



ASSESSMENT SUMMARY v1.0.0

XML Schema Definition Language (XSD)¹ Part 1 Structures

W3C²

¹ XSD Reference: <https://www.w3.org/TR/2012/REC-xmlschema11-1-20120405/>

² W3C Reference: <https://www.w3.org>

Change Control

Modification		Details
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1. INTRODUCTION

The present document is a summary of the assessment of **XSD** carried out by CAMSS using the CAMSS Assessment EIF scenario³. The purpose of this scenario is to assess the compliance of a standard or specification with the European Interoperability Framework (EIF)⁴.

2. ASSESSMENT SUMMARY

The purpose of XML Schema Definition Language: Structures is to define the nature of XSD schemas and their component parts, provide an inventory of XML markup constructs with which to represent schemas, and define the application of schemas to XML documents.

XSD Part 1 specifies the XML Schema definition language, which offers facilities for describing the structure and constraining the contents of XML 1.0 documents, including those which exploit the XML Namespace facility. The schema language, which is itself represented in XML 1.0 and uses namespaces, substantially reconstructs and considerably extends the capabilities found in XML 1.0 document type definitions (DTDs). The specification is used in a wide range of European initiatives, such as in the CESOP Legislative Package⁵, and contributes to the digital transformation in domains as education in the Europass XML Schema⁶.

2.1. EIF Interoperability Principles

Interoperability principles are fundamental behavioural aspects that drive interoperability actions. They are relevant to the process of establishing interoperable European public services. They describe the context in which European public services are designed and implemented.

The specification does support the principles setting context for EU actions on interoperability:

- **Subsidiarity and proportionality**

XSD is included in 8 national catalogues of recommended specifications. Among those we can find the Netherlands and Spain. The National Interoperability Framework (NIF) of these Member States is fully aligned with at least 2 out of 3 sections of the European Interoperability Framework (EIF) according to the National Interoperability Framework Observatory (NIFO) factsheets⁷.

³ CAMSS Assessment EIF Scenario 6.0: <https://ec.europa.eu/eusurvey/runner/CAMSSAssessmentEIFScenario6>

⁴ ISA² programme: https://ec.europa.eu/isa2/eif_en

⁵ CESOP Legislative Package: https://taxation-customs.ec.europa.eu/taxation-1/central-electronic-system-payment-information-cesop_en

⁶ Europass XML Schema 3.0: <https://joinup.ec.europa.eu/collection/employment-and-working-conditions/solution/europass-xml-schema-v30/about>

⁷ NIFO Factsheet Reference: <https://joinup.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/digital-public-administration-factsheets-2022>

The specification fully supports the principles setting context for EU actions on interoperability:

- **Openness**

XSD 1.1 is supporting the second level of maturity of Tim Berners-Lee's 5-stars schema for open data. It eases the availability of the data and structures XML files. Additionally, XSD 1.1 is implied within the RDF 1.1 XML Syntax, used for the serialisation of RDF documents as XML. Therefore, XSD fosters the publication of data as Linked Open Data.

The version which is being assessed was released in 2012, fact that demonstrates the maturity of the specification for its use in the development of products and services. Moreover, XSD is an open specification supported by products and services and it is involved in the development of web services as XML schemas are needed for validating XML files.

- **Transparency**

As XML is used to encode all communications all over the internet, XSD fosters the visibility and comprehensibility of administrations by providing validation of exchanged data. By means of validating if XML files are conformant with the schema established, the specification helps to ensure the availability of internal information systems of public administrations. It is worth to note that it is possible due to the fact that XML is used to encode communications over the internet.

- **Reusability**

XSD is a business domain agnostic specification that can be used at any business domain.

- **Technological neutrality and data portability**

XSD 1.1 is an open specification that can be used independently from other technologies or platforms. However, XSD 1.1 is defining datatypes which depend on definitions in XML and Namespaces in XML. This fact is not hampering the adoption of XSD as XML is worldwide adopted.

In the specification's documentation it is mentioned in section 2.4 "Conformance" that XSD has a property that can work both ways with the value on "full" or on "partial", that means it can potentially be implemented partially.

In the DTD for Schemas Section there is a part for "Customisation entities" that can lead to think this specification allows customisation. There are also multiple mentions to the extension of XSD throughout the specification's documentation.

XSD provides schemas for the validation of XML and the proper data exchange by means of it. Therefore, by ensuring the well formation and validity of the documents being exchanged, XSD fosters the data portability between systems and administrations across borders.

The specification partially supports the principles related to generic user needs and expectations:

- **User-centricity**

By defining schemas for XML documents, which are involved in the data exchange across borders, XSD utilizes a limited reuse and implementation of the once-only principle.

- **Inclusion and accessibility**

The purpose of XSD is not related to e-accessibility. Therefore, this criterion is not applicable to the specification.

- **Security**

By establishing constraints on the creation and exchange of XML documents XSD fosters the trustworthy data exchange between administrations and stakeholders. However, XSD does not include security features in itself. Despite this, XML includes several recommendations in order to ensure the security of data and users and protection against unauthorised changes.

