CAMSS - Solutions

ELIS

Overview Documentation

ISA²

CHANGE CONTROL

Modification	Details
Version 1.1.0	

DISCLAIMER

European Commission

Directorate-General for Informatics
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INTRODUCTION

1. INTRODUCTION

This document consists of the EIRA Library of Interoperability Specifications (ELIS)[1] version 1.1.0 as expressed using DCAT[2], as well as a narrative explaining the changes made to the ELIS v1.0.0 to reach v1.1.0 and the specifications added to the ELIS.

It contains the following elements.

- A description of the context in which the EIRA Library of Interoperability Specifications (ELIS) has been developed.
- A description of the analysis performed prior to the population of the ELIS.
- A description of the process for the expression of the ELIS using the Data Catalogue Vocabulary (DCAT).
- The Microsoft Excel and DCAT versions of the ELIS catalogue, also known as A-Box.
- SPARQL queries to retrieve information from the ELIS in a triplestore

ELIS is a library containing the standards and specifications defining the interoperability aspects of the architectural building blocks (ABBs) contained in the European Interoperability Reference Architecture (EIRA). The aim of this library is to support solutions architects when modelling using EIRA.

> *"ELIS is a modelling tool-agnostic library of interoperability specifications. ELIS is not an architecture-agnostic library of interoperability specifications. ELIS is the EIRA library of interoperability specifications"*

In the following sections, the context in which the ELIS has been developed is explained, as well as the criteria and methodology followed for the inclusion of specifications in it, and the way it is expressed using DCAT.

[1] ELIS: http://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis

[2] DCAT: https://www.w3.org/TR/vocab-dcat-3/

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CONTEXT

2. CONTEXT

The ISA² programme of the European Commission supports the development of solutions that enable cross-border delivery of interoperable public services in Europe. To ensure the interoperability of these services, the EIA action works as an integrator between the Member States and other departments of the European Commission for the development of a joint interoperability architecture for public services. The main output of this action is the European Interoperability Reference Architecture (EIRA©), which implements the European Interoperability Framework (EIF) in the Legal, Organisational, Semantic, and Technical (LOST) views of interoperability.

EIRA introduces the concept of "interoperability specification" and defines it as ''a document containing agreed normative statements for Solution Building Blocks used in an information exchange context. They can refer to existing standards or specifications''[1]. Additionally, interoperability specifications cover the four levels of interoperability as defined in EIRA.

The following table defines the interoperability specifications used in EIRA[2] per view.

Interoperability Specification	Description
Legal interoperability specifications	A Legal Interoperability Specification is a document of the highest possible level of granularity on an EIRA SBB, formulated as an agreed normative statement in design terms on a legal attribute of a European Public Service. It can refer to existing standards or specifications.
Organisational interoperability specifications	This aspect of interoperability concerns how organisations – such as public administrations in different Member States – cooperate to achieve their mutually agreed upon goals. In practice, organisational interoperability implies integrating business processes and related data exchange. Organisational interoperability also aims to meet the requirements of the user community by making services available, easily identifiable, accessible, and user-focused. Organisation interoperability specifications support organisational interoperability by addressing the core organisational interoperability background for solutions.
Semantic interoperability specification	Semantic interoperability enables organisations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and preserved throughout exchanges between parties. In the context of the EIF, semantic interoperability encompasses the following aspects. - Semantic interoperability is about the meaning of data elements and the relationships between them. It includes developing vocabulary to describe data exchanges and ensures that data

[1] How does EIRA support the interoperability: https://joinup.ec.europa.eu/sites/default/files/document/2017-01/how_does_eira_support_interoperability_v1_0_0.pdf

[2] EIRA 4.0.0 Online Documentation: https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira/chapter-3-views-viewpoints-and-architecture-building-blocks

	elements are understood in the same way by communicating parties. - Syntactic interoperability is about describing the exact format of the information to be exchanged in terms of grammar, format, and schemas. Semantic interoperability specifications support semantic interoperability by addressing the core semantic interoperability background for solutions.
Technical interoperability specification	A specification contained in a document which describes the characteristics required of a product such as quality levels, performance, safety, and dimensions. This also includes the requirements applicable to the product, in regard to the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking, and labelling, and conformity assessment procedures.

