BEA Ontology Development

March 1, 2012

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• Design and create a BEA ontology that establishes and integrates BEA, DM2, BPMN 2.0, and other domain ontology OWL files
• Migrate existing BEA data to RDF store that reflects new integrated ontology
• Test the BEA RDF store with queries from TopBraid Composer (desktop)
  ➢ Query from BEA, BPMN, and DM2 perspective
Notional BEA Ontologies

BEA Ontology

- BPMN 2.0
- DM2
- BEA Core
- H2R
- P2P
• Created BMPN 2.0 Ontology
  ➢ Use BPMN 2.0 specifications as guidelines to create ontology
  ➢ Ontology closely resembles specifications
  ➢ Flesh out BPMN Ontology with Signavio generated XML data
  ➢ *Plan to programmatically migrate BPMN xml generated from tool, into “BPMN RDF”

• Created DM2 Ontology
  ➢ Based on DM2 Logical and Conceptual Model
  ➢ Replaced IDEAS constructs with OWL constructs

• Transformed BEA non-BPMN data (SPIN & SPARQLMotion)
  ➢ Non-BPMN data: (OV2, OV5a, OV5b, SV1, Svc, CV-2) to BEA Core Ontology
  ➢ Mapped concepts to DM2 directly or indirectly(through non-BPMN ontology)

• Transformed BEA BPMN related data (SPIN & SPARQLMotion)
  ➢ BEA BPMN data: (Ov-6c, *E2E)
  ➢ Replaced BEA BPMN related concepts with BPMN 2.0 Ontology concepts

• Created BPMN Ontology Mappings(SPIN and Rules)
  ➢ Mapped appropriate BPMN 2.0 classes to DM2 classes (sub-classing)
  ➢ Mapped appropriate DM2 properties to BPMN properties (rules & chaining axioms)
• **OWL2 (OWL-DL)**
  - Why OWL2 over OWL1?
    - Improved data types
    - Additional features support for more powerful reasoning; e.g. property chains
  - Why OWL Description Logic(DL)
    - Maximum expressiveness
    - Reasoning with completeness and decidability

• **SPARQL 1.1**
  - Why SPARQL 1.1?
    - Useful new features; e.g. “Aggregate”
• Migrated BEA data to BEA “flat” RDF store(leveraged eTools and Jena)
• Created and integrated BPMN, DM2, BEA Ontologies
• Used TopBraid SPIN & SPARQLMotion to map and migrate data from BEA flat RDF to new BEA structured RDF(based on new Ontologies)
• Query new BEA RDF with SPARQL based on use cases from TopBraid
• TopBraid Composer & Protégé
• eTools(custom built)
• Jena
• Eclipse
BEA Diagram Data flat RDF

SPARQL Motion example

BEA Diagram Data flat RDF

Constructs (diagrams created not using SPIN)

SPIN Mapping Rules

Constructs (of definitions)

New non-BPMN ontology

New non-BPMN RDF store
• DM2
• BPMN 2.0
• Mapping BPMN to DM2
• BEA legacy data to integrated ontology
• **DM2:**
  • Measures (work with CIO)
  • Modify Predicate names?
  • DM2 use cases testing

• **BPMN 2.0:**
  • Run through use cases and modifications

• **Complete Mapping BPMN to DM2:**
  • Test chain axiom mappings with updated Pellet(Stardog)

• **BEA legacy Transformations:**
  • Work through remaining mappings
  • Div 2, Div 3

• **Create Target RDF Stores**
  • BPMN RDF
  • Non-BPMN RDF
  • **Build fully combined Mapping Ontology RDF**

**Outstanding Items**
Next Steps

- Develop specific use cases and test
- Continue to flesh out Ontologies
- Finish outstanding mappings…
- Generate full RDF
Example Class Mappings