



Linked Open Statistical Data in Greece

Irene Petrou
Marios Meimaris
George Papastefanatos

Institute for the Management of Information Systems
Research Center “Athena”



Share-PSI 2.0 Workshop@ Samos 2014 Summit
June 2014

Our focus: Statistical PSI in Greece

- Collected & Published by national statistical agency, e.g.
 - Census data
 - Geospatial Data
 - Socioeconomic indices, GDP, etc.
- Usually provided in
 - tabular format, csv, xls, html
 - aggregated rather than micro data
 - multidimensional observations

Who uses them?

- Government & Local Administration
 - Financial policy making
 - Drawing of new administrative regions
 - Development of new rural areas
 - Education & Health planning
 - Environmental & Energy planning
 - Forecasting future transportation needs
 - Reapportioning seats in the parliament
 - Analyzing quality-of-life indices & trends
- Media,
- Market analysis in private sector, (real estate, constructions, retail).
- Individuals, engineers, social scientists, independent researchers ... and many more

Statistical Information **costs a lot of money** to
collect, integrate, curate, analyze

Greek Census 2011

Inhabitants

A scanned image of the Greek Census 2011 form for individuals (Inhabitants). The form is a grid-based questionnaire with various sections and questions. It includes fields for personal information like name, date of birth, gender, and marital status, as well as more detailed questions about education, employment, and household members. The entire form is in Greek.

Households and dwellings

A scanned image of the Greek Census 2011 form for households and dwellings. This form is also a grid-based questionnaire. It focuses on the characteristics of the dwelling, such as type, size, and facilities, as well as the household's composition and economic activity. A large red watermark reading "cost: ~70M Euro!!!" is overlaid across both forms.

- sex, marital status, nationality, educational level, address, etc.

- type of residence, total area, facilities, number of residents, etc.



- [Statistical Themes](#)
- [Statistical Database](#)
- [Digital Library](#)
- [Portal Demo](#)
- [European Statistical Data Support center \(ESDS\)](#)
- [Search the Portal](#)
- [Comments and Feedback](#)
- [Login Credentials](#)

[Sign up](#) [Password reminder](#)

Population Census 2011

Main Portal Page > **Population Census 2011**

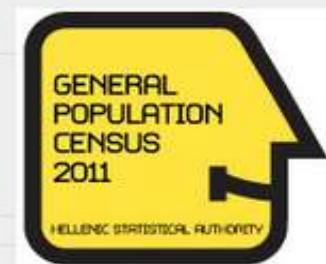
Population Census 2011

Revised Resident population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece

Revised De Jure (registered) population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece
- » Table, The De Jure (registered) population 2011



Revised DE FACTO population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece

Rest

» Resident population before revision

- » [Announcement of the demographic and social characteristics of the Resident Population of Greece according to the 2011 Population-Housing Census](#)
- » Tables of demographic and social characteristics of the Resident Population of Greece (2011 Population-Housing Census)
- » Announcement Census 2011 - Resident Population

» De Jure (registered) population before revision

- » Announcement of the De Jure (registered) Population 2011
- » Table, The De Jure (registered) Population 2011

» DE FACTO population before revision

linked-statistics.gr @ Samos Summit 2014

- » Announcement of the DE FACTO Population 2011



- Statistical Themes
- Statistical Database
- Digital Library
- Portal Demo
- European Statistical Data Support center (ESDS)
- Search the Portal
- Comments and Feedback
- 

Username:
Password:

Sign up
 Password reminder

Population Census 2011

Main Portal Page > **Population Census 2011**

 **Dataset catalog in .pdf format**

Revised Resident population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece

Revised De Jure (registered) population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece
- » Table, The De Jure (registered) population 2011

 **Table (Dataset) in .xls**

Revised DE FACTO population

- » Announcement of the revision of the results of the 2011 Population and Housing Census for the Resident, De Jure (registered) and De Facto population of Greece

Rest

 **No browsing,
No querying**

Resident population before revision

[Announcement of the demographic and social characteristics of the Resident Population of Greece according to the 2011 Population-Census](#)
[Announcement of the demographic and social characteristics of the Resident Population of Greece \(2011 Population-Housing Census\)](#)
[Announcement Census 2011 - Resident Population](#)

 **No metadata (date, reason, authorship, etc.)for datasets**

linked-statistics.gr @ Samos Summit 2014

» De Jure (registered) population before revision

- » Announcement of the De Jure (registered) Population 2011
- » Table, The De Jure (registered) Population 2011

» DE FACTO population before revision

- » Announcement of the DE FACTO Population 2011



- [Statistical Themes](#)
- [Statistical Database](#)
- [Digital Library](#)
- [Portal Demo](#)
- [European Statistical Data Support center \(ESDS\)](#)
- [Search the site](#)
- [Comments and Feedback](#)
- [Login](#)
Username:
Password:

[Sign up](#) [Password reminder](#)

Population Census 2011

Main Portal Page > Population Census 2011

Population Census 2011

Revised Resident population

- » Announcement of the revision of the results of the 2011 Population and Housing Census of Greece, De Jure (registered) and De Facto population

Revised De Jure (registered) population

- » Announcement of the revision of the results of the 2011 Population and Housing Census of Greece, De Jure (registered) and De Facto population of Greece
- » Table, The De Jure (registered) population 2011

DE JURE and DE FACTO population before revision

- » Announcement of the De Jure (registered) Population 2011
- » Table, The De Jure (registered) Population 2011

DE FACTO population before revision

- » Announcement of the DE FACTO Population 2011

linked-statistics.gr @ Samos Summit 2014

[Statistical Themes](#)[Statistical Database](#)[Digital Library](#)[Portal Demo](#)[Login Credentials](#)Username: Password: [Sign up](#)[Password reminder](#)

