



## **Data Solutions (DATA); Data Act (art. 33) standardization suggestions**

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**Reference**

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DTR/DATA-00104410

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DATA, data interoperability, oneM2M, SAREF

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# Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Data Solutions (DATA).

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# Modal verbs terminology

In the present document **"should"**, **"should not"**, **"may"**, **"need not"**, **"will"**, **"will not"**, **"can"** and **"cannot"** are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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# Introduction

Data has become the backbone of the digital economy. The rapidly increasing availability of Internet-connected products ("connected products") on the European market, which are producing an enormous volume of data, has strengthened enabling economic growth and competitiveness, fostering innovation and improving public services. The importance of data exchange, data sharing and data flows becomes more and more significant for businesses and individuals worldwide. Seamless and secure data flows, which are enabled within and across different IoT domains (cross-border and cross-industry) using data spaces or data ecosystems provide crucial businesses value.

The legal environment about data exchanges and data transactions plays an essential role in the development of data ecosystems as it brings a trust framework for all stakeholders, who are involved in the exchange of data. In Europe, the EU Data Act [i.2] is one of the key regulations, which came into force in December 2023 and aims to create a new legal framework for handling data. It gives users of connected products (companies or individuals who own, lease or rent such a product) greater control over the data they generate, while maintaining incentives for those who invest in data technologies. It also sets out general conditions for situations where a company is legally obliged to share data with another company.

Article 33 of the EU Data Act [i.2] sets out comprehensive rules on the interoperability of data, mechanisms and services for data sharing and use in shared European Data Spaces. Data Spaces include, for example, cloud environments. The EU Commission may issue implementing provisions and request standard-developing organizations (e.g. CEN, CENELEC, ETSI) to define uniform standards in this area in order to achieve this interoperability. The providers will then implement these accordingly.

Referring to Article 33 of the EU Data Act [i.2], the European Commission made available the Standardisation Request SReq [i.3]. The SReq requests CEN, CENELEC and ETSI to draft new European standards and European standardisation deliverables as listed in the Annexes of the SReq [i.3] in support of Article 33 of the EU Data Act [i.2]. For all deliverables requested by the SReq [i.3], CEN, CENELEC and ETSI are expected to co-operate in the Mode 4, which is specified in the Basic Co-operation Agreement between these three Standards Development Organizations (SDOs). According to this, one Party should take the lead of work and the other(s) may make written contributions during the progress of drafting the requested new European standards. This relation includes also full information sharing via nominated observers.

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# 1 Scope

The present document supports the preparation of the answer to C(2025)4135 - Standardisation Request M/614 [i.3] further on called "SReq" in the present document.

The present document is based on the input from ETSI TR 104 409 [i.1].

Both reports (the present document and ETSI TR 104 409 [i.1]) will prepare the normative work to satisfy the SReq [i.3].

The present document is structured as follows:

- **Clauses 1 to 3** set the scene and provide references as well as definitions of terms, symbols and abbreviations, which are used in the present document.
- **Clause 4** provides a summary of the findings highlighted in ETSI TR 104 409 [i.1] about how oneM2M fulfils the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3]. It presents guidelines about how oneM2M can be used to fulfil as much as possible the standardization requirements of these two documents without the need for changes to oneM2M specifications.  
Additionally, this clause lists potential Change Requests (CRs) that would enable oneM2M to fulfil some of the aspects of these two documents (i.e. ETSI TR 104 409 [i.1] and the present document) that are currently not covered. The content focuses on improvements that can be implemented in a reasonable manner according with the timing available to make oneM2M compliant with the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3].  
Some requirements of the two documents fall outside the scope of oneM2M specifications. Where possible, this clause provides clarification of such boundaries together with additional guidelines that may help define a clear positioning for oneM2M in the context of the two documents.
- **Clause 5** provides a summary of the findings highlighted in ETSI TR 104 409 [i.1] about how SAREF fulfils the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3].  
It lists feasible improvements that would enable SAREF [i.4] to fulfil the standardization requirements of these two documents. The content focuses on improvements that can be implemented in a reasonable manner according with the timing available to make SAREF compliant with the two documents.  
Clause 5 provides possible additional guidelines for aligning SAREF with the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3].
- **Clause 6** provides a summary of the findings highlighted in ETSI TR 104 409 [i.1] about how NGSI-LD fulfils the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3].  
It provides guidelines about how NGSI-LD can be used to fulfil as much as possible the two documents without carrying out changes within the NGSI-LD methodology.  
Clause 6 lists feasible improvements that would enable NGSI-LD to fulfil the standardization requirements of these two documents. The content focuses on improvements that can be implemented in a reasonable manner according with the timing available to make NGSI-LD compliant with the EU Data Act [i.2] with particular reference to Article 33 and the EU Standardisation Request, e.g. the definition of the mappings between NGSI-LD and DCAT-AP provided in [i.7].
- **Clause 7** provides insights about if the union of the three assets enables the fulfilment of the EU Data Act [i.2] with particular reference to Article 33 and the SReq [i.3].
- **Clause 8** provides a summary of conclusions from the standardization suggestions.

