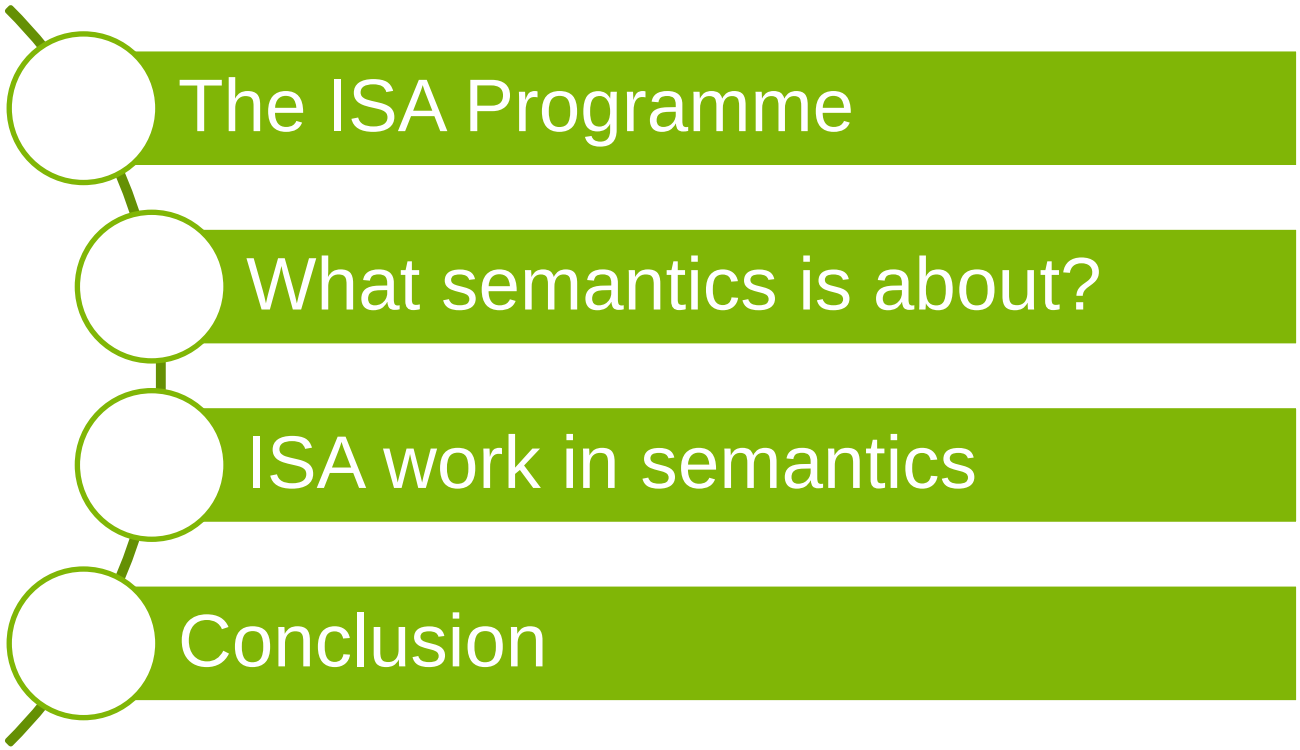
European Commission

# Promoting semantic interoperability between public administrations in Europe

SEMIC 2014 Conference - 09 April 2014, Athens
Vassilios.Peristeras@ec.europa.eu

ISA



European Commission

- The ISA Programme
- What semantics is about?
- ISA work in semantics
- Conclusion

# Modernisation of public administrations

European Commission

… towards an interconnected government model

- Develop synergies among institutions
- Unlock data across sectors
- Share services and solutions
- Optimize and simplify across ministerial boundaries

## Enabler = Interoperability

- Extract from Council Conclusions, October 2013:

"The **modernisation of public administrations should continue** … **Open data is an untapped resource** with a huge potential … **Interoperability and the re-use of public sector information** shall be promoted actively. "

European Commission

# The economic impact of interoperability
## one model (from a citizen's perspective)

**According to this model, for citizens that have to execute 10 transactions with the state when each transaction lasts 30 minutes each, the impact in the GDP is approximately:**

- in Belgium: **€1,1 billion a year**,
- in Germany: **€7,9 billion a year**,
- in Italy: **€4,9 billion a year**, etc.

