A Service-Oriented approach dedicated to Internet based Business Process Networks:

Building a MDA based collaborative platform with open-source solutions

EBM WebSourcing
Jean-Pierre LORRE – R&D Manager – ObjectWeb member

EBM WebSourcing
Parc technologique du canal, 10 avenue de l’Europe
31520 Ramonville Saint Agne, France
† EBM WebSourcing platform – Leading in providing a collaborative environment
  † Collaborative business process driven solution
  † Service Oriented Architecture
  † B2B collaborative services
  † Software as a service business model

† Corporate member of the ObjectWeb open-source consortium
  † ObjectWeb is an International consortium for open-source middleware
  † Leader of the PEtALS Enterprise Service Bus

† Provide consulting and training on Service Oriented Architecture (SOA) and open-source solutions
Talk objectives

- Present the corporate EBM WebSourcing tool chain dedicated to collaborative environments
  - BPMN Collaborative Business Process model
  - Transformation to Collaborative Information System
  - We target an ESB based Service Oriented Architecture

- Open source software is ready for enterprise use and SOA implementation
Plan

- Introduction
  - Collaborative platform

- MDA and SOA
  - Definitions and concepts

- Model driven collaborative Framework
  - Process and tools

- Conclusion
Our goal: to develop and operate a collaborative framework dedicated to enterprises ecosystems
Business drivers for collaborative environment

- **Target market**
  - Virtual community → group of organizations that join together in order to achieve common goals
  - Examples: Subcontractors group, business club, regional cluster

- **Business drivers for collaborative platform**
  - Business alliances with other stakeholders are more and more global
  - Communities of practice involvement in business alliances
  - IP connectivity anywhere at anytime becomes more and more a reality
  - Social web and social computing are emerging
What is a collaborative process?

Each partner is seen as a set of services
Collaborative process

- **Describes interactions between community members**
  - Collaboration process mediates interactions with the partner’s process
  - Describes collaborative logic

- **EBM collaborative platform**
  - Provides a set of collaborative services
  - Manages partner’s information system as a set of services

- **Examples**
  - e-procurement, trading platform, group-buying, business portal, supply chain, co-design, etc.
Requirements
Collaborative vs. in-house services

Collaborative
- Heterogeneity
- Independence
- Interoperability

Business
- Long transaction
- Highly distributed
- Scale factor
- Management

Loosely coupled service

Technical
- Short transaction
- Evolutivity
- Maintainability

In-house
- Value
- Reuse
Requirements
Collaborative vs. in-house Business Processes

Collaborative
- Multiple businesses (B2B)
- Many scenarios
- Multilingualism
- Interoperability

Business Processes

In-house
- Agility
- Choreography

Technical
- Short life-cycle
- High complexity
- Error management
- Trust

Orchestration
- Security
Interoperability as a main requirement for the collaborative platform

- The platform is easily customizable
  - To different kind of business ecosystems
  - Facilitates integration of new partners

- Target framework is implemented by a set of collaborative services

interoperability is the key requirement

- Allows B2B integration with partner’s information systems

- Software As A Service business model
  - Target SME partners having low technical skill, and little money to invest in ICT services
  - Revenue based on subscription model
MDA and SOA

- **Introduction**
  - Collaborative platform

- **MDA and SOA**
  - Definitions and concepts

- **Model driven collaborative Framework**
  - Process and tools

- **Conclusion**
MDA for interoperability

- MDA defines a set of standards in order to automate the whole software life cycle
  - Model-based transformation
  - Code generation
  - System and platform independence

Interoperability managed at model level

1. PIM
   - Platform independent system specification

2. PM
   - Platform A

3. Execution platform choice

4. PSM
   - Platform dependant system specification

Transformation
SOA for interoperability

- **Main technical SOA concepts are organized around three domains**
  - XML schema of exchanged data between services
  - Service interface in WSDL
  - Service orchestration in BPEL

- **High level abstraction and strong formalization of target architecture**
  - Facilitates code generation process and improve generated code quality
  - Facilitates the two-way synchronization of model and code
BPM for interoperability