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## 2 References

### 2.1 Normative references

Normative references are not applicable in the present document.

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

- [i.1] ETSI TR 104 409: "Data Solutions (DATA); Data Act (art. 33) requirement and references analysis".
- [i.2] [Regulation \(EU\) 2023/2854](#) of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act).
- [i.3] [C\(2025\)4135 – Standardisation request M/614](#): "Commission Implementing Decision of 1.7.2025 on a standardisation request to the European standardisation organisations as regards a European Trusted Data Framework in support of Regulation (EU) 2023/2854 of the European Parliament and of the Council".
- [i.4] [ETSI SAREF portal](#).
- [i.5] [ETSI EN 303 760](#): "SmartM2M; SAREF Guidelines for IoT Semantic Interoperability; Develop, apply and evolve Smart Applications ontologies".
- [i.6] [ETSI GS CIM 006](#): "Context Information Management (CIM); NGSI-LD Information Model".
- [i.7] [ETSI GR CIM 048](#): "Context Information Management (CIM); Handling of data catalogues and data services with NGSI-LD".
- [i.8] [DCAT-AP 3.0.1 profile](#).
- [i.9] ETSI TS 104 414: "Data Solutions (DATA); Ontology Web Server - Functional Interfaces and Architectural Specification".
- [i.10] ETSI TS 104 415: "Data Solutions (DATA); IoT Ontology Web Server - User Interfaces and Use Cases".
- [i.11] ETSI TR 104 416: "Data Solutions (DATA); IoT Ontology Web Server - Security, Deployment, and Support".

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## 3 Definition of terms, symbols and abbreviations

### 3.1 Terms

For the purposes of the present document, the following terms apply:

**ACME CSE:** open source CSE Middleware for Education

**connected product:** item that obtains, generates or collects data concerning its use or environment and that is able to communicate product data via an electronic communications service, physical connection or on-device access, and whose primary function is not the storing, processing or transmission of data on behalf of any party other than the user

**data holder:** natural or legal person that has the right or obligation, in accordance with the EU Data Act [i.2], applicable Union law or national legislation adopted in accordance with Union law, to use and make available data, including, where contractually agreed, product data or related service data which it has retrieved or generated during the provision of a related service

**data processing service:** digital service that is provided to a customer and that enables ubiquitous and on-demand network access to a shared pool of configurable, scalable and elastic computing resources of a centralized, distributed or highly distributed nature that can be rapidly provisioned and released with minimal management effort or service provider interaction

**data recipient:** natural or legal person, acting for purposes which are related to that person's trade, business, craft or profession, other than the user of a connected product or related service, to whom the data holder makes data available, including a third party following a request by the user to the data holder or in accordance with a legal obligation under Union law or national legislation adopted in accordance with Union law

**EU Data Act:** Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act) [i.2]

**GeoDCAT-AP:** extension of DCAT-AP for the representation of geographic metadata

**public sector body:** national, regional or local authorities of the Member States and bodies governed by public law of the Member States, or associations formed by one or more such authorities or one or more such bodies

**smart contract:** computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and ensuring their integrity and the accuracy of their chronological ordering

**SReq:** Standardisation Request to the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI) as regards to a European Trusted Data Framework [i.3]

## 3.2 Symbols

Void.

