



Politecnico di Milano

Context-ADDICT

Context-Aware Data Design, Integration,
Customization and Tailoring

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Motivations



Data Integration



Context-Aware
Data
Tailoring



- Disparate, heterogeneous, independent Data Sources
- Data Integration/Exchange
- Context-aware information filtering: *Data Tailoring*
- Unified, semantic, customized access to data



Goals



Global Goal: context-aware (mobile) system interoperability

- **Specific Goals:**

- Provide a complete *methodology* for *context-aware data design*
- Support the development of *data-centric context-aware applications* by solving common issues at the system level

- **Context-ADDICT (will) provide support for:**

- *Context-Modelling*
- *Data Source Discovery*
- *Data Source Semantics Extraction (meaning automatic wrapper generation)*
- *Data Source Integration / Data Exchange*
- *Context-Aware Data Tailoring (i.e., data personalization)*



Running Example



- **Running Example:**

- The scenario is the *University Everyday Life (UEL)*
- Users (in this small example): Professors, Students, Visitors
- Provide context-aware data on mobile terminals (Smartphones, PDAs) and standard devices (Desktop, Laptop) about:
 - Restaurants and bars in the area surrounding the university (each subdivision)
 - Free rooms (both to be reserved or just to be used)
 - Courses
 - Information about seminars and events at the Department
 - News about professors (schedule changes, new materials)



Data Sources



- We assume (in the most general case) to deal with data sources that are:
 - Heterogeneous
 - Distributed
 - Independent
 - Transient (not in this example)
 - Partially Overlapping

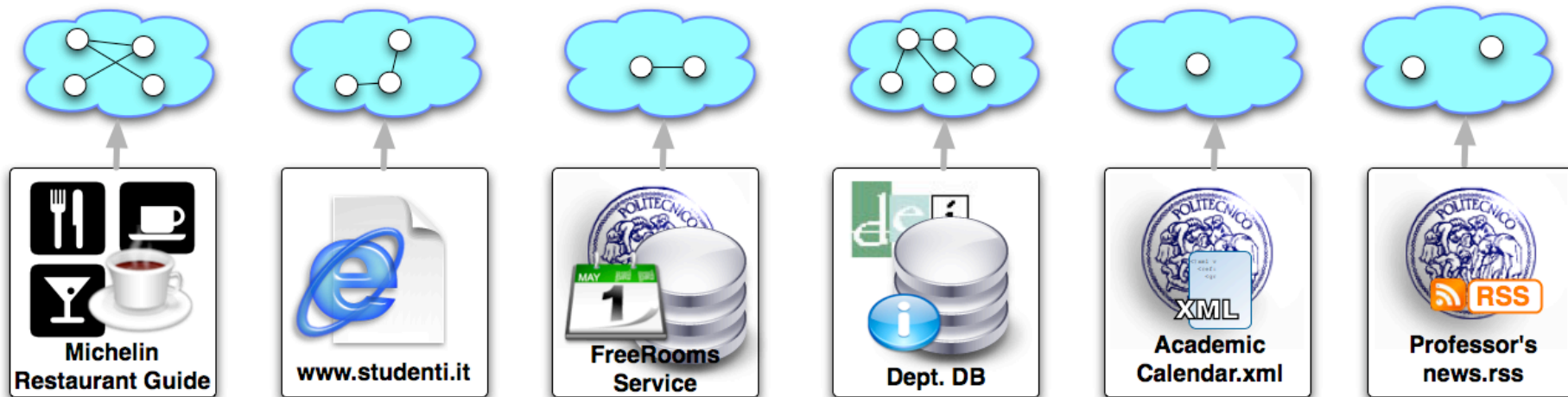




Semantic Extraction



- Data-source heterogeneity is solved by extracting the semantics in an ontology-based format
- Automatic Wrapper generation will make the actual data accessible

