A4M36AOS – Architektury orientované na služby

5. Business Process Modeling

Jiří Vokřínek

Agent Technology Center
Department of Computer Science
Faculty of Electrical Engineering, Czech Technical University in Prague

jiri.vokrinek@fel.cvut.cz http://agents.fel.cvut.cz
Business Process Modeling

- Processes capturing/representation
- Business analysis for processes improvements
- Change management
Business Process Modeling

Example: https://dekanat.fel.cvut.cz/procesy
History of BPM

- Gantt chart (~1899)
- PERT charts (1950s)
- Data Flow Diagram (1970s)
- UML (mid 1990s)
- BPMN (2000+)
PERT network chart for a seven-month project with five milestones (10 through 50) and six activities (A through F)
UML
Business Process Modeling Notation (BPMN)
BPMN

Graphical representation for specifying business processes in a business process (only) modeling
BPMN

Based on a flowcharting technique very similar to activity diagrams from UML.

Intuitive notation to business users yet able to represent complex process semantics.

Provides a mapping between the graphics of the notation to the underlying constructs of execution languages (BPEL).
BPMN

Examples

Introduction to BPMN 1.1

http://diveintobpm.org
Business Process Execution Language (BPEL)
BPEL

Web Service **composition language**

Used for web service **orchestration**

BPEL was originally developed by BEA, IBM, and Microsoft. Version 1.1 also includes input from SAP and Siebel.

The OASIS TC “Web Services Business Process Execution Language” now continues the standardization of BPEL
BPEL

BPEL4WS 1.0 (7/2002)
- Original proposal from BEA, IBM, Microsoft
- Combined ideas from IBM’s WSFL and Microsoft’s XLANG

BPEL4WS 1.1 (5/2003)
- Revised proposal submitted to OASIS
- With additional contributions from SAP and Siebel
BPEL

- WS-BPEL 2.0 (6/2007)
  - Formalization of 1.1 capabilities
  - OASIS formally adopted standard

- WS-BPEL 2.0 and beyond (10/2007)
  - Additional proposals on the table
  - Vendors beginning to ship products conforming to standards
Is this your "new age" IT organization?
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BPEL

- Defines **business processes** that **interact** with external entities through **Web services**
- The definitions use **XML** and are not concerned with the graphical representation of processes
- Defines a set of Web service **orchestration** concepts
BPEL

- Supports the implicit **creation and termination** of process instances as the basic **lifecycle** mechanism
- Defines a long-running **transaction model** to support failure recovery
- Uses **Web services** as the model for process decomposition and assembly
- Builds on compatible Web services standards
BPEL

- Business Processes
- Description
- Quality Of Service
- Transport and Encoding

- WSDL, Policy, UDDI, Inspection
- Security
- Reliable Messaging
- Transactions
- Coordination
- Other protocols
- Other services
- SOAP (Logical Messaging)
- XML, Encoding
BPEL and WSDL

- BPEL processes exposed as WSDL services
- Message exchanges map to WSDL operations
- WSDL can be derived from partner definitions and the role played by the process in interactions with partners
- Interfaces exposed by the BPEL process
- Interfaces consumed by the BPEL process
**BPEL and WSDL**

- BPEL **uses** Web Services (BPEL is orchestrating these services)

- The BPEL process itself **is** a Web Service (it has interfaces) – when defining a BPEL process, it also is described by a WSDL (its interface)

- WSDL Port Types are named sets of abstract operations

- WSDL extensions are used to identify which port types are used to link services
BPEL as Process

- BPEL applications are **executable processes**
- Describes the interfaces to external data sources
- Describes the control flow for orchestrating these data sources
BPEL Partners

- BPEL supports different relationships with partners
  - Partners may invoke the BPEL process
  - BPEL process may invoke partners
  - Partners and the BPEL process play both roles

- BPEL processes will have **at least one client** (the partner activating the process)
BPEL as Language

- Business process modeling language that is executable
- Language for specifying business process behavior based on Web Services
- Serialized in XML and aims to enable programming in the large (generally refers to the high-level state transition interactions of a process)
- No standardized graphical notation for BPEL – XML is used as the standardized syntax
BPEL as Language

- BPEL processes can be executed and thus are programs.
- BPEL is a specialized and dedicated programming language.
- BPEL combines two tasks:
  - Creates a new Web Service which is described by a WSDL interface.
  - Implements the Web Service by orchestrating a number of partners.
BPEL as Language
Example of (open source) tool – bpmn2bpel – a tool for translating BPMN models into BPEL processes

https://code.google.com/p/bpmn2bpel/
BPMN

Process example

from A4B33SI tutorials by Michal Čáp