

Pushing SKOS

ELAG 2018

06.06.2018, Prague

Felix Ostrowski, graphthinking GmbH

Adrian Pohl, hbz



Controlled Vocabularies (and other authority data)

- Central to library and other knowledge organization processes for a long time
- Commonly used across many different sources, implicitly linking resources about the same topic
- Come along in very different forms, from PDF documents and XML to Excel

ISCED fields of education:

0 General programmes

01 Basic programmes

Basic general programmes pre-primary, elementary, primary, secondary, etc.

08 Literacy and numeracy

Simple and functional literacy, numeracy.

09 Personal development

Enhancing personal skills, e.g. behavioural capacities, mental skills, personal organizational capacities, life orientation programmes.

1 Education

14 Teacher training and education science

Teacher training for pre-school, kindergarten, elementary school, vocational, practical, non-vocational subject, adult education, teacher trainers and for handicapped children. General and specialised teacher-training programmes.

Education science: curriculum development in non-vocational and vocational subjects. Educational assessment, testing and measurement, educational research, other education science.

2 Humanities and arts

21 Arts

Fine arts: drawing, painting, sculpture;

Performing arts: music, drama, dance, circus;

Graphic and audio-visual arts: photography, cinematography, music production, radio and television production, printing and publishing;

Design; craft skills.

22 Humanities

Religion and theology;

Foreign languages and cultures: living or 'dead' languages and their literature, area studies;

Native languages: current or vernacular language and its literature;

Other humanities: interpretation and translation, linguistics, comparative literature, history, archaeology, philosophy, ethics.

*So, where can I find those vocabularies?
How can I know what a certain term
means?*

Simple Knowledge Organization System

- A common vocabulary for describing vocabularies on the web
- Dereferencable and thus self-descriptive using HTTP-URIs
- Machine readable by using RDF, (ideally) human readable by using HTML

```
<A> rdf:type skos:Concept ;  
      skos:prefLabel "love"@en ;  
      skos:altLabel "adoration"@en ;  
      skos:broader <B> ;  
      skos:inScheme <S> .
```

```
<B> rdf:type skos:Concept ;  
      skos:prefLabel "emotion"@en ;  
      skos:altLabel "feeling"@en ;  
      skos:topConceptOf <S> .
```

```
<S> rdf:type skos:ConceptScheme ;  
      dct:title "My First Thesaurus" ;  
      skos:hasTopConcept <B> .
```

NWBib - Ergebnisliste x

Secure | <https://nwbib.de/search/nwbibsubject=http%3A%2F%2Fpurl.org%2Fflobid%2Fnwbib%23s550000>

NWBib Erweiterte Suche Themensuche Regionen Sachgebiete Ergänzende Suche















Merkliste

Die Nordrhein-Westfälische Bibliographie

Mehr als 400.000 Publikationen über NRW seit 1983


Sortierung: Relevanz **Neueste** Älteste Treffer pro Seite: 15 **25** 50 100

24 Treffer in Sachgebiete / Sachsystematik / 550000 Verkehr, zeige 1 bis 24:

| | | | | |
|---|---|--|------|---|
|   | Lebensadern aus Stahl, Asphalt und Wasser der Organismus Stadt lebt mit und von seinen Verkehrswegen | Wentz, Gustav; Wallhorn, Gerd; Walden, Carsten | 2016 | ☆ |
|   | Von der Auto-Stadt zu einer Stadt des Umweltverbunds zehn Leitlinien zur Verkehrswende in Wuppertal | Reutter, Oscar; Rudolph, Frederic; Koska, Thorsten | 2016 | ☆ |
|   | Verkehr des guten Lebens ein nachhaltiges Mobilitätskonzept für Köln Vollständige Fassung 1.0 | Ermert, Volker; Agora Köln | 2015 | ☆ |
|   | Verkehrsmittelwahl und Verkehrsverhalten in Oberhausen Ergebnisse einer Haushalts- und Personenbefragung im April 2014 | Marißen, Norbert; Oberhausen (Rheinland) | 2015 | ☆ |
|   | Verkehr des guten Lebens ein nachhaltiges Mobilitätskonzept für Köln | Ermert, Volker | 2015 | ☆ |
|   | Organisatorische Innovationen mit Good Governance in Logistik-Netzwerken zusammenfassender Schlussbericht für das Verbundprojekt OrGoLo | Zelewski, Stephan | 2014 | ☆ |
|   | Köln mobil 2025 | Köln | 2014 | ☆ |

Ergebnisse eingrenzen:

▼ Erscheinungsjahr



Lade Erscheinungsjahre...

