Diplomarbeitspräsentationen der Fakultät für Informatik

BPEL4People - Extending BPEL for People

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Abstract

BPEL, an XML based language, formally describes business processes and business interaction protocols. While WS-BPEL processes support automated process integration, there is a need to support human tasks, which naturally comes with new requirements. BPEL4People is a joint project of IBM and SAP that describes scenarios where users are involved in business processes, and defines appropriate extensions to WS-BPEL, exclusively using web service interfaces for maximum interoperability. Integration of human tasks into BPEL processes is achieved by defining a people activity, that encapsulates a human task, as a concrete implementation of a BPEL activity. This thesis proposes a concrete specification of BPEL4People that defines syntax and semantics that complies with the WS-BPEL specification. Finally, a generic BPEL4People system is realised that can to be coupled with a BPEL engine in order to integrate human tasks into business processes.

Problem Definition & Motivation

Web services have become widely accepted as the de facto standard for distributed business applications [2]. BPEL, that formally describes processes, permits orchestration of web services [3]. While external activities within BPEL correspond to web services, the obvious business activity of a human interaction within a process is not covered by BPEL [1].
While BPEL glues together the logic of a process, individual solutions have to be realised when people are integrated into business processes. As we can see there is a need to integrate people into BPEL processes.

Goals

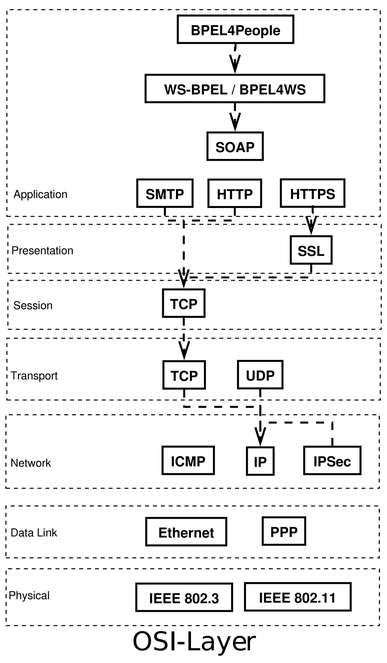
Within the context of a business process BPEL4People must

- support role based interaction of people
- provide means of assigning users to generic human roles
- take care to delegate ownership of a task to a person only
- support people scenario by extending BPEL with additional independent syntax and semantic.

Theoretical Background

Web Service Architecture

A Web service is a software system designed to support interoperable machine to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialisation in conjunction with other Web-related standards. [4]



OSI-Layer

WS-BPEL

The business process execution language (BPEL) is an XML subset defining business processes [5]. As interactions are realised with web services for maximum interoperability between various heterogeneous systems, BPEL permits orchestration of web services.
Section 14 in [5] declares extensibility for WS-BPEL by using a foreign namespace. An extension element can be used to indicate a BPEL engine that it must support a foreign XML namespace's WS-BPEL extension.

```
<extension namespace="anyURI"
  mustUnderstand="yes|no"/>+
```

Human ↔ Process Interaction

Human → Process

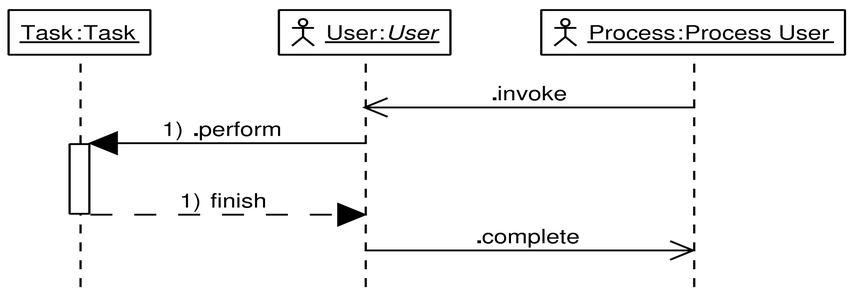
- instantiation A user instantiates a process.
- supply data Data can be supplied by a user for the process. This can be the result of a performed task as well as any annotation that may be interesting information for the continuation of the process.

Human ↔ Process

- request data A user is notified by a process and further data is required for the process execution to proceed. Upon notification the user typically will perform a task and submit the necessary data to the process.
- provide data A task is performed by a user after having been notified and the results is sent back to the process.
- approval Approval, in fact, can be understood as the most simple case of a user providing data: a binary decision. Nonetheless an approval can be enriched by an additional annotation that may document the decision.

Human ← Process

- notification A user is notified by the process that continues its work flow. While notification does not block the process it can be pointed out that the interaction type where data may be provided, does.



