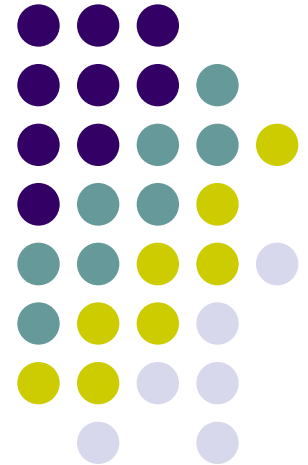


Semantic BPMN: BPMN-2.0 Ontology-Based Query Engine

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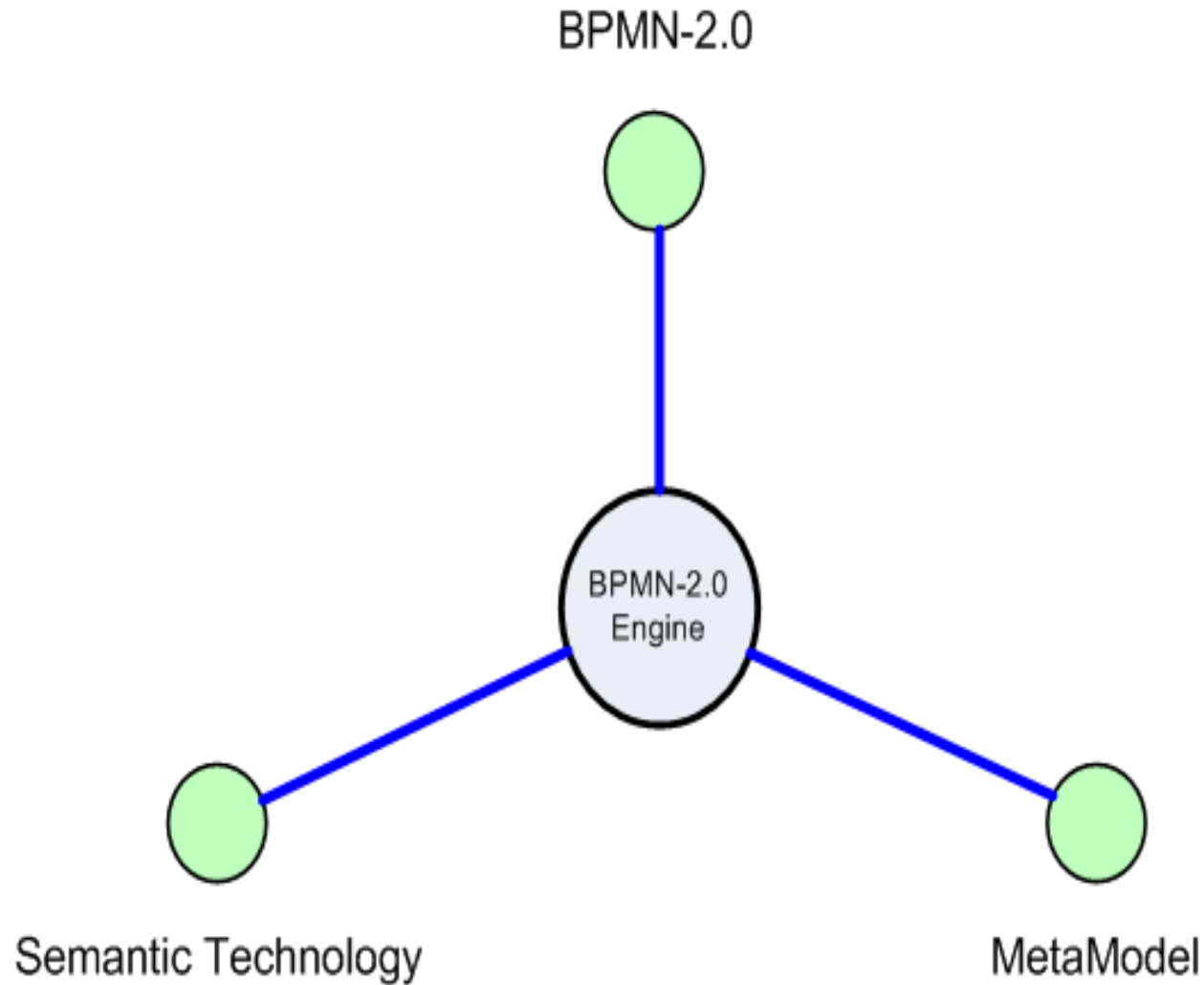


Outline



- **Introduction**
 - Ontology
 - Metamodel
- **BPMN-2.0 Metamodel Structure**
 - BPMN-1.x vs. BPMN-2.0
- **Semantic BPMN Architecture**
 - Reference Architecture
 - Domain-Based Architecture
 - Loan, Domain-Based
 - Loan, FIBO-Based
- **Live Demo and Questions**
 - Loan Process Model
 - Data Applicant Model
 - SPARQL Query Examples
 - Structured-Based
 - Data-Based
 - Business Rule Examples

