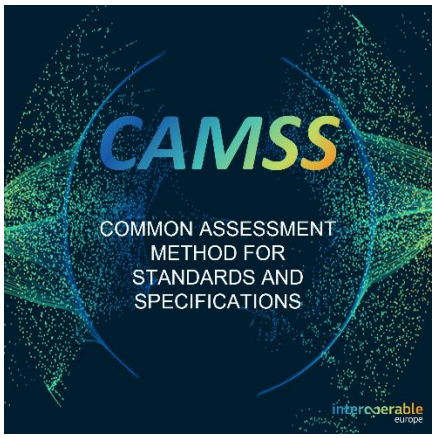

ASSESSMENT SUMMARY v1.0.0

The Extensible HyperText Markup Language (XHTML)[1]

World Wide Web Consortium (W3C)[2]

[1] XHTML Specification: https://www.w3.org/TR/xhtml1/

[2] W3C organisation: https://www.w3.org

Change Control

Modification	Details
Version 1.0.0	
Initial version	

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1. INTRODUCTION

The present document is a summary of the assessment of the **XHTML** carried out by CAMSS using the CAMSS Assessment EIF scenario[3]. 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

XHTML 1.0, as a reformulation of HTML 4, was a significant step forward in promoting the use of XML standards on the web. It aimed to bridge the gap between HTML and XML, ensuring web content was both well-formed and compatible with existing web browsers. While it provided many benefits, such as XML conformance, improved structure, and extensibility through modules, it also had some limitations, particularly around user-agent compatibility and flexibility in modern web development.

However, XHTML 1.0 has since been largely superseded by HTML5, which addresses many of the limitations and challenges that XHTML faced. HTML5 was designed to be a more flexible, feature-rich, and user-friendly version of HTML, aligning closely with the needs of modern web development.

The W3C (World Wide Web Consortium) has decided to give more focus to HTML5 because it aligns better with the evolving needs of the web. This shift in focus is driven by several key factors that make HTML5 more suitable for the modern web, as opposed to XHTML or older versions of HTML.

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

- **Subsidiarity and proportionality**
  XHTML is included in 9 national catalogues. The Member States that includes the specification are Cyprus, Estonia, France, Germany, Greece, Norway, Poland, Slovenia and Spain. At least Cyprus and Spain are aligned with at least 3 out of 4 scoreboards from the EIF Monitoring according to the National Interoperability Framework Observatory NIFO[5] factsheets.

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

- **Openness**
  XHTML adheres to the five principles of Open Data by publishing data in a structured, machine-readable format, and is XML compliant, facilitating the easy viewing, editing, and validation of documents. It supports new elements and extensions to ensure interoperability across various environments and is built on open standards, making it compatible with open-source tools. This aids in the publication of data under open licenses, eliminating the need for proprietary software.

[3] CAMSS Assessment EIF Scenario: https://ec.europa.eu/eusurvey/runner/CAMSSAssessmentEIFScenario6

[4] Isa2 programme website: https://ec.europa.eu/isa2/eif_en

[5] National Interoperability Framework Observatory Factsheets:

https://interoperable-europe.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/digital-public-administration-factsheets-2024

The World Wide Web Consortium (W3C) has a publicly available process for the development and approval of specifications, including a clear release notes archive and public review stages, while W3C's specifications, including XHTML, are covered by the Royalty-Free Intellectual Property Rights (IPR) licenses granted under the W3C Patent Policy.

XHTML evolved from HTML4 using XML, becoming a W3C recommendation on 26 January 2000, with updates like XHTML 1.1 recommended on 31 May 2001. Although XHTML was well accepted initially, HTML5 has largely replaced it due to its improved features, better browser compatibility, and a more modern web development approach, leading to a significant decline in the usage of XHTML. XHTML is maintained by the W3C, an international community that develops open standards.

- **Transparency**

  XHTML is primarily used to publish administrative data on the web, enhancing the visibility and comprehensibility of such data and services. It facilitates data exchange and reuse among stakeholders, thereby easing the decision-making process. However, XHTML is not intended to provide interfaces with internal information systems, so that criterion does not apply to its specifications.

- **Reusability**

  XHTML is freely available on the W3C's website, but it has been largely replaced by HTML5[6] as the preferred web standard. Nonetheless, it can be reused by the organisations, administrations, open communities, etc. that developed it.

- **Technological neutrality and data portability**

  The XHTML specification is not platform-agnostic and depends on specific environments and platforms, such as compatible web browsers, for proper rendering. Although XHTML is a reformulation of HTML 4 using XML, it is not wholly independent of these standards or other technologies. XHTML relies on XML parsing capabilities and enforces strict XML-based rules.

  XHTML ensures core functionality and interoperability while allowing different interpretations. For instance, a partial implementation may use the basic structure of an XHTML document while omitting optional rules, such as closing all tags. XHTML supports XML namespaces, enabling the use of elements from different vocabularies within the same document. This allows for the incorporation of custom elements and attributes from other XML vocabularies, such as MathML[7]. As one of the main markup languages for web development, XHTML files are used to exchange information over the web, fostering data portability between systems and applications.

