Integrating BPEL, Workflow & Business Rules

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Agenda

• Why SOA?
• Business Process Orchestration using WS-BPEL
• Business Process Agility with Business Rules
  – Implementing Business Rules
  – Integrating Business Processes and Rules
• Business Process & Human Workflow
• Best Practices
• What’s new?
  – WS-BPEL 2.0
  – BPEL4People
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Why SOA? - Customer Needs

Increasingly Demanding Users
- End-to-End Processes
- Shorter Change Cycles
- Better Insight and Auditing

Increasingly Complex Infrastructure
- Heterogeneous Systems
- Silos
Why SOA? - The Reality Of Modern Business

- Heterogeneous Environments
- Mergers & Acquisitions
- Multi Channel Businesses
- Data Dispersion
- Hard coding
- Lack of Standards

The Result:
Inflexible business processes
Uninformed business owners
Costly development and maintenance
Why SOA?

Web Solution

SOA Solution

1. More Interoperable
2. More Modular Business Processes
3. Richer Clients

Packaged Applications
Fulfillment Center
Customer Service
Business Partners
Why SOA? - Standards

Fusion Effect
- Portal
- Web Application
- WS API

Richer Experience
- USER INTERFACE
  PORTAL JSR-168
  Struts/JSF
- PROCESS ORCHESTRATION
  BPEL
  XSLT/XQuery

More Adaptable
- SERVICE BUS
  WS-Security
  WS-Policy, SAML
  Web Services Mgmt

More Interoperable
- BUSINESS SERVICES
  XML/XMLSchema
  WSDL/WSIF
  SOAP, JCA, JMS

MONITORING
- BAM
- JMX

BAM
- Portal
- Web Application
- WS API

Security
- Reliability
- Logging
- Failover
- Dynamic Routing

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Composite Application requirements

There is a continuous need for enterprises to tie disparate applications and services into end-to-end process flows.

Goals
- Compress the total processing time (Real Time)
- Connectivity to systems, services and people
- Better visibility (Auditing, Reporting)
- Ability to easily change the process
- Incremental roll out
Example of composite application

DSL Activation Processing

ACTIVATION FLOW

CREATE

Validate

Customer Profile

Setup 1

Setup 2

Exception Rate

SLA Management

BAM

6000 Devices

Customer (DataHub)

Order Validation (EJB 3.0)

Promotion Management (Business Rules)

Exception Management Portal – Order Hospital (Human Workflow)

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Example: DSL Provisioning at Belgacom

Application for the provisioning and activation of DSL lines. Belgacom is processing up to 15,000 DSL provisions / day through SOA and BPEL processes which link their customer interfaces and OSS layer, managing activation and repair.

Telco Activation Services
- DSL Activation Manager
- 6000+ network equipment endpoints (SLEE gateway)
- SDSL Activation Manager

Sales/Customer Service Interfaces and Order Review

Exception Management

Billing Services

Reporting Services

Account Management Services

Register for New Service
Self-service web app
Call Center
What is BPEL?

Markup language for composing a set of discrete services into an end-to-end process flow

- 10+ years of R&D from MSFT and IBM
- SOAP but also Java, JCA
- Rich Flow Semantics
- Optimized Bindings
- XPATH+XSLT+XQuery
- WS-Security
- A Process is a Service
BPEL History

Proprietary → Standard

- **BPML (Intallio et al)**: 2000/05
- **BPSS (ebXML)**: 2001/05
- **WSFL (IBM)**: 2001/06
- **WSCL (HP)**: 2002/03
- **BPEL4WS 1.0 (IBM, Microsoft)**: 2002/06
- **BPEL4WS 1.1 (OASIS)**: 2002/08
- **WSCl (Sun et al)**: 2003/04
- **WS-BPEL 2.0 (OASIS)**: 2006

- **XLang (Microsoft)**: 2001/03
- **WSFL (IBM)**: 2001/03
Order Booking SOA Demo
Focus on ESB, Rules, Workflow, BPEL
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What are Business Rules?