## 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AI	Artificial Intelligence
API	Application Programming Interface
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CR	Change Request
DCAT	Data CATalogue vocabulary
DCAT-AP	Data CATalogue vocabulary Application Profile
DSSC	Data Spaces Support Centre
ETSI	European Telecommunications Standards Institute
EU	European Union
GDPR	General Data Protection Regulation
HTTP	HyperText Transfer Protocol
IoT	Internet of Things
JSON	JavaScript Object Notation
KPI	Key Performance Indicator
LLM	Large Language Model
MCP	Model Context Protocol
MQTT	Message Queuing Telemetry Transport
NGSI-LD	Next Generation Service Interface-Linked Data
RDF	Resource Description Framework
SAREF	Smart Applications REference ontology
SReq	Standardisation Request
TR	Technical Report
W3C®	World Wide Web Consortium
Web	World Wide Web



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## 4 oneM2M

### 4.1 Introduction

The present clause gives a summary of the findings highlighted in ETSI TR 104 409 [i.1] about how oneM2M fulfils the EU Data Act [i.2] with particular reference to Article 33 and the EU Standardisation Request [i.3]. The summary guides the content of the remaining sub-clauses.

### 4.2 Use as it is to fulfil the EU Data Act and the SReq

oneM2M as it does satisfy a substantial part of the SReq [i.3], especially in the following areas:

- General Framework and Architecture:
  - oneM2M provides a comprehensive interoperability framework designed for seamless communication across various protocols and data models.
  - It supports a service layer that can be integrated into diverse hardware and software systems (this includes also access to devices, thanks to its legacy from IoT domain).
- Terminology, Concepts, and Mechanisms:
  - oneM2M specifications clearly define:
    - Terminology (e.g. "Application Entity," "Common Services Entity").
    - Architectural concepts (e.g. hierarchical resource structure).
    - Mechanisms for data sharing, access control, and interoperability.
    - oneM2M supports data sharing by design. API queries are supported, both simple ones and semantic based, also in distributed contexts.
    - oneM2M by design supports distributed architectures.
    - Thanks to its legacy as an IoT Platform, access to devices is native.
- Interoperability Requirements:
  - Data sharing & API access: Fully specifies protocols (HTTP, MQTT, etc.) and RESTful APIs for automatic data transmission.
  - oneM2M specifies interoperability mechanisms allowing data exchange with other oneM2M instances and non-oneM2M systems while preserving data security and access rights.
  - It supports API queries, both simple and semantic based, even in distributed contexts.
  - Distributed architectures: native support for IoT devices and cross-platform data exchange.
- Implementation Framework for Semantic Assets:
  - has good support for semantics, including storage, management, and discovery of ontologies, (e.g. SAREF, and custom ones).
  - Machine-readable data: Resources are represented in JSON, enabling semantic annotation.
  - It offers capabilities to discover resources based on semantic descriptions and content.
- Trustworthiness Requirements:
  - oneM2M provides advanced granular access control incorporating roles, tokens, identity verification, time-based restrictions, and location-based conditions.

- It specifies sophisticated access control policies able to handle demanding scenarios.
- Consent management support is available, considering GDPR and similar regulations in other parts of the world.
- Data integrity: Versioning ("container instances") tracks changes.
- License management: Explicitly specified for data sharing.

As such, oneM2M can contribute to provide a solid framework for the implementation of "services" in the sense of the DSSC Blueprint, especially in the context of Technical Building Blocks.

The Blueprint takes the stance that services can vary widely among Data Spaces, especially since specialized protocols may be in use according to individual vertical application. For that reason, the Blueprint cites examples but does not endorse one specific solution.

oneM2M follows a different approach, i.e. that it assumes that most of the use cases can be tackled by using a single framework.

