



ASSESSMENT SUMMARY v1.0.0

ISO/IEC 19941 Cloud Computing Interoperability and Portability¹

Publications Office of the European Union²

¹ ISO/IEC 19941: <https://www.iso.org/standard/66639.html>

² International Organization for Standardization: <https://www.iso.org/home.html>

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1. INTRODUCTION

The present document is a summary of the assessment of the **ISO/IEC 19941** carried out by CAMSS 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)³.

2. ASSESSMENT SUMMARY

ISO/IEC 19941 Cloud Computing Interoperability and Portability specifies cloud computing interoperability and portability types, the relationship and interactions between these two cross-cutting aspects of cloud computing and common terminology and concepts used to discuss interoperability and portability, particularly relating to cloud services.

ISO/IEC 19941 is developed by ISO, an independent, non-governmental international organisation with a membership of 170 national standards bodies that aims to bring together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges. This specification specifically addresses interoperability challenges in cloud computing, which can be extremely useful in eGovernment by enhancing data portability, increased efficiency and integrity.

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 specifically addresses interoperability in cloud computing, which can be extremely useful in eGovernment by enhancing data portability, increased efficiency and integrity.

The specification does not support the principles setting context for EU actions on interoperability:

- **Subsidiarity and proportionality**

ISO/IEC 19941 has not been included within any Member States' catalogues of recommended specifications.

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

- **Openness**

ISO/IEC 19941 does not directly facilitate the publication of data on the web, but it contributes to the broader goal of improving cloud computing interoperability. Standards are developed by groups of experts called technical committees. These experts are put forward by ISO's national members. If a user interested in getting involved, they ought to contact their national standards body. While this specification's life cycle is completely public, releases do not foresee public reviews. In accordance with ISO/IEC JTC 1 and the ISO and IEC Councils, these International Standards are publicly available for Standardization purposes. ISO/IEC 19941 was

³ European Interoperability Framework (EIF): https://ec.europa.eu/isa2/eif_en

released in 2017 and a second major release (ISO/IEC AWI 19941) is under development. This specification is supported by ISO therefore, support is available but as part of a closed community requiring registration and possibly fees. Nonetheless, other groups are also involved in the development and promotion of cloud standards such as the Object Management Group (OMG)⁴.

- **Transparency**

The specification enables the visibility of administrative procedures as ISO/IEC 19941 is about cloud computing interoperability and data portability, which is in enhancing administrative data visibility. This implementation contains a semantic section that could help fostering its comprehensibility. It also contains a specific section that addresses interfaces, APIs and interoperability regarding cloud services. By promoting an international standard for cloud services, the specification enables the exposure of interfaces to access the public administration's services.

- **Reusability**

This specification is domain-agnostic as it can be implemented or used in any domain. The focus of ISO/IEC 19941:2017 is on the broader aspects of cloud computing interoperability and portability thus, it is applicable across different domains.

- **Technological neutrality and data portability**

The specification is independent from any software, hardware, or operating system. Therefore, it can be said that ISO/IEC 19941 is technology and platform agnostic. The specification contains specific requirements regarding the different facets of cloud interoperability and data portability, which can be implemented incrementally or separately. The specification explicitly addresses and enables data portability syntactic, semantic and policy wise.

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

- **User-centricity**

According to this specification cloud computing is defined as a paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand. Therefore, information is only provided once-only and reused as needed.

- **Inclusion and accessibility**

purpose of ISO/IEC 19941:2017 is not related to e-accessibility. Therefore, this criterion is considered not applicable to this specification.

⁴ Object Management Group (OMG): <https://www.omg.org/>

- **Privacy**

According to this specification, special attention must be given to personal information. For instance, the ISO mentions the regulation (EU) 2016/679 about General Data Protection Regulation⁵. The specification explicitly addresses and enables the implementation of features to guarantee confidentiality such as data minimization. ISO/IEC 19941 has a section that directly mentions data policy portability and how these policies dictate shortened data retention periods, de-identification of data and erasure or masking of records not needed to provide the cloud service.

- **Security**

According to this specification, security is a key concern for all Cloud Service Commerces (CSCs) when using cloud services, both in terms of interoperability and, in terms of data portability and application portability. The specification explicitly addresses and enables the secure and trustworthy processing of data as it highlights considerations regarding policy interoperability. This specification mentions that cloud services employ an identity and access management (IdAM) system to control access to the interfaces offered by a cloud service, to guarantee data integrity and to control access to resources inside a cloud service. The authentication of the role agents involved in the data transactions is likely to be in the hands of the Cloud Service Provider (CSP).

Depending on the user's role and identity, data may be restricted, Cloud computing is crucial in the improvement of data processing accuracy. Cloud computing platforms provide scalable resources, allowing users to easily scale up or down based on their processing needs. Data portability raises a series of security concerns that need security controls mechanisms. The CSCs need to classify the data according to how sensitive is its content; more sensitive data need a higher level of security controls applied. There are also the security controls relating to the operation of the application (firewalls, authentication, encryption and so on).