- Rules are a way to specify conditional actions or policies
  - If salary is less than $10,000 then “deny” loan application
  - If miles flown is greater than 50,000 then grant “Gold” status

- Rules
  - Can be represented as simple if-then statements
  - Are declarative, not procedural
  - Often generated by GUI programs

- Rules executed on Rules Engines
  - Facts are input
  - Facts analyzed per Rules
  - Actions conditionally executed or results returned
Business Rules Key Benefits

• Agility – fast time to market
  – Goal: Business analysts, not programmers write Rules
  – Business policy changes deployed instantly
  – Rules reuse

• Transparency -- directly viewable by the business analyst
  – Rules clearly describe associated policies

• Cost reduction
  – Business analysts can directly create/update Rules
  – More efficient interface for describing policy
  – Cost reductions especially dramatic during maintenance
When Rules are Attractive

• Applications requiring agility
  – Frequently changing (legal) regulations
  – Frequent policy changes to reflect market changes
  – Requirements for high levels of customization

• Industries
  – Insurance, health care
  – Finance & risk analysis
  – Operations management
  – Call centers

• Service Oriented Architectures

Rules Engine are particularly attractive in SOA applications
**Business Rules Architecture**

- Rules enabled applications
- Application run-time logic
- Rule Session Class
- Rules Engine
- Rules repository
- Facts can be Java objects or XML

- Rule Author
  - Rules customizing application
  - Rules SDK

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BPEL & Rules - Usage Scenarios

Rules engines can be invoked as a Decision Service from a BPEL process.

Dynamic processing
- Intelligent routing
- Validation of policies within process
- Constraint checks

Ad-hoc Workflow
- Policy based task assignment
- Various escalation policies
- Load balancing of tasks
Decision Service - Concepts

Enables users to easily wire any Rules engine with a BPEL process

Key ideas:
• Abstracts proprietary rule engine apis via a standard web service interface.
• Will work with any rules engine.
  – Ex: Oracle Business Rules and iLog JRules
• Access to rules repository at design time to enable user to browse rule sets
• Supports both stateless and stateful interaction patterns
  – Example: ExecuteFunction, AssertFacts, WatchFacts etc.

• Implementation Details
  – Generates specific WSDL based on rule set being invoked
  – Metadata about rule engine and repository captured in .decs XML file in BPEL project
  – Supports both SOAP and WSIF bindings
• Java API for rule engines
  – Set of rule engine operations
    Parsing rules, adding objects to rules engine, firing rules and getting results from rules engine
• Doesn’t prescribe a rule language
• Facilitates runtime interoperability between rule engines
• Targets Java SE platform
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**Human Workflow Requirements**

- Task assignment to Users, roles, groups
- Task routing – various flow patterns and assignment rules
- Escalation and Delegation rules
- Notification to users/groups - Email, Voice, Pager, SMS …
- Customizable Worklist, Task forms, attachments
- Task History and Audit, Productivity Reports
Workflow Services – Exchange Patterns

**BPEL Process**

- “Assign Task”
- “Task Complete”

- “Assign tasks to role or group (from directory)”

- “Escalation and Delegation rules”
- “Escalate Task”
- “Notify manager”
- “Task Resolved”

**BPEL Process**

- “Get Approvals”
- “Change routing”

- “Flow patterns”, “Routing rules”
- “List work items”
- “Complete task”
- “Get weekly productivity report”

**Worklist (tasks, forms, attachments, reports)”**
Workflow as a Service

(1) assign tasks to a user/role

(2) wait for task completion as part of an end to end process flow
BPEL Human Workflow services enable you to interleave human interactions and connectivity to systems/services into a single end to end process flow.
BPEL & Human Workflow Services

