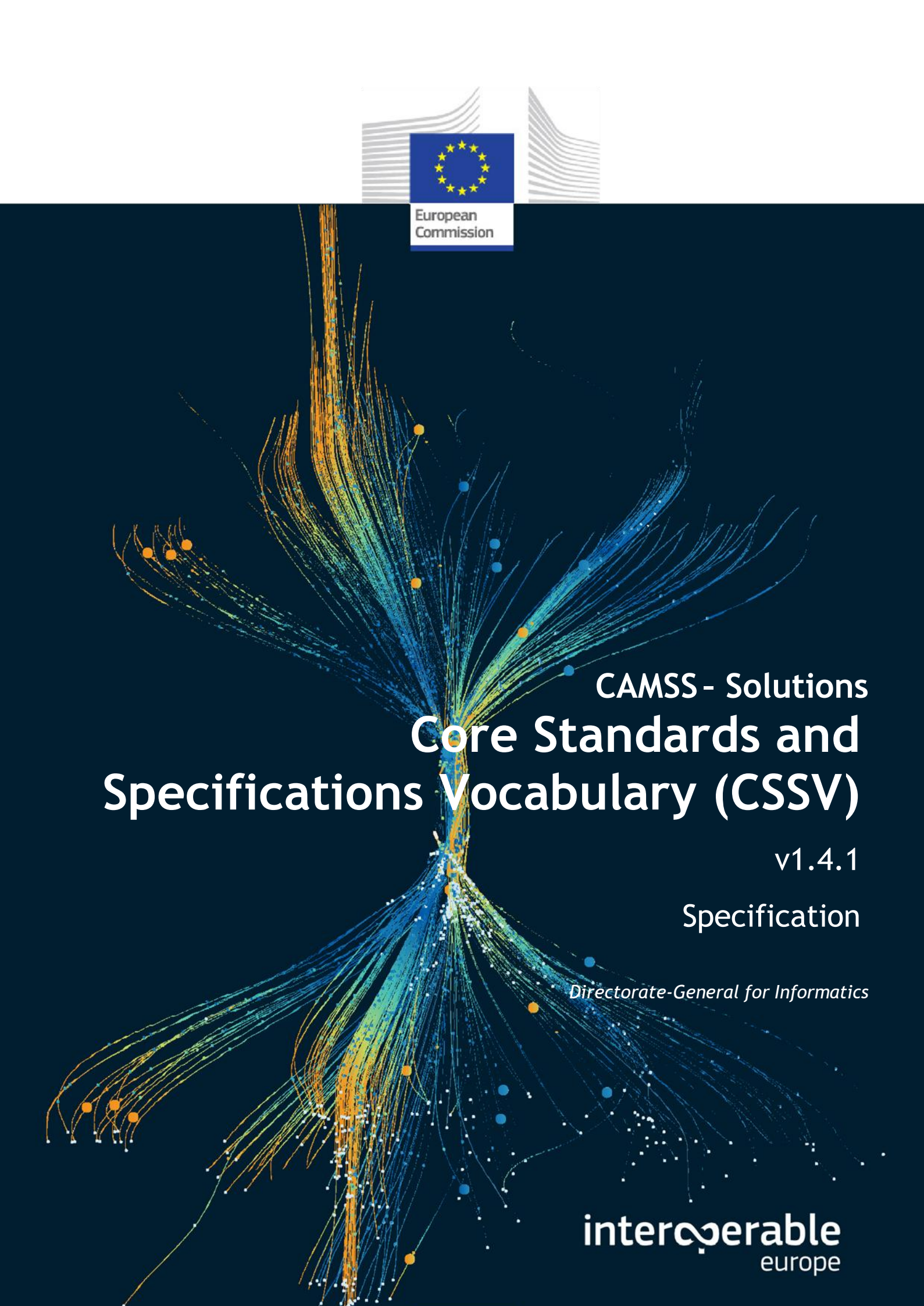

CAMSS - Solutions

Core Standards and Specifications Vocabulary (CSSV)

v1.4.1

Specification

Directorate-General for Informatics

interoperable europe

CHANGE CONTROL

Modification	Details
Version 1.4.1	
Current version	**This is a bug fixing release of the CSSV Vocabulary including the following changes:** **- Best practices on namespace definition in the CSSV T-Box: empty prefix and base were removed.** **- OWL representations of external terms redefining their meaning have been removed from the T-Box.** **- References to the redefinition of these late terms have been removed from this document for consistency.** **- A restriction on the dcat:previousVersion has been added with regards to the CSSV Specification class.**
Version 1.4.0	
Last version	**Main changes for this minor version of the Vocabulary are:** **- Alignment with SEMIC style guide practices.** **- CSSV update regarding with new versions of DCAT v3.** **- In the T-box, a new property for recommending the use of specifications was added.**
Version 1.3.0	
	Main changes for this minor version of the Vocabulary are: - Refinement of Specification and Standard's definition. - Refinement of Specification's versioning. - Alignment of CSSV T-box and CSSV specification. - Adoption of the schema:contactPoint relationship for expressing the Agent who maintains the Specification. - Recovery of the cssv:alternative attribute. - Addition of the dcat:downloadURL attribute.
Version 1.2.0	
	This minor release of the CSSV includes: - The class cssv:Scope has been removed. - The cssv:Specification class inherits from the DCAT the attribute dcat:Version to identify the version of the specification. - Addition of the attribute cssv:acronym in the class cssv:Specification and the attribute dct:alternative has been removed.
Version 1.1.0	
	This minor release of the CSSV includes: - Use of the latest of version of DCAT.