BPMN-2.0 Engine – Contributed Technologies



Ontology & Metamodel



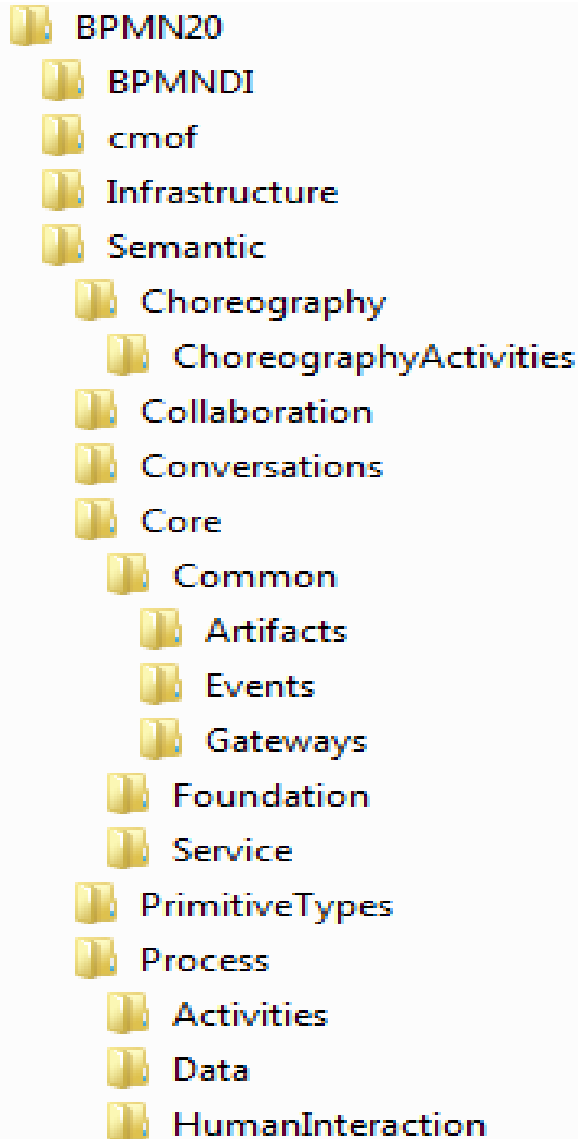
- An ontology is a formal explicit description of a particular domain in terms of:
 - Concepts
 - Data properties of concepts
 - Object properties among concepts
 - Restrictions
 - DataRange
 - Instances
 - etc.
 - Model
- Key Features:
 - Formally and natively handles semantic in a standard way (W3C)
 - **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 XML Metamodel***

BPMN-2.0 Metamodel Structure

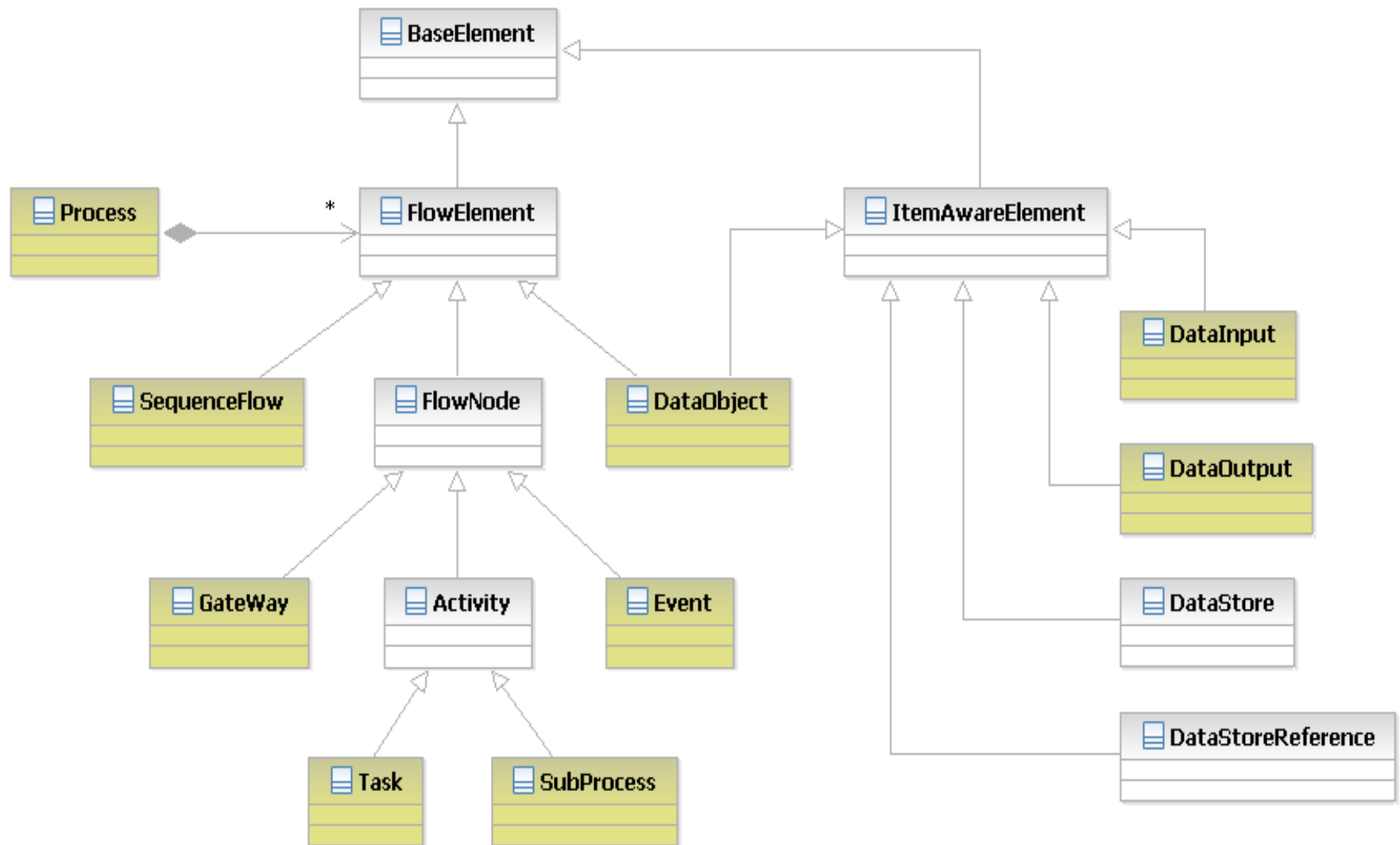


BPMN-2.0 Metamodel (Jan 2011)

