

Design of a CNL to Involve Domain Experts in Modeling

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[Be Informed](#)

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Second Workshop on Controlled Natural Languages,
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Our Objectives Today

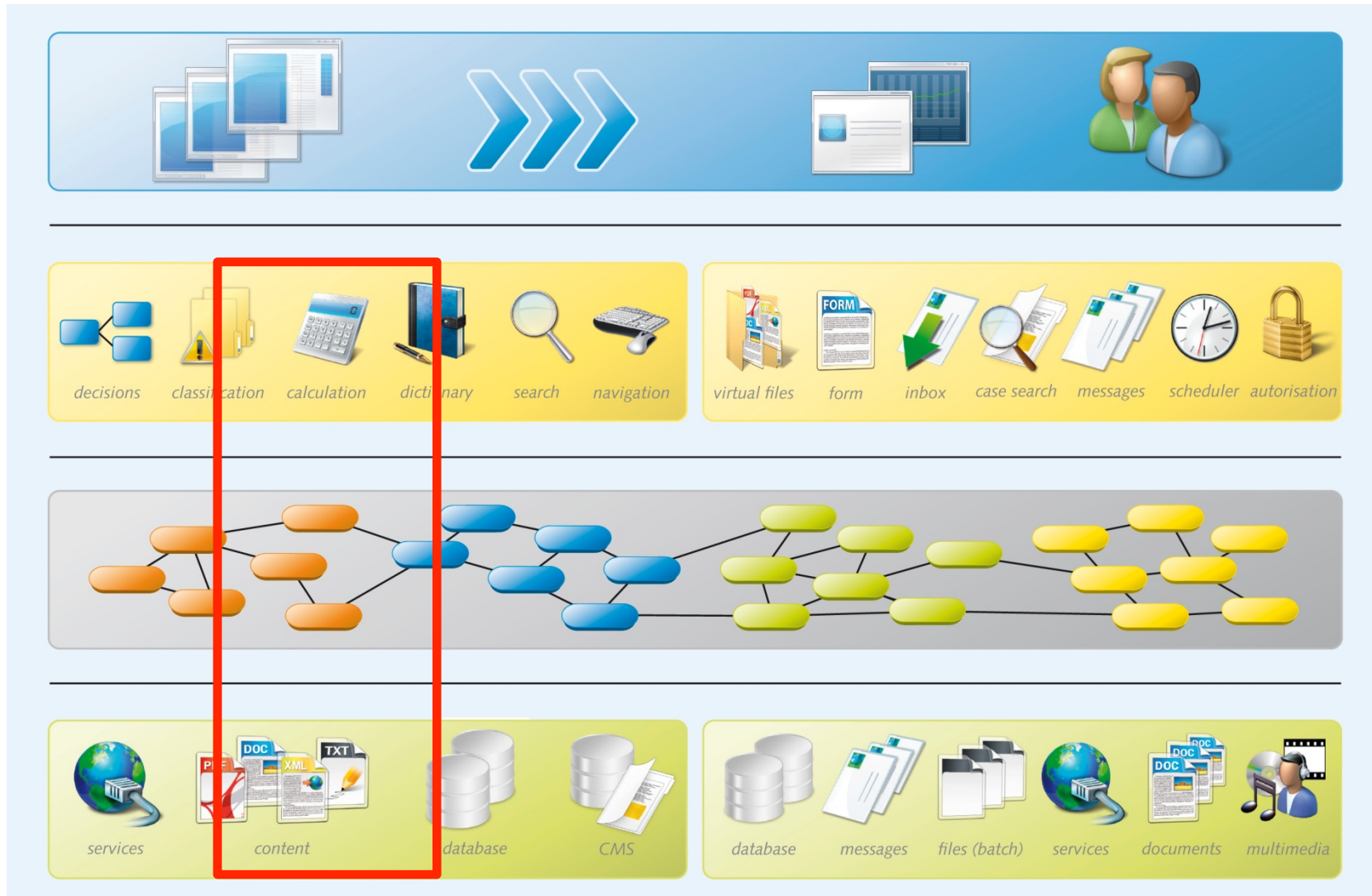
- Present to you our efforts to use natural language as a means to involve business users in modeling
- Present to you our experiences while trying these ideas out in the field
 - Typical challenges for business users
 - Their first response to our representation
- Ask your feedback
 - What relevant work/technologies/fields may be helpful to us?

Outline

- Context
 - Who are we and what do we do
- Involving Business Users
- Pattern sentences
- DEMO: Illustration of Practical Experiences
- Challenges/Discussion/Future Work