Even in the cases where consolidated protocols/data layout are well established for a given vertical industry, a clear path for dealing with that (via the use of Application Entities) is outlined. This way, the effort needed to adapt to a new vertical is reduced to a minimum and clearly confined to easily identified sections of the software implementing the platform.

Application Entities exchange data and information with the oneM2M core via messages, following to APIs that are well specified. This approach makes the code implementing the Application Entity to be disjoint from that of the oneM2M core: in this way, existing libraries for the existing/consolidated use cases can be leveraged, and there are no constraints regarding the programming language used.

This is by design, with the intention of reusing as much as possible, avoiding reinventing the wheel each time.

## 4.3 Potential improvements

There are areas where oneM2M allows some room for potential improvements (work may be already being done to address some of said improvements):

- Master Catalogue:
  - oneM2M does not provide a single master catalogue for listing available data. Considering the potential dimensions and the tremendous diversity of services, applications and of the related data sets, oneM2M provides advanced functionality to discover applications and related data, so that data catalogues can be easily built as oneM2M services.
  - Another work item, recently approved, calls for studying and specifying the interworking between oneM2M and Model Context Protocol (MCP).
  - This provides an alternative approach, in line with modern developments in LLMs and Agentic AI. There will be challenges as well, most notably about balancing the (typically greedy) access by AI against the granularity of access control allowed by the oneM2M specifications.
- Data collection methodology, data quality, and uncertainty:
  - The oneM2M specifications only guarantee correct handling and transfer of data items between digital entities.
  - It is implicitly assumed that assessment of data quality is left either to human actors (who can have knowledge of the quality of data and related collection methodology) or to automated tools (that can, e.g. assess quality related information according to given KPIs).
  - A possible improvement, that can be considered by the oneM2M community, is to define a standardized way to convey information about quality of a given data item to participants of the Data Space.
  - Similar considerations might apply also to concepts like KPIs or reporting structure for Data Space maturity.

- Auditability of data transactions:
  - oneM2M provides users with a mechanism for data versioning (so called "content instances" in oneM2M jargon of any resource are kept available and can be accessed by users, subject to access control policies).
  - A possible improvement to this scheme is to standardize the recording of aspects of the actors that caused such changes to occur. In this way it becomes possible to ensure full accountability of the actors that operate on a given Data Space. Such a feature could be graduated according to the required degree of accountability, from none to who caused data changes up to who just accessed any resource for the most demanding cases.

## 4.4 Additional guidelines

Clauses 6.1.1 and 6.1.2 of ETSI TR 104 409 [i.1] explain that oneM2M is more than the specification of an IoT platform, stating it is well suited to support Data Spaces.

These capabilities, however, are not currently advertised on the [oneM2M.org](https://oneM2M.org) website.

A possible improvement is to augment the website content to reflect these considerations.

oneM2M specifications are technical in nature and describe APIs, mechanisms for managing information, etc. There are guidelines and best practices for implementation and usage of the specifications but, currently, they are oriented towards technical users.

To better meet some of the requirements from the SReq [i.3], additional guidelines can be provided, articulated in practical, non-legal language that is accessible to all potential stakeholders.

Such additional guidelines should cover not only the way oneM2M compliant frameworks can be implemented/deployed, but also explaining how oneM2M features map to requirements of the SReq [i.3], including coverage of the way to meet domain-specific (non-regulatory) requirements

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# 5 SAREF

## 5.1 Introduction

ETSI TR 104 409 [i.1] provides an analysis about how the SAREF methodology fulfils the EU Data Act [i.2], with particular reference to the Article 33 and the EU Standardisation Request [i.3]. There have been two main aspects making SAREF well positioned compared to the EU Data Act [i.2]. The first one is that the SAREF methodology is mentioned within the SReq [i.3] as a virtuous example of support to achieve data interoperability. This point paves the way to adopting the SAREF methodology to build data repositories and to making them compliant with the SReq [i.3]. The second one concerns the structure of the SAREF methodology, i.e. a set of Technical Specifications containing the description of each element and examples of concrete specifications. Their quality enables independent developers to develop conformant implementations. As part of the specifications, terminology, concepts and mechanisms used are clearly specified.

