



ASSESSMENT SUMMARY v1.0.0

Asset Administration Shell (AAS)¹

The Platform Industrie 4.0 secretariat²

¹ <https://industrialdigitaltwin.org/en/wp-content/uploads/sites/2/2024/06/IDTA-01001-3-0->

² <https://www.plattform-i40.de/IP/Navigation/EN/Home/home.html>

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TABLE OF CONTENT

1. INTRODUCTION4

2. ASSESSMENT SUMMARY4

2.1. EIF Interoperability Principles4

2.2. EIF Interoperability Layers.....7

3. ASSESSMENT RESULTS9

1. INTRODUCTION

The present document is a summary of the assessment of the **Asset Administration Shell (AAS)** carried out by CAMSS using the CAMSS Assessment EIF scenario³. 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 Asset Administration Shell (AAS) is a standardised digital representation of assets in industry. The model defines digital assets and their interaction with technology manufacturers.

The specification is addressing interoperability between administrations and manufacturers via digitisation of industrial assets. This is done with a metamodel of the assets so they can be easily exchanged among partners.

The specification is currently developed by the Plattform Industrie 4.0⁵ which is an initiative developed by the German government to facilitate the integration of processes among multiple manufacturing groups. The initiative is also part of a broader one, the Digital Twin initiative (IDTA)⁶ that aims to provide the means for the sharing of manufacturing assets to a set of collaborative partners. The first releases of the specification were done by the OPC foundation⁷ but once IDTA took over the development those were deprecated⁸.

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

- **Subsidiarity and proportionality**

The Asset Administration Shell (AAS) specification is yet to be included in a member state catalogue.

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

- **Openness**

The Asset Administration Shell (AAS) facilitates the publication of data on the web since it is based on open standards and additionally the usage of URI's in order to facilitate the exchange of the digital versions of industrial assets among partners.

³ <https://ec.europa.eu/eusurvey/runner/CAMSSAssessmentEIFScenario6>

⁴ https://ec.europa.eu/isa2/eif_en

⁵ [Plattform Industrie 4.0 - Homepage](#)

⁶ [IDTA – working together to promote the Digital Twin](#)

⁷ <https://opcfoundation.org/>

⁸ <https://opcfoundation.org/developer-tools/documents/view/273>

Currently the Asset Administration Shell (AAS) is maintained by the Platform Industrie 4.0 and has a dedicated working group which is open to contribution on GitHub⁹.

Currently there is widespread use of the specification in the context of industrial manufacturing, in this sense the groups Bosch¹⁰ and Siemens¹¹ have dedicated efforts in the spread of the specification among its members.

- **Transparency**

The Asset Administration Shell (AAS) is the standardised digital representation of an asset. The AAS may be the logical representation of a simple component, a machine or a plant at any level of the equipment hierarchy. The specification can contribute to the visibility of manufacturing processes and the generated data to the administrators.

The Asset Administration Shell (AAS) is not directly related to public administration services but given that the specification creates the means to conceptualise assets among its partners it could be adapted to provide interfaces for public services.

- **Reusability**

The Asset Administration Shell (AAS) is the standardised digital representation of an asset, the corner stone for the interoperability of Industrial components organised in Industry 4.0 systems. The AAS may be the logical representation of a simple component, a machine or a plant at any level of the equipment hierarchy.

In this sense the specification can be used in other domains rather than the industrial manufacturing but it would be a complicated implementation.

- **Technological neutrality and data portability**

The Asset Administration Shell (AAS) is tied up to REST APIs communication. Although the Asset Administration Shell (AAS) service declares its own data model in a machine-readable form, which allows customers to interact with the service on a generic basis, the Asset Administration Shell (AAS) relies on REST APIs in order to be implemented. This API's may be platform-agnostic, without any dependency on the environment or programming language being used, and in this case the Asset Administration Shell (AAS) primarily exists to expose data in a platform agnostic manner so that .NET, Java, PHP, Python, REST, etc clients can all access the data.

