Publishing data of bicycle sharing operators as Linked Data [work in progress]

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Abstract – **There are different ways to publish mobility related data causing these datasets to be non-interoperable. A unified data model that fosters creation of reusable identifiers for mobility infrastructure components, is required to increase data interoperability. Following the principles of Linked Data, a proposal for an extensible RDF vocabulary that captures the straightforward object properties of bicycle sharing data is designed. The vocabulary is focusing on the bicycle sharing use case so data of Flemish bicycle sharing operators can be republished as Linked Data. The OSLO mobiliteit: trips & aanbod ontology of the Flemish government is a candidate to expand with properties defined in the GBFS specification to satisfy the needs of operators like Blue Bike and Velo. Mobility operators can republish their data in our developed vocabulary, but some of them can't invest a lot of time and money in republishing their data in a provided data model. Therefore, an intermediate party is needed to republish their data as Linked Data. During following phases of research, the RDF data model is ready to be expanded to future mobility operators and become a single, all-encompassing and interoperable data model for mobility related data.**

Keywords – **RDF, Linked Open Data, OSLO**

I. INTRODUCTION

Authorities in Flanders offer more than thousand services to serve businesses and citizen. These services have to work together and exchange information in order to add value to the society in an efficient manner [1]. Because of the different information systems that are used, a lot of time and money flows to remodeling and transforming data over and over again. By semantically aligning information between the different information systems of each service, the data exchange can be automated and therefore reduce costs [2]. The Open Standards for Linked Organizations program (OSLO)[1] is the strategy of the Flemish government to bring this interoperability following the principles Linked Data. Firstly OSLO defines standard models so data of multiple different domains can be published in a uniform way. Secondly OSLO offers services to get new and existing data into the OSLO program. An important aspect of this interoperability is the introduction of reusable identifiers (IDs). A reusable ID protects the identified object against inconsistent modifications of its properties and an unambiguously interpretation of the object.

In this thesis we are searching for a generic solution to get data of shared mobility into the OSLO program. This is done by taking data of Flemish bicycle sharing operators into account to get a quick first proposal for a standard model. In terms of shared mobility, OSLO has not yet come up with a well defined standard to solve the lag of interoperability in this domain. OSLO mobiliteit: trips & aanbod[2] is the standard for travelers and the mobility operators available for traveling. Therefore this standard is a candidate to expand to model data of shared mobility. Once this expansion defines the properties that satisfy the needs of operators like Blue Bike and Velo, these operators can republish their data in our developed standard. Not all operators have the resources to republish their data into an obligated data model. An intermediate party is needed to make this mapping and host the republished Linked Data. Once this data is republished, it is part of a pipeline with data that can be queried and archived in a uniform way.

II. WHAT IS LINKED DATA?

To accomplish interoperability, the OSLO program makes use of the concept of Linked Data (LD). It is the idea of making links between arbitrary things described by the Resource Description Framework (RDF) [3]. When a dataset satisfies to all five requirements of the design principles provided by Tim Berners-Lee and published by w3c it can be called Linked Open Data.

A. Resource Description Framework

RDF is an open standard to describe relations between objects using URIs. A URI offers a uniform way to identify an object. The linking of objects is done by RDF triples: a three-part subject-predicate-object structure. This linked structure forms a directed and labeled graph where the labels contain information about the relation (predicate) of two nodes (subject and object). One of the formats to serialize RDF triples in a textual representation is Turtle.

B. RDF Vocabulary

An RDF vocabulary describes concepts and relations to create context in a dataset. The terms described in a vocabulary give meta information about the nodes of a graph and the relation it has with other nodes. An RDF vocabulary by itself is also published as LD because of the same RDF standard that is used to build it.
[TBC]

III. WHY LINKED DATA

[TBC]

IV. OSLO EXPANSION

[TBC]
GBFS als voorbeeld voor de standaard

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