- **Multilingualism**

The specification does not foresee any support for multilingualism. Nevertheless, it does mention that cloud computing services may have operational policies such as requirements for support of minority user languages. Some territories also have strict laws and regulations around correct use of character sets in user interfaces (notably Asian characters and their usage), legal requirements to support mandatory “official” languages (some of which might have few real speakers).

⁵ General Data Protection Regulation (EU) 2016/679: <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

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

- **Administrative Simplification**

The implementation of this specification improves the interoperability and portability of data in cloud platforms, which can facilitate collaboration and interoperability among different government agencies and departments and deployment of e-government services. This can lead to more streamlined and integrated public services, reducing redundancy and improving the overall citizen experience, especially interaction-wise.

- **Preservation of information**

ISO/IEC 19941 does not foster the long-term preservation of electronic records and other kinds of information. The purpose of the specification is not related to the preservation of information.

- **Assessment of effectiveness and efficiency**

The effectiveness and efficiency of ISO/IEC 19941 is often evaluated through various means, including practical implementation and scalability. For instance, a 2017-paper mentions this specification as a reference for an FBM model of ISO Cloud Computing Architecture⁶ and in 2016 the European Committee for Interoperable Systems wrote a paper in highlighting how ISO/IEC 19941 is an example of a cloud solution that vendors can adopt⁷.

2.1. 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 fully supports the implementation of digital public services complying with the EIF interoperability model:

- **Interoperability Governance**

This specification is included in the Controlled Vocabulary ABB in the current European Library of Specifications (ELIS). This specification contains several cloud interoperability and portability facet models that state the aim of the facet and its requirements to achieve conformance.

⁶ An FBM Model of ISO Cloud Computing Architecture: https://link.springer.com/chapter/10.1007/978-3-319-73805-5_16

⁷ Special Paper on Cloud Computing - Portability and Interoperability: <https://www.ecis.eu/wp-content/uploads/2010/10/ECIS-Special-Paper-on-Cloud-Computing-Portability-and-Interoperability-16-06-27.pdf>

This specification has been recommended by the Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services (ILNAS)⁸. In fact, it has been included in a catalogue of cloud computing standardisation projects produced by Portail-Qualité⁹, an initiative by ILNAS that constitutes a network of competencies in the field of quality, security and compliance at the service of competitiveness.

ISO/IEC 19941 is included in the solutions catalogue of ICT Standards for Procurement¹⁰ created by the European Commission. The European Catalogue will contribute to offering a one-stop shop for procurers on guidelines for procurement, including on vendor lock-in, on the use of standards, and a lifecycle costing scheme that accounts for the often-neglected interoperability costs.

- **Legal interoperability**

This specification can be considered a European Standard as it is listed in the European Union Observatory for ICT Standardisation (EUOS)¹¹. The EUOS will thoroughly monitor the global Standardisation landscape, providing a comprehensive and accurate coverage of the most important ICT Standards, Working Groups and Technical Committees that affect the key ICT topics of the Digital Single Market and the EU ICT Rolling Plan for Standardisation¹².

- **Organisational interoperability**

This specification has specific sections that present facet models that can be adapted into business models. Furthermore, cloud data portability has an important part where it is thoroughly described how to operate in different case scenarios. It is detailed what possible organisational policies should be considered and incorporated; thus, this could facilitate organisational interoperability agreements.

- **Semantic Interoperability**

The specification clearly encourages the creation of communities along with the sharing of their data and results as its purpose is to improve cloud computing portability and interoperability, thus improving communication between different actors. Furthermore, ISO/IEC 19941 has been included in different catalogues of ICT standards in a European level therefore, it is an important standard to consider.

⁸ ILNAS: <https://portail-qualite.public.lu/fr/acteurs/ilnas.html>

⁹ Cloud Computing Published Standards: <https://portail-qualite.public.lu/content/dam/qualite/publications/normalisation/2020/ans-smart-secure-ict/cloud-computing-standards-projects-V1.pdf>

¹⁰ ICT Standards for Procurement: <https://joinup.ec.europa.eu/collection/ict-standards-procurement>

¹¹ EUOS: <https://standict.eu/euos>

¹² ICT Rolling Plan for Standardisation: <https://digital-strategy.ec.europa.eu/en/policies/rolling-plan-ict-standardisation>

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **ISO/IEC 19941**. 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
Principles setting the context for EU actions on interoperability	20/100 (20%)	100%	Ad-hoc
Core interoperability principles	1400/1700 (82%)	100%	Seamless
Principles related to generic user needs and expectations	1120/1200 (93%)	83%	Seamless
Foundation principles for cooperation among public administrations	400/500 (80%)	100%	Sustainable
Interoperability layers*	920/1000 (92%)	100%	Seamless
Overall Score	3660/4300 (85%) ¹³	96%	

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

With a 96% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 85% (3660/4300) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

¹³ 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>