	- The class adms:Asset has been replaced by dcat:Resource. - The dcat:Resource class has a dct:creator which is a foaf:Agent. - Addition of the class schema:ContactPoint.
Version 1.0.0	
Initial version	

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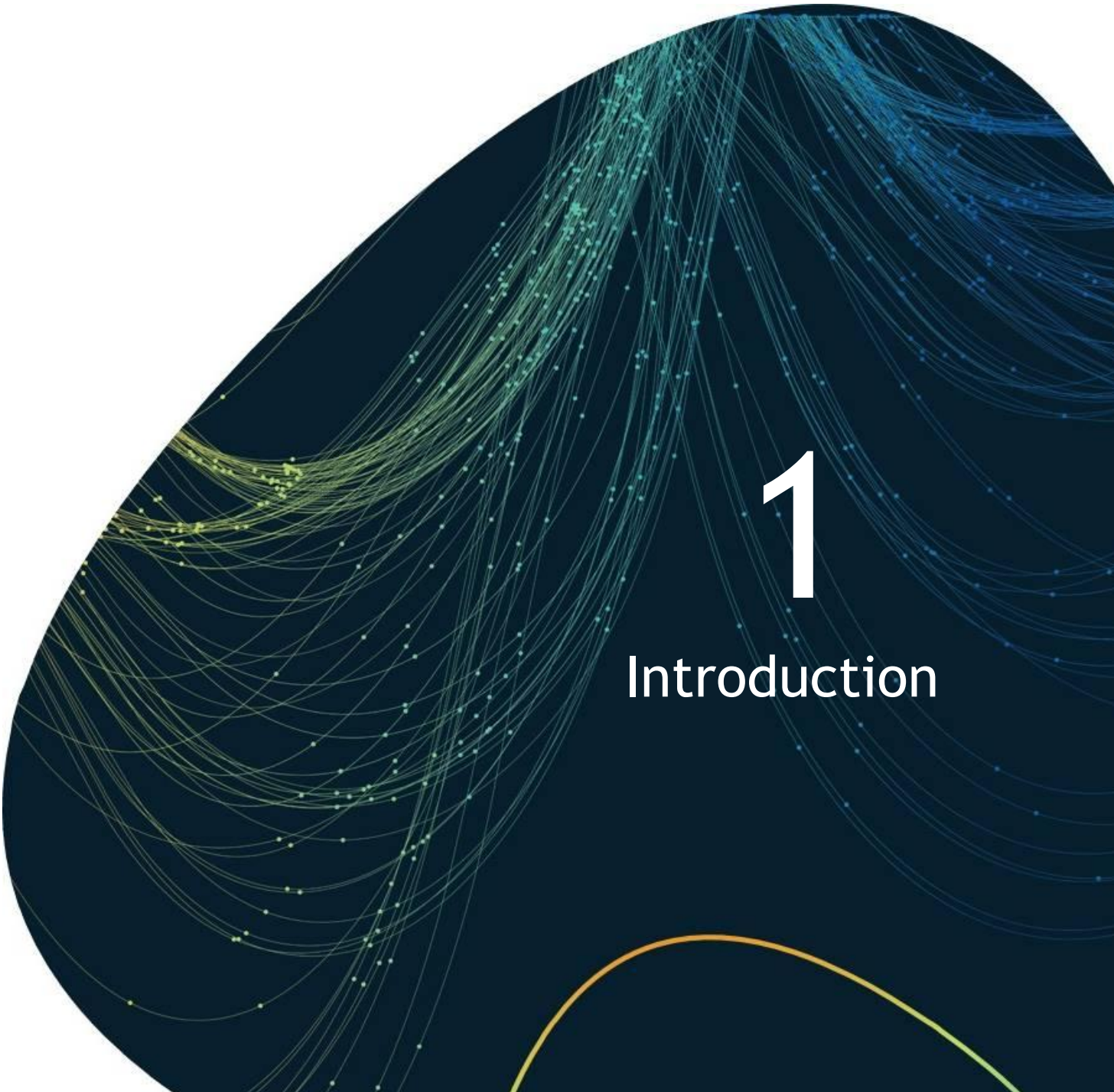
Intellectual Property Rights:

Foreword

This Specification has been produced by the Common Assessment Method for Standards and Specifications (CAMSS) Team, a Digital Europe (DEP) Programme initiative in alignment with the European Standardisation Regulation 1025/2012.

TABLE OF CONTENTS



1

Introduction

1. Introduction

The CSSV is the vocabulary used for the information exchange related to standards and specifications amongst software solutions, as well, it is the key element for the development and maintenance of the EIRA Library of Interoperability Specifications (ELIS[1]).

1.1 Context

The DEP Programme of the European Commission supports the development of solutions that enable the cross-border delivery of interoperable public services in Europe. In order to ensure the interoperability of those 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©[2]).

As an element of EIRA©, the EIRA Library of Interoperability Specifications (ELIS) was created. The ELIS contains the specifications describing the interoperability requirements of the architecture building blocks (ABBs) that conform to EIRA©.

At the core of the ELIS, there is also another asset developed in the context of the CAMSS action that shall be referenced which has been further developed: the Core Standards and Specifications Vocabulary (CSSV).

1.2. Objective and Scope of the document

The objective of this document is to provide an interoperability-oriented solution for the information exchange related to standards and specifications amongst software solutions, the Core Standards and Specifications Vocabulary.

The scope of this document encompasses the following.

- Conceptual data models used for the CAMSS Vocabulary.
- Constraints and rules specific to the CAMSS domain.
- A reference implementation of the A-Box as an OWL Turtle syntax.

