**D5.1.2 - Core Public Service Vocabulary specification**

Deliverable

Document Metadata

|  |  |
| --- | --- |
| **Property** | **Value** |
| Release date | *17/01/2013* |
| Status | *Draft* |
| Version | *0.04* |
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Document History

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Description** | **Action** |
| 0.01 | *29/10/2012* | *Creation (ToC)* | *Creation* |
| 0.02 | *15/11/2012* | *Initial thoughts, concepts scheme etc.* | *Update* |
| 0.03 | *04/01/2013* | *Update following first two telcos* | *Update* |
| 0.04 | *17/01/2013* | *Update following 9/1/13 telco* | *Update* |

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# Introduction

## About the ISA Programme

This specification has been created as part of Action 1.1 [A1.1] of the Interoperability solutions for European public administrations (ISA) programme of the European Commission (EC). This programme funds initiatives to foster the efficient and effective cross-border electronic interactions between European public administrations. Action 1.1 of this programme is targeted towards improving the semantic interoperability of European e-Government systems. It addresses these by encouraging the sharing and reuse of semantic assets. As part of Action 1.1, the ISA Programme intends to build consensus on a number of e-Government Core Vocabularies for public sector information exchange.

## Terminology

This document uses the following terminology:

**Semantic interoperability** is defined as the ability of information and communication technology (ICT) systems and the business processes they support to exchange data and to enable the sharing of information and knowledge: *Semantic Interoperability enables systems to combine received information with other information resources and to process it in a meaningful manner* (European Interoperability Framework 2.0[[1]](#footnote-1)). It aims at the mental representations that human beings have of the meaning of any given data.

A **Core Vocabulary** is a simplified, reusable, and extensible data model that captures the fundamental characteristics of an entity in a context-neutral fashion [EGOV-CV]. Well known examples of existing Core Vocabularies include the Dublin Core Metadata Set [DC]. Such Core Vocabularies are the starting point for agreeing on new semantic interoperability assets and defining mappings between existing assets. Semantic interoperability assets that map to or extend such Core Vocabularies are the *minimum required* to guarantee a level of cross-domain and cross-border interoperability that can be attained by public administrations.

## Objectives

The Core Public Service Vocabulary (CPSV) is designed to make it easy to exchange basic information about the functions carried out by the public sector and the services in which those functions are carried out. By using the vocabulary, almost certainly augmented with sector-specific information, organisations publishing data about their services will enable:

* easier discovery of those services
* easier discovery of the legislation and policies that underpin service provision;
* easier recognition of how services provided by a single organisation interrelate and are used either by other services or external users;
* easier comparison of service provision across different organisations.

## Scope

Any description of a public service will fit into a broader data set; for example: service users, metrics, outcomes, incidents and reports are all concepts likely to impinge on a service. In order to complete the current work in timely fashion, it is necessary to limit the scope and focus specifically on the core aspects of a service, recognising that it must fit in with existing and future vocabularies. That said, the CPSV must be broad enough so that it provides a framework for publishing data that is immediately useful and does not automatically require the addition of terms that would need to be defined in future work.

At its simplest, a public service is the capacity to carry out a procedure and exists whether it is used or not. It is a set of deeds and acts performed by or on behalf of a public agency for the benefit of a citizen, a business or another public agency. Public services operate according to rules that are derived from some combination of legislation and policy which can be set at local, national or supranational level. We further stipulate that a public service:

* is atomic, meaning that its use can be triggered by businesses, citizens or other public administrations;
* usually requires information that is checked before the public administration issues an official decision that is registered in a system (in an automatic or manual way).

# Motivation

The **metadata** and **reference data** used in electronic public services across Europe most often has a very specific context. Attaining consensus on common metadata and reference data for these electronic services is a *critical* step towards semantic interoperability. Unfortunately, consensus building is hindered by the diverse cultural, multi-lingual, legal, and organisational contexts of these e-Government services. To alleviate this problem, consensus building should start at a higher level of abstraction that surpasses the contexts of individual electronic public services, and thus the cultural, lingual, legal, and organisational differences of individual countries. In particular, consensus can be more easily attained on the semantics of a *small* set of fundamental concepts, for which less divergent opinions exist [EGOV-CV]. These concepts are what we describe as Core Vocabularies.

## Use cases

[See WG page on Joinup]

## Related work

Before embarking on the development of the CPSV, the working group notes and in many cases draws directly upon the following existing initiatives:

* The UK Public Sector Concept Model [PSCM]
* DG DIGIT's Catalogue of Services [ISA13]
* Vocabulario de trámites y servicios públicos [VTSP]
* ESD Toolkit Service List [SL4]
* KL Emnesystematik [KLE]
* Fælles Offentlig Referance Model [FORM]
* OASIS Transformational Government Framework [TGF]
* Greek Interoperability Centre Service Registry [ELSR]

[To Do - summarise similarities - will come out of WG discussion]

# Conformance Statement

A data interchange, however that interchange occurs, is conformant with the Core Public Service Vocabulary 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 Core Public Service Vocabulary terms.

A CPSV Profile is a specification for data interchange that adds additional constraints. Such additional constraints in a profile may include:

* a minimum set of required terms;
* classes and properties for additional terms not covered in the Core Public Service Vocabulary;
* controlled vocabularies or URI sets as acceptable values for properties;

The Core Public Service Vocabulary 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.

# Core Public Service Conceptual Model

## Domain model

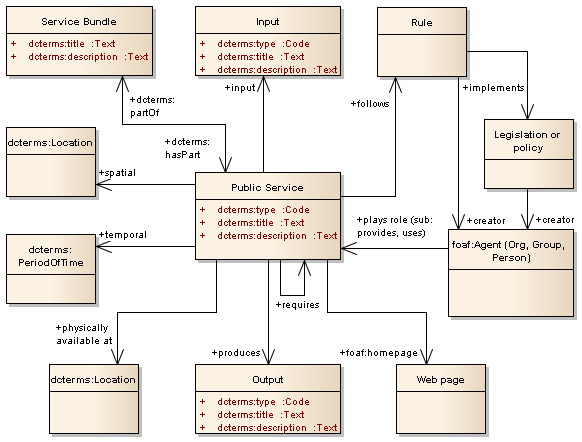


Figure UML diagram for the Core Public Service Vocabulary

The conceptual model presented in Figure 1 is independent of any technology that may be used to represent it. It describes the minimal set of classes, relationships and properties necessary to describe a public service. Properties and classes from the existing Dublin Core and FOAF vocabularies are prefixed with dcterms and foaf respectively. All others are newly minted as part of the Core Public Service Vocabulary.

At the heart of the model is the public service itself. This will very likely have a name, a description and, in many cases, will be of a specific type. For greatest interoperability, service types should be given as values from a list such as the service list used in many EU countries [SL4]. The service may be available online at the URL given as the value for the homepage property, and/or at one or more physical locations, given as the value for the physically available at property. Details of the location can be given using the Location Core Vocabulary [LOCN] or similar.

A service will almost always require some sort of input. In the case of issuing a driving licence, for example, this will be evidence that driving test has been passed; many services will require some sort of proof of ID and so on. Likewise, the output will vary depending on the specific service but there will usually be a document or other artefact that is the output, as well as a record in a database. This is not the same as the *outcome*. Drawing on the definitions used in StratML [StratML], if the service controls all of the necessary inputs and processes, the desired result is an out*put*. If not, it is an out*come*. For example, a driving licence is an out*put* - a physical change that is entirely within the control of the service that issues it. The out*come* is that the new licence holder can drive a vehicle on the public highway. How they do that, which vehicle they drive etc. is beyond the service's remit.

Public services are regulated by a set of rules. These will typically be set by a single organisation and will implement combination of legislation and policy that may be decided at any level from local to supranational by any number of bodies. The creator of the rules, policy or legislation is the body responsible for their creation, not the individual(s) who wrote them. It is notable that the Rule and Legislation or policy classes are both defined as sub classes of the FRBR class Expression [FRBR]. This allows linkage to other expressions of the same conceptual set of rules, policies or legislation.

An individual service may be part of a 'service bundle', that is, a collection of services that logically work together. One service may require the use of another.

The Agent class represents any individual, group or organisation that plays any role in the service. These include but are not limited to:

* + the public administration responsible for providing the service;
  + the public administration that defines the rules that regulate the service;
  + the person, organisation or group that uses the service;
  + the organisation(s) that deliver the service on behalf of the responsible public body;
  + the public body responsible for passing the legislation or setting the policy or policies from which the rules are derived.

The basic roles however are 'provides' and 'uses' and specific object properties are provided for these. To support the description of any role played within the provision or usage of a service a 'has role' super property is provided from which sub properties with specific semantics may be defined as part of a CPSV Profile (see section 3). More sophisticated descriptions of roles played may be described using relevant mechanisms defined in the Organisation Ontology [ORG].

Finally the service is likely to be available within a defined geographical area and/or time frame. These limits are recorded using the relevant classes and properties from the Dublin Core Metadata set [DC].

## The Public Service Class

This class represents the service itself. As noted in the scope (section 1.4), a public service is the capacity to carry out a procedure and exists whether it is used or not. It is a set of deeds and acts performed by or on behalf of a public agency for the benefit of a citizen, a business or another public agency.

The following subsections define the properties of the Public Service class.

### dcterms:title (data type)

|  |  |
| --- | --- |
| Property | Data Type |
| name | Text |

The name of the service. Language identifiers are particularly important in multilingual contexts where a Public Service may have more than one name.

### dcterms:description (data type)

|  |  |
| --- | --- |
| Property | Data Type |
| description | Text |

A free text description of the Public Service. Language identifiers are particularly important in multilingual contexts where a service may be described in multiple languages.

### dcterms:type (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| dcterms:type | Code |

The type of Public Service as described in a controlled vocabulary such as ESD Toolkit's Service List [SL4].

### input (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| input | Input |

Links a Public Service to one or more instances of the Input class (see section 4.3 below). A specific service may require the presence of certain inputs or combinations of inputs in order to operate. These should be described in an application profile for a given service.

### output (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| output | Output |

Links a Public Service to one or more instances of the Output class (see section 4.3 below).

### dcterms:isPartOf (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| dcterms:isPartOf | Service Bundle |

Links a Public Service to a collection of services of which it forms a logical part. Examples of Service Bundles include things like "Education," "Transport" etc. Public Services that are interdependent should be linked using the 'requires' property (4.2.11)

### dcterms:spatial (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| dcterms:spatial | dcterms:Location |

Links a service to the Location that defines where the service is available or applicable. This will typically a city, region or country. This is quite separate from the 'physicallyLocatedAt' property that points to a specific location at which an end user interacts with the service.

### dcterms:temporal (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| dcterms:temporal | dcterms:PeriodOfTime |

Links a service to the Period of Time during which the service is available or applicable. For example, winter fuel payments would only be available during certain months of the year. As with dcterms:spatial, this is quite separate from any opening times that apply to the physical location at which an end user can interact with the service.

.

### physically available at (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| physicallyAvailableAt | dcterms:Location |

This property links the service to a physical location at which a user may interact with the service, e.g. provide input to or receive an output from it.

### foaf:homepage (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| foaf:homepage | URL |

The specific Web page through which the service can be accessed. This may be, but usually will not be, the homepage of the service provider.

### requires (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| requires | Public Service |

One Public Service may require or in some way make use of another. It is common that the Output of one Public Service is the Input to another and that a Rule will stipulate that the completion of the first service triggers the second.

## The Input and Output Classes

Inputs and outputs can by any resource - document, artefact - anything. In a specific context it is likely to be useful to either define a sub class or declare the particular resource to also be of another type as well. A general case might be a foaf:Document but where possible, it is better to refer to a controlled vocabulary of types. dcterms:type should be used to use to provide this information and, in RDF implementations, it should link to a SKOS Concept.

The usual Dublin Core properties (e.g. title, description, created) should be used to describe the Inputs and Outputs.

## The Rule Class

The Rule class represents the specific rules, guidelines or procedures that the Public Service follows. Rule is defined as a sub class of FRBR's Expression class [FRBR], that is, a concrete expression, such as a document, of the more abstract concept of the rules themselves.

Rules should be linked to the organisation that is responsible for them via the usual dcterms:creator property.

### implements (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| implements | LegislationOrPolicy |

The implements property links a Rule to relevant legislation or policy documents (see below).

## The Legislation or Policy Class

As is clear from the name, this class represents the legislation, policy or policies that lie behind the rules that govern the service. As with the Rule class, the Legislation or Policy class is a sub class of frbr:Expression, i.e. instances of the class are concrete expressions of the more abstract concept of the legislation or policy itself.

The European Council's invitation to introduce the European Legislation Identifier [ELI] and portals such as legislation.gov.uk are relevant in this context. Dublin Core provides the necessary properties for describing the legislation or policy, including dcterms:creator to link it to the public body responsible for it. Adding '/data.xml' or /data.rdf' to any legislation URI on legislation.gov.uk will reveal how this can be done, for example http://www.legislation.gov.uk/uksi/2012/3170/contents/made{/data.rdf or /data.xml}.

## The Agent Class

The Agent class, defined Dublin Core and FOAF, is any resource that acts or has the power to act. Its well known sub classes are Person, Group and Organization. The latter is re-used in the Organization Ontology [ORG] which provides further sub classes.

### plays role (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| playsRole | Public Service |

This very general property links an Agent to a Public Service in which it plays some role. Sub properties may be defined in a CPSV profile that will be more specific about the role played by a given Agent, however, two of these are defined as part of the vocabulary: 'provides' and 'uses.' The specific semantics of these two properties are defined immediately below and should be taken into account before using them.

Where more complex relationships exist between a Public Service and the users or providers of that service, the ORG Ontology's membership and reporting structures provide a suitable mechanism.

### provides (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| provides | Public Service |

This property links an Agent to a Public Service in which it plays the specific role of provider, meaning that it is responsible for the provision of the service. Whether it provides the service directly or outsources it is not relevant, the Agent that provides the service is the one that is ultimately responsible for its provision.

### uses (object type)

|  |  |
| --- | --- |
| Property | Object Type |
| uses | Public Service |

This property links an Agent to a Public Service in which it plays the specific role of user, meaning that it provides the input and receives the output but does not play any direct role in providing the service. This will typically be an individual citizen or an outside organisation.

## The Text Data Type

The text data type is a combination of a string and a language identifier. It is useful for names and descriptions that are available in multiple languages. Where this is so, each version of the data should be included and each one associated with the relevant language identifier. RFC 3066 [RFC 3066] provides a commonly used set of identifiers for natural languages. This is the set recognised by UN/CEFACT and XML Schema.

Languages are represented by two character codes, optionally followed by a locale definition such as "de" meaning German and "de-at" meaning "German as spoken in Austria."

## The Code Data Type

The Code data type represents a terms from a controlled vocabulary. In RDF implementations this should be encoded as a SKOS Concept [SKOS].

# Core Public Service Vocabulary in RDF

## Namespace

## RDF Schema

# Approach & Community

The process and methodology followed in the development is set out in detail in the Process and Methodology for Developing Core Vocabularies [PMDCV].

Specific acknowledgement is due to:

# Change Control

The Core Public Sector Vocabulary is published by the ISA Programme. Review comments and requests for changes can be made via the mailing list which is archived at

@@@ Mailing list @@@.

# Future work

## Evolution of the model

## Planned implementations

# References

[A1.1] Action 1.1 Improving semantic interoperability in European eGovernment

systems

http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action\_en.htm

[ADMS] The Asset Description Metadata Standard,

http://joinup.ec.europa.eu/asset/adms/description

[DBpedia] DBpedia is a community effort to extract structured information from Wikipedia and to make this information available on the Web. http://dbpedia.org/

[DC] DCMI Metadata Terms, Dublin Core Metadata Initiative.

http://dublincore.org/documents/dcmi-terms/

[DGUT] data.gov.uk Time Intervals. Linked data for every time interval and instant into the past and future, from years down to seconds. This is an infinite set of linked data. It includes government years and properly handles the transition to the Gregorian calendar within the UK. http://thedatahub.org/dataset/data-gov-uk-time-intervals

[EGOV-CV] e-Government Core Vocabularies: The SEMIC.EU approach. Retrieved from

European Commission - Directorate-General Informatics:

http://www.semic.eu/semic/view/documents/egov-core-vocabularies.pdf

[ELI] Council conclusions inviting the introduction of the European Legislation Identifier (ELI). European Council (2012/C 325/02)

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2012:325:0003:0011:EN:PDF

[ELSR] Greek Interoperability Service Register, EPU-NTUA

http://www.iocenter.eu/demos/service-registry-(greek--english).aspx

[FOAF] Friend of a Friend

http://xmlns.com/foaf/spec/

[FORM] Fælles Offentlig Referance Model (FORM) http://blog.modernisering.dk/

[FRBR] Functional Requirements for Bibliographic Records, K G SAUR, 1998. IFLA Report http://archive.ifla.org/VII/s13/frbr/frbr\_current\_toc.htm. See also the RDF schema created by I Davis and R Newman at http://vocab.org/frbr/core.html

[ISA] Interoperability Solutions for European Public Administrations,

http://ec.europa.eu/isa/

[ISA13] Accessing Member State information resources at European level

http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-3action\_en.htm

[ISO 8601] Data elements and interchange formats -- Information interchange -- Representation of dates and times, ISO 8601:2004. http://www.iso.org/iso/catalogue\_detail?csnumber=40874

[ISO 19125] ISO 19125-1:2004 Geographic information -- Simple feature access -- Part 1: Common architecture See

http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=40114)

[JOINUP] The Joinup Platform is operated by the European Commission designed to enable the sharing and reuse open-source software, semantic assets and other interoperability solutions for public administrations. See http://joinup.ec.europa.eu/

[KLE] KL Emnesystematik, Local Governments Denmark http://www.kle-online.dk/

[LOCN] Core Location Vocabulary, EC/ISA Programme.

http://joinup.ec.europa.eu/asset/core\_location/asset\_release/core-location-

vocabulary-100

[ORG] An organization ontology, Dave Reynolds/W3C

http://www.w3.org/TR/vocab-org/

[PMDCV] Process and Methodology for Developing Core Vocabularies, 22 November 2011. https://joinup.ec.europa.eu/elibrary/document/isa-deliverable-process-and-methodology-developing-core-vocabularies

[PSCM] Public Sector Concept Model, Under development by a consortium of UK government bodies lead by LeGSB. http://www.pauldcdavidson.com/pscm/index.php?Action=ShowModel&Id=3

[SCLS] Eurostat Standard Code Lists are available through the RAMON portal (http://ec.europa.eu/eurostat/ramon/).

[SKOS] SKOS Simple Knowledge Organization System, Reference. Miles, A,

Bechhofer, S, W3C Recommendation 18 August 2009.

http://www.w3.org/TR/skos-reference/

[SL4] ESD Toolkit Service List 4 http://doc.esd.org.uk/ServiceList/4.00.html

[StratML] @@@ To add - currently offline @@@.

[TGF] OASIS Transformational Government Framework

https://www.oasis-open.org/committees/tc\_home.php?wg\_abbrev=tgf

[TOGM] Towards Open Government Metadata, Vassilios Peristeras, DG DIGIT, ISA Unit, September 2011

https://joinup.ec.europa.eu/sites/default/files/towards\_open\_government\_metadata\_0.pdf

[TURTLE] Terse RDF Triple Language, W3C http://www.w3.org/TR/turtle/

[UKCODE] Observation Status concept scheme.

http://www.jenitennison.com/blog/files/codelists.ttl

[VTSP] Vocabulario de trámites y servicios públicos, CTIC,

http://data.fundacionctic.org/vocab/infraestructuras/servicios.html

[XSD] XML Schema Part 2: Datatypes Second Edition. W3C Recommendation 28 October 2004. http://www.w3.org/TR/xmlschema-2/#date

1. The Core Public Service Working Group

1. Core Public Service Vocabulary – Example in RDF

1. <http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf> [↑](#footnote-ref-1)