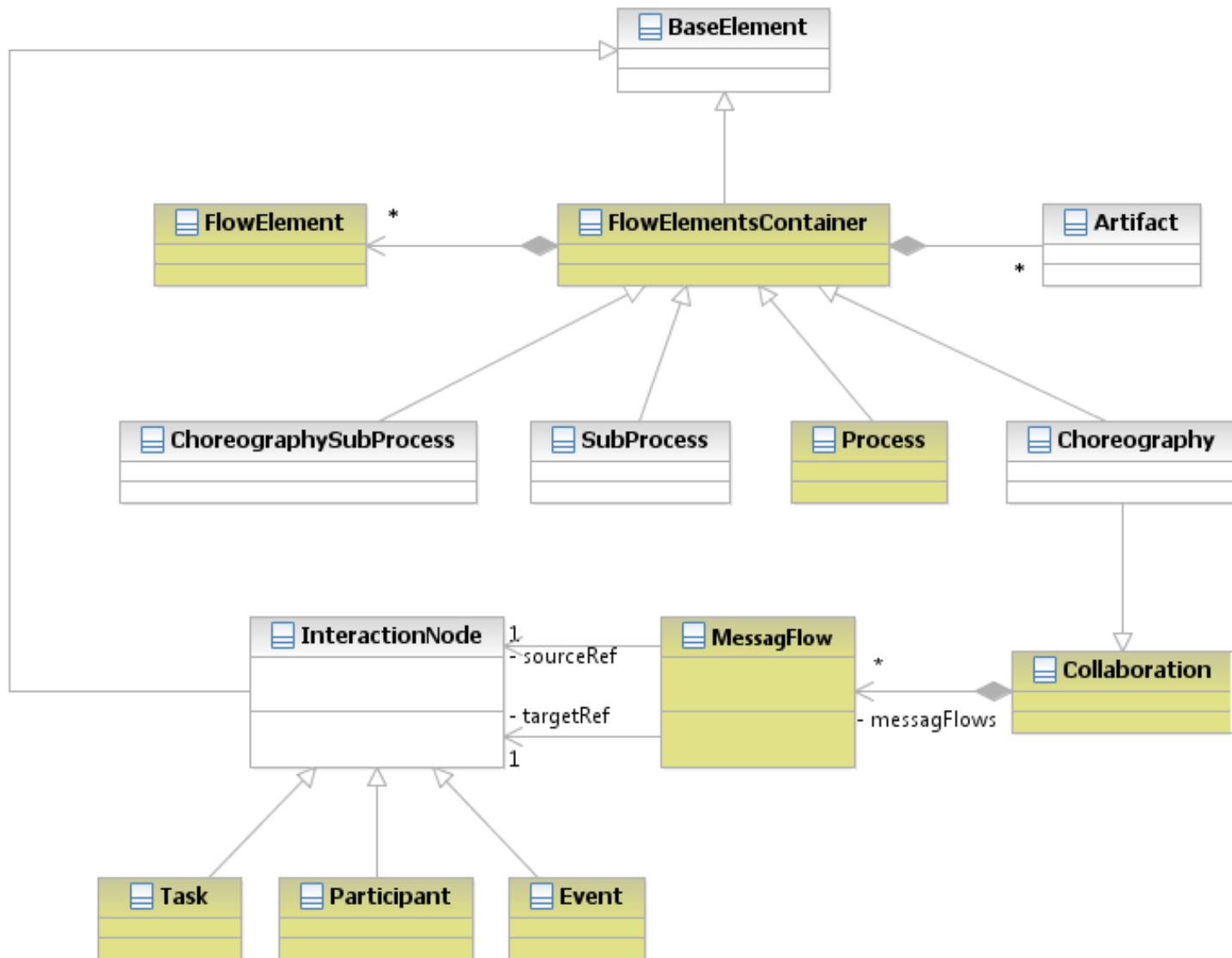
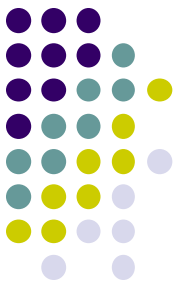
- **21** Packages (OWL model per package)
- **140** Classes (+ 181 Class restrictions)
- **64** Attributes
- **185** Associations (many across packages)

▪ See UML Models...