3

Update of the ELIS and Release of v1.1.0

3. UPDATE OF THE ELIS AND RELEASE OF V1.1.0

The European Library of Interoperability Specification is the digital library of specifications defining interoperability aspects of the European Interoperability Reference Architecture (EIRA) architectural building blocks (ABBs), and Solution building blocks (SBBs). It is used by solutions architects when modelling Detailed Level Solution Architecture Templates (DL SAT). The current version of the ELIS is based on the latest version of EIRA (EIRA v4.0.0 see Annex II).

This section aims to explain how the new release of the ELIS has been performed. ELIS connects each EIRA ABB to one or more specifications and some specifications to one or more existing CAMSS assessments.

For this purpose, two other updates have been done and promoted:

- The Core Specifications and Standards Vocabulary (CSSV) [1]
- The Core Assessment Vocabulary (CAV) [2]

Also, it is important to remark that the ELIS expression is based on DCAT.

3.1. The DCAT expression of the ELIS Catalogue

As the catalogue is electronic, it can be processed by a software application. ELIS is therefore expressed as an electronic catalogue so it can be consumed by software applications like Archi® and other architecture modelling and development tools. For its expression as a machine-readable artefact, the ELIS uses the DCAT specification.

The Data Catalogue Vocabulary (DCAT) is used to describe public sector datasets in Europe. This vocabulary has been developed by the W3C. DCAT can be used to describe any type of asset – treated as a dataset, especially when considering that metadata is also data. DCAT can be used to describe any type of asset – treated as a dataset, especially if you consider that metadata is also data.

The figure below shows the summary DCAT classes and properties[3]:

[1] CSSV: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/core-standards-and-specifications-vocabulary-cssv

[2] CAV: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/core-assessment-vocabulary-cav

