

Publishing and studying historical opera and music theatre performances on the Semantic Web: case OperaSampo 1830–1960

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<http://seco.cs.aalto.fi/projects/oopperasampo/>



Contents of the Case Study

- **Original data**
- **Data transformation into a knowledge graph**
- **Linked Open Data service**
- **Semantic Portal**

Original Data

Reprise Database

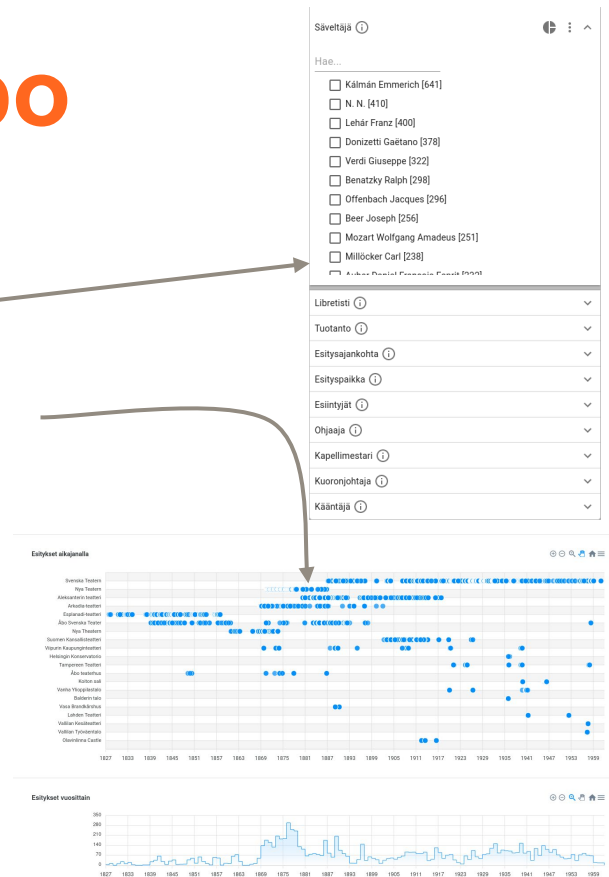


- **Opera and music theater performances in Finland 1830-1960**
 - 9 000 performances
 - 3500 people
 - 6400 role characters
 - 650 compositions
- **Created by Sibelius Academy, University of Arts, Finland**
- **Published using a traditional web service**

Reprises → OperaSampo

- Why a LOD-based portal?

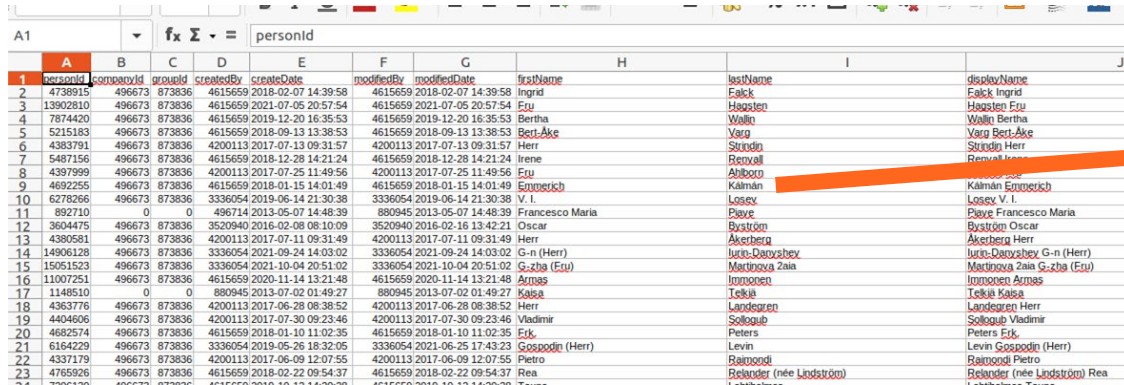
- More versatile search & browsing
 - Faceted search
 - Seamlessly integrated data-analytic tools
- Old platform getting old and unsecure
- Suitable data model for future extensions
 - Enriching data from other data sources



Reprises → OperaSampo Data Transformation

• Process:

- SQL data dump → 18 CSV files
 - 1 table → 1 CSV file
- CSV files → RDF Turtle files
 - Using Python scripts
 - 9 CSV files correspond to classes
 - Other files to properties and other values of the classes