Services en events

Be Informed Suite



Be Informed Positioning

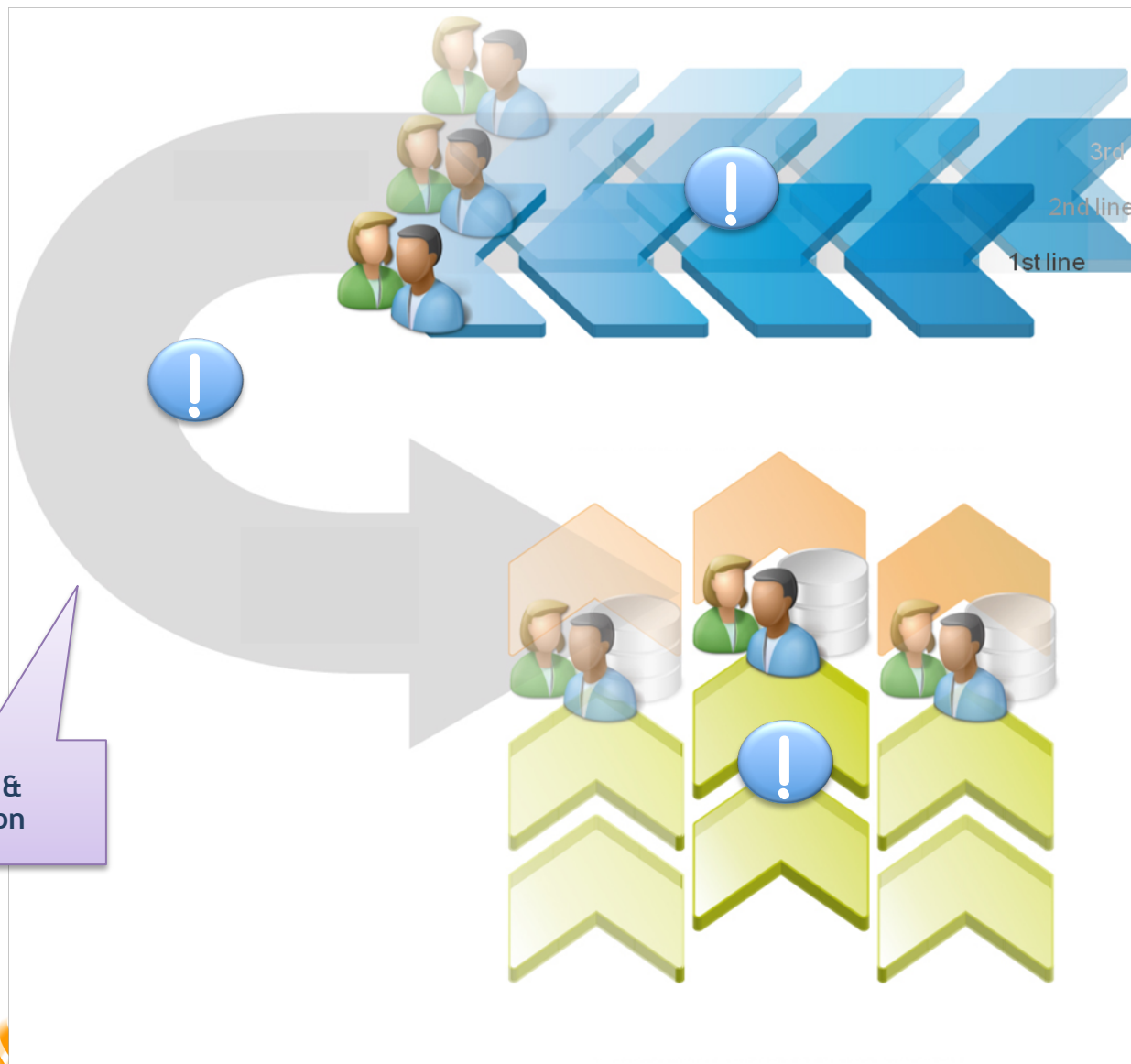
- Domain characteristics
 - Deterministic (rule based)
 - Decision-oriented
- Typical Ontology Size
 - #Concepts up to 40k
- Kind of Processes
 - Application processing
 - Case management
- Industries
 - Public Sector
 - Financial/Insurance

Our Typical Business User

- Domain Experts, close to the business of our Clients
 - Highly Educated
 - Very Experienced
 - Respected in their Fields
- But
 - No training in Formal Representation
 - Averse to “Technology”

Business User Tasks in Modeling

- Holy Grail: Editing
 - “Single step policy implementation: Business changes its own systems”
- But even more important
 - Reviewing
 - Dissemination/Communication
 - Explaining individual cases
 - Feedback