▼ Raumbezug

Die Nordrhein-Westfälische Bibliographie

```
https://raw.githubusercontent.com/hbz/lobid-vocabs/master/nwbib/nwbib.ttl#s550000
Secure | https://raw.githubusercontent.com/hbz/lobid-vocabs/master/nwbib/nwbib.ttl#s550000

@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix vann: <http://purl.org/vocab/vann/> .

<http://purl.org/lobid/nwbib>
  a skos:ConceptScheme ;
  vann:preferredNamespacePrefix "nwbib" ;
  dct:title "Sachsystematik der Nordrhein-Westfälischen Bibliographie"@de , "Classification scheme of the North Rhine-Westphalian bibliography"@en ;
  dct:license <http://creativecommons.org/publicdomain/zero/1.0/> ;
  dct:description "This classification was created for use in the North Rhine-Westphalian bibliography. The initial transformation to SKOS was carried out
by Felix Ostrowski for the hbz." ;
  dct:issued "2014-01-28" ;
  dct:modified "2017-10-09" ;
  dct:publisher <http://lobid.org/organisation/DE-605> ;
  vann:preferredNamespaceUri "http://purl.org/lobid/nwbib#" ;
  skos:hasTopConcept <http://purl.org/lobid/nwbib#s1>, <http://purl.org/lobid/nwbib#s2>, <http://purl.org/lobid/nwbib#s4>, <http://purl.org/lobid/nwbib#s5>,
<http://purl.org/lobid/nwbib#s6>, <http://purl.org/lobid/nwbib#s7>, <http://purl.org/lobid/nwbib#s8> .

<http://purl.org/lobid/nwbib#s1>
  a skos:Concept ;
  skos:inScheme <http://purl.org/lobid/nwbib> ;
  skos:narrower <http://purl.org/lobid/nwbib#s100000>, <http://purl.org/lobid/nwbib#s120000>, <http://purl.org/lobid/nwbib#s140000>,
<http://purl.org/lobid/nwbib#s160000>;
  skos:notation "1" ;
  skos:prefLabel "Landeskunde (allgemein. Geo-u. Biowissenschaften)"@de .

<http://purl.org/lobid/nwbib#s2>
  a skos:Concept ;
  skos:inScheme <http://purl.org/lobid/nwbib> ;
  skos:narrower <http://purl.org/lobid/nwbib#s200000>, <http://purl.org/lobid/nwbib#s210000>, <http://purl.org/lobid/nwbib#s220000>,
<http://purl.org/lobid/nwbib#s240000>, <http://purl.org/lobid/nwbib#s260000>;
  skos:notation "2" ;
  skos:prefLabel "Landeskunde (historisch)"@de .

<http://purl.org/lobid/nwbib#s4>
  a skos:Concept ;
  skos:inScheme <http://purl.org/lobid/nwbib> ;
  skos:narrower <http://purl.org/lobid/nwbib#s400000>, <http://purl.org/lobid/nwbib#s420000>, <http://purl.org/lobid/nwbib#s440000> ;
  skos:notation "4" ;
  skos:prefLabel "Staat. Politik. Verwaltung. Recht"@de .

<http://purl.org/lobid/nwbib#s5>
  a skos:Concept ;
  skos:inScheme <http://purl.org/lobid/nwbib> ;
  skos:narrower <http://purl.org/lobid/nwbib#s500000>, <http://purl.org/lobid/nwbib#s520000>, <http://purl.org/lobid/nwbib#s530000>,
<http://purl.org/lobid/nwbib#s540000>, <http://purl.org/lobid/nwbib#s550000>, <http://purl.org/lobid/nwbib#s560000>, <http://purl.org/lobid/nwbib#s570000>
```

