Porting the xEBR Taxonomy of XBRL-Europe to a Linked Data Representation

Thierry Declerck, DFKI GmbH

On Behalf of the Prêt-à-LLOD project (https://www.pret-a-llod.eu/)

Based on former work by Thierry Declerck and Dagmar Gromann

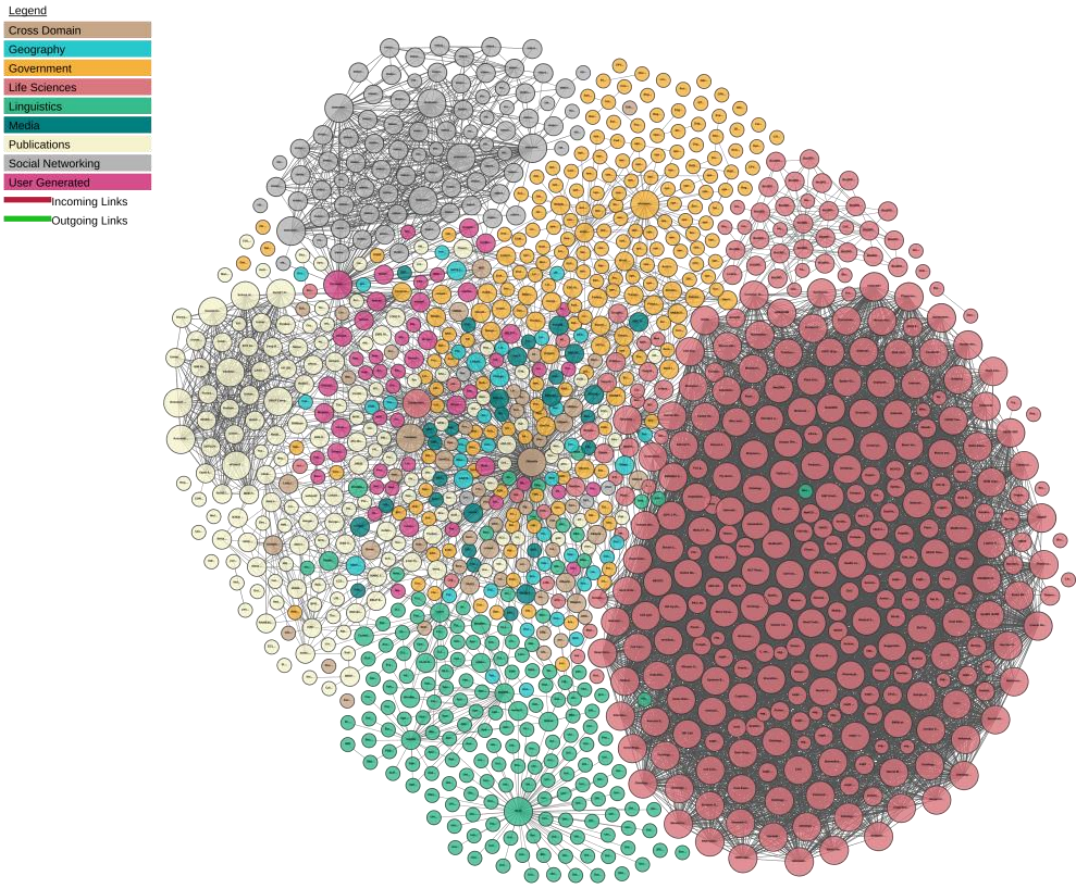
Porting the xEBR Taxonomy to a Linked Open Data compliant Format

Thierry Declerck[1] & Dagmar Gromann[2]
[1]DFKI GmbH, Saarbrücken, Germany
[2]Artificial Intelligence Research Institute, Barcelona

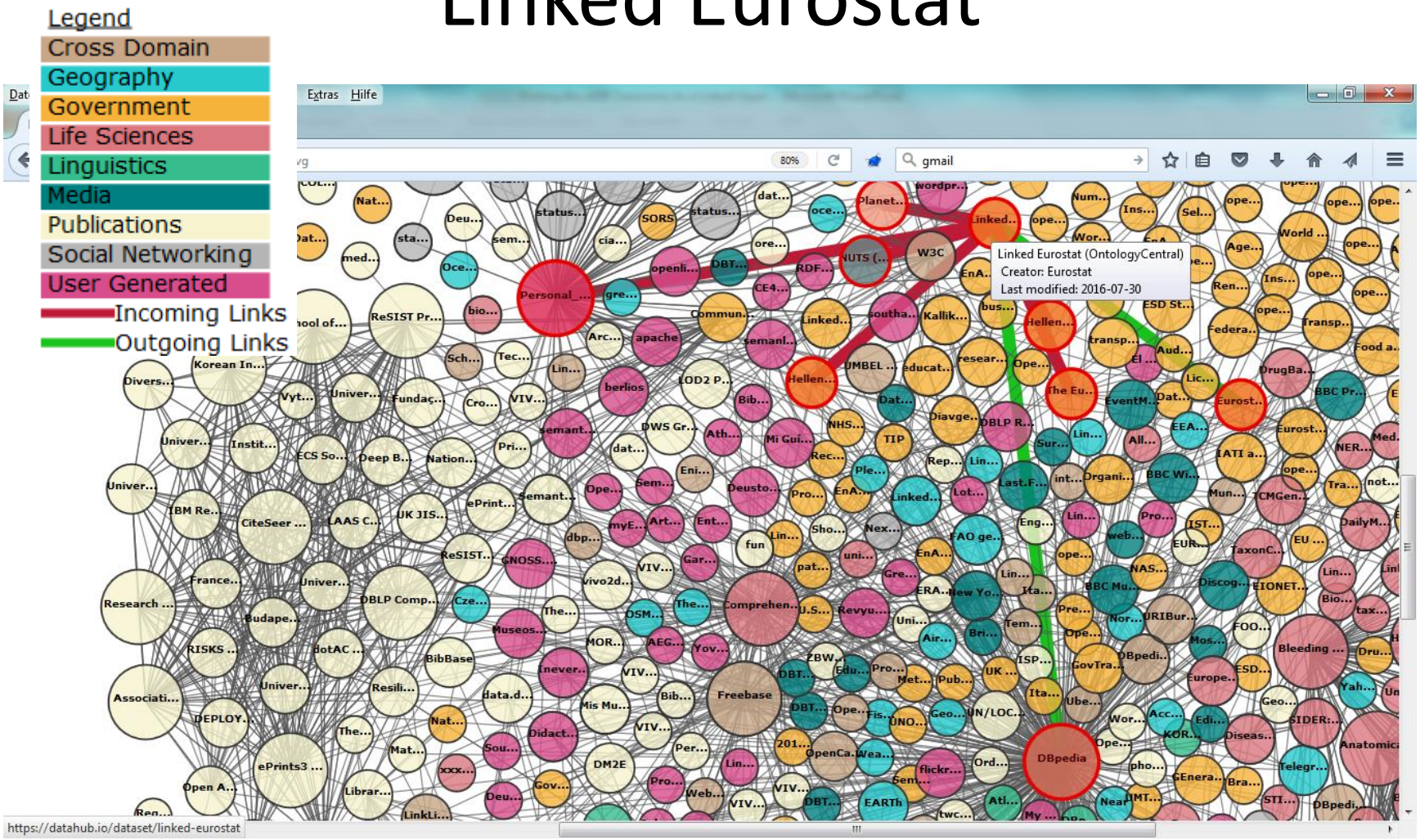
Motivation

- Porting the xEBR Core Reference Taxonomy to a Linked Open Data (LOD) compliant format, in order to enable the use of semantic technologies, beyond the syntactic interoperability offered by the xEBR Taxonomy.
- Linking to other resources for analysts, also considering the data sets in the Linked (Open) Data cloud-