Primary proces

Policy proces

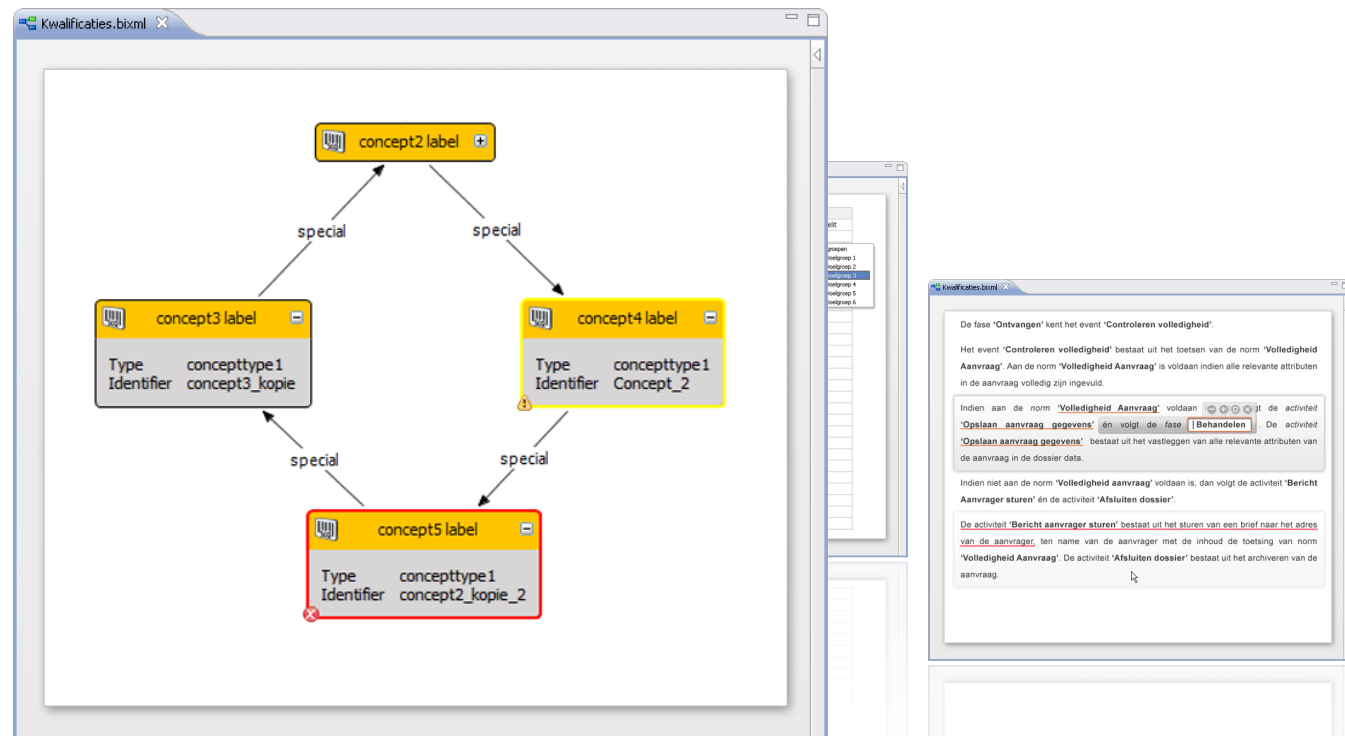
Review & validation

Business User Friendly Representation

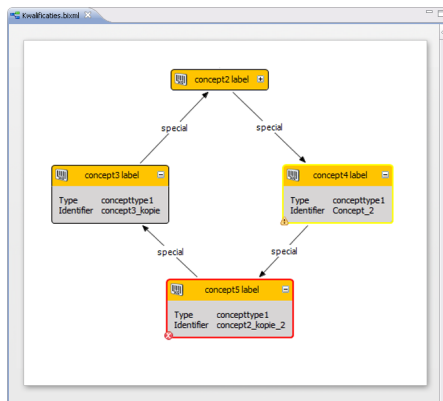
The screenshots illustrate various views of the system:

- Concept Hierarchy:** A diagram showing relationships between concepts (concept1 to concept5) using 'special' relationships.
- Configuration Page:** A form for 'concept 10' with fields for Label, Identifier, Type, Properties, Labels, Text fragments, and References.
- Table View:** A table with columns for Product, Label, Eigenschap I, Eigenschap II, Eigenschap III, and Doelgroep. A dropdown menu for Doelgroep is visible.
- Text Description:** A text-based description of a process phase 'Ontvangen' and its associated activities and events.

Business User Friendly Representation



Business User Friendly Representation



★ concept 10

Configuration

| | |
|------------|------------|
| Label | concept 10 |
| Identifier | concept_10 |
| Type | default |

Properties

| | |
|--------|-------------------------------------|
| Ja/Nee | <input checked="" type="checkbox"/> |
| Datum | 10-10-09 |

Labels

Text fragments

Label_1
Lorem ipsum dolor sit amet, cur adipiscing elit. Maecenas ipsum. Nullam a tincidunt libero. Nullam rutrum justo, nec ornare tortor quis nunc in urna convallis suscipit tempor. Suspendisse potenti. Susus dignissim condimentum. Morbi metus arssim ac fringilla in, euismod

References

- Part of [LG Lege](#)
- Part of [GRD Grensoverschrijdingsdocument](#)
- Part of [OO Openbare Orde](#)
- Part of [Mv Medische verklaring](#)

De fase 'Ontvangen' kent het event 'Controleren volledigheid'

Het event 'Controleren volledigheid' bestaat uit het toetsen van de norm 'Volledigheid Aanvraag'. Aan de norm 'Volledigheid Aanvraag' is voldaan indien alle relevante attributen in de aanvraag volledig zijn ingevuld.

Indien aan de norm 'Volledigheid Aanvraag' voldaan is, volgt de fase 'Behandelen'. De activiteit 'Opslaan aanvraag gegevens' bestaat uit het vastleggen van alle relevante attributen van de aanvraag in de dossier data.

Indien niet aan de norm 'Volledigheid aanvraag' voldaan is, dan volgt de activiteit 'Bericht Aanvrager sturen' en de activiteit 'Afsluiten dossier'.

De activiteit 'Bericht aanvrager sturen' bestaat uit het sturen van een brief naar het adres van de aanvrager, ten name van de aanvrager met de inhoud de toetsing van norm 'Volledigheid Aanvraag'. De activiteit 'Afsluiten dossier' bestaat uit het archiveren van de aanvraag.

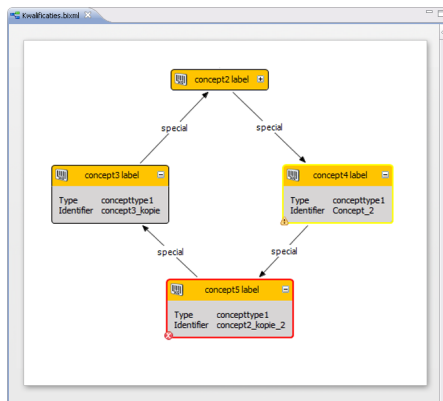
Business User Friendly Representation

The image displays several screenshots from a software application titled "Kwalificaties.bixml".

- Top Left:** A hierarchical diagram showing relationships between concepts. A central node "concept2 label" is connected to "concept3 label" and "concept4 label" via "special" relationships. "concept3 label" and "concept4 label" are further connected to "concept5 label". Each node lists "Type" and "Identifier" attributes.
- Middle Left:** A configuration panel for "concept 10". It includes sections for "Configuration" (Label, Identifier, Type), "Properties" (Ja/Ne, Datum), "Labels" (Label_L), "Text fragments" (Label_L), and "References" (Part of).
- Center:** A data table with columns: Label, Eigenschap I, Eigenschap II, Eigenschap III, and Doelgroep. The table lists products A through G with various property values. A dropdown menu for "Doelgroepen" is open, showing options 1 through 6.
- Right:** A text-based description of a process phase. It explains the event "Controleren volledigheid" and the activity "Opstellen aanvraag gegevens". It details the conditions for the activity and the steps involved, such as "Bericht aanvrager sturen" and "Afsluiten dossier".

At the bottom of the image, there is a logo for "beinformed!" on the left and the "Libri" logo on the right, with a decorative orange and black swoosh line passing through them.

Business User Friendly Representation



De fase 'Ontvangen' kent het event 'Controleren volledigheid'.