<http://purl.org/lobid/nwbib#s550000>



Sachsystematik der x

pyvoc.localhost/purl.org/lobid/nwbib#s550000

Sachsystematik der Nordrhein-Westfälischen Bibliographie / Bevölkerung, Soziales, Wirtschaft, Raumordnung, Umweltschutz / Verkehr

Verkehr

<http://purl.org/lobid/nwbib#s550000>

| | |
|----------|--------|
| Notation | 550000 |
|----------|--------|

Narrower

- Straßenverkehr
- Verkehr - Allgemeines
- Verkehrsrecht
- Schifffahrt
 - Häfen
 - Kanäle
 - Schifffahrtsgeschichte
- Verkehrsgeschichte
- Öffentlicher Personennahverkehr
- Luftverkehr
- Eisenbahn
 - Eisenbahngeschichte
- Post- und Fernmeldewesen
 - Fernmeldewesen, Telekommunikation
 - Postgeschichte

```
public/purl.org/lobid$ ls
nwbib.de.html  nwbib.json  nwbib.ttl
```

First ingredient: static site generator to publish SKOS as HTML...

The screenshot shows a web browser displaying a JSON-LD document. The document is a JSON object with the following structure:

```

{
  "notation": "00",
  "topConceptOf": {
    "@id": "https://w3id.org/class/esc/scheme"
  },
  "@id": "https://w3id.org/class/esc/n00",
  "narrower": [
    {
      "@id": "https://w3id.org/class/esc/n003"
    },
    {
      "@id": "https://w3id.org/class/esc/n001"
    },
    {
      "@id": "https://w3id.org/class/esc/n002"
    }
  ],
  "scopeNote": {
    "@value": "General education programmes and qualifications which cover a broad range of subjects with little or no specialisation in a particular field or fields will typically be classified within the broad field 00 'Generic programmes and qualifications'",
    "@language": "en"
  },
  "@context": {
    "publisher": {
      "@id": "http://publications.w3id.org/terms/publisher"
    },
    "@vocab": "http://www.w3id.org/terms/esc",
    "description": {
      "@id": "http://publications.w3id.org/terms/description"
    },
    "license": {
      "@id": "http://publications.w3id.org/terms/license"
    },
    "title": {
      "@id": "http://publications.w3id.org/terms/title"
    },
    "issued": {
      "@id": "http://publications.w3id.org/terms/issued"
    }
  }
}

```

Overlaid on the bottom right is a terminal window showing the output of a command:

```

public/w3id.org/isced/1997$ ls
level0.de.html  level1.ttl      level3.json     level5.en.html  scheme.de.html
level0.en.html  level2.de.html  level3.ttl     level5.json     scheme.en.html
level0.json     level2.en.html  level4.de.html  level5.ttl     scheme.json
level0.ttl     level2.json     level4.en.html  level6.de.html  scheme.ttl
level1.de.html  level2.ttl     level4.json     level6.en.html
level1.en.html  level3.de.html  level4.ttl     level6.json
level1.json     level3.en.html  level5.de.html  level6.ttl

```

... and [JSON-LD](#) (and [Turtle](#))

Why a static site generator?

- SKOS is usually read much more often than written
- Apache can do all the Linked-Data-Yada-Yada
- DB-based solutions are already out there

*But is it really all that useful to only know
what a topic means and not which
resources about that topic are out there?*

If you take away only one thing:

To drive **OER adoption**,
communities of practice are key.

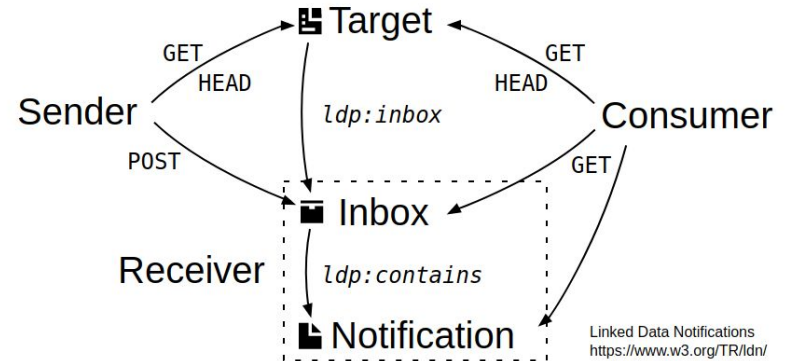
Topic-oriented technology can
help foster them.