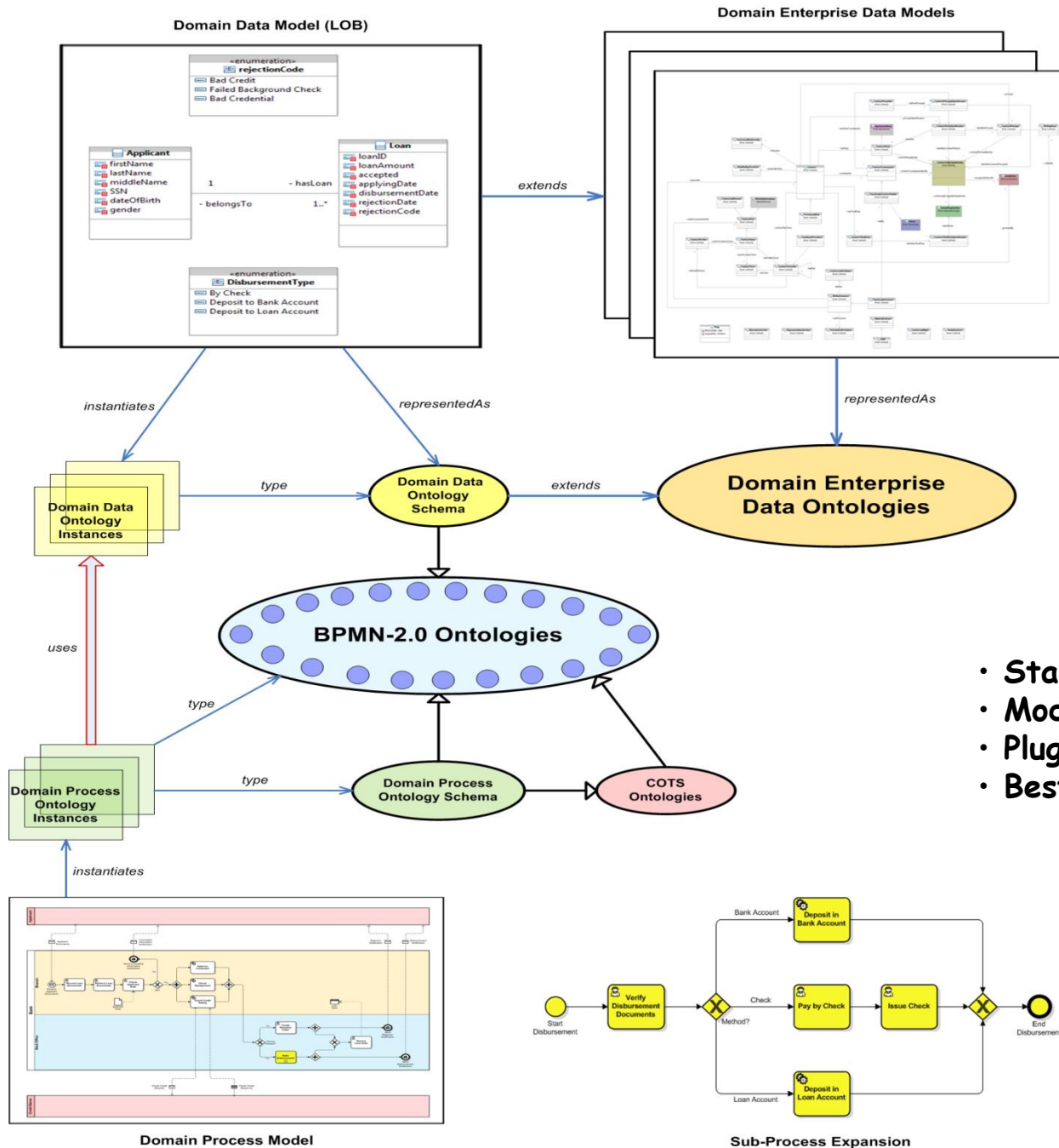
BPMN-2.0 Core Elements



BPMN-2.0 Core Elements – Cont.

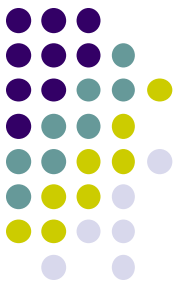
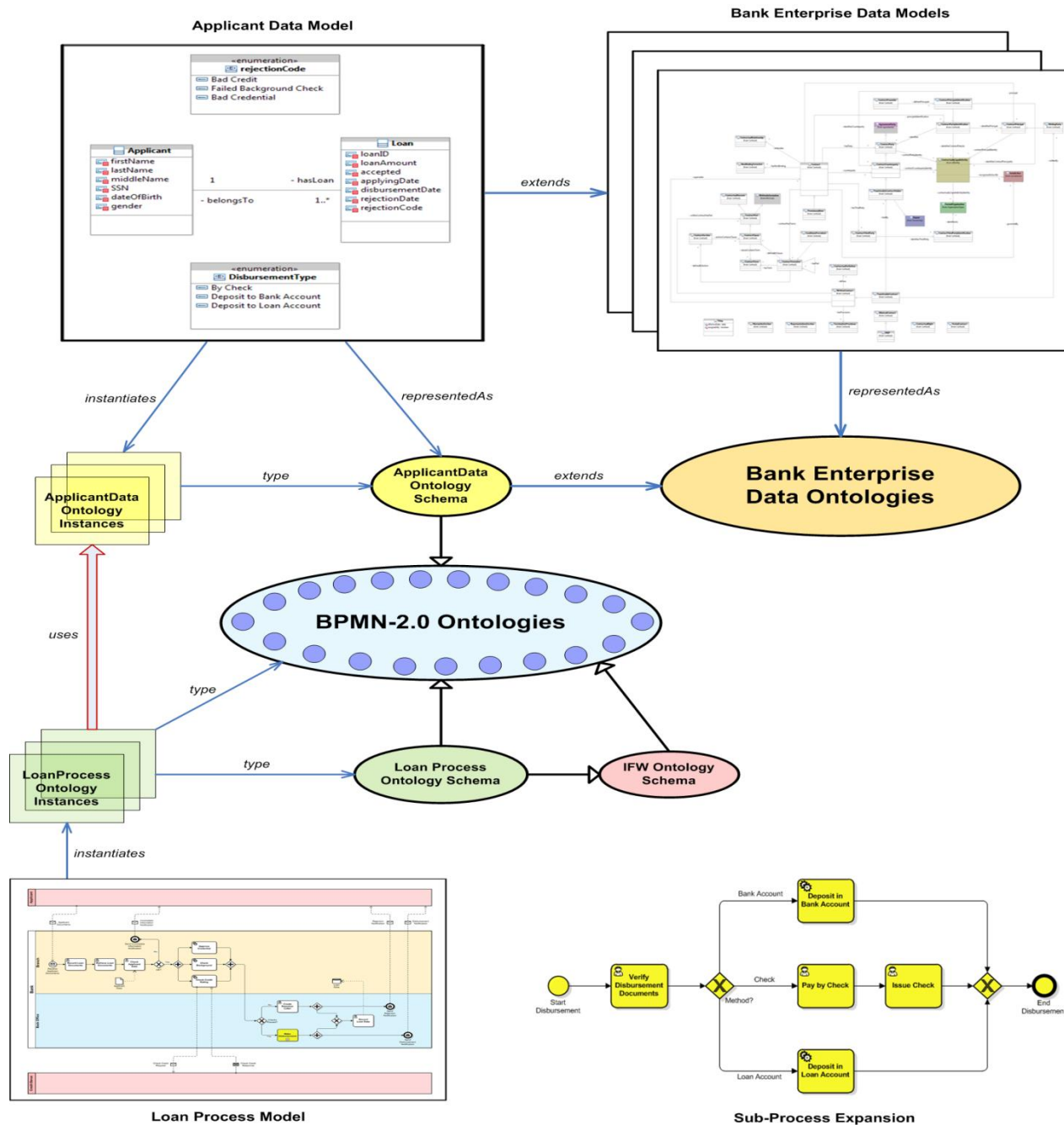