**These figures can vary with the number of transactions and the time spend on them.**

From a Microsoft Research study

European Commission

# Interoperability Solutions for Public Administrations

## Objectives

**Efficient**

… and effective electronic cross-border and cross-sector interaction between European public administrations.

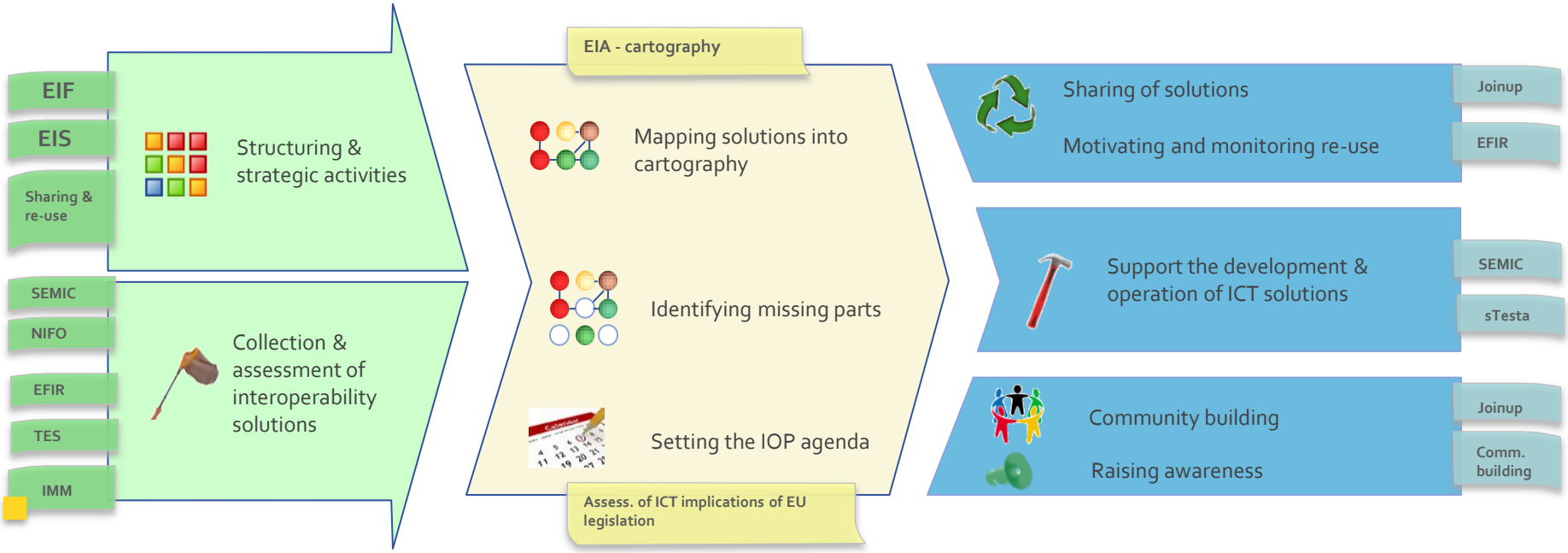
**European public administrations**

… share and re-use existing successful or new Interoperability solutions, common services and generic tools.

**Flexible and interlinked**

…IT systems allow smooth implementation of Community policies and activities.

# Achieving Interoperability requires an holistic approach be it at EU or national level



# ISA outputs

European Commission

## Support the effective Implementation of EU legislations (L)

- ICT Impact Assessments
- PSI
- CISE
- State Aid
- EULF
- IMI
- ECI
- INSPIRE
- ePrior
- ELI

## Key Interoperability Enablers (I)

- Networks
- Machine Translation
- Semantics
- Information exchange
- Sources of trusted information (access to base registers)
- eSignature & eIdentification
- Catalogues of services