[TOOLS - Topic-Oriented Open Learning platforms, Pim Bellinga & Paul Gobée at OE Global 2018, Delft](#)

Linked Data Notifications

- Simple protocol to publish notifications on the Web
- No further specification of the payload
- Pull approach for retrieval of notifications from an inbox

<https://www.w3.org/TR/ldn/>



Overview of Linked Data Notifications

Generic programmes and qualifications

https://w3id.org/class/esc/n00

Notation 00

Narrower

- Literacy and numeracy
- Basic programmes and qualifications
- Personal skills and development

Inbox

```
{
```

```
<https://w3id.org/class/esc/n00> ldn:inbox <http://localhost:3000/inbox?target=https://w3id.org/class/esc/n00>
```

```
  "@id": "https://w3id.org/class/esc/n00",
  "@type": "Concept",
  "name": [
    {
      "@value": "Allgemeine Programme und Qualifikationen",
      "@language": "de"
    },
    {
      "@value": "Generic programmes and qualifications",
      "@language": "en"
    }
  ],
  "narrower": [
    {
      "name": [
        {
```



Second ingredient: provide an inbox for each topic ...

Maybe we should h x
localhost:8000

Enter a schema URL Submit

A great course about n00!

Creator

@type

@id

Name

Description

Logo

Url

License

EducationalCredentialAwarded

DatePublished

About

Allgemeine Programme und Qualifikationen x

TimeRequired

```

{
  "@type": "Course",
  "name": "A great course about n00!",
  "about": [
    {
      "@id": "https://w3id.org/class/esc/n00",
      "@type": "Concept",
      "name": [
        {
          "@value": "Allgemeine Programme und
          Qualifikationen",
          "@language": "de"
        },
        {
          "@value": "Generic programmes and
          qualifications",
          "@language": "en"
        }
      ],
      "narrower": [
        {
          "name": [
            {
              "@value": "Grundlegende Programme und
              Qualifikationen",
              "@language": "de"
            },
            {
              "@value": "Basic programmes and
              qualifications",
              "@language": "en"
            }
          ],
          "notation": [
            "001",
            "0011"
          ],
          "@id": "https://w3id.org/class/esc/n001",
          "broader": {
            "@id": "https://w3id.org/class/esc/n00"
          },
          "scopeNote": [
            {
              "@value": "Generic programmes which cover a
              range of subjects, such as languages and literature, social
              and natural sciences, mathematics, arts and/or physical
              education, should be classified in 0011 \\u2018Basic
              programmes and qualifications\\u2019. This should be the
              case even if there is some concentration on a certain
              category of subject matter, such as humanities, social
              sciences, natural sciences, etc., which can occur.",
            }
          ]
        }
      ]
    }
  ]
}

```

2000 ms 4000 ms 6000 ms 8000 ms 10000 ms 12000 ms 14000 ms 16000 ms 18000 ms 20000 ms 22000 ms

inbox

Hide data URLs XHR JS CSS Img Media Font Doc WS Manifest Other

Name

inbox?target=https://w3id.org/class/esc/n00

inbox?target=https://w3id.org/class/esc/n00

Headers Preview Response Timing

General

Request URL: http://localhost:3000/inbox?target=https://w3id.org/class/esc/n00

Request Method: POST

Status Code: 200 OK

Remote Address: [::1]:3000

Referrer Policy: no-referrer-when-downgrade

Response Headers

Access-Control-Allow-Headers: Origin, X-Requested-With, Content-Type, Accept

Access-Control-Allow-Origin: *

Connection: keep-alive

Content-Length: 1731

Content-Type: application/json; charset=utf-8

Date: Tue, 05 Jun 2018 19:56:33 GMT

Etag: W/"6c3-1KCDvvgEckS7Crk7kuw00kIC4"

X-Powered-By: Express

Request Headers

Accept: */*

Accept-Encoding: gzip, deflate, br

Accept-Language: de

Connection: keep-alive

Content-Length: 1731

Content-Type: application/json

Host: localhost:3000

Origin: http://localhost:8000

Referer: http://localhost:8000/

User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/65.0.3325.162 Safari/537.36

