

# Visual Presentation and Summarization of Linked Data Schemas



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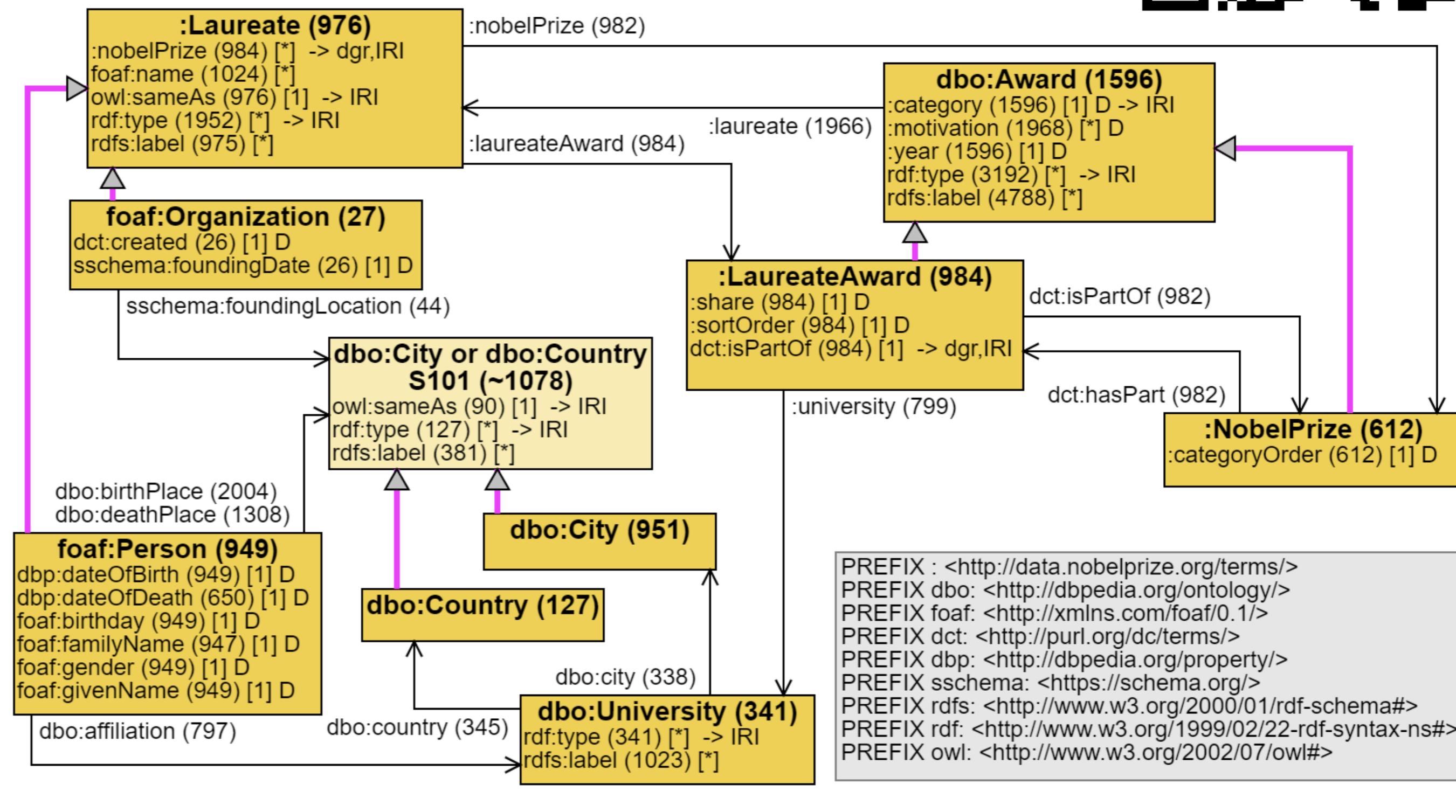
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## ViziQuer: visual data schema exploration and visual queries