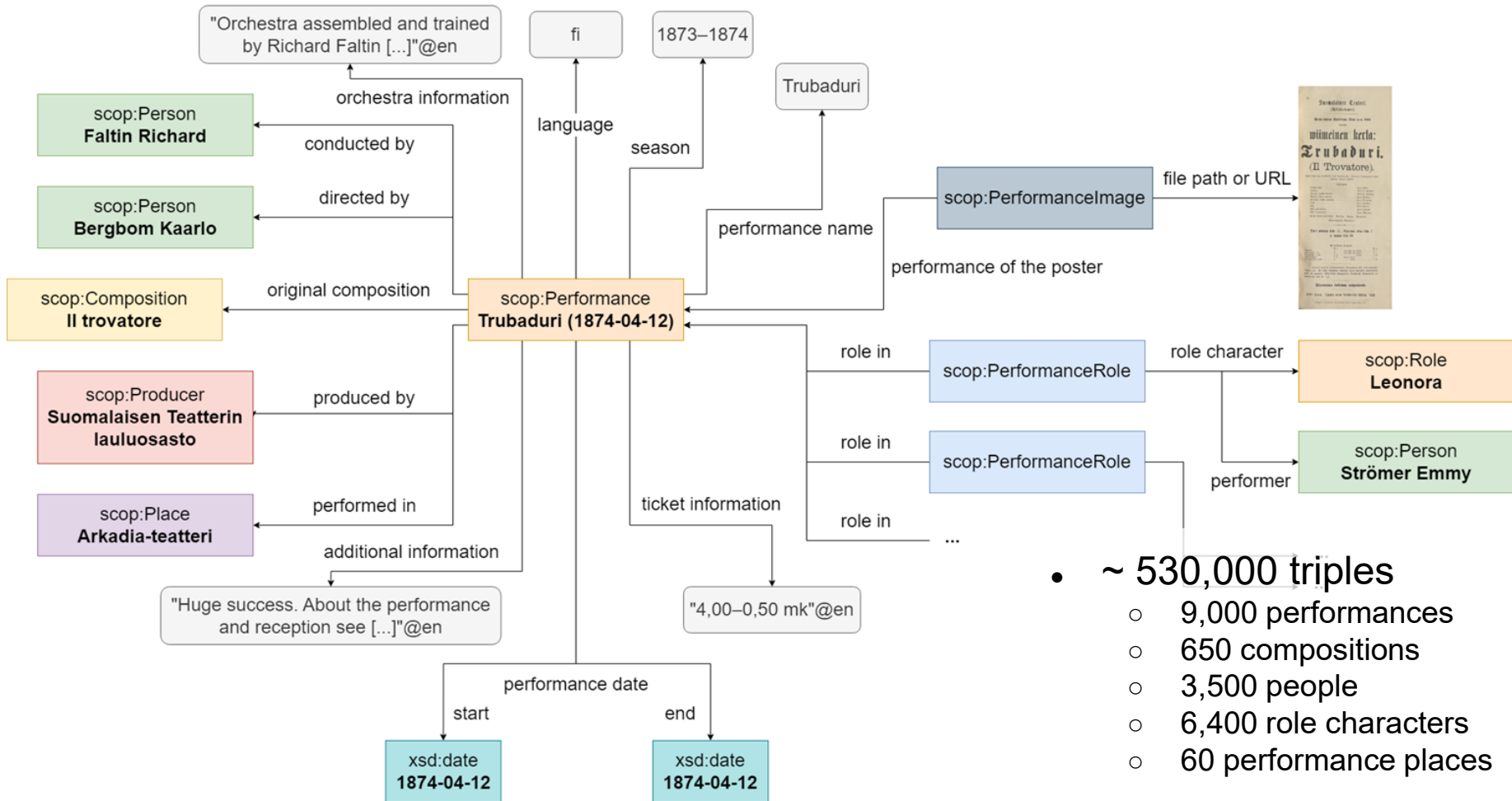


A1	A	B	C	D	E	F	G	H	I	J
1	personId	companyId	groupId	createBy	createDate	modifiedBy	modifiedDate	firstName	lastName	displayName
2	4738915	496673	873836	4615659	2018-02-07 14:39:58	4615659	2018-02-07 14:39:58	Ingrid	Falk	Falk Ingrid
3	13902810	496673	873836	4615659	2021-07-05 20:57:54	4615659	2021-07-05 20:57:54	Fu	Haugen	Haugen Fu
4	7874420	496673	873836	4615659	2019-12-20 16:35:53	4615659	2019-12-20 16:35:53	Bertha	Waltz	Waltz Bertha
5	5215183	496673	873836	4615659	2018-09-13 13:38:53	4615659	2018-09-13 13:38:53	Bert-Ake	Varg	Varg Bert-Ake
6	4383791	496673	873836	4200113	2017-07-13 09:31:57	4200113	2017-07-13 09:31:57	Herr	Storöjn	Storöjn Herr
7	5487156	496673	873836	4615659	2018-12-28 14:21:24	4615659	2018-12-28 14:21:24	Irene	Renval	Renval Irene
8	4397999	496673	873836	4200113	2017-07-25 11:49:56	4200113	2017-07-25 11:49:56	Fu	Aliboro	Aliboro Fu
9	4692255	496673	873836	4615659	2018-01-15 14:01:49	4615659	2018-01-15 14:01:49	Eggen	Kaiman	Kaiman Eggen
10	6276266	496673	873836	3336054	2019-06-14 21:30:38	3336054	2019-06-14 21:30:38	V. I.	Lesey	Lesey V. I.
11	892710	0	0	496714	2013-05-07 14:48:39	880945	2013-05-07 14:48:39	Francesco Maria	Pave	Pave Francesco Maria
12	3604475	496673	873836	3520940	2016-02-08 08:10:09	3520940	2016-02-16 13:42:21	Oscar	Byström	Byström Oscar
13	4380581	496673	873836	4200113	2017-07-11 09:31:49	4200113	2017-07-11 09:31:49	Herr	Akerberg	Akerberg Herr
14	14906128	496673	873836	3336054	2021-09-24 14:03:02	3336054	2021-09-24 14:03:02	G-n (Herr)	Juri-Davoshev	Juri-Davoshev G-n (Herr)
15	15051523	496673	873836	3336054	2021-10-04 20:51:02	3336054	2021-10-04 20:51:02	G-zha (Fu)	Martynova Zha	Martynova Zha G-zha (Fu)
16	11007251	496673	873836	4615659	2020-11-14 13:21:48	4615659	2020-11-14 13:21:48	Armas	Juononen	Juononen Armas
17	1148510	0	0	880945	2013-07-02 01:49:27	880945	2013-07-02 01:49:27	Herr	Iskol	Iskol Rea
18	4363776	496673	873836	4200113	2017-06-28 08:38:52	4200113	2017-06-28 08:38:52	Herr	Landegren	Landegren Herr
19	4404606	496673	873836	4200113	2017-07-30 09:23:46	4200113	2017-07-30 09:23:46	Vladimir	Sollogub	Sollogub Vladimir
20	4682574	496673	873836	4615659	2018-01-10 11:02:35	4615659	2018-01-10 11:02:35	Fjk.	Peters	Peters Fjk.
21	6164229	496673	873836	3336054	2019-05-26 18:32:05	3336054	2021-06-25 17:43:23	Gospodin (Herr)	Levin	Levin Gospodin (Herr)
22	4337179	496673	873836	4200113	2017-06-09 12:07:55	4200113	2017-06-09 12:07:55	Pietro	Rabozzi	Rabozzi Pietro
23	4769596	496673	873836	4615659	2018-02-22 09:54:37	4615659	2018-02-22 09:54:37	Rea	Rea	Rea (nee Lindström)

```
1 @prefix dc: <http://purl.org/dc/elements/1.1/> .
2 @prefix foaf: <http://xmlns.com/foaf/0.1/> .
3 @prefix ops: <http://ldf.fi/operasampo/> .
4 @prefix owl: <http://www.w3.org/2002/07/owl#> .
5 @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
6 @prefix scop: <http://ldf.fi/schema/operasampo/> .
7 @prefix skos: <http://www.w3.org/2004/02/skos/core#> .
8 @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
9
10 ops:compositions_14316953 a scop:Composition ;
11   scop:additionalTitle "Le ressemblance"@fi ;
12   scop:composed "1798" ;
13   scop:composedBy ops:persons_14316933 ;
14   scop:librettist ops:persons_3551583 ;
15   skos:prefLabel "Le prisonnier"@fi .
16
17 ops:compositions_15984644 a scop:Composition ;
18   scop:additionalInfo "Tanssi-ja laulunaytelmä."@fi ;
19   scop:composedBy ops:persons_3685237 ;
20   skos:prefLabel "Divertissement"@fi .
21
22 ops:compositions_3556786 a scop:Composition ;
23   scop:additionalTitle "Qvåkaren och dansösen"@fi ;
24   scop:composedBy ops:persons_3556760 ;
25   scop:librettist ops:persons_3556760 ;
26   scop:originalTitle "Le quaker et la danseuse" ;
```

