

XML Schema Implementation based on ISO/TS 19139

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Introduction

ISO 19139 encoding rules have been primarily established for the XML Schema implementation of ISO 19115. ISO 19139 defines the following namespaces (in parenthesis after the current prefix):

- gco (<http://www.isotc211.org/2005/gco>) implementing partially ISO 19103;
- gmd (<http://www.isotc211.org/2005/gmd>) implementing ISO 19115;
- gmx (<http://www.isotc211.org/2005/gmx>) implementing ISO 19139 extensions of ISO 19115;
- gss (<http://www.isotc211.org/2005/gss>) implementing partially ISO 19107;
- gsr (<http://www.isotc211.org/2005/gsr>) implementing partially ISO 19111;
- gts (<http://www.isotc211.org/2005/gts>) implementing partially ISO 19108;

ISO 19139 encoding rules are more generally applicable, and they have been applied to other (draft) standards and extended profiles of these standards, including:

- ISO 19115-2: gmi (<http://www.isotc211.org/2005/gmi>);
- ISO 19110: gfc (<http://www.isotc211.org/2005/gfc>);
- ISO 19119 Amndt 1 and its extended profile defined in [ISOAP1.0]: srv (<http://www.isotc211.org/2005/srv>);
- ISO 19126: gfd (<http://www.isotc211.org/2005/gfd>).

There are different repositories of the corresponding XML Schemas containing part or the whole of these XML Schema implementations, sometimes different versions. Three repositories are considered here:

- OGC (<http://schemas.opengis.net>) contains the XML Schema implementations officially used by OGC;
- ISO (<http://standards.iso.org/ittf/PubliclyAvailableStandards>) contains the official XML Schemas of ISO 19136 (http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19136_Schemas/) and ISO 19139 (http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/);
- EDEN (<http://eden.ign.fr/xsd/isotc211>) is a repository maintained by IGN and containing draft XML Schema implementations not available on the OGC and ISO/TC 211 repositories.

Last, but not least, ISO/TS 19139 is based on ISO 19136. Different versions of ISO 19136 XML Schemas have been released and particularly:

- the XML Schemas of GML 3.2 (ISO/DIS 19136) were in use when ISO 19139 has been published. It is known as <http://www.opengis.net/gml> namespace
- the official version of ISO 19136 XML Schemas corresponds to GML 3.2.1. It is known as <http://www.opengis.net/gml/3.2>

This paper aims at:

- identifying the differences between the different XML Schema repositories;
- identifying issues to be solved by OGC, ISO/TC 211 and IGN concerning there repositories;
- establishing a reference set of XML based on ISO 19139.

References

[ISOAP1.0] OpenGIS® Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile, OGC 07-045, Version 1.0 dated 2007-07-1

ISO/TC 211

ISO/TC 211 provides reference XML Implementations of ISO 19139 and ISO 19136. The XML schemas available here seems conformant to the corresponding standards. Particularly, the GML namespace used in ISO 19139 XML Schemas is <http://www.opengis.net/gml/3.2> (i.e. the namespace of GML defined in ISO 19136) and ISO 19139 clearly states that the namespace of GML to be used is the one defined in ISO 19136¹.

The main issue of the reference implementations provided here is the absence of XML Schema Implementations of other standards such as ISO 19119, ISO 19110, ISO 19115-2, ... The only way to address this issue is to initiate NWIP proposal to document the XML Schema implementation of those standards using the encoding rules of ISO 19139.

OGC

The OGC XSD repository contains many XML Schemas, but few are based on or relevant to ISO 19139:

- 2 different version of ISO 19139 XML schemas are provided (see <http://schemas.opengis.net/iso/19139/>)
 - o The one dated 4/05/2006 is based on GML 3.2 (namespace <http://www.opengis.net/gml>). The GML schemas are here directly included with the XML Schemas of ISO 19139;
 - o The one dated 17/04/2007 seems equivalent to the version available on the ISO repository and is based on GML 3.2.1 (namespace <http://www.opengis.net/gml/3.2>).
- There are many versions including a version 3.2.1 (namespace <http://www.opengis.net/gml/3.2>) equivalent to the version available on the ISO repository. But, there is no version 3.2 (namespace <http://www.opengis.net/gml>);
- The encoding of ISO 19119 defined in [ISOAP1.0] is provided here. This encoding includes an extension of ISO 19119 Amndt 1 which has never been advertised to ISO/TC 211 by OGC. There is a set of known problems in those schemas:
 - o a wrong import statement of ISO 19139 in serviceMetadata.xsd
 - o they reference the version of ISO 19139 dated 4/05/2006 which is based on GML3.2;
 - o there is minor non conformity to ISO 19139 concerning the implementation of XML Property Type. It has no real impact on the instances.
 - o the XML Schema implementation of the Service Model part follows ISO 19119 which is badly defined (typically, there is an inconsistent inheritance relationship between SV_ServiceSpecification, SV_PlatformNeutralServiceSpecification and SV_PlatformSpecificServiceSpecification).

¹ the editors of ISO 19139 have anticipated the change of namespace which occurred in ISO 19136 after the publication of ISO 19139

Two actions have to be considered by OGC:

1. A corrigendum of [ISOAP1.0] to:
 - a. fix the wrong import statement of ISO 19139 in serviceMetadata.xsd
 - b. move from GML 3.2 to GML 3.2.1;
 - c. fix the encoding of the property types.
2. A NWIP from Amendment 2 of ISO 19119 should be considered to:
 - a. make official, both the extension of ISO 19119 defined in [ISOAP1.0] and the XML Schema implementation of ISO 19119;
 - b. fix the service model part of ISO 19119 and its XML Schema Implementation

EDEN

The EDEN XSD repository provides draft XML schema implementations of many standards which are not available anywhere else:

- The XML Schema of ISO 19110 Amndt1 should be made available soon on the ISO repository since this Amendment is close to publication.
- An XML Schema implementation of ISO 19115-2 has been proposed as an annex to ISO 19115-2 as part of the DIS comments, but ISO/TC 211 didn't accept to add it to the standard at this stage. An NWIP has to be submitted.
- A draft XML schema implementation of ISO 19126 (gfd namespace) that has been proposed without success for incorporation to ISO 19126 amendment proposal.
- An XML Schema implementation of ISO 19119 Amndt 1 (without the extensions documented in [ISOAP1.0] but without the issues identified in the OGC Schemas).

The major issue is that all those XML Schemas are based on a version of ISO 19139 XML Schema using GML 3.2 instead of GML 3.2.1. This has to be fixed and a full release of those schemas based on the XML Schemas published on the ISO Web site is envisioned.

Complementary actions can be envisioned with:

- An ISO NWIP for publication of ISO 19115-2 XML schema encoding;
- An ISO NWIP for publication of ISO 19126 XML Schema encoding, but as noted by the US as part of the DIS comment phase: "The ISO 19126 register schema is based on ISO 19135, while the ISO 19110 schema is based on the catalogue model of ISO 19139. During the final stages of the development of ISO 19135 (Procedures for item registration), the project team for ISO 19139 developed a conceptual schema for catalogues that includes many attributes that are identical to, or very similar to, attributes defined in ISO 19135 for registers and register items. This redundancy makes it almost impossible to model cleanly the relationship between a register and a catalogue." This has to be resolved by the ISO/TC 211 Program Maintenance Group (PMG) before initiating anything.
- A support to OGC for the submission of ISO 19119 Amndt 2 NWIP. In the short term, it seems appropriate to replace the current XML implementation of ISO 19119 by the one published of EDEN², with a fix of two issues of this implementation:
 - o element "coupledResource" must precede element "couplingType" in SV_ServiceIdentification ;
 - o element "scopedName" must be added in SV_CoupledResource

² The implementation of the service model part is not compliant with ISO 19119 Amendment 1, but has been used in real cases demonstrating the need to amend this part of 19119. There can't be any consistent use of a conform implementation of the current model.

Conclusion

There isn't any repository providing a coherent set of XML Schemas for the implementation of GML3.2.1 (ISO 19136), ISO 19139 (i.e. ISO 19115), ISO 19115-2, ISO 19119, ISO 19110, ... Yet, the reference implementation of ISO 19136 and ISO 19139 is the one provided on the ISO XSD repository. Different actions have to be undertaken within ISO/TC 211 and OGC to fix different issues. But in a short term, IGN will release a complete set of XSD based on the XML schemas based on the ISO repository.