



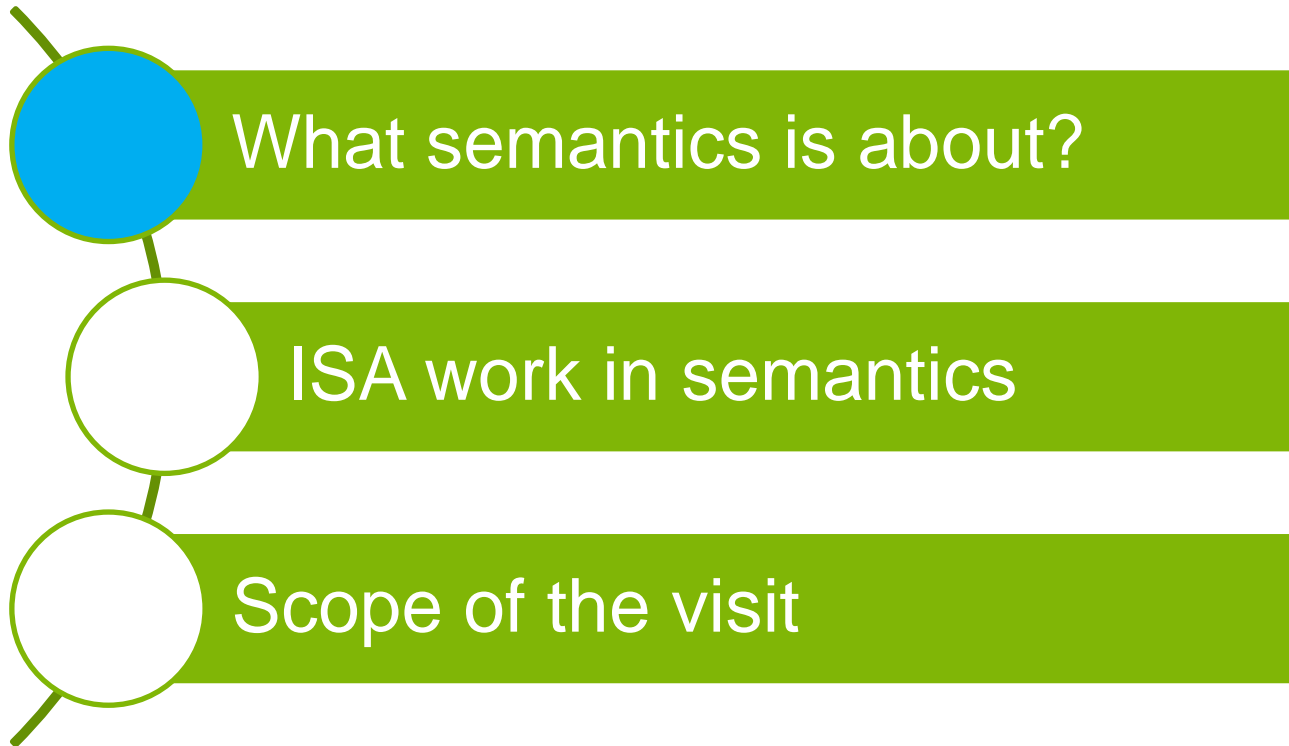
European
Commission

Promoting semantic interoperability between public administrations in Europe

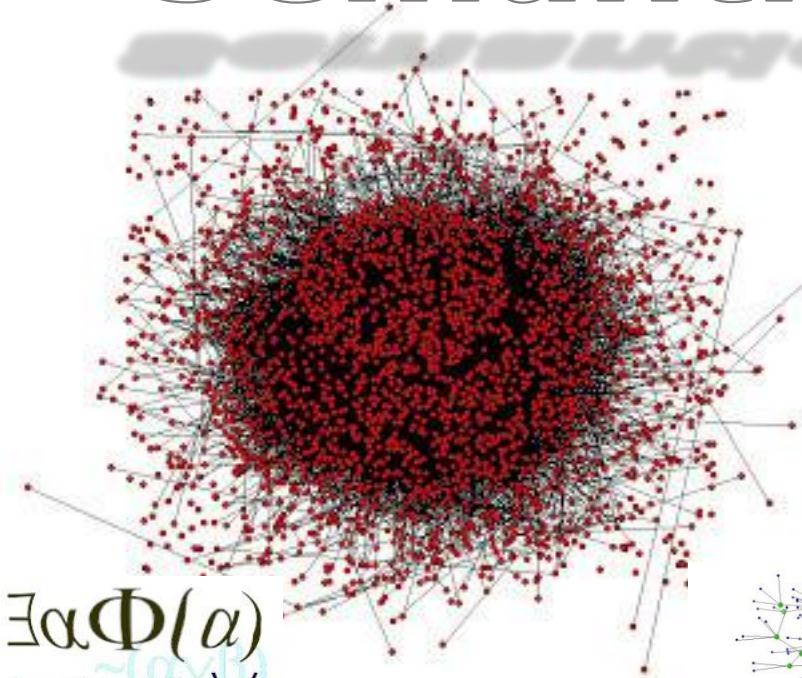
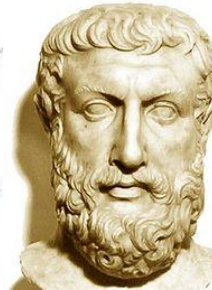
ISA solutions, Brussels, 23 September 2014
Vassilios.Peristeras@ec.europa.eu