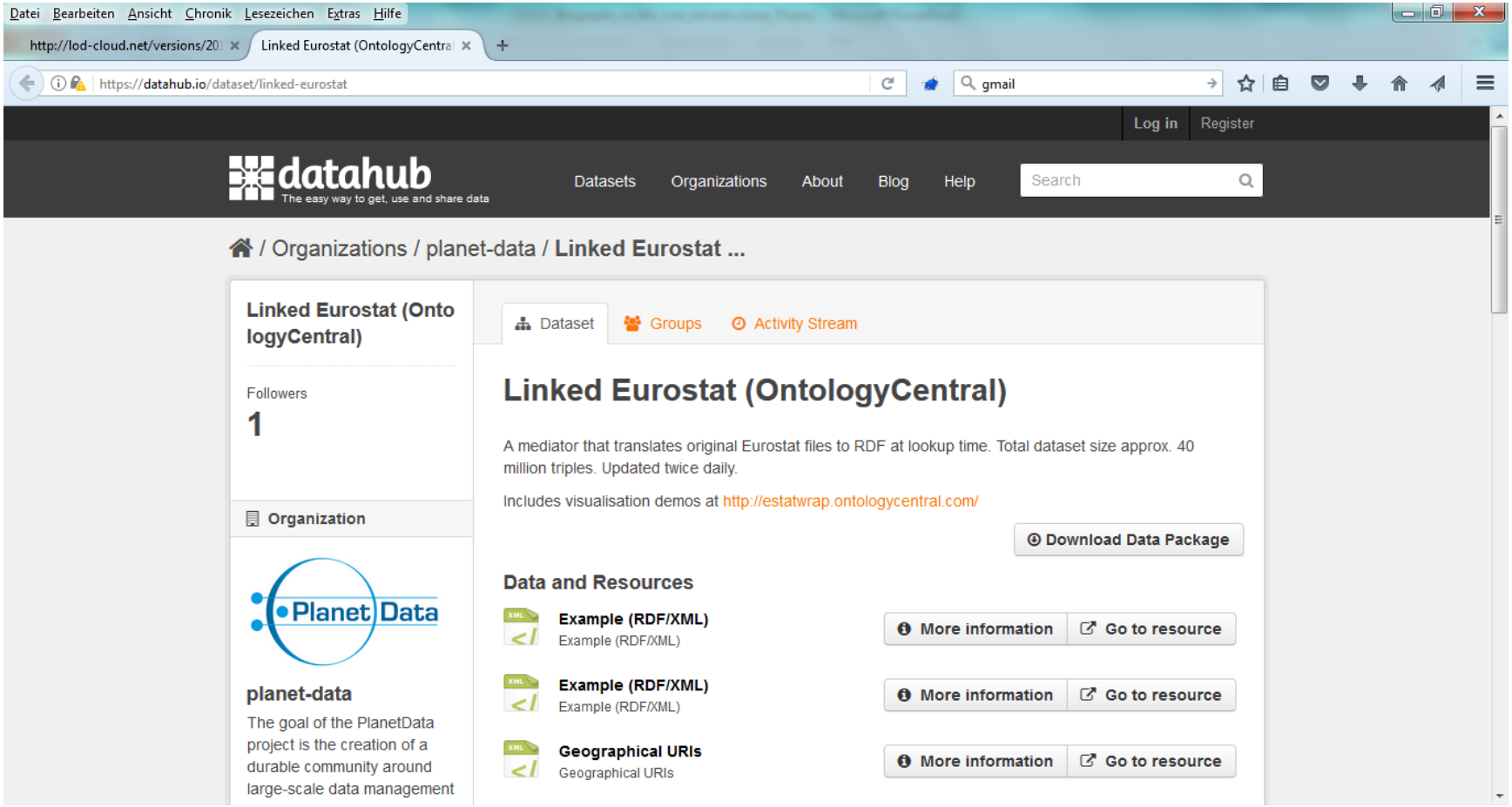
Linked Open Data cloud
http://lod-cloud.net/



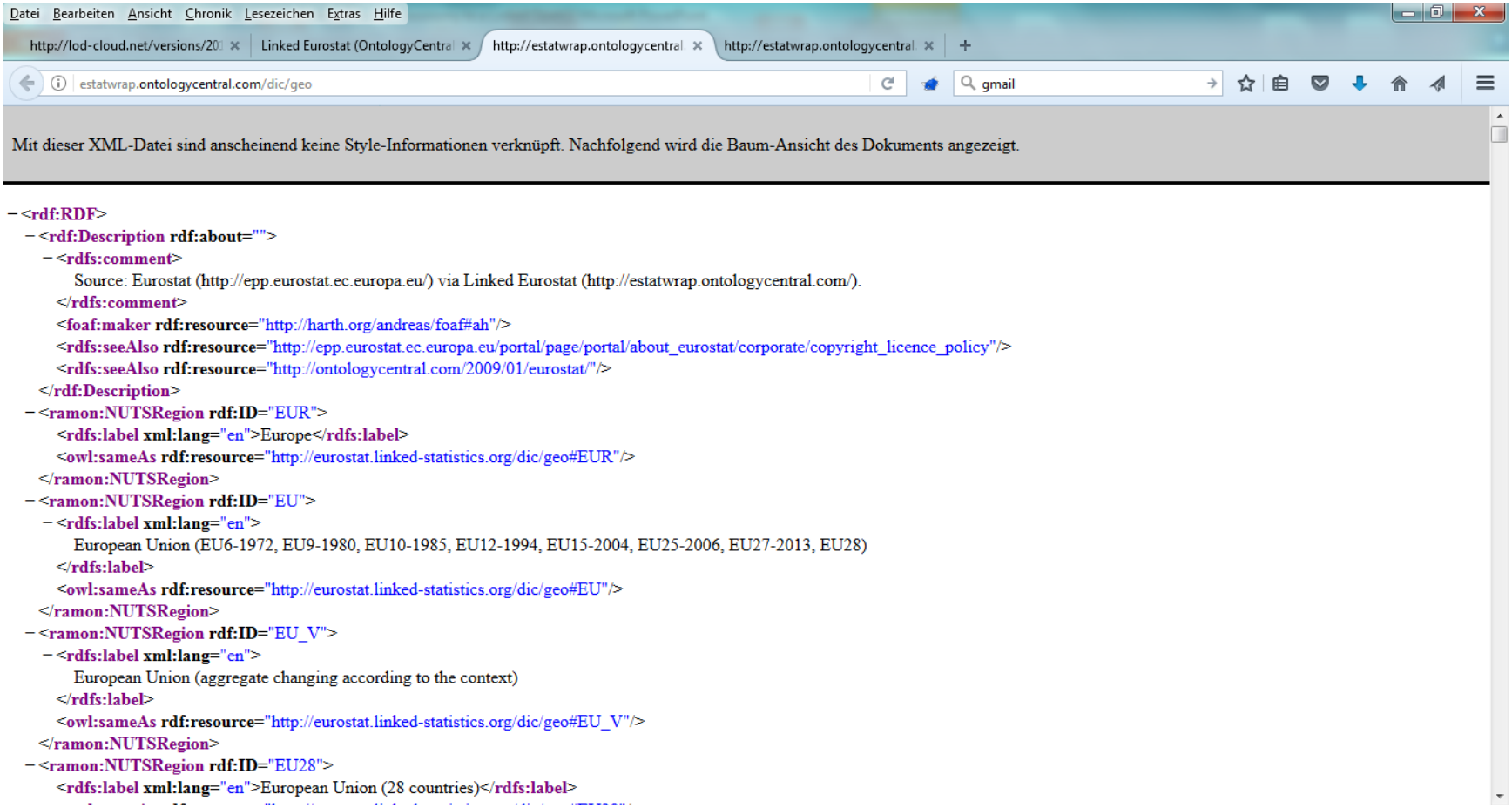
A closer Look to the LOD cloud (1)
Linked Eurostat