Clause 5.2 provides a description about the impact of the SAREF methodology, concerning its current level of compliance with the EU Data Act [i.2], if it is used as it is. Instead, clause 5.3 describes a set of action that should be put in place to enhance the compliance level of the SAREF methodology to make it fully compliant with the EU Data Act [i.2] and EU SReq [i.3].

## 5.2 Use of SAREF to fulfil the EU Data Act and the SReq

The content of the present clause refers to the version of SAREF published at the date in which the present document is written. Any subsequent updates of SAREF may affect the validity of the content provided below.

The SAREF methodology is described in ETSI EN 303 760 [i.5] where there are provided the good practices about how the SAREF methodology can be used to grant semantic interoperability for IoT smart applications in a set of high-level outcome-focused provisions. Through the methodology described within ETSI EN 303 760 [i.5], it is possible to support all parties involved in the development and manufacturing of IoT smart applications and products with guidance on making them interoperable in compliance to the SAREF framework. The provisions give organizations and companies the flexibility to innovate and implement SAREF-compliant semantic interoperability solutions appropriate for their products and applications. Indeed, through the adoption of the described methodology, the datasets produced meets completely the following aspects of the SReq [i.3]:

- Paragraph 1 (c) of the EU Data Act [i.2], Article 33;
- Harmonised standards on Trusted Data Transactions - Part 1: Terminology, concepts and mechanisms;
- Harmonised standards on Trusted Data Transactions - Part 2: Trustworthiness requirements;
- Technical specification(s) on an implementation framework for semantic assets;
- European standard on a quality framework for internal data governance;

and partially:

- Paragraph 1 (a) of the EU Data Act [i.2], Article 33;
- Harmonised standards on Trusted Data Transactions - Part 3: Interoperability requirements.

In particular, the SAREF methodology is fully compliant with the accessibility requirement. This enables the creation of datasets that, in turn, will be all compliant with the SReq [i.3]. Indeed, by adopting the SAREF methodology, datasets can be published by using the RDF Turtle language, a machine-readable format recommended by the W3C®. This way, it is possible to understand the structure of the datasets built by using the SAREF methodology in a clear manner.

The usage of the SAREF methodology in its current version leaves open some gaps before fulfilling completing the SReq [i.3]. Clause 5.3 provides a list of possible actions to improve the SAREF methodology.

## 5.3 Potential improvements

The present clause provides a set of actions that should be considered to improve the SAREF methodology, and a mention to possible assets that would make the SAREF ecosystem fully compliant with the EU Data Act [i.2] and the SReq [i.3]. Particularly, three feasible actions can be implemented to enhance the fulfilment of SReq [i.3].

The SReq [i.3] explicitly requires reliance on existing communities and well-established specifications, in particular **DCAT-AP** and some extensions. Therefore, DCAT-AP is intended to serve as the baseline methodology for dataset and catalogue metadata, while SAREF can provide domain-specific semantics enriching DCAT-AP descriptions.

First, the SAREF methodology ensures the management of metadata catalogues describing the resource. The vocabulary recommended by the EU SReq is DCAT-AP [i.8] and some existing extensions. Through DCAT-AP, it is possible to generate a DCAT-AP extension or mapping for each dataset built by using the SAREF methodology. This new application profile allows to provide metadata describing such datasets to make them compliant with the SReq [i.3]. Indeed, currently, datasets built by using the SAREF methodology are, on the one hand, equipped with some descriptors coming from the RDF language. But, on the other hand, each dataset is not associated with a datasheet providing all the necessary information required by the SReq [i.3] (e.g. data quality descriptors). To satisfy this requirement, it is necessary to integrate the management of DCAT-AP extensions into the SAREF methodology. This way, the data structures, data formats, vocabularies, classification schemes, taxonomies and code lists, will be described in a publicly available and consistent manner with other Data Spaces to allowing the publication of SAREF-based datasets within the Common European Data Spaces catalogue and ensuring cross-domain interoperability.