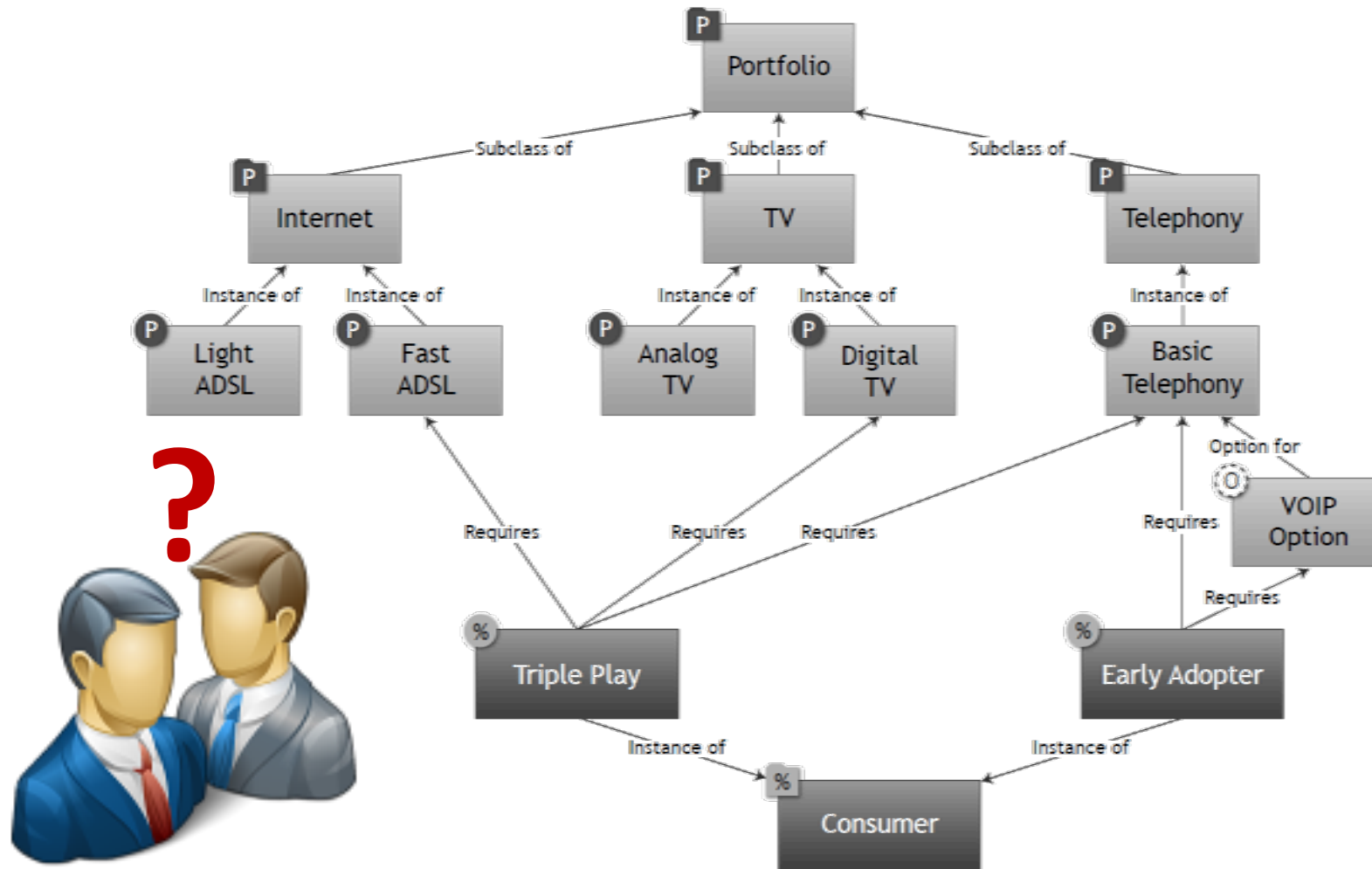
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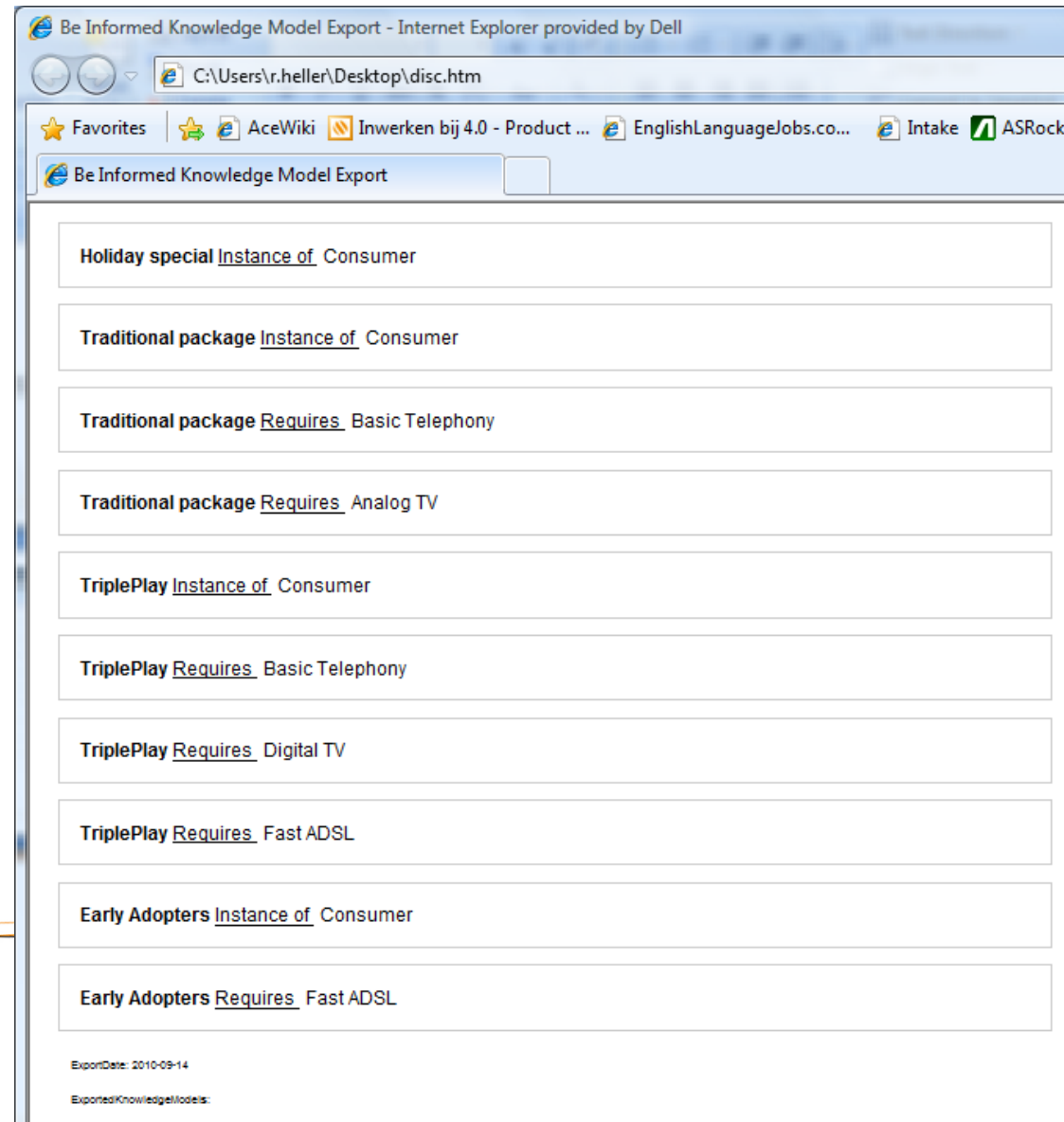
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Be Informed model



