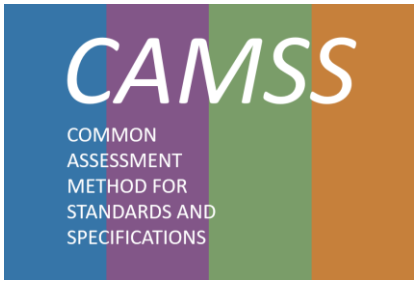

ASSESSMENT SUMMARY v1.0.0

OpenAPI Specification (OAS)[1]

OpenAPI Initiative (OAI)[2]

[1] OpenAPI Specifcation: OpenAPI Specification v3.1.0 | Introduction, Definitions, & More

[2] OpenAPI Initiative: Home - OpenAPI Initiative (openapis.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 OpenAPI Specification (OAS) carried out by CAMSS using the CAMSS Assessment EIF scenario[3]. The purpose of this scenario is assessing the compliance of a standard or specification with the European Interoperability Framework (EIF)[4].

2. ASSESSMENT SUMMARY

The **OpenAPI Specification (OAS)** previously known as the Swagger Specification, is a specification for machine-readable interface files for describing, producing, consuming, and visualizing RESTful web services. Previously part of the Swagger framework, it became a separate project in 2016, overseen by the OpenAPI Initiative, an open-source collaboration project of the Linux Foundation. Swagger and some other tools can generate code, documentation, and test cases given an interface file.

The OpenAPI Specification (OAS) is a vendor neutral description format for HTTP-based remote APIs. Currently, the OAS is maintained, evolved and promoted by the OpenAPI Initiative (OAI), a consortium of industry experts with an open governance structure under the Linux Foundation umbrella. It is worth noting that OAS is the most broadly adopted industry standard for describing new APIs, since it has the most developed tooling ecosystem and its format is readable by both machines and humans.

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

- **Subsidiarity and proportionality**
  OAS is included within the catalogues of Malta and The Netherlands. The National Interoperability Framework of The Netherlands 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) factsheets.

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

- **Openness**
  Being a tool that facilitates the development of RESTful conformant APIs, OAS is a good enabler for the publication of open data since its use can ease the retrieval of resources in any given format. It has been developed by the OpenAPI Initiative (OAI) which is a group operating under the Linux Foundation organisation. It is vendor-neutral and open-source, and it can be accessed without any restrictions following its royalty-free policies. Public reviews are part of the release

[3] EU Survey 5.1.0: EUSurvey - Survey (europa.eu)

[4]ISA2 Programme: https://ec.europa.eu/isa2/eif_en

lifecycle and There is a wide community of developers that maintain the specification, who can raise issues and participate in the development with no specific fees.

It is interesting to remark that OAS has support from interest groups and organisations that are funding the OAI and the specification's development. In terms of availability, OAS is publicly available for free on W3C's webpage[5] and Github[6]. It is licensed on a royalty-free basis for its implementation or study.

- **Transparency**
  Performing code generation for documentation, clients and servers, OAS contributes to the visibility of administrative procedures given that it facilitates APIs implementation, improving understandability and interaction for clients. OAS usefulness, on the other hand, lies in the comprehensibility of the APIs development, as it facilitates coding and also documentating the development in an easy, understandable way. It can also be an enabler for the exposure of interfaces given that it performs information exchange with reliable and efficient communication standards.

- **Reusability**
  The ADMS is publicly available for its use for free at OAI's website, and the Githug repository. Additionally, the creation of APIs through OAS is flexible and not restricted to any domain, allowing for its use and implementation across business domains.

- **Technological neutrality and data portability**
  OAS is independent of any specification and can be implemented without relying on other technologies, nor with any dependency on platforms. As each set of requirements may vary whle creating an API, OAS is designed to be implemented incrementally or separately, thus allowing for partial implementations. Moreover, customisation is always allowed as long as the API complies with the skeleton structure given by the specification. Extensions are made available by the OAS toolset to add requested support.

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

- **User-centricity**
  The purpose of OAS is not related to the reuse of information, therefore this criterion does not apply to the specification.

- **Inclusion and accessibility**
  The purpose of OAS is not related to e-accessibility. Therefore, this criterion is considered not applicable to this specification.

[5] OpenAPI Specifcation: OpenAPI Specification v3.1.0 | Introduction, Definitions, & More

[6]OpenAPI in Github: GitHub - OAI/OpenAPI-Specification: The OpenAPI Specification Repository

- **Security and privacy**
  OAS takes into account essential safety aspects when it comes to the design of APIs. Security in OAS is tackled with the "Security Requirement Object" where security mechanisms are settled to authorise requests.

- **Multilingualism**
  The purpose of OAS is not related to the 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**
  OAS has many functionalities that can simplify the delivery of European public services. One of the most notable aspects of OAS is its conformity with REST architectural style, which means it allows for the connection of components in microservices applications. This OAS characteristic, is a key enabler for the simplification of European public services, as it eases the digitalisation and accessibility of RESTful API's design, documentation and functionalites.

- **Preservation of information**
  Although some APIs are designed for the long-term preservation of data and information, no specific provisions are stated in OAS.

- **Assessment of effectiveness and efficiency**
  There have been found some studies assessing OAS effectiveness and efficiency. Examples vary from the effectiveness assessment of the automatic generation of test cases for REST APIs using OAS[7], to the efficiency assessment of the OAS capacity of conversion to a semantic OWL-S specification[8].

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'.

[7] Automatic Generation of Test Cases for REST APIs: A Specification-Based Approach: Automatic Generation of Test Cases for REST APIs: A Specification-Based Approach | IEEE Conference Publication | IEEE Xplore

[8] From Open API to Semantic Specifications and Code Adapters: From Open API to Semantic Specifications and Code Adapters | IEEE Conference Publication | IEEE Xplore

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

- **Interoperability governance**
  OAS is already mapped into the EIRA Library of Interoperable Specifications in the machine to machine interface ABB from the EIRA Technical View. Moreover, the specification is recommended and included in the catalogues of Malta and The Netherlands. Despite having been included in MS's catalogues, it is not included in any catalogue at European Level. In terms of implementation conformity, OAS gives itself a criterion and guidelines and structure to develop API's and also constitutes an environment for testing the conformity of the application to the OAS parameters.

- **Legal Interoperability**
  OAS is developed by the OpenAPI initiative (OAI), an organisation operating under the Linux Foundation. Therefore, it is not a European standard.

- **Organisational interoperability**
  In some aspects, OAS can facilitate the modelling of business processes since it is a tool to document the design of an API in an automated manner as well as to develop RESTful APIs themselves more simply and efficiently. Nonetheless, given its main characteristics, OAS is not suited to facilitate organisational interoperability agreements.

- **Semantic Interoperability**
  The Github platform hosts the OpenAPI guidelines and specifications, as well as a space for contributions and proposals of improvements in which any individual interested is encouraged to participate and raise issues regarding OAS implementation. However, there are currently no European platforms hosting a community of developers interested in OAS.

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **OAS**. 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	2100/2200 (95,4%)	100%	Seamless
Principles related to generic user needs and expectations	500/500 (100%)	60%	Seamless
Foundation principles for cooperation among public administrations	440/500 (88%)	100%	Seamless
Interoperability layers*	820/1100 (74,5%)	100%	Sustainable
Overall Score	3660/4100 (89%)[9]	93%	

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

With a 93,2% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 89% (3660/4100) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

[9]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