Population Census 2011

[Main Portal Page](#) > **Population Census 2011**

Population Census 2011

LINKED OPEN DATA

[Revised De Jure \(registered\) population](#)**GENERAL
POPULATION
CENSUS**

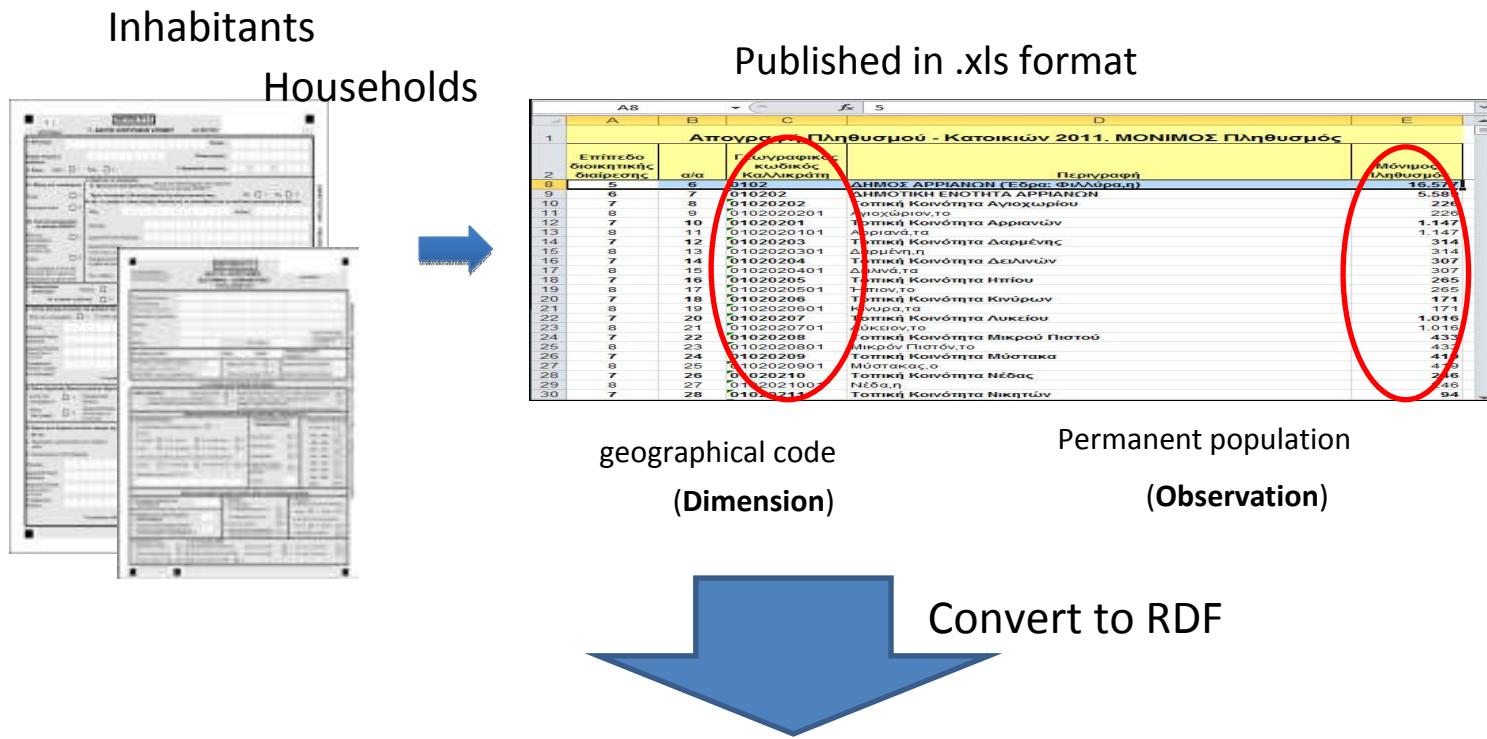
- High quality : Uniform Metadata – Common Vocabularies and standards
- Machine-readable, Citable datasets – URIs to link
- Discover, Query and Browse Information
- Easily consumed, combined with other sources, produce new insights

[Table: The De Jure \(registered\) Population 2011](#)[» DE FACTO population before revision](#)

linked-statistics.gr @ Samos Summit 2014

[» Announcement of the DE FACTO Population 2011](#)