[3] DCAT: https://www.w3.org/TR/vocab-dcat-3/

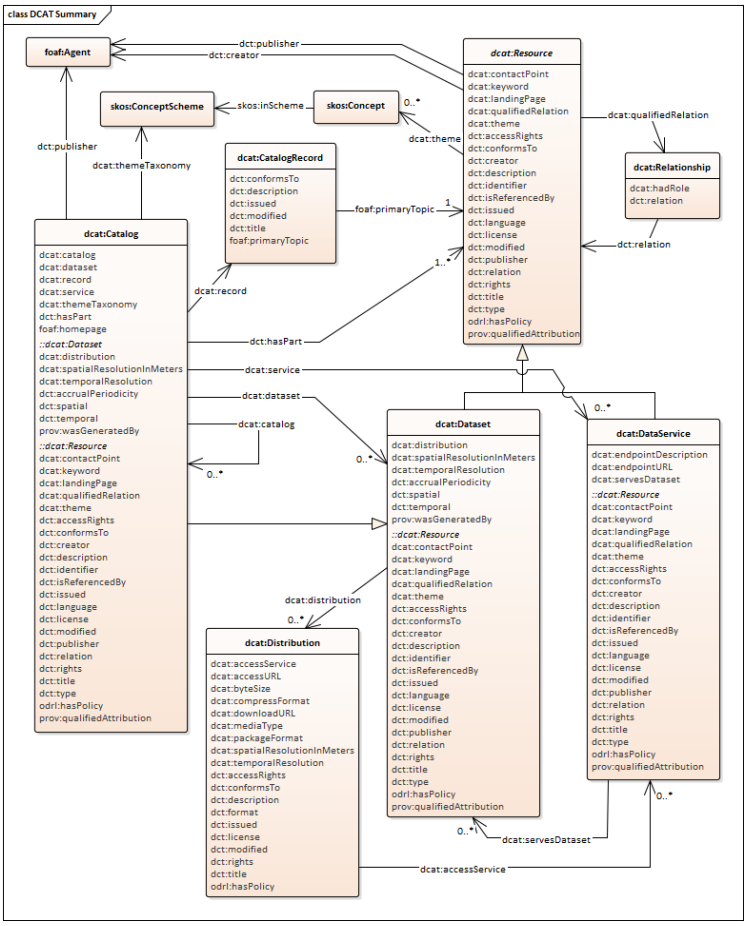

Figure 1: DCAT classes and properties

3.2. The Code Standards and Specifications Vocabulary (CSSV)

The CSSV is the vocabulary used for the exchange of information related to standards and specifications amongst software solutions, in addition to being the key element for the development of the new release of the EIRA Library of Interoperability Specifications (ELIS). To improve the quality of this vocabulary, it has been publicly reviewed through a public consultation[1] where stakeholders contributed to its improvement.

The current version of ELIS has been slightly revamped to accommodate the concepts defined in the last version of the CSSV and to support the requirement of all stakeholders, e.g. EIRA-based solution developer needs, NATO profiles, others.

The following figure shows the classes and properties used or defined in the CSSV, and which are part of the new ELIS release:

[1] CSSV Public Consultation: https://github.com/SEMICeu/CAMSS_CSSV

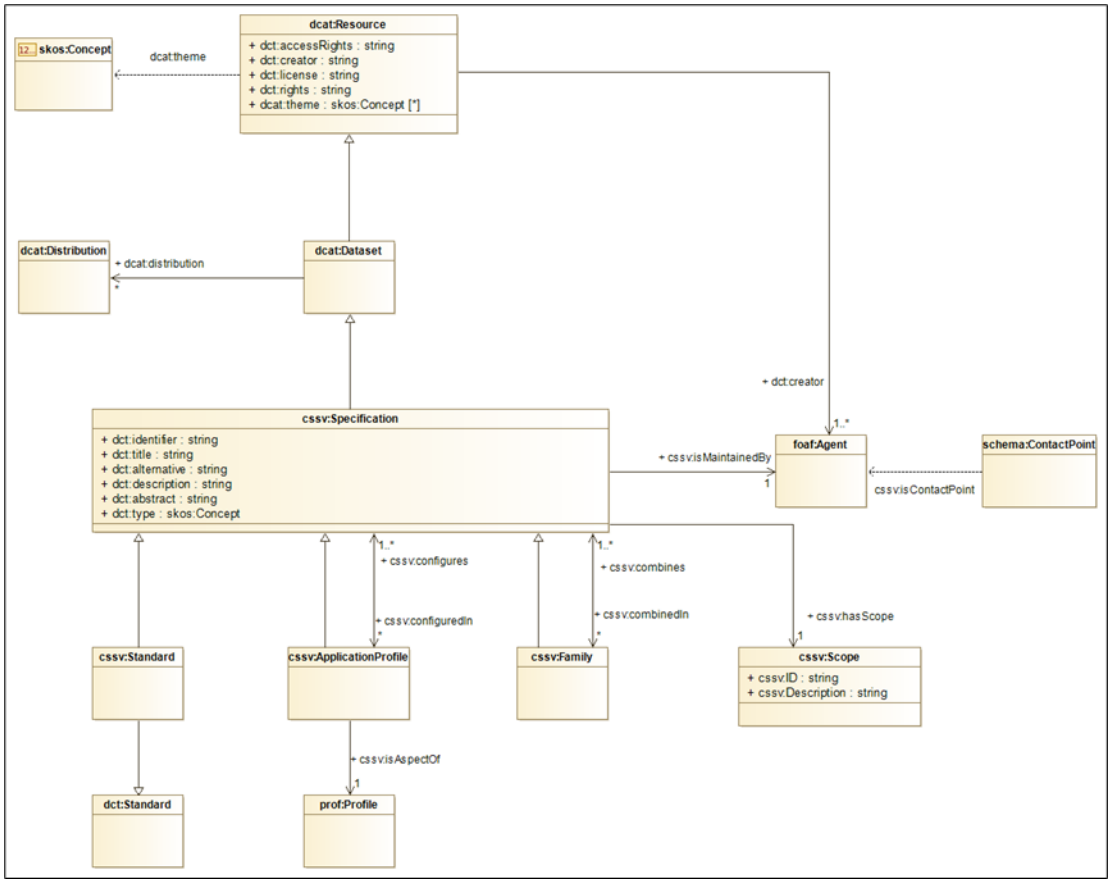

Figure 2: CSSV Data Model

The main class of the CSSV model is the "Specification". A Specification is an asset, as it inherits from the *dcat:Dataset*, which inherits from the *dcat:Resource*.

A Specification can additionally be a Standard, an Application Profile, and/or a Family or a collection of other specifications.

The CSSV model defines the terms as follows.

- **Specification** as a set of agreed, descriptive, and normative statements about how a specification should be designed or made.
- **Standard** as a specification that is largely adopted and possibly endorsed.
- **Application Profile** as customisation of one or more existing specifications potentially for a given use case or a policy domain adding an end-to-end narrative describing and ensuring the interoperability of its underlying specification(s). By customisation, we understand the "addition of more specificity by identifying mandatory, recommended, and optional elements, as well as by defining controlled vocabularies to be employed".
- **Family** as a collection of interrelated and/or complementary specifications, standards, or application profiles, with the explanation of how they are combined, used, or both.

A collection of Specifications differs from a Family of Specifications in that the interrelationship is not explicit. In the CSSV model, a collection of Specifications is an Asset related to other Assets and realised

as an individual of a Specification. In other words, a Specification that reuses the *dct:relation* property of its base class *dcat:Dataset*.

There are occasions where collections of Specifications are applied to a context or a domain in a specific "configuration". Thus application profiles may conform sets of "themed" specifications. For this, the CSSV model uses the property "configures/includedIn" and the *dcat:theme* property pointing at a *skos:Concept* (i.e. a code, see the DCAT model above).

It is important to note that the descendants of the specifications are all "disjoint". Thus, ApplicationProfiles and Families are Specifications that refer to, or put together, with other Specifications and/or Standards, but cannot themselves be considered Standards.

In time, a Specification may become a Standard. In these cases, the authority (author) that defined the Specification may be different from the one that creates and maintains artefacts out of the Standard. Think for example of the artefacts produced, maintained, and distributed by the Publications Office of the European Union (OP) in its site EU Vocabularies[1]; all these artefacts are defined by other authorities (e.g. the ISO), whilst the artefacts (e.g. the controlled vocabularies expressed in SKOS, XML, GeneriCode, XML, etc.) are supplied by the OP. For this, the CSSV uses the properties *dct:creator* and *cssv:isMaintainedBy*. Additionally, the *dcat:Dataset* has the property *dct:type* that can be used to state that the Specification is of type "definition, artefact, or other". The DCAT vocabulary also provides the possibility of expressing who is responsible for the publication of the definition or the artefacts via the property *dct:publisher* (see the DCAT model).

The maintainer or publisher of a Specification is a *foaf:Agent*, which allows creates flexibility to the CSSV model, as *foaf:Agent* is the base class in many ontologies. The CSSV puts forward the reuse of the Core Person Vocabulary (ISA^2 CPV) and the Organisation Ontology (W3C Org) for this purpose. Additionally, the *foaf:Agent* also provides the contact point of the specification.

In terms of reusability, the class *cssv:Scope* allows for the reuse of the Specification. It refers to the area of requirements addressed by the specification.

Concerning Intellectual Property Rights, they are covered by a specification which is a *dcat:Resource* and allows to define the *dct:license* and *dct:rights*.

Finally, all the descendants of the *cssv:Specification* are disjoint. This entails that an individual of an application profile or family cannot be a standard, but does not preclude the application profile or the family becoming standards, in time. If this were the case, individuals of *cssv:Standard* would be created to represent the standardisation of those specifications that are application profiles and families.

