MOLTO WP12 : GF Adoption within
Be Informed
Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decision. The development, release, and timing of any features or functionality described for Be Informed’s products remains at the sole discretion of Be Informed.
Overview

• O : State of affairs, goals and challenges

• I : Adaption of GF in product

• II : 3D architecture for conceptualization and modularization

• III : Eco System : covering challenge tradeoff of high precision and coverage

• IV : Integrated Demo and Evaluation results : L Language (likelihood) and Engineering (D2.3)
Context: Be Informed Use Case

• Be Informed offers **ontology** driven support throughout policy lifecycle
  • Business processes, products and decisions, registrations, interaction
  • Drafting, choosing, communicating, executing, evaluating

• **Multilingual**, because
  • Customers are offering multi lingual services (for example: immigrations, Dutch government in the Caribbean)
  • Customers are sharing international models (for example: Europe, emission trading)
  • Be Informed is developing international business
Welcome

If you come to the Netherlands to live, work or study, you are likely to have some questions about the arrangements you need to make. This site will guide you to the government organizations you may have to deal with.

What can you do?

If you fill in your profile, you will see a list of subjects that are relevant for you, with links to information from the organizations concerned. You can also choose a subject directly.

Your profile

What is your age?

What is your nationality?

Length of your stay?

The purpose of your stay?
(You may give more than one answer)

Create my checklist

Subjects

- Education
- Employment
- Permits and visa
- Social security
- Taxes
- Vehicles

See also
- Employers (dutch)
- The forum (dutch)
• Leveraging LT for Policy Lifecycle

• Business Applications Platforms

• Artefacts like business rules, enterprise models and complex configuration capture business policies

• Audiences for business policies
  • Business Analysts: policy design choices
  • IT: implementing and maintaining derives business processes
  • Users, customers and citizens: participating in the processes

• Natural language for representing policies (interacting, collaboration, sharing, publishing) proven to be intuitive are providing common grounds for all audiences.
Grant application

Intake
- performs (if needed)
- issues
  - Case handler

Assess
- performs (if needed)
- requires
  - creates Eligibility [Eligibility=FALSE]
  - Rejection
  - decides
  - creates Eligibility [Eligibility=TRUE]
  - Confirmation

Publish
- performs [Eligibility=TRUE]
- requires
  - creates

Archive
- creates

Maximum period for treatment
- begins
  - Grant request
- ends
  - requires expired

Grant request
- creates

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Some LT supported examples

Housing benefit application
Veldweg 24a

Overview | Updates | Documents | Appointments

Updates

All updates

- The activity Publish the application is completed by Astrid
- The document Rejection letter is created
  10 minutes ago
- The appointment Customer visit is edited by Kees
  1 day ago
- The activity Accept the application is completed by Kees
- The document Acknowledge letter is created
- The time limit Acceptable response time is triggered
- The appointment Customer visit is scheduled
  1 day ago
- The activity Submit the application is completed by Anonymous
  6 days ago

Emiel van Haandel
123456782
emiel@vanhaandel.nl
06-50423303

Activities

- Veldweg 24a
  - Submit
  - Accept
  - Assess
- Publish
- Archive

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• Adoption of GF in Be Informed

• Highlights

  • Requirements Analysis for adoption GF in Be Informed Business Process Platform
  
  • Replaced verbalization component based on Velocity template with GF based
  
  • Developed multiple methods for GF with adoption in cooperation with Molto and Monnet partners.
  
  • Carried out evaluation comparing baseline (Velocity) to newly adopted methods
• **Challenges for LT adaption in Businesses**

  • Generic applications of LT prevent targeted solutions

  • Needs specific expertise usually not found in companies: Costly!

  • LT tooling often trade precision for coverage and v.v. Companies need reliability and predictability as to ensure the quality of underlying services.
• Business Driven Approach based on GF

• **Conceptually scoped** based on the application to enable tailoring and limiting of interpreted and generated language.

• **Generation** and conversion of lexical resources. Decreasing need for LT expertise.

