ASSESSMENT SUMMARY

Shapes Constraint Language (SHACL)

1. INTRODUCTION

The assessment of Shapes Constraint Language (SHACL) has been 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 technical specification with the European Interoperability Framework (EIF)[1].

The present document is a summary of the assessment. Additionally, it includes the observations gathered throughout the assessment process and an interpretation of the results of the assessment.

2. ASSESSMENT SUMMARY

SHACL is a language for validating Resource Description Framework (RDF) graphs against a set of conditions. These conditions are provided as shapes and other constructs expressed in the form of RDF graphs. RDF graphs that are used this way are called "shapes graphs" in SHACL, and the RDF graphs that are validated against a shapes graph are called "data graphs". As SHACL shape graphs are used to validate that data graphs satisfy a set of conditions, they can also be viewed as a description of the data graphs that do satisfy those conditions. Such descriptions may be used for a variety of purposes besides validation, including user interface building, code generation and data integration.

The Technical Specification is not compliant with the **principle setting the context for EU actions on interoperability:**

- **Subsidiarity and proportionality**

SHACL is not yet recommended or listed as a mandatory standard by any EU Member State. Despite this, some European Member States[2] are starting to promote SHACL as a relevant standard for their national standard catalogue.

The Technical Specification is partially compliant with the **core interoperability principles:**

- **Openness**

SHACL is implemented for data validation purposes by DCAT-AP, which is a specification that describes public sector datasets with the aim to enable cross-data portal search for datasets, and make public sector data easily searchable across borders and sectors. DCAT-AP is used in the Open Data Support service initiated by the European Commission.

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[1] https://ec.europa.eu/isa2/eif_en

[2] https://joinup.ec.europa.eu/news/flemish-oslo-project-puts-add

In addition, the World Wild Web Consortium[3] (W3C), which developed and maintains SHACL, has a defined and publicly available process for the development and approval of specifications. The World Wild Web Consortium Process[4] describes how all the relevant stakeholders can formally appeal or raise objections to the development and approval of a specification. Furthermore, all the information related to the standardisation process and to the decision making process for approving technical specifications[5] or standards is publicly available. A set of clear Release Notes tracking the changes of the different technical specification versions are also archived and publicly available.

Finally, SHACL is publicly available for implementation and use for free on GitHub[6] and it is licensed under the W3C Royalty-free license[7] granted under the W3C Patent Policy[8].

- **Transparency**

SHACL has been designed to enhance the semantic and technical interoperability layers of ontologies expressed as RDF graphs. Moreover, RDF is a European Standard used by public administrations and therefore, SHACL can be used to validate data of public administrations published as RDF. This would foster the transparency of that data.

- **Reusability**

SHACL is publicly available for implementation and use for free on GitHub.

- **Technological neutrality and data portability**

W3C is a vendor-neutral standard developing organisation. Therefore, SHACL was developed independently from any vendor product. However, since the purpose of SHACL is to validate RDF graphs, it is highly dependent from RDF.

The Technical Specification is partially compliant with the **principles related to generic user needs and expectations**:

- **User-centricity**

The application of the once-only principle in all EU Member States public administrations aims at reducing the administrative burden. To achieve this, interoperability between public administrations is a sine qua non condition. In this sense, SHACL addresses and facilitates

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[3] http://www.w3.org

[4] https://www.w3.org/2019/Process-20190301/

[5] https://www.w3.org/standards/history/shacl

[6] https://github.com/w3c/data-shapes

[7] https://www.w3.org/Consortium/Patent-Policy-20170801/#sec-Requirements

[8] https://www.w3.org/Consortium/Patent-Policy-20170801/

interoperability between public administrations, cross border services and impacts positively the development of eGovernment. This is due to the fact that it has been designed to enhance the semantic and technical interoperability layers of ontologies expressed as RDF graphs, and RDF is a European Standard used by public administrations in projects for sharing Linked Data.

- **Inclusion and accessibility**

The purpose of SHACL is not related in any way to e-accessibility.

- **Security and privacy**

SHACL can also help controlling critical aspects such as privacy, security and financial costs. By externalising data validation using SHACL, a security and privacy-centred validation can be carried out. This would positively impact the financial costs of maintaining the data models as the maintenance of the conceptual model and the maintenance of the validation model are decoupled.

- **Multilingualism**

The purpose of SHACL is not related in any way to the delivery of multilingual public services.

The Technical Specification is partially compliant with the **foundation principles for cooperation among public administrations:**

- **Administrative Simplification**

The adoption of SHACL reduces the administrative burden due to the fact that it is available both for free and on a FRAND basis.

- **Preservation of information**

The purpose of SHACL is not related in any way to the preservation of information.

- **Assessment of effectiveness and efficiency**

There are no evidences of existing studies or documentation assessing SHACL in terms of effectiveness and efficiency.

The Technical Specification is partially compliant with **interoperability layers:**

- **Interoperability governance**

SHACL can be mapped to European Interoperability Reference Architecture (EIRA) describing the interoperability requirements of the Data Validation Service or Data Validation Component architecture building blocks (ABBs) from EIRA's Technical View.