PREFIX scop: <http://ldf.fi/schema/operasampo/>

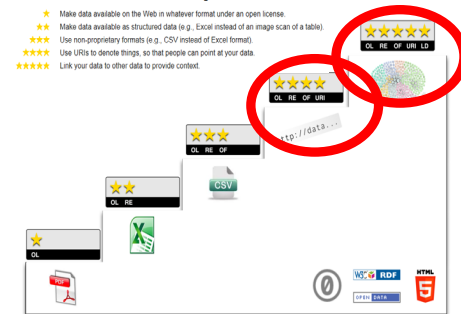
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>



- ~ 530,000 triples
 - 9,000 performances
 - 650 compositions
 - 3,500 people
 - 6,400 role characters
 - 60 performance places

Published on Linked Data Finland LDF.fi From “5-star” to ”7-star” model

Goals: enhance **re-usability** and **data quality**



7-star Linked Data Service

<https://ldf.fi>

(Tim Berners-Lee)

<http://5stardata.info>

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 and access them, as well as a better grasp of their quality and provenance. To this end, we extend the model with two additional stars:

- ★★★★★★ Provide your data with a schema and documentation so that people can *understand and re-use* your data easily.
- ★★★★★★ Validate your data and denote its provenance so that people can *trust the quality* of your data.

This added support should come with as little extra work as possible to the data publisher. Our hypothesis is that a lot of this can be done automatically, basing on the Linked Data core. A data publisher needs only to provide their data in the RDF format, and the LDF.fi portal will do the rest automatically. See the [overview paper](#) (in ESWC 2014 Proceedings, Springer-Verlag) for some more details about the underlying ideas.



Burj Al Arab



<https://www.go-fair.org/fair-principles/>

Sampo Model for Creating LOD Services and Semantic Portals

Sampo Model:

Principles for creating LOD services

Principles for creating semantic portal interfaces

Sampo Model Principles P1–P6

P1	Support collaborative data creation and publishing
P2	Use a shared open ontology infrastructure
P3	Make clear distinction between the LOD service and the user interface (UI)
P4	Provide multiple perspectives to the same data
P5	Standardize portal usage by a simple filter-analyze two-step cycle
P6	Support data analysis and knowledge discovery in addition to data exploration

References

Eero Hyvönen: **Digital Humanities on the Semantic Web: Sampo Model and Portal Series**. Semantic Web – Interoperability, Usability, Applicability, 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 – Interoperability, Usability, Applicability, vol. 13, no. 1, pp. 69-84, 2022.



Two Faces of a Sampo System: for 1) Machines and 2) Human Users

Linked Data Finland: Sampo LOD Data Services

<http://www.ldf.fi/dataset/nbf>



Linked Data Finland
Living Laboratory Data Service for the Semantic Web

This site is the Living Laboratory of the [Linked Data Finland](#) research initiative, conducted by the [Semantic Computing Research Group](#) at [Aalto University](#) in collaboration with University of Helsinki and a large consortium of Finnish public organizations and companies.

Our goal is to make life easier for both publishers as well as consumers of structured data on the Web. We base our work on the [Linked Data](#) paradigm and stack of standards, which combines an expressive, semantic data model (RDF) with standardized access mechanisms (SPARQL and live HTTP URIs).

5-star Linked Data

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

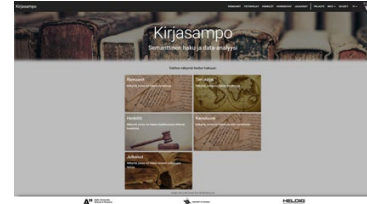
- ★ Make data available on the Web in whatever format.
- ★★ Make data available as structured data (e.g., Excel instead of an image scan of a table).
- ★★★ Use non-proprietary formats (e.g., CSV instead of Excel format).
- ★★★★ Use URIs to denote things, so that people can point at your data.
- ★★★★★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

7-star Linked Data Service

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 and access them, as well as a better grasp of their quality and provenance. To this end, we extend the model with two additional stars.



Sampo Portal & Applications



Google Colab, Jupyter, YASGUI. etc.