Query String Parameters

target: https://w3id.org/class/esc/n00

Request Payload

{@type: "Course", name: "A great course about n00!...", @type: "Course", @about: [{"@id": "https://w3id.org/class/esc/n00", @type: "Concept",...}], name: "A great course about n00!"}

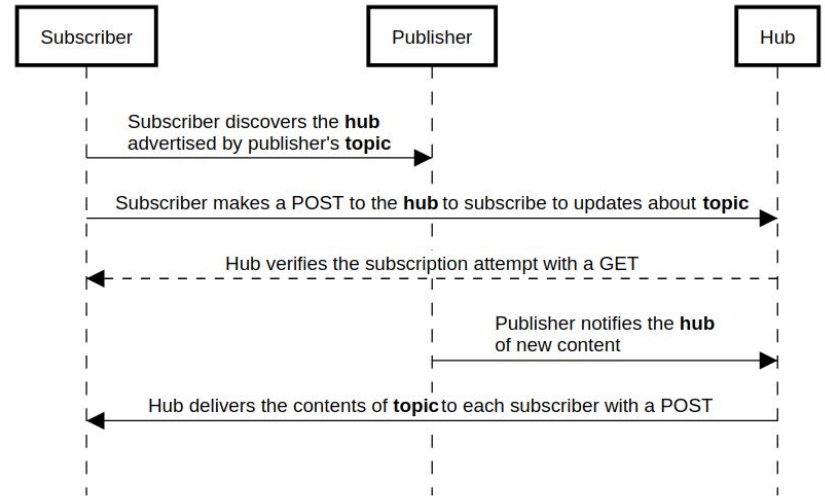
... and send updates to that inbox!