Semantic BPMN Reference Architecture

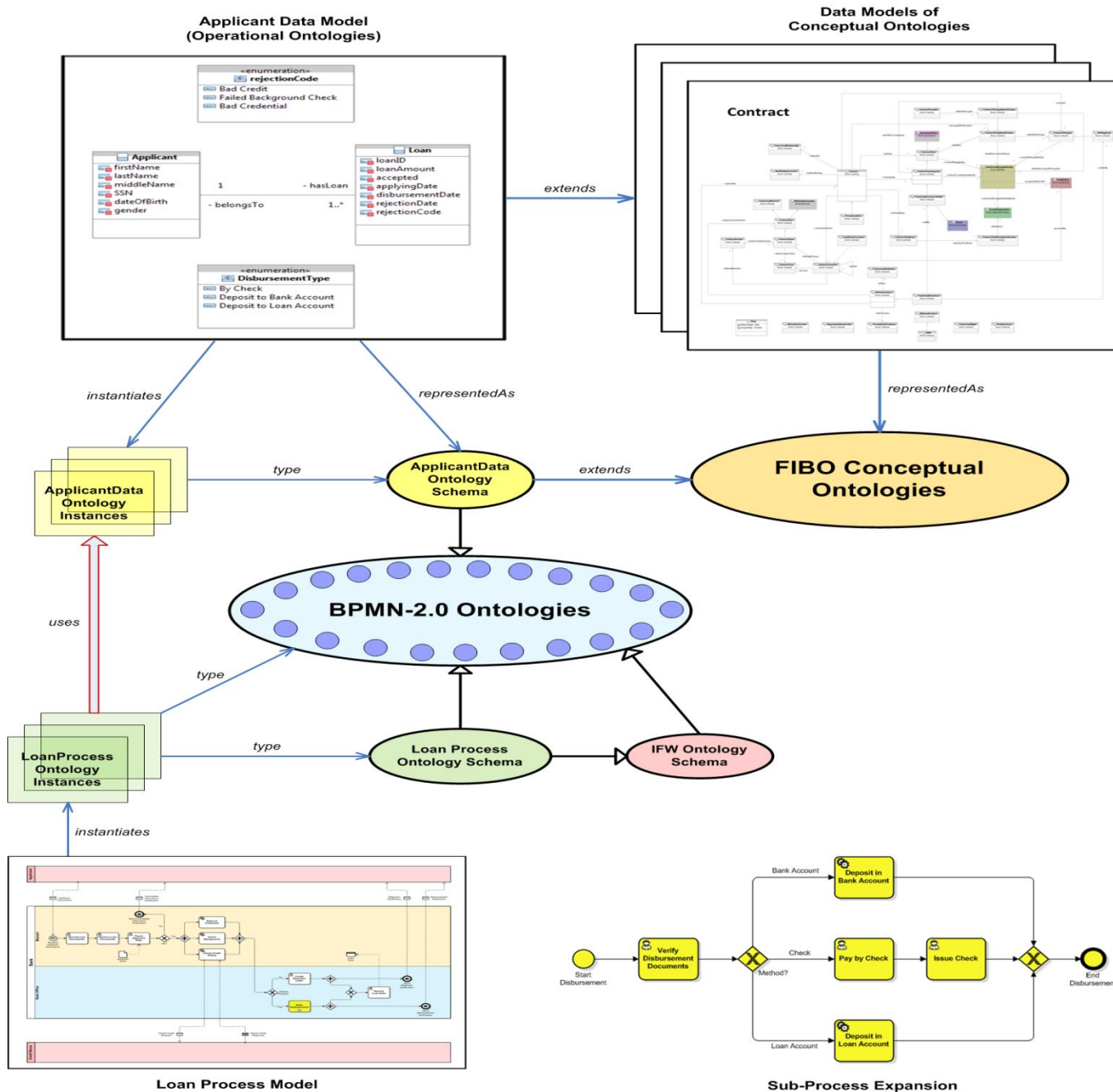
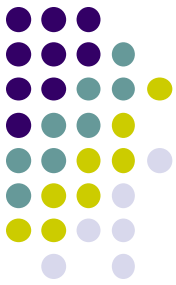


