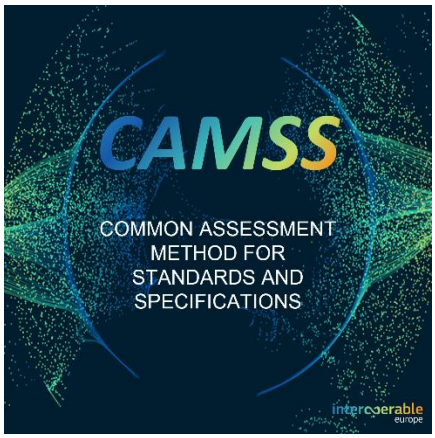

ASSESSMENT SUMMARY v2.0.0

Web Services Description Language (WSDL[1])

World Wide Web Consortium (W3C[2])

[1] WSDL specification: https://www.w3.org/TR/wsdl20/

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

Change Control

Modification	Details
Version 2.0.0	
Initial version	

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1. INTRODUCTION

The present document is a summary of the assessment of **WSDL** 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

WSDL, a key standard developed by the World Wide Web Consortium (W3C), serves as a standardized language to describe web services' interfaces, operations, bindings, and services. This facilitates interoperability across diverse platforms and technologies, forming a crucial part of W3C's comprehensive framework for web service specifications.

In WSDL 2.0, the description of a web service occurs in two stages: abstract and concrete. At an abstract level, it outlines the messages a web service sends and receives, emphasizing reusability and separating design concerns. Independently of specific wire formats, these messages are described using a type system, typically XML Schema. At a concrete level, WSDL 2.0 introduces bindings, specifying transport and wire format details for one or more interfaces. An endpoint connects a network address with a binding, representing a specific instance of a service. Interfaces, defining operations and messages, and bindings, outlining communication rules, together form the foundation for effective web service implementation.

Historically, the development of WSDL reflects the ongoing efforts of W3C to establish standardized protocols for web services. Initially introduced in 2001, WSDL has evolved through various versions to meet the changing needs of web service interoperability. This commitment to standardization has played a crucial role in shaping the landscape of web services on a global scale.

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 supports the principles setting context for EU actions on interoperability*:**

- **Subsidiarity and proportionality**
  WSDL is included in 10 national catalogues of recommended specifications. They belong to Bulgaria, Cyprus, France, Germany, Greece, Malta, Netherlands, Portugal, Spain and Sweden. The

[3]CAMSS Assessment EIF Scenario 6.0.0: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/camss-assessment-eif-scenario/release/600

[4]European Interoperability Framework (EIF): https://ec.europa.eu/isa2/eif_en

National Interoperability Framework (NIF[5]) 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[6]) factsheets.

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

- **Openness**

  WSDL plays a crucial role in describing and facilitating the availability of administration's web services, particularly those containing public data structured in XML format. This aligns with Tim Berners Lee's 5-star schema for Open Data[7], indicating WSDL's support for various maturity levels in making data accessible for reuse. Additionally, W3C has provided recommendations and notes on semantics in WSDL, known as Semantic Annotations for Web Services Description Language [8](SAWSDL), along with a technical report from the Web Services Description Working Group that maps WSDL models into RDF representation.

  In the contemporary landscape, WSDL is widely utilized in the implementation of Service-Oriented Architectures[9] (SOAs). Within the realm of web services development, SOAP and REST are the primary methodologies, with WSDL playing a pivotal role in describing services and ensuring their accessibility, particularly in SOAP-based implementations. Consequently, WSDL contributes significantly to the development of diverse and innovative solutions within the context of modern service-oriented architectures.

- **Transparency**

  Web Services Description Language, is a specification focused on describing the interface and operations of web services, emphasizing the contractual aspects between service providers and consumers. It provides a standardized method for specifying the location, supported operations, message formats, and communication protocols of a web service. Despite being business-agnostic and applicable across various domains, WSDL primarily aims to enhance interoperability by defining contracts without addressing administrative procedures or data visibility. While it enables the exposure of web service interfaces, it often requires additional components and considerations for complete implementation.

  In essence, WSDL serves to facilitate the interoperability of web services by establishing a standardized contract between service providers and consumers, enabling the description and

[5]NIF: https://joinup.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/european-interoperability-framework-detail

[6]NIFO Factsheets: https://joinup.ec.eropa.eu/collection/national-interoperability-framework-observatory-nifo/nifo-factsheets

[7]Berners Lee's 5-star schema for Open Data: https://www.w3.org/2011/gld/wiki/5_Star_Linked_Data

[8] Semantic Annotations for Web Services Description Language: https://www.w3.org/TR/sawsdl/

[9] Service-Oriented Architectures: https://www.ibm.com/topics/soa

access of functionalities, operations, and communication protocols in a domain-independent manner.