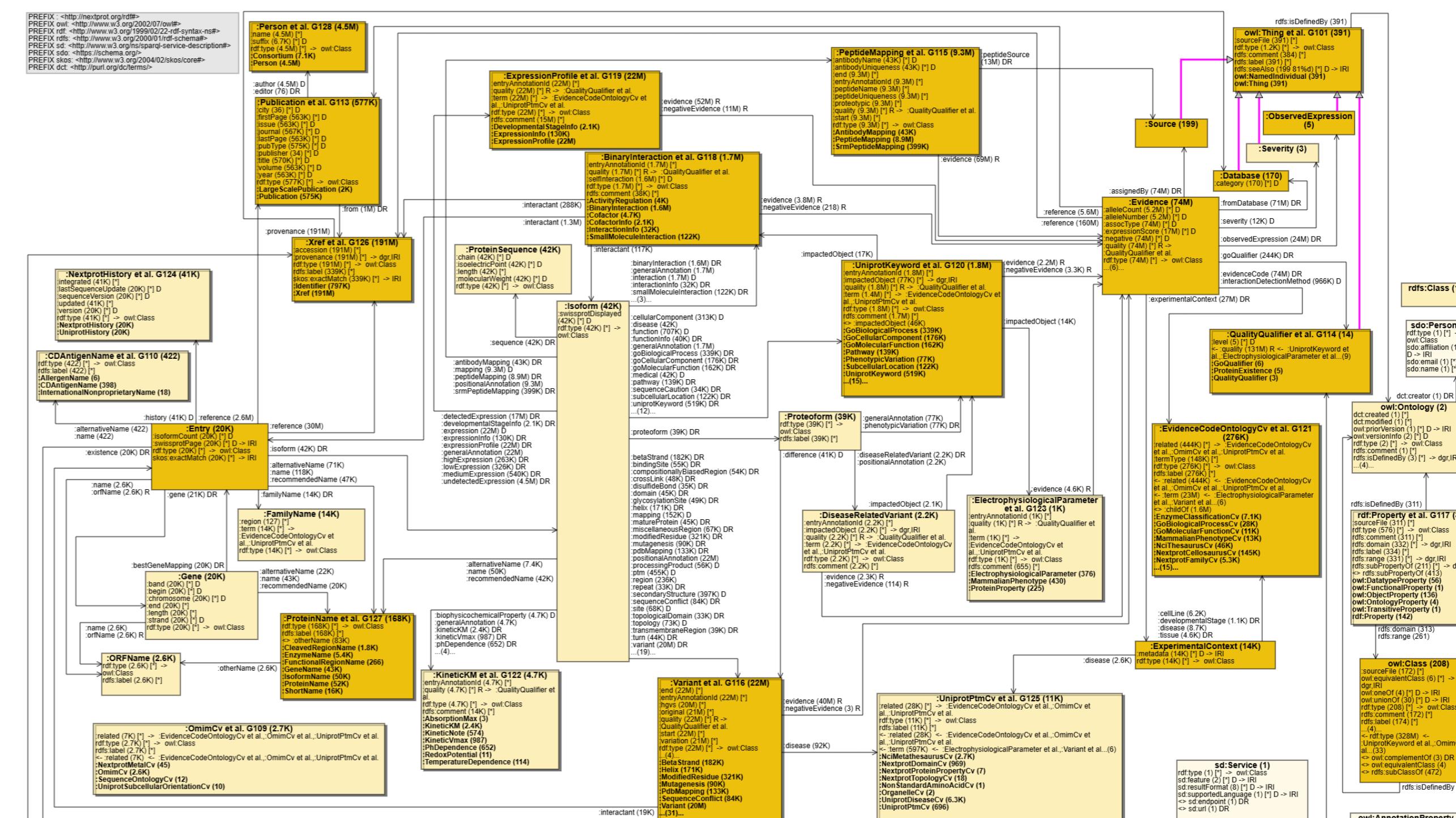
- Extract schema from a data endpoint, store in the tools' database
- Visualize the schema or its fragment as a UML style diagram
- Use the schema to serve entity display names and provide query auto completion
- Check: <https://viziquer.lumii.lv/> (playground and docker container options available)
- This can work with your data set



