carefully considered the options for specifying transport protocols. Two aspects of the anticipated implementations drove the decision-making:

  – The NCIP will be implemented extensively in applications that cross administrative domains. In these applications, secure transmission is a critical issue.

  – In many cases NCIP messages will be embedded within Web applications, but in others, notably self-standing kiosk applications, the use of Web protocols might be difficult.

  For these reasons, the IMP1 allows applications to use one of three transport protocols: hypertext transport protocol (HTTP), hypertext transport protocol with secure socket layer (HTTPS), and TCP/IP. The initiating application selects the transport mechanism and the responding application must respond using that transport. These choices may be restricted by an application profile.

  The committee also considered using Simple Object Access Protocol (SOAP). While it had several advantages, the committee chose not to adopt it because SOAP is not currently a fully approved protocol.

Trademarks, Service Marks

The following NISO members were in the voting pool that approved this standard.

American Society for Information Science & Technology (ASIS&T)
Mark Needleman

Association of Research Libraries (ARL)
Julia Blixrud

College Center for Library Automation (CCLA)
David Brightbill

EnvisionWare Inc.
Robert Walsh

Ex Libris Inc.
Mike Dicus

Innovative Interfaces Inc.
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Marilyn Redman

National Security Agency
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Polaris Library Systems
Eric Graham

Ringgold Inc.
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The Library Corporation (TLC)
Juli Marsh

NISO Discovery to Delivery Topic Committee Members

This standard is part of the portfolio of the NISO Discovery to Delivery Topic Committee. At the time the Topic Committee approved this standard for ballot, the following individuals were members.

Pascal Calarco
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Lucy Harrison
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Ex Libris, Inc.

Jeff Penka
OCLC Online Computer Library Center

Tim Shearer
University of North Carolina Chapel Hill Libraries

Chris Shillum
Reed Elsevier

Robert Walsh
EnvisionWare, Inc.

NCIP-SC Members

The NCIP Standing Committee (NCIP-SC) provides support for the NCIP standard, including voting on and preparing changes according to the continuous maintenance procedures for this standard. The following individuals were members of the NCIP-SC at the time that version 2.02 (2012) was approved.

John Barr
Polaris Library Systems

John Bodfish
OCLC, Inc.

Dhaval Kotecha
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Ranny Lacanienta
SirsiDynix

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NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1

1 Purpose

The purpose of this Protocol Implementation Profile 1 (IMP1) is to specify details of implementation of the NISO Circulation Interchange Part 1: Protocol (NCIP). This IMP1 was developed primarily to support three broad application areas:

- Direct Consortial Borrowing,
- Circulation/Interlibrary Loan Interchange, and
- Self Service Circulation.

Secondarily, the profile was intended for use with emerging application areas such as the management of electronic resources.

2 Scope

This IMP1 addresses the following implementation issues:

- Message, Character, and Data Encoding
- Required Components and Behavior
- Network Transport
- Network Security
- Scheme Registration
- Provision for Extension

3 Normative References

This standard references the following documents. When cited in the text of the standard, the standard may be referred to by its number only or an abbreviated title. Where no date is supplied; the most current version of the standards should be used. See the Bibliography for additional references that are cited in informative sections of the standard.

ANSI/NISO Z39.83-1-2012, *NISO Circulation Interchange Part 1: Protocol (NCIP)*

IETF RFC2119, *Key words for use in RFCs to Indicate Requirement Levels*, March 1997 <http://www.ietf.org/rfc/rfc2119.txt>

IETF RFC 2396, *Uniform Resource Identifiers (URI): Generic Syntax*, August 1998 <http://www.ietf.org/rfc/rfc2396.txt>

IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*; June 1999 <http://www.ietf.org/rfc/rfc2616.txt>

ISO 4217, *Codes for the representation of currencies and funds*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

ISO 10646, *Information Technology – Universal multiple-octet coded character set (UCS)*

The Unicode Consortium, *The Unicode Standard* <http://www.unicode.org/versions/latest/>

W3C Recommendation, *Character Model for the World Wide Web 1.0: Fundamentals*; February 15, 2005 <http://www.w3.org/TR/charmod/>

W3C Recommendation, *Extensible Markup Language (XML) 1.0*, fifth edition; November 26, 2008 <http://www.w3.org/TR/xml/>

W3C Recommendation, *XML Schema Part 2: Datatypes*, second edition, October 28, 2004 <http://www.w3.org/TR/xmlschema-2/>

4 Definitions and Conventions

4.1 Definitions

The following terms, as used in this standard, have the meanings indicated.

Term	Definition
Strictly Conformant	An implementation is strictly conformant to this IMP1 and the NCIP if the implementation **always** behaves as mandated in this IMP1 whenever it exchanges messages (either as initiator or responder) with another implementation.
Conformant	An implementation is conformant to this IMP1 and the NCIP if the implementation behaves **as if** it were a **strictly conformant** implementation whenever it exchanges messages (either as initiator or responder) with a **strictly conformant** implementation.
IMP1	*NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1*, ANSI/NISO Z39.83-2-2012.
Initiating Implementations NCIP	Implementations that initiate NCIP services.
Protocol	*NISO Circulation Interchange Part 1: Protocol (NCIP)*, ANSI/NISO Z39.83-1-2012.
Responding Implementations	Implementations that respond to NCIP messages sent to them by initiating implementations.
Supported	Recognized by the implementation but not necessarily used by the implementation beyond NCIP messaging per se.

4.2 Notational Convention

The key words “must,” “must not,” “required,” “should,” “should not,” “recommended,” “may,” and “optional” in this standard are to be interpreted as described in IETF RFC 2119.

5 Encoding

This IMP1 specifies required behavior with regard to encoding in three contexts, as follows:

- Message encoding and structure
- Character representation
- Representation of data types

5.1 Message Encoding and Structure

5.1.1 XML Schema

For the purposes of this IMP1, conformant messages must be valid according to the rules for valid documents specified in the XML standard. For each message governed by the NCIP, there is an element in the "NCIP XML Schema." For the XML Schema, see Appendix A. The following URL should be consulted for any changes or revisions that may have occurred subsequent to the publication of this standard:

http://www.niso.org/schemas/ncip/

Each message shall contain one and only one NCIP Message element as defined in the NCIP XML Schema.

5.1.2 Compression

This Implementation Profile does not define compression mechanisms. However, implementations should consider supporting optional mechanisms that, by agreement with peer implementations, can be enabled. Examples of compression mechanisms are:

- Using an XML Stylesheet to substitute shorter element names, such as "AI" for "Agency Id"
- Using HTTP content-encoding (e.g., gzip compression)

5.2 Character Representation

For the purposes of this IMP1, conformant messages must employ the UTF-8 encoding of Unicode (UCS-2) as the encoding for all data. All applications must have the ability to recognize any character defined in 16-bit Unicode (UCS-2) as a valid character. Applications are not required by this IMP1 to display, edit, or process all Unicode characters—each application may choose any subset of Unicode characters it will support in sending and receiving messages.