- **Reusability**
  WSDL is a business agnostic specification that can be implemented in any domain requiring web services description and access, depeloved to be usable beyond business-specific domains and is designed to facilitate interoperability across a wide range of applications and industries.

- **Technological neutrality and data portability**
  WSDL plays a crucial role in fostering communication and integration among components with diverse technologies, promoting interoperability across systems and programming languages. Its standardized approach to describing the contract between service providers and consumers enables the creation of interoperable web services, independent of specific platforms. This is achieved by providing high-level, abstract descriptions of web service interfaces and operations, thus decoupling service descriptions from implementation details.

  Furthermore, WSDL offers flexibility in web service implementation, allowing service providers to selectively choose operations and features based on specific requirements. While defining the contract elements, WSDL's extensibility through custom elements and attributes accommodates unique requirements or domain-specific details not covered by standard elements. While WSDL significantly contributes to interoperability, achieving comprehensive data portability involves considerations beyond its technical aspects, such as data standards, semantic interoperability, governance frameworks, and regulatory compliance. Nonetheless, the adoption of standardized WSDL descriptions can enhance data portability by fostering interoperability, particularly in the context of European public services.

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

- **User-centricity**
  WSDL promotes the development of modular and reusable service descriptions, allowing developers to design services with an emphasis on consistency and reduced redundancy. This approach enhances the maintainability and efficiency of systems. WSDL adopts the "+xml" convention outlined in IETF RFC 3023[10], defining XML data types and associated security considerations.

  Given that WSDL is an XML document, different implementations can have varied security requirements. An illustrative implementation is seen in the SELIS [11]project, which provides web

[10] IETF RFC 3023: https://joinup.ec.europa.eu/collection/ict-standards-procurement/solution/xml-media-types-rfc-3023-xml-media-types/about

[11] SELIS: https://cordis.europa.eu/project/id/690588

services related to eInvoicing, aligning with the Once-only Principle and Digital Single Market[12] frameworks.

- **Inclusion and accessibility**

  WSDL is a specification that, in its inherent design, does not directly address or influence e-accessibility. WSDL is primarily designed for describing the interfaces and operations of web services, concentrating on the technical aspects of communication between software systems. Its main purpose lies in facilitating interoperability and providing a standardized way to define contracts between service providers and consumers, with a focus on the functional and operational aspects of web services rather than considerations related to e-accessibility.

- **Privacy**

  Web Services Description Language is fundamentally oriented towards describing the interfaces and operations of web services. Notably, WSDL lacks inherent features or mechanisms dedicated to ensuring the protection of personal data managed by public administrations or other entities. Instead, its primary purpose lies in providing a standardized framework for specifying how services can be invoked and the associated data structures.

  In the European Union (EU), where privacy and data protection are governed by the General Data Protection Regulation[13](GDPR), any implementation of web services, including those outlined in WSDL, must align with GDPR requirements and other pertinent privacy laws at the European or national levels. While WSDL itself, as a technical specification developed by the World Wide Web Consortium (W3C), does not embed privacy-specific features, the adoption and utilization of WSDL in European or national initiatives should be approached with consideration of and adherence to privacy laws and regulations.

- **Security**

  Web Services Description Language itself primarily focuses on describing the interfaces and operations of web services, and it does not provide specific mechanisms for ensuring the secure processing of data. Security considerations, including aspects related to secure data processing, are commonly addressed at other layers within the web services architecture.

  The specification itself lacks mechanisms for protecting information against unauthorized changes. Although WSDL may reference security policies and mechanisms, such as WS-Security[14], the actual implementation and enforcement of security measures typically occur outside the realm of WSDL, operating at the application and infrastructure levels. Access control, a crucial aspect involving determining who can access specific resources or perform certain operations, is

[12]Digital Single Market: https://eufordigital.eu/discover-eu/eu-digital-strategy/

[13]General Data Protection Regulation: https://gdpr.eu/what-is-gdpr/

[14] WS-Security: https://www.ibm.com/docs/es/integration-bus/10.0?topic=configuration-ws-security

typically managed at the implementation and deployment levels rather than being defined within the WSDL specification. Access control mechanisms are commonly implemented within the runtime environment or the infrastructure supporting the web service.