FIG. 3: Amount of people alive on timeline



FIG. 4: Average lifespan of biographers



Sampo-UI: “Standardizing” the User Interface Model & Logic

- Easy to (re-)learn by end users
- Easy to (re-)implement by developers

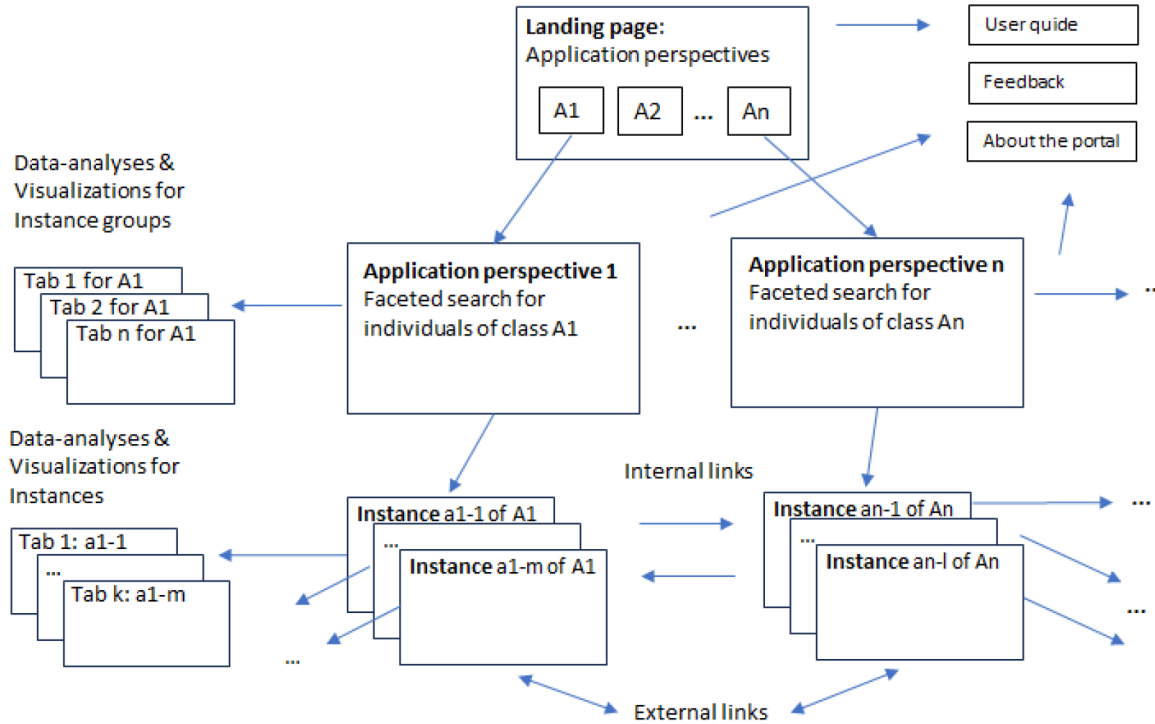


Figure 3: Navigational page structure of a portal based on Sampo-UI.

Sampo Series of LOD Services & Portals



A. Gallen-Kallela: Defense of Sampo, 1896, Turku Art Museum,

1. **MuseumFinland** – Finnish Museums on the Semantic Web (2004) [39 000 users]
2. **CultureSampo** – Finnish Culture on the Semantic Web (2008) [107 000 users]
3. **TravelSampo** - Mobile Contextualized Services of Cultural Tourism (2011)
4. **BookSampo** – Finnish Fiction Literature on the Semantic Web (2011) [1.6 million users in 2022]
5. **WW1LOD** – World War I Linked Open Data (2014)
6. **WarSampo** – Finnish World War 2 on the Semantic Web (2015-19) [1 100 000 users]
7. **Norssi Alumni on the Semantic Web** – Historical person registry using LOD (2017)
8. **U.S. Congress Prosopographer** – U.S. Congress Legislators 1789-2018
9. **BiographySampo** - Finnish Biographies on the Semantic Web (2018-20) [381 000 users]
10. **NameSampo** – Linked Data Workbench for Toponomastic Research (2019) [55 000 users]
11. ~~WarVictimSampo 1914-1922 – National War History [80 000 users]~~
12. **Mapping Manuscript Migrations (MMM)** – medieval manuscripts (2020) [9100 users]
13. **AcademySampo** – Finnish Academic People 1640 – 1899 (2021) [26 000 users]
14. **FindSampo** – Archaeological Finds on the Semantic Web (2021) [7 000 users]
15. **WarMemoirSampo** – Memoirs of Finnish WW2 veterans (2021) [3 800 users]
16. **LetterSampo** – Early Modern Letters on the Semantic Web (2022)
17. **LawSampo** – Finnish Legislation and Case Law on the Semantic Web (2023)
18. **ParliamentSampo** – Parliament of Finland on the Semantic Web (2023)
19. **BookSampo 2.0** – Semantic Search, Browsing, and Data Analysis
20. **OperaSampo** – Opera and music theatre performances in Finland 1830–1960
21. **ConfermentSampo** – Conferment Ceremonies of the University of Helsinki on the Semantic Web
22. **CoinSampo, ArtSampo, ...** (2024-)

Sampo-UI

Sampo = Mythical artifact of the Finnish Epic Kalevala that gives to its owner riches and good fortune. *A metaphore of amazing ancient technology.*

Links to all Sampos: <https://seco.cs.aalto.fi/applications/sampo/>

Data Maintenance Tool

Native RDF edited
using **SAHA** editor

SAHA3 | operasampo-dev - search

http://rdf.fi/operasampo/places_3561640

Esitypaikka: Svenska Teatern i Helsingfors

[\[edit\]](#)

