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Diploma Thesis

Support for Human Users in Scientific Workflows

Beginning: Immediate

Background

The use of conventional workflow environments and service compositions is suitable for automating business processes. However, it is not yet completely applicable for scientific workflows and simulations. In particular, the involvement of human users in scientific workflow models and environments requires thorough investigation.

Tasks

There are at least two scenarios in which human users need to be enabled to participate in an interaction with a scientific workflow: 1) in order to intervene in the execution of a workflow instance in the case of a fault in order to repair it and 2) to perform tasks and make decisions in the scientific workflow [1]. To provide support for these scenarios several challenges in the area of flexible service compositions have to be addressed. In particular, substitutability of automated services with human-provided services in scientific workflows needs to be covered with respect to current standards [2] [3] [4]. Further, adaptation of scientific workflows by introducing human-based activities has to be enabled in a model-as-you-go fashion [5]. A prototype based on the SimTech scientific workflow environment has to be developed as proof of concept.

Requirements

This thesis builds on the lectures on Workflow Management, Web-based Application Integration and Services and Service Compositions. The thesis requires skills in programming with Java and Web services (Java, WSDL, XML, SOAP, Eclipse). The thesis can be written in English or German.

Literature

[1] David Schumm, Dimka Karastoyanova: Human Users in Simulation Workflows – Integrate, Register & Communicate. Poster, SimTech Seminar, November 2011.

[2] Organization for the Advancement of Structured Information Standards (OASIS): Business Process Execution Language 2.0 (BPEL), 2007.

[3] Agrawal et al.: WS-BPEL Extension for People (BPEL4People), Version 1.0, White Paper, 2007.

[4] Agrawal et al.: Web Services Human Task (WS-HumanTask), Version 1.0, White Paper, 2007.

[5] Mirko Sonntag, Dimka Karastoyanova: Next Generation Interactive Scientific Experimenting Based On The Workflow Technology. In: Proceedings of the 21st IASTED International Conference on Modelling and Simulation (MS 2010), 2010.

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