Introduction to BPEL [1]

- BPEL – an XML-based language for creating a process, a set of logical steps (called activities)
- BPEL process fulfills a workflow primarily by assessing one service after another
- Basic activities – discrete tasks
  - Receive, invoke
- Structured activities – if, while
  - Specify an order of execution or conditions that affects the circumstances for running a set of other, embedded activities, which may be basic, structured or both

BPEL Standards


BPEL Tutorials


Introduction

- BPEL 2.0 – an XML-based language for
  - Formally describing business process and business interaction protocols
  - Extending the Web Services interaction model to support business transactions

- BPEL4WS 1.0 – The Business Process Execution Language for Web Services, July 2002
  - Joint effort by IBM, Microsoft and BEA
  - IBM’s Web Service Flow Language (WSFL)
  - Microsoft’s XLANG specification

- BPEL4W 1.1, May 2003
  - Joined by other contributions from SAP and Siebel System
  - Submitted to an OASIS technical committee for open standard development

Basic Concepts

The Structure of BPEL Processes

- Abstract Processes
- Executable Processes
BPEL 2.0 Structure

- `<Process>` // Container (Partners, process data, handlers..)
  - `<Scope />` // Global or Local
  - `<partnerLinks>` // Relationship to Business Partners: Comm Channels
    - `<partnerLink>` // Partner name and Role name
    - `<partnerLink>`
  - `<variables>` //State of a BPEL process
    - `<variable>` //WSDL message types
    - `<variable>` // XML Schema types
    - `<variable>` // XML complex types
    - `<variable>` // XML elements

BEHAVIOR OF a BPEL PROCESS

Activities
- Receive
- Reply
- Invoke
- Pick
- Event Handler

Operations
- One Way Operation
- Request-Response Operation
  - `<receive />` // Received Activity: partner link, operations, variables
  - `<reply />` // Reply Activity
  - `<invoke />` // Invoke Activity

PROCESS LOGIC STRUCTURING
- Sequential Activities (Processing)
- Business Logic
  - if-else, elseif, else; condition; invoke
  - while; condition; invoke
  - repeatUntil: invoke; condition
  - forEach; startCounterValue; finalCounterValue
- Parallel Processing
  - flow: links; invoke, invoke,..
    - Synchronization => Control dependency
    - transitionCondition =>
      - request-to-approve
      - request-to-decline
    - jointCondition
      - $approve-to-notify or $decline-to-notify

DATA MANIPULATION
XPath 1.0 is the default expression and query language in WS-BPEL 2.0
- assign, copy, from variable, to variable
- assign, copy, from variable, query, // Query Language Attribute

EXCEPTION HANDLING
- faultHandlers, catch faultName, faultVariable, catchall

References
[7 ] OpenSource BPEL Engine, http://bpms.intalio.com/?adid=BPELFree&_kk=bpel&_kt=caccc1b7-01bf-4b8c-9f0c-60ebf5e140e1&gclid=COqzuJfdz5YCFQIMswodMkf_3Q
[10 ] Open Source Workflow Engine in Java (Apache ODE, OpenSymphony OSWorkflow, Taverna, iBPM, etc), http://java-source.net/open-source/workflow-engines