Suosittelu nimike	(fi) Svenska Teatern i Helsingfors
Vaihtoehtoinen nimike	Nya Teatern, Nya Theatern
Osoite	(fi) Pohjoisesplanadi 2
Kaupunki	(fi) Helsinki
Maa	(fi) Suomi
Lisätietoja	<p>(fi) Nya Teatern (Uusi teatteri/ Ruotsalainen teatteri). Tämä Georg Theodor Chiewitzin suunnittelema kivinen teatteritalo sijaitsi Helsingin Esplanadin puistossa samalla paikalla kuin nykyinen Svenska Teatern. Se vihittiin käyttöön 28.11.1860 mutta tuhoutui täysin tulipalossa jo muutaman vuoden kuluessa vuonna 1863.</p> <p>Uusi Nicholas Benoisen suunnittelema teatteritalo vihittiin käyttöön vuonna 1866. Vuonna 1870 nimi muutettiin muotoon Nya Teatern. Vuodesta 1888 teatteri on ollut nimeltään Svenska Teatern i Helsingfors (Helsingin ruotsalainen teatteri).</p> <p>Teatterirakennuksen julkisivu uudistettiin 1936 funktionalismin hengessä (Eero Saarinen ja Jarl Eklund), mutta sisältä teatteri säilyi pääosin vuoden 1866 asussa.</p> <p>Katsomopaikkoja oli alkujaan 850. Vuonna 2023 paikkaluku suurella näyttämöllä oli n. 545.</p>
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	Esitypaikka
Pilottettu nimike	Helsingin ruotsalainen teatteri, Ruotsalainen teatteri, Uusi teatteri

References (5 479)

[Siegfried \(1910-10-05\) \(Esiitys\) – Esitypaikka](#)
[Siegfried \(1910-10-07\) \(Esiitys\) – Esitypaikka](#)
[Siegfried \(1910-10-12\) \(Esiitys\) – Esitypaikka](#)
[Siegfried \(1910-10-09\) \(Esiitys\) – Esitypaikka](#)
[Siegfried \(1910-10-13\) \(Esiitys\) – Esitypaikka](#)
[Martha eller Marknaden i Richmond \(1878-05-10\) \(Esiitys\) – Esitypaikka](#)

SAHA3 | operasampo-dev - search

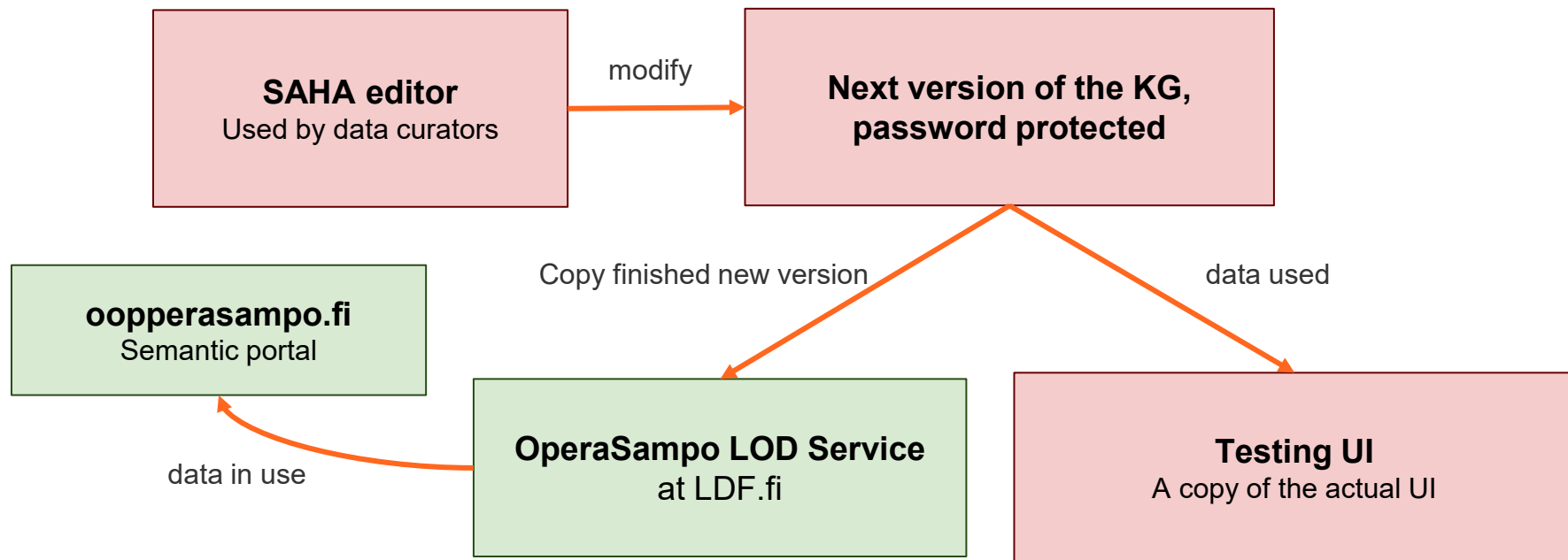
http://rdf.fi/operasampo/places_3561640

Esitypaikka: Svenska Teatern i Helsingfors

[\[view\]](#) | [\[edit\]](#) | [\[config\]](#) | [\[remove\]](#)

Suosittelu nimike Ominaisuus suositellun nimikkeen yhdistämiseen resurssiin. Ominaisuutta käytetään yleensä "nimi-kentässä sekä linkkeleissä viitattessa resurssiin. Arvoja tulisi olla maksimissaan yksi käänteisesti ja arvoa suomiksi.	<input type="text"/> add new literal <input type="text"/> [remove] (fi) Svenska Teatern i Helsingfors
Vaihtoehtoinen nimike Ominaisuus vaihtoehtoisen nimikkeen yhdistämiseen resurssiin. Jos esityspaikalla tai henkilöllä on ollut useita eri nimiä, tähän voi listata ne nimet, joita ei käytetä suositeltuna nimikkeenä.	<input type="text"/> add new literal <input type="text"/> [remove] Nya Teatern <input type="text"/> [remove] Nya Theatern
Osoite Ominaisuus osoitteeseen yhdistämiseen esityspaikkaan.	<input type="text"/> add new literal <input type="text"/> [remove] (fi) Pohjoisesplanadi 2
Kaupunki Ominaisuus kaupungin yhdistämiseen esityspaikkaan.	<input type="text"/> add new literal <input type="text"/> [remove] (fi) Helsinki
Postinumero Ominaisuus postinumeron yhdistämiseen esityspaikkaan.	<input type="text"/> add new literal <input type="text"/> [remove] [remove]
Maa Ominaisuus maan yhdistämiseen esityspaikkaan.	<input type="text"/> add new literal <input type="text"/> [remove] (fi) Suomi

