Reference Ontology for Business Models
Towards Interoperability between Business Modeling Ontologies

Licentiate Thesis

Tharaka Ilayperuma
Overview

• Motivation
• Business Models and Business Modelling Ontologies
  – BMO
  – e³-value
  – REA
• The Reference Ontology – How we model things?
• Facilitating interoperability between BM ontologies through the Reference ontology– the mappings
• Contributions
Motivation

• Basic requirement of an Ontology
  – Being a generic description shared by a community of users

• Interoperability between different business models
Business Models and Ontologies

“Business models describes how a company intends to create value in the market place …”

“Ontologies are viewed as increasingly important tools for structuring domain of interests.”
Business Modelling Ontologies ..

- Business Model Ontology
- $e^3$-value Ontology
- Resource Events Agents (REA) Ontology
BMO Main Concepts

WHAT?
VALUE proposition

WHAT?
Customer group

HOW?
Value configuration

Distribution channel

HOWN?
Partnership

Revenue

Core capability

Cost

HOW MUCH?
Relationship
An $e^3$-value Business Model
REA Ontology – An Example

Reference Ontology for Business Models
Towards Interoperability between Business Modelling Ontologies
Reference Ontology – Resources, Features, and Rights

An actor is entitled to handle a resource in a certain way (use, income, transfer)

RIGHT

Own
Borrow

RESOURCES

Book

FEATURE

Any property or association of the resource

Weight
Number of pages

September 28, 2007
© Tharaka Ilayperuma

Reference Ontology for Business Models
Towards Interoperability between Business Modelling Ontologies
Three Components of a Transfer

- EVIDENCE DOCUMENT
- TRANSFER
- RIGHT

Custody

Resource

Movie

Goods

Services

Information

Money

1 Right
2 Custody (access, enabling)
3 Evidence of right

Transfer of

Ticket

Evidence

Transfer

Goods

Services

Information

Money
Transfer and Conversion

CONVERSION

FEATURE

RESOURCES

TRANSFER

RIGHT

of

on
Grouping Transfers and Conversions – The Process Concept
Grouping Transfers and Conversions – The Process Concept …
Creating Common Understanding

• Use of the Reference Ontology to map concepts in original ontologies.
  – Too many differences make it difficult to map one concept to another.
  • e.g. *Value Object* in e3-value and *Economic Resource* in REA
Example - BMO to Reference Ontology

Distribution Channel | Actor and Transformation process

**RELATIONSHIP MECHANISM**
- Active artists acquisition for famous artists
- Passive web sign-up for unknown artists
- Standardized mailings

**DISTRIBUTION CHANNEL**
- Artists acquisition department
- Rights Clearing department

**CUSTOMER SEGMENT**
- Customer Interface
- Rights Users
- Right owners

**PROCESS**

**EVENT TYPE**

**TRANSFORMATION**
- Rights collection
  - Collecting music rights
  - Making payments
- Rights redistribution
  - Clearing music rights
  - Collecting payments

**ACTOR TYPE**
- RightsSociety

**CONVERSION TYPES**

Mapped concepts in the Reference Ontology
Example – REA to Reference Ontology

<table>
<thead>
<tr>
<th>Economic Event</th>
<th>Transfer Event of an Actor (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Resource</td>
<td>Resource</td>
</tr>
<tr>
<td>Economic Event Type</td>
<td>Transfer Type of an Actor Type (2)</td>
</tr>
</tbody>
</table>

REA model for music rights case from an Artist’s perspective
Example – $e^3$-value to Reference Ontology

<table>
<thead>
<tr>
<th>Value port</th>
<th>Transfer type (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value exchange</td>
<td>Exchange (4)</td>
</tr>
</tbody>
</table>

```xml
<Exchange rdf:ID="E113">
  <hasEventTypes>
    <TransferType rdf:about="#TT78">
      <hasTransferredRight rdf:resource="#RightToMakePublic"/>
      <hasTransferredOrConversedResourceType rdf:resource="#Song"/>
      <hasActorType rdf:resource="#Artists"/>
      <isEventType rdf:datatype="http://www.w3.org/2001/XMLSchema#string">decrement</isEventType>
    </TransferType>
    <TransferType rdf:about="#TT105">
      <hasTransferredRight rdf:resource="#RightToMakePublic"/>
      <hasTransferredOrConversedResourceType rdf:resource="#Song"/>
      <hasActorType rdf:resource="#RightsSociety"/>
      <isEventType rdf:datatype="http://www.w3.org/2001/XMLSchema#string">increment</isEventType>
    </TransferType>
  </hasEventTypes>
</Exchange>
```
Realising Mappings

Two step mapping process
Realising Mappings

An XQuery function used in Step 1

```
declare function local:getTransactionInterfaceProcess() as element()* {
    let $docName := doc("musicRights.rdf")
    let $vi := $docName/a:value_interface
    for $j in (distinct-values(local:getTransactionTransferType()))
        let $q := fn:substring-before($j,"_")
        let $r := fn:substring-after($j,"_")
        return element Transaction {attribute rdf:ID {fn:concat("TP","$j")},
        for $vi1 in $vi return
            for $t in $q return
                if (string($vi1/@a:e3_has_uid) = $t) then
                    for $i in (local:getExchnagesofInterfaces($t)) return
                        element hasExchanges {
                            element Exchange {attribute rdf:about{fn:concat("#E","$i")},
                            local:getExchangeRelatedValuePort($i)}
            } else() 
    }
};
```

An XSLT template used in Step 2

```
<xsl:template match="Exchange//TransferType"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:owl="http://www.w3.org/2002/07/owl#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
    <xsl:param name="e_resource_id" select="current()/@rdf:about"/>
    <xsl:param name="e_transfer_id" select="substring-after($e_resource_id,'#')"/>
    <xsl:copy>
        <xsl:copy-of select="@*"/>
        <xsl:copy-of select="$file2//TransferType[@rdf:ID = $e_transfer_id]/*"/>
        <xsl:apply-templates/>
    </xsl:copy>
</xsl:template>
```

September 28, 2007
© Tharaka Ilayperuma

Reference Ontology for Business Models
Towards Interoperability between Business Modelling Ontologies
Thesis Contributions

• Analysis of value transfers
• Facilitating the common understanding between similar concepts in different ontological approaches
• Realisation of mappings between $e^3\text{-value}$ and the Reference Ontology
Thank you!

- Questions/Comments