Second, to provide a SAREF-based query endpoint. The ontologies instantiating the SAREF methodology are available for download through the dedicated portal. However, it is still missing an endpoint to query datasets built by using the SAREF methodology (i.e. instantiating the SAREF ontologies) with the aim of extracting knowledge about their structures and contents.

Third, to implement and deploy a SAREF-compliant web server. The SAREF ecosystem comes with a collection of synthetic examples showing how the ontologies instantiating the SAREF methodology can be used. However, the type of scenarios specified in the SReq [i.3] is not addressed since, currently, the SAREF methodology does not include an accompanying web server enabling the mentioned type of access. Currently, even SAREF is available for download through its website, it is not equipped with a facility allowing the access to the structured data produced by using SAREF. This issue is going to be addressed through the adoption of the ETSI IoT Ontology Web Server [i.9], [i.10], [i.11].

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## 6 NGSI-LD

### 6.1 Introduction

ETSI TR 104 409 [i.1] provides an analysis about which components of NGSI-LD fulfils the EU Data Act [i.2], with particular reference to the Article 33 and the EU Standardisation Request [i.3]. NGSI-LD [i.6] is information model and API for publishing, querying and subscribing to context information. It enables structured information sharing across multiple domains like smart cities, smart industries, and digital twins. The NGSI-LD information model represents Context Information as entities that have properties and relationships to other entities. It is derived from property graphs, with semantics formally defined on the basis of RDF and the semantic web framework.

There have been two main aspects making NGSI-LD aligned to the EU Data Act [i.2]. The first one is that with NGSI-LD it is possible to describes both data points and datasets with a set of metadata making this information accessible. The possibility of describing datasets put NGSI-LD at the same semantic level of DCAT by making NGSI-LD compliant with the SReq [i.3]. The second one is how the accessibility requirement is satisfied by the NGSI-LD standard. The specifications provide a complete documentation concerning the accessing mechanisms to all the data stored by using such a standard. NGSI-LD comes also with a set of open-source implementations of web service that can be used to access data collections stored by using the NGSI-LD format.

Clause 6.2 provides a description about the impact of NGSI-LD, concerning its current level of compliance with the EU Data Act [i.2], if it is used as it is. Instead, clause 6.3 describes a set of action that should be put in place to enhance the compliance level of NGSI-LD to make it fully compliant with the EU Data Act [i.2] and EU SReq [i.3].

### 6.2 Use of NGSI-LD to fulfil the EU Data Act and the SReq

The content of this clause refers to the version of NGSI-LD published at the date in which the present document is written. Any subsequent updates of NGSI-LD may affect the validity of the content provided below.

The NGSI-LD specifications are described in [i.6] where there are provided the good practices about how NGSI-LD can be used to grant semantic interoperability for IoT smart applications in a set of high-level outcome-focused provisions. Through the specifications described in [i.6], it is possible to support all parties involved in the development and manufacturing of IoT smart applications and products with guidance on making them. The provisions give organizations and companies the flexibility to innovate and implement NGSI-LD compliant semantic interoperability solutions appropriate for their products and applications. Indeed, through the adoption of the described methodology, the datasets produced meets completely the following aspects of the SReq [i.3]:

- Paragraph 1 (c) of the EU Data Act [i.2], Article 33;
- Paragraph 3 and Paragraph 8 of the EU Data Act [i.2], Article 33;
- Harmonised standards on Trusted Data Transactions - Part 2: Trustworthiness requirements;
- Technical specification(s) on a data catalogue implementation framework;

and partially:

- Paragraph 1 (a) of the EU Data Act [i.2], Article 33;
- Harmonised standards on Trusted Data Transactions - Part 1: Terminology, concepts and mechanisms;
- Harmonised standards on Trusted Data Transactions - Part 3: Interoperability requirements;

- Technical specification(s) on an implementation framework for semantic assets;
- European standard on a quality framework for internal data governance.

The usage of NGSI-LD in its current version leaves open same gaps before fulfilling completing the SReq [i.3]. Clause 6.3 provides a list of possible actions to improve NGSI-LD.