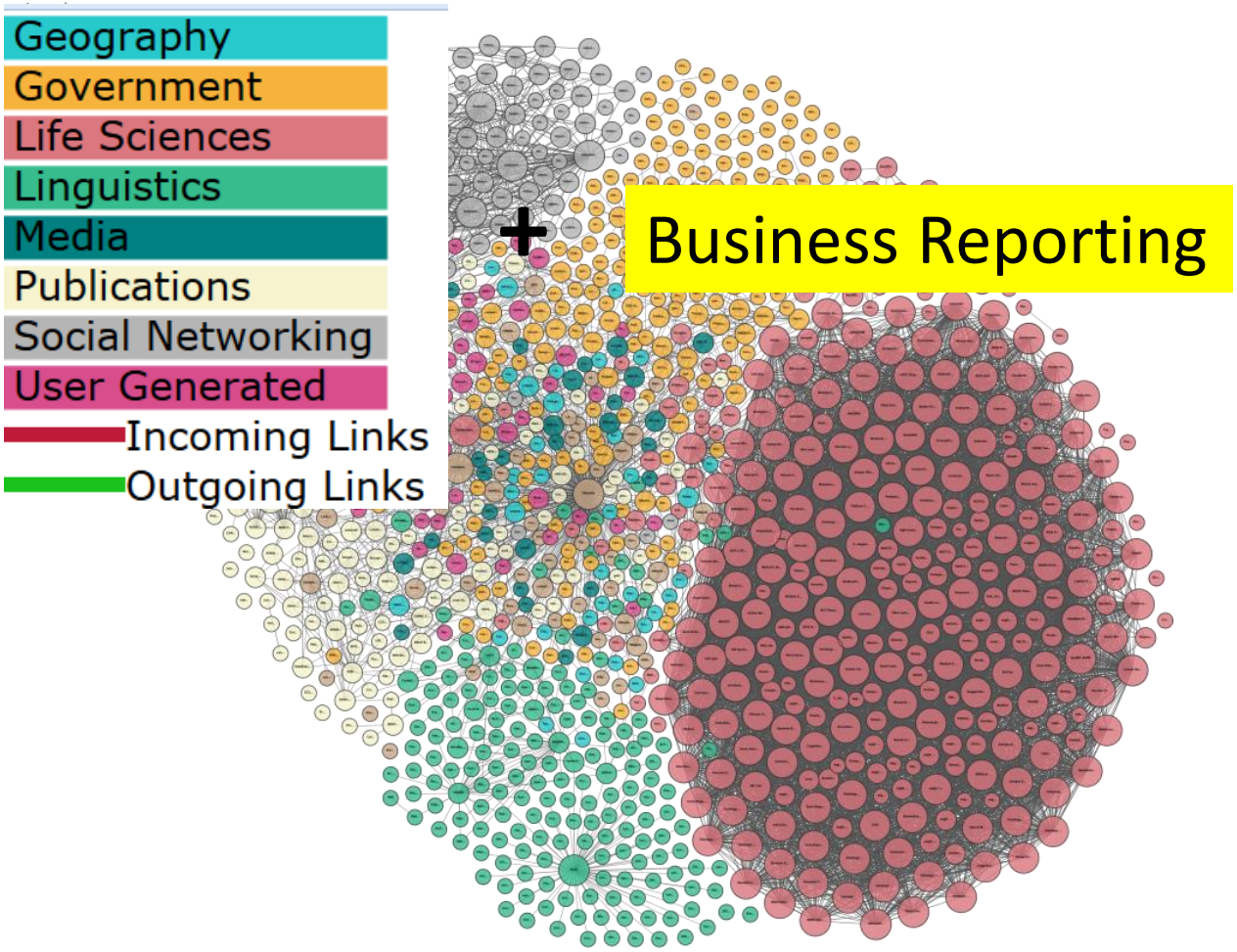
A closer Look to the LOD cloud (2)
Linked Eurostat



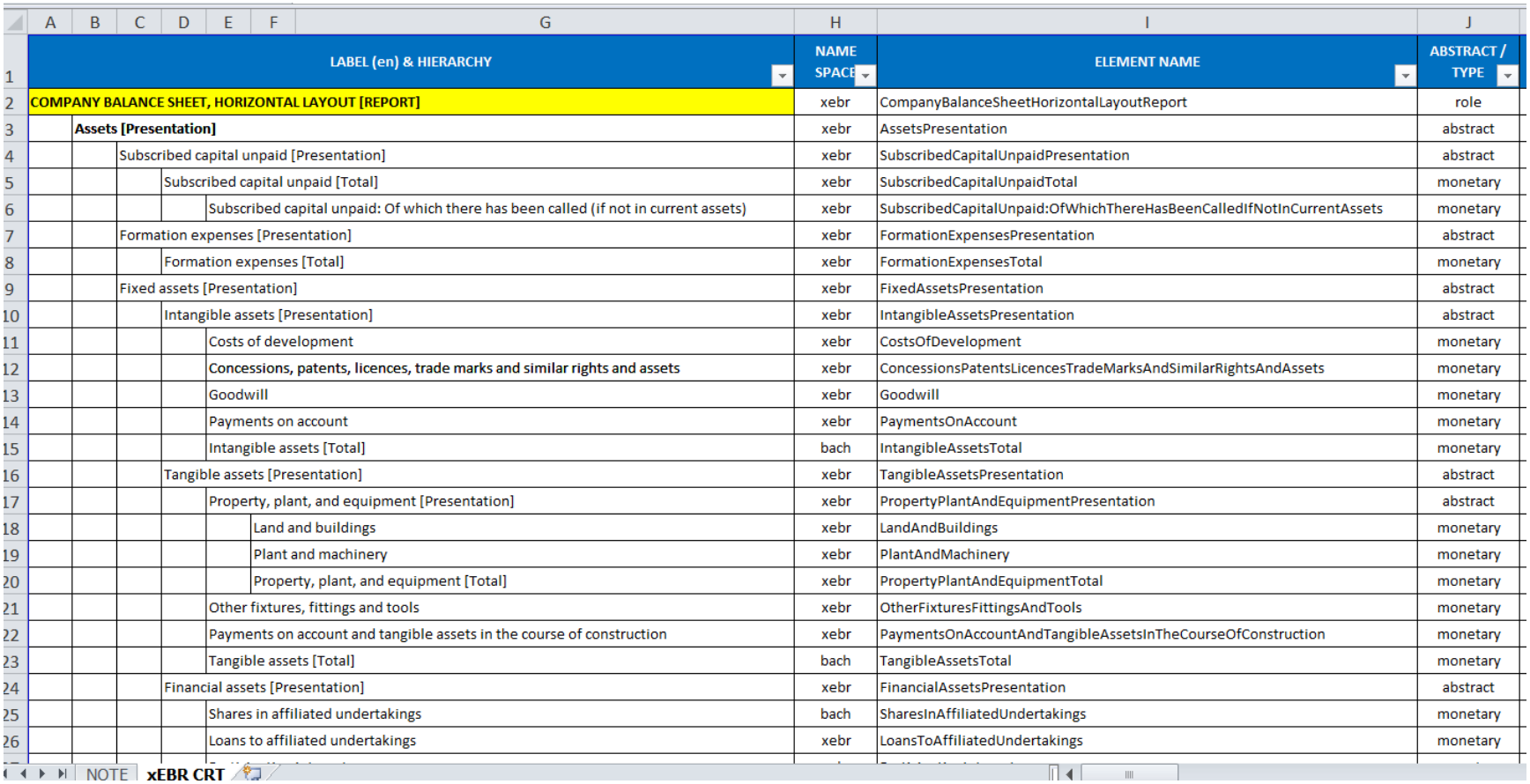
A closer Look to the LOD cloud (1)
Linked Eurostat (geo URIs)



