An Ontology Based Architecture for eGovernment Environments

Luis Álvarez Sabucedo and Luis Anido Rifón
Universidade de Vigo
España

The 3rd International Workshop on Vocabularies, Ontologies and Rules for The Enterprise (VORTE 2007)
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
Introduction

• eGovernment:
  “the use of information and communication technology (ICT) and its application by the government for the provision of information and basic public services to the people”

Keywords: people and ICT
Several initiatives

e-GIF
eGovernmentInteroperability Framework

SAGA

Terregov
Introduction

- **Drawbacks:**
  - Lack of interoperability among developed solutions
  - Difficulties for locating services

- **Our proposal:**
  - Support for a holistic software platform
  - Take advantage of semantic technologies
Agenda

• Introduction
• **Semantic Web**
• Proposal
• Applying semantics
• Architecture
• Conclusion
Semantics

- “is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation”
  
  Tim Berners-Lee

- “An ontology is a formal, explicit specification of a shared conceptualisation of a domain of interest.”
  
  Gruber

- OWL, a W3C recommendation to express knowledge
There is no consensus on the best approach to semantically describe Web Services.

Current Approaches:
- Use ontology-based mechanisms to describe web services: OWL-S, WSMO, ...
- Mark up WSDL (now WSDSL 2.0!) with ontologies: WSDL-S, SAWSDL

Objective: provide agents with additional capability
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
LifeEvent

- any particular situation in which a citizen must deal with a PA and he/she requires support or license from one or several PAs
  - getting certifications, paying a fine, getting married, moving, requesting a grant from the government, ...
- Different levels of focus on the citizen.
  - Mature issues
  - Interoperability issues
  - Orchestability issues
LifeEvent

Task
Description
Input documents
Output documents
Scope
Security conditions
Cost
LifeEvent

Problem identification

Problem decomposition

Look for main terms: input document, scope, ...

Identification internal PA subgoals

Target document identification

For each sub-problem identified
LifeEvent

- **Objective:** provide a uniform view of the services provided by the administration to the citizen.
  - We need a software architecture to support them.
  - Web services are an obvious approach
  - Their semantic support may increase interoperability
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
Semantic support

• LEs are semantically described using OWL.
  ▫ Methontology guidelines.

• Apart from Life Events:
  ▫ Citizen
  ▫ Public Administration
  ▫ Documents
  ▫ And others...

• Recommendations by official standardization bodies has been used: CWA “guidance on the use of Metadata in E-government”; Time ontology by the W3C, ISO standards
LifeEvent - Ontology

CEN CWA 14860

Regions (ISO 3166)

Administrations

Smaller Regions

Laws

Defines

Time (W3C Time Ontology)

requires

generates

lasts

expires

issued

owns

Documents

Citizen (FOAF)

Adopted

Adopted with modifications as ontology
Several properties have been identified to allow the implementation of mechanisms to discover LifeEvents or how they can be composed.

<table>
<thead>
<tr>
<th>Property</th>
<th>Domain</th>
<th>Range</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>issues</td>
<td>PA</td>
<td>Document</td>
<td>Refers to which document is provided by who</td>
</tr>
<tr>
<td>requires</td>
<td>LE</td>
<td>Document</td>
<td>Refers to which document is required for a LE</td>
</tr>
<tr>
<td>supports</td>
<td>PA</td>
<td>LE</td>
<td>Refers to which LE is supported by a PA</td>
</tr>
<tr>
<td>owns</td>
<td>Citizen</td>
<td>Document</td>
<td>Refers to which Document is owned by a Citizen</td>
</tr>
<tr>
<td>generates</td>
<td>LE</td>
<td>Document</td>
<td>Refers to which Document is the output of a certain LE</td>
</tr>
</tbody>
</table>

*Inverse Relations* can be defined: e.g. “is supported”
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
Publishing LEs

• Key point: Publishing Les
  ▫ Push method: PAs will be responsible for that
  ▫ Pull method: “the system” will look for LEs at the PAs sites.

• We propose the use of the “Blue Page Server” as the main actor for this propose
Use Cases

Citizen (from Actors)

SearchLE <<include>>

RequestOperation

NotifyEvent <<include>>

getStatusOperation

Search

Blue Page Server (from Actors)

Service

Service (from Actors)
Model of interaction

: Citizen
1: SearchLE()

: Blue Page Server
2: InvokeLE()
3: GetStatus()

: PA
4: RequestNotification()
Agenda

• Introduction
• Semantic Web
• Proposal
• Applying semantics
• Architecture
• Conclusion
Conclusions

- Defining “eServices” using LEs seems to be a quite nice approach.

- Semantic technologies are getting more and more mature.

- Making things easier for PA and citizens is a must.

- OBA provides advantages.
Thank you!!

Luis Álvarez Sabucedo and Luis Anido Rifón
Universidade de Vigo, SPAIN
Luis.Sabucedo@det.uvigo.es