[1] EU Vocabularies: https://publications.europa.eu/en/web/eu-vocabularies/controlled-vocabularies

3.3. The Core Assessment Vocabulary (CAV)

The Core Assessment Vocabulary (CAV) represents and defines what an "Assessment" of an "Asset" is, and how to perform the Assessment using scenario-based "Criteria". It is a domain-agnostic vocabulary, meaning that it can be used to assess any type of asset. Hence, the CAV is at the very core of the CAMSS Ontology. Or in other words, the CAMSS Ontology reuses and extends the CAV.

The following figure shows the classes and properties used or defined in the vocabulary:

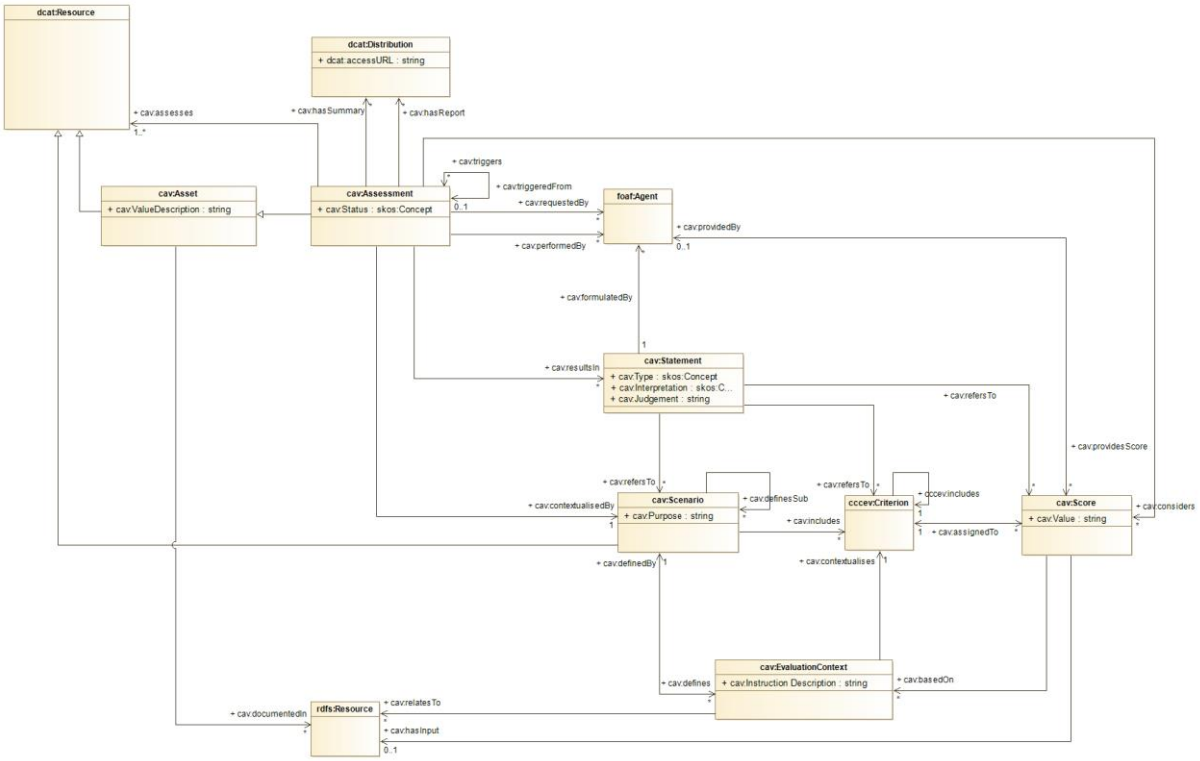

Figure 3: CAV Data Model

Any asset can be identified and described, and has individuals distributions, publishers, etc. Additionally, the CAV class Assessment needs to specify the requestors and evaluators of the Assessments. These can be anything represented by a FOAF[1] Agent, such as a natural person or an organisation. Notice that the objects assessed are also Resources, meaning that the CAV may be used to assess anything that is considered a valuable resource. Examples of such resources could be products, services, or as is the case with CAMSS, standards, and specifications.