Early attempts to incorporate language

- Language-like triples
 - Adding language to relation
 - Concatenation of Multiple Triples
- One of our typical users:
 - **“I don’t think that sentence is correct...”**
- Editing by parsing triples out of these sentences
- Typical reaction:
 - **“I keep getting it wrong...”**



The screenshot shows a web browser window titled "Be Informed Knowledge Model Export - Internet Explorer provided by Dell". The address bar shows the file path "C:\Users\r.heller\Desktop\disc.htm". The browser's Favorites bar includes "AceWiki", "Inwerken bij 4.0 - Product ...", "EnglishLanguageJobs.co...", "Intake", and "ASRock". The main content area displays a list of knowledge model triples, each in a separate box:

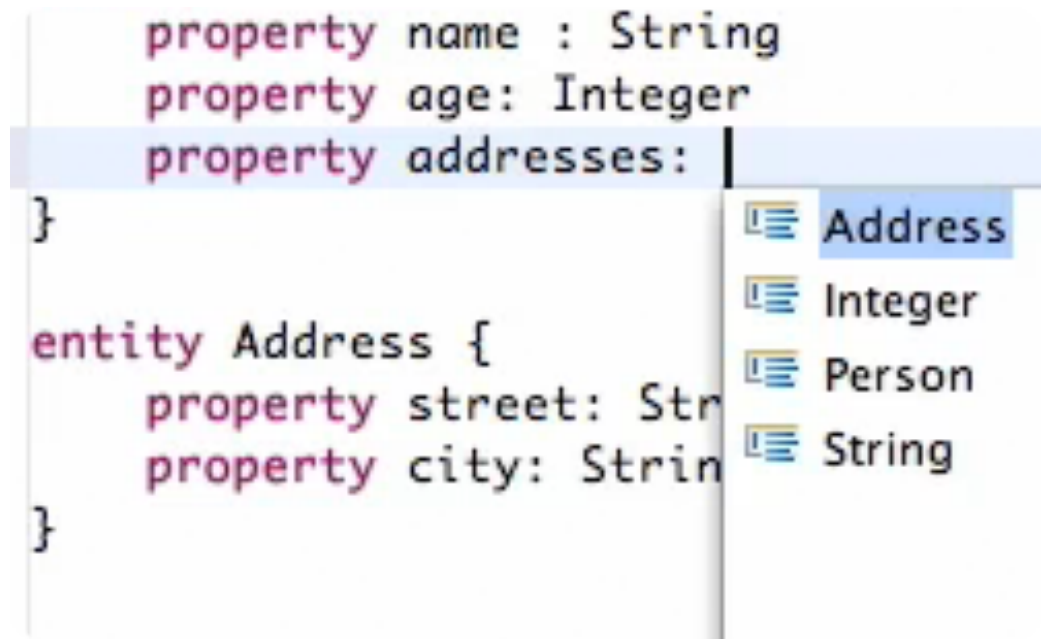
- Holiday special Instance of Consumer
- Traditional package Instance of Consumer
- Traditional package Requires Basic Telephony
- Traditional package Requires Analog TV
- TriplePlay Instance of Consumer
- TriplePlay Requires Basic Telephony
- TriplePlay Requires Digital TV
- TriplePlay Requires Fast ADSL
- Early Adopters Instance of Consumer
- Early Adopters Requires Fast ADSL

At the bottom of the page, there is a footer with the text "ExportDate: 2010-09-14" and "ExportedKnowledgeModels:".

Early attempts to incorporate language

- Domain Specific Languages
- Many are very syntax oriented
- Typical Reaction:
“That’s programming!”