Applications conforming to this IMP1 that make use of string identity matching must adhere to the requirements of Section 6 ("String Identity Matching") of *Character Model for the World Wide Web 1.0* for strings to be matched. This implies that applications that compare text in data elements in incoming messages for identity with text supplied in outgoing messages, as might be the case with unique identifiers, should ensure that such text in outgoing messages is normalized sufficiently well that further normalization by the recipient of the message will not affect the ability to compare for identity.

Any valid character representation, including character references and entity references, must be supported. However, as the NCIP XML Schema does not define any entity references, in practice the permissible entity references are restricted to "amp" (ampersand), "lt" (less than), "gt" (greater than), "apos" (apostrophe), and "quot" (quote).

5.3 Representation of Data Types

The data types employed by messages conforming to this IMP1 are defined in this section.

The XML Schema governing the structure of conformant messages under this IMP1 employs what are commonly called “fixed attributes” to specify data types of all simple elements.

The data types are presented here in alphabetical order. For each data type a definition, lexical representation, example of usage, and an example data element are presented. The definitions and lexical representations are derived from the W3C *XML Schema Part 2: Datatypes* document (see Section 3). Any terms used in the definitions below that are themselves undefined may be found defined in the aforementioned XML document.

An **Empty** data type is an element that contains no data and indicates, by its presence or absence, a predefined condition or situation. For example, the empty element Item Reported Lost, used in the Report Circulation Status Change Service, indicates that a User has reported that the Item is lost.

Name	**dateTime**
Definition	The **dateTime** data type represents a specific instant in time. The value space of **dateTime** is the space of the combinations of date and time of day from Section 4.3 of ISO 8601-2004.
Representation	A single representation, which is a subset of the lexical representations defined by ISO 8601, is allowed. This lexical representation is the ISO 8601 extended format CCYY-MM-DDThh:mm:ss.sss where “CC” represents the century, “YY” the year, “MM” the month, and “DD” the day, preceded by an optional leading “-” sign to indicate a negative number. If the sign is omitted, “+” is assumed. The letter “T” is the date/time separator, and “hh”, “mm” and “ss” represent hour, minute, and second respectively. Additional digits may be used to increase the precision of fractional seconds if desired, i.e., the format ss.sss ... with any number of digits after the decimal point is supported. The fractional seconds part is optional; all other parts of the lexical form are mandatory. To accommodate year values greater than 9999, additional digits may be added to the left of this representation. The year 0000 is prohibited. The CCYY field must have at least four digits, the MM, DD, hh, mm, and ss fields exactly two digits each (exclusive of fractional seconds); leading zeroes must be used if the field would otherwise have too few digits. This lexical representation must be followed immediately by a “Z” to indicate Coordinated Universal Time (UTC), or the time zone must be omitted. It is important to note also that a value of 00 for hours, minutes, or seconds, refers to the *start* of the day, hour, or minute respectively, so for example a time of 15:35:00 means the start of the 35th minute after 3 p.m. In this example, if the intent is to indicate an “unspecified” number of seconds then it is up to an application to decide whether indicating the time as 15:35:59 or 15:36:00 might be a more desirable representation of this than 15:35:00.

Example Usage	2002-06-1 5T1 0:59:00Z 2002-1 1-10T12:20:30.1Z 2002-09-1 4T1 8:49:12.061 2002-09-1 9T1 9:00:00 2002-07-31 T00:00:00Z (midnight, start of 2002 July 31) Same instant in time: 2002-07-31 T24:00:00Z (midnight, end of 2002 July 31) 2002-08-01 T00:00:00Z (midnight, start of 2002 August 1)
Example Data Element	DateDue

Name	**integer**
Definition	The data type **integer** is a decimal number where the value of *scale* is set to 0 (zero).
Lexical Representation	**integer** has a lexical representation consisting of a finite-length sequence of decimal digits with an optional leading sign (“+” or “-”). If omitted, “+” is assumed.
Example Usage	15 12345 -1 -123
Example Data Element	MonetaryValue

Name	**nonNegativeInteger**
Definition	The data type **nonNegativeInteger** is an integer whose minimum value is zero. The value space of **nonNegativeInteger** is an infinite space of integers beginning with zero {0,1,2,…}.
Lexical Representation	**nonNegativeInteger** has a lexical representation consisting of an optional sign (+) followed by a finite-length sequence of decimal digits. If the sign is omitted, “+” is assumed. If present the sign must be “+”; a negative sign (“-”) is not valid.
Example Usage	+100 0 145 +34
Example Data Element	HoldQueueLength

Name	**positiveInteger**
Definition	The data type **positiveInteger** is an integer whose minimum value is a positive 1. The value space of **positiveInteger** is the infinite set of positive numbers {1,2,3,…}.

Lexical Representation	**positiveInteger** has a lexical representation consisting of an optional positive sign ("+") followed by a finite sequence of decimal digits.
Example Usage	15 +200
Example Data Element	HoldQueuePosition

Name	**string**
Definition	The **string** data type represents character strings in XML. The value space of **string** is the set of finite-length sequences of UCS (Universal Character Set) characters (from ISO 10646 and Unicode).
Lexical Representation	None – defined as a primitive data type in XML Schema.
Example Usage	library Overdue money AAB2071-1-1 Chan
Example Data Element	Surname

5.4 Representation of Monetary Quantities

The protocol specifies that currencies of the world be identified and represented according to ISO 4217. This means that to specify monetary quantities fully, both a three-character currency code, from ISO 4217, and an integer value must be used. The integer value is based on the minor denomination of the specific currency. For example, the currencies of Canada (the dollar), Egypt (the pound), and Bahrain (dinar) are represented by the three-character codes: CAD, EGP, and BHD, respectively. The minor units of each of these currencies are 1/100, 1/100, and 1/1000, respectively, of the major unit. ISO 4217 specifies the representation of a monetary quantity as follows: an integer expressed as positive, negative, or zero, obtained by multiplying an amount expressed in the major unit (i.e., expressed as a rational number) by ten to the power M, where M is the value of the minor unit for that currency as defined in ISO 4217. For example, 9.53 Canadian dollars would be represented as 9.53×10^2 (M = 2 for Canadian dollars), or 953. Similarly, 12.98 Egyptian pounds would be represented as 12.98×10^2 (M = 2 for Egyptian pounds), or 1298. As a final example, 16.750 Bahraini dinars would be represented as 16.750×10^3 (M = 3 for Bahraini dinars), or 16750.

The protocol defines a data element Amount**,** composed of two child elements (both derived from, or based on, ISO 4217): Currency Code and Monetary Value**.** The quantities exemplified above are expressed as illustrated in Table 1.

Table 1: Representation of Amount data element

```
<Amount>
<CurrencyCode Scheme="http://www.bsi-
global.com/Technical+Information/Publications/_Publications/tig90x.doc">
CAD</CurrencyCode>
<MonetaryValue>953</MonetaryValue>
</Amount>
<Amount>
<CurrencyCode Scheme="http://www.bsi-
global.com/Technical+Information/Publications/_Publications/tig90x.doc">
EGP</CurrencyCode>
<MonetaryValue>1298</MonetaryValue>
</Amount>
<Amount>
<CurrencyCode Scheme="http://www.bsi-
global.com/Technical+Information/Publications/_Publications/tig90x.doc">
BHD</CurrencyCode>
<MonetaryValue>16750</MonetaryValue>
</Amount>
```

Converting these Amounts back to rational numbers requires only that the Monetary Value be divided by 10.