- Task Management Service (Task data, forms, Attachments)
- Identity Service (Users, Roles)
- Task Routing Service (Assignment, Dispatching)
- Task Query Service (Task listing, Reporting)
- User Metadata Service (Rules, work queues)
- Notification Service (Email & wireless)
- Identity Management (OID, LDAP, JAZN)
- Notification Channels (Email, Oracle DB, AS Wireless (Voice, SMS, Pager))
DEMO

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Best Practices for Defining an SOA Strategy

1. Portfolio of Services
2. Enterprise Service Bus
3. Process Orchestration, Workflow and Rules
4. User Interface
5. Business Activity Monitoring
6. Performance Scalability
6. Security and Management

SOA Strategy?
Step 1 | Portfolio of Services

- .NET, SAP, Mainframe, Oracle, Retek, PeopleSoft, Siebel, etc

- BEST PRACTICES
  - Contract/Interface First
  - Coarse Grain Documents
  - Asynchronous Interactions
  - Undo/Cancel Operations
  - Versioning
  - WS-I, Wrapped Document Style
  - WSIF Binding to Java, JCA
Step 2 | Enterprise Service Bus

BEST PRACTICES

• UDDI Registry
• JCA Adapters
• Integration with Policy Management Framework
• Service Virtualization Logical Naming
• Differed, Reliable Delivery (Configurable)

Enterprise Service Bus

.NET, SAP, Mainframe, Oracle, Retek, PeopleSoft, Siebel, etc

Java
Step 3 | Process Orchestration, Workflow and Rules

- BPEL
- XSLT Transformation
- Human Workflow Service
- Rules Service
- Notification Service
- Error Hospital Service
- ESB Binding and Wiring
- Tracing and Debugging
- Iterative Development
- Unit Testing

Enterprise Service Bus

Java

.NET, SAP, Mainframe, Oracle, Retek, PeopleSoft, Siebel, etc
Step 4 | User Interface

Portal, JSF Applications, .NET, Microsoft Office

BEST PRACTICES
• MVC – BPEL is a Model (Loose Coupling)
• Workflow Service is a Model
• JSF or Struts
• WSRP, JSR-168
Step 5 | Business Activity Monitoring

Portal, JSF Applications, .NET, Microsoft Office

BEST PRACTICES
• PKI First
• Sensors to Collect Events without Process Logic Changes
• Real-time Dashboard
• Alert/Actions (Fusion Effect)

Enterprise Service Bus

Java

.NET, SAP, Mainframe, Oracle, Retek, PeopleSoft, Siebel, etc
Step 6 | Security Policy Management

- BEST PRACTICES
  - WS-Policy, WS-Security
  - Change Policy without Changing Endpoint
  - Integrated with ESB (Multi-binding Support)
  - Agent and Gateway Mode
  - Support for Java and .NET
Step 7 | Performance, Scalability and Reliability

Portal, JSF Applications, .NET, Microsoft Office

Enterprise Service Bus

BPEL  Workflow  Rules

Java

.NET, SAP, Mainframe, Oracle, Retek, PeopleSoft, Siebel, etc

BEST PRACTICES

- Asynchronous Interactions
- WS-Addressing Correlation
- Support for Large XML Documents
- “Stateless Architecture”
- JCA and Java Binding
- Batch API
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What’s new in WS-BPEL 2.0?

- New activity types (if-then-else, repeatUntil, validate, forEach, extensionActivity)
- Completion condition in forEach activity
- Variable initialization
- XSLT for variable transformations (New XPath extension function bpws:doXsltTransform)
- XPath access to variable data (XPath variable syntax $variable[.part]/location)
- XML schema variables in Web service activities (for WS-I doc/lit style service interactions)
- Locally declared messageExchange (internal correlation of receive and reply activities)
- Clarification of Abstract Processes (syntax and semantics)
What’s BPEL4People?

- Currently no standard that covers service orchestration and user interactions
- Extension to WS-BPEL
- Proposed by IBM and SAP
- Support use cases that involve people with business processes
- People activities
  - Task assigned to a user and user is required to perform certain action
- People links
  - Group of people associated with a role
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