A key development in this area is ETSI GR CIM 048 [i.7], which provides a detailed mapping between NGSI-LD and DCAT-AP. This mapping demonstrates how NGSI-LD annotations at the entity level can be systematically expressed in DCAT-AP compliant metadata records, thereby bridging dataset semantics with the catalogue-level requirements mandated by the SReq [i.3] ensuring discoverability.

## 6.3 Potential improvements

This Clause provides a set of actions that should be considered to improve NGSI-LD, and a mention to possible assets that would make NGSI-LD fully compliant with the EU Data Act [i.2] and the SReq [i.3].

In the previous clause, it has been mentioned that NGSI-LD satisfies the accessibility requirement by including information about its content, use restrictions, and licences in a machine-readable format, to allow the recipient to find, access and use the data. Concerning the aspects related to information about the data collection methodology, data quality and uncertainty, they are not applicable in the case of NGSI-LD since it is defined as a vocabulary to annotate data that have been previously collected. Hence, such a verification is demanded to the creator of the dataset annotated with the NGSI-LD vocabulary.

The NGSI-LD information model consists of a specification. Their quality enables independent developers to develop conformant implementations. As part of the specifications, terminology, concepts and mechanisms used are clearly specified. These can be contributed to define the subset of the SReq [i.3] that can be covered by NGSI-LD. Concerning the specific requirement of terminology specification, the NGSI-LD specifications play the role of drivers to build assets being compliant with the SReq [i.3]. Hence, the appropriate adoption of NGSI-LD specifications would allow the fulfilment of all aspects mentioned by this requirement when constructing new data resources.

Finally, also the requirement concerning the evaluation of the maturity and the interoperability of the NGSI-LD specifications cannot be fulfilled by NGSI-LD since the evaluation procedure within the Common European Data Space is still under development.

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## 7 oneM2M, SAREF and NGSI-LD cooperation to fulfil EU Data Act and SReq

Previous clauses describe how each single asset fulfil the SReq [i.3]. The present clause provides insights and recommendations about how the interplay between them may mitigate current gaps.

First, the interplay between oneM2M and SAREF can satisfy the requests regarding various aspects of semantics that come from the SReq [i.3]. In particular, the aspect of managing data tagging since SAREF provides the methodology to describe the semantic meaning of data, while oneM2M provides the actual data. This is slightly different than just stating that oneM2M allows (multiple) ontologies to be loaded and to perform tagging and queries. Indeed, in the case of such an interplay, this aspect becomes more concrete.

Second, the interplay of oneM2M and NGSI-LD could equip oneM2M datasets with a light-semantic index facilitating the discoverability of data managed by oneM2M.

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## 8 Conclusions

The present document provides a set of guidelines that may drive future activities on oneM2M, SAREF and NGSI-LD in the context of their usage concerning the implementation of data spaces that intend to be compliant with the EU Data Act [i.2].

For each asset, there are reported which points of the SReq [i.3] are already fulfilled and which actions can be put in place to fill the current gaps. Of course, by considering the nature of each asset and their purpose, not all aspects of the SReq [i.3] can be achieved (e.g. to exploit the outcomes of the ongoing work of CEN/CENELEC on dataset quality aspects, to equip the SAREF methodology with such capability).

Finally, the present document provides an analysis of how the interplay between oneM2M, SAREF and NGSI-LD can increase the fulfilment of SReq [i.3].

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## Annex A: Change history

Date	Version	Information about changes
23.04.25	V0.0.1	Initial structure of Early Draft including all headlines and a description for each about the intended content of the clause
24.04.25	V0.1.0	Early Draft provided to TC DATA for acceptance as basis for further drafting
29.08.25	V0.2.0	Final Draft V0.2.0 provided for approval
15.09.25	V0.2.1	Incorporation of comments received during the Remote Consensus Phase of V0.2.0
06.10.25	V0.2.2	Incorporation of further comments received



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# History

Document history		
V1.1.1	October 2025	Publication