## Supporting Instruments to European Public Administrations (PA)

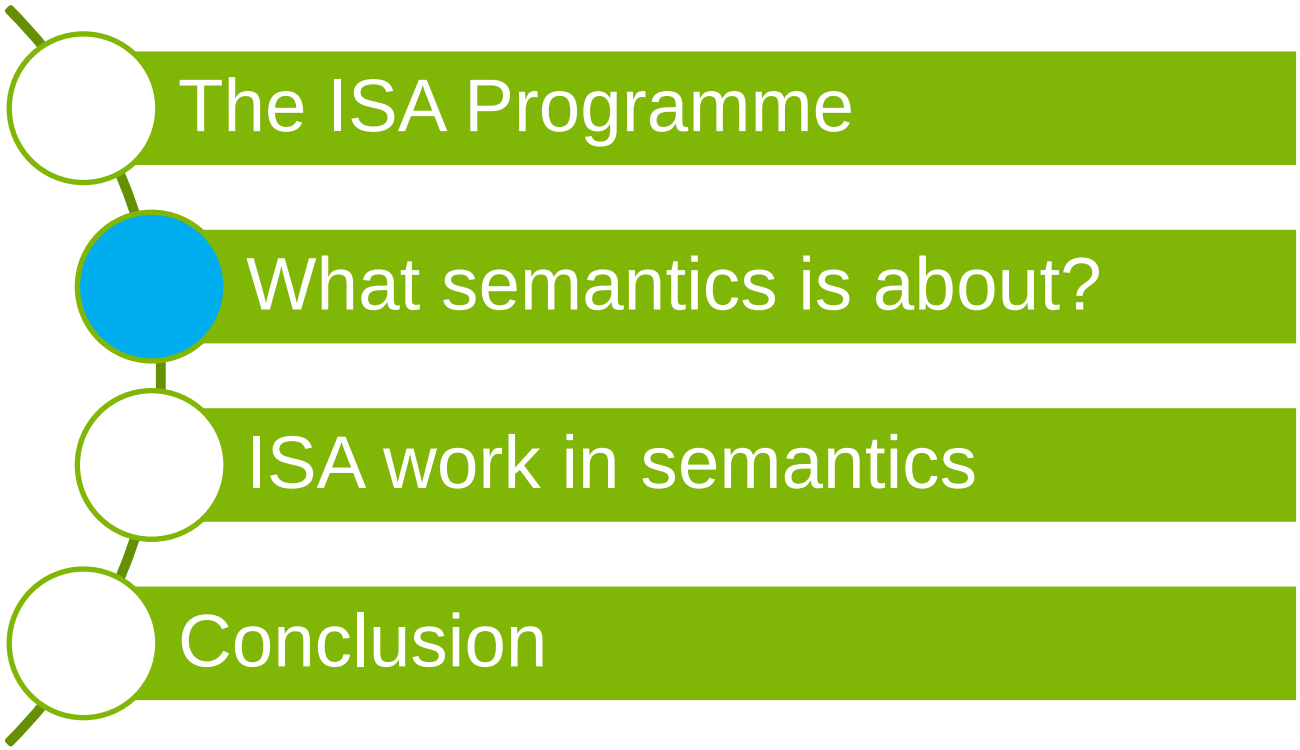
- EIS/EIF
- EIA (EIrA and EU cartography)
- Sharing & reuse
- EFIR
- IMM
- CIRCABC
- CAMMS
- ICT Impact Assessments
- Decision Support Enablers