An Assessment results in **Statements** capturing the produced knowledge and providing value judgments. These can refer to the Assessment as a whole or a specific section, even being as detailed as to refer to individual evaluated criteria.

A **Criterion** is typically derived from a Reference Framework, which is to be understood as a series of "agreed and descriptive reference requirements" coming from one or more sources (e.g. legislation, specifications and standards, ICT policy-related works like the EIF within the EIS, etc.).

[1] FOAF Vocabulary Specification http://xmlns.com/foaf/spec/

Throughout the Assessment each Criterion is assigned a **Score** (in principle by humans, but potentially by systems) as the value output that is considered when formulating the resulting Statement(s). The **Score** can take into consideration any resource input (e.g. when the score is calculated based on different input parameters, algorithms, and formulae).

Any Assessment is performed in the context of a **Scenario**. The Scenario defines the purpose of the Assessment and the set of Criteria to be scored by one or more Agents. Scenarios can be defined with a flexible structure including nested sections (represented as sub-Scenarios) that serve to provide additional context, group thematically Criteria, and are referred to by the assessment's resulting Statement(s).

Criteria can themselves be simple or complex and originate from various reference sources. The overall context for the evaluation of the Criteria is provided by the Scenario, however, in case certain Criteria require additional contextualisation or evaluation instructions, these can exceptionally be provided by means of **EvaluationContext** which is related to a resource.

Finally, an Assessment might trigger another related Assessment of different content with its own Scenario and Criteria. Note that it is also possible to model work in progress, expressed by having the Assessment defining optional links to Scores, Statements, reports, and summaries.

3.4. ELIS Overview

This section explains how ELIS is connected with DCAT, the CSSV, and the CAV. The figure below shows a conceptual overview of how the ELIS is connected:

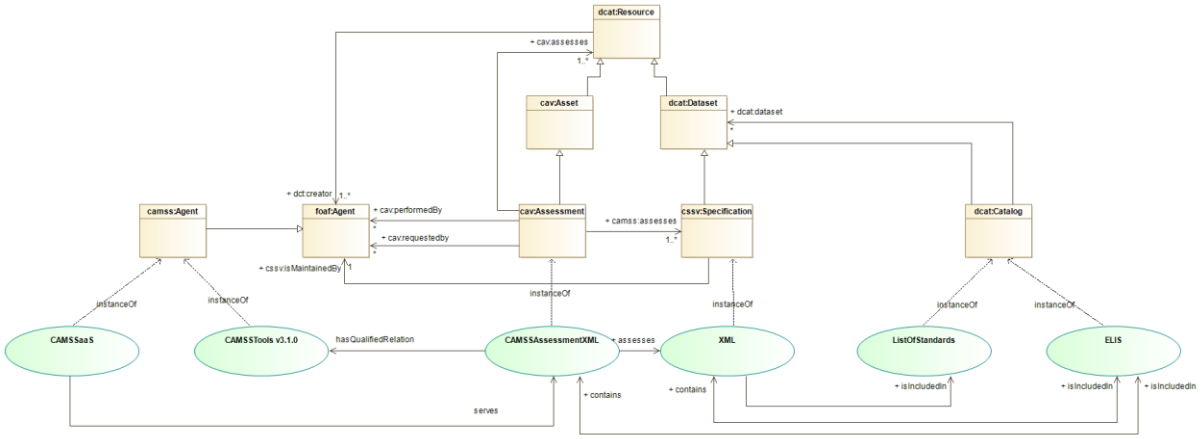

Figure 4: ELIS Conceptual Overview

It is important to consider the following.