## Schemas of 24 large data sets from LOD cloud

Endpoint URL	Triples	Cl.	Props.	Nodes	Lines
<a href="https://libris.kb.se/sparql">https://libris.kb.se/sparql</a>	2695020210	540	939	225	467(0), 417(100)
<a href="https://sparql.nextprot.org/">https://sparql.nextprot.org/</a>	2130123293	165	238	39	66(0), 65(100)
<a href="http://affymetrix.bio2rdf.org/sparql">http://affymetrix.bio2rdf.org/sparql</a>	1377023559	661	1328	132	307(0), 271(100)
<a href="https://ruian.linked.opendata.cz/sparql">https://ruian.linked.opendata.cz/sparql</a>	870638775	85	200	43	53(0), 26(100)
<a href="http://data.bnfr.fr/sparql">http://data.bnfr.fr/sparql</a>	651506623	26	886	19	39(0)
<a href="http://kaiko.getalp.org/sparql">http://kaiko.getalp.org/sparql</a>	522998164	128	245	31	34(0), 28(100)
<a href="http://cr.eionet.europa.eu/sparql">http://cr.eionet.europa.eu/sparql</a>	482077457	272	2001	220	350(0), 308(100)
<a href="http://dati.isprambiente.it/sparql">http://dati.isprambiente.it/sparql</a>	385222839	122	383	86	135(0), 101(100)
<a href="http://dati.camera.it/sparql">http://dati.camera.it/sparql</a>	322885735	92	283	61	119(0), 113(100)
<a href="http://data.allie.dbcls.jp/sparql">http://data.allie.dbcls.jp/sparql</a>	287461727	43	201	28	37(0)
<a href="http://datos.bne.es/sparql">http://datos.bne.es/sparql</a>	258140051	16	329	15	32(0)
<a href="http://rdf.disgenet.org/sparql/">http://rdf.disgenet.org/sparql/</a>	99381703	110	665	46	78(0), 48(100)
<a href="https://taxref.mnhn.fr/sparql">https://taxref.mnhn.fr/sparql</a>	82745498	1913	608	58	96(0), 73(100)
<a href="http://opendata.aragon.es/sparql">http://opendata.aragon.es/sparql</a>	70049160	206	1259	88	119(0), 103(100)
Muziekweb	37114240	30	59	16	20(0), 20(100)
<a href="http://premon.fbk.eu/sparql">http://premon.fbk.eu/sparql</a>	32611819	95	146	46	42(0), 36(100)
<a href="http://geo.linkeddata.es/sparql">http://geo.linkeddata.es/sparql</a>	29884998	360	212	41	26(0), 12(100)
<a href="http://en.openei.org/sparql">http://en.openei.org/sparql</a>	27317782	1600	5163	306	209(0), 81(100)
<a href="http://datos.bcn.cl/sparql">http://datos.bcn.cl/sparql</a>	52057935	542	357	122	157(0), 132(100)
<a href="http://id.eaufrance.fr/sparql">http://id.eaufrance.fr/sparql</a>	17743557	76	318	56	58(0), 46(100)
<a href="http://ldf.fi/warsa/sparql">http://ldf.fi/warsa/sparql</a>	14385118	90	310	57	110(0), 96(100)
<a href="http://ldf.fi/yoma/sparql">http://ldf.fi/yoma/sparql</a>	6627922	267	123	34	60(0), 53(100)

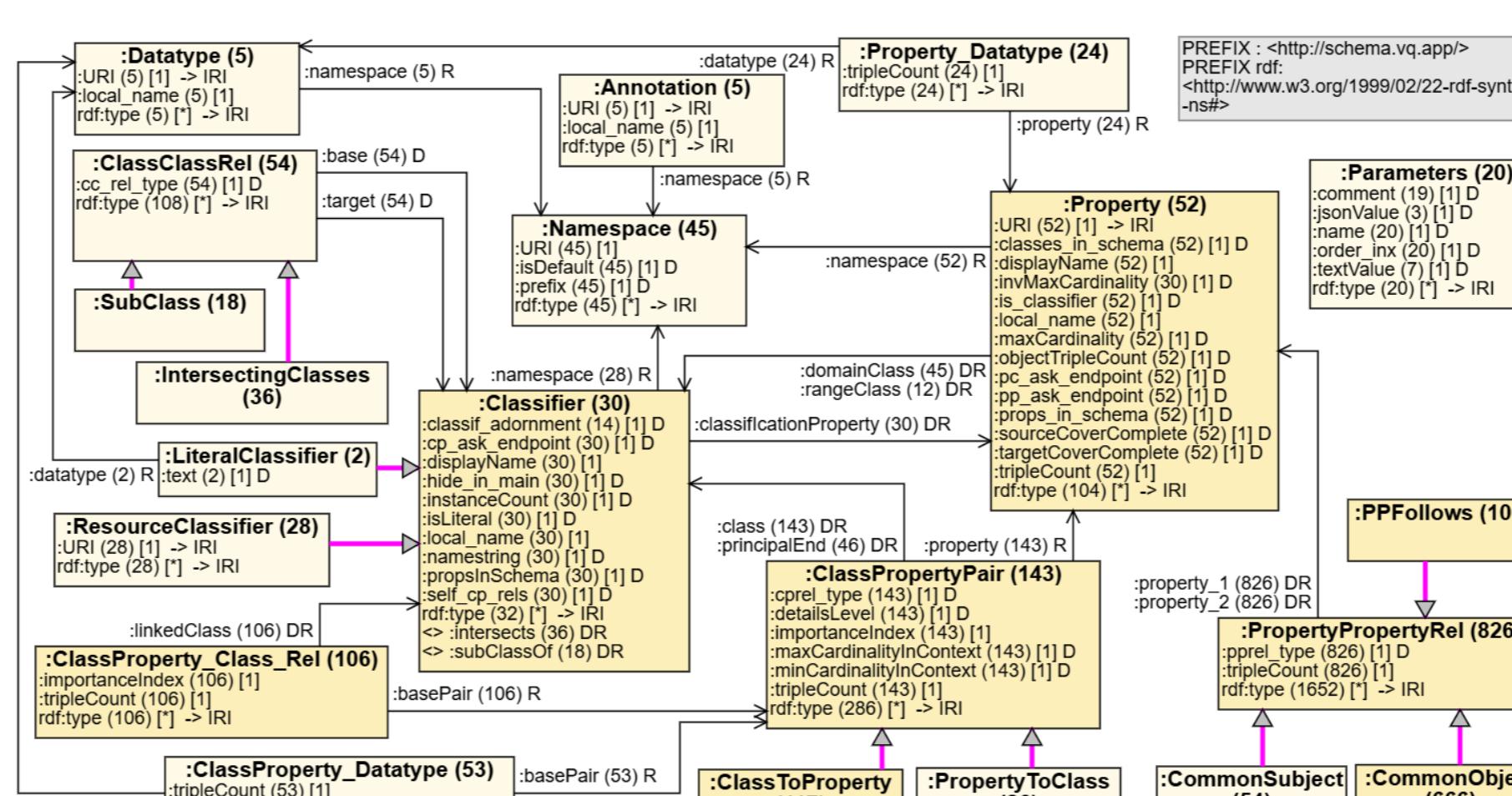
sparql.nextprot.org: 165 classes, 39 nodes, 67 lines