People Scenario

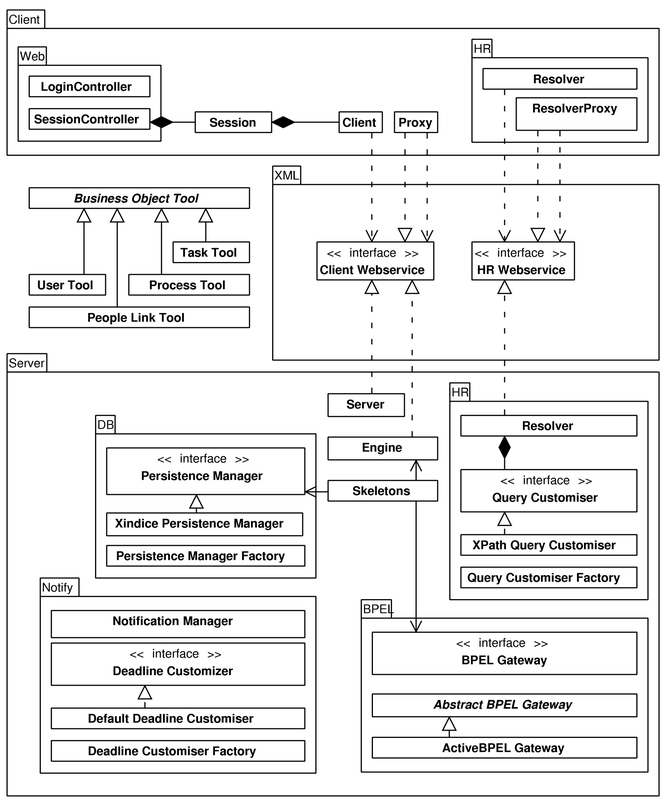
four eyes scenario A task may be given to persons that are independent in order to obtain different opinions or for comparison of results. If a potential owner claims one of the equal tasks they must be excluded as potential owner for all others.
nomination A potential owner may be nominated to become the actual owner of a task. Even though there might be other potential owners, only nominated owners shall be allowed to claim such a task.
escalation An escalation takes place if deadlines are not met. In such a case escalation notifications to escalation recipients take place.
chained execution Tasks may be logically chained - that is to say a task might link to a following, related task. Chained execution is an execution of a process fragment where the owner of one task by successfully completing a task, automatically requests ownership for the following chained task.

Syntax & Semantics

- http://xml.taid.holmes.at/ns/bpel4people/account.xsd
- http://xml.taid.holmes.at/ns/bpel4people/businessobject.xsd
- http://xml.taid.holmes.at/ns/bpel4people/process.xsd
- http://xml.taid.holmes.at/ns/bpel4people/protocol.xsd
- http://xml.taid.holmes.at/ns/bpel4people/task.xsd

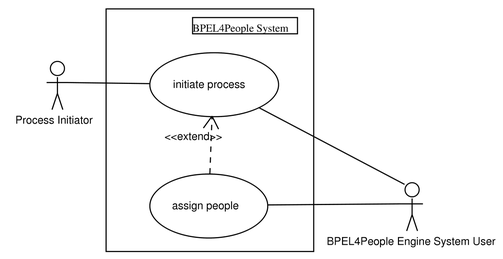
System Interfaces

- http://xml.taid.holmes.at/ns/bpel4people/client.wsdl
- http://xml.taid.holmes.at/ns/bpel4people/client.xsd
- http://xml.taid.holmes.at/ns/bpel4people/hr.wsdl
- http://xml.taid.holmes.at/ns/bpel4people/hr.xsd

