

## **Linked Data Publishing and Ontology in Korea Libraries**

### *Poster*

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**Keywords:** Linked Open Data; DCTERMS; Dublin Core; metadata vocabularies; ontology; class; property; BIBO; FOAF; SKOS; BIBFRAME

### **Abstract**

This poster was to analyze three linked open data (LOD) services in Korea in an aspect of ontology, and to suggest three LOD to transform their local ontology to BIBFRAME as a measure for interoperability of LOD. For this study, literature review and case studies were conducted. For case studies, KERIS, NLK, and KISTI were selected, which are the major organizations publishing LOD. They have been publishing LOD from bibliographic records and authority data with linking the external LOD such as VIAF, LDS, BNB, ISNI, WorldCat, and so on. We analyzed the characteristics of three LOD according to the following categories: (1) subject domain, (2) volumes of bibliographic, authority, and subject data, (3) ontology, (4) local ontology, and (5) linking external LODs. In particular, in the aspect of ontology, FOAF, SKOS, DC, and BIBO were used in common, and however, MODS, DCTERMS, BIBFRAME, PRISM, and Bibtex were also used in three LOD. Also, three LOD devised their own ontology – properties and classes – due to lack of classes and properties in describing LOD. These local properties and classes were different with inconsistency that would bring out conflicts in data sharing. In an aspect of requirements for metadata, interoperability is very important. Therefore, this study suggested transforming the local ontology of three LOD to BIBFRAME for interoperability and crosswalking.

### **LOD publishing in Korea**

Linked open data (LOD) has been mandatory to construct the semantic web library. In Korea, 10 organizations in a public sector have started their LOD services since 2013. Among them, three organizations provided library-centric LOD, which are KERIS (Korea Education and Research Information Service), NLK (National Library of Korea) and KISTI (Korea Institute of Science and Technology Information).

KERIS has been publishing KERIS LOD (<http://data.riss.kr/serviceHome.do>) of bibliographic records in late 2013. It has used the properties and the classes from DC, BIBO, MODS, FOAF, SKOS, and KERIS devised local ontology. OCLC WorldCat, LCSH, BNB, GeoNames, DBpedia, Flickr are most consumed for linking vocabularies of external LOD by KERIS. KERIS has been publishing 1,981,255 bibliographic data, and 8,143 name authority data as shown in Table 1.

NLK has been publishing NLK LOD (<https://lod.nl.go.kr>) of bibliographic records, Name authority data, and Subject headings in early 2014 with linking external LOD. It has used properties and classes from lots of ontology such as DC, DCTERMS, BIBO, BIBFRAME, FOAF, SKOS, and NLK defined local ontology. Name authority data were converted to LOD using FOAF, and National Library of Subject Headings (NLSH) were transformed to LOD according to SKOS. ISNI, LDS, and VIAF have been consumed for linking vocabularies of external LOD by NLK. NLK has been publishing 19,775,931 bibliographic data, 346,888 authority data, and 542,661 subject headings as shown in Table 1.

KISTI has been publishing KISTI LOD (<http://lod.ndsl.kr>) of bibliographic records for scientific academic information in late 2013. It has used properties and classes from PRISM, DC, Bibtex, FOAF and KISTI devised local ontology. DBpedia, Open Library, Sudoc, and BibBase are most

consumed for linking vocabularies of external LODs by KISTI. KISTI has been publishing 1,794,088 bibliographic data focusing on article and 467,574 agent data as shown in Table 1.

TABLE 1: Comparison of 3 LOD services

	KERIS	NLK	KISTI
URI	http://data.riss.kr/serviceHome.do	http://lod.nl.go.kr	http://lod.ndsl.kr
Domain	General	General	Scientific academic information
Volume of Bibliographic data	1,981,255	19,775,931	1,794,088
Volume of Authority data	8,143	346,888	467,574
Volume of Subject	-	542,661	-
Ontology for Bibliographic Data	DC, BIBO MODS	DC, DCTERMS, BIBO BIBFRAME	DC PRISM, Bibtex
Ontology for Agent	FOAF	FOAF	FOAF
Ontology for Subject	SKOS	SKOS	
Local ontology	Keris properties	nlon properties	ndsl properties and classes
Interlinking External LOD	OCLC WorldCat, LCSH, BNB, GeoNames, DBpedia, Flickr	VIAF, LC LDS, ISNI	DBpedia, Open Library, Sudoc, BibBase
Starting Year	late 2013	early 2014	late 2013
This table was based on NIA(2014)			