## Schema presentation and summarization principles

- Classes -> nodes, properties -> edges
- Calculate principal property ascription points (coverage, minimality, specificity)
- Contraction of class nodes with equal or similar property sets (configurable)
- Property link inlining (in, out, loop attributes)
- Schema fragment selection, if needed

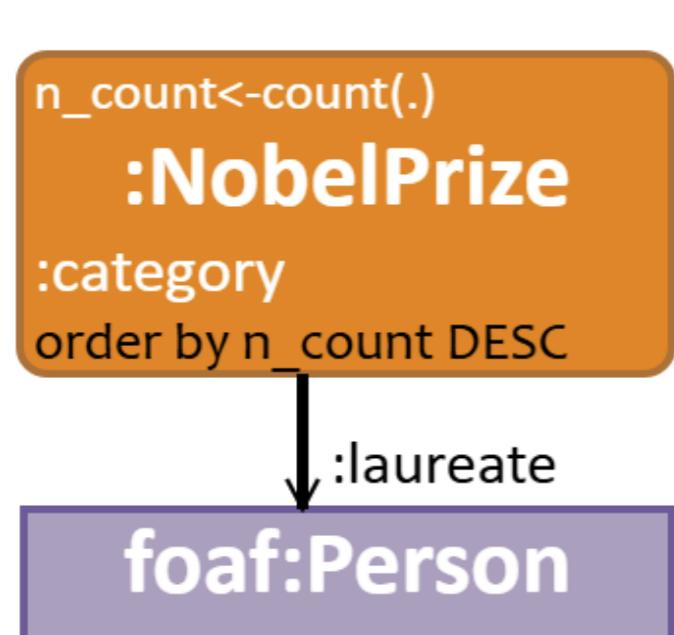
## Data schema structure



## Further Work

- Query from the schema diagram
- Fragment selection automation
- «Class-free» nodes (discover longer property paths)
- Exchangeability with SHACL
- Practical examples

Visual queries accompany the schema visualization possibilities



```

SELECT ?category (COUNT(?NobelPrize) AS ?n_count)
WHERE{
    ?NobelPrize rdf:type :NobelPrize.
    ?NobelPrize :laureate ?Person.
    ?Person rdf:type foaf:Person.
    OPTIONAL{?NobelPrize :category ?category.}
}
GROUP BY ?category
ORDER BY DESC(?n_count)
  
```

#	category	n_count
1	<a href="http://data.nobelprize.org/terms/Physiology_or_Medicine">http://data.nobelprize.org/terms/Physiology_or_Medicine</a>	225
2	<a href="http://data.nobelprize.org/terms/Physics">http://data.nobelprize.org/terms/Physics</a>	219
3	<a href="http://data.nobelprize.org/terms/Chemistry">http://data.nobelprize.org/terms/Chemistry</a>	191
4	<a href="http://data.nobelprize.org/terms/Literature">http://data.nobelprize.org/terms/Literature</a>	118
5	<a href="http://data.nobelprize.org/terms/Peace">http://data.nobelprize.org/terms/Peace</a>	110
6	<a href="http://data.nobelprize.org/terms/Economic_Sciences">http://data.nobelprize.org/terms/Economic_Sciences</a>	89