6 Required Components

Implementations conforming to this IMP1 must support the required components specified below.

6.1 Required Services

This Implementation Profile 1 does not require any specific services. Application profiles, as defined within the NCIP, may require support of certain NCIP Services.

6.2 Required XML Prolog

When transmitting XML-formatted NCIP initiation and response messages using either HTTP, HTTPS, or TCP/IP as the transport protocol, the XML Prolog code in Table 2 must be used at the beginning of every message.

Table 2: XML Prolog code

```
<?xml version = '1.0' encoding='UTF-8'?>
<!DOCTYPE NCIPMessage
xmlns:xsi = 'http://www.w3.org/2001/XMLSchema-instance'
xsi:noNamespaceSchemaLocation =
'http://www.niso.org/ncip/v2_02/imp1/xsd/ncip_v2_02.xsd'
version = 'http://www.niso.org/ncip/v2_02/imp1/xsd/ncip_v2_02.xsd'>
```

6.2.1 XML Namespace

In some cases in which NCIP messages may be included in other XML web services, it will be necessary to declare an XML namespace in order to distinguish NCIP messages. This can be done by the optional inclusion of a namespace declaration. NISO is presumed to be the authority and owner of the NCIP namespace. The following is an example:

```
xmlns:ncip="http://www.niso.org/ncip"
```

6.3 Required Data Structures

6.3.1 Message Headers

Every NCIP message may contain a header. Initiation messages may contain an **Initiation Header**, defined as follows:

Initiation Header

Required data:	From Agency Id
	To Agency Id
Optional data:	Application Profile Type
	From Agency Authentication
	From System Authentication
	From System Id
	On Behalf Of Agency
	To System Id

If the Agency, on behalf of which an initiation message is sent, is not that identified by the From Agency Id in the Initiation Header, then the message must also include identification of the originating Agency in the On Behalf Of Agency element.

The data elements that comprise this data structure are defined in the NCIP.

Response messages may contain a Response Header, defined as follows:

Response Header

Required data:	From Agency Id
	To Agency Id
Optional data:	From Agency Authentication
	From System Authentication
	From System Id
	To System Id

The data elements that comprise this data structure are defined in the NCIP.

6.3.2 Version Attribute

In addition to other required data structures, every NCIP message must also contain a version attribute attached to the root element of the message (i.e., NCIPMessage). This attribute must contain a text string identifying the XML Schema file (and therefore the NCIP version) to which the message belongs, for example:

http://www.niso.org/schemas/ncip/v2_02/ncip_v2_02.xsd

Any conformant application, which supports the NCIP version being referred to in an initiation message, must respond using the same version in the response message.

In NCIP v1.0, the Lookup Version message was defined by a separate DTD. This allowed the message to remain constant as the standard itself continued to evolve. The idea was that, regardless of an application's own version of NCIP, it would be able to send the Lookup Version message to a responder and be certain that the responder would be able to process it and respond appropriately. With the informal release of NCIP v1.01 and the migration from a DTD to an XML Schema, a parallel XML Schema was created for the Lookup Version message. An initiating application may now choose to use either the DTD or the XML Schema with the Lookup Version message. However, a responder that is strictly compatible only with NCIP v1.0 will likely not be able to respond to the Lookup Version message if it references the XML Schema.

The following URLs may be consulted for the NCIP version definition (see also NCIP, Part 1, Section 5.3.5).

XML Schema: http://www.niso.org/ncip/v1_0/imp1/xsd/ncip_version.xsd

DTD: http://www.niso.org/ncip/v1_0/imp1/dtd/ncip_version.dtd

Note: In Version 2 of the NCIP standard, the URL for the NCIP Version schema was inadvertently changed. The NCIP Version schema should always be available at a known location to that applications using any version of NCIP can send a LookupVersion request to determine what version is being used by the responder. As a result of this error in Version 2 of the standard, implementers should treat the following URL as a synonym:

http://www.niso.org/ncip/v2_0/imp1/xsd/ncip_version.xsd

6.4 Requirements and Restrictions on Data Elements

6.4.1 Lists of Values for Certain Data Elements

Implementers are free to draw values from whatever lists of values they choose, or from no list at all, in agreement with their partners. The protocol allows an optional Scheme value on the data element for specifying a scheme should one wish to do so for validation purposes or for the purposes of defining agreed-upon values. The following list of data elements contains those that have the optional Scheme attribute. See Appendix C for suggested schemes and values lists that could be used. Other such lists may be posted on the Maintenance Agency web site.

- Data Element: Acknowledged Item Use Restriction Type
- Data Element: Agency Address Role Type
- Data Element: Agency User Privilege Type
- Data Element: Authentication Data Format Type
- Data Element: Authentication Data Format Type
- Data Element: Authentication Input Type
- Data Element: Authentication Prompt Type
- Data Element: Bibliographic Item Identifier Code
- Data Element: Bibliographic Level
- Data Element: Bibliographic Record Identifier Code
- Data Element: Block or Trap Type
- Data Element: Circulation Status
- Data Element: Component Identifier Type
- Data Element: Currency Code

- Data Element: Electronic Address Type
- Data Element: Electronic Data Format Type
- Data Element: Fiscal Action Type
- Data Element: Fiscal Transaction Type
- Data Element: Item Description Level
- Data Element: Item Identifier Type
- Data Element: Item Use Restriction Type
- Data Element: Location Type
- Data Element: Medium Type
- Data Element: Notice Type
- Data Element: Organization Name Type
- Data Element: Payment Method Type
- Data Element: Physical Address Type
- Data Element: Physical Condition Type
- Data Element: Request Element Type
- Data Element: Request Identifier Type
- Data Element: Request Scope Type
- Data Element: Request Status Type
- Date Element: Request Type
- Data Element: Requested Action Type
- Data Element: Required Item Use Restriction Type
- Data Element: Security Marker
- Data Element: Unstructured Address Type
- Data Element: User Address Role Type
- Data Element: User Identifier Type
- Data Element: User Privilege Status Type

6.5 Required Behavior Rules

The following rules define how responding applications must behave in order to claim conformance with this IMP1. The rules govern the level of action that must be taken before the responding application may make particular declarations. They do not govern the manner in which the responder takes that action.

6.5.1 Declaration of Success

The rules in sections 6.5.1.2 - 6.5.1.4 define the level of action a responding application must take in order to declare a service a success within each of the three service types. If a responding application cannot declare a service a success, it must declare the service a failure, i.e., by returning a Problem element describing the reason for the failure.