Towards a Business Reporting Node in the LOD Infrastructure?



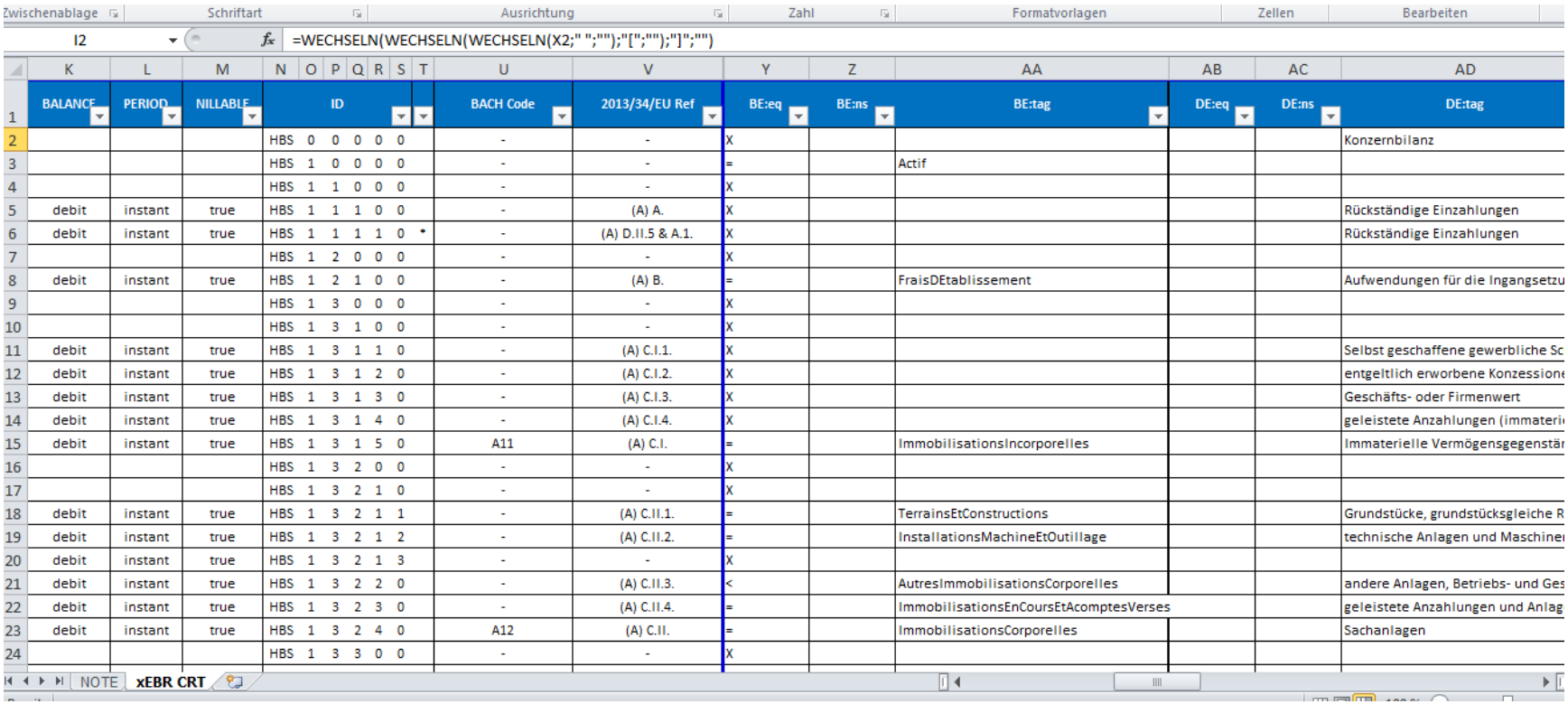
Our Departure Point for the study: xEBR Excel file with preliminary version 8



	LABEL (en) & HIERARCHY	NAME SPACE	ELEMENT NAME	ABSTRACT / TYPE
2	COMPANY BALANCE SHEET, HORIZONTAL LAYOUT [REPORT]	xebr	CompanyBalanceSheetHorizontalLayoutReport	role
3	**Assets [Presentation]**	xebr	AssetsPresentation	abstract
4	Subscribed capital unpaid [Presentation]	xebr	SubscribedCapitalUnpaidPresentation	abstract
5	Subscribed capital unpaid [Total]	xebr	SubscribedCapitalUnpaidTotal	monetary
6	Subscribed capital unpaid: Of which there has been called (if not in current assets)	xebr	SubscribedCapitalUnpaid:OfWhichThereHasBeenCalledIfNotInCurrentAssets	monetary
7	Formation expenses [Presentation]	xebr	FormationExpensesPresentation	abstract
8	Formation expenses [Total]	xebr	FormationExpensesTotal	monetary
9	Fixed assets [Presentation]	xebr	FixedAssetsPresentation	abstract
10	Intangible assets [Presentation]	xebr	IntangibleAssetsPresentation	abstract
11	Costs of development	xebr	CostsOfDevelopment	monetary
12	**Concessions, patents, licences, trade marks and similar rights and assets**	xebr	ConcessionsPatentsLicencesTradeMarksAndSimilarRightsAndAssets	monetary
13	Goodwill	xebr	Goodwill	monetary
14	Payments on account	xebr	PaymentsOnAccount	monetary
15	Intangible assets [Total]	bach	IntangibleAssetsTotal	monetary
16	Tangible assets [Presentation]	xebr	TangibleAssetsPresentation	abstract
17	Property, plant, and equipment [Presentation]	xebr	PropertyPlantAndEquipmentPresentation	abstract
18	Land and buildings	xebr	LandAndBuildings	monetary
19	Plant and machinery	xebr	PlantAndMachinery	monetary
20	Property, plant, and equipment [Total]	xebr	PropertyPlantAndEquipmentTotal	monetary
21	Other fixtures, fittings and tools	xebr	OtherFixturesFittingsAndTools	monetary
22	Payments on account and tangible assets in the course of construction	xebr	PaymentsOnAccountAndTangibleAssetsInTheCourseOfConstruction	monetary
23	Tangible assets [Total]	bach	TangibleAssetsTotal	monetary
24	Financial assets [Presentation]	xebr	FinancialAssetsPresentation	abstract
25	Shares in affiliated undertakings	bach	SharesInAffiliatedUndertakings	monetary
26	Loans to affiliated undertakings	xebr	LoansToAffiliatedUndertakings	monetary