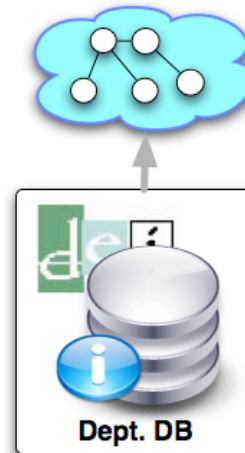
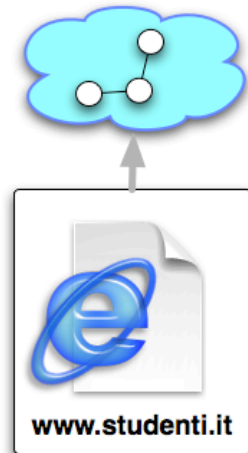
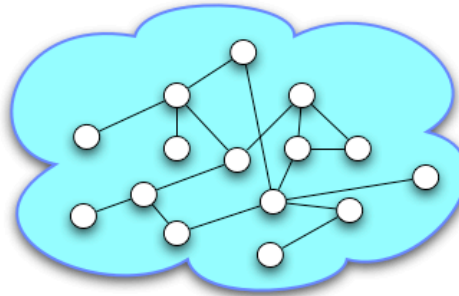




Domain Modelling



Global Schema: Domain Ontology

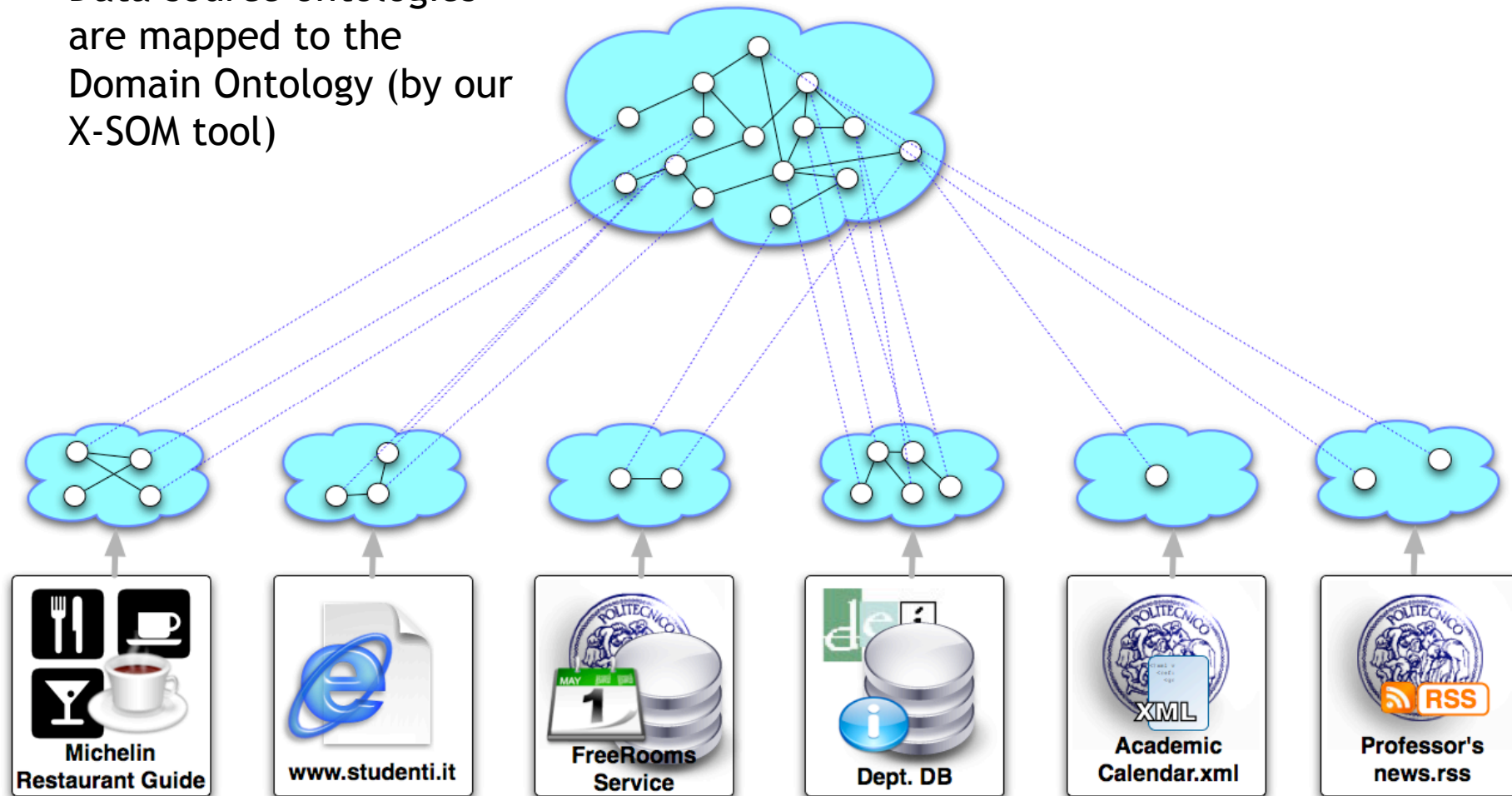




Domain Modelling

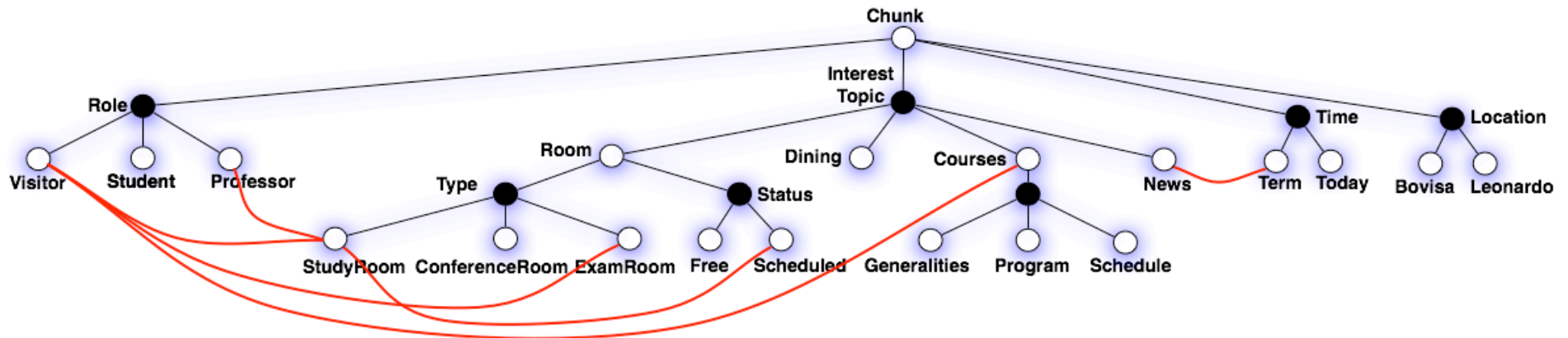
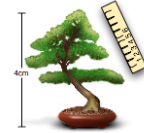


Data-source ontologies
are mapped to the
Domain Ontology (by our
X-SOM tool)





Context Modelling



Context-Dimension Tree:

- representation independent
- extensible
- granularity and (useless-context) constraints support



