

# Publishing Sampo data (dump), data service (LDF.fi), and portal on the Web

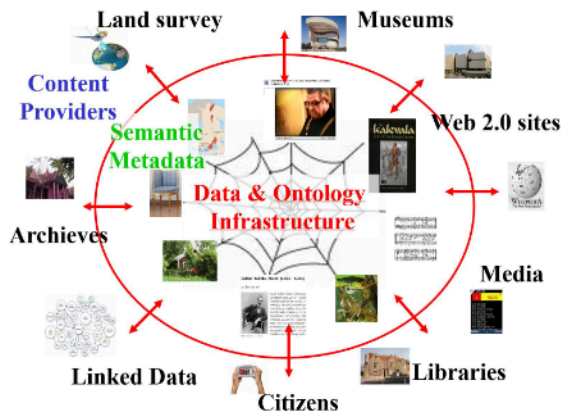
*Jouni Tuominen*

# Sampo Model for 1) Human Users and 2) Machines



## LINKED DATA SERVICE

Findable, Accessible, Interoperable, Re-usable  
FAIR data!



Linked Data Finland

Living Laboratory Data Service for the Semantic Web

<https://ldf.fi/>

## APPLICATIONS & TOOLS

Use Cases

**Sampo Portals & Applications**

Samos:  
<https://seco.cs.aalto.fi/applications/sampo/>

**Digital Humanities Research**

Tools

Sampo-UI, etc.

Google Colab, Jupyter,  
YASGUI, etc.



## References

Eero Hyvönen: **How to Create a National Cross-domain Ontology and Linked Data Infrastructure and Use It on the Semantic Web**. *Semantic Web*, 2024. DOI: 10.3233/SW-243468.

Eero Hyvönen: **Digital Humanities on the Semantic Web: Sampo Model and Portal Series**. *Semantic Web*, vol. 14, no. 4, pp. 729-744, 2023.

Esko Ikkala, Eero Hyvönen, Heikki Rantala and Mikko Koho: **Sampo-UI: A Full Stack JavaScript Framework for Developing Semantic Portal User Interfaces**. *Semantic Web*, vol. 13, no. 1, 69-84, 2022.

# Sampo data dumps (static files)

- **Zenodo**
  - Static RDF files
  - Versioning, digital object identifier (DOI)
- **Also other formats (e.g., CSV, XML) can be provided**
  - E.g. ParliamentSampo: CSV & XML (Parla-CLARIN, ParlaMint)

# Linked Data Finland Living Lab <http://ldf.fi>



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[Search Data](#)  
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## Linked Data Finland

### Living Laboratory Data Service for the Semantic Web

This site is the Living Laboratory of the [FIN-CLARIAH](#) research infrastructure initiative, conducted by the [Semantic Computing Research Group](#) at [Aalto University](#) in collaboration with University of Helsinki and a large consortium of other Finnish universities and organizations.

Our goal is to make life easier for both Linked Data publishers and consumers on the Web. We base our work on the Linked Data principles and stack of standards founded on the semantic data model [RDF](#), standardized query language [SPARQL](#), and [live HTTP URIs](#) for identifiers.

#### 5-star Linked Data

The baseline of our work is the [5-star Linked Data model](#), proposed by Tim Berners-Lee.

- ★ Make data available on the Web in whatever format.
- ★★ Make data available as structured data (e.g., Excel instead of an image scan of a table).
- ★★★ Use non-proprietary formats (e.g., CSV instead of Excel format).
- ★★★★ Use URIs to denote things, so that people can point at your data.
- ★★★★★ Link your data to other data to provide context.

