Open and Linkable Knowledge about Management of Health Information Systems

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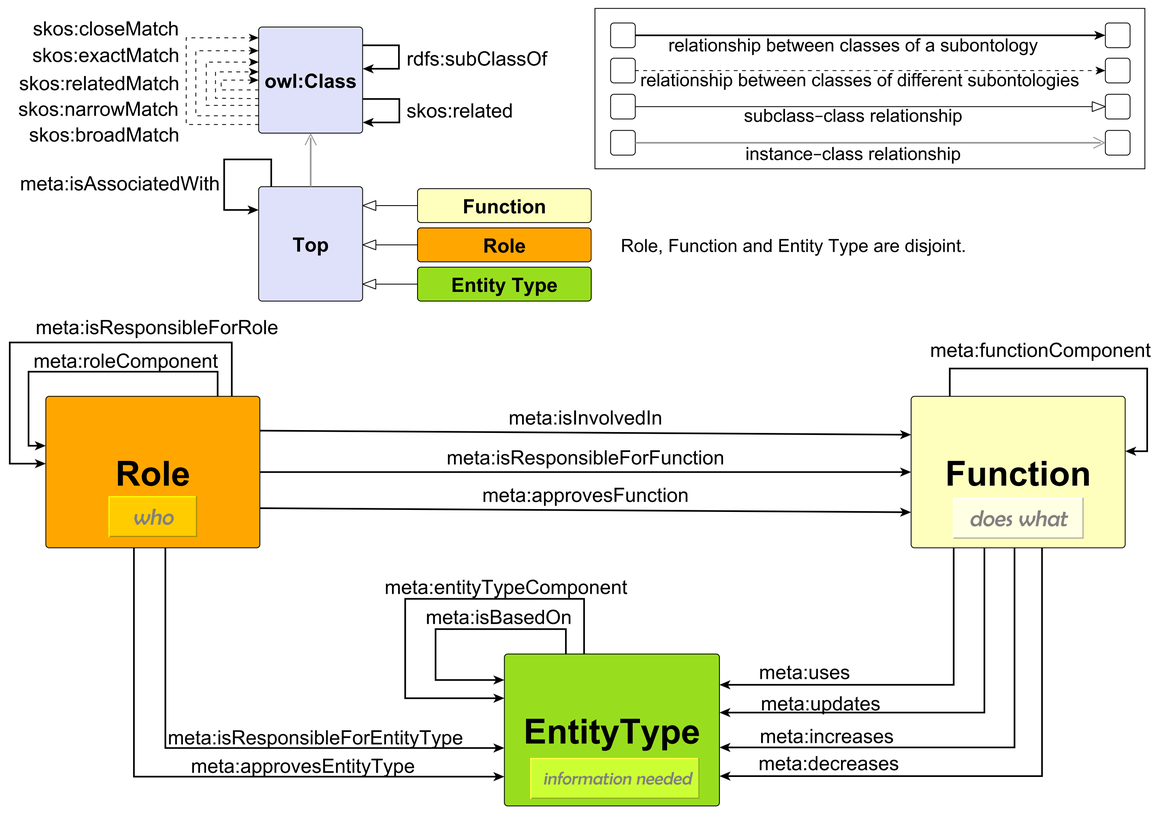
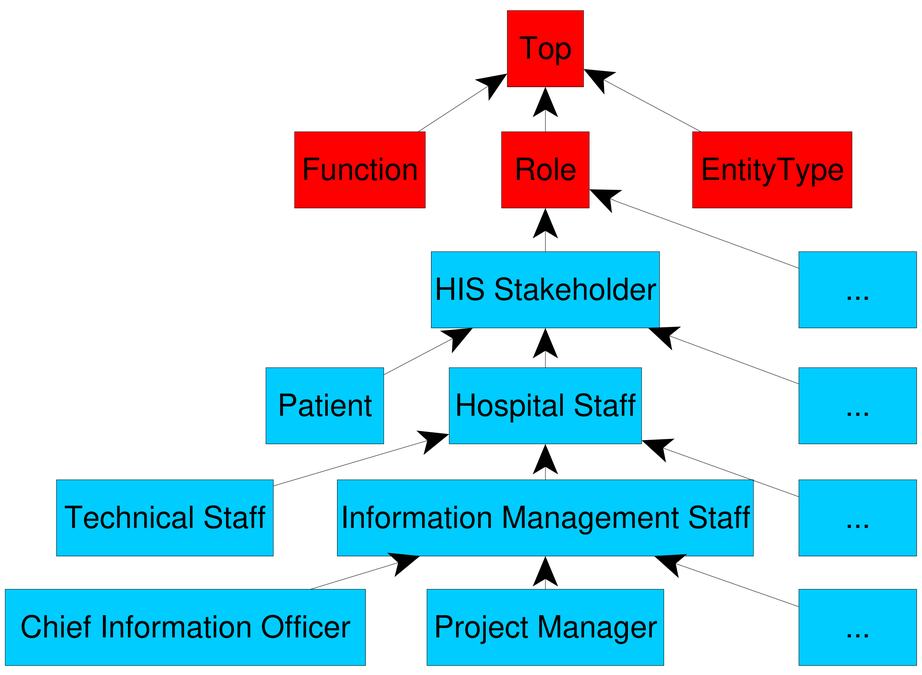
Background