- Standard-Based
- Model-Driven Based
- Plug-and-Play Based
- Best Practices Based

Semantic BPMN - Loan Architecture – Domain-Based



Semantic BPMN - Loan Architecture – FIBO-Based

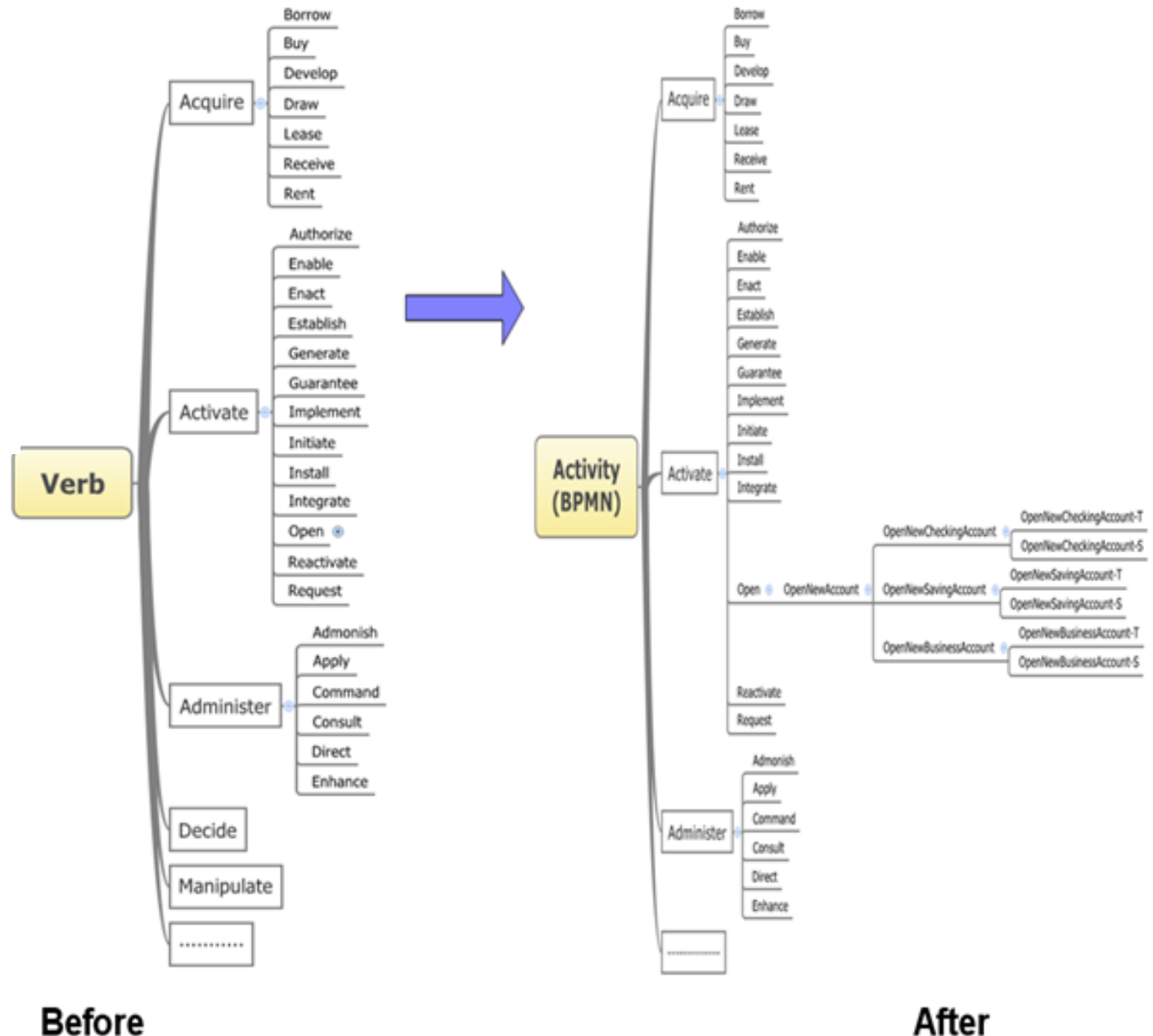


Information FrameWork - IFW



Verb

Acquire
Activate
Administer
Decide
Manipulate
Prepare
Provide
Record
Suspend
Terminate



Before

After

Engine Architecture – Cont.