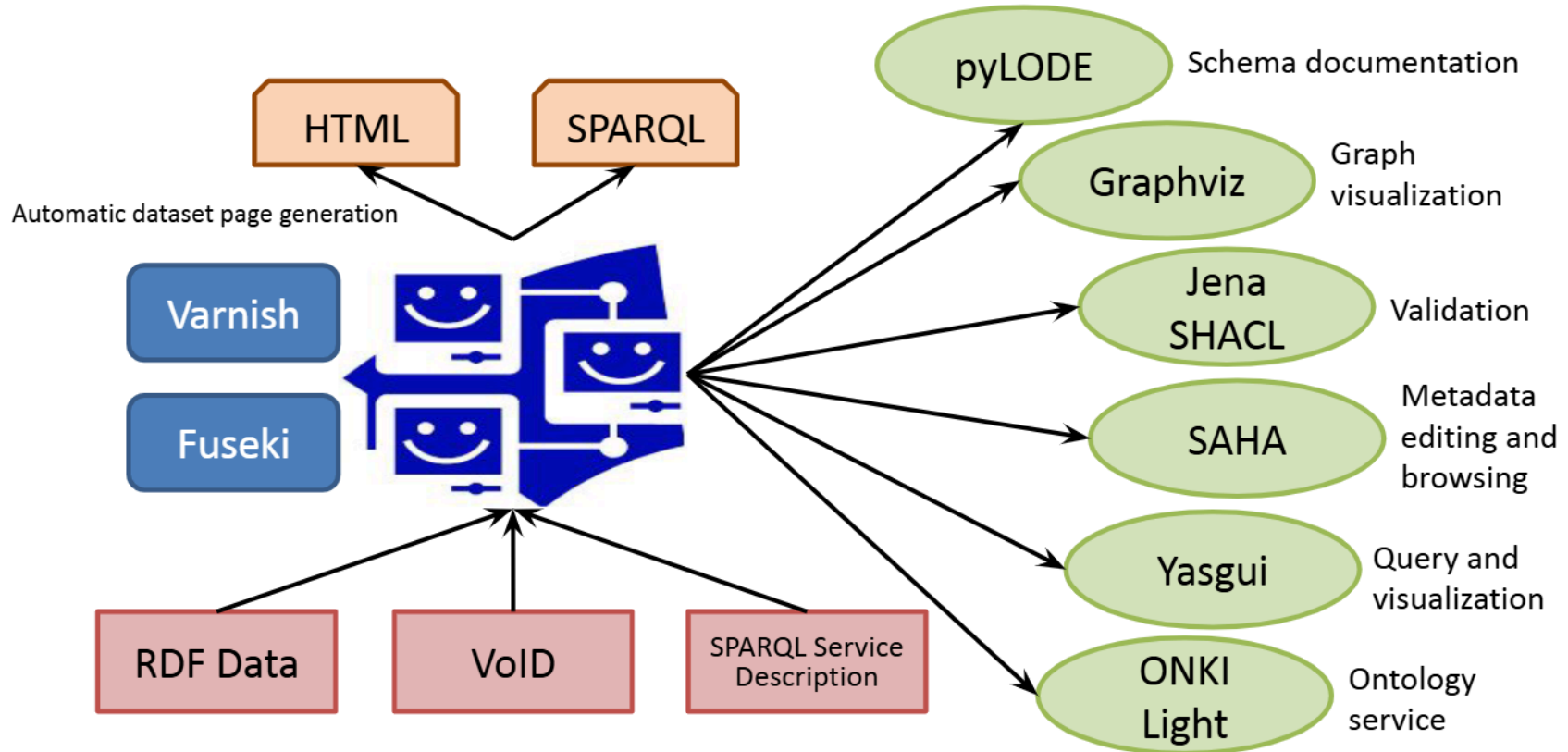
#### 8-star Linked Data

However, in our opinion, providing 5-star Linked Data is just the beginning. To actually make use of the datasets, consumers need more support in getting to know the underlying data models used, how well the data actually conforms to the models, as well as trustworthiness of the data. To these ends, we extend the model with three additional stars to encourage data publishers to make their data more re-usable:

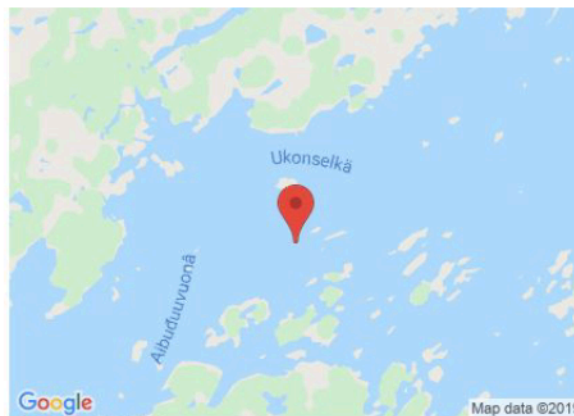
- ★★★★★★ Describe explicitly and publish the schemas used in the dataset (unless the schemas are already available elsewhere).
- ★★★★★★ Explain the quality of the dataset against the schemas used in it, so that the user can tell whether the data quality matches her needs.
- ★★★★★★ Give explanations when the data is factually correct with respect to the real world and when possibly not.

Eero Hyvönen and Jouni Tuominen: 8-star Linked Open Data Model: Extending the 5-star Model for Better Reuse, Quality, and Trust of Data. *Posters, Demos, Workshops, and Tutorials of the 20th International Conference on Semantic Systems (SEMANTICS 2024)*, vol. 3759, CEUR Workshop Proceedings, September, 2024. <https://ceur-ws.org/Vol-3759/paper4.pdf>

# LDF.fi – generic Linked Data publication platform



saari: Ukko

[\[edit\]](#)

68.936487, 27.282297

<b>Collection</b>	1-kokoelma
<b>Collection parish (in ca 1938)</b>	Inari
<b>Collector</b>	Portti, Reija
<b><a href="http://ldf.fi/schema/kotus-names-archive/positioning_accuracy">http://ldf.fi/schema/kotus-names-archive/positioning_accuracy</a></b>	Paikka sijaitsee keruukartalla tämän karttaruudun alueella.
<b>Latitude</b>	68.936487
<b>Longitude</b>	27.282297
<b>Name</b>	Ukko
<b>Name type</b>	paikannimi
<b>Same as</b>	<a href="https://nimiarkisto.fi/wiki/Q5601617">https://nimiarkisto.fi/wiki/Q5601617</a>
<b>Stamp date</b>	1990
<b>Type</b>	<a href="#">saari</a>

# LDF.fi:

## Linked Data browsing for humans and machines

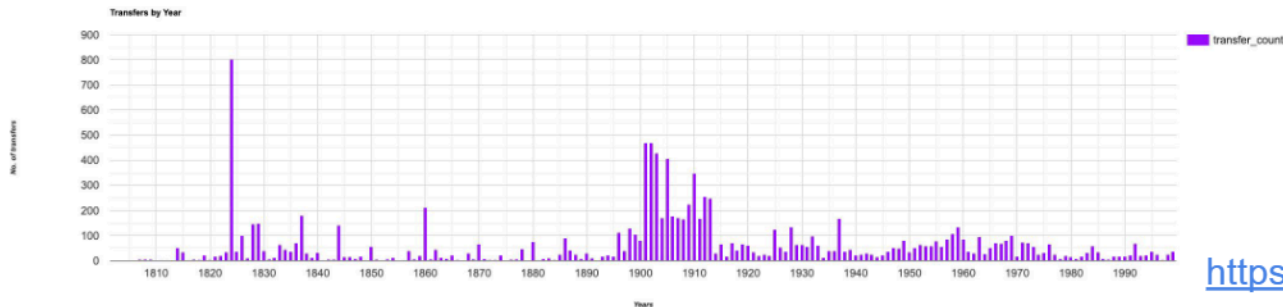
```
<http://ldf.fi/kotus-names-archive/Q5601617>
  a      <http://ldf.fi/schema/kotus-names-archive/place_type_41> ;
<http://ldf.fi/schema/kotus-names-archive/collection>
  "1-kokoelma" ;
<http://ldf.fi/schema/kotus-names-archive/collector>
  "Portti, Reija" ;
<http://ldf.fi/schema/kotus-names-archive/name_type>
  "paikannimi" ;
<http://ldf.fi/schema/kotus-names-archive/parish>
  "Inari" ;
<http://ldf.fi/schema/kotus-names-archive/positioning_accuracy>
  "Paikka sijaitsee keruukartalla tämän karttaruudun alueella." ;
<http://ldf.fi/schema/kotus-names-archive/stamp_date>
  1990 ;
<http://www.w3.org/2002/07/owl#sameAs>
  <https://nimiarkisto.fi/wiki/Q5601617> ;
<http://www.w3.org/2003/01/geo/wgs84_pos#lat>
  68.936487 ;
<http://www.w3.org/2003/01/geo/wgs84_pos#long>
  27.282297 ;
<http://www.w3.org/2004/02/skos/core#prefLabel>
  "Ukko" .
```