In addition, this vocabulary has been publicly analysed to create a stable version of the vocabulary.

The CSSV has been reviewed by a group of experts contributing to the new release of the vocabulary.

[1] ELIS: https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis
[2] EIRA: https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/about

1.3 Methodological approach

The CSSV defined in this document is a minor release of the vocabulary. As its precedent release, the CSSV is created for the development of the ELIS.

The approach followed for the development of the CSSV adheres to three fundamental principles.

1. Reuse and share when possible (i.e., do not reinvent the wheel).
2. Do not betray the knowledge and experience of the domain, nor the terminology and interpretation of the concepts (i.e., do not invent new terms when they already exist in the communities of practice or generic domains).
3. Isolate technical and business constraints and rules as much as possible (i.e., externalise them in separate artefacts, for example, graph and data shapes for the control and validation of the data). This has a great impact on the quality and cost of the implementation, as well as the maintenance of the vocabulary.
4. One way of facilitating the semantic interoperability consists of reusing existing generic ontologies and vocabularies. This way, the semantics of common concepts and properties are agreed upon without the need for re-discussion. When concepts or properties have not been identified nor defined for the purposes pursued, they must be proposed as either extensions, or from scratch.

The methodological approach followed for the development of the CSSV reuses the following ontologies and vocabularies.

- Data Catalogue Vocabulary (DCAT);
- Friend of a Friend (FOAF);
- The Organization Ontology;
- DCMI Metadata Terms (DCTerms);
- The Profiles Vocabulary (PROF);
- Schema.

The rationale for defining this vocabulary goes as follows.

1. No generic ontologies or vocabularies have been found defining what an Assessment is that fulfils the purposes of CAMSS, partially or totally (e.g., some initiatives define methodologies for assessment, but not ontologies or vocabularies).
2. Existing concepts in other ontologies did not cover all the information requirements needed in CSSV and had to be reused or specialised by new classes.
3. Concepts and properties existing in other ontologies have different semantics to those needed in CSSV.
4. Concepts required in CSSV have not been identified in any other existing ontologies and therefore needed to be defined.
5. Given this is “Core” vocabulary, a key goal is to make it as flexible as possible. This means that predicates are set with optional and multiple cardinality (0..n) unless there is a strong reason for further restriction.

1.4 Structure of this document

This document consists of the following sections.

- Section 2 describes the related solutions to the Core Standards and Specifications Vocabulary (CSSV).
- Section 3 explains the CSSV model and identifies the classes and properties defined for the vocabulary.
- Section 4 contains the Conformance Statement for this vocabulary.
- Section 5 describes how CSSV is compliant with the FAIR principles.
- Section 6 describes specific accessibility and multilingualism aspects.
- Section 7 lists the different acronyms used in the whole document.
- Section 8 contains related references.

2

RELATED SOLUTIONS

2. Related Solutions

This section lists the different CSSV related solutions. Note that some are still under development.

2.1 EIRA Library of Interoperability Specifications (ELIS)

The ELIS is a family of interoperability specifications that define the interoperability aspects of the Architecture Building Blocks (ABBs) contained in EIRA©. ELIS aims to support architects for the modelling of solutions based on EIRA©. The current version of ELIS will need to be slightly revamped to accommodate the concepts defined in the CSSV and to support the requirement of all stakeholders, e.g., EIRA-based solution developer needs, NATO profiles, and others.

2.2 2.2. Core Assessment Vocabulary[3] (CAV)

The Core Assessment Vocabulary represents, expresses, and defines what an "Assessment" of "Assets" is and how to perform the assessment based on "Criteria". It is a domain-agnostic vocabulary, meaning that it can be used to assess any asset.

2.3 Data Catalogue Vocabulary[4] (DCAT)

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).

The figure below shows the DCAT conceptual data model with its classes and properties :