6.5.1.1 Lookup Service Type

A responding application must declare a Lookup Service to be completed successfully if and only if it returns some or all of the data requested in the initiation message. As specified in the NCIP, a responder is not required to return all requested data when that data is unavailable, or when policy or practice prohibits or restricts access. Otherwise, the service must be declared a failure. For example, an application that receives a Lookup User message that requests the Personal User Common Name and the Electronic Address may be designed to withhold Electronic Addresses (e.g., telephone, e-mail) for privacy reasons. In this case, the implementation would return a Lookup User Response message containing the User's Personal User Common Name, but not the Electronic Address, and declare the service to have succeeded.

6.5.1.2 Update Service Type

A responding application must declare an Update Service to be completed successfully if and only if all updates requested in the initiation message have been performed as if they have been made to persistent storage (e.g., a database). Otherwise, none of the requested updates must be performed and the service must be declared a failure.

6.5.1.3 Notification Service Type

A responding application must declare a Notification Service to be completed successfully if it determines that the initiation message was valid even if it determines that it will not process the notification. It must declare a Notification Service to have failed if and only if the initiation message was invalid. For example, an application that receives an Item Requested message for a User associated with one of its agencies, but is not designed to track such information, must respond with an Item Requested response message that declares the service to have succeeded provided the initiation message was not in error.

6.5.2 Omission of Requested Elements

A responding application may omit elements requested in the initiation message of a Lookup Service via the value of an Agency Element Type, Item Element Type, User Element Type, Loaned Items, Requested Items, Current Borrower, or Current Requesters element. Similarly a responding implementation *may* omit the Electronic Resource element requested in the initiation message by the presence of the Resource Desired element. When any such omission occurs it does not, in itself, preclude the responding application from declaring the service a success.

6.5.3 Data Elements to be Included in Service Responses

A Lookup Service response must include as Optional Fields only the data elements that are requested in the initiation message as values in the data elements Agency Element Type, Item Element Type, and User Element Type, or the presence of any of the empty elements Loaned Items, Requested Items, Current Borrower, or Current Requesters.

An Update Service response must include as Optional Fields only the data elements that are specified in an initiation message as values in Item Element Type and User Element Type.

Similarly, a responding implementation must include the Electronic Resource element only if it is requested in the initiation message by the presence of the Resource Desired element.

6.5.4 Null Values

NCIP data elements with any data type other than EMPTY must not contain null values.

6.5.5 Update Processing

In processing the initiation messages Update Agency, Update Item, Update Request Item, and Update User, a responding application must behave as if it has performed *all* deletions indicated in the message *before* it performs *any* additions indicated in the same message.

When an implementation that receives an Update Service initiation message performs an update of a data element (such as Date Of Birth), and as a consequence also updates a data element not present

in the initiation message (such as User Privilege), it may use the Notification Service to transmit the fact of the update to the implementation that initiated the Update Service. Such a notification would take place on a separate connection from that employed for the Update Service and might well occur long after the Update Service is successfully completed. As specified in the NCIP (Section 7), multiple simultaneous connections may be open between communicating implementations.

6.5.6 Mandated Action

When an initiation message contains the Mandated Action element, the application sending that initiation message is indicating that, although the transaction is being framed as a request, it has already occurred. While the responding application should respond with any processing errors it would otherwise have sent if the Mandated Action element were not present (so that the initiating application is informed of the errors), the presence of this element indicates that the associated event (e.g., check out of an Item to a User) has already occurred, and this discrepancy might require handling outside of the NCIP context.

6.5.7 Denial of Access

For Lookup Service and Update Service messages, access may be denied by a responding application, when policy or practice dictates. See also 6.5.2.

A responding application indicates denial of access to all data about an Agency, an Item, or a User by returning a response message with only the Response Header and the Problem element (indicating access denied).

A responding application indicates denial of access to specific data associated with an Agency, an Item, or a User by returning a response message that identifies, within the Problem element, the specific data element to which access is denied.

6.5.8 Error Identification

Responders must use the Problem element as a top-level message choice when responding to errors that occur before the specific message can be identified. Errors that occur within any particular message must be reported within the Problem element in that message response.

A responding application, when validating against the XML Schema, must indicate errors in conformance with these rules:

1. Indicate a parse error if that error would be identified as such by a validating XML parser.
2. Indicate an unknown scheme error if the message is valid per the XML Schema, but the Scheme element associated with the error element is unknown to the responding implementation.
3. Indicate an unknown element error if the message is valid according to the XML Schema and the Scheme element associated with the error element is known to the responding implementation but the Value is not included in that scheme.

6.5.9 Agency Id

The protocol does not address the fact that a borrowing or a lending entity may be known by different Agency Ids among the partners exchanging NCIP messages. It is expected that implementers will utilize a local mechanism, such as mapping, for linking the disparate identifiers by which an entity is known. This is particularly likely to occur among consortia, in brokered DCB or brokered ILL transactions, or among libraries who are members of several consortia, each with its own Agency Id.

6.5.10 Persistent Ids

Users may be known to various agencies and their circulation applications by a variety of identifiers. For purposes of this profile, the data conveyed via the element User Id must be a persistent user identifier. Other identifiers may be used, but only as optional, additional elements to User Id.

Items may be known to various agencies and their circulation applications by a variety of identifiers. For purposes of this profile, the data conveyed via the element Item Id must be a persistent item identifier. Other identifiers may be used, but only as optional, additional elements to Item Id.

7 Transport Protocol

Implementations that conform to this profile must behave in the following manner in regard to the selection and use of transport protocols.

7.1 Implementations Acting as Initiators

Implementations acting as initiators must support at least one of the following transport protocols:

- HTTP
- HTTPS
- Direct Transmission over TCP/IP

7.2 Implementations Acting as Responders

Implementations acting as responders must support *all* of the following transport protocols:

- HTTP
- HTTPS
- Direct Transmission over TCP/IP

The selection of the transport protocol by the initiator of a message will govern the transport protocol used by the responder. It must respond using the same connection, and therefore, the same transport protocol that was used to send it the message.

All NCIP initiation messages sent via HTTP or HTTPS must use the POST method (refer to IETF RFC 2616), thus (where CRLF = carriage return/line feed):

```
POST http://www.niso.org/ncip HTTP/1.1 CRLF
```

All NCIP response messages sent via HTTP or HTTPS must use the normal HTTP/HTTPS protocol response mechanism used to respond to POSTs. For example:

```
HTTP/1.1 200 OK CRLF
<response header fields> CRLF CRLF
<response message>
```

7.3 HTTP/HTTPS Message Headers

For both optional NCIP initiation and response messages, the HTTP/HTTPS Content-Type and Content-Length headers must be included and coded as follows:

```
Content-Type: application/xml; charset="utf-8" CRLF
Content-Length: nnnn CRLF
```

where `nnnn` is the length of the data being sent (does not include length of headers).

The entity transferred via the HTTP message must contain the entire text of the NCIP message following a carriage return/line feed (CRLF) with no preceding text, thus:

```
CRLF
<initiation message> | <response message>
```

where `<initiation message>` or `<response message>` contains the XML formatted data for the message being sent (see also Section 6.2).

7.4 Direct Transmission via TCP/IP

For NCIP initiation and response messages transported via TCP/IP, only the XML formatted messages are sent; the headers that are needed for HTTP must not be transmitted. The choice of port number is outside the scope of this profile and will need to be determined a priori by the applications.