# LDF.fi: SPARQL endpoints for querying data for analysis, visualization, mash-up apps (CSV, JSON, XML)

```
Query +  
0 | http://ldf.fi/mmm/sparql  
1 - PREFIX skos: <http://www.w3.org/2004/02/skos/core#>  
2 PREFIX ecms: <http://ec.europa.eu/ecms/ontology/>  
3 PREFIX ecr: <http://ec.europa.eu/ecms/ontology/>  
4  
5 # transfers of custody in 1800-2000  
6  
7 - SELECT ?transfer_year (COUNT(*) AS ?transfer_count) WHERE {  
8   ?transfer ecms:P4_has_line-span ?transfer_line-span ;  
9     ecms:P101_in_documented_in ?source .  
10  ?transfer_line-span skos:prefLabel ?line-span_label ;  
11    ecms:P82a_begin_of_the_begin ?timespan_datetime .  
12  BIND(YEAR(?timespan_datetime) AS ?transfer_year)  
13  FILTER(?transfer_year < 2000 && ?transfer_year > 1800)  
14  
15  ?source skos:prefLabel ?source_title .  
16  
17  ?transfer ecms:P30_transferred_custody_of ?manuscript .  
18  ?manuscript a ecr:M001_P4_Manifestation_Singleton ;  
19    skos:prefLabel ?manuscript_name .  
20  
21 } GROUP BY ?transfer_year  
22 ORDER BY ?transfer_year
```

Table Response Gallery Chart Geo Geo-3D Geo events Pivot Timeline 193 results in 9.526 seconds

Configure



# LDF.fi: Download data graphs (Turtle, JSON-LD, RDF/XML, ...) via SPARQL HTTP Graph Store Protocol

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix schema: <http://schema.org/> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix xml: <http://www.w3.org/XML/1998/namespace> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://urn.fi/URN:NBN:fi:bib:me:W00003542600> schema:author <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:contributor <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricolan teokset : 1, ABC kiria ; Rucoufkiria",
    "Mikael Agricolan teokset : 1, Abckiria, rucouskiria",
    "Mikael Agricolan teokset : 2, Se Wfi Teftamenti",
    "Mikael Agricolan teokset : 2, Se wsi testamentti",
    "Mikael Agricolan teokset : 3, Käsikiria, Messu eli Herran echtolinen, Se meiden Herran Iesusen Christusen pina, Davidin
psaltari, Weisut ia ennustoxet, Ne prophetat, Haggaj, Sacharia, Maleachi",
    "Mikael Agricolan teokset : 3, Käsikirja",
    "Mikael Agricolan teokset : Tekstien selvennys" .

<http://urn.fi/URN:NBN:fi:bib:me:W00023266800> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Suomalaisia suurmiehiä" .