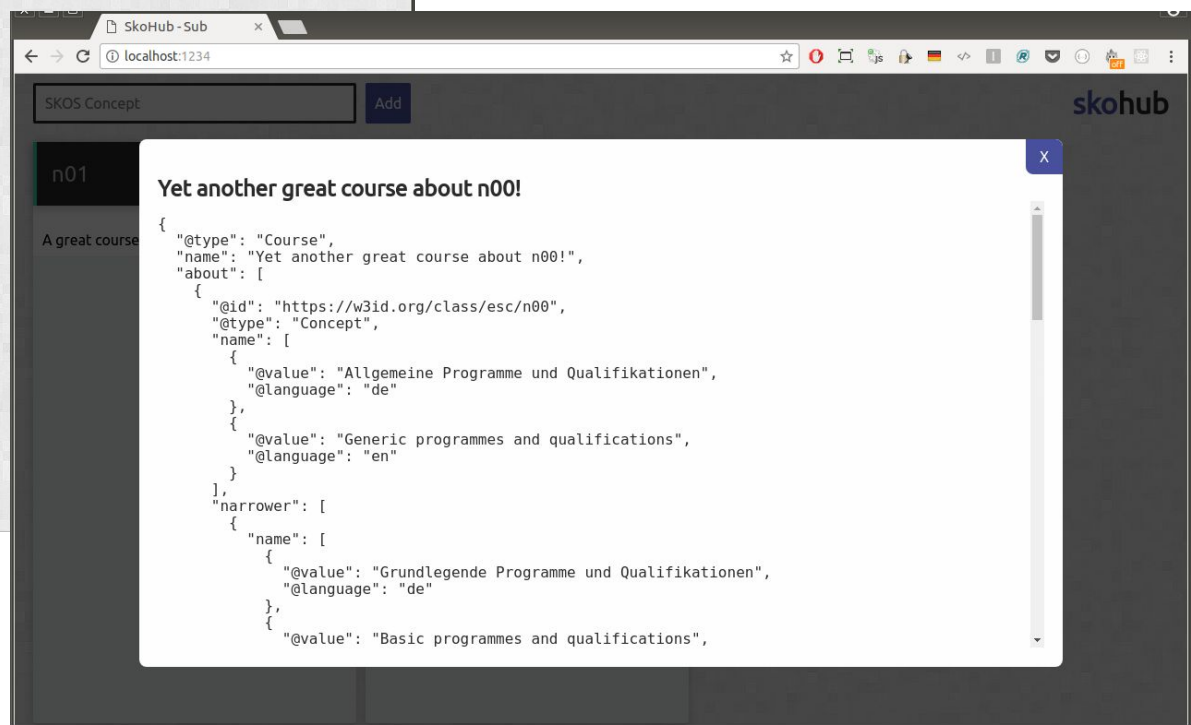
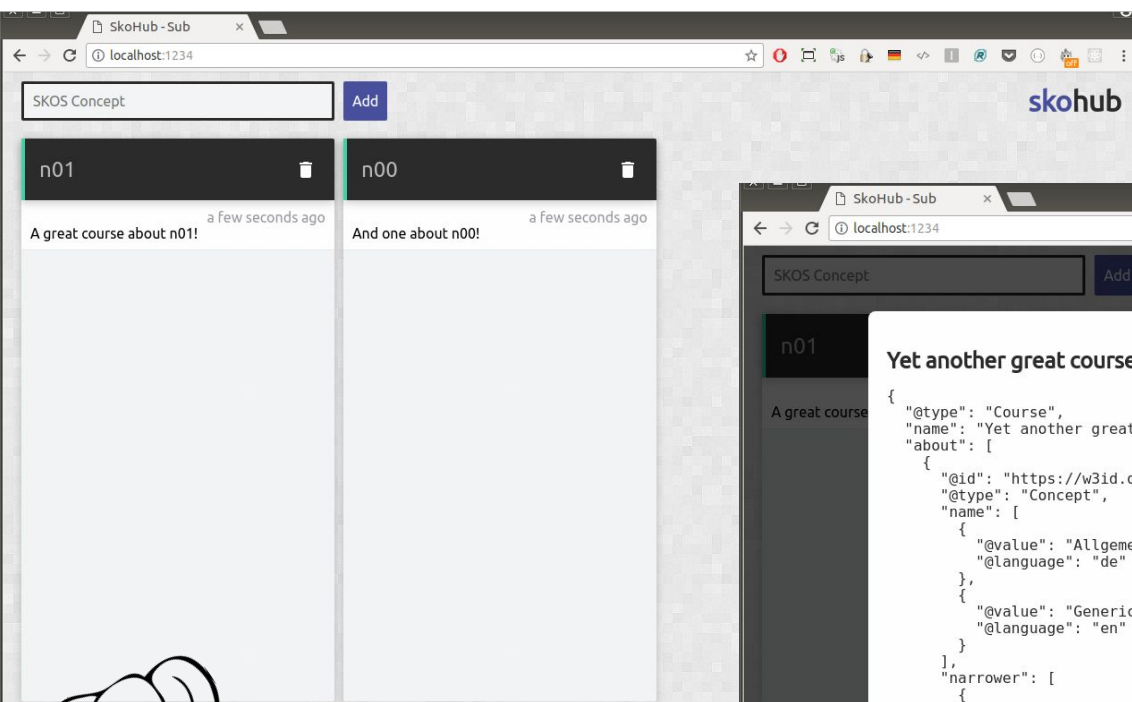
How often should a consumer check for new notifications? How long should notifications be saved?

WebSub

- A simple protocol to communicate arbitrary content from a publisher to a subscriber
- No further specification of the publishing mechanism
- Push approach for retrieval of content

<https://www.w3.org/TR/websub/>



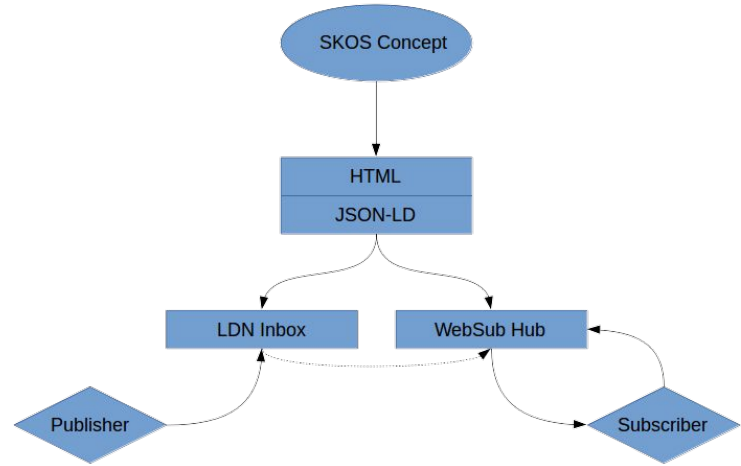


Final ingredient: provide the means to subscribe for update about topics

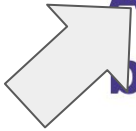
skohub (simple knowledge organization hub)