NOTE xEBR CRT

Our Departure Point for the study: xEBR Excel file with preliminary version 8 (2)



Zwischenablage | Schriftart | Ausrichtung | Zahl | Formatvorlagen | Zellen | Bearbeiten

I2 =WECHSELN(WECHSELN(WECHSELN(X2;" ";"");"[";"");"]";"")

	K	L	M	N O P Q R S T	U	V	Y	Z	AA	AB	AC	AD
1	BALANCE	PERIOD	NILLABLE	ID	BACH Code	2013/34/EU Ref	BE:eq	BE:ns	BE:tag	DE:eq	DE:ns	DE:tag
2				HBS 0 0 0 0 0	-	-	X					Konzernbilanz
3				HBS 1 0 0 0 0	-	-	=		Actif			
4				HBS 1 1 0 0 0	-	-	X					
5	debit	instant	true	HBS 1 1 1 0 0	-	(A) A.	X					Rückständige Einzahlungen
6	debit	instant	true	HBS 1 1 1 1 0	-	(A) D.II.5 & A.1.	X					Rückständige Einzahlungen
7				HBS 1 2 0 0 0	-	-	X					
8	debit	instant	true	HBS 1 2 1 0 0	-	(A) B.	=		FraisDEtablissement			Aufwendungen für die Ingangsetzu
9				HBS 1 3 0 0 0	-	-	X					
10				HBS 1 3 1 0 0	-	-	X					
11	debit	instant	true	HBS 1 3 1 1 0	-	(A) C.I.1.	X					Selbst geschaffene gewerbliche Sc
12	debit	instant	true	HBS 1 3 1 2 0	-	(A) C.I.2.	X					entgeltlich erworbene Konzessione
13	debit	instant	true	HBS 1 3 1 3 0	-	(A) C.I.3.	X					Geschäfts- oder Firmenwert
14	debit	instant	true	HBS 1 3 1 4 0	-	(A) C.I.4.	X					geleistete Anzahlungen (immateri
15	debit	instant	true	HBS 1 3 1 5 0	A11	(A) C.I.	=		ImmobilisationsIncorporelles			Immaterielle Vermögensgegenstär
16				HBS 1 3 2 0 0	-	-	X					
17				HBS 1 3 2 1 0	-	-	X					
18	debit	instant	true	HBS 1 3 2 1 1	-	(A) C.II.1.	=		TerrainsEtConstructions			Grundstücke, grundstücksgleiche R
19	debit	instant	true	HBS 1 3 2 1 2	-	(A) C.II.2.	=		InstallationsMachineEtOutillage			technische Anlagen und Maschine
20	debit	instant	true	HBS 1 3 2 1 3	-	-	X					
21	debit	instant	true	HBS 1 3 2 2 0	-	(A) C.II.3.	<		AutresImmobilisationsCorporelles			andere Anlagen, Betriebs- und Ges
22	debit	instant	true	HBS 1 3 2 3 0	-	(A) C.II.4.	=		ImmobilisationsEnCoursEtAcomptesVerses			geleistete Anzahlungen und Anlag
23	debit	instant	true	HBS 1 3 2 4 0	A12	(A) C.II.	=		ImmobilisationsCorporelles			Sachanlagen
24				HBS 1 3 3 0 0	-	-	X					

NOTE | xEBR CRT

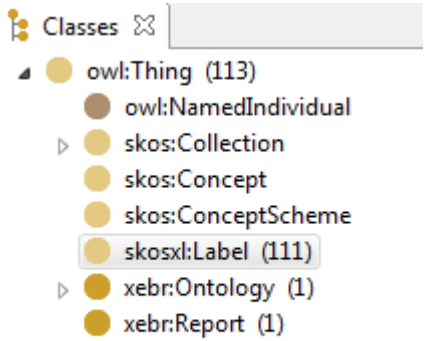
Porting the Taxonomy to an Ontology

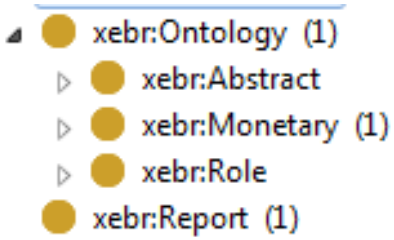
- Use of W3C Standards in the Ontology:
  - Representation languages: OWL, RDF(s), RDF
  - Related Vocabularies : SKOS and SKOS-XL, DC
- Using thus a representation language that is originally suited for dealing with graphs, instead of trees (XML can also represent and process graphs, but in my opinion in a very cumbersome manner: better use a language natively conceived for dealing with graphs.
- Why using graphs – I think those are more compact, and their elements easily re-usable

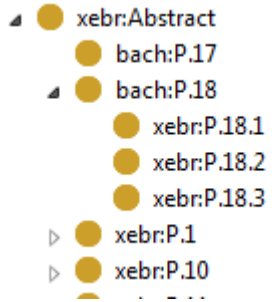
Porting the Taxonomy to an Ontology

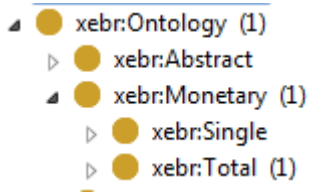
- Elements of xEBR now in a class hierarchy, together with a few set of properties for expressing relations between classes (and their potential instances, described in a class called “Report”)
- Multilingual labels now expressed with the help of SKOS-XL
- We consider Role, Abstract and Monetary as Classes, as they suggest a central characteristics of the elements listed in xEBR with this type.
- We consider differently the types tuple, date, string, url, boolean, as those are more about the xsd types the value of an element can take.
  - But still to think about tuple!! Could be a class as it implies a complex value object

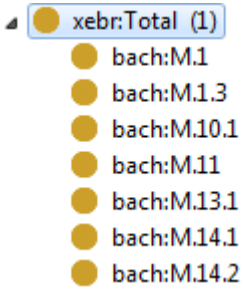
Screen Shots from the current state of the suggested xEBR ontology (Class Hierarchy)