ISA

- What semantics is about?
- ISA work in semantics
- Scope of the visit



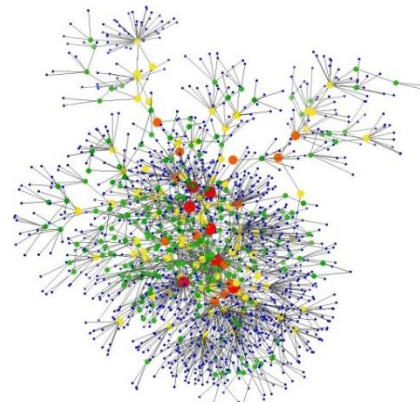
Semantics



$$\exists \alpha \Phi(\alpha)$$

$$\frac{\frac{\frac{\text{---}}{x} \quad \frac{\text{---}}{A(x)} \quad \frac{\text{---}}{B(x)}}{\text{---}}}{\text{---}}}{\text{---}} \quad \forall x$$

$$\neg K \quad P \rightarrow Q$$



- $\forall x(Bx \rightarrow Cx), \forall x(Ax \rightarrow Bx) \vdash \forall x(Ax \rightarrow Cx)$
- $\exists x(Ax \ \& \ \neg Px), \forall x(Bx \rightarrow Px), \exists x(Ax \ \& \ \neg Bx)$
- $\forall x(Px \leftrightarrow Qx), \exists x \neg Qx \vdash \exists x \neg Px$
- $\forall x \forall y(Ax \ \& \ By) \vdash \exists x(Ax \ \& \ Bx)$
- $Na \rightarrow \forall x(Mx \leftrightarrow Ma), Ma, \neg Mb \vdash \neg Na$
- $(Pa \vee Qb), (Qb \rightarrow b = c), \neg Pa \vdash Qc$
- $(m = n \vee n = o), An \vdash (Am \vee Ap)$
- $\exists x Px, \exists y \neg Py \vdash \exists x \exists y x \neq y$

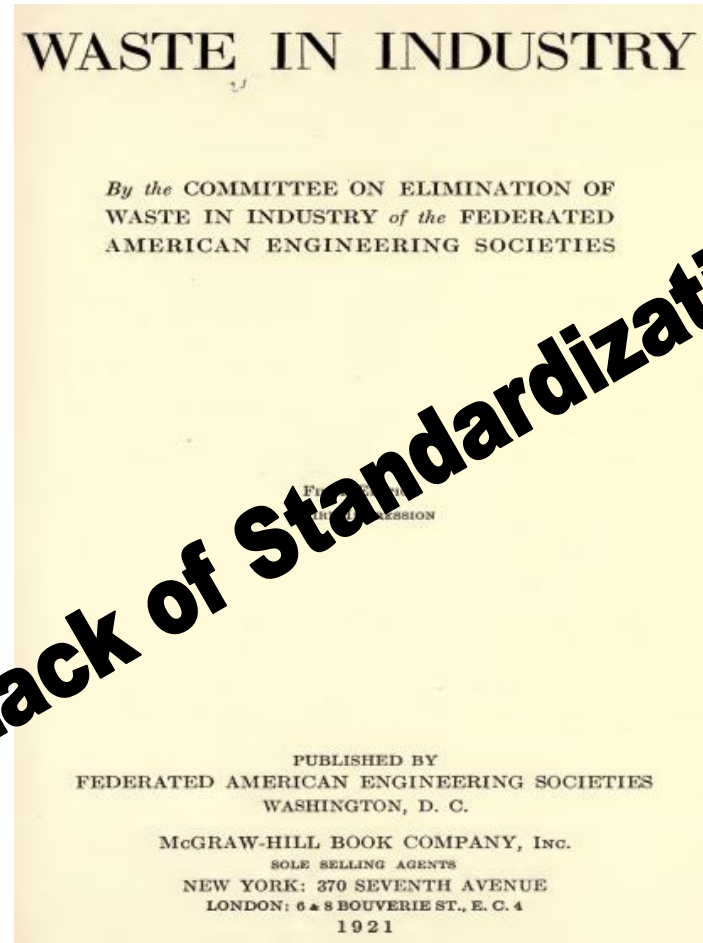
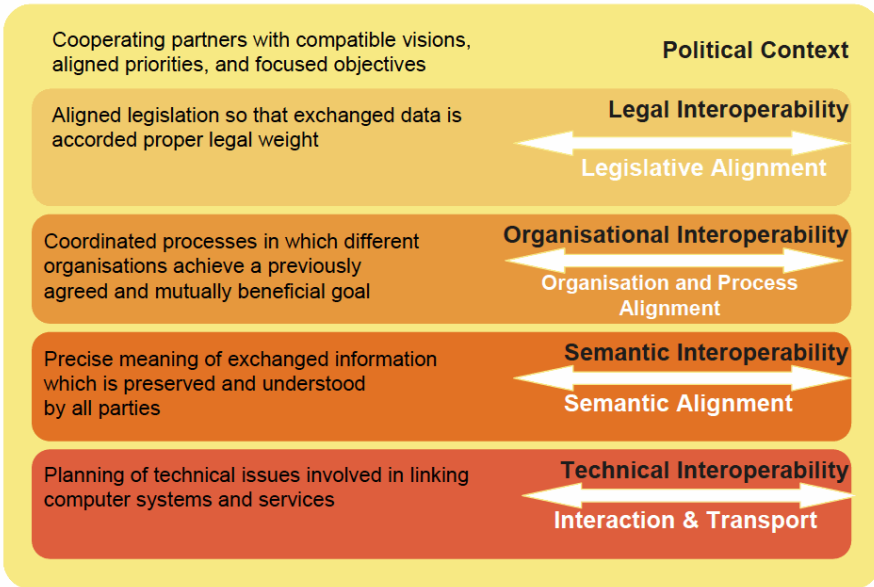


