

FIWARE
**Global
Summit**



Smart Data Models

SDMX towards context information: achieving interoperability with NGSI-LD

Gran Canaria, Spain
14-15 September, 2022
#FIWARESummit

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INTERSTAT – Open Statistical Data interoperability framework

Scope

- Interoperability between different National Statistical Office (NSO)
- Interoperability between NSO Open Data Portals and European Open Data Portal
- Use of semantic data and metadata standardization to increase interoperability

Goal

- Creation of a framework to allow replication of cross-border services.
- Automate metadata harmonisation and data publication in (linked) Open Data.
- Provide technical interfaces for a standard and re-use of statistical information.
- Simplify the statistical data visualisation and analysis for non-technical end-users.

Tech

- Smart Data Models, DCAT-AP, statDCAT-AP
- Open Data portals, CKAN
- Metadata vocabularies (Dublin Core, SDMX, INSPIRE)
- Context Broker, Idra, ETSI NGSI-LD

Use cases

S4Y - The School For you



Know the distribution of students or potential students in the territory and the services addressed to them.

- Search for sources of statistical data
- Outline the original source;
- Harmonization of the data sources
- Provide the integrated scheme through the ontologies
- Detail steps for the transformations and physical integrations of the data
- Technological scheme for achieving the physical integration of data
- Provide a single data access to resolve heterogeneity of data formats

Geolocalized Facilities



Set up a mechanism for providing decision support based on use of geolocalized information about infrastructures and events.

- Finding the nearest facilities of a visiting place
- Search for events close to their location
- Search for capacity of the equipment in the neighbourhood
- Combine with data on the demographic evolution at a fine level
- Combine the statistical information with other more relevant data sources

Support for Environment Policies



Enrich air quality information, produced to support local policy makers responsible for environmental decisions.

- Exploration of published open data related to the domains of interest
- Inventory of potential data providers
- Selection of specific datasets, description of data models and structures
- Analysis of available ontologies , data vocabularies and tools.

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Outcomes

- Publish statistical data with the FIWARE Context Broker
- Interoperability between ETSI NGSI-LD and statistical models
- SDMX Information model (data and metadata)
- VTL data model
- DDI Cross-domain integration (CDI) model
- Extraction of Statistical Data (Datasets) from Eurostat (SDMX)
- Transformation of SDMX (RDF) content into DCAT-AP / CKAN through FIWARE Idra and publication into European Data Portal
- Transformation of SMDX (RDF) into JSON-LD using statDCAP-AP and publication the information using ETSI NGSI-LD for External Systems.

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Results

- Air quality data
 - Specified and published by the European Environment Agency (EEA).
 - Models and metadata from the Eionet data dictionary[1].
- Demographic data
 - Using the Census Hub models and metadata.
 - Expressed in SDMX / Data Cube[2].

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DCAT-AP data models

- Agent – Agent Schema meeting DCAT-AP 2.0 specification.
- Catalogue – Catalogue of datasets compliant with DCAT-AP specification.
- CatalogueRecord – This is a Catalogue Record belonging to a dataset according to the DCAT-AP standard 2.0.1.
- DataService – Data Service adapted from DCAT-AP 2.0 specification, but extended with additional properties and compatible with NGSI standard.
- Dataset – Dataset Schema meeting DCAT-AP 2.0 specification.
- Distribution – This is a distribution belonging to a dataset according to the DCAT-AP standard 2.0.1.

statDCAT-AP extension

- Dataset – Dataset Schema meeting STAT-DCAT-AP 1.0.1 specification.

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Potentially new SDMs to propose:

- statDCAT-AP.Checksum.
- Deal with SDMX metadata model.
- Generalize to other statistical models (VTL, DDI-CDI).
- Link to other useful models (e.g. Semantic Sensor Network Ontology for sensor data).

Potential extension of currently SDMs:

- AirQuality, introduction of statistical information of the pollution information.



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First results: translation of census data to NGSI-LD

```
isc:dSDL
  a qb:DataStructureDefinition ;
  rdfs:label "Population by sex, age and local administrative unit"@en ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:attribute sdmx-attribute:unitMeasure ;
                 qb:componentAttachment qb:DataSet
               ] ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:attribute isc:att-nuts3 ;
                 qb:componentAttachment qb:Observation
               ] ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:dimension isc:dim-age
               ] ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:dimension isc:dim-sex
               ] ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:dimension isc:dim-lau
               ] ;
  qb:component [ a qb:ComponentSpecification ;
                 qb:measure sdmx-measure:obsValue
               ] .
```



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      "@language": "en"
    }
  ],
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      },
      "qb:componentAttachment": {
        "@id": "qb:DataSet"
      }
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    (...),
    {
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      }
    },
    {
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      "qb:measure": {
        "@id": "sdmx-measure:obsValue"
      }
    }
  ]
}
```