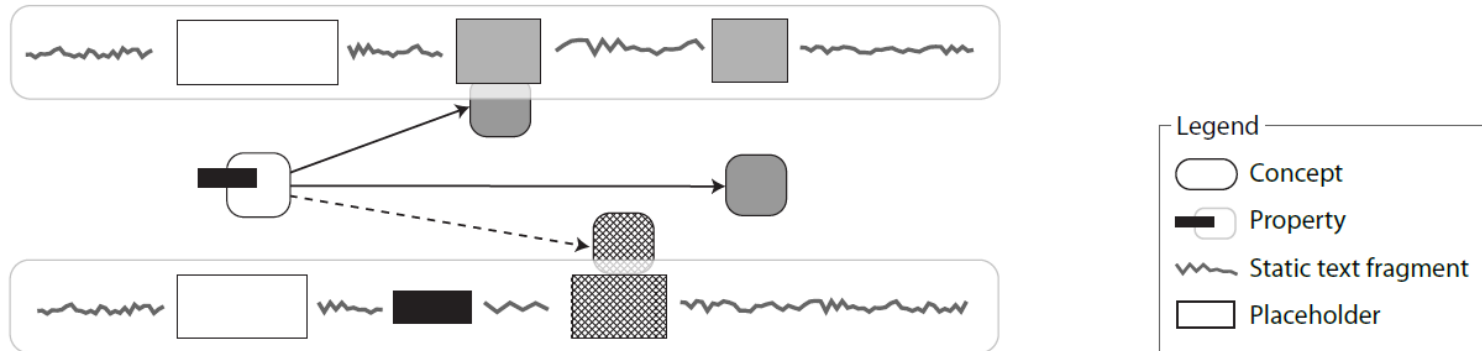
```
property name : String
property age: Integer
property addresses:
}
entity Address {
property street: Str
property city: Strin
}
```



Early lessons learned

- Free typing is not a great editing metaphor
 - Is it freedom if there is more wrong than right?
- Limiting users in the number of ways things must be expressed is a good thing
 - Consistency and quality
 - No need to make choices at every sentence
- Guidelines are needed to avoid ambiguity
 - For instance from SBVR/Rulespeak

Introducing Pattern Sentences



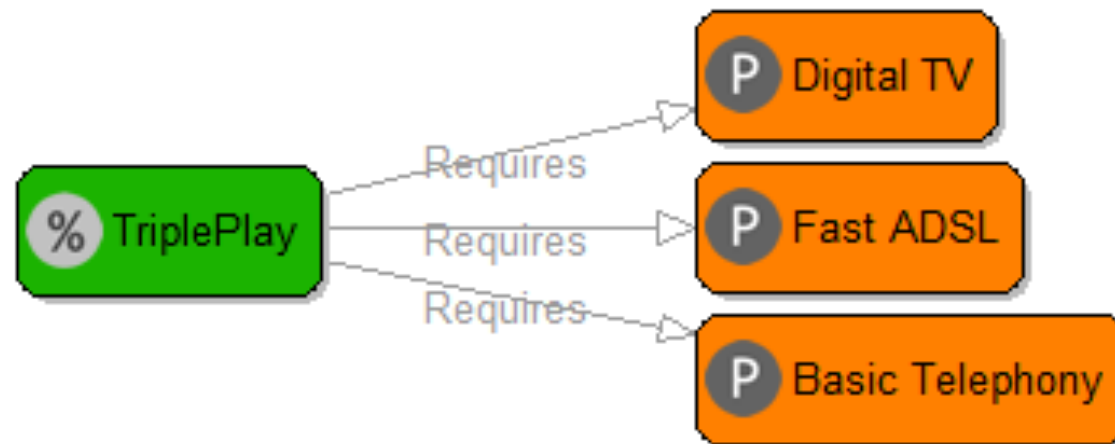
- Sentence Parts mapping to triple types in formal graph
 - Static Text
 - Introduction of concepts (Objects)
 - References to concepts (Subjects)
- Editing operations based on pattern sentences
 - Choosing sentence parts
 - Name an introduced concept
 - Choose an existing concept to refer to

Why Pattern Sentences

- Bridge the gap between formal and natural approach
 - The underlying model is the formal graph
 - The sentences are hand made for comprehensibility
 - Based on best practices in the BR comm. like RuleSpeak
- Based on NLG
 - No parsing: on editing, widgets are NLG-ed in
 - Provides freedom in choosing pattern sentences
- Ability to embed “explanation” inside the pattern
 - Example: next slide

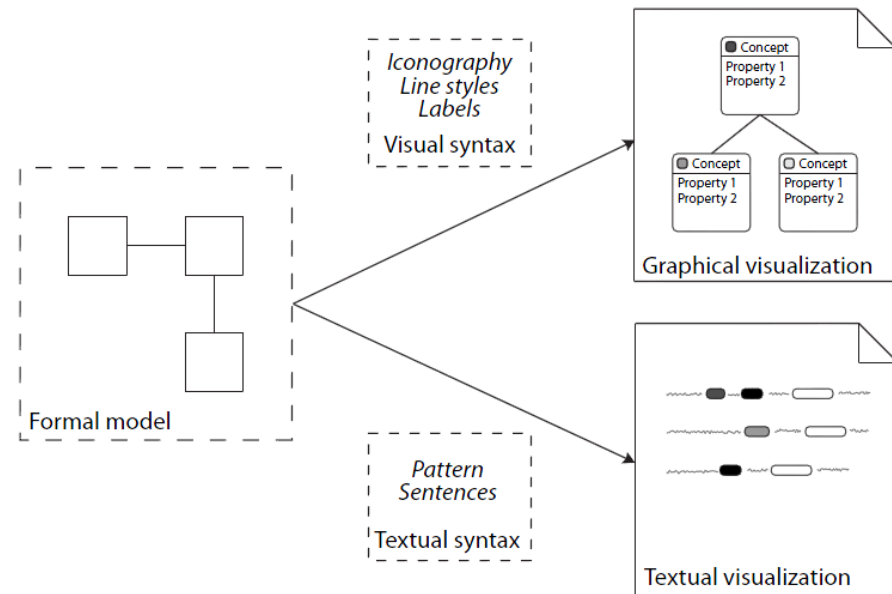
Example

A customer applies for the Triple Play by ordering all of the products Digital TV, Fast ADSL and Basic Telephony