[6] HTML5 W3C Reference: https://html.spec.whatwg.org/multipage/

[7] MathML Reference: https://www.w3.org/TR/xhtml1/#ref-xhtml-mathml

***The specification support the principles related to generic user needs and expectations*:**

- **User-centricity**
  By enabling administrations to access and reuse information across borders, the implementation of XHTML and other HTML family standards can foster and facilitate the Once-Only Principle.

- **Inclusion and accessibility**
  XHTML fosters e-accessibility helping people with disabilities to understand and navigate through web and mobile web applications with friendly tools and proper information formats. Moreover, the Regional Government of Bizkaia developed his website to promote the integration of groups with disabilities into the Public Administration of Bizkaia. They used XHTML 1.0 recommendations and CSS2[8].

- **Privacy**
  XHTML incorporates features to mitigate potential security vulnerabilities. By enabling data exchange via online websites, it promotes secure and trustworthy interactions between administrations and stakeholders.

  However, the XHTML specification does not include built-in mechanisms for restricting access to information or data, rendering this criterion inapplicable. Additionally, there are no initiatives at the European or national level specifically addressing privacy aspects within the XHTML specification, making this criterion inapplicable as well.

- **Security**
  XHTML includes features to mitigate potential security vulnerabilities and fosters secure and trustworthy data exchanges between administrations and stakeholders through online websites.

  However, it lacks mechanisms to guarantee the authenticity and authentication of the roles of agents involved in data transactions, making this criterion inapplicable to the specification. Additionally, XHTML does not have built-in mechanisms to directly prevent unauthorized changes, nor does it ensure data processing accuracy.

- **Multilingualism**
  Although XHTML's purpose is not to foster the delivery of multilingual European public services, several websites contain multilingual parallel texts and are developed in XHTML.

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

- **Administrative Simplification**
  By providing public administrations with an online domain to publish various types of administrative data, documents, videos, and more, the XHTML specification reduces the

[8] CSS2 Reference: https://www.w3.org/TR/CSS2/

administrative burden for both citizens and administrations. Although XHTML has been superseded by HTML5, it laid the foundation for modern web development and continues to support the delivery of a diverse array of digital services through the web.

- **Preservation of information**
  The purpose of XHTML is not related to long term preservation of electronic records.

Assessment of effectiveness and efficiency

After an extensive search, no documents or studies evaluating the efficiency of XHTML were found. However, it is important to highlight that HTML5 now performs many of the same functions as XHTML, resulting in a decline in XHTML usage. There is a wealth of research, studies, and resources available on HTML5, showcasing its significance in supporting modern and more efficient web environments.

2.1. 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**
  XHTML can be mapped to the Eira Library of Interoperability Specifications (ELIS)[9] in the "Knowledge" and "Data Representation" under the Semantic view.

  The W3C provides a free Markup Validation Service[10] to validate web documents, including XHTML implementations. Nine member states, namely Cyprus[11], Estonia, France, Germany, Greece, Norway, Poland, Slovenia, and Spain[12], recommend XHTML in their ICT National Catalogues.

[9] EIRA Library of Interoperability Specifications (ELIS): https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss /solution/elis/release/v610

[10] W3C Markup Validation Service: https://validator.w3.org

[11] National Catalogue of Cyprus: https://dits.dmrid.gov.cy/dmrid/dits/dits.nsf/all/B83AA8E4EB4EFD19C225855800288B10/$file/Cyprus%20eGovernment%20Interoperability%20Framework_new%20EIF_v2.0-To%20Publish.pdf

[12] National Catalogue of Spain: https://administracionelectronica.gob.es/pae_Home/pae_Estrategias/pae_Interoperabilidad_Inicio/pae_Normas_tecnicas_de_interoperabilidad.html#CATALOGOESTANDARES

XHTML has been used by the EU Commission for publishing regulations (EURLEX)[13], exemplified by the proposal for reducing legal and administrative obstacles in a cross-border context. However, there is no evidence of XHTML's inclusion in any European standard catalogue after checking the different standard catalogues at the supra-national level.

- **Legal Interoperability**
  XHTML, developed by the W3C, is not classified as a European Standard. However, it significantly contributes to the foundation of web technologies widely used throughout Europe. By providing a consistent way to structure web documents, XHTML has helped improve digital communication and made it easier to exchange information.

- **Organisational interoperability**
  XHTML's purpose does not involve the modelling of business processes or to facilitate organisational interoperability agreements.

- **Semantic Interoperability**
  XHTML is maintained by the World Wide Web Consortium (W3C), an international community dedicated to developing open standards. This collaboration ensures that web technologies remain accessible, interoperable, and beneficial to users globally.

[13] XHTML implementation by Eur-lex:

https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018PC0373&from=EN

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **XHTML**. 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
EIF Principle setting the context for EU actions on interoperability	100/100 (100%)	100%	Seamless
Core interoperability principles	1460/1700 (86%)	100%	Seamless
Principles related to generic user needs and expectations	1020/1200 (85%)	100%	Sustainable
Foundation principles for cooperation among public administrations	500/500 (100%)	100%	Seamless
Interoperability layers*	840/1000 (84%)	100%	Seamless
Overall Score	2420/3000 (81%)[14]	100%	

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

With an 100% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 81% (2420/3000) 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