Statistical data → multidimensional LOD

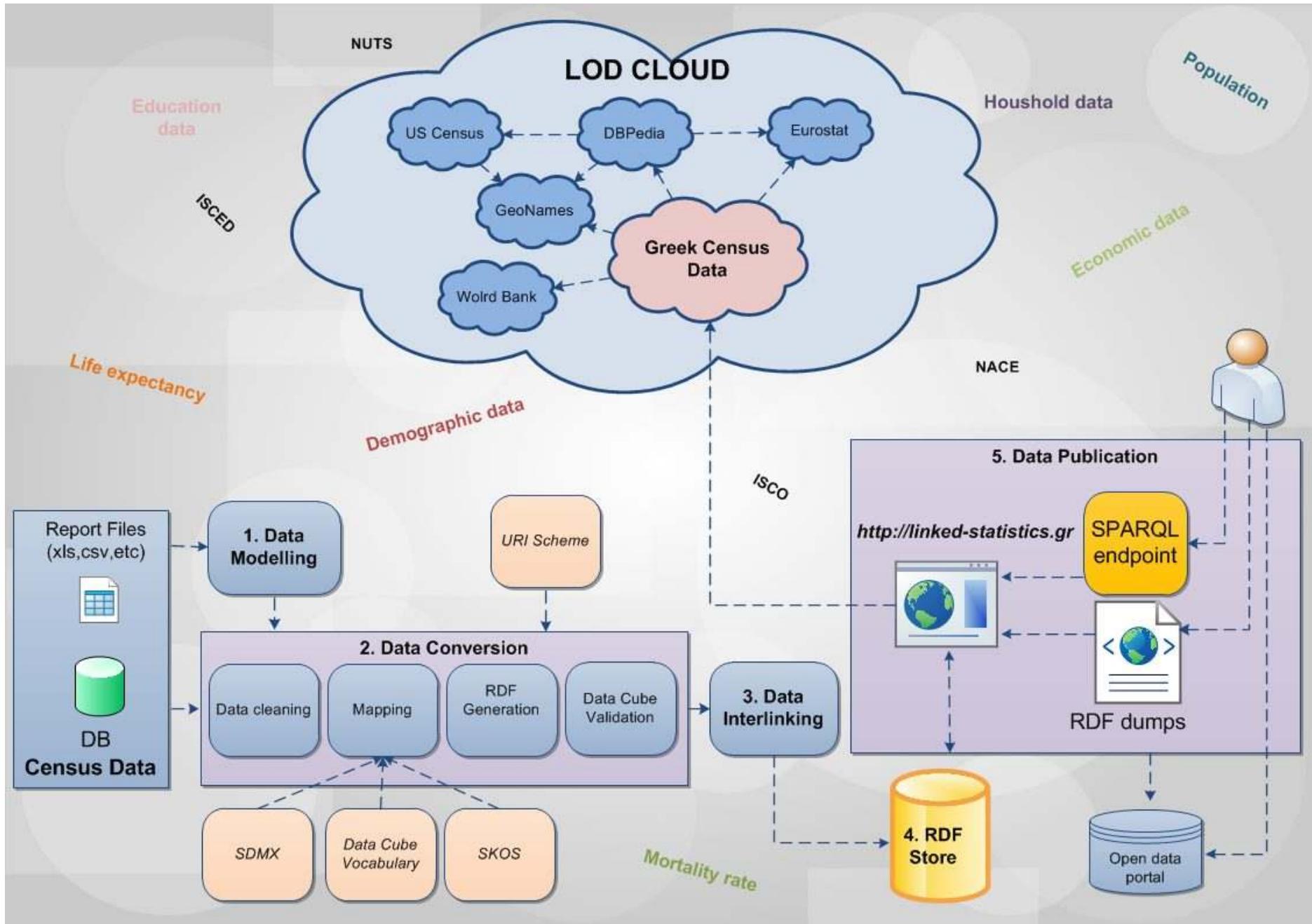


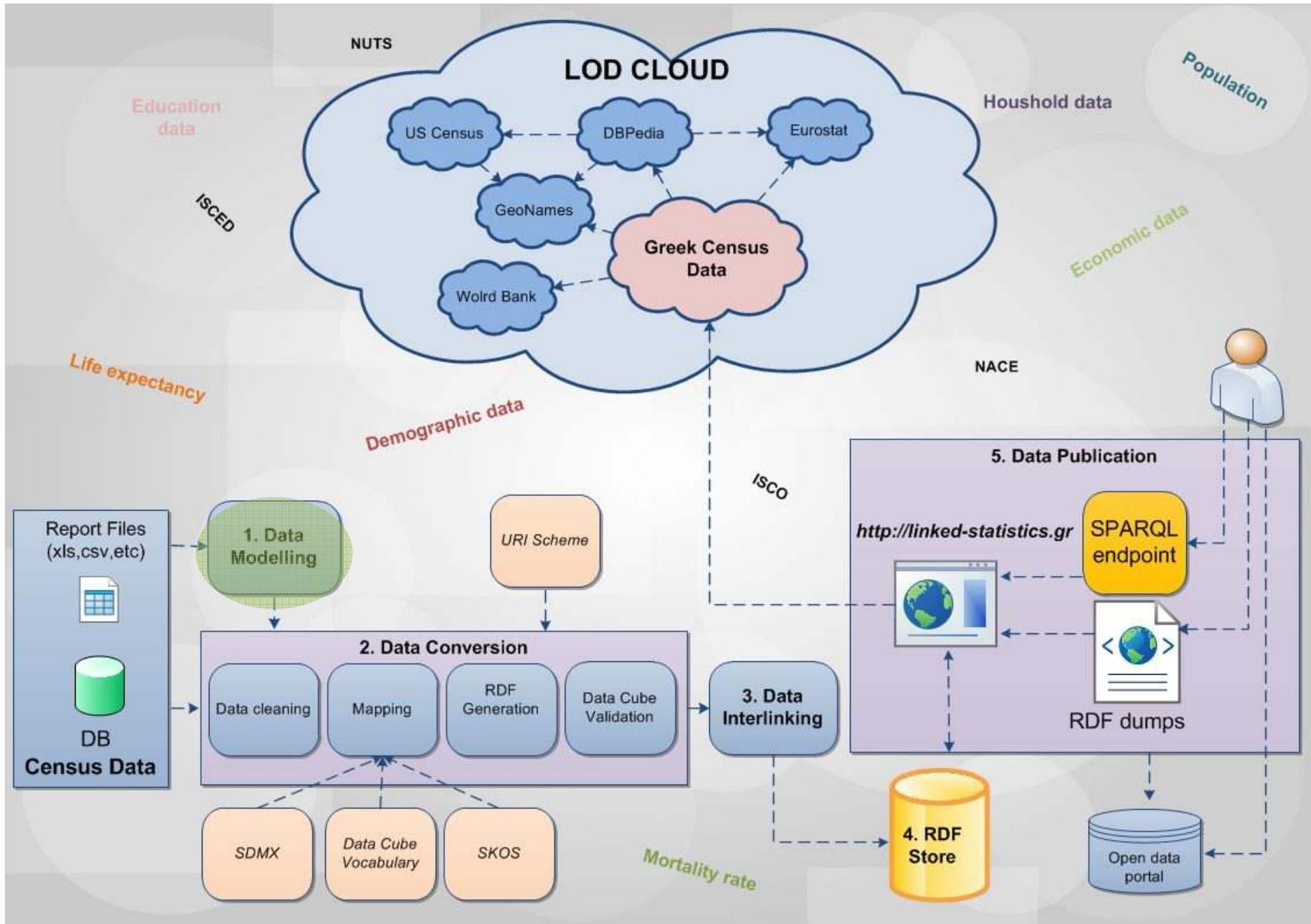
```

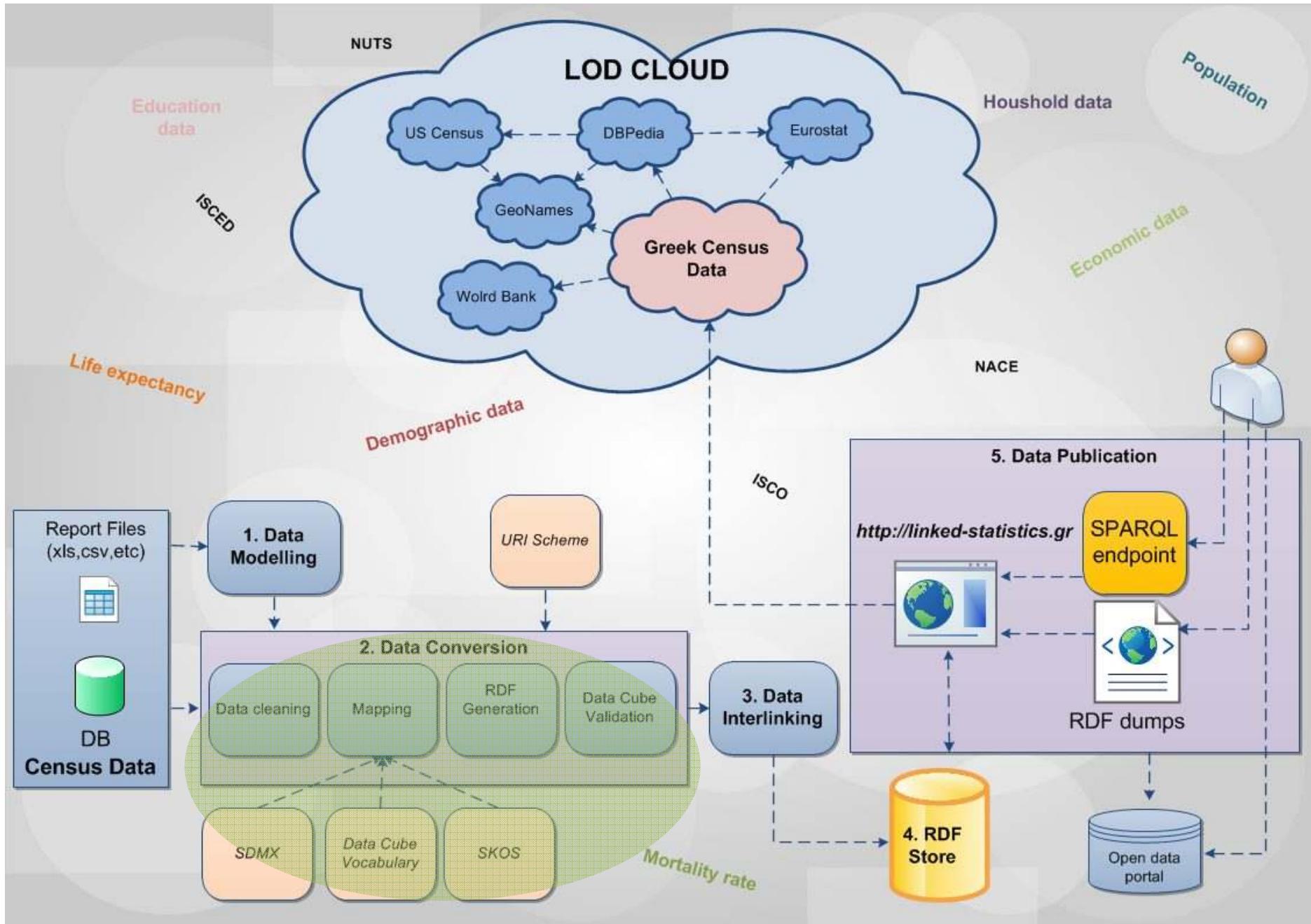
<rdf:Description rdf:about="http://linked-statistics.gr/resource/dataset/per-pop-geo/obs/2011/1110102">
  <rdf:type rdf:resource="http://purl.org/linked-data/cube#Observation"/>
  <sdmx-dimension:refArea rdf:resource="http://linked-statistics.gr/resource/admin-division/2011/municipality/1110102"/>
  <populationMeasure xmlns="http://linked-statistics.gr/ontology/qb-components#" rdf:datatype="http://www.w3.org/2001/XMLSchema#int">16577</populationMeasure>
  <qb:dataSet rdf:resource="http://linked-statistics.gr/resource/dataset/per-pop-geo"/>
  <sdmx-dimension:refPeriod rdf:resource="http://reference.data.gov.uk/id/gregorian-year/2011"/>
</rdf:Description>
  
