
Information and documentation — MarcXchange

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 46, *Information and Documentation*, Subcommittee SC 4, *Technical interoperability*.

This second edition cancels and replaces the first edition. Yet valid first edition records will be compliant with this second edition of the standard.

Introduction

In 2001, the US Library of Congress developed a framework for working with MARC data in an XML environment. The core of the framework is a MARCXML schema that allows lossless round-trip conversion of an ISO 2709 MARC 21 record and an XML-encoded MARC 21 record.

MARCXML is tightly coupled to ISO 2709. It was obvious to generalize this to an XML-based alternative for ISO 2709 such that any existing format based on ISO 2709 could be represented.

This International Standard describes a schema which is a generalized version of, and with as few changes as possible to, MARCXML but which retains the original MARCXML structure. The resulting schema is an XML extension to ISO 2709. Thus, the original elements of MARCXML are reused and verbal links to the terminology of ISO 2709 have been added. MarcXchange is useable as a framework for conversion of all records using the ISO 2709 syntax into XML. Extensions to MarcXchange might be required to retain the definition and application of fields, subfields, and control characters employed in data representation techniques specific to implementations of ISO 2709. The international exchange of records uses local variations of internationally recognized formats as much as it uses internationally recognized formats in the precise way in which they are prescribed for international exchange. MarcXchange, as an internationally recognized format, is mainly intended as a framework for making local schemas, or to which local extensions can be added. Experience has shown that there is a need for local deviations – even if MARC 21 or UNIMARC is chosen as the local format. This schema provides a specification for the development of local specific schemas, ensuring compatibility.

The relationship of the schema described in this International Standard to MARC and ISO 2709 are as follows.

- The XML schema is constructed to contain MARC data.
- The schema can be used for the exchange of MARC records or to act as a “bus” to enable MARC data records to go through further transformations such as to Dublin Core and/or processes such as validation.

The basic components of ISO 2709 are treated in the following way in the XML schema.

- The record label is treated as a simple string.
- The directory has no counterpart in the schema; when converting from MarcXchange to ISO 2709 the directory has to be recalculated.
- The record identifier field and the control fields are treated as elements with the tag as an attribute.
- Data fields are treated as elements with the tag and indicators as attributes.
- Subfields are treated as sub-elements with the subfield code as an attribute.

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Information and documentation — MarcXchange

1 Scope

This International Standard specifies the requirements for a generalized XML-based exchange format for bibliographic records as well as other types of metadata.

It does not define the length or the content of individual records and does not assign any meaning to tags, indicators, or identifiers, these specifications being the functions of an implementation format.

This International Standard describes a generalized structure, a framework designed primarily for communication between data processing systems, but can also be relevant for use as a processing format within systems.

MarcXchange could potentially be used as follows:

- for representing a complete MARC record or a set of MARC records in XML;
- for original resource description in XML syntax;
- as an extension schema to METS (Metadata Encoding and Transmission Standard);
- for exchange of MARC records in XML,
- for transfer of MARC records in web services like SRU (search/retrieval via URL);
- for publisher transmission of data; <https://standards.iteh.ai/catalog/standards/sist/2a4c943c-90a7-4170-954d-87ca5349d6b0/iso-25577-2013>
- as a temporary format in all kinds of data transformation or manipulation, e.g. conversion, publication, editing, validation;
- for metadata in XML that can be packaged with an electronic resource.

Validation of MARC records content is not enforced by the schema but by dedicated software tailored for the specific usage (e.g. the specific MARC-format).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2709, *Information and documentation — Format for information exchange*

ISO/IEC 646, *Information technology — ISO 7-bit coded character set for information interchange*

ISO/IEC 10646, *Information technology — Universal Coded Character Set (UCS)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 MAchine-Readable Cataloguing MARC

family of format standards for the storage and exchange of bibliographic records and related information in machine-readable form

Note 1 to entry: All MARC standards conform to ISO 2709.

3.2 collection

set of records

Note 1 to entry: In the schema, this is represented by a root element named “collection”.

Note 2 to entry: The terms root element, element and attribute are in line with the definitions in XML. The term sub-element is used for an element which is the content (or child) of another element (the parent).

3.3 record

collection of fields, including record label, directory and data

Note 1 to entry: In the schema, this is represented by a root element named “record”. It can occur alone or as a sub-element of the “collection” element.