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Semantics



"Now! ... That should clear up
a few things around here!"



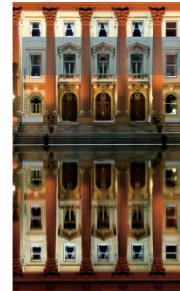
Lack of Standardization

How do we achieve technical interoperability?





European Commission



AI AND GOVERNMENT

Editor: Vassilios Peristeras, European Commission, vassilios.peristeras@ec.europa.eu

Semantic Standards: Preventing Waste in the Information Industry

Vassilios Peristeras, European Commission

It is not sufficient to attempt to standardize the product of a given industry, for almost every industry is so dependent upon others that they too must co-operate.

—Herbert Hoover, 1921

In 1921, Commerce Secretary Herbert Hoover— who then became president of the US—published a report under the title “Waste in Industry.” The report, at the peak of the industrial era, identified waste as a primary enemy of production in industry, as well as a major cost of doing business. Scientific standards were introduced by the French revolution and the American Civil War paved the way for the industrial standardization movement. Standards were first perceived as key to the success of enterprises such as railways. Interoperability standards across different industries were quite early.

Technical standards have contributed to the industrial revolution. Information standards have become an essential part of the information solution and information technology. Semantic information technology was a natural evolution of technical standardization, and it is at this level. The main goal and advantage of semantic interoperability in information technology has been the interoperability for hardware and software. Barriers at the technical level are only one aspect of the interoperability problem. As widely acknowledged nowadays, for example, in the European Interoperability Framework, interoperability conflicts can appear at the technical, semantic, and/or organizational level. Technical standardization has largely contributed towards truly interoperable networks, devices, and communication protocols. With this progress at the technical level, semantic interoperability is perceived as the next challenging barrier for information exchange, especially in eGovernment

environments. However, systematic standardization efforts in the area of semantics are rather rare, and even the term *semantic standard* remains weakly defined. The more general term *standard* varies greatly, depending on the context, and can refer to anything from a screw thread, a unit of measurement, or a way of looking at the world.² Semantic standards are related to world interpretations: they represent “a way of looking at the world.”

Unless semantic standards and specifications are identified, aligned, documented, managed, and made available for reuse, we shall suffer from a substantial loss of information and communication investments. This is particularly true for investments, because they remain heavy investments. The major ICT investor, the enterprise system and for open data and web platforms. Semantic standards could improve the availability and quality of linked open government data.³