Additional Advantages

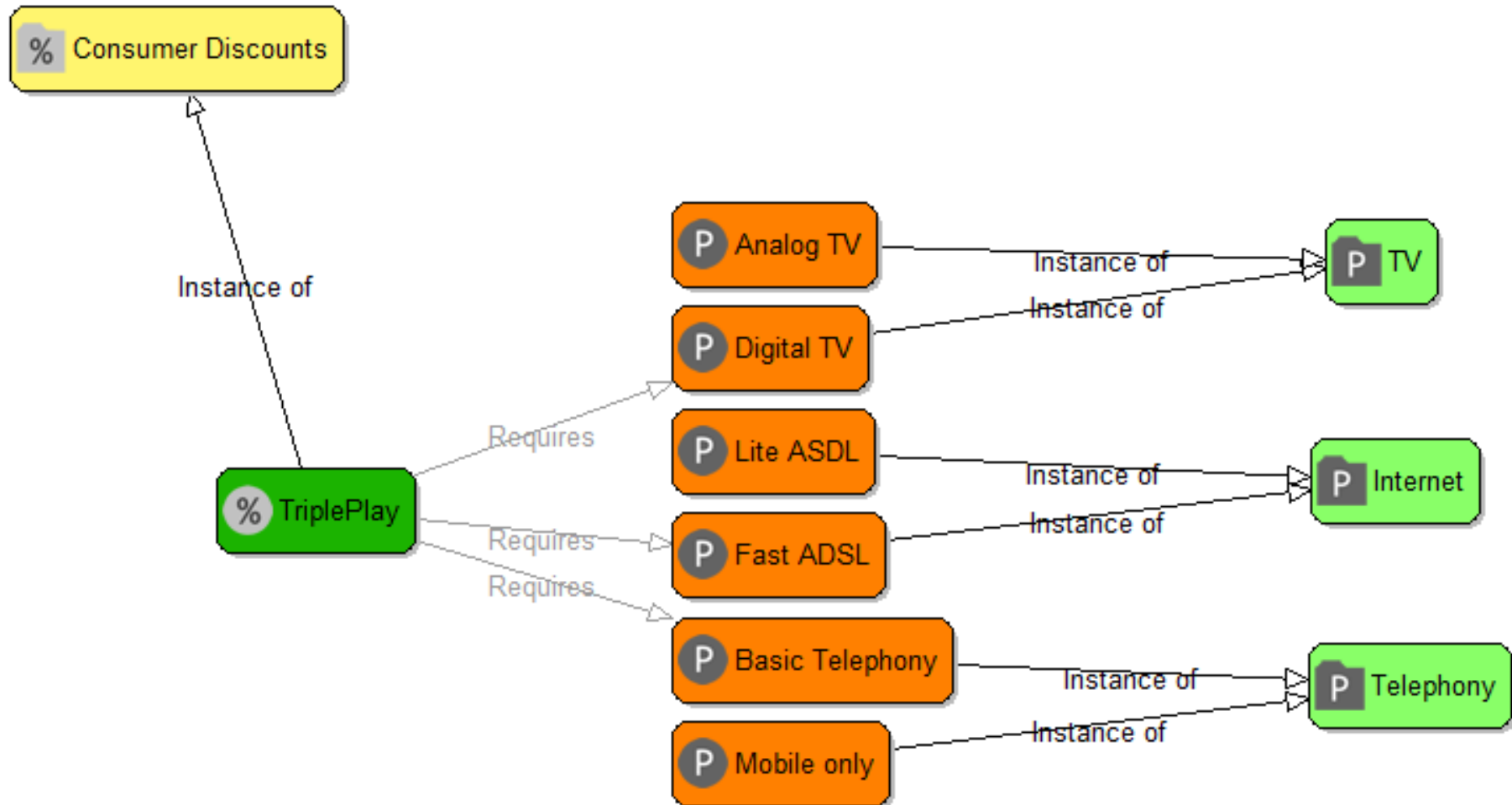
- Pattern sentences on top of formal graph has other advantages
- Multiple visualisations
 - Visual, tabular, textual
- Multiple languages
 - Translated Patterns
- Multiple target groups
 - I.e. Grammars for different Expert levels



Demo: Textual Policy

In telecommunications, triple play service is a marketing term for the provisioning of two bandwidth-intensive services, high-speed Internet access and television, and a less bandwidth-demanding (but more latency-sensitive) service, telephone, over a single broadband connection. Triple play focuses on a combined business model rather than solving technical issues or a common standard.

Demo: The knowledge model



Demo: The model driven service

init

reset-current-instrument

Consumer

What type of Internet dou
you want?

Lite ASDL

Lite Uncapped, is an entry level uncapped, unshaped package that offers low to medium usage users a Premium speed at an affordable rate.

Fast ADSL

Our Fast ADSL network was designed for users whom requires superior, business critical connectivity. Our Uncapped products run on a World Class Business ADSL network, where we take the meaning of 'Always-On' to heart. With fail-over accounts at the clients disposal, 'going down' will not be an option!



Asymmetric Digital Subscriber Line (ADSL) is one form of the Digital Subscriber Line technology, a data communications technology that enables faster data transmission over copper telephone lines than a conventional voiceband modem can provide. It does this by utilizing frequencies that are not used by a voice telephone call.[1] A splitter, or DSL filter, allows a single telephone connection to be used for both ADSL service and voice calls at the same time.

ADSL can generally only be distributed over short distances from the central office, typically less than 4 kilometres (2 mi), [2] but has been known to exceed 8 kilometres (5 mi) if the originally laid wire gauge allows for farther distribution.