8 Security

Implementations are not required to support encryption of all or any part of the message or to support other security mechanisms that provide appropriate levels of data protection. Implementers are encouraged to ensure security of sensitive data by adopting one or more mechanisms that may be employed by users at their discretion. Such security mechanisms may be employed at layers of the protocol stack below the NCIP application layer.

Authentication of systems and agencies, when done at the NCIP application layer, must include an entity, such as a digital certificate, in the following elements as appropriate:

- From System Authentication
- From Agency Authentication

Implementations may employ authentication rules to constrain the messages and/or combinations of data elements within messages that are accepted from any particular application or agency. Failures of authentication constitute processing errors in the terms of this IMP1. The NCIP General Processing Error Scheme defines appropriate values for this purpose (see Section 6.4.5 of the NCIP).

9 Scheme /Profile Registration

Scheme names must conform to IETF RFC 2396, *Uniform Resource Identifiers (URI)*.

Scheme/value pairs were removed from the protocol in version 2. It is recognized, however, that schemes may be used in the optional Scheme element as authoritative reference for certain data elements and that it will continue to be important to register schemes, as well as Profiles, when these are developed.

Implementers and others (such as administrators of consortial implementations) may assign URIs within their Internet domain for this purpose. The maintenance agency for the NISO Circulation Interchange Protocol will offer a registration service that can provide a URI for a scheme name.

Each scheme value must be unique within that scheme.

For information about maintenance and registration activities see Appendix F, *Designation of Maintenance and Registration Agency,* in the NCIP (Part 1).

10 Extension

Extension is managed at the top level (as a message choice) with the XML tag <Any> within a wrapper element <Ext>. This gives the potential for defining a new message type as needed by

private agreement among parties. A similar mechanism has been placed at appropriate spots within some messages, allowing, for instance, the ability to specify type of address desired in a response. The intention is to allow implementers to extend existing messages readily as needed, with agreement of their partners. Extensions can be brought to the Maintenance Agency with a request to incorporate them into the protocol when a new version is created.

Appendix A
(normative)
NCIP XML Schema

Referenced below is the version of the NCIP XML Schema that was current as of publication of this document.

Note that XML omits spaces (as required by the rules of XML) from element and attribute names. Element and attribute names are formed by removing the spaces from the form of the names specified in the NCIP and in this IMP1. Capitalization is retained.

See http://www.niso.org/ncip/v2_02/imp1/xsd/ncip_v2_02.xsd for the text of the XML Schema.

Appendix B
(informative)
Definitions of Values for Use in Some Sample Lists of Values

(This appendix is not part of the *NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1*, ANSI/NISO Z39.83-2-2012. It is included for information only.)

This appendix includes definitions of values from sample lists for data elements listed in Section 6.4.1 of this IMP1. This table is arranged alphabetically by data element name.

NCIP Agency Address Role Type Scheme		
	Bill To	Address to which bills for the Agency are to be sent.
	Multi-Purpose	Address used for most purposes when communicating with the Agency.
	Official	Official address of the Agency.
	Ship From	Address from which the Agency ships material.
	Ship To	Address to which material destined for the Agency is to be shipped.

NCIP Agency User Privilege Type Academic Scheme		
	Faculty	User accorded rights and privileges associated with faculty of the Agency.
	Graduate	User accorded rights and privileges associated with graduate students of the Agency.
	Postdoctoral	User accorded rights and privileges associated with postdoctoral students and fellows of the Agency.
	Staff	User accorded rights and privileges associated with administrative employees and other non-teaching staff of the Agency.
	Undergraduate	User accorded rights and privileges associated with undergraduate students of the Agency.

NCIP Agency User Privilege Type Public Scheme		
	Adult	User accorded rights and privileges associated with adults (as defined by the Agency).
	Child	User accorded rights and privileges associated with children (as defined by the Agency).
	Senior	User accorded rights and privileges associated with senior citizens (as defined by the Agency).
	Staff	User accorded rights and privileges associated with the employees of the Agency.
	Young Adult	User accorded rights and privileges associated with young adults (as defined by the Agency).

NCIP Authentication Input Type Scheme		
	Barcode Id	Printed and variously patterned bars, spaces, and sometimes numerals designed to be scanned and read into computer memory and used as input for User authentication.
	MD5 Message Digest Algorithm	An algorithm intended for digital signature applications, where a large file must be compressed in a secure manner before being encrypted with a private (secret) key under a public-key cryptosystem such as RSA. It is used in NCIP as input for the purpose of User authentication.
	Password	Sequence of characters used by the User to gain access to restricted data on a computer network and used as input for User authentication
	PIN	Personal Identification Number—an alpha-numeric string known only to the User—and used as input for User authentication.
	Secondary Confirmation String	Text string supplied as confirmation of the primary authentication input, and used as input for User authentication.
	User Id	Sequence of characters identifying the User to the responding application and used as input for User authentication. Also known as User ID, account name, or login name.
	X.509 Certificate	Provides a means for secure signatures of encryption keys; used in NCIP for authentication.

NCIP Bibliographic Item Identifier Code Scheme		
	CODEN	CODEN *Source:* International CODEN Section of Chemical Abstracts Service; ASTM E250-98(2009)
	DOI	Digital Object Identifier For example: 10.XXXX/1 234 *Source:* ANSI/NISO Z39.84, *Syntax for the Digital Object Identifier*

NCIP Bibliographic Item Identifier Code Scheme		
	Government Publication Number	Alpha-numeric identifier assigned to government publications by a country's designated government agency, possibly a classification number.
	GTIN	Global Trade Item Number *Source:* GS1, GTIN (Global Trade Item Number)
	ISBN	International Standard Book Number *Source:* ISO 2108
	ISMN	International Standard Music Number *Source:* ISO 10957
	ISRC	International Standard Recording Code *Source:* ISO 3901
	ISSN	International Standard Serial Number Source: ISO 3297
	Legal Deposit Number	Alpha-numeric identifier assigned by a national bibliographic agency to a bibliographic Item received under national legal deposit laws
	PURL	Persistent Uniform Resource Locator *Source:* PURL administrator interface, OCLC
	Report Number	Alpha-numeric identifier assigned by a publisher to a technical report. *Source:* ANSI/NISO Z39.23
	SICI	Serial Item and Contribution Identifier *Source:* ANSI/NISO Z39.56
	UPC	Universal Product Code *Source:* GS1 EAN/UPC
	URI	Uniform Resource Identifier *Source:* IETF RFC 2396

NCIP Bibliographic Level Scheme		
	Collection	Bibliographic Item describes a collection, i.e., a group of Items treated as a unit.
	Monograph	Bibliographic Item describes a monograph, i.e., a non-serial bibliographic item, which is either complete in one part or is complete, or intended to be complete, in a finite number of separate parts.
	Monographic Component Part	Bibliographic Item describes a unit of a monograph, such as a volume of a multi-part monograph or a chapter within a monograph.
	Serial	Bibliographic Item describes a publication issued in successive parts, usually having numerical and/or chronological designation, and intended to be continued indefinitely.
	Serial Component Part	Bibliographic Item describes a unit of a serial, such as an

NCIP Bibliographic Level Scheme		
		issue of a serial, or an article within an issue.