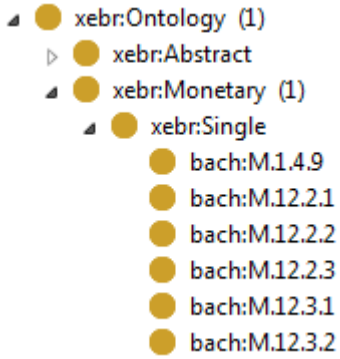


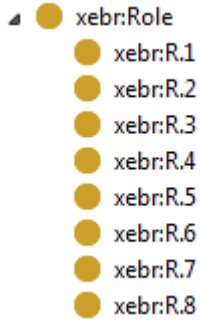




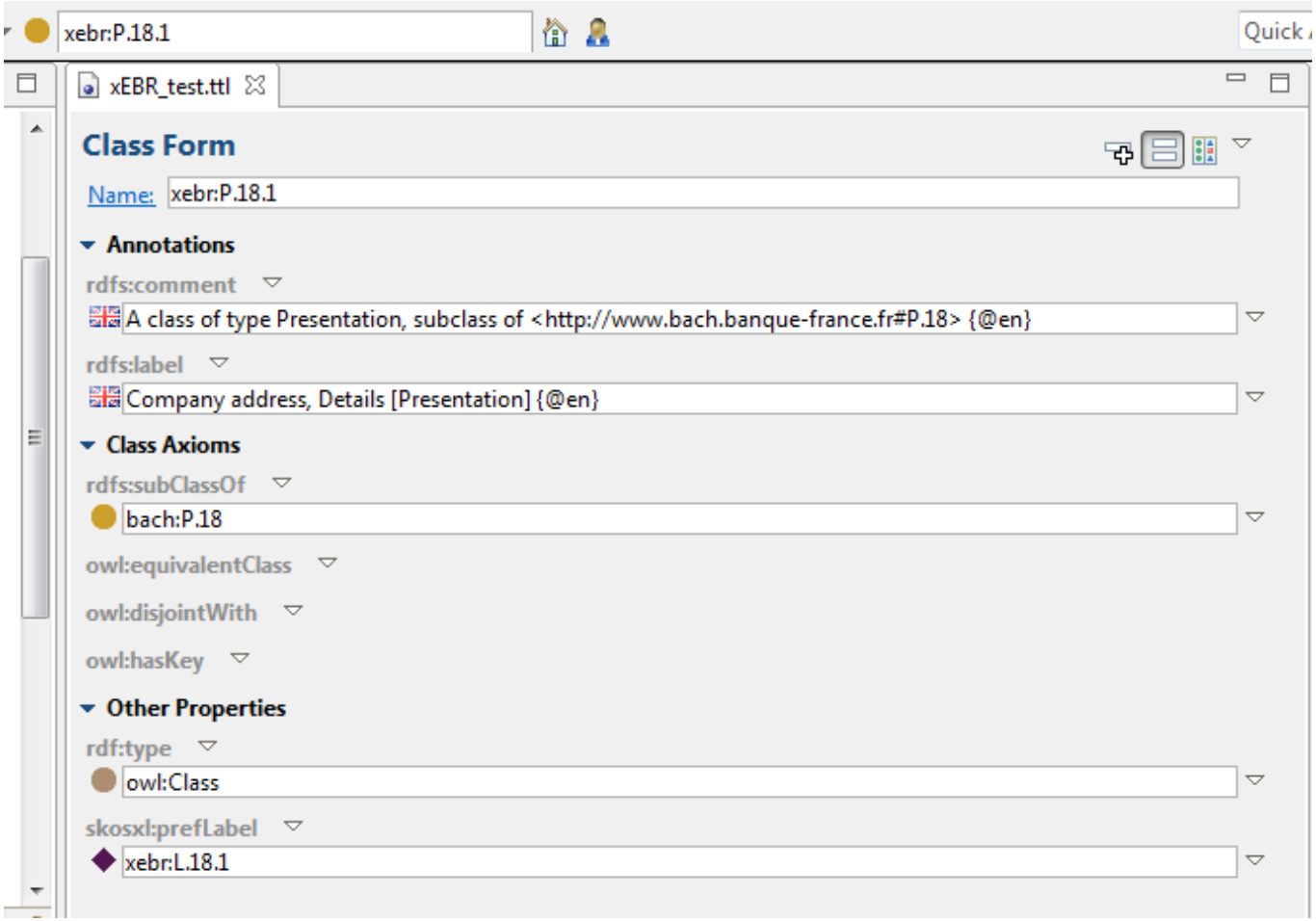








Details for Classes (1): Presentation type

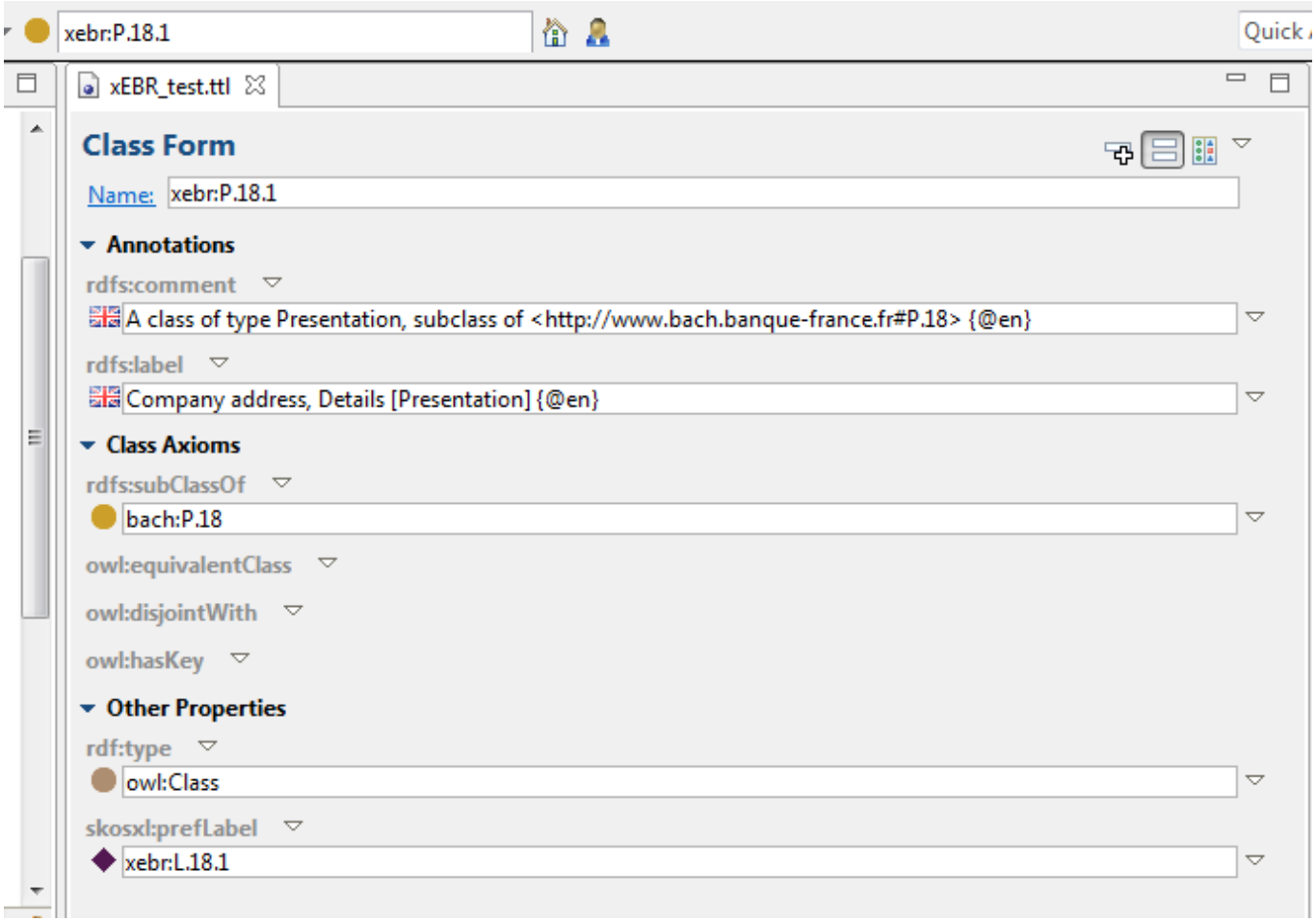


Details for Classes (1): Presentation type; internal OWL, RDF(s), RDF coding

<http://www.dfki.de/lt/onto/xebr.owl#P.18.1>
  rdf:type owl:Class ;
  rdfs:comment "A class of type Presentation, subclass of <http://www.bach.banque-france.fr#P.18>"@en ;
  rdfs:label "Company address, Details [Presentation]"@en ;
  rdfs:subClassOf <http://www.bach.banque-france.fr#P.18> ;
  skosxl:prefLabel <http://www.dfki.de/lt/onto/xebr.owl#L.18.1> ;
.

