

# Semantic Application Integration by Learning Ontologies

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# Agenda

- Introduction
- Ontology construction
- Interoperability issues
- Case study
- Conclusions

# About Temida

- Consulting
  - Web Technologies
  - Business Process
  - e-Business
- Application development
  - Web services
  - SOA
  - Interoperability

# Ontologies

- Formal definition on Ontology:
  - Ontologies are knowledge bodies that provide a *formal representation* of a *shared conceptualization* of a particular domain
- Ontology describes semantics of data in order to provide a uniform way to make different parties to understand each other

# Semantic Application Integration

- Is an Interoperability issue
  - Web services
  - Service Oriented Architecture
- Implementing SOA principles typically includes discovering services

## **But...**

How do we know what properties are used to describe the service we are searching for and what typical values are to be assigned to the properties?

- .....
- According to the SOA reference model, the structure isn't enough
    - Semantic of the property must be clear
      - is it really a service you are searching for?
    - Not only that we have to find the right property of a service, but we also have to be able to consistently interpret the value assigned to that property

# So what is needed for the distributed world of SOA?

- Clearly defined indication of the vocabulary from which properties originate
- Clearly defined indication of the vocabulary from which property values originate
- Clearly defined mechanisms for mediating between vocabularies

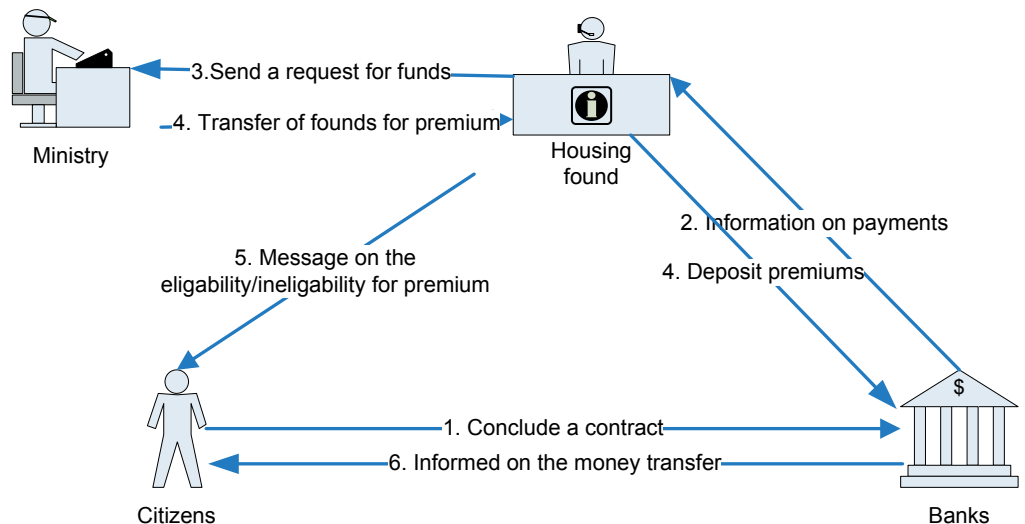
**If not Ontologies, then what?**

# Our story

- NHSS project has a large number of participating partners, the exchanged data is relatively high
  - difficult change management procedures
  - arise of need for completely automated interoperability solution
    - providing more accurate data on the web for all partners
    - shift from technical to semantic level of interoperability
  - need for efficient business process management (including all sub-processes managed by participating partners)