NCIP Bibliographic Record Identifier Code Scheme		
	ANBN	Australian National Bibliography Number
	BNBN	British National Bibliography Number
	CN	Canadiana Number
	LCCN	Library of Congress Control Number
	NLM TCN	National Library of Medicine Title Control Number
	OCLC	OCLC system number
	RLIN	RLIN system number

NCIP Block Or Trap Type Scheme		
	Block Check Out	Do not allow the User to check out an Item.
	Block Electronic Resource Access	Do not allow the User to access Agency's collection of electronic resources.
	Block Hold	Do not allow the User to place a hold on an Item.
	Block Recall	Do not allow an Item to be recalled for the User.
	Block Renewal	Do not allow an Item to be renewed for the User.
	Block Request Item	Do not allow the User to request an Item.
	Trap For Lost Card	Do not allow any transactions using this user card to proceed.
	Trap For Message	Notify the User of existence of notification message.
	Trap For Pickup	Notify the User that the Item is available for pickup

NCIP Circulation Status Scheme		
	Available For Pickup	Item is being held for pickup by a User.
	Available On Shelf	Item can be found in the shelf location specified in Call Number and Location and is available for loan or supply.
	Circulation Status Undefined	Item's Circulation Status is undefined.
	Claimed Returned Or Never Borrowed	Agency has received a report that a User or Agency claims to have returned the Item or never borrowed it.
	In Process	Item has been received by the Agency but has not yet been fully processed (e.g., accessioned or cataloged).
	In Transit Between Library Locations	Item is being moved from one agency location to another.
	Lost	Item has been reported lost. The concept of "Lost" carries the implication that there is

NCIP Circulation Status Scheme		
		little hope that the Item will be found.
	Missing	Item has been reported missing and is being traced. The concept of "Missing" carries the implication that the Item may be found
	Not Available	Item is not available for loan or supply.
	On Loan	Item is currently on loan.
	On Order	Item is on order, but has not been received and processed by the Agency.
	Pending Transfer	Item is to be transferred to another location, but that transfer has not yet taken place.
	Recalled	Item is on loan and has been recalled.
	Waiting To Be Reshelved	Item is waiting to be reshelved and may be available for loan or supply.

NCIP Component Identifier Type Scheme		
	SICI	Serial Item and Contribution Identifier *Source:* ANSI/N ISO Z39.56

NCIP Fiscal Action Type Scheme		
	Assess	Agency should assess a charge, the nature of which is specified in the NCIP Fiscal Transaction Type Scheme.
	Cancel	Agency should cancel a charge previously assessed to a User.
	Forgive Payment	Agency should update the User account to reflect the complete or partial payment of a charge.
	Penalty	Agency should assess the User a penalty fee.
	Waive	Agency should not assess the User a potential charge.
	Write Off	Agency should update the User's account to reflect the inability to collect the total or a portion of an outstanding charge.

NCIP Fiscal Transaction Type Scheme		
	Book Replacement Charge	Fiscal charge for replacement of a lost or badly damaged Item.
	Card Replacement Charge	Fiscal charge for replacement of a user card.
	Catalog Search	Fiscal charge for performing a catalog search.
	Day Pass	Fiscal charge for a day pass allowing the User to make use of Agency services.
	Fine	Fiscal charge for overdue materials.
	Interlibrary Loan Fee	Fiscal charge for an interlibrary loan transaction.

	Purchase	Fiscal charge for purchase of an Item from an Agency.
	Reminder Charge	Fiscal charge for a reminder.
	Renewal Fee	Fiscal charge for an extension on the loan of an Item.
	Rental	Fiscal charge for the use of an Item.
	Reservation Charge	Fiscal charge for the arrangement made in advance to have an Item held for the User.
	Service Charge	Fiscal charge for a particular service performed for the User.

NCIP Item Description Level Scheme		
	Bibliographic Item	Description of Item is at the level of the Bibliographic Item and contains no identifying information about individual copies or pieces.
	Item	Description of Item is at the level of the individual Item and contains identifying information for the Item, including, as appropriate, volume and issue details and other holdings enumeration and chronology information and/or copy identifiers.

NCIP Item Use Restriction Type Scheme		
	Available For Supply Without Return	User is not required to return the Item as supplied.
	In Library Use Only	Item is available for use only within the library.
	Limited Circulation, Long Loan Period	Long loan period, determined by Agency User Privilege Type.
	Limited Circulation, Normal Loan Period	Normal loan period, determined by Agency User Privilege Type.
	Limited Circulation, Short Loan Period	Short loan period, determined by Agency User Privilege Type.
	No Reproduction	Reproduction of the Item by any means is prohibited.
	Not For Loan	Item is not for loan.
	Overnight Only	Item is available for loan, but must be returned by a specific time the next day.
	Renewals Not Permitted	Loan period for the Item cannot be extended beyond the current date due of the loan.
	Supervision Required	The Item may be used only with direct supervision of Agency staff.
	Term Loan	Loan period for the Item is for the extent of time of an academic term of the Agency. The duration of the loan period varies according to the structure of the academic year in place at the Agency (e.g., quarter, semester, etc.).
	Use Only In Controlled Access	Item may be used only within a controlled facility, such as a rare book room or a reading room to which access is

NCIP Item Use Restriction Type Scheme		
		limited.
	User Signature Required	The signature of the User is required for use of the Item.

NCIP Location Type Scheme		
	Current Location	The location where an Item is at a particular point in time, or where it was last known to be.
	Permanent Location	The location where an Item is normally shelved.
	Temporary Location	The location where an Item is shelved for a finite period of time, after which it will be returned to its permanent location.

Medium Type		
	Audio Tape	Item is a tape on which sound vibrations have been registered so that the sound may be reproduced. *Source:* 3M SIP, media type CK004
	Blu-ray	Item is a Blu-ray Disc (BD) on which visual images, usually in motion and accompanied by sound, have been recorded. *Source:* Blu-ray Disc Association, What is Blu-ray?
	Book	Item is text, eye-readable, printed, and complete in one part or intended to be completed in a finite number of separate parts. *Source:* 3M SIP, media type CK001
	Book With Audio Tape	Item is a kit comprising a book and an audiotape. *Source:* 3M SIP, media type CK010
	Book With Compact Disc	Item is a kit comprising a book and a compact disc. *Source:* 3M SIP, media type CK009
	Book With Diskette	Item is a kit comprising a book and a diskette. *Source:* 3M SIP, media type CK008
	Bound Journal	Item is text, eye-readable, printed, and with successive parts bearing numerical or chronological designations bound together. *Source:* 3M SIP, media type CK003
	CD-ROM	Item is computer file recorded on a compact disc with read-only memory (ROM) on which digitized machine-readable data or program code has been registered; this data is intended to be accessed, processed, or executed by computer. *Source:* 3M SIP, media type CK006
	Compact Disc (CD)	Item is a compact disc on which sound vibrations have been registered so that the sound may be reproduced. *Source:* 3M SIP, media type CK006