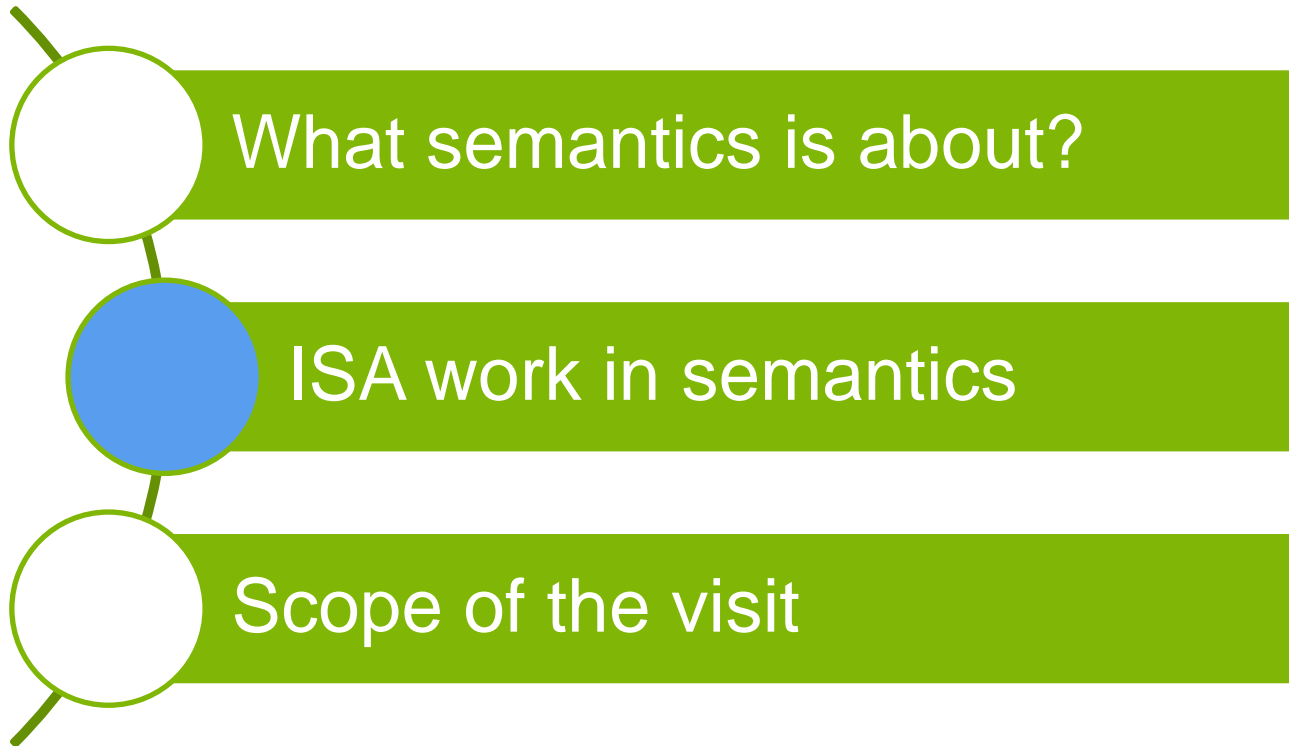
Semantic Standards Worldwide
Semantic standards are not always systematic, several semantic standards are in process worldwide. In the US and Europe, government projects are building repositories of semantic standards and promoting their reuse, with third parties cataloguing existing semantic standards and standardizing initiatives related to semantics.

In the US, the National Information Exchange Model (NIEM, www.niem.gov) has extended its initial coverage, which was restricted to the judicial domain to engage stakeholders from a wide spectrum

SOCIAL AGREEMENTS ON DATA STANDARDS

Open Semantic Standards

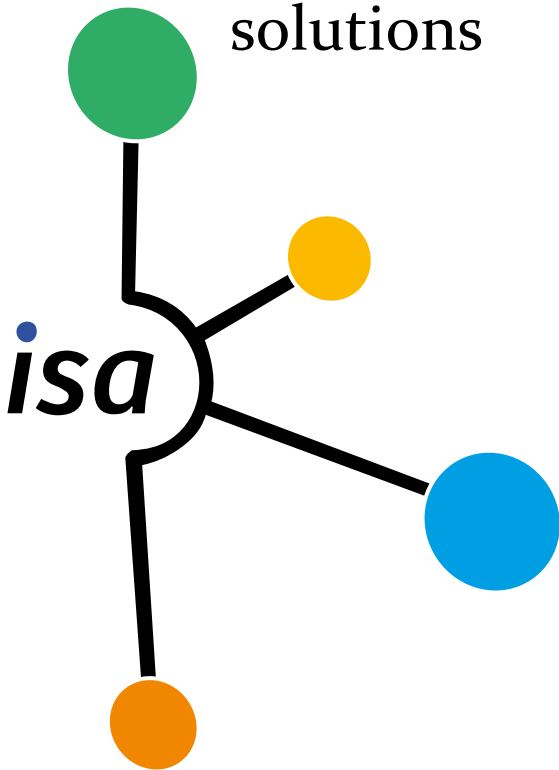




Making visible existing
solutions



*ADMS & Catalogue of
semantic standards*





- Using the same semantic standards promotes interoperability
- By reusing what is available you save resources, you reduce risks, and you become more interoperable with others
- A large number of semantic standards already exists



- The existing solutions are scattered in numerous places and are very difficult to find
 - Several national initiatives to create repositories/libraries/catalogues of semantic standards (e.g. Germany, Denmark, Finland, Estonia...)
 - Standardization bodies and third party initiatives generate valuable and highly reusable specifications (e.g. OASIS, W3C, UN/CEFACT...)
 - Independent projects make available semantic standards to their own websites



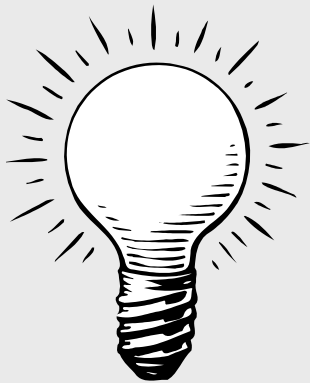
How could we promote the visibility and reuse of existing semantic standards at the European level?



