COMMUNITY DRIVEN REQUESTS FOR PROPOSALS

Applying Semantics to match Customer Purchase Intents to Vendor Offers

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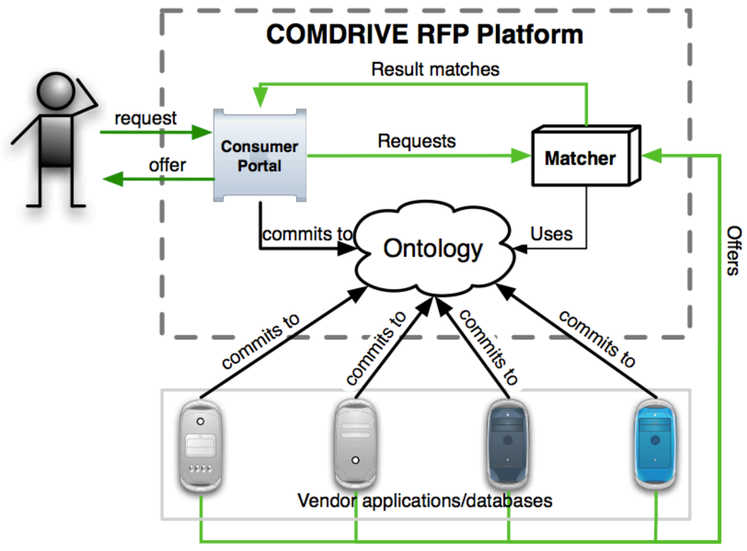
Introduction & Problem

When consumers want to buy a certain item on the World Wide Web today, they have to browse through literally **hundreds of offerings and results** and this number is expected to increase in the future. In this model, the **vendors drive the process** by publishing products and providing means to buy these online. Travel agencies in the Netherlands need to query many different tour operators to find holiday packages meeting their customers' requirements. They often have an API that facilitates this process, but the granularity of the specific search is often limited due to the **heterogeneous nature of all vendor databases**. The questions we ask ourselves are:

- How can we ameliorate the process of finding a suitable product for the customer?
- How can we make the process customer driven rather than vendor driven?
- How can we exploit the data in the heterogeneous vendor databases?

Solution

Allow consumers to specify their requirements (Request for Proposals, RFP) and to match these to offers of different vendors by sending out the request to a distributed vendor infrastructure, which responds to the request with offers. For this solution to be truly effective, customers and vendors need to share a common vocabulary of the domain. More specifically, software agents need to interpret the information in RFPs to (semi-)automatically match this information with data in the vendors' product database based on their meaning. In this solution, **ontologies** are and will drive the other modules such as **semantic matching** of customer intents and heterogeneous vendor data and a **ontology driven user interface** for RFP construction.

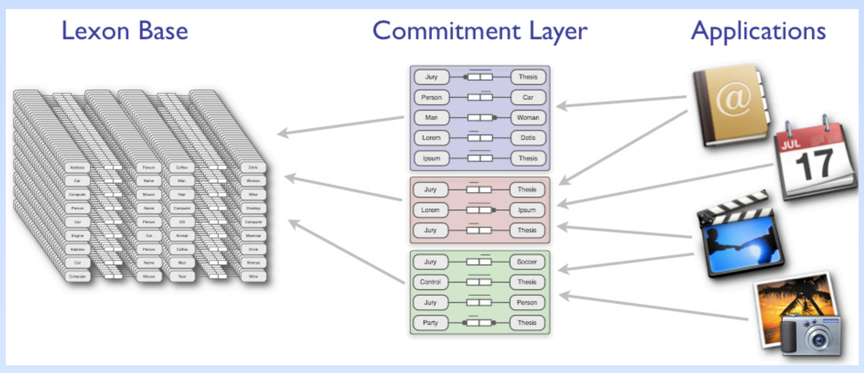


Approach

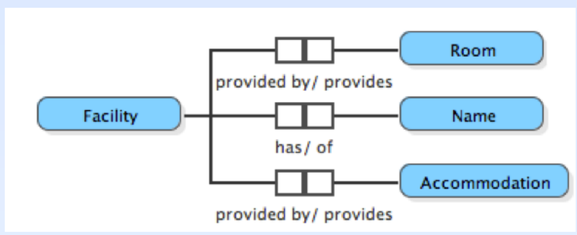
(1) Ontology Engineering Methodology

DOGMA is an ontology approach and framework that is not restricted to a particular representation language. This approach has some distinguishing characteristics that make it different from traditional ontology approaches such as its groundings in the linguistic representations of knowledge and the methodological separation of the domain- and application-conceptualization, commonly known as the ontology double articulation principle. The idea is to enhance the potential for re-use and design scalability.

Conceptualizations are stored as lexons, which are 5-tuples declaring a relationship in some context. Another distinguishing characteristic of DOGMA is the explicit duality in interpretation between the language level and conceptual level. The goal of this separation is primarily to disambiguate the lexical representation of terms in a lexon (on the language level) into concept definitions (on the conceptual level), thus tackling the problem of synonyms and homonyms.



DOGMA-MESS, which adds a collaborative layer around the DOGMA Approach, helps communities consisting of different stakeholders to define shared ontologies that are relevant to their joint collaboration goals. It aims at providing support to make this complex and fuzzy shared meaning evolution process of a collaborative community as effective and efficient as possible.



After bootstrapping the ontology with existing standards, we had several ontology iterations with 2 different communities with a different perspective on the subject: tour operators (the vendor perspective) and a community of ski-fanatics (the customer perspective).

(2) Vendor Data Annotation

Annotation of vendor data in commitments written in Ω-RIDL. Commitments contain a 1) selection of lexons with 2) constraints (describing the use) and 3) mapping of application symbols to terms. Those commitments then are used to generate queries to transform data into another format. The semantic matcher uses this to transform vendor data and data from request to perform the matching

```
Holiday Package is identified by Name.
Holiday Package has exactly 1 Name.
Holiday Package has at most 1 Description.

map "/items/item" on Holiday Package.
map "/items/item/title" on Name of Holiday Package.
map "/items/item/description" on Description of Holiday Package.
```

(3) Construction of RFP

- Driven by Ontology to aid users expressing their intent
- Some concepts (Country, Transports) provide starting points

(4) Semantic Matching

- Fuzzy Matcher
- Matching conditions (from RFP) against object from Offers
- Also commits to the ontology via a Ω-RIDL

Pilot & Conclusions

Pilot ran in October 2010 in collaboration with Milq Media, the company behind a community of skiers in http://www.wintersporters.nl/.

Users generally welcomed the idea, but we observed a serious discrepancy between information customers were looking for and information contained in the data provided by vendors.

Future work would thus consist of creating a feedback loop from a community of (potential) customers to manufacturers and vendors.

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