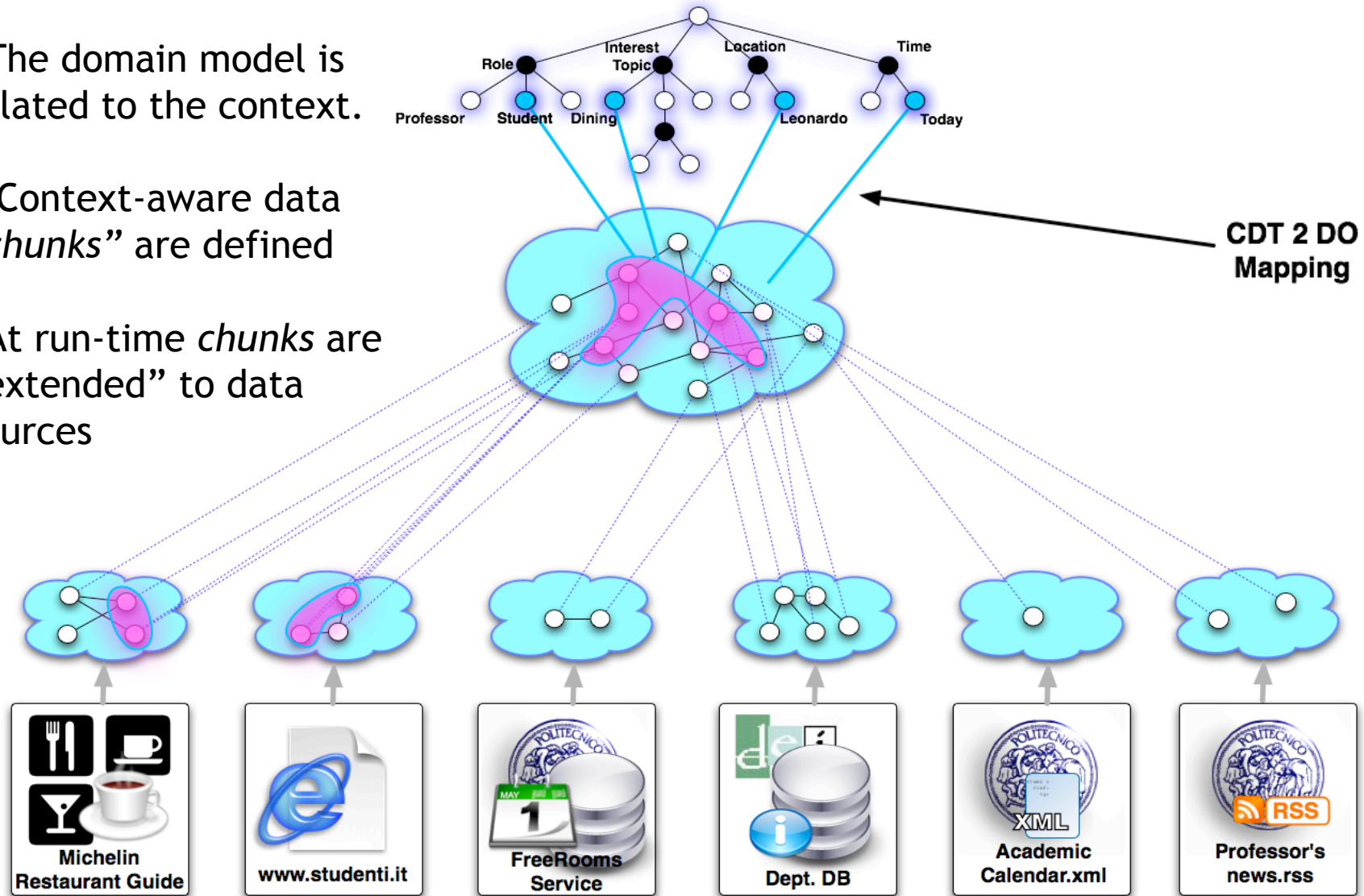
Data Tailoring



- The domain model is related to the context.

