

# ASSESSMENT SUMMARY

**JavaScript Object Notation (JSON)**

ECMA International

## TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>3</b>
<b>2. ASSESSMENT SUMMARY.....</b>	<b>3</b>
2.1. Interoperability principles.....	3
2.2. Interoperability layers.....	5
<b>3. ASSESSMENT RESULTS .....</b>	<b>7</b>

## 1. INTRODUCTION

The present document is a summary of the assessment of JSON carried out by the CAMSS Team using the CAMSS EIF assessment scenario. The purpose of this scenario is assessing the compliance of a standard or specification with the European Interoperability Framework (EIF)<sup>1</sup>.

## 2. ASSESSMENT SUMMARY

**Java Script Object Notation (JSON)**<sup>2</sup> is an independent format for data interchange of open standard file format using human readable text. JSON is maintained and developed by **ECMA international**<sup>3</sup>, and it is commonly used instead of XML in situations requiring more flexibility and a lightweight payload.

### 2.1. 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**

JSON is included in 2 national catalogues of recommended specifications. They belong to The Netherlands and Slovenia. The National Interoperability Framework (NIF) of these Member States is fully aligned with at least 4 out of 5 sections of the European Interoperability Framework (EIF)<sup>4</sup> according to the National Interoperability Framework Observatory (NIFO)<sup>5</sup> factsheets.

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

- **Openness**

JSON is an open specification publicly available for study or use. In ECMA, all the stakeholders have the opportunity to contribute to the development of JSON and the decision making process includes a public review. Additionally, JSON is widely implemented for the exchange of data. It has a significant market acceptance that demonstrates that it is mature enough for the development of products and services, including for the creation of innovative solutions.

- **Transparency**

JSON fosters the visibility and comprehensibility of administrative rules, processes, data, services and decision-making of a public administration. Moreover, it eases the communication between

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<sup>1</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)

<sup>2</sup> <https://www.ecma-international.org/publications/standards/Ecma-404.htm>

<sup>3</sup> <http://www.ecma-international.org/default.htm>

<sup>4</sup> [https://ec.europa.eu/isa2/sites/isa/files/eif\\_brochure\\_final.pdf](https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf)

<sup>5</sup> <https://joinup.ec.europa.eu/collection/national-interoperability-framework-observatory-nifo/nifo-factsheets>

administrations enhancing the decision-making process. However, the purpose of JSON is not related to ensuring the availability of interfaces.

- **Reusability**

JSON sector agnostic specification that can be reused in any business domain requiring a common format to exchange data between different programs. In addition, it is available for its use an implementation at ECMA International and EITF's webpages<sup>6</sup>.

- **Technological neutrality and data portability**

JSON is independent from any specific technology and/or platform and is designed to foster data portability between systems and applications.

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

- **User-centricity**

JSON eases the implementation of the once-only principle by enabling for the data exchange and interchange between administrations and stakeholders.

- **Inclusion and accessibility**

JSON does not foster e-accessibility. The purpose of the specification is not related to inclusion and accessibility.

- **Security and privacy**

JSON in itself does not provide security features, which is a weakness per se. The storage of private data as JSON format is not recommended in order to avoid malicious activities against stored information.

- **Multilingualism**

JSON is used as format for data interchange by APIs. As APIs are involved in the services provision, therefore, JSON fosters the delivery of European public services including the multilingual ones.

***The Technical Specification partially supports the foundation principles for cooperation among public administrations:***

- **Administrative Simplification**

JSON allows the data exchange and consumption from different administrations stakeholders. Ensuring data exchange through applications avoids the interaction by means of reducing the non-

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<sup>6</sup> <https://www.ecma-international.org/publications/standards/Ecma-404.htm>

<https://tools.ietf.org/html/rfc8259#section-14.1>

digital data exchange. Therefore, the adoption of JSON eases the reduction of administrative burden.

- **Preservation of information**

JSON does not foster the long-term preservation of electronic records and other kinds of information. The purpose of the specification is not related the preservation of information.

- **Assessment of effectiveness and efficiency**

There are existing documents and studies assessing the JSON's features and performance. Some of those documents include comparisons between XML and JSON<sup>7</sup>.

## 2.2. 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 Technical Specification supports the implementation of digital public services complying with the EIF interoperability model:***

- **Interoperability governance**

Five Member States are recommending JSON in their ICT National Catalogues. Additionally, JSON is already associated to the European Interoperability Reference Architecture (EIRA) ABBs in the European Library of Specifications (ELIS). More specifically, JSON can define the interoperability aspects of the "Representation" ABB of the semantic view and "Machine to machine interface" from the EIRA technical view.

Moreover, the specification has been selected as one of the key elements for the data interchange between administrations and stakeholders. The European Union is using JSON within the Europeana Search API, fostering data retrieval from Europeana repository. Currently, the Single Electronic Data Interchange Area (SEDIA) is using JSON as the basis to make data available for stakeholders.

However, JSON is not included in any supra-national catalogue of standards.