```

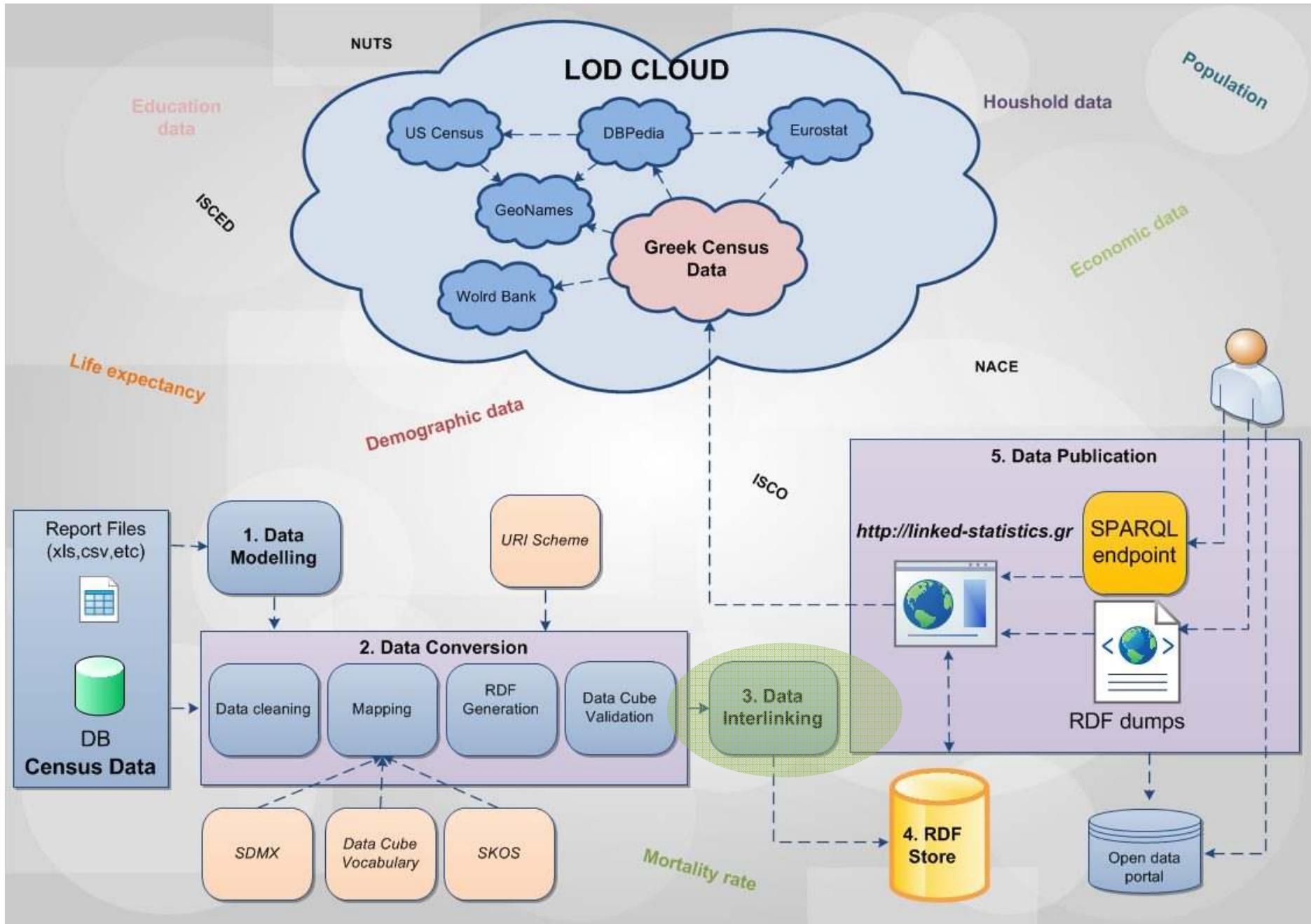
Output

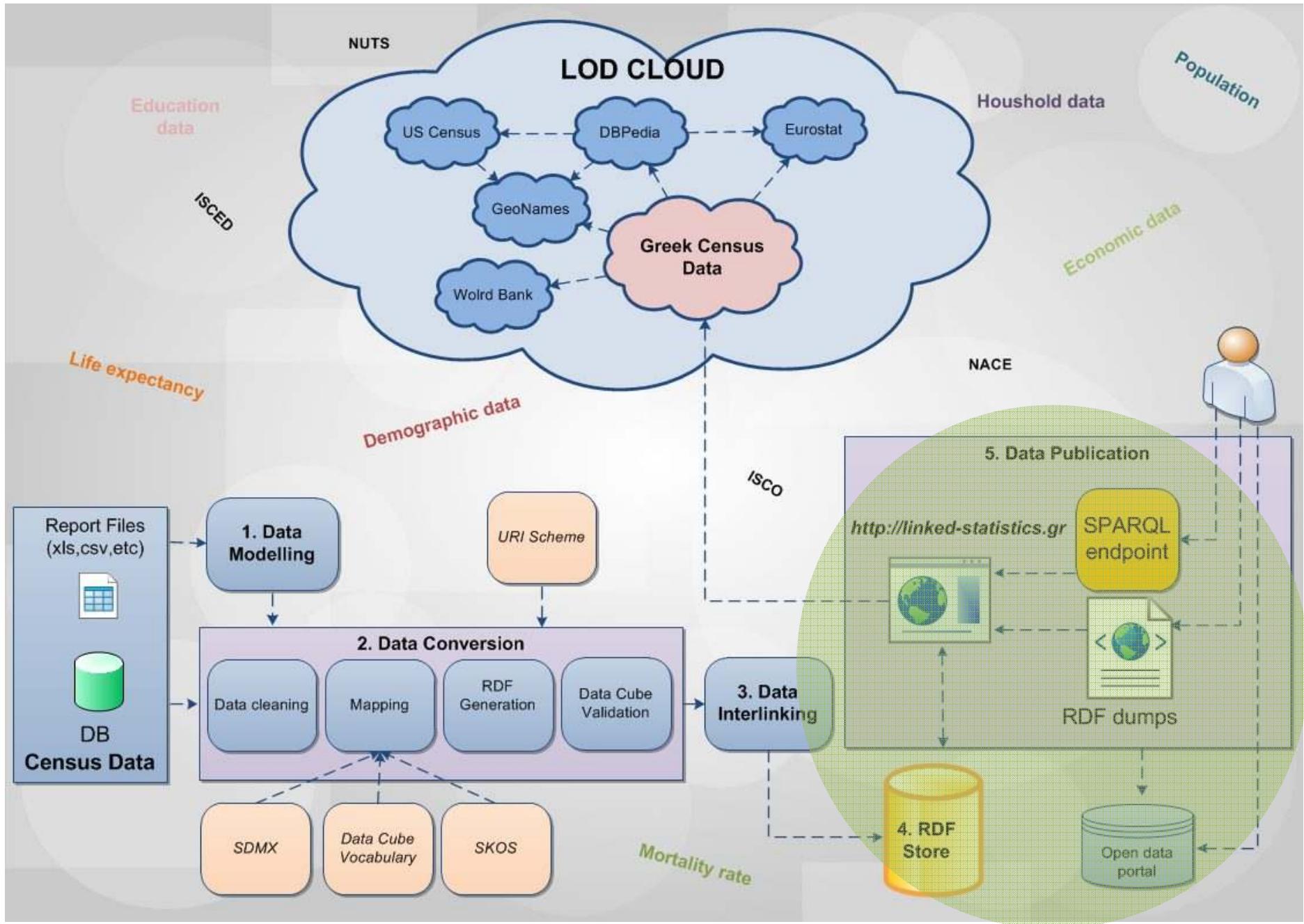
- Methodology & Tool for transforming spreadsheets to multidimensional Linked Data
- A step-by-step guide
 - Make it easy for the Data curator, the non-expert user (e.g. statisticians)
 - Make use of open tools and standards for publishing PSI
- Encourage users of statistical data to consume LOD in their analysis (e.g. social scientists).
 - simplify the data linking process,
 - promote data integration and mash ups











Publishing Greek statistics as LOD

- Follows best practices for Linked Data
 - Reuse of standard statistical vocabularies, such as the *Data Cube Vocabulary, SDMX, and SKOS*.
 - URI naming, provenance information for datasets
 - Interlink with other statistical concepts & datasets
 - Use of existing publishing tools & RDF storage technologies.

How to use linked-statistics.gr


Publishing statistical data as Linked Open Data

Query

About Download SPARQL Endpoint Publications Contact Us

Welcome to linked-statistics.gr

What is linked-statistics.gr?

linked-statistics.gr delivers socio-economic and socio-demographic data, made available as csv or excel files by the Hellenic Statistical Authority (ELSTAT), as [Linked Open Data \(LOD\)](#). Linked statistics provides semantically rich statistical data and connects ELSTAT to the LOD cloud. Linked statistical data facilitate their interlinking and cross-validation with datasets published by other statistical sources such as Eurostat, WorldBank, etc. linked-statistics.gr offers users the ability to local use in RDF format, query via a SPARL endpoint and browse online the data. It builds on top of existing open source tools (Protégé OWL editor and Jena).

Link

About: <http://linked-statistics.gr/resource/dataset/reg-pop-geo/obs/2011/46259> 

An Entity of Type : [Observation](#), within Data Space : [linked-statistics.gr](#)
[Start faceted browsing from this Type](#)

Attributes	Values
rdf:type	qb:Observation
Πληθυσμός	11308(xsd:integer)
Περιοχή αναφοράς	ΠΕΡΙΦΕΡΕΙΑΚΗ ΕΝΟΤΗΤΑ ΑΝΔΡΟΥ
qb:dataSet	Registered (De jure) Population per geographical area
Περίοδος αναφοράς	interval:2011

Datasets
[Ontologies](#)
[Codelists](#)



Useful Links

IMIS R.C. "Athena"

Download

Dataset Name: Resident population
Structure: [data structure definition](#) [5.92 KB]
Dimensions: [geographical areas](#)
Download data per:
 All administrative divisions [13.53 MB]
 Original dataset: [XLS](#)

Browse

linked-statistics.gr @ Samos Summit 201

Project Overview

- Organization, management and map representation of socio-demographic data collected from the last three Greek Population Censuses in 1991, 2001 & 2011.
- The census data from the three censuses will be available:
 - **PANORAMA**: Map Visualization portal
 - <http://linked-statistics.gr>: LOD provision
 - **Kalidoskopio**: Analysis and provision of indices for poverty, social exclusion, politics & elections, etc.



NATIONAL CENTRE FOR SOCIAL RESEARCH



This research is co-financed by the European Union (European Regional Development Fund - ERDF) and Greek national funds through the Operational Program "Competitiveness and Entrepreneurship" (OPCE II) of the National Strategic Reference Framework (NSRF) - Research Funding Program: KRIPIS.

Thank you!

The screenshot shows the homepage of the [linked-statistics.gr](http://linked-statistics.gr/index.html) website. The header features the "Linked statistics" logo and the tagline "Publishing statistical data as Linked Open Data". The main navigation menu includes links for About, Download, SPARQL Endpoint, Publications, and Contact Us. The main content area has a heading "Welcome to linked-statistics.gr" and a section titled "What is linked-statistics.gr?". This section describes the service as delivering socio-economic and socio-demographic data in LOD format, provided by the Hellenic Statistical Authority (ELSTAT). It mentions the use of existing tools like Protégé-OWL, Google Refine, and Data Cube Vocabulary, along with LOD storage technologies like OpenLink Virtuoso. Below this, there's a paragraph about census data from 2011. A sidebar on the right contains the IMIS logo and sections for "Useful Links" (IMIS, R.C. "Athina", Hellenic Statistical Authority, Data Cube Vocabulary) and "Latest News" (New Website Launched, January 30th, 2014).