How could we promote the reuse of existing semantic standards at the European level?



... by agreeing on a common language (template) to describe semantic standards



... creating a yellow page infrastructure with standards descriptions and links to the actual standards



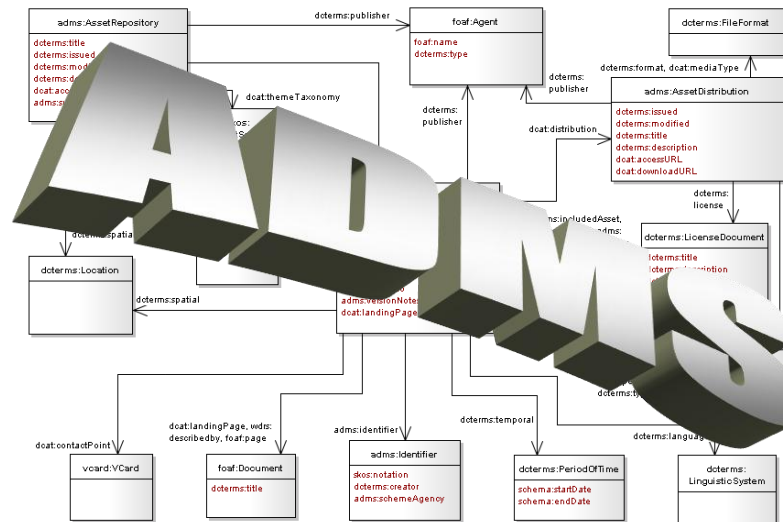
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Commission

ADMS

Common template (metadata) for describing semantic standards



Asset Description Metadata Schema (ADMS)



May 2012: ADMS endorsed by the EU member states (ISA Coordination Group)

ADMS implementation

ADMS-based federation of
semantic standards repositories



Catalogue of semantic
standards

joinup

- Semantic standards are described using ADMS
- Features simple and advanced search of semantic standards
- 2000+ semantic standards from 25 repositories are currently searchable through Joinup

Since January 2013

European Federated Interoperability Repository (EFIR)

ADMS-based repository of any
type of interoperability solution



Catalogue of interoperability
solutions

joinup

- Interoperability solutions are described using ADMS
- Features simple and advanced search of interoperability solutions
- Semantic and technical standards, open source software, reusable services

By end 2014

Making visible existing solutions



ADMS & Catalogue of semantic standards

Establishing agreements on basic semantics



Core Vocabularies

isa





Core Vocabularies

"...What has been discovered over the years is that there are a number of (information) structures that are universal and applicable to all kinds of organizations, both private and public. There are four fundamental categories: People and Organizations, Geography, Physical Resources and Activities and Events"

David Hay, Describing the World: Data Patterns

Core vocabularies

Simplified, re-usable, generic and extensible data models that capture the fundamental characteristics of a data entity in a context-neutral fashion.

**CORE
PUBLIC
SERVICE
VOCABULARY**

**CORE
PERSON
VOCABULARY**

**CORE
BUSINESS
VOCABULARY**

**CORE
LOCATION
VOCABULARY**

DCAT
APPLICATION
PROFILE FOR
EUROPEAN
DATA PORTALS



D3.1 – PROCESS AND METHODOLOGY FOR CORE
VOCABULARIES

Deliverable

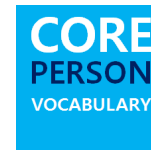
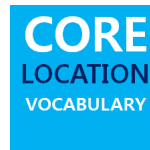
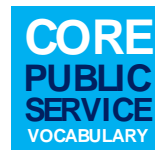
JOINING UP GOVERNMENTS