- BPMN-2.0 Ontologies
 - Fully generated from XML 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

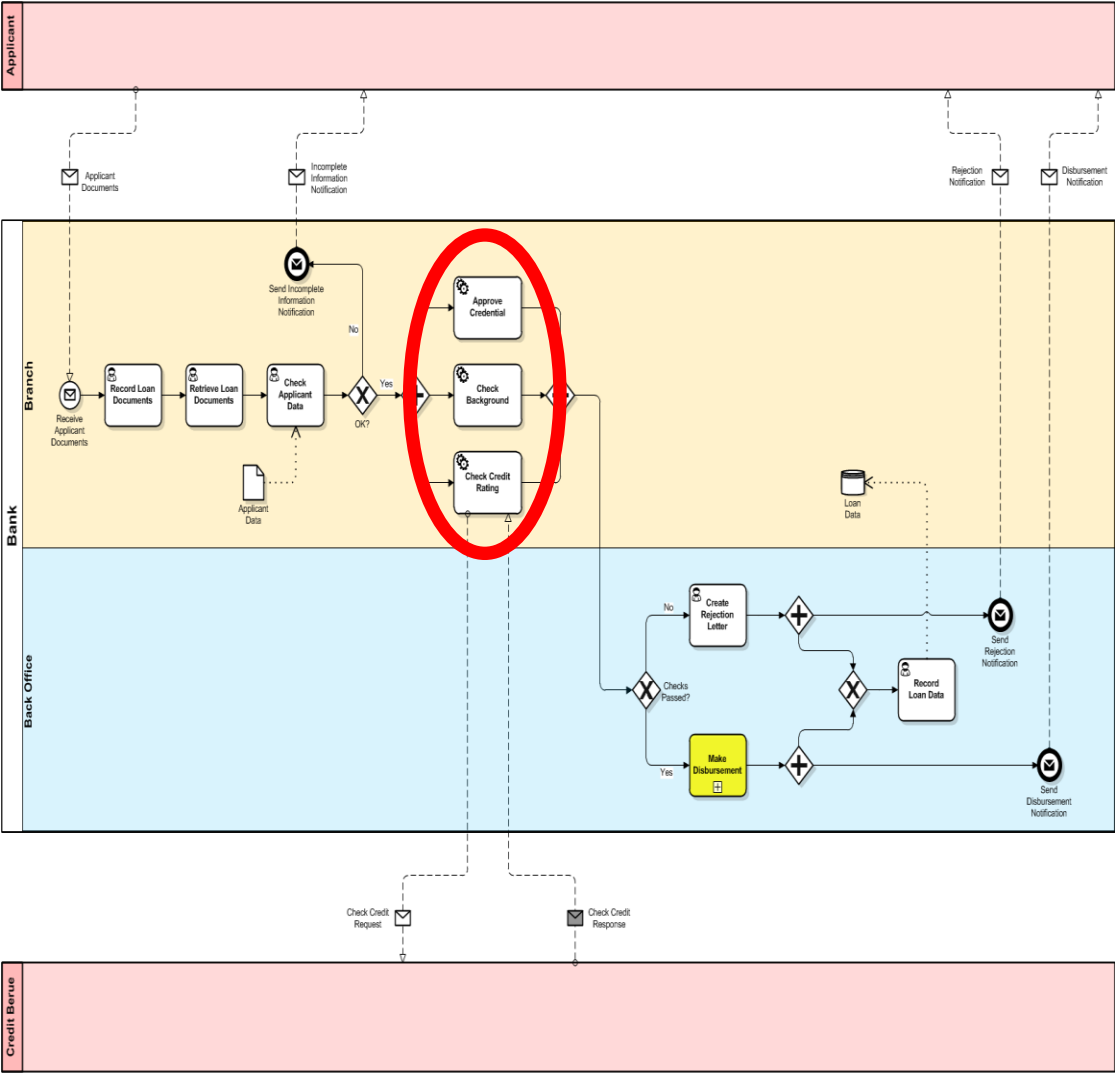
Live Demo

Bank Loan Process

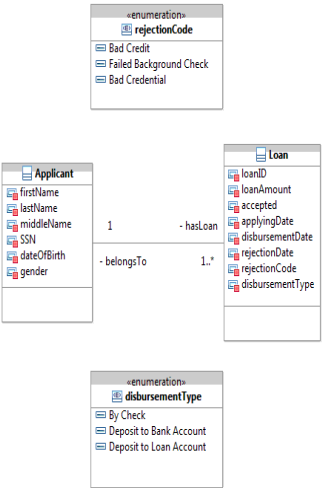


- Collaboration Diagram for Bank Loan Process
 - Three Participants (3 Pools)
 - Main Process has two Swimlanes
 - A set of BPMN elements includes:
 - Tasks, Sub-Process, Gateways, Events, Data Object, Data Store, etc.
- Applicant Data Model (extends Enterprise Data Model)
 - Classes, Attributes, Associations,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