Data Maintenance Process



Semantic Portal

Oopperasampo.fi

OperaSampo User Interface

- **Based on Sampo-UI Framework**
 - Using the same KG from different application perspective
 - Two-step usage: filter data & analyse filtered data
- **5 application perspectives**
 - Performances
 - People (singers, composers, ...)
 - Compositions
 - Role characters
 - Places of performance
- **2 information views**
 - Links to related services
 - Source references

Oopperasampo

Ooppera- ja musiikkiteatteriesityksiä Suomessa
1830–1960

Application
perspectives

Valitse näkymä etsiäksesi ja selataksesi aineistoja:

Esitykset

Näkymä, jossa voi hakea esityksiä.

Performances

Henkilöt

Näkymä, jossa voi hakea oopperaan liittyviä henkilöitä (säveltäjät, esiintyjät, jne.).

People

Sävellykset

Näkymä, jossa voi hakea sävellyksiä.

Compositions

Roollit

Näkymä, jossa voi hakea sävellyksien roolihahmoja.

Role characters

Esityspaikat

Näkymä, jossa voi hakea esityspaikkoja.

Places of perform.

Lähteet

Lista käytetyistä lähteistä.

References

Esicore, Suomen Kansallisoopperan ja -baletin esitystietokanta
Ooppera.fi

Teatterien tietopankki (1800-luku -): <http://opera.info.fi/>

Kansallisen musiikkiteatterin aineisto: <http://dial.kansallisteatteri.fi/>. Esitykset

sisältä

Linkkejä erinäisiin digitaalisiin aineistoihin

Kansallisen musiikkiteatterin aineisto: <http://dial.kansallisteatteri.fi/>. Esitykset

Dansk Forfatterleksikon > teatteri-yksikkö - ja esim. Kuninkaallisen teatterin (Det kongelige Teater) esitysuettelot 1748-

Related services

Esitykset (i)

Tulokset: 8776 esitystä)

Rajaa:

Sävellys (i)

Hae...

- Polnische Hochzeit [238]
- Mam'zelle Nitouche [175]
- La Fille du régiment [159]
- Faust [143]
- Die Csárdásfürstin [142]
- Die Zirkusprinzessin [138]
- Die lustige Witwe [125]
- Il trovatore [124]
- Im weissen Rössl [121]
- Meine Schwester und ich [109]
- ...

Säveltäjä (i)

Libretisti (i)

Tuotanto (i)

Esitysajankohta (i)

Esityspaikka (i)

Esiintyjät (i)

Ohjaaja (i)

Kapellimestari (i)

TAULUKKO

YMPYRÄKAAVIO/PYLVÄSDIAGRAMMI

VUOSITTAISET ESITYKSET

ESITYKSET AIKAJANALLA

Rivejä per sivu 15 1-15 of 8776

Nimi (i)	Sävellys (i)	Säveltäjä (i)	Libretisti (i)	Tuotanto (i)	Esitysajankohta (i)
Den spanska näktergalen (1933-10-30)	Die spanische Nachtigall	Fall Leo	-	Svenska Teatern	1933-10-30
Il trovatore (1874-11-04)	Il trovatore	Verdi Giuseppe	Cammarano Salvatore	Suomalaisen Teatterin lauluosasto	1874-11-04
Trubaduri (1874-11-06)	Il trovatore	Verdi Giuseppe	Cammarano Salvatore	Suomalaisen Teatterin lauluosasto	1874-11-06
Carmen (1890-02-13)	Carmen	Bizet Georges	Halévy Ludovic ...	Inhemska operasällskapet	1890-02-13
Martha (1890-02-14)	Martha oder Der Markt zu Richmond	von Flotow Friedrich	Friedrich (oik. Riese) W. (oik. Friedrich Wilhelm)	Inhemska operasällskapet	1890-02-14
Martha (1890-02-19)	Martha oder Der Markt zu Richmond	von Flotow Friedrich	Friedrich (oik. Riese) W. (oik. Friedrich Wilhelm)	Inhemska operasällskapet	1890-02-19
Figaros bröllop (1890-02-21)	Le nozze di Figaro, ossia la folle giornata	Mozart Wolfgang Amadeus	-	Inhemska operasällskapet	1890-02-21
Martha (1890-02-27)	Martha oder Der Markt zu Richmond	von Flotow Friedrich	Friedrich (oik. Riese) W. (oik. Friedrich Wilhelm)	Inhemska operasällskapet	1890-02-27
Trubaduren (1890-03-01)	Il trovatore	Verdi Giuseppe	Cammarano Salvatore	Inhemska operasällskapet	1890-03-01
Carmen (1890-03-04)	Carmen	Bizet Georges	Halévy Ludovic ...	Inhemska operasällskapet	1890-03-04
Vapensmeden (1890-03-06)	Der Waffenschmied	Lortzing Albert	Lortzing Albert	Inhemska operasällskapet	1890-03-06
Martha (1890-03-08)	Martha oder Der Markt zu Richmond	von Flotow Friedrich	Friedrich (oik. Riese) W. (oik. Friedrich Wilhelm)	Inhemska operasällskapet	1890-03-08
Trubaduren (1890-03-09)	Il trovatore	Verdi Giuseppe	Cammarano Salvatore	Inhemska operasällskapet	1890-03-09
Faust (1890-03-14)	Faust	Gounod Charles	Barbier Jules ...	Inhemska operasällskapet	1890-03-14
Faust (1890-03-17)	Faust	Gounod Charles	Barbier Jules ...	Inhemska operasällskapet	1890-03-17

