XKOS and how to use it
What is XKOS?

An extension of SKOS for statistical classifications
What are statistical classifications?

- Hierarchical structures of concepts
  - One or several levels of detail
  - Usually balanced hierarchies
- Covering a specific field
  - Economic activity, occupations, level of education, legal form...
  - Usually exhaustively and mutually exclusively
What are statistical classifications?

- Living objects
  - Published in major versions (classification schemes)
  - Minor modifications on a regular basis (notes)
- Linked by correspondence tables
  - Between one major version and the next
  - Between classifications on the same field
  - Between classifications on related fields
What are statistical classifications?

**World level**
- **ISIC**
- **CPC**
- **HS**
- **SITC**

**EU level**
- **NACE**
- **CPA**
- **PRODCOM**
- **CN**

**National level**
- National versions of NACE
- National versions of CPA
- National versions of PRODCOM

Is the reference classification. Classifications are linked by the structure.

Is the reference classification. Classifications are linked by conversion table.

Classifications are linked by conversion tables.
What is SKOS?

An RDF vocabulary for Knowledge Organization Systems
What is an RDF vocabulary?

- RDF is a framework for expressing information about resources (RDF 1.1 Primer)
  - Information is modeled as statements (or triples)
    - 'EDDI 2014' 'takes place in' 'London'
    - <subject> <predicate> <object>
    - <subject> and <predicate> are IRIs, <object> is IRI or literal

- RDF vocabularies add semantics to RDF data
  - EDDI 2014 is an event, London is a city
  - Vocabularies are defined in schema languages (RDFS, OWL)
An RDF example

http://www.eddi-conferences.eu/eddi14/

http://sws.geonames.org/2643743/

rdfs:label

rdf:type

event:place

gn:name

EDDI 2014

London
The SKOS data model
How does XKOS extend SKOS?

• Specific classes and properties
  – 3 additional classes
    • Classification level (a kind of SKOS Collection)
    • Correspondence and Concept Association
  – 36 additional properties
    • Business properties of classification management
    • More semantic relations
How does XKOS extend SKOS?

- Additional semantic relations
How does XKOS extend SKOS?

- Additional types of notes

- skos:note
- skos:scopeNote
- xkos:inclusionNote
- xkos:exclusionNote
- xkos:coreContentNote
- xkos:additionalContentNote
How to use XKOS?

• For classifications (obviously)
  – Some dedicated features
  – Important to publish classifications as Linked Data
    • Fundamental in the structuration of statistical data
    • Coordinated at the international level

• But not only
  – Semantic relations, for example:
    • Generic / specific and partitive relations
    • Sequential / causal relations for representing processes
  – Notes (inclusion, exclusion)
XKOS for statistical classifications

- Better representation
  - Linking a classification with the field it covers
  - Linking a classification and its major versions
  - Formalizing the classification levels
XKOS for statistical classifications

• Better representation
  – Better modelization of the correspondences
  – More precise typology of textual material
  – Richer semantics for relations between items
  – Possibility to represent how the actual objects are classified
XKOS for statistical classifications

- **XKOS is SKOS**
  - Use of SKOS mapping properties
  - Use of classifications and levels in Data Cube

- **XKOS is RDF**
  - Use of standard properties
    (for example rdfs:seeAlso, owl:sameAs)
  - Use of other vocabularies (PROV-O, DC, ADMS)
  - Inference
  - IRIs
XKOS for statistical classifications

- Enhances their value as Linked Metadata
  - Richer browsing
    - Classification structure is clearer
    - Links to other classifications or versions
  - Smarter queries
    - Avoid to match on exclusion notes
    - Queries on concept associations
  - Easier extractions, in multiple formats
    - Levels
    - Correspondences
**XKOS current state**

- Most of the work done during two Dagstuhl workshops (September 2011 and October 2012)
  - Other specification authors: Richard Cyganiak, Daniel Gillman, R.T.A.M. Grim, Yves Jaques, Wendy Thomas... and many more contributors
- 2012-2013: real implementations (Istat, INSEE)
- Public review completed in 2014
- Final publication at the beginning of 2015 by the DDI Alliance
XKOS and how to use it

Thank you