The Semantic Network of Information Management in Hospitals (SNIK) is an OWL 2 DL ontology with a modular architecture: The meta model provides a common vocabulary for the domain of hospital information system (HIS) management. It defines three basic disjunctive classes: Role (who), Function (does what) and Entity Type (which information is read and written).



Methods

Semantic Web technologies principles are used to create, store and publish SNIK as Linked Open Data [3]. Subontologies are manually extracted from different sources and build upon the meta model by attaching their subclass hierarchies to the Function, Role and EntityType classes.



Ontology	Prefix	Source
http://www.snik.eu/ontology/meta	meta	All Sources
http://www.snik.eu/ontology/bb	bb	Textbook [5]
http://www.snik.eu/ontology/ob	ob	Textbook [1]
http://www.snik.eu/ontology/he	he	Textbook [2]
http://www.snik.eu/ontology/ciox	ciox	CIO Interview
http://www.snik.eu/ontology/it4it	it4it	Standard [4]

References

[1] E. Ammenwerth, R. Haux, P. Knaup-Gregori, and A. Winter. *IT-Projektmanagement im Gesundheitswesen*. Schattauer, 2014.

[2] L. J. Heinrich, R. Riedl, and D. Stelzer. *Informationsmanagement: Grundlagen, Aufgaben, Methoden*. De Gruyter, 2014.

[3] K. Höffner, F. Jahn, C. Kücherer, B. Paech, B. Schneider, M. Schöbel, S. Stäubert, and A. Winter. Technical Environment for Developing the SNIK Ontology of Information Management in Hospitals. *Studies in Health Technology and Informatics*, 243:122–126, 2017.

[4] The Open Group. IT4IT™ reference architecture, version 2.1. *The Open Group*, 2017.

[5] A. Winter, R. Haux, E. Ammenwerth, B. Brigl, N. Hellrung, and F. Jahn. *Health Information Systems: Architectures and Strategies*. Health Informatics. Springer London, 2011.