- **Multilingualism**
  WSDL, by its nature, does not impose or dictate language-specific aspects; instead, it establishes a foundation for describing the technical components of web services. The broader considerations for incorporating multilingual support are shaped by design choices, documentation practices, and the implementation of the web service.

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

- **Administrative Simplification**
  WSDL plays a crucial role in enabling service providers to define interfaces and operations for web services in a standardized manner. This standardization facilitates interoperability, particularly among various systems and services, thereby easing the exchange of information and functionality for European public services. The specification also contributes to making administrations and stakeholders web services more accessible by providing information and endpoints, simplifying consumption. This support for data and web service reuse helps streamline processes, reducing the need for unnecessary steps or transactions.

  By providing a standardized way to describe web service interfaces, WSDL promotes interoperability between different software systems—an essential aspect when constructing digital service delivery channels involving communication across diverse applications and platforms.

- **Preservation of information**
  WSDL itself is not designed or intended to address the long-term preservation of data, information, or knowledge.

- **Assessment of effectiveness and efficiency**
  Numerous documents and studies already exist that assess the performance and features of WSDL. The primary focus of these resources revolves around enhancing effectiveness in discovering and automatically classifying web services, as well as addressing issues related to poor query results. Two noteworthy examples include “Improving Web Service Descriptions for Effective Service Discovery[15]” and "Towards Effective Service Discovery using Feature Selection

[15]Improving Web Service Descriptions for Effective Service Discovery:
https://core.ac.uk/download/pdf/82569095.pdf

and Supervised Learning Algorithms[16]". These studies contribute valuable insights into optimizing WSDL for efficient service discovery and classification through various approaches, including feature selection and supervised learning algorithms.

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**

  WSDL is already associated with EIRA ABBs in the European Library Of Specifications (ELIS)[17]. Specifically, WSDL can define the interoperability aspects of the "Machine to machine interface" ABB of the EIRA "Technical View".

  WSDL has been chosen as a key component in several cross-border initiatives with the objective of validating the description of services provided, ultimately improving the retrieval and promoting the reuse of web services by interested parties. An illustrative example of such an initiative is the SELIS[18] project, which focuses on eInvoicing and aims to seamlessly integrate it into existing accounting software. Remarkably, WSDL specification have been included in the catalogues of recommended specifications in 10 Member States, namely Bulgaria, Cyprus, France, Germany, Greece, Malta, Netherlands, Portugal, Spain, and Sweden.

- **Legal Interoperability**

  WSDL, a specification created by the World Wide Web Consortium (W3C), represents an international standard within the realm of web-related standards. Although WSDL is not inherently a European Standard, its utilization is often acknowledged or suggested in European initiatives and frameworks. One notable example is the European Interoperability Framework (EIF), which offers guidelines for promoting interoperability among European public services. In this context, WSDL may be referenced or recommended to support the implementation of interoperable web services within the European landscape.

[16]Towards Effective Service Discovery using Feature Selection and Supervised Learning Algorithms: https://thesai.org/Downloads/Volume10No5/Paper_25-Toward_Effective_Service_Discovery.pdf

[17]European Library Of Specifications (ELIS): https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/news/new-release-elis-501

[18]SELIS: https://joinup.ec.europa.eu/collection/eprocurement/document/secure-electronic-invoicing-service-selis

- **Organisational interoperability**

  WSDL serves as a standardized means to define the inputs, outputs, and operations of a web service, focusing on technical aspects rather than modeling business processes. While WSDL is a crucial tool for fostering technical interoperability between systems and services, it does not inherently address organizational interoperability agreements directly. Instead, it plays a pivotal role in establishing a common understanding and framework for communication between different systems, emphasizing the technical aspects of web service interoperability.

- **Semantic Interoperability**

  The WSDL specification is freely accessible on the European Collaborative platform Joinup. This availability underscores the commitment to promoting open access to the specification, facilitating its use and adoption in various initiatives and projects within the European collaborative landscape.

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **WSDL**. 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	1560/1700 (91%)	100%	Seamless
Principles related to generic user needs and expectations	840/1200 (70%)	58%	Sustainable
Foundation principles for cooperation among public administrations	440/500 (88%)	100%	Seamless
Interoperability layers*	840/1000 (84%)	80%	Seamless
Overall Score	3080/3800 (81%)[19]	84%	

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

With an 84% 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% (3080/3800) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

[19] 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