• **Modularize** creation and use of resources by introducing 3 dimension creating separate modules: language, domains and tasks. Higher return on investment by re-use of modules.
• 3D Framework for Modularization And Conceptualization of Lexical Resources
Eco system

Lexical Resources

GF Grammars

<publish>
Web services
Linked Resource

<libraries>
Resource Grammars

<Conceptualization>
OWL

<Conceptualization>
Be Informed Models

<translate>
Lemon GF

<conversion>
Lemon2GF

<Enrichment>
Lemon Frame Generation

<tagging>
PoS

<conversion>
BI2OWL
Grammar Representation 3d model

- Core: S
- Task: Handmade (validation, explanation, querying)
- Domain: Automatically created
Example

**Be Informed**

- Assess the request
- requires scheduled
- Customer visit

**OWL**

- requiresScheduled
- Scheduled
- AssessTheRequest
- CustomerVisit

- rdf:type
- PreCondition
- State
- Activity
- Appointment
Core grammars

Core

Class;
Individual Class;
Statement;

liftIndividual : (c : Class) -> Individual c -> Statement;
modifyIndividual : (c1,c2 : Class) -> Individual c2 -> Proposition;

OWLLibrary

cat xsd_boolean;

fun owl_NamedIndividual : Class;
fun coerce : (c1,c2 : Class) -> Subclass c1 c2 -> Individual c1 -> Individual c2;
Query grammar

Question;
Imperative;
WhPron;
WhAdv;

YesNo : Proposition -> Question;
queryInd : (c : Class) -> Individual c -> Question;
queryAdv : (c : Class) -> WhAdv -> Proposition -> Question;
Domain grammar

Activity : Class;
Appointment : Class;
Scheduled : Class;

requiresScheduled : (c1,c2 : Class) -> Individual c1

AssessTheRequest : Individual Activity;
CustomerVisit : Individual Appointment;
AST generation

AST for Core grammar:
requires (liftIndividual Activity (mkBIIndividual Activity AssessTheRequest))
(modifyIndividual Scheduled Appointment CustomerVisit)

AST for Query grammar:
Yes/No(requires (liftIndividual Activity (mkBIIndividual Activity AssessTheRequest)) (modifyIndividual Scheduled Appointment CustomerVisit))
### Example linearizations

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain</td>
<td>&quot;The request may be assessed when the customer visit is scheduled&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;The request cannot be assessed unless a customer visit is scheduled&quot;</td>
</tr>
<tr>
<td>Online</td>
<td>Question</td>
</tr>
<tr>
<td></td>
<td>&quot;Did you schedule the customer visit?&quot;</td>
</tr>
<tr>
<td></td>
<td>Put / Assert</td>
</tr>
<tr>
<td></td>
<td>&quot;We still require you to schedule the customer visit.&quot;</td>
</tr>
<tr>
<td></td>
<td>2nd / 3rd person</td>
</tr>
</tbody>
</table>
|            | "I would like to inform you that the customer visit has been scheduled."
| Validation | Contradiction                                                          |
|            | "The assessment of the request does not require that the customer visit is scheduled." |
|            | Logisal emphasis                                                       |
|            | "The assessment of the request requires both a scheduled customer visit and an intake form." |
|            | Generalize                                                             |
|            | "The assessment of the request requires an appointment."              |
Naïeve

- Classifies all entities as predefined lexical categories. No matter what the actual lexical information of the label is.
- Class = CommonNoun; NamedIndividual = ProperName; Relation = Function
- Has metamodel template to correct most of the relations
  - Cannot deal with any form of label variance
  - Cannot with verbs it does not know

+ Takes least amount of time to implement
+ Works for all languages implemented in GF
NaïveWithHeuristic

- Naive verbalizer, complemented with a lemmatizer to retrieve the infinitive form of a verb
- Contains an aggregation to concatenate sentences from which the ASTs begin with the same subject and relation
  - intake creates invitation
  - intake creates application form
  - intake creates invitation and application form.

- Cannot deal with any form of label variance
- Depends greatly on an untweakable lemmatizer

+ Creates concatenated sentences, which makes the output sentences seem more natural.
Lemonaided

- Verbalizer that parses the labels, and uses this lexical information to add the right determiner and decides how to linearize the sentence in a given situation
  - The intake requires that the request is assessed
  - The activity where the request is assessed creates the assessment form

- Lemon patterns do not support any other frames than the ‘Name’ for the individuals at the moment

- Huge effort to create dictionaries and optimize them for a certain language and domain

+ Lexical information already makes it possible to deal with different labels differently (add determiners, check if label ends in preposition)
+ Much more possibilities to tweak, because we created the dictionaries ourselves
**Evaluation**

- Language model based on 100k sentences of the Europarl corpus
- Language model measures the likelihood of the occurrence of the sentence
- Finished: Dutch and English
- To come: French, Slovakian, Spanish, Turkish
Spread English
Spread Dutch
Discussion

• All GF grammars scored substantially better than velocity templates, our current verbalization component.

• The LemonAided verbalizer created, according to our evaluation method, while not optimally used grammatically most likely sentences.

• Possibility to use different verbalizers for different languages or tasks.