3.4 format

specification of the information content of record label, control fields, data fields, indicators and subfields of an ISO 2709 record

Note 1 to entry: In the schema, an attribute, named “format”, of the “record” element is used to specify the MARC format used in the particular record.

3.5 type

sub-application of format

Note 1 to entry: In the schema, an attribute, named “type”, of the “record” element is used to specify the application.

EXAMPLE Bibliographic record, holdings record.

3.6 record label

field occurring in an ISO 2709 record

Note 1 to entry: In the schema, this is represented by a sub-element, named “leader”, of the “record” element.

3.7 directory

index used in ISO 2709 records

3.8 control field

record identifier field or reference field in ISO 2709

Note 1 to entry: In the schema, this is represented by a sub-element, named “controlfield”, of the “record” element.

3.9 data field

type of field in ISO 2709

Note 1 to entry: In the schema, this is represented by a sub-element, named “datafield”, of the “record” element.

3.10**tag**

three characters associated to a control field or a data field in ISO 2709 and used to identify it

Note 1 to entry: In the schema represented by an attribute, named “tag”, of the “controlfield” element and the “datafield” element.

3.11**indicator**

data element in a data field in ISO 2709

Note 1 to entry: In the schema, this is represented by attributes, named “ind1”, ..., “ind9”, of the “datafield” element.

3.12**subfield**

part of a data field in ISO 2709

Note 1 to entry: In the schema, this is represented by a sub-element, named “subfield”, of the “datafield” element

3.13**subfield identifier**

data element consisting of a control code followed by from zero to eight characters identifying a subfield in an ISO 2709 record

Note 1 to entry: In the schema, the subfield identifier characters following (the control code) is represented by an attribute, named “code”, of the “subfield” element.

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4 XML schema exchange of MARC records**4.1 General**

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The generic schema is listed in [Annex A](#). Examples of formatted records are listed in [Annex B](#). References to applications of the schema are listed in [Annex C](#).

The MarcXchange schema supports XML markup of MARC records using terminology and element names consistent with ISO 2709.

Though ISO 2709 does not address the notion of embedded fields, it is possible to define a hierarchical structure based on subfields. To reflect this, MarcXchange can embed fields as well as whole records, leaving it to the specific MARC-format to decide how to make use of this facility.

ISO 2709 defines the general structure illustrated in [Figure 1](#).

Record label
Directory
Fields
Record separator

Figure 1 — ISO 2709 general structure

An ISO 2709 record contains the following components:

- a) a record label (fixed length);
- b) a directory (variable length);
- c) a record identifier field (variable length);

- d) a number of reference fields (variable length);
- e) a number of data fields (variable length);
- f) a field separator, i.e. separator IS2 conforming to ISO/IEC 646, which terminates the directory and each field;
- g) a record separator, i.e. separator IS3 conforming to ISO/IEC 646, which terminates each record.

In MarcXchange, the element “leader” is used for the ISO 2709 record label. Part of the ISO 2709 record label (positions 0 to 4 “record length” and positions 12 to 16 “base address of data”), contains information, which is only meaningful for the ISO 2709 record. It is recommended always to recalculate this information when converting from MarcXchange to ISO 2709.

The ISO 2709 directory has no counterpart in MarcXchange. When converting from MarcXchange to ISO 2709, this component has to be recalculated.

In the MarcXchange schema, the element “controlfield” is used for the ISO 2709 record identifier field and reference field while the element “datafield” is used for ISO 2709 data field.

This schema is an extension to ISO 2709. It allows the usage of the “datafield” element for all legal ISO 2709 tags, including 001 to 009, 00A to 00Z and 00a to 00z; and two attributes are introduced to specify the content of a record, i.e. “format” to specify the MARC format and “type” to specify the kind of record.

This schema states that subfield codes can consist of characters from ISO/IEC 10646, BMP row 00 (Basic Latin and Latin-1 Supplement).

There is one restriction. A special mode (identifier length = 0) of ISO 2709 operates with data fields without subfields. In the MarcXchange schema subfields are required, i.e. identifier length = 0 is not supported.

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4.2 Structure of XML schema

[Figure 2](#) illustrates the structure of the MarcXchange schema. All elements have an optional attribute, named id, inherited from MARCXML.

The following are the description of elements and attributes.