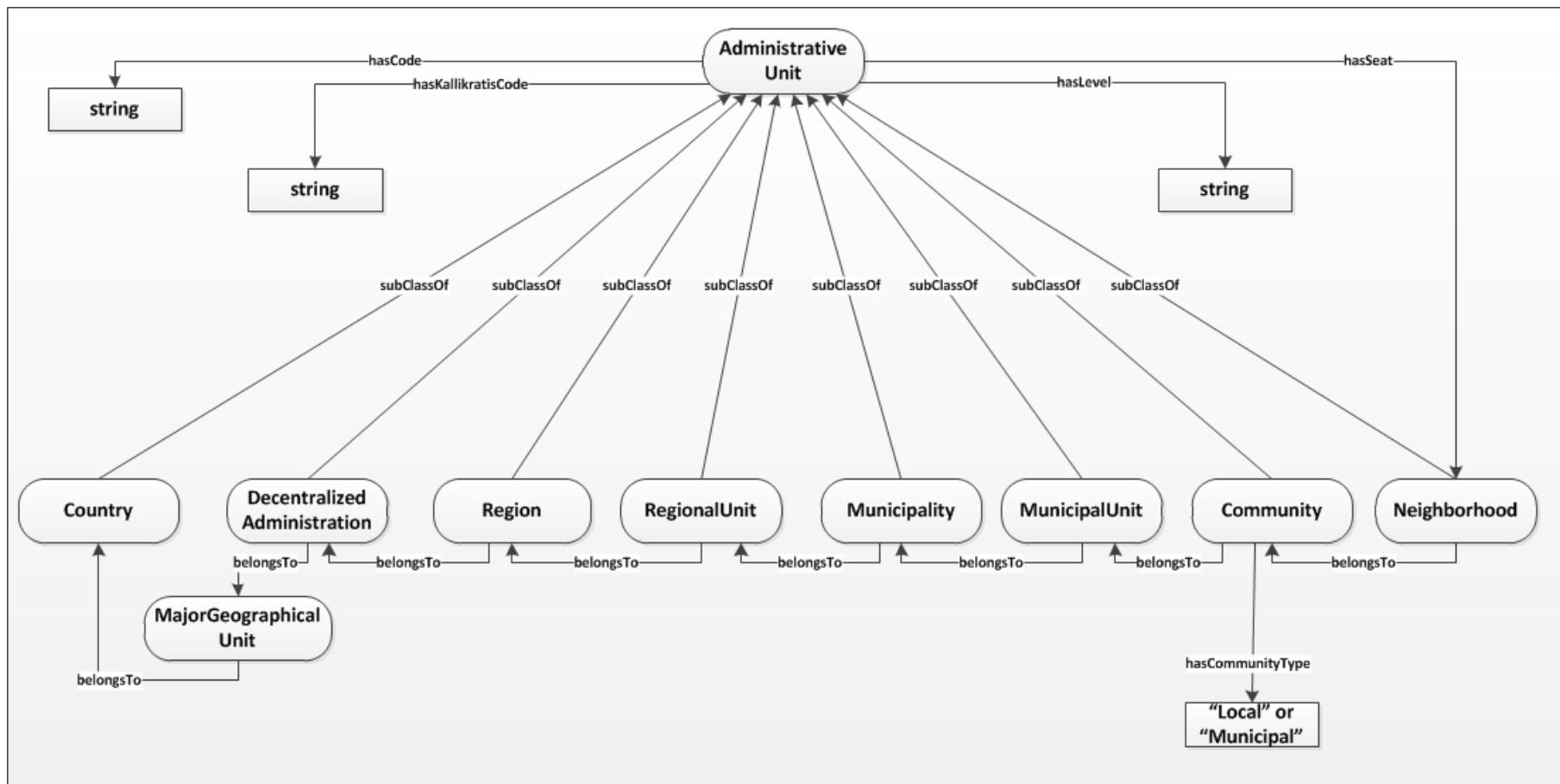
Backup

Example – Publishing Census 2011 dataset

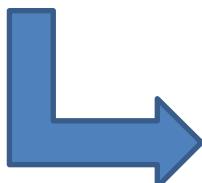
“Resident population by sex and age groups”