- The ELIS Catalogue is instantiated using the DCAT class Catalog.
- The ELIS Catalogue has as many entries as instances of DCAT CatalogRecord(s). One CatalogRecord is composed of metadata about each entry in the ELIS Catalogue representing one CSSV Specification.

- The Primary Topic of an ELIS Catalogue Record is always a Specification, a Standard, an Application Profile, or a Family, which are implemented as a DCAT DataSet.

- The Primary Topic always has a Distribution that points to the web page where the specification is available.

- Some Specifications have associated Assessments that also have Distributions that point to the Joinup page where can be downloaded.

- Notice that some entities are associated with a domain expressed as dcat:theme and the ELIS T-box, which defines the structure.

    - The ***Interoperability Specification Domain*** helps to contextualise the area/domain that the specifications included in ELIS are addressing. It is worth noting that one specification can have multiple domains depending on the association with ABBs and its context. In these cases, specs can be considered as multi-domain or cross-domain, but since the ELIS is also referring to EIRA views, it needs to be specified.

    - The ***ELIS T-Box*** provides the structure of the library according to CSSV and CAV.

- Additionally, each EIRA Interoperability Specification can express its interoperability aspects via the association to one or other EIRA ABB as defined in EIRA[1] (expressed as SKOS Concepts).

The language chosen to represent the ELIS is the Terse RDF Triple Language (Turtle)[2]. Turtle is a textual syntax for Resource Description Framework (RDF) that allows an RDF graph to be completely written in a compact and natural text form, with abbreviations for common usage patterns and data types. Turtle provides levels of compatibility with the N-Triples [N-TRIPLES] format as well as the triple pattern syntax of the SPARQL W3C Recommendation.

Additionally, the ELIS will be available through the OP's CELLAR SPARQL endpoint: http://publications.europa.eu/webapi/rdf/sparql. A set of SPARQL queries can be found in Annex III. These queries can be executed in the endpoint to retrieve data from the ELIS.

[1] EIRA v4.0.0 SKOS: https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira/distribution/eira-v400-skos

[2] RDF 1.1. Turtule: https://www.w3.org/TR/turtle/

4

ELIS v1.1.0

4. ELIS V1.1.0

4.1. Excel version

Access the document here: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/distribution/elis-catalogue-v110xlsx

4.2. DCAT version

Access the document here: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/distribution/elis-catalogue-v110ttl

5

ELIS Factsheet and Dashboard

5. ELIS FACTSHEETS AND DASHBOARD

This section contains the ELIS Dashboard which shows the overview of the ELIS metrics and characteristics regarding its population.

ELIS Dashboard

6

ACRONYMS

6. ACRONYMS

Acronym	Description
ABB	Architecture Building Block
CSSV	Core Standards and Specifications Vocabulary
DCAT	Data Catalogue Vocabulary
EIF	European Interoperability Framework
EIRA	European Interoperability Reference Architecture
ELIS	EIRA Library of Interoperability Specifications
RDF	Resource Description Framework
SKOS	Simple Knowledge Organisation System
SPARQL	SPARQL Protocol and RDF Query Language
Turtle	Terse RDF Triple Language

7

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7. REFERENCES

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ANNEX I: ELIS T-Box

ANNEX I – ELIS T-BOX

Access the document here: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/distribution/elis-t-box-v110

ANNEX II: ELIS T-Box

ANNEX II – EIRA 4.0.0

Access the document here: https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira/distribution/eira-v400-skos

ANNEX III: ELIS SPARQL Queries

ANNEX III – ELIS SPARQL QUERIES

Access the document here: https://github.com/isa-camss/ELIS/blob/master/doc/sparql.zip

An action supported by ISA²

ISA² is a EUR 131 million programme of the European Commission which develops digital solutions that enable interoperable cross-border and cross-sector public services, for the benefit of public administrations, businesses and citizens across the EU. ISA² supports a wide range of activities and solutions, among which is the Interoperability Maturity Assessment of a Public Service (IMAPS) action.
ISA² solutions can be used free of charge and are open source when related to IT.

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