- a) **Collection**: a top level container element for zero or many **record** elements.
- b) **Record**: a top level container element for the leader element and all of the **controlfield** and **datafield** elements which comprise the record. The record element has the following attributes:
 - 1) **Format** (optional): identifies the MARC format (examples: MARC21, UNIMARC, danMARC2, lbermarc);
 - 2) **Type** (optional): identifies the type of record (examples: bibliographic, authority, holdings, classification and community).
- c) **Leader**: corresponds to ISO 2709 record label, 24 octets.
- d) **Controlfield**: corresponds to ISO 2709 record identifier field (tag 001) and reference fields (tags 002 to 009 and 00A to 00Z). The **controlfield** element has one attribute.
 - 1) **Tag** (required): identifies the field (e.g. 008).
- e) **Datafield**: can be used for all fields (tags 001 to 999 and 00A to ZZZ). It contains **subfield** elements. The **datafield** element has the following attributes:
 - 1) **Tag** (required): identifies the field (e.g. 245);

- 2) **Ind1 to ind9** (optional): contain the indicator values.
- f) **Subfield**: corresponds to ISO 2709 subfield. The **subfield** element has one attribute.
- 1) **Code** (required): corresponds to ISO 2709 subfield identifier.
- g) **Embeddeddata**: can be used to contain an number of embedded fields (**controlfields** or **datafields**) or a whole **record**. The embeddeddata element has the following attributes:
- 1) **Format** (optional): identifies the MARC format (examples: MARC21, UNIMARC, danMARC2, lbermarc);
- 2) **Type** (optional): identifies the type of record (examples: bibliographic, authority, holdings, classification and community).

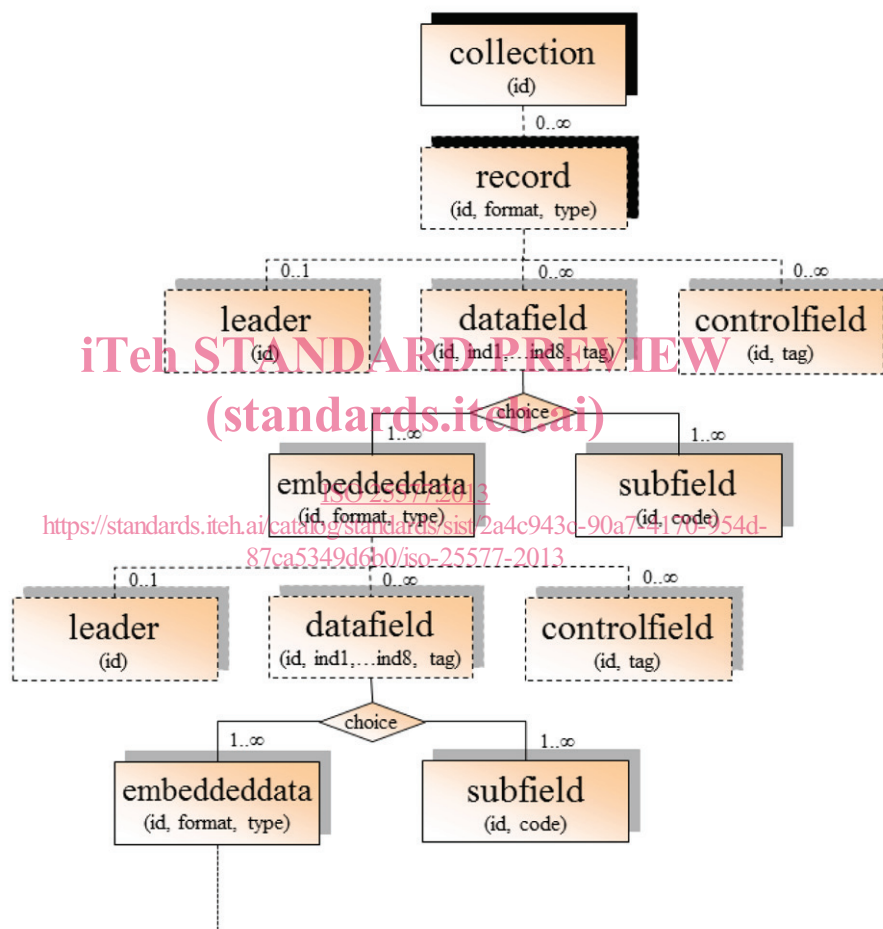


Figure 2 — MarcXchange general structure