Query-1: Find all Service Task classes



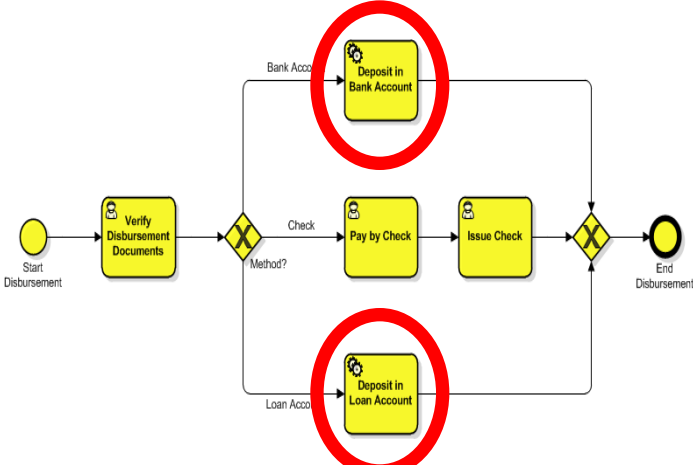
Applicant Data Model



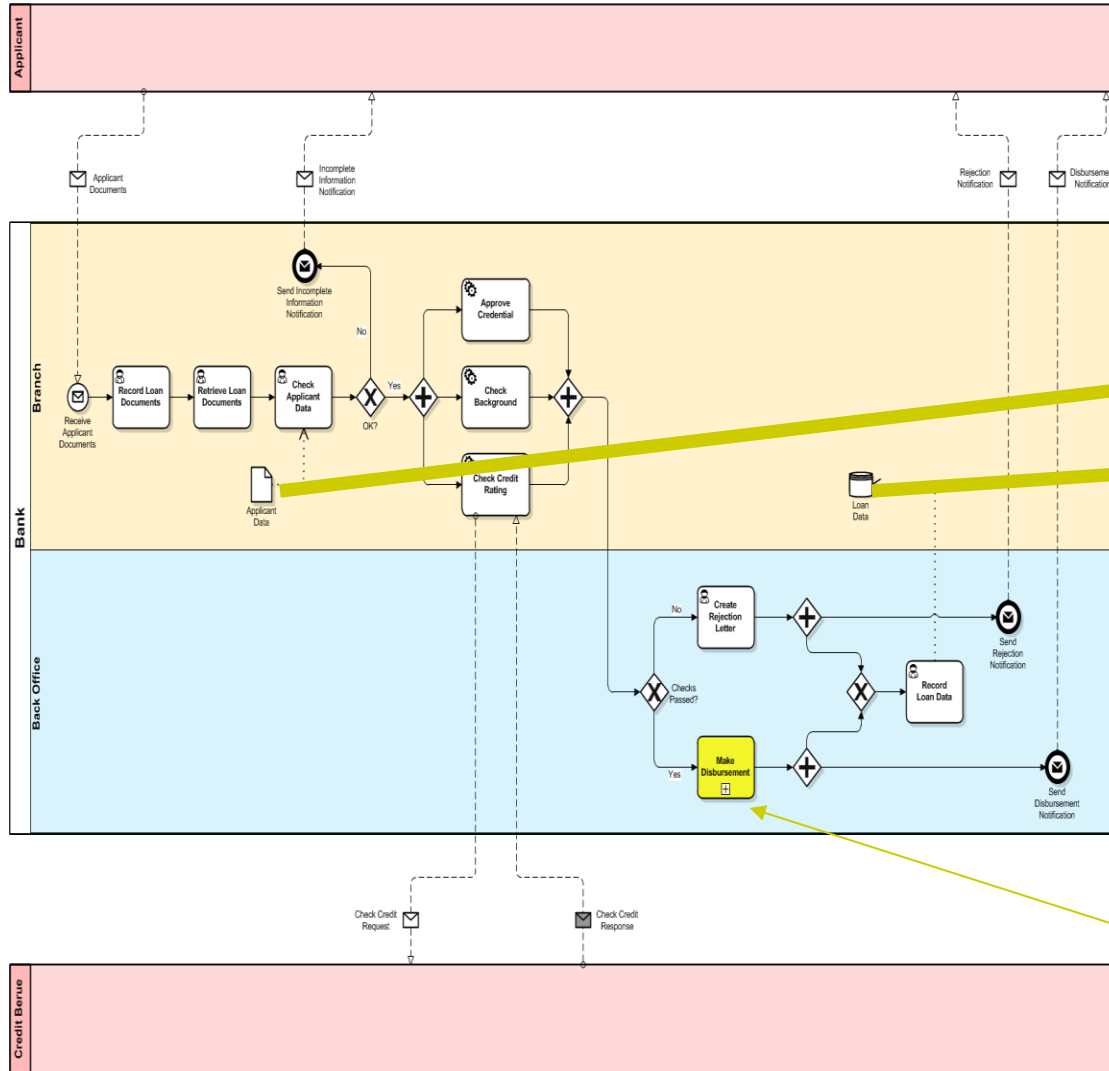
Loan Instance Data



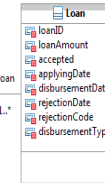
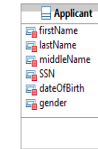
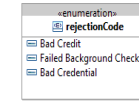
Make Disbursement Sub-Process



Query-2: Find all process model instances for all applicants who applied for loans in 2011 and had disbursement by check



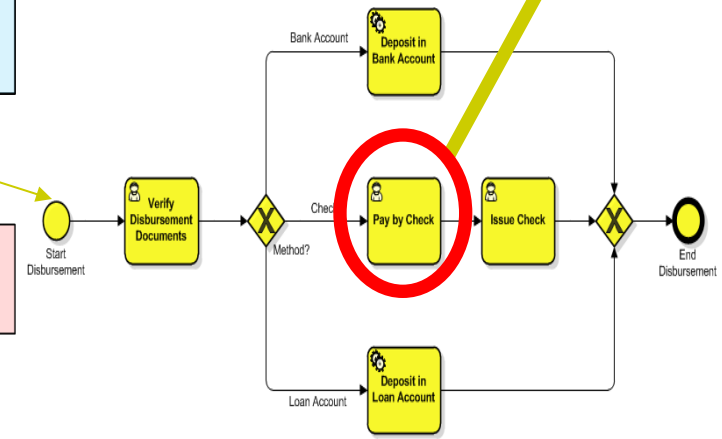
Applicant
Data
Model



Loan
Instance
Data



Make Disbursement
Sub-Process



Thank you!