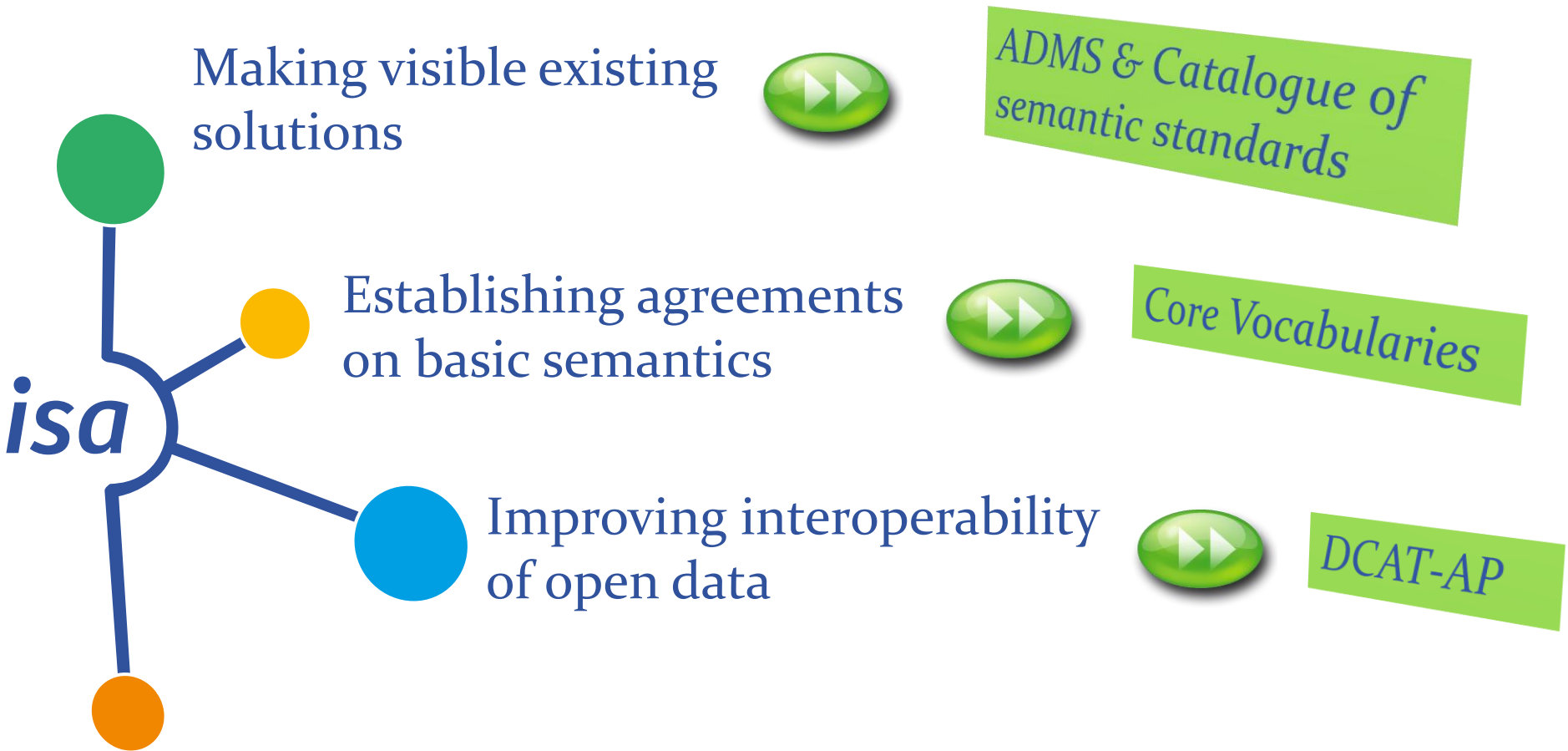




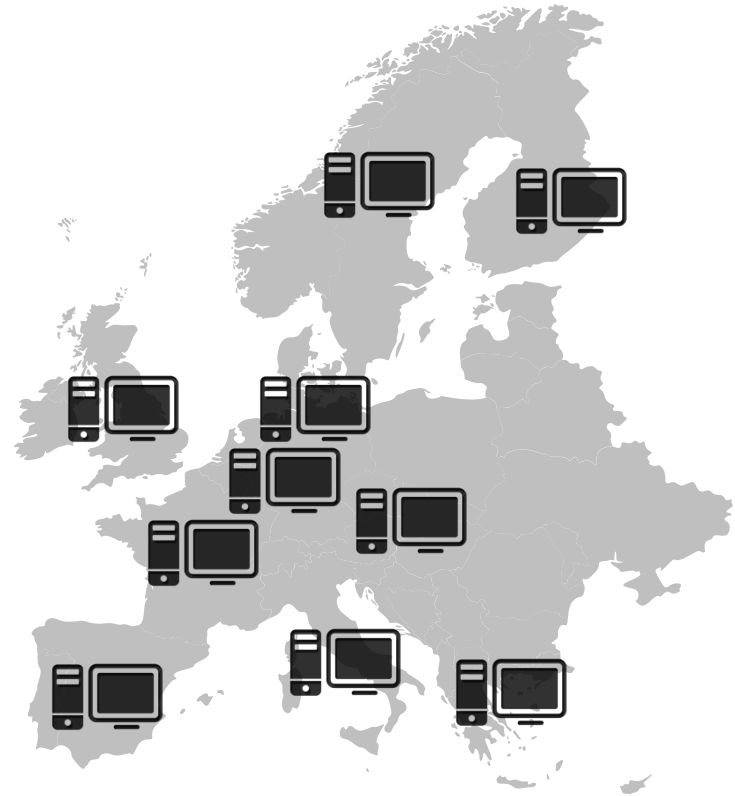
Usage

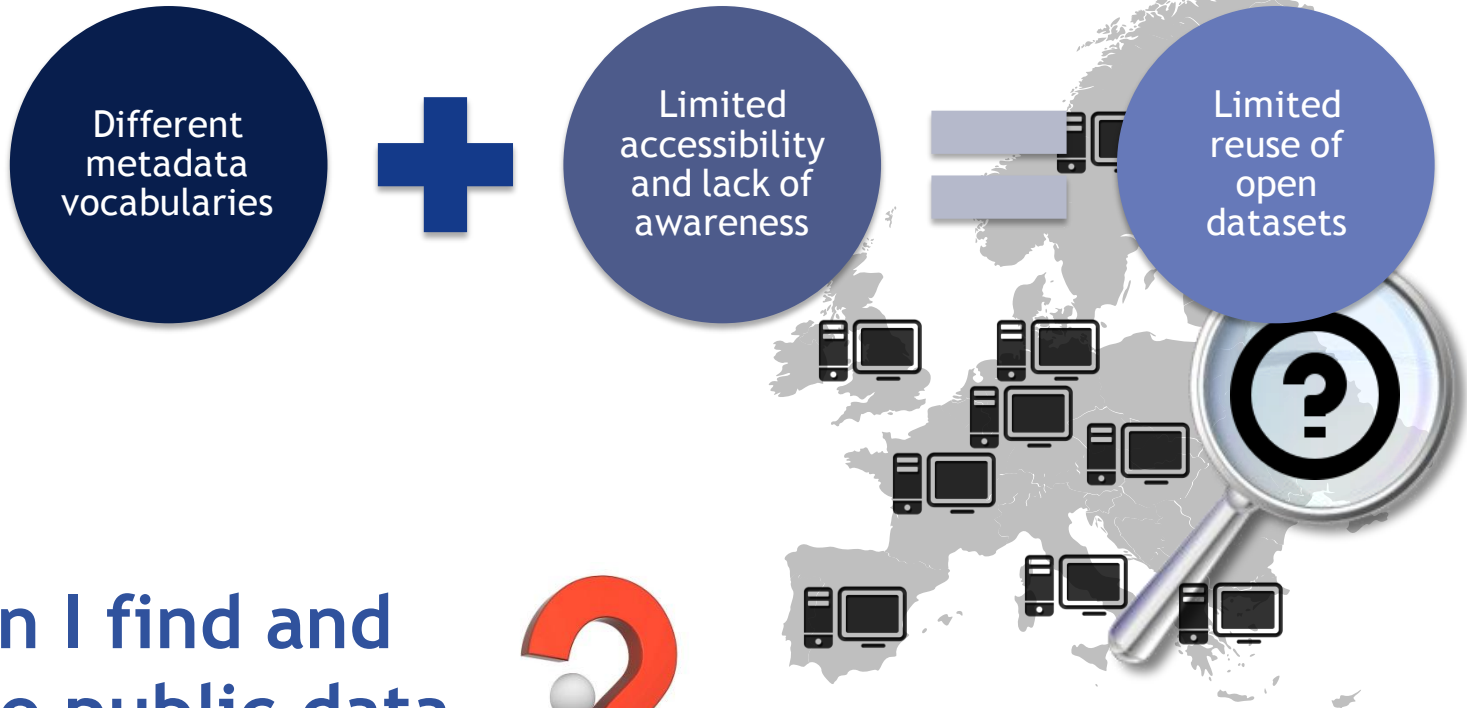
- New systems: As default starting points for data modeling
- Existing systems:
 - As reference data models for integration and information sharing
 - As export specifications for publishing open data





150+
Existing OGD Portal





How can I find and combine public data from various sources?





