SEMIC: PROMOTING SEMANTIC INTEROPERABILITY AMONGST THE EUROPEAN UNION MEMBER STATES (2016.07)

IDENTIFICATION OF THE ACTION

Type of Activity	Common Services
Service in charge	DG DIGIT
Associated Services	EU Publications Office, DG CNECT, ESTAT, Secretary General

EXECUTIVE SUMMARY

Within the ISA Programme, the Action has produced specifications, created communities, and supported policy domains, DGs and MSs in improving semantic interoperability.

In the new Programme the Action continues to develop specifications in the form of data standards and reference data with close collaboration with the domain owners and addressing needs from DGs and MSs.

The existing semantic interoperability solutions produced by the Action and other EC initiatives will be further promoted to be used in operational systems. Recent examples include the successful use of the Core Business vocabulary in the DG JUST Business Registers Interconnection System (BRIS), the DCAT-AP specification in the DG CNECT pan-European Open Data Portal (part of the CEF DSIs), the Core Vocabularies for the DG COMP State Aid Notification system, the Core Public Service Vocabulary in Estonia and the Maltese National Data Strategy where the Core Vocabularies are referred as the starting point for developing national core data standards. Moreover, resources will be invested to exploit these core data model in base registries, with the aim to develop the missing common semantic layer to allow exchange of basic data amongst the MSs, contributing to the "once-only" vision.

Furthermore, aiming at addressing the lack of a mature and interoperable tool for the management and publication of controlled vocabularies, the Action, in close collaboration with the Publications Office of the EU, will continue the development around the open-source thesaurus management tool VocBench. VocBench 3.1 will offer a ready solution for the management, alignment and publication of controlled vocabularies as Linked Open Data, thus taking away the burdens for public administrations to maintain and publish their controlled vocabularies in an open and interoperable way.

At the same time, the Action will continue investing towards innovative approaches to achieve application and data integration by applying semantic technologies and linked data. This will take the form of pilots to be organised with the active participation of MSs and relevant EU services checking amongst others efficient ways to decrease the costs and increase the efficiency for bringing together systems that have been developed independently but need to exchange information.

Last, the Action will elaborate and update as needed the semantic layer of the European Interoperability Reference Architecture (EIRA) working closely and contributing to the relevant ISA[2] Action.

OBJECTIVES

The objective of this action is to promote semantic interoperability amongst the EU Member States (MSs) and the EU Institutions. This is achieved by:

- Supporting alignments and agreements on common definitions and specifications at the semantic layer for the MSs and the EU Institutions.
- Promoting the use of the ISA Core Vocabularies, the ADMS and DCAT-AP specifications.

- Identification of areas for new Core Vocabularies and/or common data models.
- Supporting relevant policy and projects executed by DGs and MSs.
- Using core data models in base registries.
- Supporting DGs and MSs for using the ISA data models in operational systems.
- Supporting and promoting metadata management policies to MSs and DGs.
- Promoting open and linked data approaches and technologies.
- Promoting best practices, and lessons-learnt in the area of semantic interoperability.
- Supporting the development of a new version of VocBench (version 3.1) as a toolbox for controlled vocabularies, metadata and glossaries.
- Continuation of the promotion and dissemination work including the SEMIC conference.

SCOPE

Development of new specifications, policy and technical support, pilots, promotion activities are within the scope of the Action. Emphasis will be given on promoting cross-domain interoperability but single-domain, cross-border and/or cross-EU institutions initiatives remain with the scope of the Action. Moreover, the Action will develop a new version (version 3.1) of the collaborative thesaurus-management platform VocBench.

The following activities are not considered within the scope of this Action:
• All technical development related to the Joinup platform including the implementation of the federation of interoperability solutions.
• Specific VocBench deployments to any of the partners involved in the ISA initiative

ACTION PRIORITY

Contribution to the interoperability landscape

The contribution of the action to the interoperability landscape, measured by the importance and necessity of the action to complete the interoperability landscape across the Union

Question	Answer
Does the proposal directly contribute to implementing the European Interoperability Strategy, the European Interoperability Framework, or other EU policies with interoperability requirements, or needed cross-border or cross-sector interoperability initiatives? If yes, please indicate the EU initiative / policy and the nature of contribution.	The Action supports the implementation of the EIF and the EIS, the INSPIRE Directive, the PSI Directive, the Service Directive by promoting semantic interoperability, through the definition and use of common specifications and by providing an open-source reference tool for the management of semantic interoperability assets.
Does the proposal fulfil an interoperability need for which no other alternative solution is available?	The Action tries to develop and promote common specifications when such specifications are not available. It is the only horizontal action for promoting semantic interoperability for the European public administrations. Moreover, VocBench is the most mature OSS platform for advanced thesaurus management.

Cross-sector

The scope of the action, measured by its horizontal impact, once completed, across the sectors concerned

Question	Answer
*Will the proposal, **once completed** be useful, from the interoperability point of view, and utilised in two (2) or more EU policy areas? If yes, which are those?*	The specifications developed by the Action are generic and reusable in any policy domain. VocBench can be used for hosting any type of thesauri and vocabulary, allowing also mappings and alignment amongst assets coming from different policy areas.
*For proposals or their parts **already in operational phase**: have they been utilised in two (2) or more EU policy areas? Which are they?*	The DCAT-AP spec is used in the PSI (open data) and in environmental (INSPIRE) policy areas. The Core Public Service Vocabulary has been used in the Service Directive (points of single contacts), eGovernment (national portals) and local government (OSLO initiative). VocBench is already used in multiple EU policy areas such as "Agriculture, fisheries and foods", "Justice, home affairs and citizens' rights" and "Employment and social rights".

Cross-border

The geographical reach of the action, measured by the number of Member States and of European public administrations involved.

Question	Answer
*Will the proposal, **once completed** be useful, from the interoperability point of view, and used by public administrations of three (3) or more EU Members States?*	The results of the Action can be used by all MSs while VocBench supports multilinguality.
*For proposals or their parts **already in operational phase**: have they been utilised by public administrations of three (3) or more EU Members States?*	DCAT-AP is used in more than 8 MSs, CPSV in at least 3 MSs, VocBench in 4 MSs.

Urgency

The urgency of the action, measured by its potential impact, taking into account the lack of other funding sources

Question	Answer
Is your action urgent? Is its implementation foreseen in an EU policy as priority, or in EU legislation?	Semantic interoperability has always been identified as an important barrier in digital EU policies (e.g. Digital Agenda for Europe, Digital Single Market)
Does the ISA² scope and financial capacity better fit for the implementation of the proposal as opposed to other identified and currently available sources?	As semantic interoperability should be promoted at a horizontal and cross-domain level, the ISA² is a perfect match for hosting such activities

Reusability of action outputs

The re-usability of the action, measured by the extent to which its results can be re-used

Name of reusable solution	Data models
Description	A set of 6 Core Vocabularies, three DCAT-related specifications, ADMS have been developed by the Action
Reference	https://joinup.ec.europa.eu/community/semic/description
Target release date / Status	2012 – today: All the specifications are released on Joinup.
Critical part of target user base	The specifications can be used by all system architects, designers and national authorities as horizontal data standards.
For solutions already in operational phase - actual reuse level (as compared to the defined critical part)	34 known implementations in 8 countries are presented on https://joinup.ec.europa.eu/community/semic/description

Name of reusable solution	VocBench 3.1
Description	The main outcome of the work. A fully fledged collaborative platform for management of RDF thesauri (in SKOS / SKOSXL) and ontologies (OWL) with particular emphasis on Controlled Collaboration, Extensibility and Scalability
Reference	http://vocbench.uniroma2.it/
Target release date / Status	Currently available as V2.4.2 stable, a further 2.5 will be released on September, 2016). Planned 3.0 for July 2017. Planned 3.1 for the end of the

	project (at most, or intermediate release and further features added by the end).
Critical part of target user base	VocBench will be an open source system for collaborative editing of RDF data, OWL ontologies and SKOS and SKOS-XL thesauri. VocBench's adoption is not meant to be in any way restricted to the registered stakeholders, and its full compliance with W3C standards make it a perfect platform for the evolution of many organizations and authorities towards production and publication of Linked Open Data.
For solutions already in operational phase - actual reuse level (as compared to the defined critical part)	N.A.

Level of reuse by the proposal

The re-use by the action of existing common frameworks and elements of interoperability solutions.

Question	Answer
Does the proposal intend to make use of any ISA[2], ISA or other relevant interoperability solution(s)? Which ones?	Joinup is used as a publishing and community building tool for all the specifications developed under the Action. The specifications produced by the Action have the potential to be used by several other Actions in all data modelling tasks. For VocBench, the Metadata Registry module will allow generating descriptions of the controlled vocabulary in DCAT-AP and ADMS. The module can be extended to cover other ISA interoperability solutions such as StatDCAT-AP and GeoDCAT-AP.
For proposals or their parts already in operational phase: has the action reused existing interoperability solutions? If yes, which ones?	Joinup is the main publishing and community platform for the Action.

Interlinked

The link of the action with Union initiatives to be measured by the collaboration and contribution level of the action to Union initiatives such as the DSM.

Question	Answer
Does the proposal directly contribute to at least one of the Union's high political priorities such as the DSM? If yes, which ones? What is the level of contribution?	Interoperability is considered critical for the progress of the Digital Single Market, and special references are included in the relevant strategy. Admittedly, semantic interoperability together with organisational are the two layers where most MSs experience the most severe problems. o The Action contributes to "better public services" in the Digital Single Market strategy. o Copying from the DSM strategy "*The lack of open and interoperable systems and services and of data portability between services represents another barrier for the cross-border flow of data and the development of new services.*" The Action contributes to better interoperability and data portability. o The DSM promotes the "Free flow of data" and identifies interoperability as an important issue for achieving this. o The DSM strategy asks for a revision of the European Interoperability Framework. One of the interoperability levels there refers to "semantic interoperability". o The DSM discusses about the interconnection of base registries and the Once-Only principle. Semantic interoperability is a prerequisite for achieving these targets. PSI and Open Data In line with the EC objectives in the area of the PSI Directive, the Action promotes policies towards both open data and open metadata by the MSs and the EU services as a support measure for the more general Open Data policy. One of the concrete measures developed to implement this policy entails the setting up of the EU Open data Portal which is operated by the Publications Office of the EU. Close collaboration and common activities with the Publications Office of the EU have already started in 2013 and continues to secure alignment of efforts and concrete results. The creation of the pan-European Open Data portal is also part European open data policy. The portal has started its operation in 2015, and the DCAT-AP specification is used as the metadata standard for the description of the datasets coming from over 70 Open Data portals from 34 countries. The Action closely collaborates with the relevant EC service (DG CONNECT/G3). In 2014, a revision of the DCAT-AP has been concluded. Moreover, two extensions of the specifications are being developed to cover description of geospatial (GEO/DCAT-AP) and statistical (STAT/DCAT-AP) data.

PROBLEM STATEMENT

The environment in which data exchange and service execution takes place amongst MSs is very complex contributing many barriers and challenges to the exchange of data during the execution of European Public Services. These barriers include divergent interpretations of the data, lack of commonly agreed and widely

used data models, absence of universal reference data (e.g. code lists, taxonomies), from which only few are publicly available and even less as Linked Open Data, lack of interoperable tools/formats for the management and publication of reference data, the multilingual challenge. Last, in the sensitive area of labour markets, we currently experience fragmented European labour markets which hinders European mobility as the data of jobseekers and the matching job vacancies are kept in different systems due to the existing digital segmentation etc.

Due to these pressures, semantic interoperability becomes an important element in many eGovernment and interoperability national agendas and interesting experience and lessons-learnt can already be shared at a European level.

EXPECTED BENEFICIARIES AND ANTICIPATED BENEFITS

Beneficiaries	Anticipated benefits

Member States' Public Administrations	o Forum to identify opportunities for harmonization at European level
	o A virtual place to share best practices and experiences
	o Core Vocabularies, reference data, XML schemata and thesauri ready to be used in public administration information systems development.
	o Linked data best practices.
	o Reduced development costs
	  • due to reuse during the initial development phase
	  • due to less interoperability conflicts while integrating systems or providing cross-agency/domain/country services

IT Services Industry	o Reduced development costs, as explained above. o Reuse and integrate controlled vocabularies and metadata produced by Member States and Public Administrations or EU institutions and bodies.
European Commission Services	o A set of specifications in the form of Core Vocabularies and other relevant tools, such as reference data (e.g. authority tables), XML schemata and thesauri that can be reused by the EC services to facilitate interoperability among different applications and systems o Reduced development costs, as explained above.
For VocBench	
Publications Office (EuroVoc, Name Authority Lists) and its stakeholders: Cedefop (European Agency for vocational training), EU-OSHA	The Publications Office proposes as a free collaborative environment open to the EU institutions and bodies for the maintenance of their controlled vocabularies. The system is based on a common ontology-profile that increases the interoperability between the controlled vocabularies but also facilitates their dissemination in a common EU controlled vocabularies data portal. VocBench enables to re-use the concepts and their translations in the

(Agency for Security and Health at Work) European Executive Agency for Education and Culture (EEAEC), EIGE (Institute for Gender Equality); EEA (European Environment Agency)	different controlled vocabularies but also to extend the coverage with most specific or generic concept. For example, EuroVoc will be enriched with the concepts from the specialised thesauri (EU-OSHA, EEAEC, EIGE, Cedefop, EIGE) while the specialised thesauri will re-use the most generic concepts from EuroVoc; VocBench also manages the semantic relations with remote controlled vocabularies such as Gemet, AgroVoc, JRC Inspire Feature Concepts or UNBIS (United Nations Thesauri). EuroVoc and its semantic extensions (specialised thesauri, alignments) will be established as reference vocabulary used to index/ annotate and to retrieve EU resources as well as resources published by national or regional authorities (for example, legislation, publications, datasets or web resources).
European Commission Library	Reconciliation and mapping of the European Commission thesaurus (ECLAS) with EuroVoc in the purpose of re-indexing the European Commission Library collection (ECLAS) with EuroVoc.
European Commission, Informatics Directorate (DIGIT)	Use VocBench for the maintenance and dissemination of the glossaries and ontologies produced by DIGIT.
EU and national Open Data Portal	Use VocBench for the maintenance and dissemination of the dcat-ap themes used as a standard vocabulary to annotate the Open Data datasets in European, trans-European and national Open Data Portal.
FAO (Food and Agricultural Organisation)	Use VocBench for the maintenance and dissemination of the Agrovoc thesaurus, the Glossary of Biotechnology for Food and Agriculture, the Land and Water controlled vocabulary and the FAO main topics. A list of the partners acting in the VocBench Community is available at http://VocBench.uniroma2.it/support/community.jsf
JRC Inspire Registry	Use VocBench for the maintenance and dissemination of the JRC Inspire themes and features concept dictionary.
National and regional authorities	Use VocBench for the maintenance of their controlled vocabularies and metadata, for the alignment of thei national and regional controlled vocabularies with EuroVoc. Enrich the EU-level semantic of EuroVoc with in-depth national and regional coverage responding to the need of the Member States.
Academy and Education	Given the open and standard compliant nature of VocBench, it is being adopted in various areas of education (ranging from digital libraries, archiving and purely IT areas of learning) for teaching how to develop thesauri compliant with W3C standards for the web of data.

EXPECTED MAJOR OUTPUTS

Output name	Targeted studies, use cases and publications promoting semantic interoperability
Description	

Reference	
Target release date / Status	

Output name	Consultancy and support provided to MSs and EU institutions
Description	
Reference	
Target release date / Status	

Output name	Metadata Registry and Retriever (temporary name)
Description	The Metadata Registry and Retriever is a separate open-source project adopted in VocBench as an embedded software component of the system. The purpose of this module is to edit metadata descriptions of datasets available online. The Metadata Registry shall handle the standard formats such as DCAT, VOID or ADMS. There are three main intended usage scenarios for this module: 1. First it will allow describing the datasets that are being created with VocBench. 2. Second It will provide a pertinent mechanism to handle external resource descriptions for the Vocabulary Alignment Module (used to link the created vocabulary to other existing vocabularies hosted at places and described by their metadata). 3. Third, this module also acts as a single interface for accessing the remote resources wrapping various ways of access. For example the resources can be available via http dereferencing (at the concept level) or via SPARQL endpoint. The component was not realized in the course of the first action on VocBench, due to budget reduction and other more urgent requirements which emerged at the first VocBench stakeholders meeting and which have been listed in deliverable D03.03
Reference	N.A.
Target release date / Status	M6

Output name	MAPLE
Description	MAPLE is being developed as a separate open-source project adopted in VocBench as an embedded software component of the system. It is built on the lexical metadata vocabulary LIME, developed

	by UniTov and contributed to the OntoLex W3C community group.
	MAPLE will automatize the alignment capabilities in VocBench, providing dataset-access facilities and lexical resource provisioning to alignment systems.
	The component was not realized in the course of the first action on VocBench, due to budget reduction and other more urgent requirements which emerged at the first VocBench stakeholders meeting and which have been listed in deliverable D03.03
Reference	http://art.uniroma2.it/maple/ http://art.uniroma2.it/lime/
Target release date / Status	Planned integration by the end of the project.

ORGANISATIONAL APPROACH

Expected stakeholders and their representatives

Stakeholders	Representatives
Member States	o ISA[2] Committee o ISA[2] Coordination Group or ISA CG equivalent o Persons/units in charge of National and/or regional Interoperability Frameworks and/or metadata standards catalogues/repositories, etc. o Persons/units in charge of governmental portals
Standardization bodies	o W3C o OASIS o GS1 o CEN o UN/CEFACT o Dublin Core Metadata Initiative o EU Interinstitutional Metadata Maintenance Committee (IMMC)
DIGIT	• DIGIT/B2, DIGIT/01 • Unit (s) responsible for promoting common specifications in new and existing systems
EU Publications Office	The unit responsible for metadata management The unit responsible for the EU Open Data portal The unit responsible for the Common Vocabulary for legal documents
Other EC DGs and EU	Representatives from the DGs who work as IT coordinators (IRMs)

Institutions	Representatives from DGs and EU Institutions (e.g. JRC, EEA etc.) who work in the area of metadata management.
	DG CNECT units for public services and G.3 PSI and open data
	The EC Secretariat General
	The EU Council, the European Parliament.
FAO	The unit responsible for metadata management using VocBench.

Identified user groups

All MSs and EU institutions.

Communication plan

The Action will create the necessary links with the ISA[2] Communication Action to coordinate the promotion and dissemination of results to several types of recipients. The Action includes within its plan communication activities which are of technical nature, while Action 4.1.1 will promote the results to a broader audience, using appropriate non-technical language, and different channels.

Event	Representatives	Frequency of meetings / absolute dates of meetings?
The Action tries to disseminate its work with presentations, posters and panels in the major eGovernment and semantic technologies conferences and events		
The Action will try to raise awareness for the importance of metadata management, data standards and alignment in MSs and internally in the EC		
The Action will try to disseminate and promote the use of the Core Vocabularies and linked data best practices in the EU MSs		2 MSs visits per year
The Action will continue organising its annual conference which has been very successful so far		1 conference per year

VocBench is already a mature open-source project. Communication about its further releases, support and discussion are given and held through different channels, covering different needs with the most appropriate solution, and exhibiting redundancy to some extent.

By first, the official site of VocBench: http://vocBench.uniroma2.it represents an entry point for people/organizations willing to approach the system. Secondly, two mailing lists/discussion groups: Users[1] and Developers[2], provide assistance to, respectively, the community of users and of those willing to contribute the project or develop independent extensions for it. An Atlassian Suite instance provides project management, bug report and wiki services. Finally, the Agricultural Information Management Standards (AIMS) portal, managed by FAO, reports on news about VocBench and associated systems and tools.

The Publications Office of the EU will reserve a space on its future corporate EU Vocabularies website for information on VocBench. The Publications Office offers access to an instance of VocBench to other EU institutions and bodies through the Testa network. It will organise information and training sessions for services interested in managing their controlled vocabularies in VocBench.

Promotion beyond the EU institutions of the new version of VocBench is foreseen by making use of social media (Twitter), webinars and participation in conferences (posters). The project stakeholders will promote VocBench in their respective communities.

Governance approach

The Action is run by the European Commission, DG DIGIT, B.6 (ISA Unit).

For the work expected in this Action, collaboration with MSs and other stakeholders (e.g. DG EMPL, the EU Publications Office, other DGs, EU institutions, agencies and bodies, standardisation bodies) is considered of critical importance. For this reason, communication with the MSs and third parties will be frequent and their active involvement will be encouraged via invitations for participation in ad hoc groups discussing specialised issues related to the content of the Action.

For the design and development of a new major version for VocBench (version 3.1) A Project Steering Committee will be established to provide overall guidance and to ensure the consistency of the project regarding the roadmap, the technical specifications and the programme actions. The Committee will consist of representatives from the Publications Office, UNITOV, DIGIT (European Commission), Joint Research Centre (Inspire Registry), Food and Agricultural Organisation (FAO), European Environment Agency (EEA) and representatives from the Member States' national or regional authorities.

TECHNICAL APPROACH AND CURRENT STATUS

Overview for work so far

The Action tries to overcome semantic interoperability problems by:
- documenting what is available in each MS with regards to metadata policies and the management of semantic interoperability assets;
- identifying opportunities for alignment;
- promoting share and reuse of semantic assets, experiences and tools and facilitating agreements in key areas;
- raising awareness on the importance of metadata management;
- identifying and promoting successful practices and tools for linking governmental data;
- developing and promoting common specifications.

Through this action, the ISA programme sets to achieve a better collaboration between European public administrations towards creating new and promoting existing agreements on the meaning of the exchanged

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[1] http://groups.google.com/group/VocBench-user
[2] http://groups.google.com/group/VocBench-developer

information and on the common use of metadata. Joinup provides the necessary infrastructure for this collaboration while a broad network of stakeholders including several EU bodies like JRC, DG SANTE, DG EMPL, DG FISMA, DG GROW, the PO, DG TAXUD, DG MARE, DG CONNECT, DG COMP, DG COMM and DG JUST actively participate and/or follow the work.

The Action maintains communication links with relevant initiatives to promote semantic interoperability around the world (e.g. USA, Japan) to exchange views and share experiences.

Below an overview of the results of the Action during the last 5 years is provided.

In 2011, an assessment of the Action results for the period 2008-1010 took place. Based on this evaluation, recommendations were provided to identify areas where the Action could contribute. Following these recommendations, the Action produced the following results:

a) In the period 2011-2012, the Asset Description Metadata Schema (ADMS) was developed as a common vocabulary to describe semantic assets. ADMS has been extended to describe any type of interoperability solution. Based on this specification, a federation of semantic assets repositories has been developed and is available via the Joinup platform. This federation went live in January 2013. Currently, more than 20 repositories participate in the federation making available over 2.000 specifications. The Action will continue providing support to MSs to participate in the federation and use ADMS for describing their own assets. Nevertheless, the EFIR Action (action 4.2.4) remains the focal place for the federation maintenance and support in Joinup.

b) In the period 2011-2013, the Action has developed four Core Vocabularies, namely Core Business, Core Person, Core Location, and Core Public Service in close collaboration with other EU bodies including DG MARKT, Eurojust, and the JRC. These specifications (together with ADMS) have been endorsed by the ISA Coordination Group. In 2013-2014, implementations of the vocabularies have been implemented in 5 pilots with data coming from MSs and different EC/DGs.

c) In 2013, the DCAT Application Profile (DCAT-AP) as a specification to describe open data catalogues and datasets was developed in close collaboration with DG CONNECT and the EU Publications Office.

d) During the period 2011-2014 several case studies, surveys and recommendations have been published trying to raise awareness on issues related to semantic interoperability, open and linked data, metadata management and persistent Unique Resource Identifiers (URIs).

e) In 2014, the Action has tried to promote the use of core vocabularies both at national and at European level. Issues related to sustainability, governance, publication and persistence for these specifications were also identified and work has started to set up relevant policies. During the same year, the Action produced guidelines and support for the publication of high-value datasets, and initiated cross-institutional work to draft metadata and URI policies for the EU institutions which are reusable by the MSs. Work to create a stack of tools for metadata management with the participation of DG MARE, JRC, DG COMP and the PO has been also initiated.

f) In 2015/16, the Action delivered: a revision of the DCAT-AP and two extensions to describe geospatial and statistical data; supported the DCAT-AP implementation at Eu and MSs level; drafted a specification for publishing State Aid Notifications as open data working closely with DG COMP; supported the work to develop

the Common Vocabulary for describing legal documents in the context of the IFC; drafted a specification for publishing the EU budget as open data with the PO; run a pilot with ESCO and DG Employment; run a pilot with the Core Public Service Vocabulary in Estonia; supported the creation of the data model for the Business Registers Interconnection System (BRIS) for DG Justice; provided the semantic layer for EIRA; supported the Secretariat General of the EC and EFSA to establish an information management strategy; supported EU inter-institutional work to establish persistent URIs management; supported local pilots to use the Core Vocabularies in Italy and Belgium.

Activities in the new WP

Activities promoting semantic interoperability at horizontal level

In the new ISA[2] Programme WP2017, the Action will continue to maintain, update whenever necessary, and promote the above-mentioned specifications. It will also try to identify and develop more Core Vocabularies (e.g. Core Budget), promote the real usage of the existing specifications, make available a robust toolset for metadata management, further elaborate on policies for metadata and URI management. More specifically the Action will deliver the following results:

- Core Vocabularies
  - o Identification of areas for new Core Vocabularies and/or common data models.
  - o Checking maturity and opportunities for developing specifications with communities.
  - o New vocabularies development.
  - o Sustainability of the existing specs.
- Policy and project support to DGs and MSs for promoting semantic interoperability with pilots and policy advice including the areas of open and linked data.
- Support for using the ISA data models in operational systems in DGs and MSs
- Use of core data models in base registries.
- Work for metadata management, including documenting existing policies and tools, drafting guidelines, architectures, providing direct support to MSs and DGs, aligning and coordinating relevant initiatives.
- Information management strategy: good practices, guidelines, recommendations, tools.
- Support work for open data and open data portals interoperability with further animation of the community of practice for DCAT-AP implementation.
- Continuation of the promotion and dissemination work including the SEMIC conference, identification of good practices, case studies, recommendations.

VocBench 3.0

The objective of the first ISA2 action was to start a completely revised version of VocBench with respect to its predecessor VocBench 2, by removing all those technological barriers which version 2.0 had inherited from version 1.0.

VocBench 3 is being built on the lessons learned from the move from VocBench 1.0 to 2.0, by rewriting VocBench original layers with proper technologies and adopting more flexible solutions for the history and validation, based on proper serializations of the content changes expressed natively in RDF. Development will follow the already established modalities, based on planning through JIRA, bug reporting, unit testing and possibly adding continuous development and deployment through a dedicated server.

The planned features (with references to deliverable ISA 2015 SEMIC 7, D03.03: "Report on the provided support for the development of VocBench 3.0" and the set of user requirements expressed there) are:

- Editing Capabilities
    - Advanced Concept Management (aspect of 5.1.5 not dealt with in round 1)
    - Support for OWL 2 (requirement NF-O-1 of D03.03)
    - Multiple Properties Editing Support (section 5.1.5.1 of D03.03)
    - Support for UNDO (sect. 5.10. of D03.03):
    - Support for managing skos:Collection and skos:OrderedCollection
- Visualization and Human-Computer Interaction
    - Rendering Engine Extension Point and three implementations for RDFS, SKOS and SKOSXL lexical models
    - Search Support (indexing and autocompletion across different triple store technologies, sect. 5.1.6. of D03.03)
    - Extension Points: role/context-based extension points for pluggable actions on resources
    - User Notification Support (sect. 5.10.1.1 of D03.03)
- Improved multilingualism: support for Locales
    - Property Language Tags Support (sections 5.1.5.3, 5.10 and 5.10.1 of D03.03)
    - MAPLE (was left out of first ISA2 action on VocBench 3 due to change of priorities)
- Global Data Management
    - Data Export Management: Excel Export (section 5.3.2 of D03.03)
    - Data Export Management: Customizable Export (section 5.3.2 of D03.03)
    - Sheet2RDF: Highly configurable spreadsheet Import (part of it is described in sect. 5.3.1. Data Import Management of D03.03)
- Metadata management
    - Resource Level Metadata (sect 5.6.2 of D03.03)
    - Provenance Management (parts of 5.6.4 not dealt with in first action on VocBench 3)
    - Metadata Registry and Retriever (adding retriever part and the LOD registry part, while metadata production has been implemented in the first action on VocBench 3)
- Low-level customization
    - Extensible URI Generation System
- Discovering Data Inconsistencies, and fixing
    - SKOS Vocabulary Constraint Management (sect. 5.9.1.1. of D03.03)
    - Integrated Constrains Validation Service (sect. 5.9 of D03.03)
- Alignment
    - Alignment covering datasets exposed through HTTP dereferenciation and datasets exposed on a SPARQL endpoint (completion of requirement FR-I-35 started in first ISA2 action on VocBench 3 due to change of priorities)
    - Alignment Management Service (sect. 5.5 of D03.03)
- Improved Collaboration
    - Other Collaboration Services (sect. 5.8.3. of D03.03): Development of extensions points for: connectable collaboration frameworks (extension point 2 was not included in first)
    - Specific extension point for connectable collaboration frameworks implementation for JIRA Support (sect. 5.8.3.1. of D03.03)
- Action Level History Management (sect. 5.7.3 of D03.03): realization of a Time Machine
- Related Documentation
    - A development manual presenting the Semantic Turkey REST API and Web API with sample code for the various extension points
    - An improved User Manual (on public site) with all added/improved functionalities
    - An improved Architecture Manual (on public site) with added components

COSTS AND MILESTONES

Breakdown of anticipated costs and related milestones

Main SEMIC action

Phase: Initiation Planning Execution Closing/Final evaluation	Description of milestones reached or to be reached	Anticipated Allocations (KEUR)	Budget line ISA/ others (specify)	Start date (QX/YYYY)	End date (QX/YYYY)
	Support to define information management strategies: good practices, guidelines, recommendations, tools.	50	ISA[2]	Q2/2016	Q12/2016
Operational	Identification of areas for new Core Vocabularies and/or common data models. Checking maturity and opportunities for developing specifications with communities. New vocabularies development. Update and sustainability of the existing specs.	371	ISA[2]	Q2/2016	Q4/2017
	Policy and project support to DGs and MSs for promoting semantic interoperability, linked and open data with pilots and policy advice.	400	ISA[2]	Q2/2016	Q4/2017
	Use of core vocabularies in base registries.	175	ISA[2]	Q2/2016	Q4/2017
	Support for using the ISA data models in operational systems in	200	ISA[2]	Q2/2017	Q4/2017

	DGs and MSs				
	Work for metadata management, including documenting existing policies and tools, drafting guidelines, architectures, providing direct support to MSs and DGs, aligning and coordinating relevant initiatives.	150	ISA^2	Q2/2016	Q4/2017
	Support to define information management strategies: good practices, guidelines, recommendations, tools.	50	ISA^2	Q2/2017	Q4/2017
	Support work for open data interoperability with animation of a community of practice for DCAT-AP and support is real life-implementations.	100	ISA^2	Q2/2016	Q4/2017
	Continuation of the promotion and dissemination work including country visits, the annual SEMIC conference, one international workshop and webinars.	200	ISA^2	Q2/2016	Q4/2017
	Total	**1696**			

VocBench subactivity

Phase: Inception	Description of milestones reached or to be reached	Anticipated Allocations (in KEUR)	Budget line ISA/ others (specify)	Start date (Q2/2016)	End date (Q2/2017)
Inception	Study, testing and comparison of state of the art technologies that are suitable for the design of VB3.0 and its technological innovation.	10	ISA^2	Q2/2016	Q2/2016
Inception	Definition of the new technological stack	5	ISA^2	Q2/2016	Q2/2016

Execution	Designing and Developing the Semantic Turkey architecture as the core system of VB3.0.	80	ISA[2]	Q3/2016	Q3/2017
Execution	Enabling all user aspects (Authentication, permissions etc.) in ST	25	ISA[2]	Q3/2016	Q3/2017
Execution	Action History: completely rewritten wrt old module in VB2.0.	15	ISA[2]	Q3/2016	Q3/2017
Execution	Controlled Collaboration & Validation: completely rewritten wrt old module in VB2.0.	25	ISA[2]	Q3/2016	Q3/2017
Execution	Versioning	25	ISA[2]	Q3/2016	Q3/2017
Execution	Provenance Management	15	ISA[2]	Q3/2016	Q3/2017
Execution	Metadata Registry and Retriever and integration in VB	20	ISA[2]	Q3/2016	Q3/2017
Execution	MAPLE Finalization and integration in VB	20	ISA[2]	Q3/2016	Q3/2017
Execution	Lexical Linked Data Registry, starting and managing the Service and making VB compliant with it.	25	ISA[2]	Q3/2016	Q3/2017
Execution	Improved Alignment: access and interaction with LOD data.	15	ISA[2]	Q3/2016	Q3/2017
Execution	Improved Alignment : more automatism/support for validation of externally loaded mappings	15	ISA[2]	Q3/2016	Q3/2017
Execution	Metadata producer: generators for ADMS/DCAT-AP/VoID/LIME Metadata.	10	ISA[2]	Q3/2016	Q3/2017
Execution	Development of extensions points for : - customized export - connectable collaboration Frameworks	15	ISA[2]	Q3/2016	Q3/2017
Execution	JIRA connector as an instance of a collaboration framework connector. Execution reported in 2017-2018 (Vocbench 3.1)	8	ISA[2]	Q3/2016	Q3/2017
Execution	Dedicated SKOS-AP-EU exporter as an instance of the export extension point.	5	ISA[2]	Q1/2017	Q3/2017
Execution	Property Language Tags Support (sections 5.1.5.3, 5.10 and 5.10.1 of D03.03)	9	ISA[2]	Q3/2017	Q4/2017
Execution	Data Export Management: Excel Export (section 5.3.2 of D03.03)	1	ISA[2]	Q3/2017	Q3/2017
Execution	Extensible URI Generation System	12	ISA[2]	Q3/2017	Q4/2017
Execution	Alignment covering datasets exposed through HTTP dereferenciation and datasets exposed on a SPARQL endpoint (completion of requirement FR-I-35 started in first action on VocBench 3)	10	ISA[2]	Q3/2017	Q4/2017
Execution	Integrated Constrains Validation Service (sect. 5.9 of D03.03)	6	ISA[2]	Q3/2017	Q4/2017
Execution	User Notification Support (sect. 5.10.1.1 of D03.03)	21	ISA[2]	Q3/2017	Q2/2018
Execution	Sheet2RDF: Spreadsheet Import (part of it is described in sect.	37	ISA[2]	Q3/2017	Q2/2018

	5.3.1. Data Import Management of D03.03)				
Execution	Extension Points: role/context-based extension points for pluggable actions on resources	19	ISA²	Q3/2017	Q2/2018
Execution	MAPLE (was left out of first ISA action on VocBench 3)	25	ISA²	Q3/2017	Q2/2018
Execution	Support for OWL 2 (requirement NF-O-1 of D03.03)	28	ISA²	Q3/2017	Q2/2018
Execution	Rendering Engine Extension Point and three implementations for RDFS, SKOS and SKOSXL lexical models	8	ISA²	Q3/2017	Q3/2017
Execution	Search Support (indexing and autocompletion, sect. 5.1.6. of D03.03)	8	ISA²	Q3/2017	Q4/2017
Execution	Data Export Management (section 5.3.2 of D03.03)	12	ISA²	Q3/2017	Q4/2017
Execution	Overall Testing	14	ISA²	Q3/2017	Q2/2018
Execution	Metadata Registry and Retriever (adding retriever part and the LOD registry part, while metadata production has been implemented in the first action on VocBench 3)	26	ISA²	Q4/2017	Q2/2018
Execution	Alignment Management Service (sect. 5.5 of D03.03)	21	ISA²	Q4/2017	Q2/2018
Execution	Action Level History Management (sect. 5.7.3 of D03.03)	12	ISA²	Q4/2017	Q2/2018
Execution	Resource Level Metadata (sect 5.6.2 of D03.03)	21	ISA²	Q4/2017	Q2/2018
Execution	Provenance Management (parts of 5.6.4 not dealt with in first action on VocBench 3)	12	ISA²	Q4/2017	Q2/2018
Execution	SKOS Vocabulary Constraint Management (sect. 5.9.1.1. of D03.03)	15	ISA²	Q4/2017	Q1/2018
Execution	Advanced Concept Management (parts of 5.1.5 not dealt with in round 1)	12	ISA²	Q1/2018	Q2/2018
Execution	Multiple Properties Editing Support (section 5.1.5.1 of D03.03)	4	ISA²	Q1/2018	Q1/2018
Execution	Support for UNDO (sect. 5.10. of D03.03):	6	ISA²	Q1/2018	Q1/2018
Execution	Other Collaboration Services (sect. 5.8.3. of D03.03): Development of extensions points for: connectable collaboration frameworks (ext.point.2 was removed in round 1)	14	ISA²	Q1/2018	Q2/2018
Execution	Specific extension point for connectable collaboration frameworks implementation for JIRA Support (sect. 5.8.3.1. of D03.03)	9	ISA²	Q1/2018	Q2/2018
	Total	695			

Breakdown of ISA funding per budget year

Budget Year	Phase	Anticipated allocations (in KEUR)	Executed budget (in KEUR)
2016	Operational	950	950
2016	Execution (VocBench)	348	
2017	Operational	746	
2017	Execution (VocBenck 3.1)	347	
2020			

ANNEX AND REFERENCES

Description	Reference link	Attached document
Federation of Semantic Assets Repositories	https://joinup.ec.europa.eu/catalogue/all?filters=bs_current_version:true	
Core Vocabularies (Core Person, Core Business, Core Location, Core Public Service)	https://joinup.ec.europa.eu/community/core_vocabularies/description	
The DCAT Application Profile	https://joinup.ec.europa.eu/asset/dcat_application_profile/description	
Towards Open Government Metadata	http://www.semic.eu/semic/view/documents/towards_open_government_metadata.pdf	
Similar project in another, related domain: Specifications for the development of an open metadata schema for qualifications	20150717 Specifications.pdf 20150717 Annex to the Specifications.pdf	