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<sup>7</sup>[https://www.researchgate.net/profile/Hanif\\_Ullah/publication/321361853\\_Behavior\\_based\\_Comparative\\_analysis\\_of\\_XML\\_and\\_JSON\\_web\\_technologies/links/5a1eb56f0f7e9b9d5e000bfd/Behavior-based-Comparative-analysis-of-XML-and-JSON-web-technologies.pdf](https://www.researchgate.net/profile/Hanif_Ullah/publication/321361853_Behavior_based_Comparative_analysis_of_XML_and_JSON_web_technologies/links/5a1eb56f0f7e9b9d5e000bfd/Behavior-based-Comparative-analysis-of-XML-and-JSON-web-technologies.pdf)  
[https://www.researchgate.net/profile/Kamir\\_Yusof/publication/320045078\\_Efficiency\\_of\\_JSON\\_for\\_data\\_retrieval\\_in\\_big\\_data/links/5a3f14ea458515f6b0456f54/Efficiency-of-JSON-for-data-retrieval-in-big-data.pdf](https://www.researchgate.net/profile/Kamir_Yusof/publication/320045078_Efficiency_of_JSON_for_data_retrieval_in_big_data/links/5a3f14ea458515f6b0456f54/Efficiency-of-JSON-for-data-retrieval-in-big-data.pdf)

- **Integrated public service governance & Legal interoperability**

No formal interoperability agreement has been found involving European public services providers. Moreover, after checking the assessments performed by CAMSS and the list of specifications identified by the MSP Multi-stakeholder-platform, no assessment verifying the compliance of the specification with the European standardisation regulation has been found.

- **Organisational interoperability**

The purpose of JSON is not related to the modelling of business processes and organisational interoperability. Therefore, this criterion is not applicable to the specification.

- **Semantic interoperability**

The adoption of JSON fosters the publication of data as open data by means of providing structured data and the usage of non-proprietary formats, which means that JSON is highly supporting Tim Berners Lee's 5-stars schema for open data<sup>8</sup>. In addition, the specification is available for free at the European Collaborative Platform Joinup.

Nevertheless, JSON cannot be considered a data model so it is defining a set of rules for formatting data instead of a data model.

- **Technical interoperability**

JSON is an open specification that is widely used for the exchange of structured data.

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<sup>8</sup> <https://www.w3.org/community/json-ld/>

<https://json-ld.org>

[https://www.europeandataportal.eu/sites/default/files/european\\_data\\_portal\\_-\\_open\\_data\\_goldbook.pdf](https://www.europeandataportal.eu/sites/default/files/european_data_portal_-_open_data_goldbook.pdf)

<https://5stardata.info/en/>

### 3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for JSON. 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 are used to calculate the “Automated Score” per category and an “Overall Score”.

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

Category	Automated Score	CAMSS Strength	Favourable	Unfavourable	Not Applicable
Principle setting the context for EU actions on interoperability	100%	100%	1	0	0
Core Interoperability principles	100%	94%	15	0	1
Principles related to generic user needs and expectations	67%	75%	2	1	1
Foundation principles for cooperation among public administrations	100%	67%	2	0	1
Interoperability layers	80%	91%	16*	4	2
<b>Overall Score</b>	<b>84%</b>	<b>86%</b>	<b>27</b>	<b>5</b>	<b>5</b>

With an 86% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 84% demonstrates that JSON highly supports the European Interoperability Framework in the domains where it applies.

#### INTEROPERABILITY PRINCIPLES

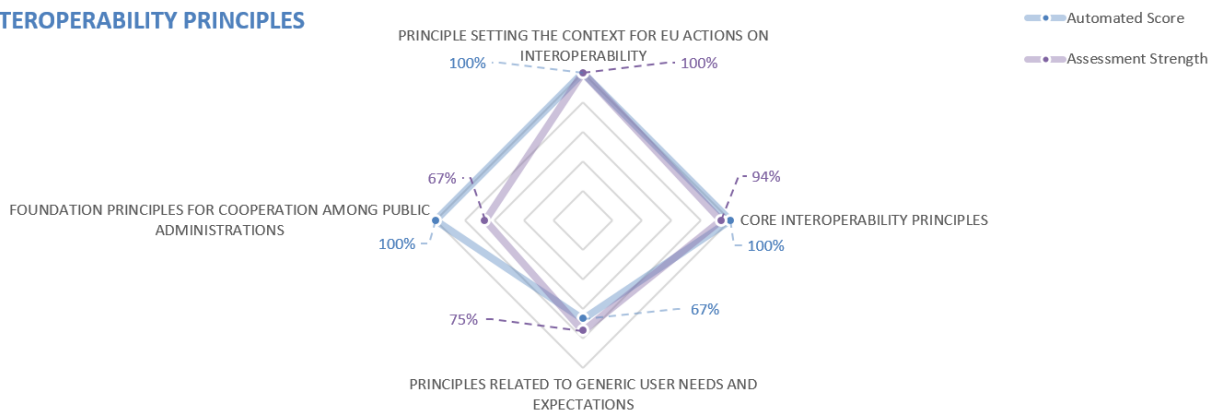
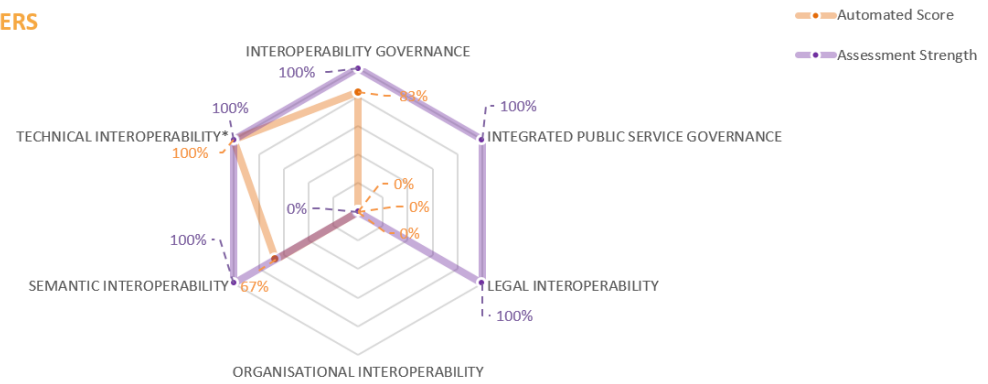


Figure 1 Assessment Results - Interoperability Principles

## INTEROPERABILITY LAYERS



**Figure 2 Assessment Results - Interoperability Layers**