- **Goal:** To improve collective performance by working at process level

- **Collaborative processes models**
  - Allow to work at business level
  - Improve agility

- **Collaborative process engineering**
  - Allow to identify collaborative patterns
  - Allow to classify collaboration

- **Partners information system models**
  - Interfaces of services and business data
Model driven collaborative framework

- **Introduction**
  - Collaborative platform

- **MDA and SOA**
  - Definitions and concepts

- **Model driven collaborative Framework**
  - Process and tools

- **Conclusion**
Overall process

Collaborative processes

Collaborative logical architecture (SOA)

PIM

Collaborative information system architecture

Collaborative system

Java BPEL WSDL XSD

Partners IS: Services, data

Services

Services interfaces

Partners

Collaborative framework architecture

PM (ESB)
Model driven framework for CIS

1. Modeling → PIM
2. Platform representation → PM
3. Technical projection → PSM
1 – Modeling (PIM)

- Transform a BPMN model of collaborative process into a UML collaborative information system architecture

- Based on a logical architecture for Collaborative Information System
  - Collaborative Service Oriented Architecture

- BPMN $\rightarrow$ XML $\rightarrow$ UML

- Use a MOF based collaborative process meta-model
  - Subset of BPMN meta-model
Example of a collaborative process
SOA-compliant CIS logical architecture (Service model)
SOA-compliant CIS logical architecture (Process model)

Information model

Process model
2 – Platform representation (PM)

- **Meta-model for the collaborative platform**
  - Collaborative Service Oriented Architecture implemented thanks to an ESB

- **Enterprise Service Bus**
  - Routes messages between services
  - Converts transport protocol between partners
  - Transforms message format
  - Orchestrates Services

- **MOF based meta-model for**
  - XSD, WSDL
  - BPEL
Collaborative platform main components

Rich Client portal

BPEL orchestration engine

ESB

Service  Service  Service  Service
Open-source SOA platform

**Design**
- UML modeler
- BPMN designer
- XSLT transformation engine
- Orchestra BPEL engine

**JBI service engine**
- PEtALS ESB
- JOnAS J2EE AS

**Execution**
- Web Service Celtix / XLinker
- JMS JoRAM
- B2B Gateways

**Integration**

**ESB**

**WSDL Service**

**WSDL Service**

**WSDL Service**
3 – Technical projection (PSM)

- Transform collaborative information system architecture into code for the collaborative platform
- Use knowledge about platform (PM)
- Generates
  - BPEL code for service orchestration
  - XML schema of business objects exchange between partners
  - Interfaces of services in WSDL
Transformation tools

- **ATL: Atlas transformation language**
  - Model transformation language: allows to define rules
  - ATL is the ATLAS INRIA & LINA research group answer to the OMG MOF/QVT RFP

- **KM3: Kernel Meta Meta Model**
  - Notation to facilitate and speed up the creation and management of metamodels

- Based on EMF (Eclipse Modeling Framework)
Software Tool chain
Conclusion

- **Introduction**
  - Collaborative platform

- **MDA and SOA**
  - Definitions and concepts

- **Model driven collaborative Framework**
  - Process and tools

- **Conclusion**
Business advantages

- **Agility**
  - Enable to work at the process level

- **Reuse**
  - Allows to leverage a collection of collaborative business services

- **Usability**
  - Suitable for each worker profile: business analyst, service designer
  - Provides facilities to orchestrate services

- **Technical benefits**
  - Build scalable, evolvable systems (grid architecture)
  - Manage complex systems
Open-source value

- **Interoperability vector**
  - Open-source promotes standards as the cornerstone of interoperability
  - Availability of an open-source reference implementation of a standard facilitates its dissemination
  - Open-source promotes openness solutions

- **Improve TCO**
  - At design and execution levels

- **Open-source is promoted by many organizations**
  - Not only government bodies
  - Large European Commission initiatives
    - NESSI - European Technology Platform (Networked European Software and Services Initiative)
Thanks for your attention

Questions?