<http://urn.fi/URN:NBN:fi:bib:me:W00025575600> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricolan edelläkävijä : Pyhän Stefanin, Perman ensimmäisen piispan, elämäntyö" .

<http://urn.fi/URN:NBN:fi:bib:me:W00028705000> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Nuori Mikael Agricola" .

<http://urn.fi/URN:NBN:fi:bib:me:W00029465400> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricolasta E. W. Pakkalaan : Suomen kirkon paimenien elämäkerrasto" .

<http://urn.fi/URN:NBN:fi:bib:me:W00031602000> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "En väg till en av världs litteraturens stora namnlösa skaldar : vem var Michael Agricola?" .

<http://urn.fi/URN:NBN:fi:bib:me:W00041137700> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Fiskaresonen : Finlands oförgätlige wälgörare" .

<http://urn.fi/URN:NBN:fi:bib:me:W00041920500> schema:contributor <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricola ja Erasmus Rotterdamlainen" .

<http://urn.fi/URN:NBN:fi:bib:me:W00046892800> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricola : bibliografinen opas" .

<http://urn.fi/URN:NBN:fi:bib:me:W00047053600> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Vanhan kirjasuomen lukemisto" .

<http://urn.fi/URN:NBN:fi:bib:me:W00047350200> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Michael Agricola : der Reformator Finnlands : sein Leben und sein Werk" .

<http://urn.fi/URN:NBN:fi:bib:me:W00047843300> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricola, der erste finnische Bibelübersetzer" .

<http://urn.fi/URN:NBN:fi:bib:me:W00048912200> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:contributor <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Oma kieli : Mikael Agricolan tekstejä nykysuomeksi" .

<http://urn.fi/URN:NBN:fi:bib:me:W00049272700> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Agricolan aika" .

<http://urn.fi/URN:NBN:fi:bib:me:W00060415000> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Suomalaisen eksegetiikan ja orientalistiikan juuria : Roots of exegetics and oriental studies in Finland" .

<http://urn.fi/URN:NBN:fi:bib:me:W00060662600> schema:about <http://urn.fi/URN:NBN:fi:au:pn:000103346> ;
  schema:name "Mikael Agricola",
    "Mikael Agricola : elämä ja teokset" .
```



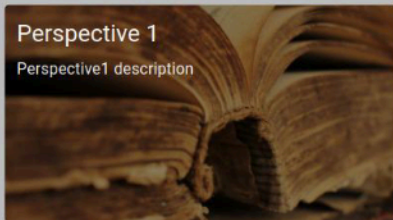
# Sampo-UI

"Here to forge for us the Sampo,  
Hammer us the lid in colors"

Select a perspective to search and browse the knowledge graph:

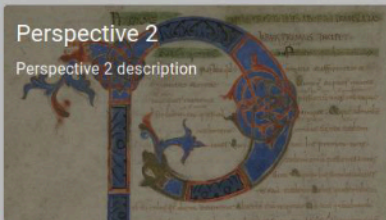
## Perspective 1

Perspective1 description



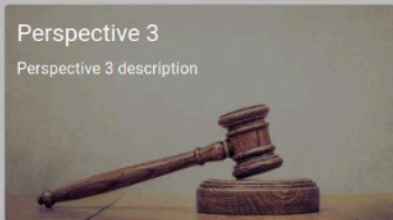
## Perspective 2

Perspective 2 description



## Perspective 3

Perspective 3 description



## ClientFS

Client-side faceted search



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# Sampo infrastructure

- **All software components are run as Docker containers**
  - Portable services, can be run on a local machine/server
- **Triple stores (Fuseki) run on virtual machines**
- **Web applications (www.idf.fi, Sampo portals) run on OpenShift container cloud**
  
- **Part of the DARIAH-FI research infrastructure program**
- **Technical infrastructure provided by CSC – IT Center for Science (by Ministry of Education and Culture)**

# Thank You!