Medium Type		
	Diskette	Item is a computer file recorded on a diskette; this data is intended to be accessed, processed, or executed by computer. *Source:* 3M SIP, media type CK007
	DVD	Item is a digital video disc (DVD) on which visual images or digitized machine-readable data or program code has been recorded.
	Magazine	Item is text, eye-readable, printed, bearing numerical or chronological designations, and is one of successive parts intended to be continued indefinitely. *Source:* 3M SIP, media type CK002
	Microform	Item is in a medium such as microfilm, microfiche, etc.
	Video Tape	Item is a tape on which visual images, usually in motion and accompanied by sound, have been registered, and which are designed for playback on a television receiver or video monitor. *Source:* 3M SIP, media type CK005

NCIP Notice Type Scheme		
	Account Reminder	User notice is an account reminder.
	Available For Pickup	User notice concerns an Item that is available for pickup.
	Item Overdue	User notice concerns an overdue Item.
	Item Recall	User notice concerns the recall of an Item.
	Subscription	User notice concerns a subscription to a library service.
	Warning	User notice is a warning.

NCIP Organization Name Type Scheme		
	Abbreviation Or Acronym	Abbreviation and/or acronym used officially to identify an Agency or User.
	Alternative Name	Alternative name by which an Agency or User may be known; may be a former name.
	Converted Name	Form of name of the Agency or User converted from the original by a means other than transliteration, or translation.
	Distinguished Name	Official name of the Agency or User plus the official name of the parent agency(ies) within the organizational hierarchy.
	Official Name	Official name of the Agency or User in its exact form.
	Translated Name	Form of name translated into a language other than that used in the Official Name, for example, the English translation of an official name in French.

NCIP Organization Name Type Scheme		
	Transliterated Name	Form of name transliterated, following the relevant transliteration standard, into a character set other than that used in the Official Name, for example, the transliteration in Latin characters of an official name in Sanskrit.

NCIP Payment Method Type Scheme		
	Bank Draft	Method of payment via a bank draft, i.e., an instrument equivalent to a check issued by a financial institution.
	Cash	Method of payment using legal currency acceptable to both parties.
	Check	Method of payment by check, i.e., a written order directing a financial institution to pay money as instructed.
	Credit Card	Method of payment by a credit instrument, such as a card or similar device.
	Debit Card	Method of payment using a card that allows the cost of goods or services that are purchased to be deducted directly from the User's account in a financial institution.
	Deposit Account	Method of payment by directly drawing on an account to which prepayment has been made.
	Direct Debit	Method of payment using a direct debit from the User's or Agency's account in a financial institution.
	Funds Transfer	Method of payment by transfer of funds from one financial institution to another, as directed by an Agency or a User.
	Money Order	Method of payment via a money order issued by a financial institution or postal authority.
	Traveler's Check	Method of payment via the use of prepaid checks issued by a financial institution.

NCIP Physical Address Type Scheme		
	Postal Address	Address to which a postal authority delivers mail.
	Street Address	Designation assigned by a civic authority to uniquely describe the physical location of a home, building, or building complex.

NCIP Physical Condition Type Scheme		
	Bad URL	The supplied data file has been placed on a web server, but the URL does not retrieve the data file.
	Binding Weak	Binding of the Item is weak.
	Color Plates Missing	Some or all of the Item's color plates are missing.
	Corrupt Or Unreadable File	The supplied data file is corrupted or otherwise unreadable.

	Discolored	Item is discolored.
	Faded	Item is faded.
	Markings	Item has markings.
	Pages Missing	Some pages are missing from the Item.
	Photocopy Illegible	The supplied physical copy is illegible.
	Special Binding	Item has a special binding.
	Water Damage	Item has sustained water damage.

NCIP Request Scope Type Scheme		
	Bibliographic Item	Request includes any physical pieces and copies described by the specific Bibliographic Item.
	Item	Request is restricted to a specific instance or copy of the bibliographic Item.

NCIP Request Status Type Scheme		
	Available For Pickup	Requested Item is available for pickup, e.g., at an Agency's service counter.
	Cannot Fulfill Request	Requested Item cannot be provided.
	Expired	Time period provided for the pickup of the Item requested has expired and the Item has been returned to its regular Circulation Status.
	In Process	Request for Item is in process.
	Need to Accept Conditions	Further processing of the request requires the User to accept or reject conditions that have been placed on the supply of the Item.
	Requested Via ILL	Requested Item has been ordered via interlibrary loan.

NCIP Request Type Scheme		
	Estimate	Request is for an estimate of the charge to provide the Item or service requested.
	Hold	Request is to reserve the Item for future use. If the Item is not currently available, the request is placed in an ordered list or queue so that the request is satisfied when the Item becomes available. Alternatively the request can specify a specific date/time when the Item is required.
	Loan	Request is for the loan of the Item for a specified period of time.
	Non-returnable Copy	Request is for the supply of the Item with no requirement that the Item be returned.
	Stack Retrieval	Request is for the retrieval of the Item from a location that may not be accessible to a User.

NCIP Requested Action Type Scheme		
	Circulate	Circulate the Item to the User. This value indicates that the responding application is responsible for managing the circulation of the Item and the initiating application is responsible for sending user notices.
	Circulate And Notify	Circulate the Item to the User. This value indicates that the responding application is responsible for managing the circulation of the Item, including sending user notices.
	Hold for Pickup	Hold the Item for pickup by the User. This value indicates that the initiating application is responsible for managing the circulation of the Item, including sending user notices.
	Hold for Pickup And Notify	Hold the Item for pickup by the User. This value indicates that the initiating application is responsible for managing the circulation of the Item and the responding application is responsible for sending user notices.

NCIP Security Marker Scheme		
	Checkpoint emag	Checkpoint's electromagnetic security marker.
	Checkpoint RFID	Checkpoint's radio frequency ID (RFID) security marker.
	Gemplus RFID	Gemplus' radio frequency ID (RFID) security marker.
	Guardian emag	Guardian's electromagnetic security marker.
	Ketec RFID	Ketec's RFID security marker.
	Knogo emag	Knogo's electromagnetic security marker.
	Lib-Chip	Codeco's RFID security marker.
	None	Item has no security marker.
	PGP	Pretty Good Privacy security marker.
	Protexit emag	Protexit's electromagnetic security marker.
	Sensormatic emag	Sensormatic's electromagnetic security marker.
	Tag-It	Texas Instrument's RFID security marker.
	Tattle-Tape Security Strip	3M's security marker.
	Ultra-Max	Sensormatic's acoustomagnetic security marker.

NCIP Unstructured Address Type Scheme		
	Carriage-Return, Newline-Delimited Text	Lines of text separated by the character pair hex 0D0A.
	HTML	Address data delimited using HTML tags.
	Newline-Delimited Text	Lines of text separated by the character hex 0A.
	XML	Address data delimited using XML tags.