# NHSS project

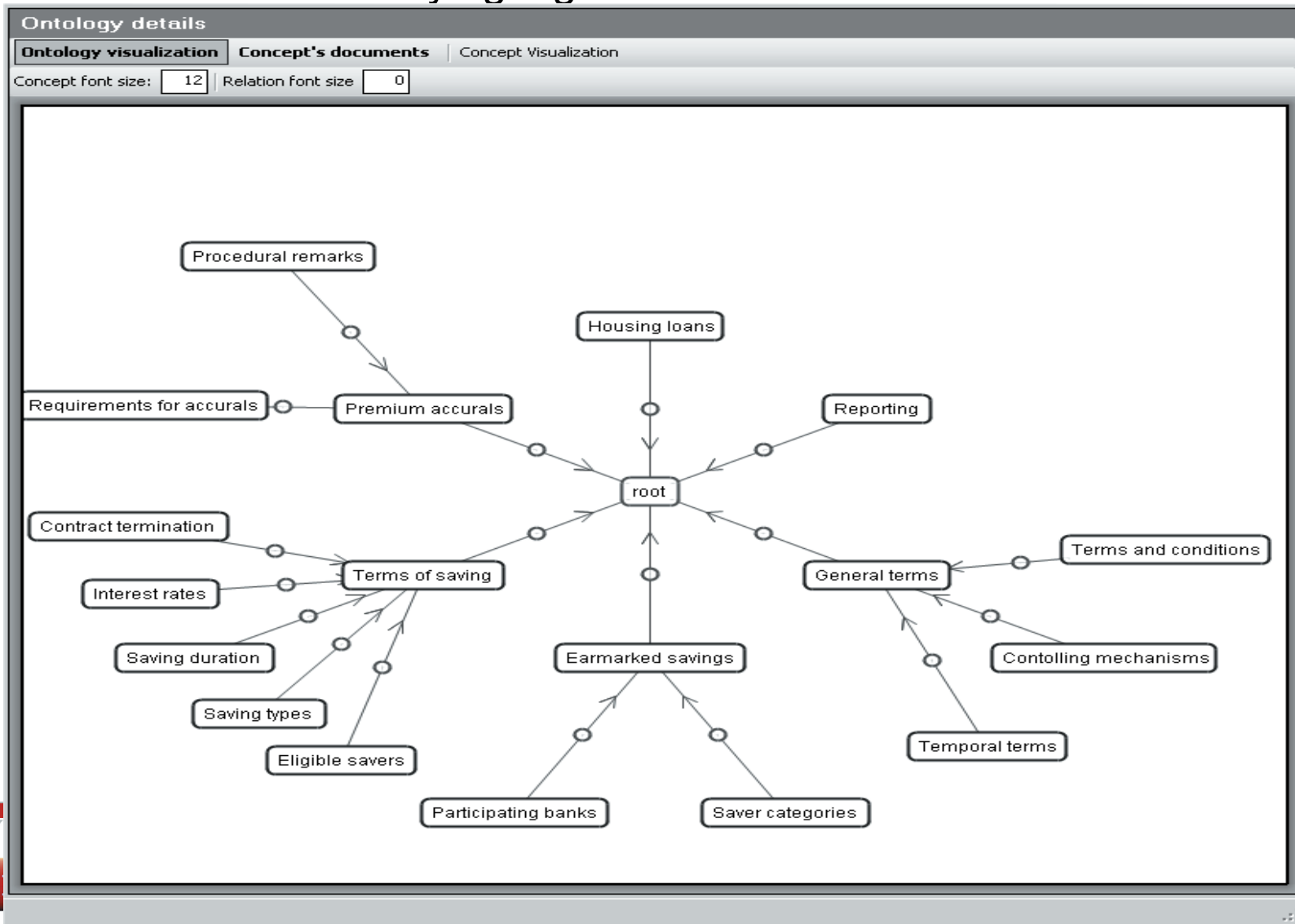
- State project governed by the legal act
- Several stakeholders involved:
  - Ministry
  - Housing found
  - business banks
  - citizens



# Ontology construction

- e-Government legal acts contains large quantity of information
- We used OntoGen tool for interactive construction of ontologies from text documents:
  - form concepts and edit them thematically
  - assign documents to the formed concepts
- Results of constructed ontology:
  - top-level ontology gives an insight into the structure of the studied domain
  - provides some sort of "birds-eye view" on the domain