## Accompanying Measures (A)

- Community building
- Communication Activities

## Monitoring activities (M)

- Programme
- TES
- NIFO

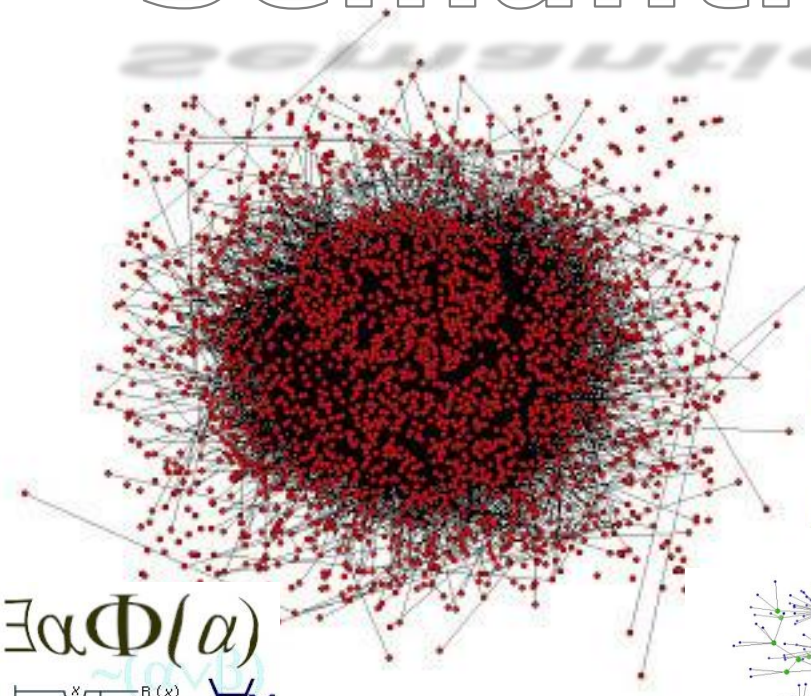


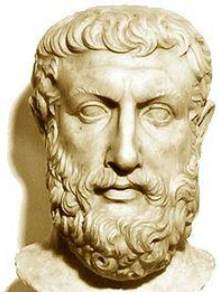
European Commission

- The ISA Programme
- What semantics is about?
- ISA work in semantics
- Conclusion

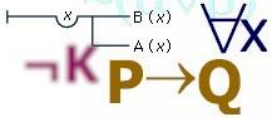
European Commission

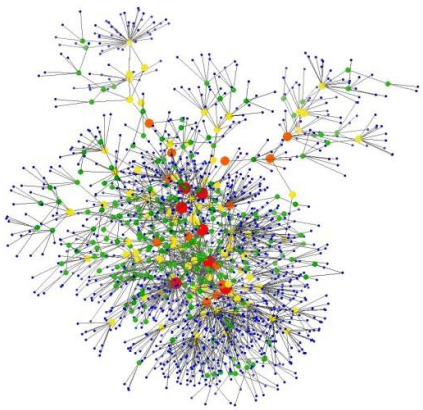
# Semantics





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

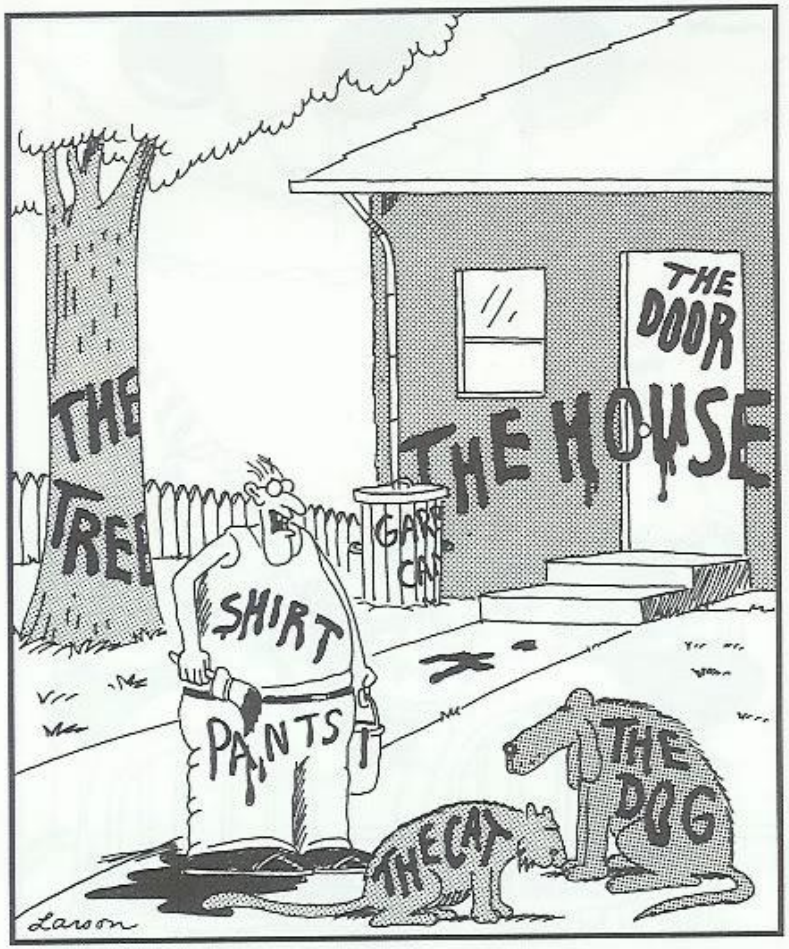


a) $\forall x(Bx \to Cx), \forall x(Ax \to Bx) \vdash \forall x(Ax \to Cx)$
b) $\exists x(Ax \ \& \ \neg Px), \forall x(Bx \to Px), \exists x(Ax \ \& \ \neg Bx)$
c) $\forall x(Px \leftrightarrow Qx), \exists x \neg Qx \vdash \exists x \neg Px$
d) $\forall x \forall y(Ax \ \& \ By) \vdash \exists x(Ax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