A	B	C	D	E	F	G	H	I	U	V	W	X	Y	Z	AA	AB	AN	AO	AP	AQ	AR	AS	AT	AU	BG	BH	
1	Πληκτρολόγιο Πληθυσμού 2011. Μόνιμος Πληθυσμός, κατά φύλο και ημίδες ηλικιών Μεγάλες Γεωγραφικές Ενόπτες (INTS 1), Αποκεντρωμένες Διοικήσεις, Περιφέρειες (INTS 2), Περιφερειακές Ενόπτες, Δήμοι, Δημοτικές Ένοπτες																										
2																											
3																											
4																											
5	Επικράτεια Γεωγραφικός Κωδικός	Περιγραφή		Άριθμοί των θύμων										Δρεπανες										Θήλεις			
6				Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+	Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+	Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+
7	0	ΣΥΝΟΛΟ ΧΩΡΑΣ		10.815.197	537.185	512.533	519.371	553.225	627.093	352.341	230.937	5.302.703	274.763	262.398	265.782	286.355	325.110	146.443	85.285	5.512.494	262.422	250.135	253.809	266.870	301.953	205.898	145.852
8	1	ΒΟΡΕΙΑ ΕΛΛΑΣ		3.110.596	155.103	150.116	156.068	166.021	181.401	107.696	58.152	1.519.774	78.435	76.855	79.735	84.891	91.843	45.054	21.437	1.580.822	75.667	73.161	76.333	81.130	89.558	62.642	36.715
9	2	ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ ΜΑΚΕΔΟΝΙΑΣ -		2.490.051	126.775	122.262	125.095	133.000	146.695	82.960	41.748	1.212.226	64.794	62.636	64.387	68.197	74.573	34.449	15.238	1.277.831	61.981	59.626	61.828	64.803	72.122	48.511	26.510
10	3	ΠΕΡΙΦΕΡΕΙΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ		608.182	30.597	28.719	30.632	33.306	36.852	21.998	10.756	298.643	15.749	15.182	15.684	17.630	20.101	9.154	3.937	308.539	14.848	14.537	14.948	15.676	16.751	12.844	6.819
11	4	ΠΕΡΙΦΕΡΕΙΑΝΗ ΕΝΟΤΗΤΑ ΡΟΔΟΠΗΣ		112.039	5.284	5.203	5.257	7.099	8.244	3.104	1.706	54.555	2.724	2.653	2.698	3.489	3.950	1.308	589	57.484	2.560	2.550	2.559	3.810	4.285	1.796	1.117
12	5	ΔΗΜΟΣ ΚΟΜΟΤΗΝΗΣ		66.919	3.383	3.186	3.239	4.842	5.840	1.642	809	32.354	1.737	1.579	1.670	2.395	2.725	666	312	34.065	1.646	1.607	1.569	2.547	3.115	976	587
13	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΚΟΜΟΤΗΝΗΣ		60.648	3.176	2.964	2.994	4.675	5.601	1.374	770	29.314	1.636	1.474	1.544	2.261	2.590	554	262	31.334	1.540	1.400	1.450	2.414	3.011	820	508
14	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΑΙΓΑΙΟΥΡΟΥ		3.493	114	140	145	153	133	152	78	1.715	54	72	74	72	83	64	29	1.777	60	68	71	81	50	88	49
15	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΝΕΟΥ ΣΔΗΡΟΧΩΡΙΟΥ		2.778	93	82	100	114	106	118	81	1.324	47	33	52	62	52	48	21	1.454	46	49	48	52	54	68	40
16	5	ΔΗΜΟΣ ΑΡΡΙΑΝΩΝ		16.577	780	839	850	846	887	362	180	8.183	406	444	414	439	418	152	52	8.384	374	385	436	407	469	210	128
17	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΦΛΑΥΡΑΣ		7.583	346	386	406	390	389	158	80	3.710	172	207	205	204	187	63	25	3.873	174	179	201	186	222	95	56
18	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΑΡΡΙΑΝΩΝ		5.589	221	250	268	271	270	145	63	2.697	115	126	118	138	133	62	18	2.882	106	124	151	137	84	94	45
19	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΚΕΧΡΟΥ		1.222	68	59	56	57	82	19	11	634	38	30	29	31	39	9	3	588	30	29	27	26	43	10	8
20	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΟΡΓΑΝΗΣ		2.183	145	144	119	128	146	39	26	1.142	81	81	62	66	79	18	6	1.041	64	63	57	62	67	21	20
21	5	ΔΗΜΟΣ ΙΑΣΜΟΥ		13.810	542	578	587	654	806	435	253	6.731	303	313	323	318	342	198	80	7.079	239	265	264	336	464	237	173
22	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΙΑΣΜΟΥ		5.703	222	253	301	259	246	236	119	2.825	125	141	167	139	106	117	39	2.878	97	112	134	120	140	119	80
23	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΑΜΑΞΑΔΩΝ		1.773	96	113	82	99	98	35	28	872	42	56	48	47	42	11	12	901	54	57	34	52	56	24	16
24	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΣΩΣΤΟΥ		6.334	224	212	204	296	462	164	106	3.034	136	116	108	132	194	70	29	3.300	88	96	96	164	268	94	77
25	5	ΔΗΜΟΣ ΜΑΡΩΝΕΙΑΣ - ΣΑΠΩΝ		14.733	579	600	581	657	711	665	364	7.287	278	317	291	337	474	292	145	7.446	301	283	290	320	237	373	219
26	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΣΑΠΩΝ		8.383	384	397	354	426	404	350	181	4.076	178	205	178	212	252	148	74	4.307	206	192	176	214	152	202	107
27	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΜΑΡΩΝΕΙΑΣ		6.350	195	203	227	231	307	315	183	3.211	100	112	113	125	222	144	71	3.139	95	91	114	106	85	171	112
28	4	ΠΕΡΙΦΕΡΕΙΑΝΗ ΕΝΟΤΗΤΑ ΔΡΑΜΑΣ		98.287	4.232	4.588	5.100	5.287	4.351	4.769	1.950	47.542	2.471	2.335	2.587	2.851	2.295	2.051	707	50.745	2.061	2.253	2.513	2.436	2.056	2.718	1.243
29	5	ΔΗΜΟΣ ΔΡΑΜΑΣ		58.944	2.796	2.945	3.291	3.321	2.592	2.294	931	28.304	1.429	1.514	1.653	1.789	1.338	973	313	30.640	1.367	1.431	1.638	1.532	1.254	1.321	618
30	6	ΔΗΜΟΤΙΚΕΣ ΕΝΟΤΗΤΕΣ ΔΡΑΜΑΣ ΚΑΙ ΣΔΗΡΟΝ		58.944	2.796	2.945	3.291	3.321	2.592	2.294	931	28.304	1.429	1.514	1.653	1.789	1.338	973	313	30.640	1.367	1.431	1.638	1.532	1.254	1.321	618
31	5	ΔΗΜΟΣ ΔΟΣΕΑΤΟΥ		14.516	593	655	722	715	565	862	350	6.985	310	310	379	349	282	381	134	7.531	283	345	343	366	283	481	216
32	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΚΑΛΑΜΠΑΚΙΟΥ		5.573	233	270	304	274	207	290	129	2.655	118	125	151	125	105	134	45	2.918	115	145	153	149	102	156	84
33	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΔΟΣΕΑΤΟΥ		8.943	360	385	418	441	358	572	221	4.330	192	185	228	224	177	247	89	4.613	168	200	190	217	181	325	132
34	5	ΔΗΜΟΣ ΚΑΤΩ ΝΕΥΡΟΚΟΠΙΟΥ		7.860	309	360	369	420	458	438	154	3.963	160	193	191	221	257	181	59	3.897	149	167	178	199	201	257	95
35	5	ΔΗΜΟΣ ΠΑΡΑΝΕΣΤΙΟΥ		3.901	120	142	174	229	226	304	116	1.971	62	74	86	159	157	134	49	1.930	58	68	88	70	69	170	67
36	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΠΑΡΑΝΕΣΤΙΟΥ		1.096	30	36	43	112	111	80	28	638	15	18	22	102	101	33	11	458	15	18	21	10	10	47	17
37	6	ΔΗΜΟΤΙΚΗ ΕΝΟΤΗΤΑ ΝΙΚΗΦΟΡΟΥ		2.805	90	106	131	117	115	224	88	1.333	47	56	64	57	56	101	38	1.472	43	50	67	60	59	123	50
38	5	ΔΗΜΟΣ ΠΡΟΣΩΤΣΑΝΗΣ		13.066	414	486	544	602	510	871	399	6.319	210	244	278	333	261	382	152	6.747	204	242	266	269			

Modelling – Administrative divisions ontology



Cleaning



Choose a URI Scheme

ABOX (resources/ instances) – “resource”		
Type	URI Pattern	Comments
DSD	resource/structure/{dsdName}-dsd	
Dataset	resource/dataset/{datasetID} where {datasetID} = {refPeriod}/{datasetName}	Note: {refPeriod} is omitted in case of multi-dimensional time-series or
Observation	resource/dataset/{datasetID}/obs/{obsID}	
Observation Group	resource/dataset/{source}/{timestamp}	
SliceKey	resource/dataset/{datasetID}/slice/{sliceKeyID}	
Slice	resource/structure/{sliceKeyID}	
Ontology instances	resource/{ontologyName}/{version}/{class}	
TBOX (Schema using Data Cube Vocabulary)		
To define the components of Data Cube Vocabulary		
Dimension	ontology/dimension/{dimensionName}	
Measure	ontology/measure/{measureName}	
Attribute	ontology/attribute/{attributeName}	
To define coded values for the components of Data Cube Vocabulary		
Code List/ classification	Base Classification: ontology/code/{codelistName} Versioned Classification: ontology/code/{version}/{codelistName}	
Code	ontology/code/{version}/{codelist}/{codeID}	
Optional – to add more information to the Cube		
Concept (Optional)	ontology/concept/{version}/{conceptName}	
Class (Optional)	ontology/class/{version}/{className}	Corresponding class for each declared codelist
Subject (Optional)	ontology/subject/{version}/{subjectID}	
Ontology not related with Data Cube Vocabulary		
Class/ Properties	ontology/{ontologyName}/{version}#{ClassNameOrPropertyName}	Ontologies for non-SKOS schemes (other than just a code list). When complicated relationships exists between resources other than a simple hierarchy and more information are needed to describe the resources.