Tabs for data analyses

Fasets

Search results

Esitys (i)

Trubaduri (1874-04-12)



 TAULUKKO
Kuva (i)

URI (i)	http://idf.fi/operasampo/performances/1043414
Nimi (i)	Trubaduri (1874-04-12)
Sävellys (i)	Il trovatore
Saveltäjä (i)	Verdi Giuseppe
Libretisti (i)	Cammarano Salvatore
Tuotanto (i)	Suomalaisen Teatterin lauluosasto
Esitysajankohta (i)	1874-04-12
Esityspaikka (i)	Arkadia-teatteri
Esiiintyjät (i)	<ul style="list-style-type: none"> • Azucena Strömer Sofie • Fernando (Ferrando) Bergholm John • Ines Avellan (myöh. Thuring) Aura • Kreivi Luna (Il conte di Luna) Achté Lorenz Nikolai • Leonora Strömer Emmy • Manrico Ericsson Ludvig • Ruiz Himberg Edvard • Sanansaattaja (Messo) Aspegrén August Alfred • Vanha mustalainen (Vecchio zinnari) Lundahl Artur Alfred
Ohjaaja (i)	Bergbom Kaarlo
Kapellimestari (i)	Faltin Richard
Kuoronjohtaja (i)	-
Kieli (i)	fi

Homepage of a performance

Esitykset

Tulokset: 322 esitys(ta)

Aktiiviset suodattimet:

POISTA KAIKKI

Säveltäjä: Verdi Giuseppe

Rajaa:

Nimi



Sävellys

Säveltäjä

wagner

< > 1 / 1

- Kälmän Emmerich [641]
- N. N. [410]
- Lehár Franz [400]
- Donizetti Gaetano [378]
- Verdi Giuseppe [322]
- Benatzky Ralph [298]
- Offenbach Jacques [296]
- Beer Joseph [256]
- Mozart Wolfgang Amadeus [251]
- Millöcker Carl [238]
- ...