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Results

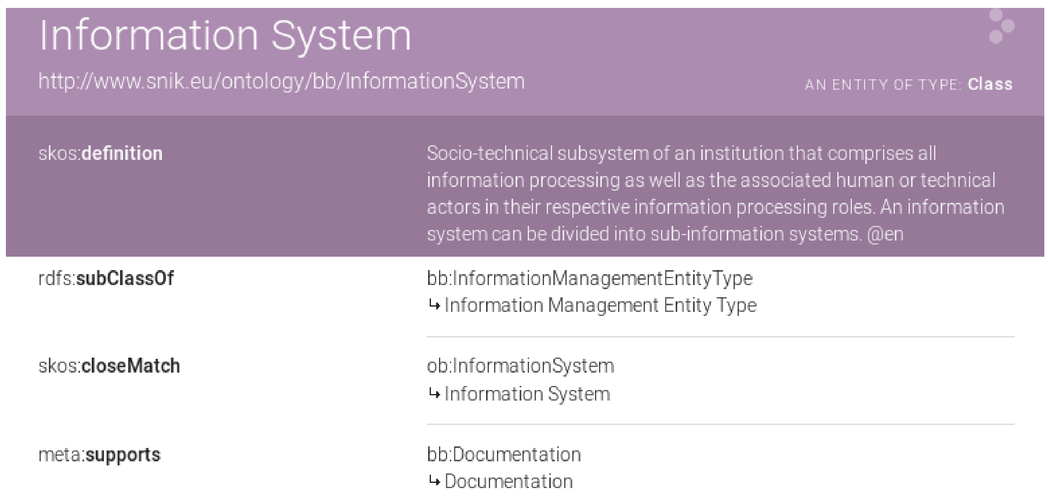
SNIK v0.8 contains 4729 classes, 329 properties, 713 interlinks and 112 747 triples. To achieve our aim of making SNIK available as Linked Open Data over several different interfaces, we publish SNIK under the CC BY-NC-SA 4.0 as:

RDF Dump `http://www.snik.eu/download/snik-0.8.zip`

The *RDF dump* contains all triples of SNIK in Turtle syntax, such as:

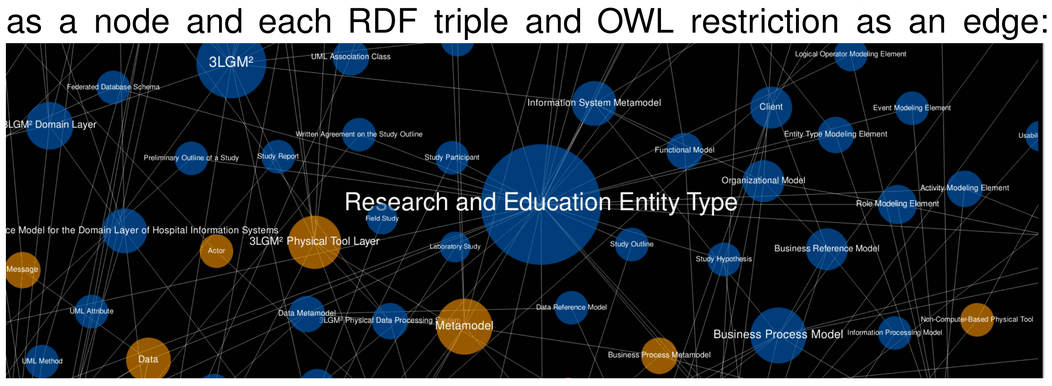
```
bb:InformationSystem
        rdfs:label "Information System"@en;
        rdfs:subClassOf
            bb:InformationManagementEntityType;
    skos:closeMatch ob:InformationSystem;
    meta:supports bb:Documentation.
```

LodLive RDF Browser `http://www.snik.eu/ontology`



SNIK Graph `http://www.snik.eu/graph`

SNIK Graph visualizes the structure of SNIK by modelling each class as a node and each RDF triple and OWL restriction as an edge:



SPARQL Endpoint `http://www.snik.eu/sparql`

The SPARQL endpoint is the most expressive interface to SNIK but requires knowledge of both the SPARQL syntax and the SNIK meta model. It can be used both as an API and directly. Examples:

Which healthcare network components are not healthcare institutions?

SELECT ?x {**bb**:HealthCareNetwork **meta**:entityTypeComponent ?x.
MINUS {?x **rdfs**:subClassOf∗ **bb**:HealthCareInstitution.}}

How many functions is the CIO responsible for?

SELECT COUNT(?f) {**bb**:ChiefInformationOfficer
meta:isResponsibleForFunction ?f.}

Discussion

SNIK is published using open standards over interfaces with different compromises between expressivity and accessibility for different audiences. Future work includes a dedicated ontology modelling tool.

Goal	Audience	Interfaces
Teaching	Teachers and Students	SNIK Graph, LodLive
Integration	Hospital Management	SPARQL Endpoint, RDF Dump
Modelling	Experts, Ontologists	SPARQL Endpoint, RDF Dump

SNIK imise. DFG Deutsche Forschungsgemeinschaft German Research Foundation