European Commission

# Semantics

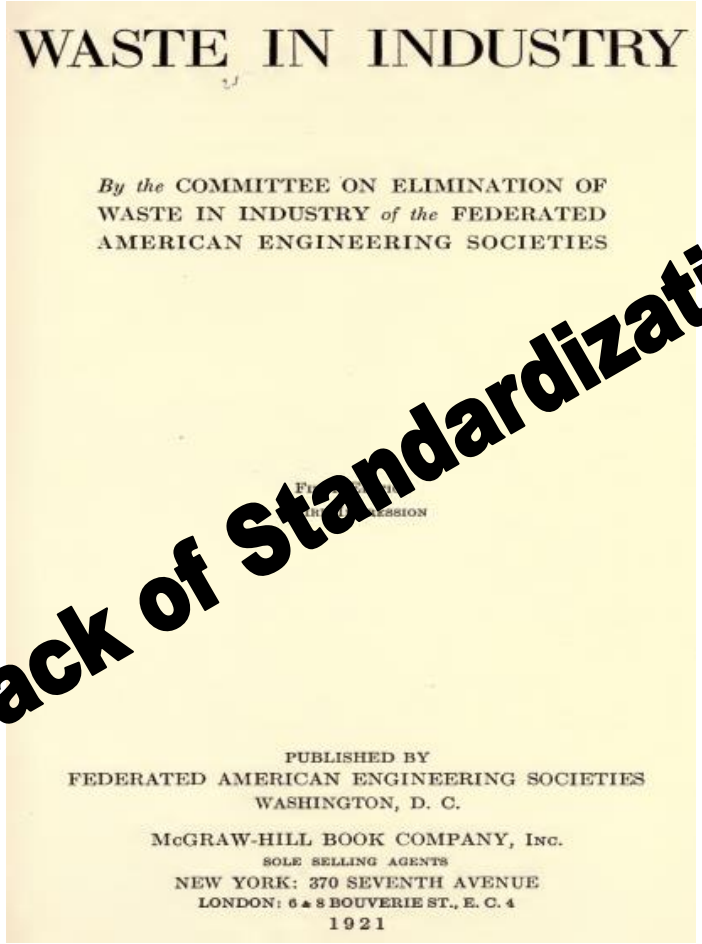



"Now! … *That* should clear up a few things around here!"

European Commission

| | |
|---|---|
| Cooperating partners with compatible visions, aligned priorities, and focused objectives | **Political Context** |
| Aligned legislation so that exchanged data is accorded proper legal weight | **Legal Interoperability** ⟷ Legislative Alignment |
| Coordinated processes in which different organisations achieve a previously agreed and mutually beneficial goal | **Organisational Interoperability** ⟷ Organisation and Process Alignment |
| Precise meaning of exchanged information which is preserved and understood by all parties | **Semantic Interoperability** ⟷ Semantic Alignment |
| Planning of technical issues involved in linking computer systems and services | **Technical Interoperability** ⟷ Interaction & Transport |

# How do we promote technical interoperability?

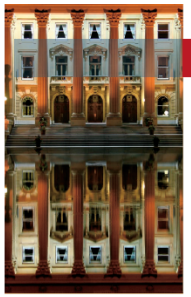



**Lack of Standardization**

European Commission

# Open Semantic Standards

ISA





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." In this report, at the peak of the industrial era, standardization was identified as a primary enabler to increase productivity in industry, as well as to cut down costs and prevent waste.

Scientific standardization boosted by the French revolution and the demand for rationalization, paved the way for the industrial standardization[1] discussed and promoted in Hoover's report. Standards were first perceived as key enablers for network industries such as railways. Interestingly, the need for establishing standards across different industries was identified quite early.

