Semantic BPMN:
BPMN-2.0 Ontology-Based Query Engine

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Outline

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    - Loan, FIBO-Based
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  - Data Applicant Model
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    - Data-Based
  - Business Rule Examples
BPMN-2.0 Engine – Contributed Technologies
Ontology & Metamodel

- An ontology is a formal explicit description of a particular domain in terms of:
  - Concepts
  - Data properties of concepts
  - Object properties among concepts
  - Restrictions
  - DataRange
  - Instances
  - etc.
  - Model

- Key Features:
  - Formally and natively handles semantic in a standard way (W3C)
    - Leads to machine automation
  - Supports inferencing
    - Can infer non-explicit information, or find hidden patterns
  - Excellent choice for complex model/metamodel

- Metamodel:
  - Information about the structure and definitions of a business data model.
  - A language that describes a model.
BPMN-2.0 vs. BPMN-1.x

- No major changes in:
  - Flow objects (Activities, Events, and Gateways)
  - Connecting objects (Sequence Flow, Message Flow and Association)

- New features
  - Some convenient events
    - Non-interrupting event
    - Escalation event
    - Event sub-process
  - A new choreography model
  - Promoting data object/store to a first-class element
  - A formal standard XMI Metamodel
BPMN-2.0 Metamodell Structure

BPMN-2.0 Metamodel (Jan 2011)

- 21 Packages (OWL model per package)
- 140 Classes (+ 181 Class restrictions)
- 64 Attributes
- 185 Associations (many across packages)

- See UML Models…
BPMN-2.0 Core Elements

- Process
- FlowElement
  - SequenceFlow
  - FlowNode
    - GateWay
    - Activity
    - Event
  - DataObject
    - DataInput
    - DataOutput
    - DataStore
    - DataStoreReference
  - SubProcess
  - Task
- ItemAwareElement
BPMN-2.0 Core Elements – Cont.
Semantic BPMN Reference Architecture

- Standard-Based
- Model-Driven Based
- Plug-and-Play Based
- Best Practices Based
Semantic BPMN - Loan Architecture – Domain-Based

Loan Process Model

Sub-Process Expansion

BPMN-2.0 Ontologies

Bank Enterprise Data Ontologies

Bank Enterprise Data Models

Applicant Data Model

Loan Process Ontology Schema

IFW Ontology Schema

representedAs

extends

type

uses

instantiates
Semantic BPMN - Loan Architecture – FIBO-Based
Information FrameWork - IFW

Verb

Acquire
Activate
Administer
Decide
Manipulate
Prepare
Provide
Record
Suspend
Terminate

Before

After
BPMN-2.0 Ontologies
- Fully generated from XMI metamodel using UML-OWL Generator
- Could be manually created from UML diagrams
  - Needs time and experience

Process Domain Ontologies
- IBM Information FrameWork (IFW) Taxonomy
  - 116 abstract activities
  - Core registry for bank activities
  - Needs to be extended to fine-grain concrete activities
  - Automatically transformed to an OWL ontology
  - Represents an upper ontology for other schema ontologies
Live Demo
Bank Loan Process

- Collaboration Diagram for Bank Loan Process
  - Three Participants (3 Pools)
  - Main Process has two Swimlanes
  - A set of BPMN elements includes:
    - Tasks, Sub-Process, Gateways, Events, Data Object, Data Store, etc.

- Applicant Data Model (extends Enterprise Data Model)
  - Classes, Attributes, Associations, Enumerations
Query-1: Find all Service Task classes

Applicant Data Model

Loan Instance Data

MAKE DISBURSEMENT SUB-PROCESS

START DISBURSEMENT DOCUMENTS

VERIFY DISBURSEMENT DOCUMENTS

CHECK PLEDGE?

PAY BY CHECK

ISSUE CHECK

END DISBURSEMENT

DEPOSIT IN BANK ACCOUNT

DEPOSIT IN LOAN ACCOUNT
Query-2: Find all process model instances for all applicants who applied for loans in 2011 and had disbursement by check
Thank you!