- Context-aware data “chunks” are defined

- At run-time *chunks* are “extended” to data sources

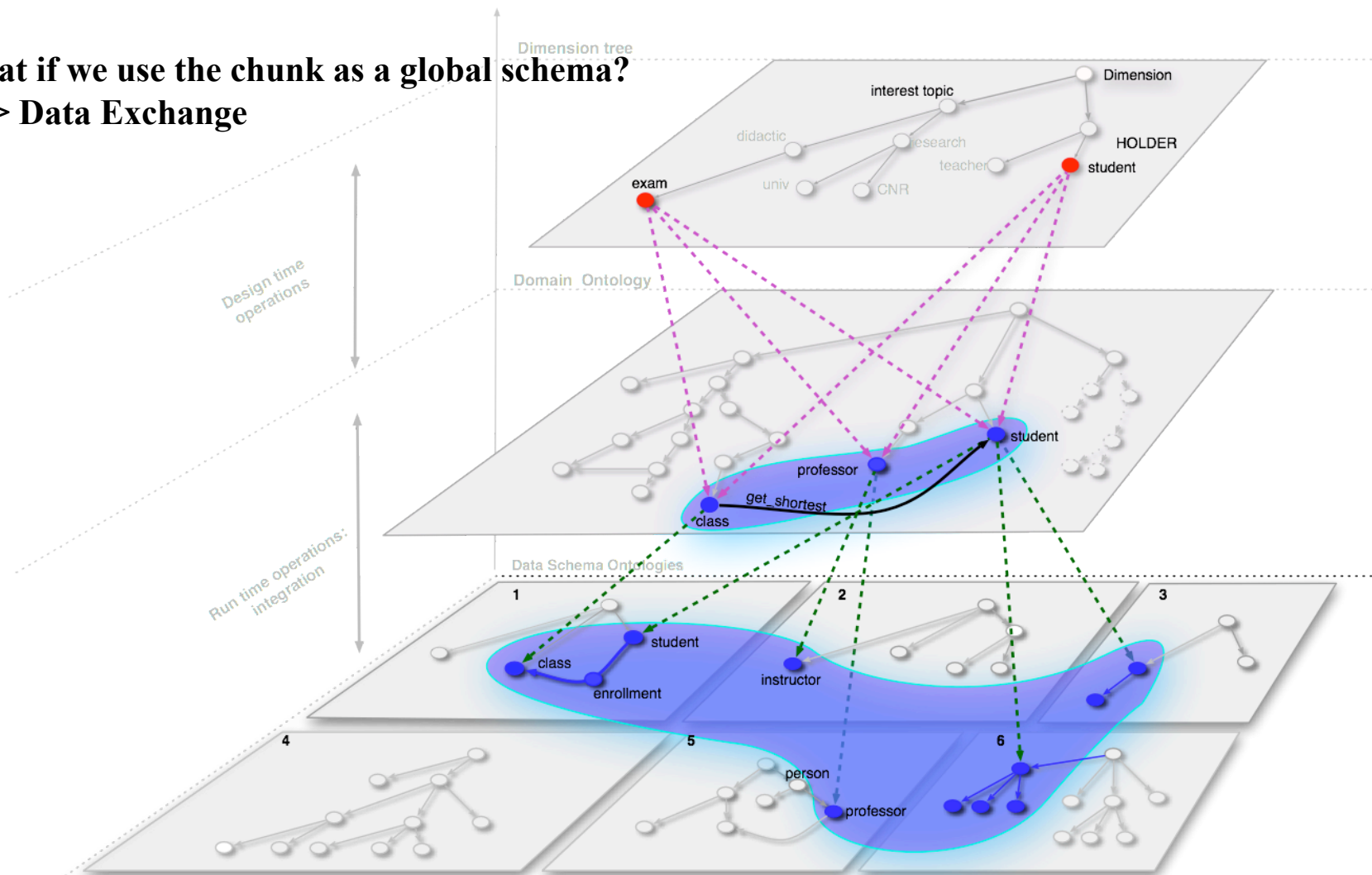




Data Tailoring: another view

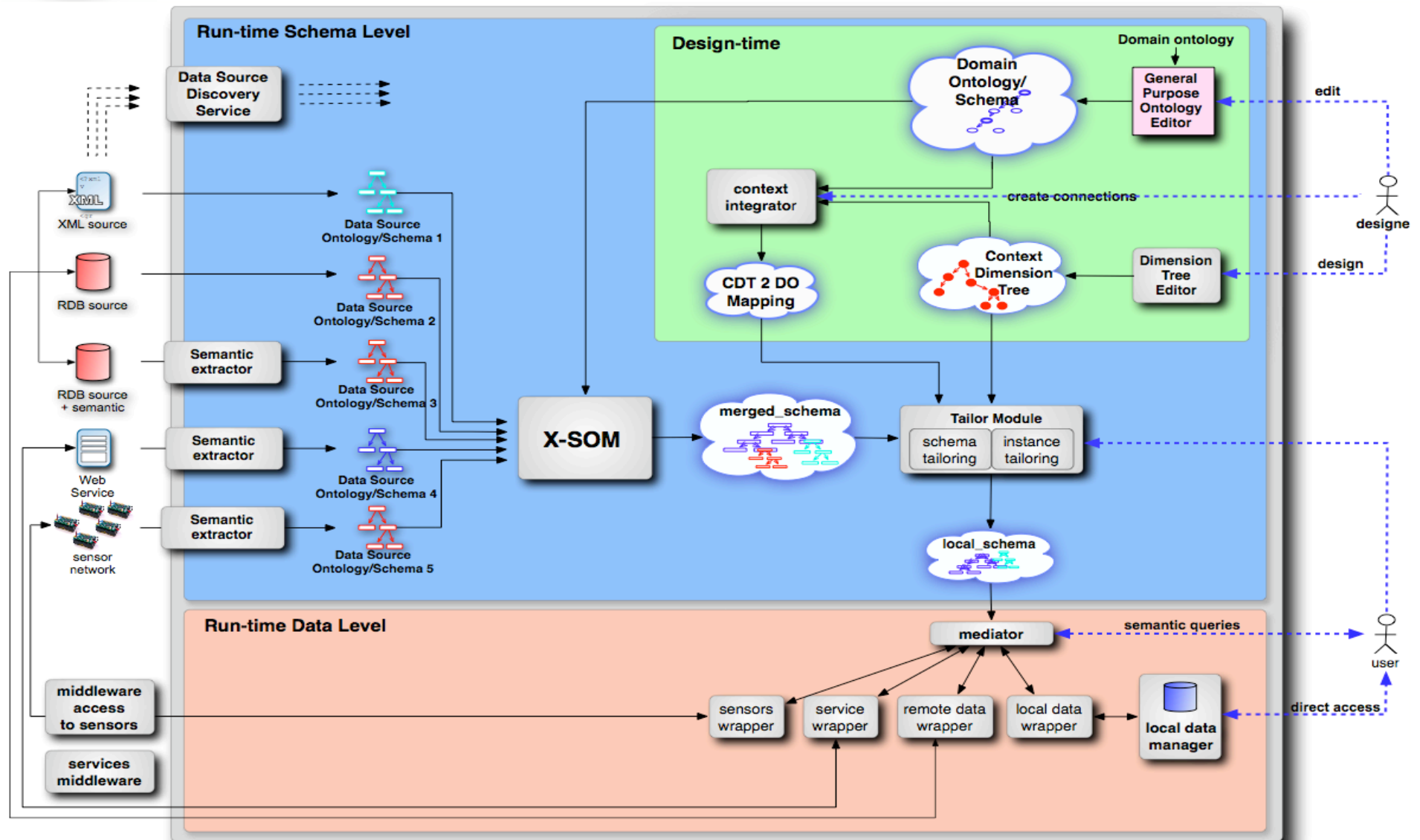


What if we use the chunk as a global schema?
-> Data Exchange





Overall Architecture





Conclusions

- **Context-ADDICT:**
 - Research Problems generating project!!
 - At the moment:
 - Context-model
 - Ideas on data tailoring extension procedures
 - Ontology mapper (to be extended)
 - First prototypes of extractors
 - Several challenges, can be faced from an “application” point of view or as “research issues”: crafted solutions vs formal investigation
- **Future Development**
 - Investigate on data tailoring/exchange issues more formally
 - Investigate Data Tailoring extension procedures
 - Investigate Query Answering
 - Complete the set of tools