Libretisti

Tuotanto

Esitysjanakohta

Esityspaikka

Esiintyjät

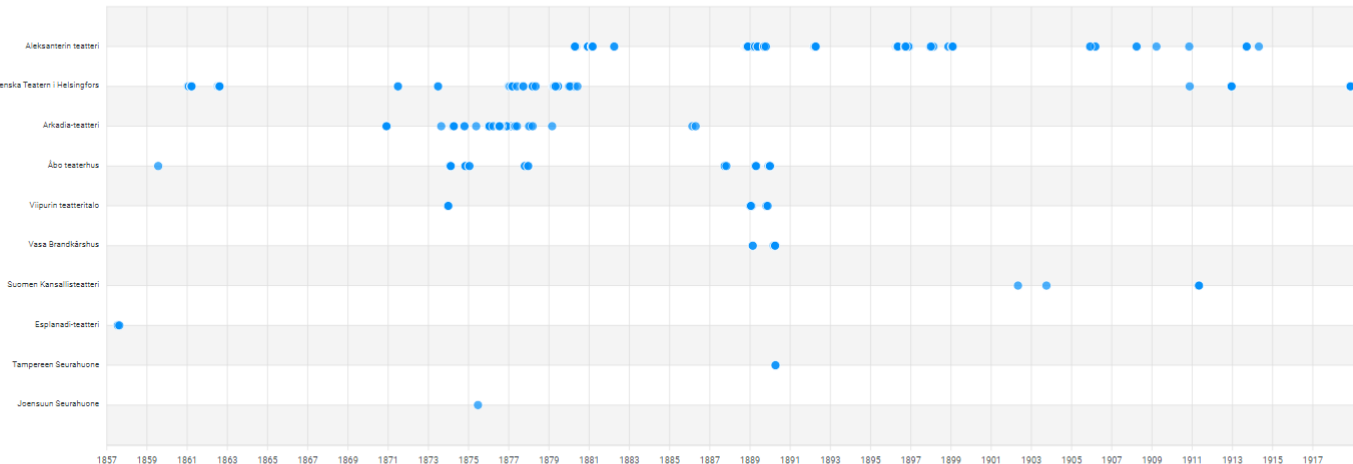
Ohjaaja

Kapellimestari

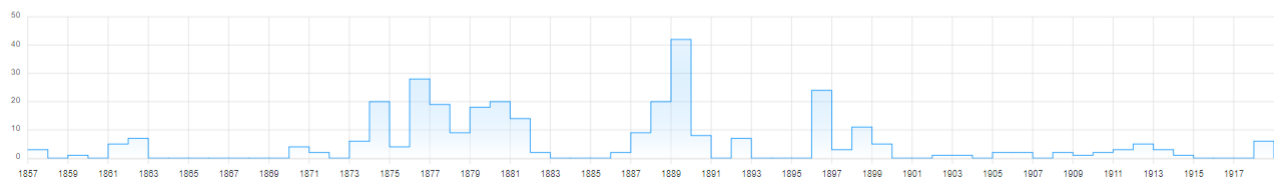
Kuoronjohtaja

Places of performance

Esitykset aikajanalla

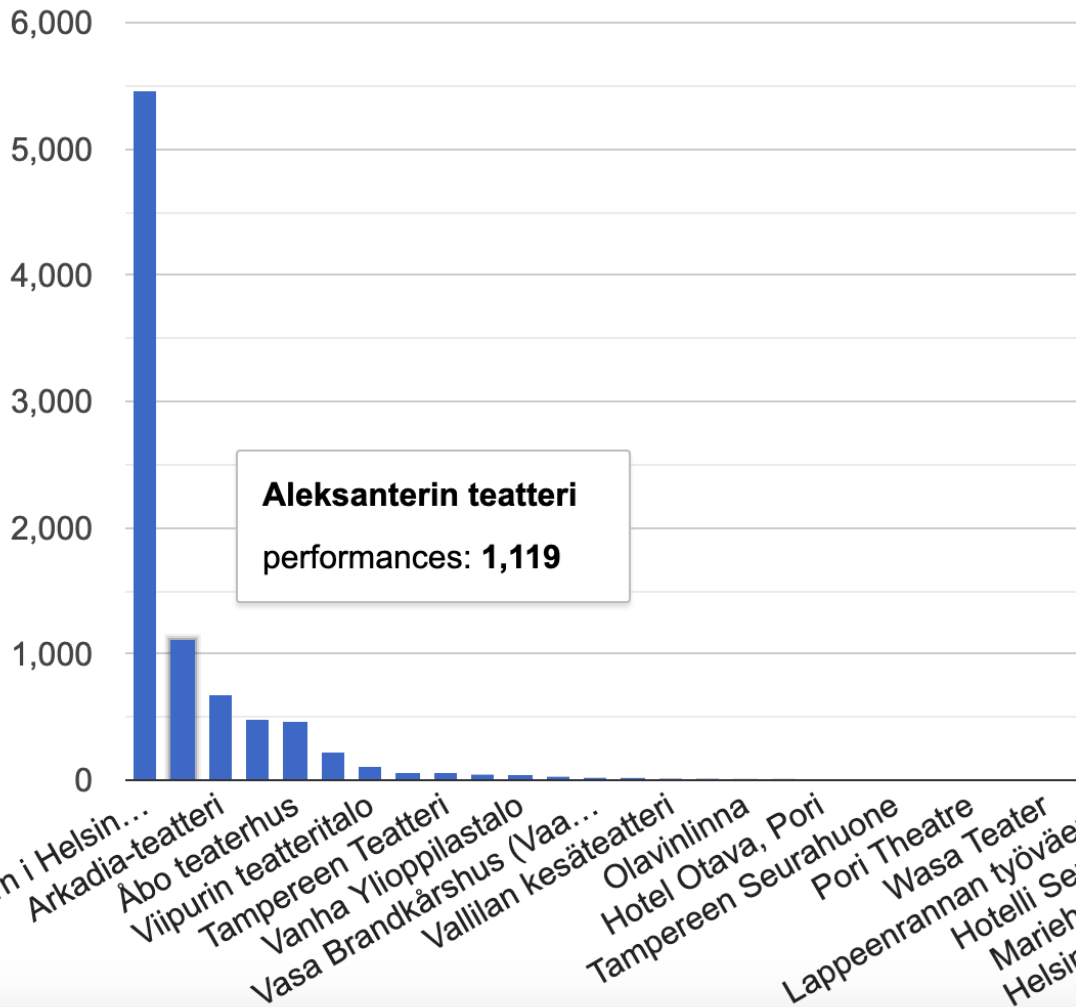


Esitykset vuosittain



Year

Using the LOD Service and SPARQL for Digital Humanities Research



Visualize the number of performances in different theaters using Yagui and the SPARQL endpoint

SPARQL Query Used

PREFIX skos: <http://www.w3.org/2004/02/skos/core#>

PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

PREFIX opera-s: <http://ldf.fi/schema/operasampo/>

```
SELECT ?theaterLabel (COUNT(DISTINCT ?performance) AS ?performances)
```

```
WHERE {
```

```
  ?performance a opera-s:Performance . # Valitaan kaikki esitykset
```

```
  ?performance opera-s:performedIn ?theater . # Teatterit joissa esitys on esitetty
```

```
  ?theater skos:prefLabel ?theaterLabel . # Teatterin nimike
```

```
}
```

```
GROUP BY ?theaterLabel
```

```
ORDER BY DESC(?performances)
```


More Information – Questions?

Project homepage: <https://seco.cs.aalto.fi/projects/oopperasampo>

Portal in use: <https://oopperasampo.fi>



Semantic Computing Research Group (SeCo)

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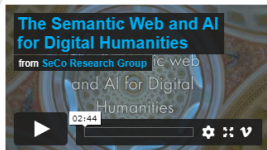
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Semantic Computing Research Group (SeCo) researches machine-processable semantics related to, e.g., the Semantic Web. We are located at the [Aalto University School of Science, Department of Computer Science](#) and [HELDIG – Helsinki Centre for Digital Humanities](#), University of Helsinki, Faculty of Arts. Our group consists of researchers both from the Aalto University, School of Science, Department of Computer Science and [University of Helsinki, Department of Computer Science](#), and HELDIG.

Our research is [focused](#) on semantic technologies, such as the Semantic Web and intelligent web services. In addition to research and [publications](#), we also create prototype applications that demonstrate the new possibilities of semantic technologies, such as [semantic portals for end users](#), [semantic infrastructural data and ontology services](#), and [ontologies and tools](#) for creating semantic applications.



Application Domains

Our work is highly cross-disciplinary, including application domains, such as Digital Humanities, Health, Learning, Government, Commerce, Geography, and Biology.

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[U.S. Congress Prosopographer](#)
Online since 2018. [Try it!](#)



[Norssi Alumni on the Semantic Web](#)
Online since 2017. [Try it!](#)



[Semantic Finlex - Finnish Law](#)



[WarSampo - Second World War](#)



[Hiola.fi - Finnish Ontology](#)



[Semantic National Biography](#)



[BirdWatch - Mobile Semantic](#)

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

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2.8.2021 8:53 by eashyone

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Eero Hyvönen: [How to Create a National Cross-domain Ontology and Linked Data Infrastructure and Use It on the Semantic Web](#)

Eero Hyvönen, Esko Ikkala, Mikko Koho, Jouni Tuominen, Toby Burrows, Lynn Ransom, and Hanno Wijsman: [Mapping Manuscript Migrations on the Semantic Web: A Semantic Portal and Linked Open Data Service for Premodern Manuscript Research](#)

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"Harmonizing and publishing heterogeneous research data into a Linked Open Data