Just as industrial standards have contributed to the industrial revolution, information standards have become an essential part of the information revolution and information society. Standardization in information technology was a natural extension of the industrial standardization, and it started at the technical level. The main goal and advantage of standardization in information technology has been to improve 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 promoted for reuse, we shall suffer from a substantial waste in information and communication technologies (ICT) investments. This is particularly true for governments, because they remain the heaviest service industry and the major ICT investor. This statement remains relevant both for the development of closed, enterprise systems and for open data and Web service platforms. Semantic standards could also boost the availability and quality of linked open government data.[3]

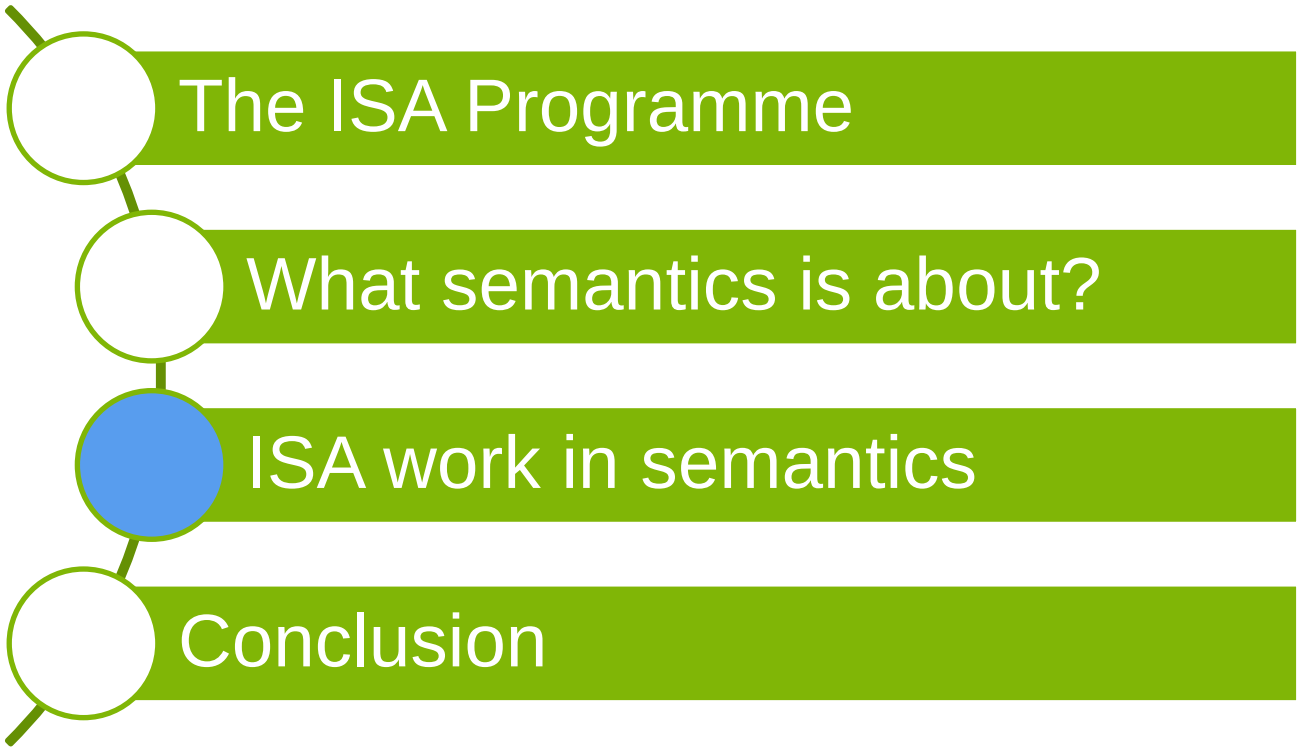
## Semantic Standards Worldwide

Although not always systematic, several semantic standardization initiatives are in process worldwide, including various efforts that aim to create semantic standards and libraries or catalogues of what already exists. In the US and Europe, government projects are creating repositories of semantic standards and promoting their reuse, with third parties cataloguing existing semantic standards and standardization bodies' 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