Regarding the recommendation and/or inclusion of SHACL in national or European catalogue of standards, the technical specification has not yet been included in any catalogue at national or European level. Nevertheless, SHACL was presented by Spain for its identification in the MSP, which happened successfully, and is currently pending its inclusion in the regulation through a Commission decision.

- **Integrated public service governance**

Given the fact that SHACL is going to be recommend by the European Commission based on the MSP's identification, it can be considered that SHACL has been included in an interoperability agreement between organisations involved in European public service provision.

- **Legal interoperability**

During the process for its identification by the MSP, SHACL was assessed with the CAMSS MSP scenario, which is in full compliance with Annex II criteria set out in the Regulation 1025/2012. As the result of the assessment was positive, SHACL proved to be compliant with a European standardisation regulation.

- **Organisational interoperability**

The purpose of SHACL is not related in any way to organisational interoperability.

- **Semantic interoperability**

SHACL was designed to enhance the semantic and technical interoperability layers of ontologies expressed as RDF graphs. RDF is a European Standard used by public administrations in projects for sharing Linked Open Data. This means that the validation carried out with SHACL on RFD graphs fosters their use for the publication of data as Linked Open Data.

- **Technical interoperability**

This technical interoperability layer is covered by the core interoperability principle ''Openness''.

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments of SHACL. The Assessment "Strength" indicator measures the reliability of the assessment by calculating the number of 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 categories.

Category	Automated Score	Assessment Strength	# Favourable	# Unfavourable	# Not Applicable
Principle setting the context for EU actions on interoperability	0%	100%	0	1	0
Core interoperability principles	81%	100%	13	3	0
Principles related to generic user needs and expectations	100%	50%	2	0	2
Foundation principles for cooperation among public administrations	50%	67%	1	1	1
Interoperability layers	77%	100%	17	5	0
Overall Score	**71%**	**92%**	**24**	**10**	**3**

The results of the CAMSS assessment, with an 83.33% Assessment Strength, can be considered as representative of the specification attributes. The Overall Automated Score is 59%; SHACL is partially compliant with the core interoperability principles, the principles related to generic user needs and expectations, the foundation principles for cooperation among public administrations and the interoperability layers. However it is not compliant with the principle setting the context for EU action on interoperability.
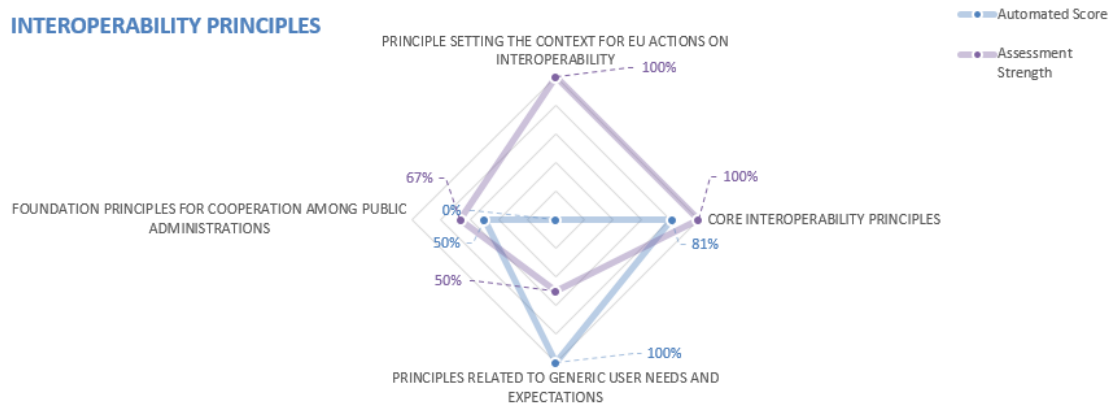

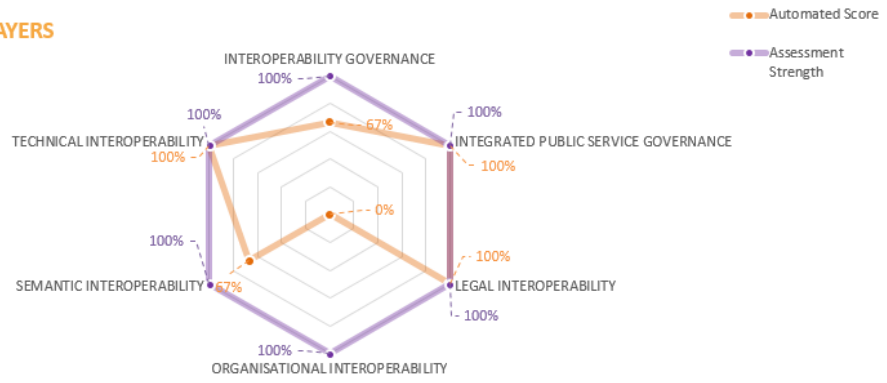**Figure 1 Assessment Results – Interoperability Principles**

INTEROPERABILITY LAYERS

Figure 2 Assessment Results - Interoperability Layers