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

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

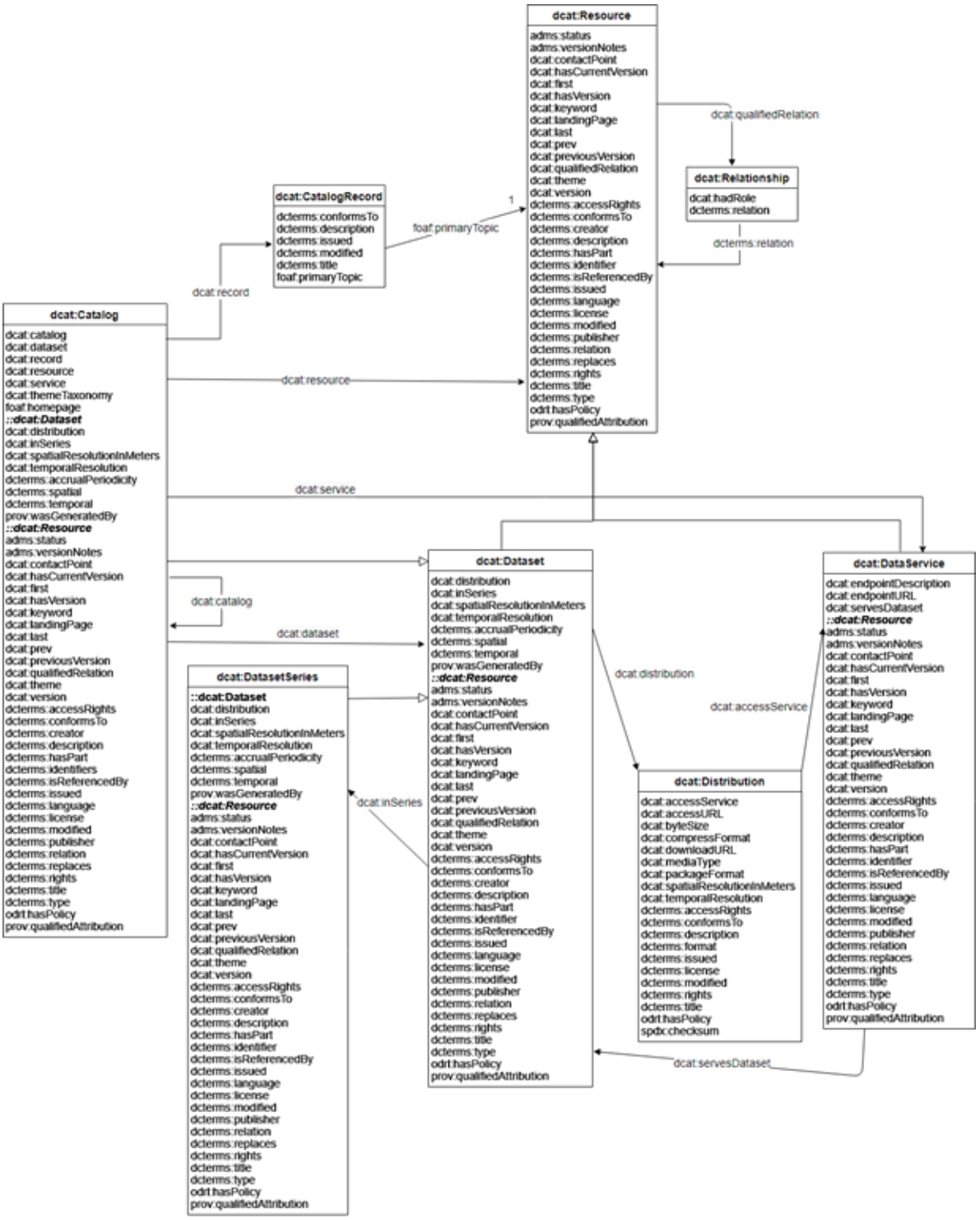
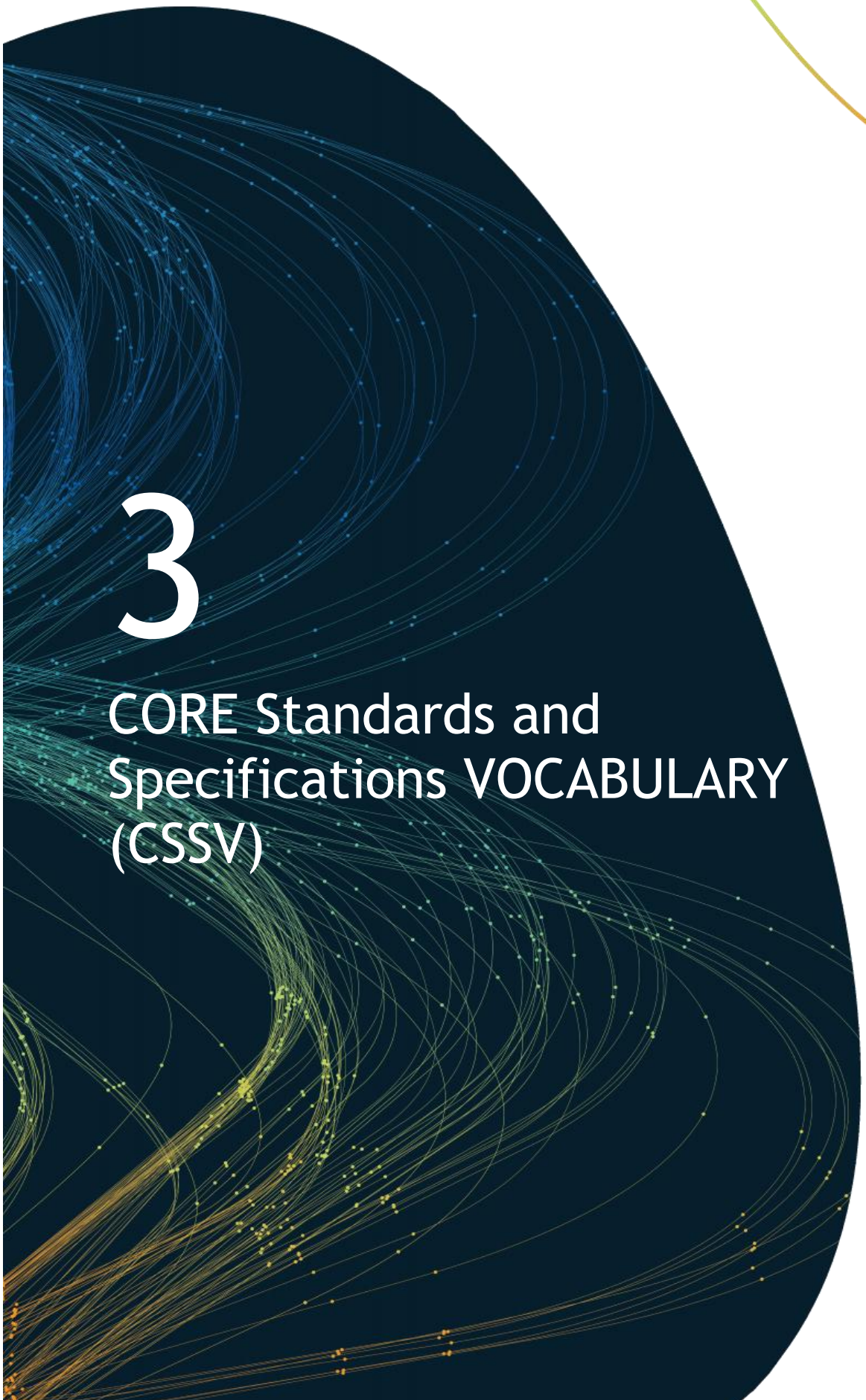


Figure 1: DCAT classes and properties

In the CSSV model, the class Specification can be considered the “root” class and is a “Resource” as defined in DCAT.



3

CORE Standards and Specifications VOCABULARY (CSSV)

3. Core Standards and Specifications Vocabulary (CSSV)

The CSSV is the vocabulary used for the information exchange related to standards and specifications amongst software solutions, as well, it is the key element for the development and maintenance of the EIRA Library of Interoperability Specifications (ELIS).

The Core Standards and Specifications Vocabulary is depicted in Figure 2 CSSV Data model. The figure shows the classes and properties that are used or defined in the CSSV.

3.1 Data Model for the CSSV

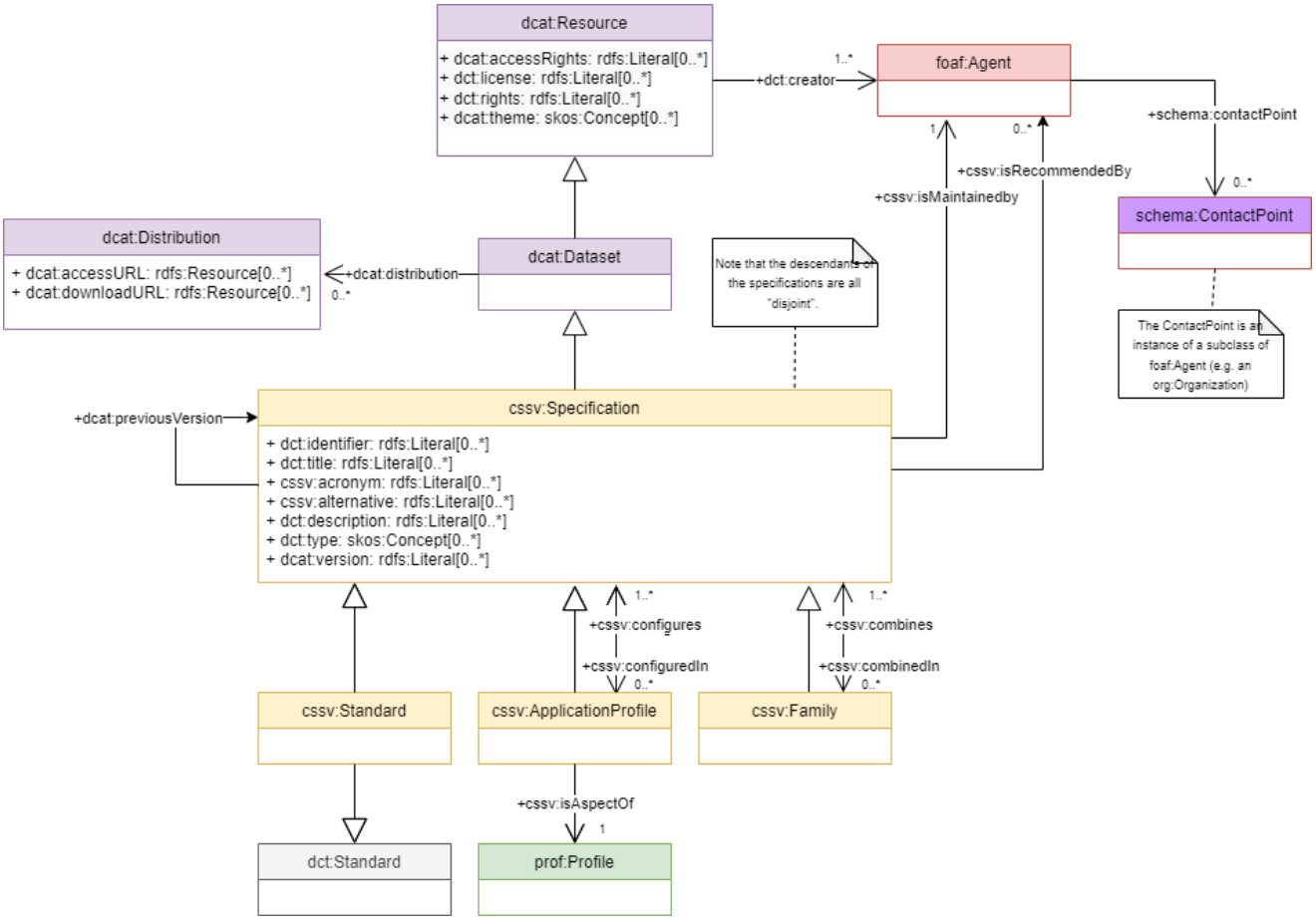


Figure 2: The Core Standards and Specifications Vocabulary

3.1.1. Interpretation

The main class of the CSSV model is the "Specification". A conceptual approach to define Specification is by aligning with the one undertaken by Joinup[6].

[6] Joinup conceptual model and implementation of an asset. See ADMS-AP version 2.0.1: https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/asset-description-metadata-schema-adms/distribution/adms-ap-version-201-pdf

As represented in the conceptual model of the CSSV, a Specification is an asset, since it inherits from the dcat:Dataset, which inherits from the dcat:Resource. A Specification, beside a document, can be a Standard, an Application Profile, and or a Family or a collection of other specifications. The CSSV model defines:

- Specification, which describes precise requirements that are needed for the implementation of a solution. A specification is not necessarily a standard.
- A Standard as a specification that has reached a certain maturity and widespread adoption and potentially endorsed, meaning that is recognized and supported by a community or sanctioned by an authority.
- An 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".
- A Family as a collection of interrelated and/or complementary specifications, standards or application profiles and the explanation of how they are combined, used, or both.

A collection of Specifications differs from a Family of Specifications in the fact that the relationship amongst themselves is not explicit. In the CSSV model, a collection of Specifications is an Asset that is related to other Assets and that is realised as an individual of a Specification. In other words, a Specification that reuses the dct:relation property of its base class dcat:Resource.

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, Application Profiles and Families are Specifications that refer to or put together with other Specifications and/or Standards, but cannot themselves be considered Standards.

One Specification, in time, 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[7]: 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 great flexibility to the CSSV model as foaf:Agent is the base class in many ontologies. Moreover, a foaf:Agent may represent a member state that recommends the a Specification; the property cssv:isRecommendedBy is introduced for this end. The CSSV puts forward the reuse of the Core Person Vocabulary (ISA2 CPV) and the Organization Ontology (W3C Org) for this purpose. Also, the foaf:Agent also provides the contact point of the specification.

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

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

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

3.2 Class:Specification

OWL Class	**cssv:Specification**
Label	Specification
Definition	Document with normative guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services conform to one or a set of requirements (ISO). Specifications are the cornerstone of interoperability, as they set the grounds for the design and development of interoperable and reusable solutions based in common services at the lowest level.
Subclass of	dcat:Dataset

3.2.1 Property: previousVersion

OWL Property	dcat:previousVersion
OWL type	owl:ObjectProperty
Label	previousVersion
Definition	The previous version of a resource in a lineage.
~~Domain~~	~~cssv:Specification~~
Usage note:	The URI identifying the previous version of the specification.
~~Range~~	~~cssv:Specification~~
Cardinality	0..n
~~Cardinality~~	~~0..1~~

3.2.1 Property: configuredIn

OWL Property	cssv:configuredIn
OWL type	owl:ObjectProperty
Label	configuredIn
Definition	A set of Specifications potentially for a given use case or policy domain that are aggregated in an ApplicationProfile.
Domain	cssv:Specification
Range	cssv:ApplicationProfile
Cardinality	0..n

3.2.1 Property: combinedIn

OWL Property	cssv:combinedIn
OWL type	owl:ObjectProperty
Label	combinedIn

Definition	A set of Specifications that are complementary and interrelated, forming a Family of Specifications.
Domain	cssv:Specification
Range	cssv:Family
Cardinality	0..n

3.2.1 Property: isMaintainedBy

OWL Property	**dct:type**
OWL type	owl:ObjectProperty
Label	isMaintainedBy
Definition	The Person, Organisation responsible to update and maintain the specification.
Domain	cssv:Specification
Range	foaf:Agent
Cardinality	1..n

3.2.1 Property: isRecommendedBy

OWL Property	**dct:type**
OWL type	owl:ObjectProperty
Label	isRecommendedBy
Definition	A link to any other person or organisation that recommends the specification.
Domain	cssv:Specification
Range	foaf:Agent
Cardinality	0..n

3.2.1 Property: identifier

OWL Property	dct:identifier
~~OWL~~ RDF type	~~owl~~rdf:~~Data~~Property
Label	identifier
Definition	An unambiguous reference to the resource within a given context.~~This property contains the main identifier for the specification, e.g. the URI or another unique identifier.~~
Range	rdfs:Literal
Property Type	xsd:anyURI
Usage note:	This property contains the main identifier for the specification, e.g. the URI or another unique identifier.
Cardinality	0..n
~~Cardinality~~	~~1~~

3.2.1 Property: title

OWL Property	dct:title
RDF type~~OWL type~~	rdf:Property~~owl:DataProperty~~
Label	title
Definition	A name given to the resource.~~The name given to the Specification.~~
Range	rdfs:Literal
Property Type	xsd:string, rdf:langString
Usage note:	The name given to the specification.
Cardinality	0..n
~~Cardinality~~	~~1~~

3.2.1 Property: acronym

OWL Property	cssv:acronym

OWL type	~~owl:DataProperty~~owl:DatatypeProperty
Label	acronym
Definition	Abbreviation of the specification.
Range	rdfs:Literal
Property Type	xsd:string, rdf:langString
Cardinality	1

3.2.1 Property: alternative

OWL Property	**cssv:alternative**
OWL type	~~owl:DataProperty~~owl:DatatypeProperty
Label	alternative
Definition	The alternative name of the specification. Additional information: The alternative title for a Specification is optional. CAMSS aims to standardise the names of specifications as a reference at EU level. However, the title of a Specification might, distinct to the provided by CAMSS, may be widely used in the community.
Range	rdfs:Literal
Property Type	xsd:string, rdf:langString
Cardinality	0..n

3.2.1 Property: description

OWL Property	**dct:description**
RDF type~~OWL type~~	rdf:Property~~owl:DataProperty~~
Label	description
Definition	An account of the resource.~~This property contains a free-text account of the Specification. This property can be repeated for parallel language versions of the description.~~
Range	rdfs:Literal

Property Type	xsd:string, rdf:langString
Usage note:	This property contains a free-text account of the specification. This property can be repeated for parallel language versions of the description.
Cardinality	0..n
~~**Cardinality**~~	~~0..n~~

3.2.1 Property: type

OWL Property	**dct:type**
RDF type~~**OWL type**~~	rdf:Property~~owl:DataProperty~~
Label	type
Definition	The nature or genre of the resource.~~This property refers to the type of the Specification. A controlled vocabulary for the values has not been defined for the time being. A proposal is provided in the examples below.~~
~~**Range**~~	~~skos:Concept~~
Usage note:	This property refers to the type of the specification. A controlled vocabulary for the values has not been defined for the time being.
Cardinality	0..n
~~**Cardinality**~~	~~0..n~~

3.2.1 Property: accesRights

OWL Property	**dct:accessRights**
RDF type~~**OWL type**~~	rdf:Property~~owl:DataProperty~~
Label	accessRights
Definition	Information about who can access the resource or an indication of its security status.
~~**Range**~~	~~rdfs:Literal~~
~~**Property Type**~~	~~xsd:anyURI~~
Cardinality	0..n

3.2.1 Property: license

OWL Property	dct:license
RDF type~~OWL type~~	rdf:Property~~owl:DataProperty~~
Label	license
Definition	A legal document giving official permission to do something with the resource.~~A legal document under which the resource is made available.~~
~~Range~~	~~rdfs:Literal~~
~~Property Type~~	~~xsd:anyURI~~
Usage note:	A legal document under which the resource is made available.
Cardinality	0..n
~~Cardinality~~	~~0..n~~

3.2.1 Property: rights

OWL Property	dct:rights
RDF type~~OWL type~~	rdf:Property~~owl:DataProperty~~
Label	rights
Definition	Information about rights held in and over the resource.~~A statement that concerns all rights not addressed with dct:license or dct:accessRights, such as copyright statements.~~
~~Range~~	~~rdfs:Literal~~
~~Property Type~~	~~xsd:anyURI~~
Usage note:	A statement that concerns all rights not addressed with dct:license or dct:accessRights, such as copyright statements.
Cardinality	0..n
~~Cardinality~~	~~0..n~~

3.2.1 Property: version

OWL Property	~~pav~~dcat:version
OWL type	~~owl:DataProperty~~owl:DatatypeProperty

Label	version
Definition	The version indicator (name or identifier) of a resource.~~The version number of a resource. This is a free text string, typical values are "1.5" or "21". The URI identifying the previous version can be provided using prov:previousVersion.~~
~~**Range**~~	~~rdfs:Literal~~
~~**Property Type**~~	~~xsd:anyURI~~
Usage note:	The version number of a resource. This is a free-text string, typical values are “1.5” or “21”. The URI identifying the previous version can be provided using dcat:previousVersion.
Cardinality	0..n
~~**Cardinality**~~	~~0..n~~

3.3 Class: Standard

OWL Class	**cssv:Standard**
Label	Standard
Definition	Specification that has reached a certain maturity and widespread adoption and potentially endorsed.
Subclass of	cssv:Specification, dct:Standard

3.4 Class: ApplicationProfile

OWL Class	**cssv:ApplicationProfile**
Label	ApplicationProfile
Definition	An application profile “customises 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)”.
Subclass of	cssv:Specification

3.4.1. Property: configures

OWL Property	cssv:configures
OWL type	owl:ObjectProperty
Label	configures
Definition	Whether an Application Profile design or adapts a Specification for a specific purpose.
Domain	*cssv:ApplicationProfile*
Range	*cssv:Specification*
Cardinality	0..n

3.4.3. Property: ~~cssv:~~isAspectOf

OWL Property	cssv:isAspectOf
OWL type	owl:ObjectProperty
Label	isAspectOf
Definition	ApplicationProfile is a part of a Profile.
Domain	*cssv:ApplicationProfile*
Range	*prof:Profile*
Cardinality	0..n

3.5 Class: Family

OWL Class	cssv:Family
Label	Family
Definition	A family is a collection of interrelated and/or complementary specifications, standards, or application profiles and the explanation of how they are combined, used, or both.

Subclass of	cssv:Specification

3.4.3. Property: combines

OWL Property	**cssv:combines**
OWL type	owl:ObjectProperty
Label	combines
Definition	Whether a Family is a union of more than one Specifications.
Domain	*cssv:Family*
Range	*cssv:Specification*
Cardinality	0..n

4

CONFORMANCE STATEMENT

4. Conformance Statement

A data interchange of Standards or Specifications, however that interchange occurs, is conformant with the CSSV if:

- it uses the terms (classes and properties) in a way consistent with their semantics as declared in this specification;
- it does not use terms from other vocabularies instead of ones defined in this vocabulary that could reasonably be used.

A conforming data interchange:

- may include terms from other vocabularies;
- may use only a subset of CSSV terms.

The CSSV is technology-neutral and a publisher may use any of the terms defined in this document encoded in any technology although RDF and XML are preferred.

5

FAIR principles conformance

5. FAIR principles conformance

The CSSV is compliant with the following aspects of the FAIR (Findable, Accessible, Interoperable, Reusable) principles:

Findable:

- The main properties of the CSSV have a unique identifier throughout it and the metadata is registered with the identifier as the description. The properties are also indexed through their classes.

e.g.

Each class in the CSSV, such as cssv:Specification, can be assigned with a unique identifier. Metadata associated with cssv:Specification is stored and indexed, making it searchable and easy to locate by its identifier.

Accessible:

- The CSSV is an open source element, meaning that is free, open and universally implementable.

e.g.

The CSSV is hosted in a public GitHub repository and is accessible via an open URL (e.g., https://github.com/isa-camss/CSSV). Anyone can download, implement, or contribute to the vocabulary without restrictions.

Interoperable:

- The CSSV is based on open specifications. Furthermore the data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

e.g.

The CSSV defines terms using RDF (Resource Description Framework), a standard, machine-readable format, ensuring that data can be seamlessly exchanged between systems regardless of their underlying platforms.

Reusable:

- In the CSSV the data is structured so it can be used in multiple settings, in this sense it is a domain agnostic vocabulary.
- The CSSV can be extended for designing new data models according to the users' needs, while still ensuring the interoperability.

e.g.

The property cssv:identifier is defined generically, allowing it to be used for any type of entity (e.g., persons, organisations, or products). This flexibility ensures that the CSSV can support data models in various domains.

6 ACCESSIBILITY AND MULTILINGUAL ASPECTS

6. Accessibility and Multilingual Aspects

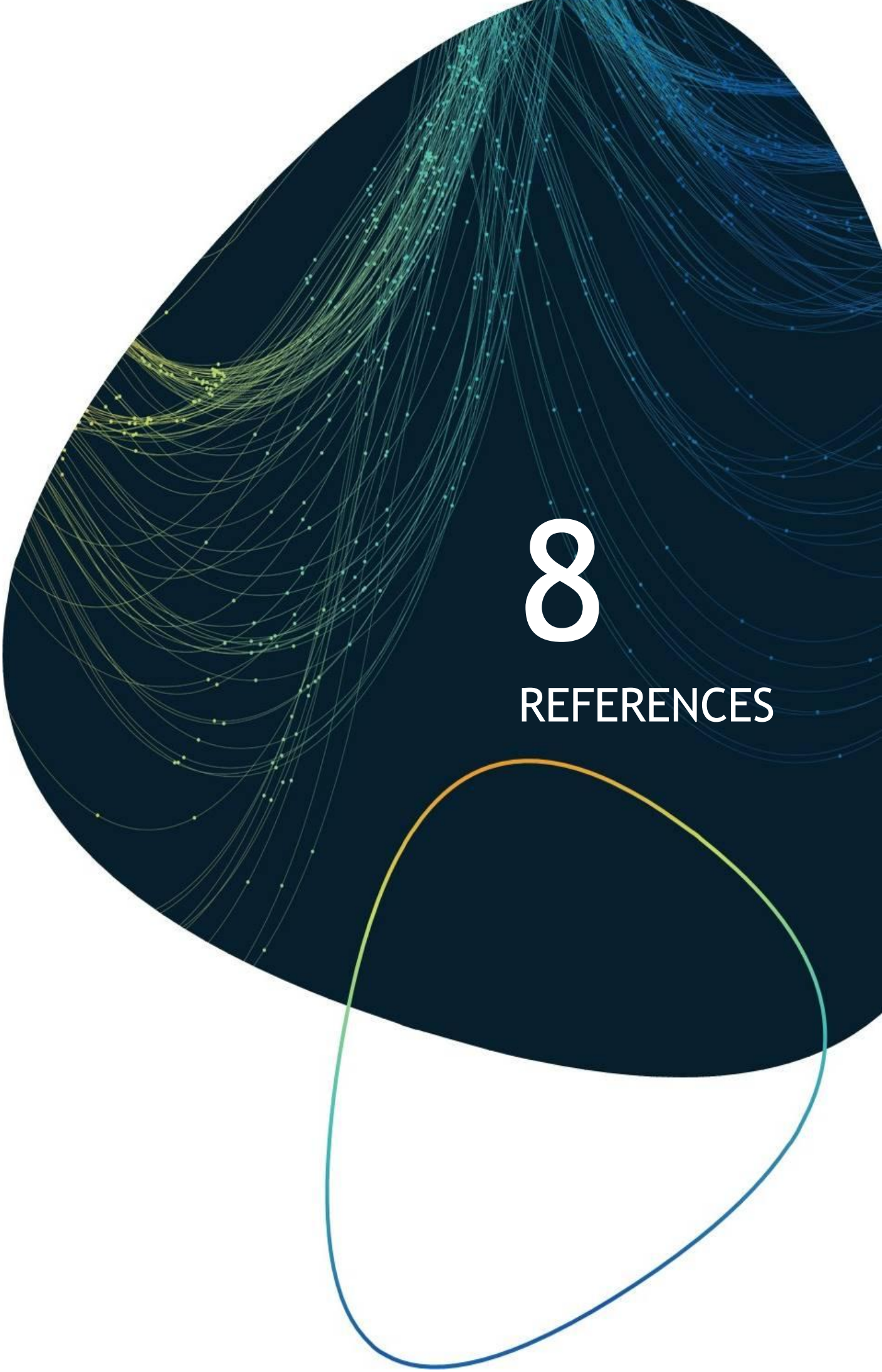
The CSSV can operate in any language due to the following.

- In a multilingual context, with all properties that are datatype “Text”, the value may exist in multiple languages, the property may be instantiated multiple times and tagged with the language identifier for the value used for that property.
- The CSSV specification encourages the use of PURIs as identifiers.

7 ACRONYMS

7. Acronyms

Term	Description
CAV	Core Assessment Vocabulary
EIRA©	European Interoperability Reference Architecture
CSSV	Core Standards and Specifications Vocabulary
DCAT	Data Catalogue Vocabulary
ELIS	EIRA Library of Interoperability Specifications
ABBs	Architecture Building Blocks
SEMIC	Semantic Interoperability Community
PAV	Provenance, Authoring and Versioning
PROF	The Profiles Vocabulary
SKOS	Simple Knowledge Organization System
RDF	Resource Description Framework



8

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Annex 1

CSSV Model

Annex 1: CSSV Model

cssv_tbox.ttl

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