The main purpose of the specification Asset Administration Shell (AAS) is to enable the portability of data among partners in the context of the manufacturing industry interoperability. This purpose is in part of the digital twins European initiative (IDTA) which is a German initiative that

⁹ <https://github.com/admin-shell-io/aas-specs/blob/master/CONTRIBUTING.md>

¹⁰ <https://www.boschrexroth.com/en/dc/asset-administration-shell-unlocking-the-power-of-data/>

¹¹ <https://www.marketscreener.com/quote/stock/SIEMENS-AG-56358595/news/Siemens-Nine-partners-demonstrate-an-interoperable-digital-twin-based-on-the-Asset-Administration-43543391/>

wants to create a shared set of tools so manufacturing companies can seamlessly share their assets.

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

- **User-centricity**

The specification Asset Administration Shell (AAS) clearly mentions that the designator elements (properties of the asset) need to be properly defined in the metamodel in order to reuse the information of the assets, if this condition is met the info can be shared once and reused as needed.

- **Inclusion and accessibility**

The Asset Administration Shell (AAS) has no relation to e-accessibility, therefore the criterion is not applicable.

- **Security and privacy**

The Asset Administration Shell (AAS) has specific provisions regarding encryption of data shared among partners that allow the confidentiality of data. Specifically the specification encrypts the data once it is packed. The specification mentions the provision for access control¹² based on the OASIS eXtensible Access Control Markup Language (XACML). Furthermore the specification also allows third party extensions to conform to more strict encryption.¹³

- **Multilingualism**

The Asset Administration Shell (AAS) has some specific provisions regarding multilingualism mainly related at the naming of the assets and is characteristics but the specification per se is not multilingual.

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

- **Administrative Simplification**

The Asset Administration Shell (AAS) has at its core the idea of platform Industrie 4.0 that is the delivery of assets among partners and this simplifies the delivery of public services related to manufacturing. One example is the use case for Service Portal by WITTENSTEIN, this portal provides a web-based, interactive customer portal that is individually tailored to the needs of users such as software developers, fitters, maintenance engineers and commissioning and service technicians. The portal provides the users with a single point of contact for them, support throughout the entire product life cycle and enables new business models and services.

¹² https://admin-shell-io.github.io/aas-specs-antora/IDTA-01004/v3.0/introduction.html#_attribute_based_access_control_abac

¹³ https://admin-shell-io.github.io/aas-specs-antora/IDTA-01004/v3.0/introduction.html#_integrity_protection

- **Preservation of information**

The Asset Administration Shell (AAS) has no direct provision for long term data preservation, but it mentions it can be implemented via extensions, but is not specifically related to long term preservation per se.

- **Assessment of effectiveness and efficiency**

Currently there are assessments regarding the specification effectiveness, The IDTA initiative provides the relevant information regarding the efficiency of the specification. This assessments were presented in the Smart Production Solutions in Nuremberg in the fall of 2024¹⁴.

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'.

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

- **Interoperability governance**

This specification is currently included in the EIRA Library of Interoperability Specifications (ELIS). Currently the specification is listed in the following ABB's: Machine To Machine Interface Application Interface, Digital Solution Application Service, Digital Solution Application Component.

Currently the Asset Administration Shell (AAS) has been recommended by any European member state, Germany. The Industrie 4.0 platform is promoted mainly by the German government, and this includes the AAS specification.

- **Legal Interoperability**

As of now, the Asset Administration Shell (AAS) is not an European standard.

- **Organisational interoperability**

The specification offers the possibility to define the metamodel of the assets among the partners in order to facilitate the interoperability of the assets. Furthermore, the core of the specification is to facilitate the data exchange among partners.

¹⁴ <https://industrialdigitaltwin.org/en/news-dates/idta-shows-at-sps-in-nuremberg-how-consistent-data-flow-is-ensured-throughout-the-entire-lifecycle-6600>

- **Semantic Interoperability**

The specification is at the core of multiple use cases compiled on the IDTA initiative. Some of them are Collaborative Engineering and Product Carbon Footprint. Both use the AAS as way to facilitate the traceability of data (carbon footprint or design changes) among partners and the creation of communities/working groups associated with this tasks.

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **AAS**. 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”.

Category	Automated Score	Assessment Strength	Compliance Level
Principle 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	1140/1200 (95%)	100%	Seamless
Foundation principles for cooperation among public administrations	400/500 (80%)	100%	Sustainable
Interoperability layers*	730/1000 (73%)	100%	Sustainable
Overall Score	3390/4200 (80%) ¹⁵	100%	

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

With an 100% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 80% (3390/4200) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

¹⁵ 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>