# Example of semi-automatically constructed ontology with OntoGen from underlying legal act:



# NHSS Interoperability implementation

- Challenges

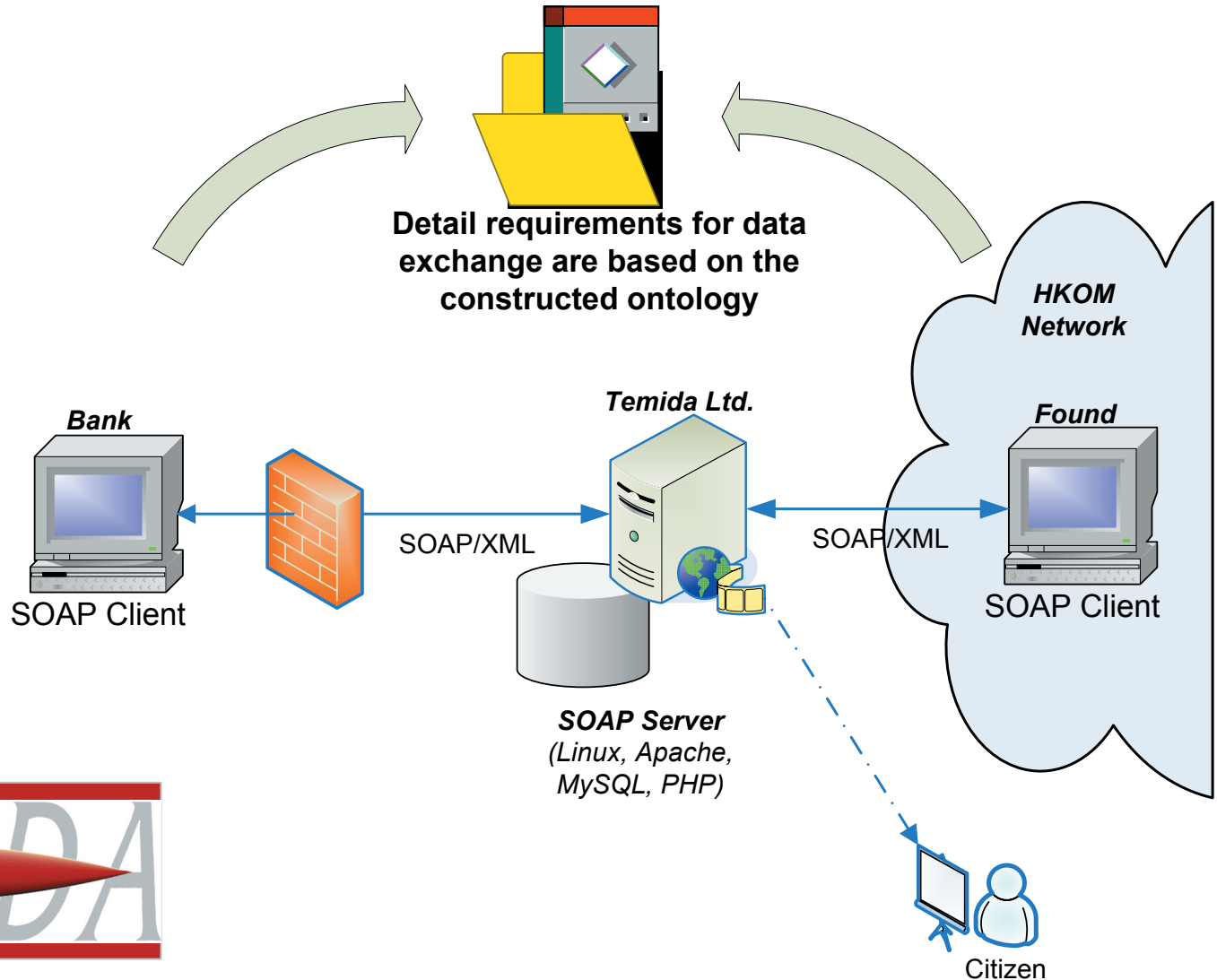
- Different technology platforms
- Common architecture agreement
- Security aspects



- Solutions

- Web Services technology
- Service Oriented Architecture principles
- Internet access via HTTPS protocol

# NHSS Interoperability implementation



# Conclusions

- Semi-automatically constructed ontology is quite similar to manually constructed, although the former **can be completed 10 times faster**
- **Ontology quickly reveals** important top-level **domain concepts**
- Ontology can serve as a **backbone in the process of designing the application integration**
- **Result: easier and more effective business process and sub-process management**

# Thank you

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