internal prototype

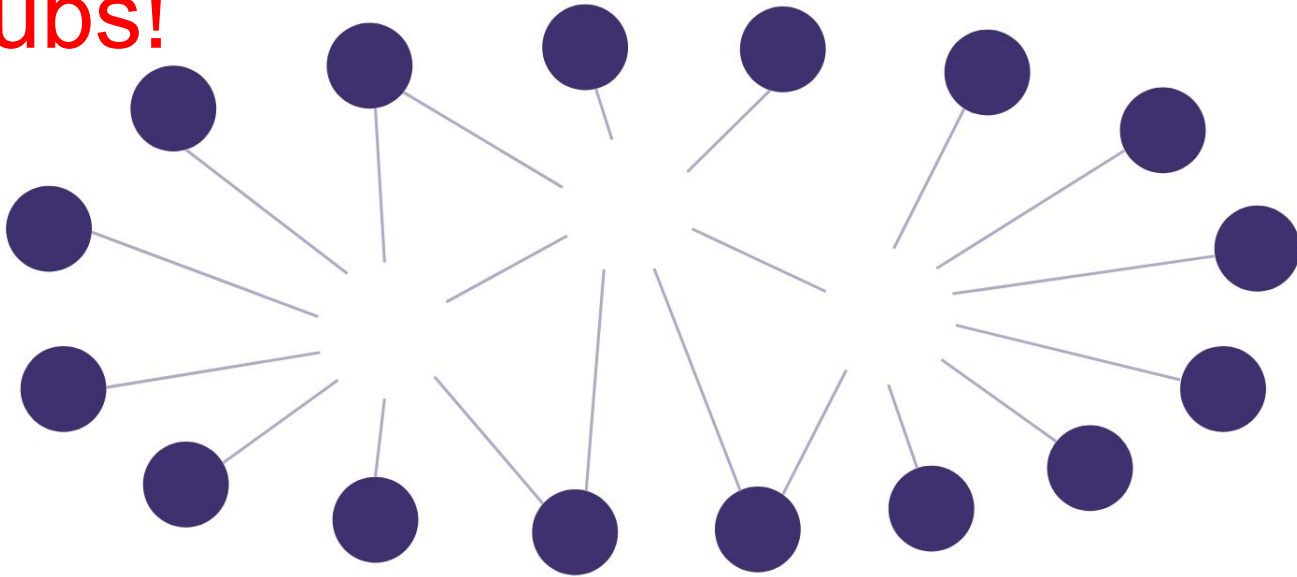
- [Publication](#) of [SKOS vocabularies](#) as static [JSON-LD](#) and [HTML](#)
- Provision of an [inbox](#) for retrieval of [metadata](#)
- Forwarding of incoming data to the corresponding [subscriber](#)



Aggregators serve as a crucial
but transparent layer in the network.



And hubs!



[One flew over the cuckoo's nest, Ruben Verborgh at Europeana Tech 2018, CC-BY](#)

The *Paradox of Freedom*: you can only be free if you follow rules.

Decentralization means making our own choices.

**Unless we agree on some basic things,
no one will see the result of our choices.**

Agreement can be layered:

100% agrees on a small set (*labeling, authorship, ...*)

80% agrees on a larger set (*places, dimensions*)

5% agrees on many smaller sets (*sizes, colors, ...*)

[One flew over the cuckoo's nest, Ruben Verborgh at Europeana Tech 2018, CC-BY](#)

Minimum viable record?

[Every Collection is a Snowflake, George Oates at SWIB17](#)

Many open questions...

- What about authorization?
- What about [spam](#)?
- What about [advanced querying](#)?

- And all of yours of course!

[@acka47](#) and [@literarymachine](#) are
happy to continue the discussion!