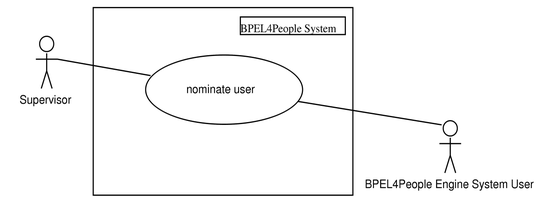


Package Diagram of the BPEL4People System

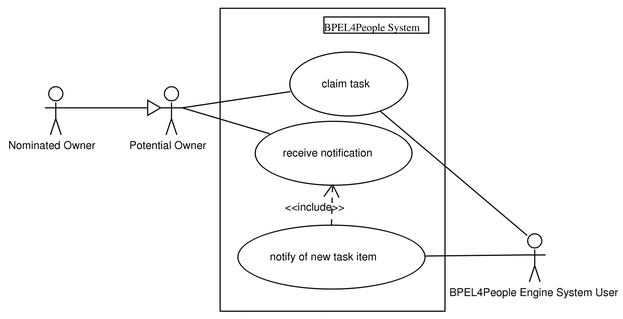
Role-based Interaction



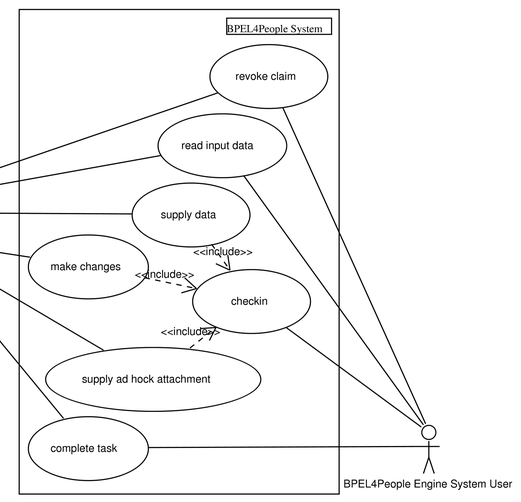
Process Initiator Use Case Diagram



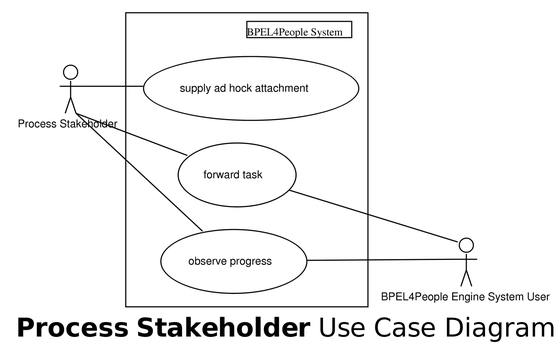
Supervisor Use Case Diagram



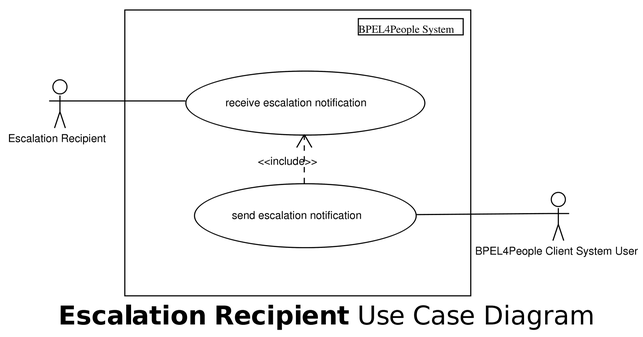
Nominated Owner &
Potential Owner Use Case Diagram



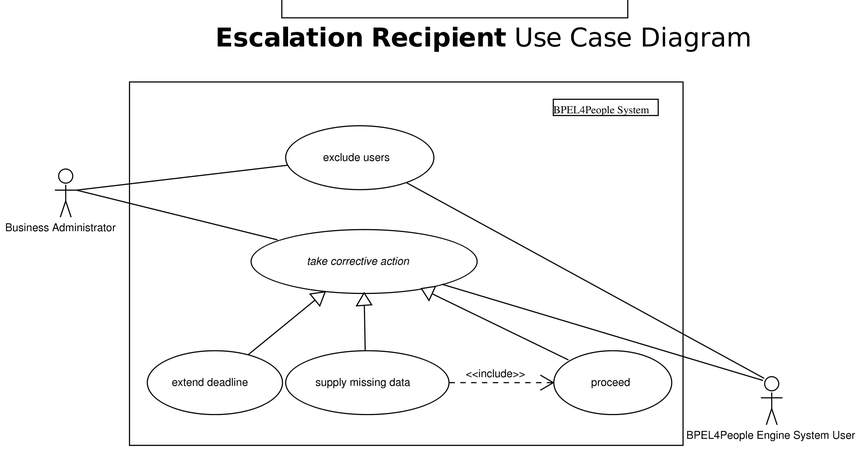
Owner Use Case Diagram



Process Stakeholder Use Case Diagram



Escalation Recipient Use Case Diagram



Business Administrator Use Case Diagram

[1] a joint IBM-SAP whitepaper. WS-BPEL Extension for People, August 2005.
[2] Anzböck, R., Dustdar, S., and Gall, H. Software configuration, distribution, and deployment of web-services. In SEKE '02: Proceedings of the 14th international conference on Software engineering and knowledge engineering (New York, NY, USA, 2002), ACM Press, pp. 649–656.
[3] Curbera, F., Khalaf, R., Mukhi, N., Tai, S., and Weerawarana, S. The next step in web services. Commun. ACM 46, 10 (2003), 29–34.
[4] Note, W. W. G. Web Services Architecture (WSA).
[5] OASIS Web Services Business Process Execution Language (WSBPEL) TC. Web Service Business Process Execution Language Version 2.0, January 2007.