Very compact representation, easing re-usability

Details for Classes (2): Monetary type



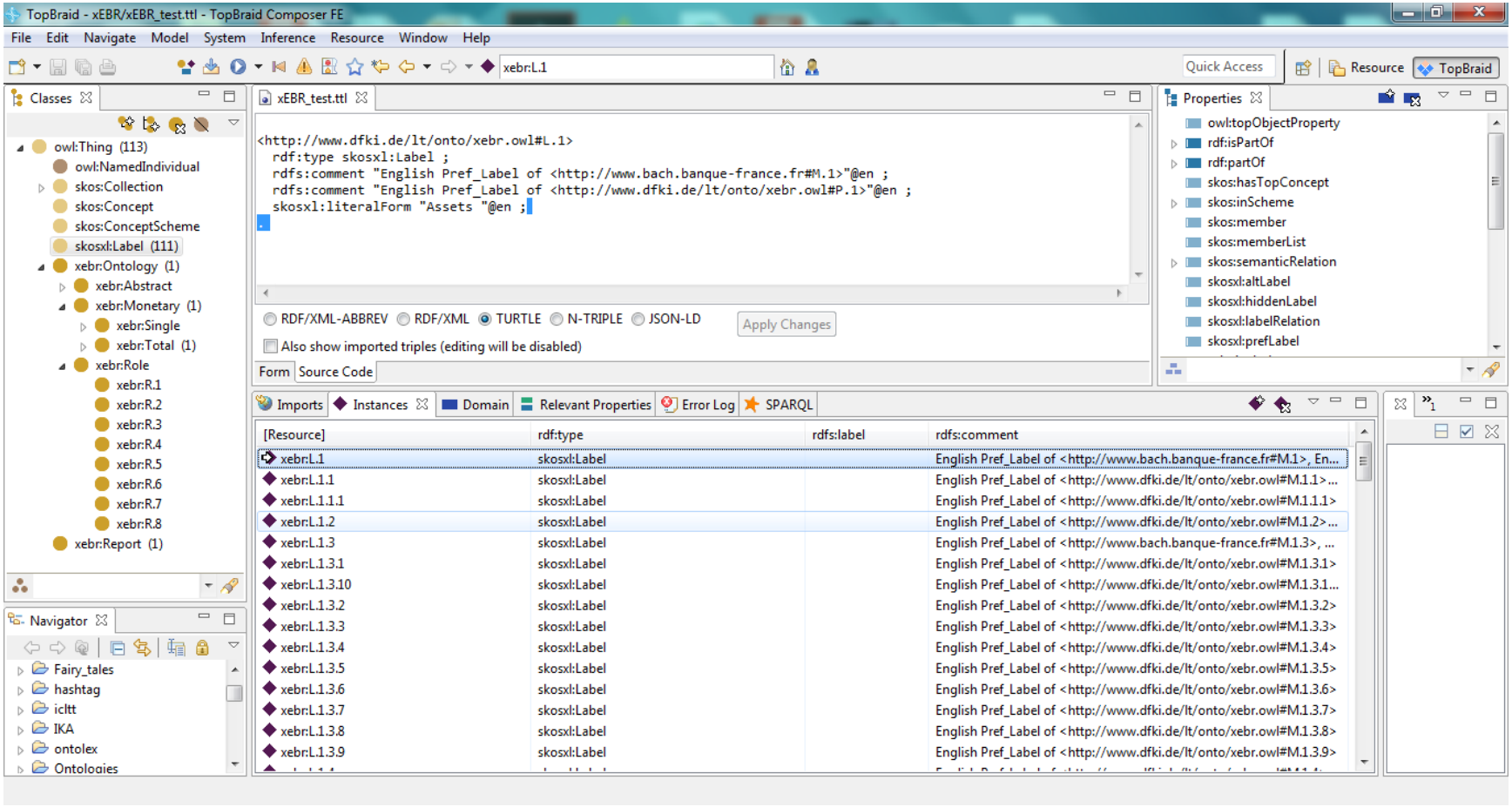
Details for Classes (2): Monetary type, internal code

<http://www.dfki.de/lt/onto/xebr.owl#M.1.4>
  rdf:type owl:Class ;
  xebr:isMonetaryPartOf
<http://www.dfki.de/lt/onto/xebr.owl#P.1.4> ;
  rdfs:comment "A class of type Monetary, subclass of
xebr:Total"@en ;
  rdfs:label "Current assets [Total]"@en ;
  rdfs:subClassOf xebr:Total ;
  skosxl:prefLabel
<http://www.dfki.de/lt/onto/xebr.owl#L.1.4> ;
.

Details for Labels

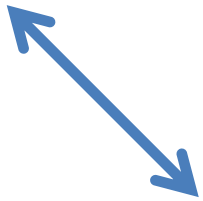
- Labels are objects on their own in the ontology (have their own URI)
- They are encoded using alphanumeric indices URIs).
- We make use of SKOS-XL for this, and linking to different other objects.
- Full support of multilingualism and terminological variants

Labels: the whole picture



Labels: Details -- Linking Abstract and Monetary classes to prefLabels:

```
<http://www.bach.banque-france.fr#M.1>
  rdf:type owl:Class ;
  xebr:isMonetaryPartOf <http://www.dfki.de/lt/onto/xebr.owl#P.1> ;
  rdfs:comment "A class of type Total, subclass of Monetary"@en ;
  rdfs:label "Assets [Total]"@en ;
  rdfs:subClassOf xebr:Total ;
  skosxl:prefLabel <http://www.dfki.de/lt/onto/xebr.owl#L.1> ;
.
```



```
<http://www.dfki.de/lt/onto/xebr.owl#L.1>
  rdf:type skosxl:Label ;
  rdfs:comment "English Pref_Label of <http://www.bach.banque-france.fr#M.1>"@en ;
  rdfs:comment "English Pref_Label of <http://www.dfki.de/lt/onto/xebr.owl#P.1>"@en ;
  skosxl:literalForm "Assets "@en ;
.
```

RDF/XML-ABBREV | RDF/XML | TURTLE | N-TRIPLE | JSON-LD | Apply Changes

Also show imported triples (editing will be disabled)