## Ontology

When analyzing ontology used in three LOD, each organization used ontology differently. FOAF for agent (person and organization), and SKOS for subject were used respectively. However, ontology for bibliographic data was various such as DC, BIBO, MODS, DCTERMS, BIBFRAME, PRISM, and Bibtex. KERIS used MODS as well as DC and BIBO, NLK selected BIBFRAME with DC, DCTERMS and BIBO, and KISTI used DC, PRISM, and Bibtex. In particular, NLK adopted BIBFRAME ontology in need of specific properties in transforming bibliographic data to LOD.

In addition to above universal ontology, three LOD developed their own ontology for specific properties and classes because of lacks of classes and properties of standard ontology. KERIS designed its properties for holding information such as keris:institution, keris:library, keris:university, and keris:author as shown in Figure 1. NLK has its properties for local data such as nlon:audienceNote, nlon:supplementNote, nlon:localHolding, nlon:awardsNote and so on as shown in Figure 2. KISTI invented its classes such as ndsl:Article and ndsl:Journal, and its properties such as ndsl:keyword, ndsl:conferenceVenue, and ndsl:yearOfAffiliation as shown in Figure 3.

Three LOD have no choice but to develop their own ontology to transform and publish their legacy data to LOD. However, these local properties and classes would lead to some problems in LOD sharing.

## Suggestion for LOD in Korea

These local properties and classes were different with inconsistency that would bring out conflicts in data sharing. In the requirement for metadata, interoperability is very important. Locally developed properties and classes would make data sharing to be difficult because of imperfect crosswalking and mapping.

Among ontological modeling, BIBFRAME is more applicable for library because BIBFRAME reflected FRBR model and accommodated MARC field and subfield to replace MARC. Therefore, for LOD interoperability and crosswalking, this study suggested transforming locally devised



Data Model - 논문

Data Model - Article

@prefix bibo: <http://purl.org/ontology/bibo/>  
 @prefix dct: <http://purl.org/dc/terms/>  
 @prefix foaf: <http://xmlns.com/foaf/0.1/>  
 @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>  
 @prefix ndsl: <http://lod.ndsl.kr/ontology/>

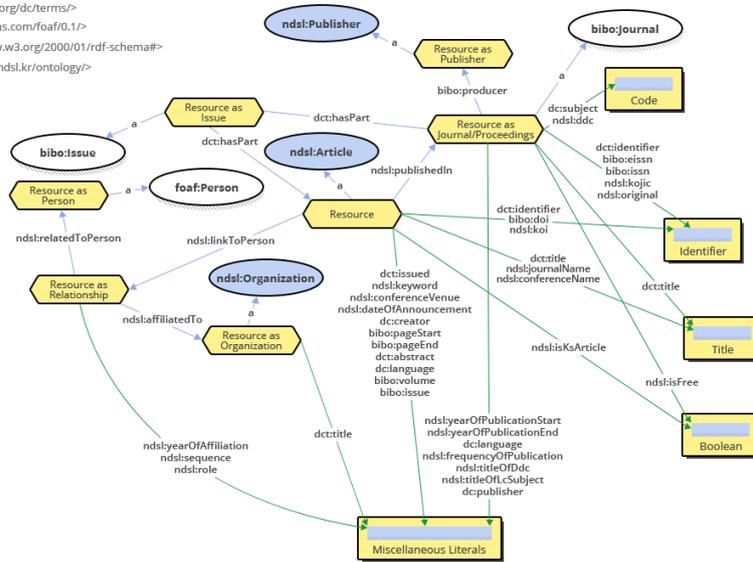


FIG. 3. NDSL ontology (Article resource)  
 Source: KISTI Home Page

### Acknowledgements

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2017S1A5A8018778)

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