The specification allows for checking that the data transmitted by data providers includes the compulsory and syntactically correct data elements. There is no signal of the specification providing an access control mechanism.

- **Privacy**

The specification introduces certain aspects that can contribute to provide means for restriction of access to information or data, as in the implementation of CESOP⁸ Legislative Package, which monitor the payees of cross-border payments and transmit information.

The specification is included in an initiative at European level covering privacy aspect. As an example, the implementation of CESOP Legislative Package, which monitor the payees of cross-border payments and transmit information.

- **Multilingualism**

The purpose of XSD 1.1 is not related to delivery of multilingual European public services. Therefore, this criterion is considered not applicable to this specification.

The specification supports the foundation principles for cooperation among public administrations:

- **Administrative Simplification**

The specification is included in an initiative at European level covering privacy aspect. As an example, the implementation of CESOP Legislative Package, which monitor the payees of cross-border payments and transmit information.

⁸ Legislative Package CESOP Reference: https://taxation-customs.ec.europa.eu/taxation-1/central-electronic-system-payment-information-cesop_en

The XSD specification contributed to enabling digital service delivery channels by contributing to the XML Europass 3.0 channels which is the final release for describing the domain of information for a learner.

- **Preservation of information**

The specification can address long-term preservation of electronic resources because XSD can contribute to metadata preservation following that XSD is an XML extension.

- **Assessment of effectiveness and efficiency**

There are already studies and documentation assessing the specification in terms of effectiveness and efficiency. The topics are different, for instance, there is a study⁹ assessing the capabilities of XML Schema for the defense against Signature Wrapped Attacks. Another field of documentation is the XML Schema clustering¹⁰, and its effectiveness and efficiency for the improvement of user results.

2.2. EIF Interoperability Layers

The interoperability model which is applicable to all digital public services includes:

- Four layers of interoperability: legal, organisational, semantic and technical;
- A cross-cutting component of the four layers, 'integrated public service governance';
- A background layer, 'interoperability governance'.

The Specification supports the implementation of digital public services complying with the EIF interoperability model:

- **Interoperability governance**

The specification is associated with EIRA¹¹ ABB's in the EIRA Library of Interoperability Specifications (ELIS)¹². It is associated with Data Syntax, Forms Structure, Controlled Vocabulary, Data, Data Mapping, Data Model, Hash Code, Metadata from the Semantic View.

There are existing mechanisms for assessing the conformity of XSD implementations. W3C provides with a XSD test suit that is available for free.

⁹ ResearchGate XML Schema Validation Reference: [On the effectiveness of XML Schema validation for countering XML Signature Wrapping attacks | Request PDF \(researchgate.net\)](#)

¹⁰ ResearchGate Effectiveness & Efficiency Assessment Reference: [XML schema matching : balancing efficiency and effectiveness by means of clustering | Request PDF \(researchgate.net\)](#)

¹¹ EIRA: <https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira/release/v500>

¹² ELIS: <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/elis-dashboard>

8 Member States are recommending XSD in their ICT National Catalogues, one of those include Spain's National Catalogue¹³.

- **Legal Interoperability**

The specification is not a European Standard.

- **Organisational interoperability**

As the specification is an extension of XML, XML can be used to represent the data related to business processes, such as the steps involved, the roles and responsibilities of stakeholders, and the inputs and outputs of each step.

- **Semantic Interoperability**

XSD 1.1 is maintained by W3C which is an international community developing open standards. It also encourages people to join and contribute to making the community bigger.

¹³ Spanish National Catalogue: https://administracionelectronica.gob.es/pae_Home/dam/jcr:9e2c2877-5103-4934-8440-c60ba2e10c48/Catalogue_of_Standards_NIF_Spain.pdf

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **XSD**. The CAMSS “Strength” indicator measures the reliability of the assessment by calculating the number of answered (applicable) criteria. On the other hand, the number of favourable answers and the number of unfavourable ones is used to calculate the “Automated Score” per category and an “Overall Score”.

Category	Automated Score	Assessment Strength	Compliance Level
Principle setting the context for EU actions on interoperability	100/100 (100%)	100%	Seamless
Core interoperability principles	1660/1700 (98%)	100%	Seamless
Principles related to generic user needs and expectations	920/1200 (77%)	67%	Sustainable
Foundation principles for cooperation among public administrations	480/500 (96%)	100%	Seamless
Interoperability layers*	840/1000 (84%)	80%	Seamless
Overall Score	3400/3900 (87%) ¹⁴	87%	

**The technical interoperability layer is covered by the criteria corresponding to the core interoperability principle "Openness".*

With an 87% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 87% (3400/3900) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

¹⁴ See the “results interpretation” section of the CAMSS Assessment EIF Scenario Quick User Guide:

<https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/camss-assessment-eif-scenario/results-visualisation-and-interpretation>