Answers

No questions answered

Zoeken

Zoek

Demo: Reviewing based on Natural Language

Discounts

There is a discountgroup **Consumer Discounts**

There is a discount **Early Adopters** of the discountgroup **Consumer Discounts** and you can apply for the discount by ordering **Lite ADSL**

There is a discount **TriplePlay** of the discountgroup **Consumer Discounts** and you can apply for the discount by ordering **Fast ADSL** , **Digital TV** and **Basic Telephony**

There is a discount **Traditional package** of the discountgroup **Consumer Discounts** and you can apply for the discount by ordering **Analog TV** and **Basic Telephony**

Demo: Business users write rules

Discounts

There is a discountgroup **Consumer Discounts**

There is a discount **Early Adopters** of the discountgroup **Consumer Discounts** and you can apply for the discount by ordering **Lite ADSL**

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There is a discount **Traditional package** of the discountgroup **Consumer Discounts** and you can apply for the discount by ordering **Analog TV** and **Basic Telephony**

Th

sentences

There is a productgroup _____

The producttype _____ is part of


The product _____ is a product of the type

There are _____



There is a discountgroup _____


There is a discount _____ of the discountgroup you...

Demo: Grammar Configuration



▼ Discount [Subject fragment] 

Label

Concept type [Discount](#)  

▼ Product [Object reference fragment] 

Label

Concept type [Productinstance](#)  

Single occurrence prefix

Multiple occurrence prefix

Link word



Link word has a leading space



Last link word

Last link word has a leading space

Minimum occurrences

Maximum occurrences (0 is infinite)

Relation type [Requires](#)  

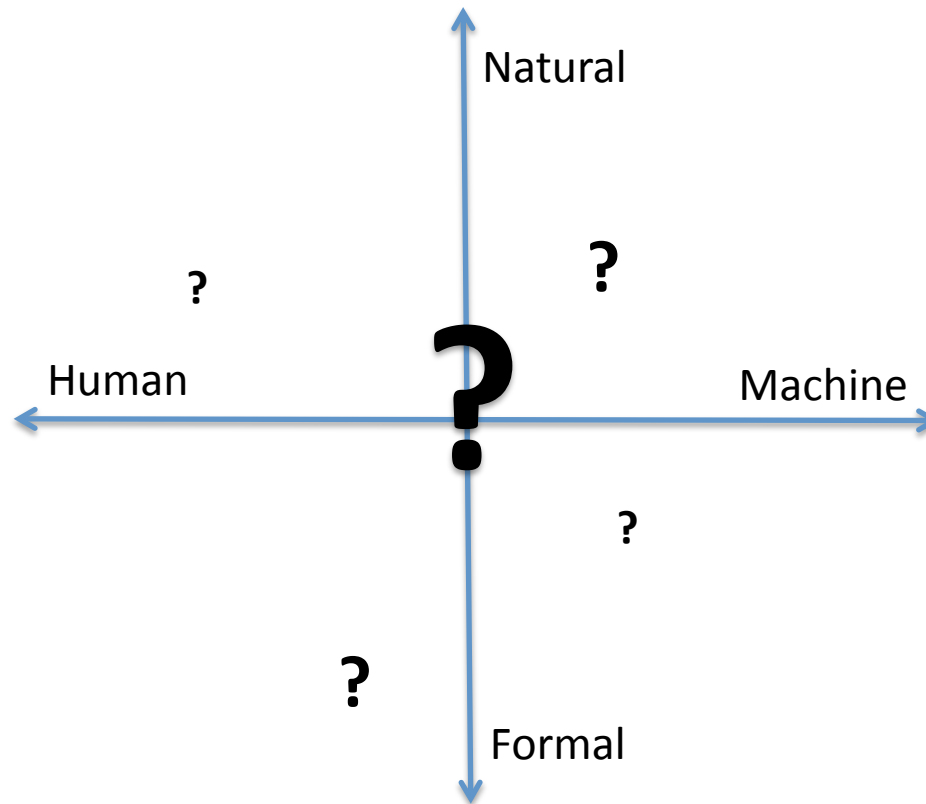
Subject type [Discount](#)  

- Discount
- New discount
 - There is a discount
 - Discount
 - of the dicountgroup and you can apply for it
 - of the discountgroup
 - of the discountgroup
 - Discountgroup
 - and you apply for it
 - you apply for it by ordering
 - Product

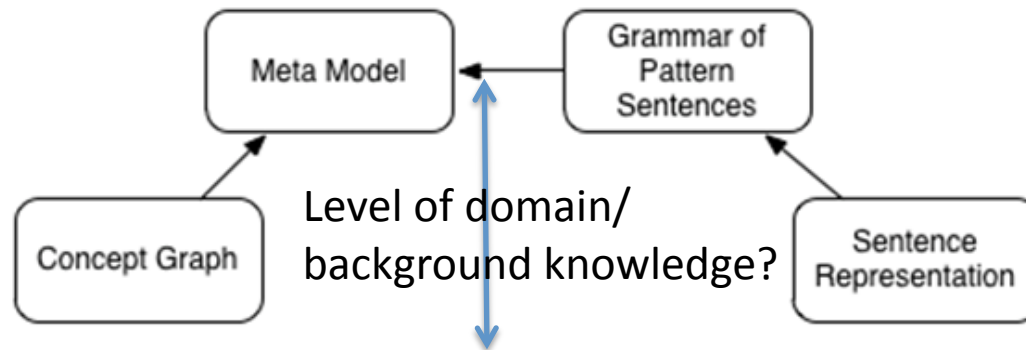
Remaining Challenges

- How to prevent large numbers of patterns
 - Language variations:
 - Inflectional morphology: Plurals,...
 - Other natural languages
- Mathematical Expressions
- Named things vs anonymous things
- Extending/relating CNL's like we extend/relate meta models

Discussion: What did you see today?



Discussion: An important CNL dimension?



Help needed

- Will this UI work?
- Can you imagine hybrid scenario's?
 - Based on Patterns
 - NLP for plurals, expressions, conditions
- Other advice?
- Pointers to related work?