User Address Role Type

	Bill To	Address to which bills for the User are to be sent.
	Home	Home address of the User.
	Multi-Purpose	Address used for most purposes when communicating with the User.
	Notice	Address to which notices to the User are to be sent.
	Ship To	Address to which material destined for the User is to be shipped.
	Work	Work address of the User.

NCIP User Privilege Status Type		
	Active	User privilege is active.
	Cancelled	User privilege has been cancelled and is no longer valid.

Appendix C
(informative)
Preliminary Registry of Schemes Defined for Optional Use with NCIP

(This appendix is not part of the *NISO Circulation Interchange Protocol (NCIP) Part 2: Implementation Profile 1*, ANSI/NISO Z39.83-2-2012. It is included for information only.)

The following list includes the schemes defined for optional use with the NCIP and this IMP1. *These are provided for illustrative purposes only.*

The list is arranged alphabetically by the data elements defined in the NCIP as carrying an optional Scheme attribute. Each entry is headed by the name of the data element. Each entry may contain one or more schemes. For each scheme, the entry includes its common name, followed by the URI representing its official scheme name. Data elements for which no schemes have been defined and data elements that share other lists are so noted.

For those who may not be familiar with URIs, the acronym stands for Uniform Resource Identifier, while URL stands for Uniform Resource Locator. URIs are simply identifiers; they are not addresses for physical entities. Although visually indistinguishable from a URL, a URI need not resolve to a document. In other words, if one enters a valid URI into the location field of a web browser, there is no requirement for a document to be returned. Put simply, a URI is a way to uniquely identify a concept, while a URL is a mechanism for locating and retrieving an actual document.

Note: The URIs for these schemes should not change unless the content of those schemes changes. Therefore, the URI for each scheme will represent the version in which the scheme was first defined. When the content of a scheme changes, the URI for that scheme will change to reflect the version in which the new content was introduced.

The format of the registry is as follows:

DataElement

Common name of scheme

Official Name of scheme, expressed as URI

Registry

AcknowledgedItemUseRestrictionType

See Item Use Restriction Type

AgencyAddressRoleType

NCIP Agency Address Role Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/agencyaddressroletype/agencyaddressroletype.scm

AgencyElementType

NCIP Agency Element Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/agencyelementtype/agencyelementtype.scm

AgencyId

No scheme defined

AgencyUserPrivilegeType

NCIP Agency User Privilege Type Academic Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/agencyuserprivilegetype/academic.scm

NCIP Agency User Privilege Type Public Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/agencyuserprivilegetype/public.scm

ApplicationProfileSupportedType

No scheme defined

ApplicationProfileType

No scheme defined

AuthenticationDataFormatType

IANA, MIME Media Types
http://www.iana.org/assignments/media-types/

AuthenticationInputType

NCIP Authentication Input Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/authenticationinputtype/authenticationinputype.scm

AuthenticationPromptType

IANA, MIME Media Types
http://www.iana.org/assignments/media-types/

BibliographicItemIdentifierCode

NCIP Bibliographic Item Identifier Code Scheme
http://www.niso.org/ncip/v2_02/imp1/schemes/bibliographicitemidentifiercode/bibliographicitemidentifiercode.scm

BibliographicLevel

NCIP Bibliographic Level Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/bibliographiclevel/bibliographiclevel.scm

BibliographicRecordIdentifierCode

NCIP Bibliographic Record Identifier Code Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/bibliographicrecordidentifiercode/bibliographicrecordidentifiercode.scm

BlockOrTrapType

NCIP Block Or Trap Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/blockortraptype/blockortraptype.scm

CirculationStatus

NCIP Circulation Status Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/circulationstatus/circulationstatus.scm

ComponentIdentifierType

NCIP Component Identifier Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/componentidentifiertype/componentidentifiertype.scm

CurrencyCode

ISO 4217 Scheme
http://www.bsi-global.com/Technical+Information/Publications/_Publications/tig90x.doc

ElectronicAddressType

IANA URI Scheme
http://www.iana.org/assignments/uri-schemes.html

ElectronicDataFormatType

IANA, MIME Media Types
http://www.iana.org/assignments/media-types/

FiscalActionType

NCIP Fiscal Action Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/fiscalactiontype/fiscalactiontype.scm

FiscalTransactionType

NCIP Fiscal Transaction Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/fiscaltransactiontype/fiscaltransactiontype.scm

FromAgencyId

No scheme defined

FromSystemId

No scheme defined

ItemDescriptionLevel

NCIP Item Description Level Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/itemdescriptionlevel/itemdescriptionlevel.scm

ItemElementType

NCIP Item Element Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/itemelementtype/itemelementtype.scm

ItemIdentifierType

No scheme defined

ItemUseRestrictionType

NCIP Item Use Restriction Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/itemuserestrictiontype/itemuserestrictiontype.scm

Language

ISO 639-2 Alpha-3 Bibliographic Codes
http://lcweb.loc.gov/standards/iso639-2/bibcodes.html

LocationType

NCIP Location Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/locationtype/locationtype.scm

MediumType

NCIP Medium Type Scheme
http://www.niso.org/ncip/v2_02/imp1/schemes/mediumtype/mediumtype.scm

MessagingErrorType

NCIP Messaging Error Type Scheme
http://www.niso.org/ncip/v1_0/schemes/messagingerrortype/messagingerrortype.scm

NoticeType

NCIP Notice Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/noticetype/noticetype.scm

OrganizationNameType

NCIP Organization Name Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/organizationnametype/organizationnametype.scm

PaymentMethodType

NCIP Payment Method Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/paymentmethodtype/paymentmethodtype.scm

PhysicalAddressType

NCIP Physical Address Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/physicaladdresstype/physicaladdresstype.scm

PhysicalConditionType

NCIP Physical Condition Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/physicalconditiontype/physicalconditiontype.scm

RequestElementType

No scheme defined

RequestIdentifierType

No scheme defined

RequestScopeType

NCIP Request Scope Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/requestscopetype/requestscopetype.scm

RequestStatusType

NCIP Request Status Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/requeststatustype/requeststatustype.scm

RequestType

NCIP Request Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/requesttype/requesttype.scm

Requested Action Type

NCIP Requested Action Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/requestedactiontype/requestedactiontype.scm

Required Item Use Restriction Type

See Item Use Restriction Type

SecurityMarker

NCIP Security Marker Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/securitymarker/securitymarker.scm

ToAgencyId

No scheme defined

ToSystemId

No scheme defined

UnstructuredAddressType

NCIP Unstructured Address Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/unstructuredaddresstype/unstructuredaddresstype.scm

UserAddressRoleType

NCIP User Address Role Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/useraddressroletype/useraddressroletype.scm

UserElementType

NCIP User Element Type Scheme
http://www.niso.org/ncip/v1_0/schemes/userelementtype/userelementtype.scm

UserIdentifierType

No scheme defined

UserLanguage

ISO 639-2 Terminological Codes
http://lcweb.loc.gov/standards/iso639-2/termcodes.html

UserPrivilegeStatusType

NCIP User Privilege Status Type Scheme
http://www.niso.org/ncip/v1_0/imp1/schemes/userprivilegestatustype/userprivilegestatustype.scm

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