Form | Source Code

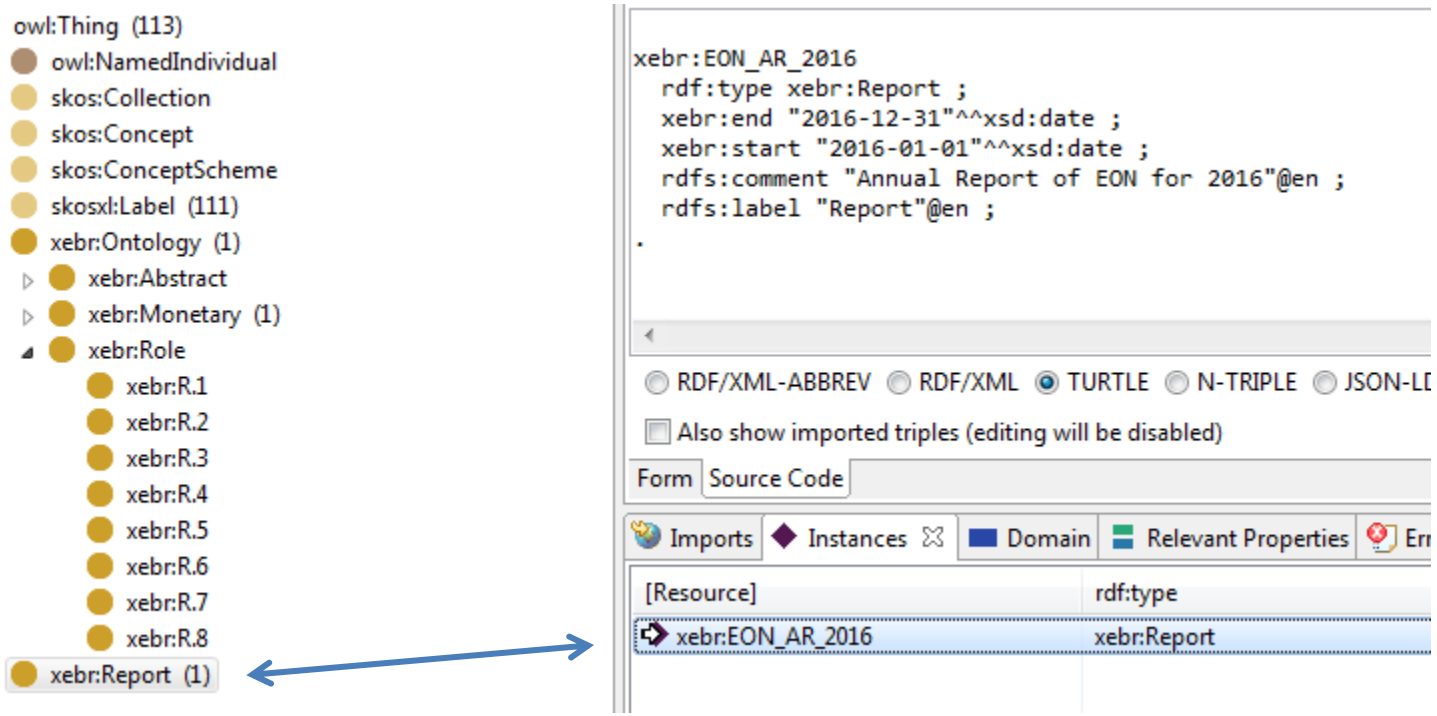
Imports | Instances | Domain | Relevant Properties | Error Log | SPARQL

[Resource]	rdf:type	rdfs:label
xebr:L.1	skosxl:Label	
xebr:L.1.1	skosxl:Label	

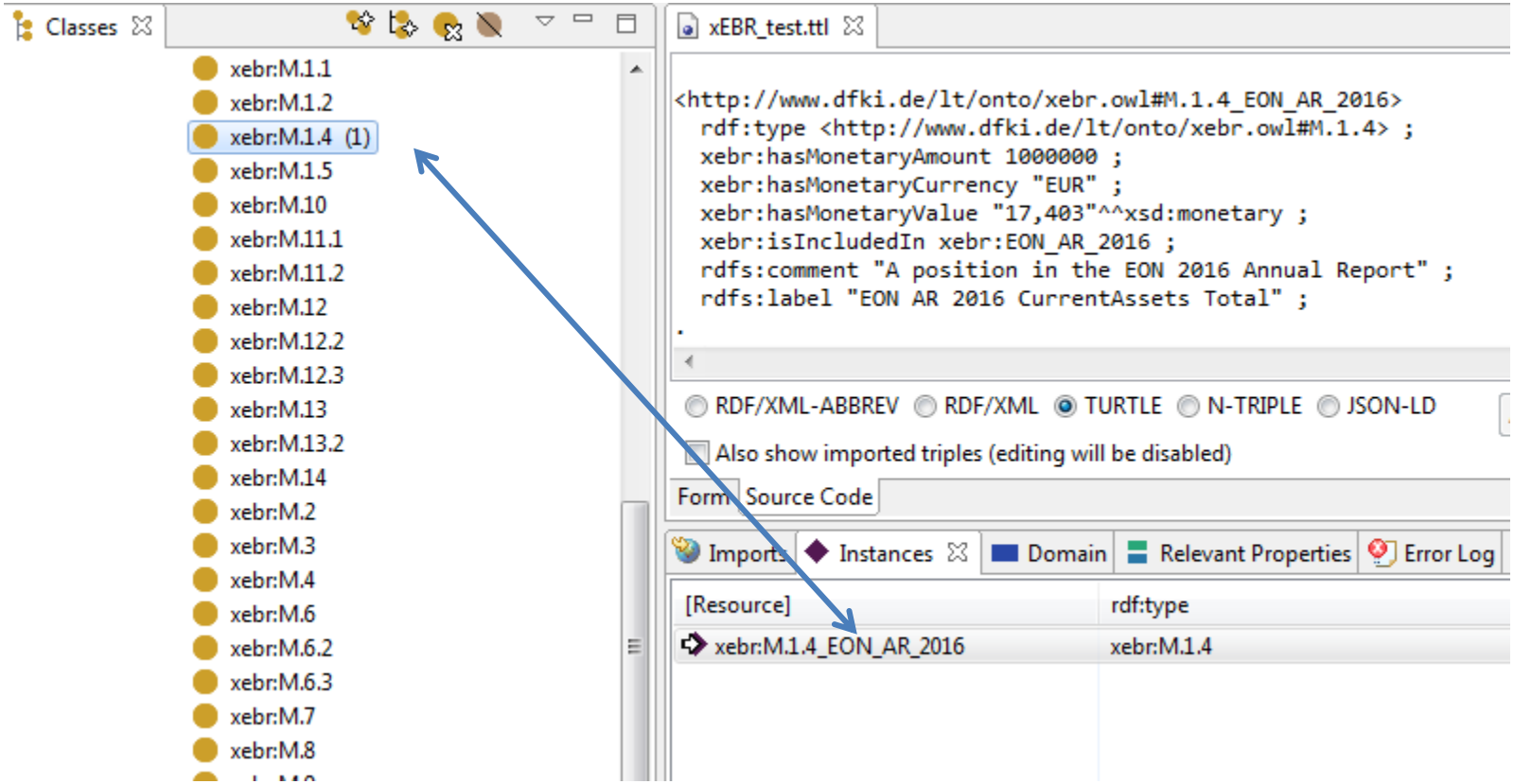
Labels: Still to come

- Waiting for the full XBRL version of xEBR for including labels in other languages.
- Designing a full terminological framework in the context of SKOS-XL
- Collecting term variants from annual reports, in many languages

An Instance for Report: Very toy for now



“Details” of the Report Instance



Thanks for your attention !