Business Process Technology Seminar
Presentation of available Topics

Summer Semester 2007
2007-05-17

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Organization (proposal)

- Today: Presentation of topics
- 22\textsuperscript{nd} of April: Select your topics via e-mail
  - Please include: name, registration number, three topics ranked by preference
  - Send e-mail to: dominik.kuropka@hpi.uni-potsdam.de
- 24\textsuperscript{th} of April: presentation of topic assignments
- 15\textsuperscript{th} of May: 5 minutes presentation on what you will elaborate in your final paper and presentation (marked)
- June: Submit draft version of your paper (PDF, LNCS-Style, 16 pages) and assignment of reviewers
- June: Submission of reviews (marked)
- July: Submission of final version of your paper (marked)
- July or later: 30 +15 minutes presentation of your paper/results (marked)
HO-1: Identity management in distributed workflows

- **Context:** Workflow often talks about "role resolution" but very little thought is spent on how role resolution may work in distributed environments such as the Internet.

- **Task:** Collect and analyze identity management technologies and evaluate them regarding workflow management in general and role resolution specifically. Also, roles may need to expose personal information, how can exchange and exposure of such data be managed?


- **Contact:** hagen.overdick@hpi.uni-potsdam.de
Context: Recent efforts have helped to remove ambiguities regarding execution semantics and to extend BPMN toward full support for common control flow scenarios. BPMN has also already been analysed regarding its resource perspective. It turned out that there is only little support and major extensions are needed for pushing BPMN into the direction of direct executability.

Task: The student should establish a requirements framework for the resource perspective of an executable process modeling language. It should be inspired by the workflow resource patterns. As main contribution, the student should propose extensions for BPMN accordingly. The semantics of these extensions need to be defined unambiguously.


Contact: gero.decker@hpi.uni-potsdam.de
GD-2: Design of a RESTful Execution Environment for BPMN

■ Context: REST is an architectural style with proven strengths in interoperability and scalability. Web resources are identified by URIs and a uniform interface consisting of a small set of verbs is used to work with the resources. REST concepts can be applied to business process execution environments, as shown in prototypes of the BPT group.

■ Task: The student should provide an assessment whether and how a BPMN execution environment can be developed in a RESTful manner. A given formalization of BPMN should serve as requirements specification of the system. The complete language set including constructs with local and non-local execution semantics needs to be addressed.

■ Initial literature: A. Großkopf. xBPMN. Formal Definition of Control Flow Semantics for the Business Process Modelling Notation through a Mapping to Coloured Petri Nets.

■ Contact: gero.decker@hpi.uni-potsdam.de
Context: With the rise of SOA the amount of available services increases over time. Therefore approaches for easy-to-use service discovery need attention.

Task: Search and analyse different approaches and publicly available service repositories. Compare them regarding ease of use and effectivity.


Contact: dominik.kuropka@hpi.uni-potsdam.de
Context: Advanced semantic service provisioning systems.

Task: Take a deeper look into Meteor-S, IRS-III and ASG service provisioning systems and compare them from theoretical and practical perspective.


Contact: dominik.kuropka@hpi.uni-potsdam.de
HS-1: ASG Scenario

- Context: The Adaptive Services Grid (ASG) project is a recently finished, large European research project aimed at developing a platform for the automated discovery, composition and enactment of services.
- Task: Design and implementation of an application scenario using real world services.
- Initial literature: http://asg-platform.org
- Contact: hilmar.schuschel@hpi.uni-potsdam.de
Context: Pegasus and the Adaptive Services Grid (ASG) are two projects in which workflows for distributed environments are planned. Both have in common, that in a first step an abstract workflow is planned. The binding to concrete resources happens in a second step right before execution. Both approaches allow replanning at runtime to cope with unexpected failures.

Task: The student should compare the approaches to planning and binding abstract workflows taken by ASG and Pegasus.


Contact: hilmar.schuschel@hpi.uni-potsdam.de
FP-1: Design Methodologies for BPM

- Context: The design phase of business process management aims at capturing business processes in a graphical manner. