A common metadata approach to support eGovernment interoperability

Makx Dekkers – makx@makxdekkers.com
João Rodrigues Frade – joao.frade@pwc.be
Stijn Goedertier – stijn.goedertier@pwc.be
Nikos Loutas – nikos.loutas@deri.org
Vassilios Peristeras – vassilios.peristeras@ec.europa.eu
Gofran Shukair – gofran.shukair@deri.org
Are not yet interoperable

Different metadata and reference data cause semantic gaps.

Affecting interoperability between Member-States and Sectors

Source: European Interoperability Framework
Semantic interoperability is the ability of organizations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and preserved by all parties.
To achieve semantic interoperability

**Find common ground**: opportunities to overcome inherent differences in linguistic, cultural, legal, and administrative environments.

**Better ways to discover and share interoperability assets across borders and domains**: Providing structured information about semantics of existing services and data will create the conditions for enhanced interoperability

- Enhance quality and visibility of information about semantic interoperability assets to support sharing and re-use
- Identify and analyse similarities and differences to help build bridges across services in different countries and domains
Five maturity levels for metadata management

Level 1  **Metadata Ignorance**
*Reusable metadata + reference data are not documented, mainly because administrations don’t consider this exercise important. This results in serious semantic IOP problems within each country as developers use ad hoc data models, metadata, codelists, taxonomies, etc for developing eGov systems.*

Level 2  **Scattered and/or Closed Metadata**
*Reusable metadata + reference data may be documented but a) not in a centralised and organized way and/or b) they are not available and accessible as "open metadata" for developers, etc*

Level 3  **Open Metadata for Humans**
*Reusable metadata + reference data are documented, and are made available as "open semantic assets" but are not systematically published in a reusable format (e.g. only available as pdf documents).*

Level 4  **Open Reusable Metadata**
*Reusable metadata + reference data are centrally documented, they are published as "open semantic assets", in a machine readable format and/or provide an API for computers to access, query and reuse them. Electronic Metadata Management Systems (MMSs) are introduced (e.g. the SEMIC platform, Digitalisér.dk) to support the established metadata architecture and policies.*

Level 5  **Linked Open Metadata**
*Semantic Assets are documented using linked data principles and are managed by advanced MMSs.*
SEMIC.EU is a collaborative platform and a set of services around this platform to promote semantic interoperability for eGovernment in the EU Member States.

SEMIC.EU encourages public administrations to manage their code lists, taxonomies, data models as **semantic interoperability assets** and share them in its asset repository.
1. Encourage Member States to **adopt** policies, processes, and repositories for *semantic asset management* at national, regional or local level;

2. Refine and **build consensus** on an interoperable way to describe the semantic asset metadata, what we like to call the **Asset Description Metadata Schema** (ADMS);

3. Setup a **federation of semantic asset repositories** with interested Member States that uses the above-mentioned ADMS specification as a common format for the exchange of asset description metadata.

4. Encourage Member States to **endorse and reuse** the ADMS specification.
The scope of SEMIC.EU is limited to EU policies and activities.

Other countries have also started to host repositories and promote the publication of semantic interoperability assets on the Web.

It is important that these repositories are linked and interoperable. Creating interoperability across repositories creates opportunities for administrations to share across borders and domains.”
The Semantic Web presents a huge opportunity to publish the **description metadata** of semantic interoperability assets as machine-readable data on the Web.

Common metadata vocabularies will facilitate interoperability across repositories.

1. **Use Uniform Resource Identifiers (URIs)** to uniquely identify semantic interoperability assets on the Web.
2. **Use HTTP URLs** corresponding to these URIs so that information can be retrieved.
3. **Provide description metadata** using open standards based on RDF(S).
4. **Include links** to related semantic interoperability assets, so that people can discover more.

Tim Berners-Lee’s Linked Open Data Guidelines
[http://www.w3c.org/DesignIssues/LinkedData.html](http://www.w3c.org/DesignIssues/LinkedData.html)
• **Metadata**: data about data
• **Semantic interoperability asset**: a code list, taxonomy, vocabulary, data model, ontology, etc.
• **Asset description metadata**: data describing a semantic interoperability asset
• **Asset description metadata schema**: the specification (ADMS), a schema (or vocabulary) used to represent asset description metadata
The Asset Description Metadata Schema (ADMS) will be a common vocabulary to publish description metadata about code lists, taxonomies, data models, etc. on the Web.
 Asset Description Metadata Schema (ADMS): initial draft

**Asset Description Metadata Schema (ADMS): initial draft**

**AccessURL**: dcat:accessURL

**DocumentationLanguage**

**ReleaseNotes**

**ReleaseDate**: dc:dateSubmitted

**UpdateDate**: dc:modified

**ReleaseName**: dc:title

**FileFormat**

**URI**: dc:identifier

**Name**: dc:title

**Description**: dc:description

**RepresentedCountry**: dc:spatial

**Owner**: foaf:agent

**License**: dc:license

**RepositoryOrigin**

**LicenseURI**

**Abstract**: dc:abstract

**AssetImage**: foaf:image

**Publisher**: foaf:agent

**LinkToWebsite**: foaf:homepage

**Tags**: adms:Asset

**Type**: adms:ArtefactType

**Status**: adms:Status

**Domain**: adms:Domain

**QualityLevel**: adms:QualityLevel

---

**RelatedRelease**

**adms:HasRelease**

**RelatedAsset**

**adms:HasAsset**

---

**Version 0.6a**

Initial draft to be further elaborated and endorsed by the EU Member States

---

**Semantic Interoperability** **SEMBIC.EU** **Semantic Web** **ADMS** **ADMS Prototype** **Roadmap**
The ADMS will enable the following benefits:

- Publication of interoperability asset description metadata in a machine-readable format.
- Create links between semantic interoperability assets on the Web.
- Exchange of asset description metadata with other repositories.
- Allow users to more easily search and retrieve information about semantic interoperability assets and discover related assets.
- Contributes to the semantic interoperability of electronic public services, leading to the benefit of citizens and businesses.
A prototype federates asset metadata from three repositories:

- Digitalisér.dk, Denmark
- Xrepository.de, Germany
- SEMIC.EU, Europe

The diagram illustrates the integration of these repositories through the ADMS prototype.
The federated repository is accessible through a central portal

Federated Portal
Of Repositories on Semantic Interoperability Solutions

This prototypes shows the federation of 3 different repositories (Danish Digitaliser, German XRepository and European SEMIC) via a common metadata schema called "ADMS".

<table>
<thead>
<tr>
<th>Identifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Issued</td>
<td></td>
</tr>
<tr>
<td>Keyword</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
<tr>
<td>Domain</td>
<td></td>
</tr>
</tbody>
</table>

http://vmudi205.deri.ie/elda/index.html
Design process and methodology

ADMS Working Group formed

Consensus building on ADMS

ADMS v1

Improved search on Joinup based on ADMS

Federation of semantic asset repositories

Roadmap:
- Semantic Interoperability
- SEMIC.EU
- Semantic Web
- ADMS
- ADMS Prototype

- September 2011
- October 2011
- March 2012
- April 2012
- April 2012
- May 2012

Project: ADMS (ADaptation of Metadata Schemes)
Work Ahead

Asset Description Metadata Schema (ADMS)

Enabling a federation of semantic assets repositories;

Using common semantics to describe a “semantic asset”

Need a common schema for assets description or an Asset Description Metadata Schema (ADMS)
1. **Advanced draft**: the ADMS Work Group works on an advanced draft, supported by representatives from EU Member States and external experts.

2. **Publication**: The work on the ADMS will be reflected on the joinup.eu collaborative platform.

3. **Review**: The advanced draft is open to review by all representatives from EU Member States and external stakeholders.

4. **Proof-of concept**: As proof-of-concept a federation prototype will be built federating existing repositories using ADMS as exchange format.

5. **Endorsement**: After the review period, the ADMS is presented for endorsement to the EU Member States who participate in the ISA programme.
eGovernment code lists, taxonomies, ontologies, etc. should be managed as assets of semantic interoperability and MS should become aware of the importance of their metadata.

ADMS is a vocabulary to represent description metadata about semantic interoperability assets.

Development supported by the European Commission, open to all stakeholders.

A first prototype has been built.

An architecture will be developed to allow for federated search.
Questions? Thank you for your feedback!