Mapping

Prefixes

sdmx-dimension: <http://purl.org/linked-data/sdmx/2009/dimension#>
sdmx-code : <http://purl.org/linked-data/sdmx/2009/code#>
codelist: <http://linked-statistics.gr/ontology/code/2011/>
age-groups: < http://linked-statistics.gr/ontology/code/2011/age/>
measure: <http://linked-statistics.gr/ontology/measure/>
skos: <http://www.w3.org/2004/02/skos/core#>
qb: <http://purl.org/linked-data/cube#>

Concept	Vocabulary Mapping	URI
Geographical code	qb:DimensionProperty	sdmx-dimension:refArea
Sex	qb:DimensionProperty	sdmx-dimension:sex
Sex code list	skos:ConceptScheme	sdmx-code:sex
Male	skos:concept	sdmx-code:sex-M
Female	skos:concept	sdmx-code:sex-F
Total	skos:concept	sdmx-code:sex-T
Age	qb:DimensionProperty	sdmx-dimension:age
Age code list	skos:ConceptScheme	codelist:age
Age groups	skos:concept	age-groups:{age-group}
Population	qb:MeasureProperty	measure:population

RDF Generation

	A	B	C	D	E	F	G	S	T	U	V	W	X	Y	Z	AL	AM	AN	AO	AP	AQ	AR	AS	BE	BF
1	Τευχοφόρος Κωδικός	Αμφοτέρων των φύλων								Άρρενες								Θήλεις							
2		Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+	Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+	Σύνολο	0-4	5-9	10-14	15-19	20-24	80-84	85+
3		10.815.197	537.185	512.533	519.371	553.225	627.063	352.341	230.937	5.302.703	274.763	262.398	265.762	286.355	325.110	146.443	85.285	5.512.494	262.422	250.135	253.609	266.870	301.953	205.898	145.652
4	1	3.110.596	155.103	150.116	156.068	166.021	181.401	107.696	58.152	1.519.774	79.436	76.955	79.735	84.891	91.843	45.054	21.437	1.590.822	75.667	73.161	76.333	81.130	89.558	62.642	36.715
5	11	2.490.051	126.775	122.262	125.995	133.000	146.695	82.960	41.748	1.212.220	64.794	62.636	64.367	68.197	74.573	34.449	15.238	1.277.831	61.981	59.626	61.628	64.803	72.122	48.511	26.510
6	111	608.182	30.597	29.719	30.632	33.306	36.852	21.998	10.756	299.643	15.749	15.182	15.684	17.630	20.101	9.154	3.937	308.539	14.848	14.537	14.948	15.676	16.751	12.844	6.819
7	11101	112.039	5.284	5.203	5.257	7.099	8.244	3.104	1.706	54.555	2.724	2.653	2.698	3.489	3.959	1.308	589	57.484	2.560	2.550	2.559	3.610	4.285	1.796	1.117
8	1110101	66.919	3.383	3.186	3.239	4.942	5.840	1.642	909	32.354	1.737	1.579	1.670	2.395	2.725	666	312	34.565	1.646	1.607	1.569	2.547	3.115	976	597
9	111010101	60.648	3.176	2.964	2.994	4.675	5.601	1.374	770	29.314	1.636	1.474	1.544	2.281	2.590	554	282	31.334	1.540	1.490	1.450	2.414	3.011	820	508
10	111010102	3.493	114	140	145	153	133	152	78	1.716	54	72	74	72	83	64	29	1.777	60	68	71	81	50	88	49
11	111010103	2.778	93	82	100	114	106	116	61	1.324	47	33	52	62	52	48	21	1.454	46	49	48	52	54	68	40
12	1110102	16.577	780	839	850	846	887	362	180	8.183	406	444	414	439	418	152	52	8.394	374	395	436	407	469	210	128
13	111010201	7.583	346	386	406	390	389	158	80	3.710	172	207	205	204	167	63	25	3.873	174	179	201	186	222	95	55
14	111010202	5.589	221	250	269	271	270	146	63	2.697	115	126	118	138	133	62	18	2.892	106	124	151	133	137	84	45

Observation RDF output example

```

<rdf:Description rdf:about="http://linked-statistics.gr/resource/dataset/2011/resident-by-sex-age-group/obs/1110101/sex-M/Y20-24">
  <measure:population rdf:datatype="http://www.w3.org/2001/XMLSchema#double">2725.0</measure:population>
  <qb:dataSet rdf:resource="http://linked-statistics.gr/resource/dataset/2011/resident-by-sex-age-group"/>
  <sdmx-dimension:refArea rdf:resource="http://linked-statistics.gr/resource/admin-division/2011/municipality/1110101"/>
  <sdmx-dimension:sex rdf:resource="http://purl.org/linked-data/sdmx/2009/code#sex-M"/>
  <sdmx-dimension:age rdf:resource="http://linked-statistics.gr/ontology/code/2011/age/Y20-24"/>
  <rdf:type rdf:resource="http://purl.org/linked-data/cube#Observation"/>
  <sdmx-dimension:refPeriod rdf:resource="http://reference.data.gov.uk/id/gregorian-year/2011"/>
</rdf:Description>

```

Interlinking

Age code list is interlinked with age code list from *eurostat.linked-statistics.org*

code	type	eurostatcode
http://linked-statistics.gr/ontology/code/2011/age/Y_LT1	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y_LT1
http://linked-statistics.gr/ontology/code/2011/age/Y1-14	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y1-14
http://linked-statistics.gr/ontology/code/2011/age/Y1	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y1
http://linked-statistics.gr/ontology/code/2011/age/Y2	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y2
http://linked-statistics.gr/ontology/code/2011/age/Y3	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y3
http://linked-statistics.gr/ontology/code/2011/age/Y4	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y4
http://linked-statistics.gr/ontology/code/2011/age/Y5-9	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y5-9
http://linked-statistics.gr/ontology/code/2011/age/Y5	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y5
http://linked-statistics.gr/ontology/code/2011/age/Y_LT6	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y_LT6
http://linked-statistics.gr/ontology/code/2011/age/Y6	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y6
http://linked-statistics.gr/ontology/code/2011/age/Y7	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y7
http://linked-statistics.gr/ontology/code/2011/age/Y8	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y8
http://linked-statistics.gr/ontology/code/2011/age/Y9	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y9
http://linked-statistics.gr/ontology/code/2011/age/Y10-19	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y10-19
http://linked-statistics.gr/ontology/code/2011/age/Y10-14	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y10-14
http://linked-statistics.gr/ontology/code/2011/age/Y_GE10	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y_GE10
http://linked-statistics.gr/ontology/code/2011/age/Y10	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y10
http://linked-statistics.gr/ontology/code/2011/age/Y11	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y11
http://linked-statistics.gr/ontology/code/2011/age/Y12	http://www.w3.org/2004/02/skos/core#exactMatch	http://eurostat.linked-statistics.org/dic/age#Y12

Lessons Learned

- Keep evolution in mind (both in terms of structure and data values)
 - Version-aware publishing, mapping of concepts across years
- Code List Identification and Reuse
 - Keep consistency across src files,
- Spreadsheets have very different layouts
 - Minimize the man-in-loop
- Link of statistical information
 - what is the best source? Official? Most complete? Up-to-date?