1541-1672/13/$31.00 © 2013 IEEE
*Published by the IEEE Computer Society*


The ISA Programme
What semantics is about?
ISA work in semantics
Conclusion

European Commission

joinup

Making visible existing solutions

ADMS & Catalogue of semantic standards

ADMS
ASSET DESCRIPTION METADATA SCHEMA

Establishing agreements on basic semantics

Core Vocabularies

CORE PERSON VOCABULARY

REGISTERED ORGANISATION VOCABULARY

CORE PUBLIC SERVICE VOCABULARY

CORE LOCATION VOCABULARY

isa

Improving interoperability of open data

DCAT-AP

DCAT
APPLICATION PROFILE FOR EUROPEAN DATA PORTALS

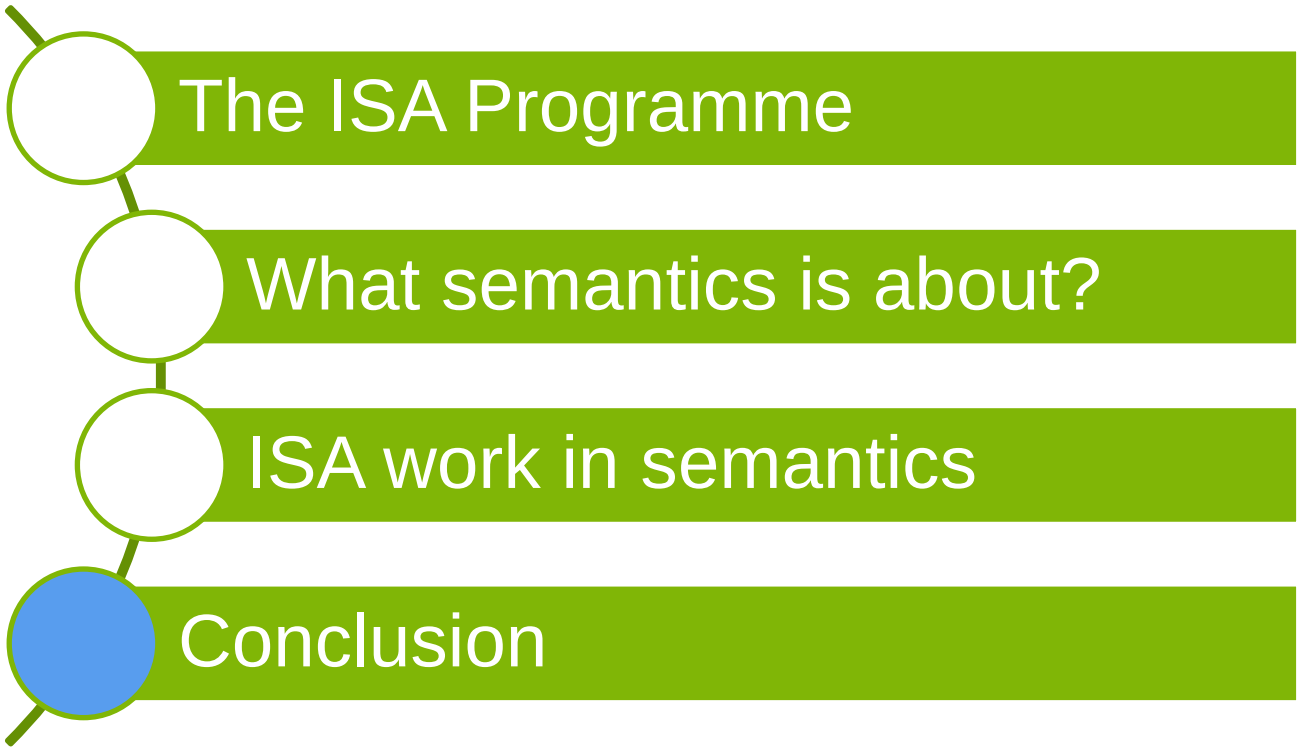
Raising awareness on semantic interoperability and metadata management

Communities

Studies

Visits

ISA


The ISA Programme
What semantics is about?
ISA work in semantics
Conclusion

## Conclusion

- Pursuing the broader possible engagement and collaboration using open processes (MSs, EU institutions, international organizations, standardization organizations, industry, third countries)
- Minimalistic and incremental approach to avoid over-specification
- Internationalization of activities and solutions

# Contact us

European Commission

## Questions

vassilios.peristeras@ec.europa.eu

Visit our initiatives

joinup

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

ISA

Get involved

Follow @SEMICeu on Twitter

Join the SEMIC group on LinkedIn

Join the SEMIC community on Joinup