DCAT

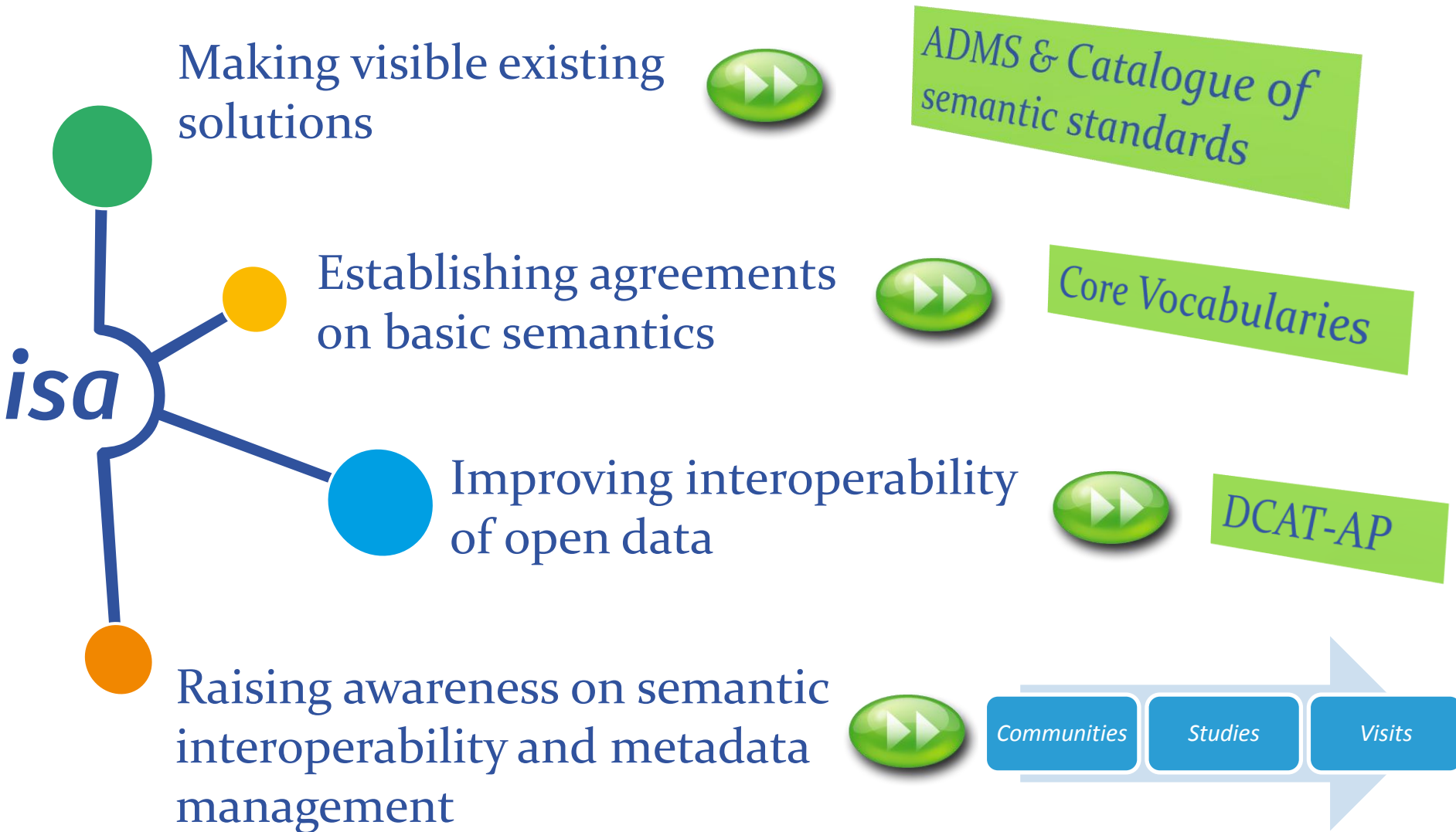
APPLICATION
PROFILE FOR
EUROPEAN
DATA PORTALS

The DCAT Application profile (DCAT-AP) is a common template to describe public sector datasets and data catalogs



**2013: pilot
of a pan-European
Open Data Portal**

**2014-2020:
progressive
implementation
as one of the CEF
(Connecting Europe Facility)
Infrastructures
(Open Data)**



Develop a national catalogue of core data standards (I)

1. Identify highly reusable information entities which remain relevant across different government domain
 - *Examples from DK, USA, DE, JP: person, business, locations*
 - *Rule of thumb: this data is stored in base registries*
2. Model this information to create generic data models and define reference data values. Use standard modeling approaches (e.g. UML, XML, RDF) and reuse existing content standards whenever possible (e.g. ISA Core Vocabularies, UBL)
 - *Example: the OSLO data standard for local authorities*
3. Develop and maintain a library of these core data standards. Promote this library as an authoritative source of core data elements (objects, properties, values)
 - *Examples: Germany-KOSIT, USA-NIEM, Japan-Core Vocabularies*

Develop a national catalogue of core data standards (II)

4. Develop tools to a) allow easy reuse of the models published in the library, b) validate compliance with the core library
- Examples: Germany-KOSIT, USA-NIEM
5. Provide space for organic growth of domain specific libraries around the core library. Allow domain-specific communities to contribute and share their (core library-compliant) models.
- Examples: Germany-KOSIT, USA-NIEM
6. Document your data models using ADMS and make descriptions available on the web. Joinup federates this content.
- Examples: 23 repositories already have used ADMS to describe their assets including Germany - Xrepository, Estonia - RIHA, the Netherlands - Dutch Standardisation Forum, Belgium - Belgian Interoperability Catalogue, Denmark - Digitaliser.dk.
7. Develop a national government metadata and standards policy (e.g. “comply or explain”)



Questions

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Visit our initiatives 

CESAR
COMMUNITY OF
EUROPEAN
SEMANTIC ASSETS
REPOSITORIES

ADMS
ASSET
DESCRIPTION
METADATA
SCHEMA

DCAT
APPLICATION
PROFILE FOR
EUROPEAN
DATA PORTALS

**SOFTWARE
FORGES
COMMUNITY**

**ADMS.
SW**

eGOVERNMENT
CORE
VOCABULARIES

**CORE
PUBLIC
SERVICE**
VOCABULARY

**CORE
LOCATION**
VOCABULARY

**CORE
BUSINESS**
VOCABULARY

**CORE
PERSON**
VOCABULARY

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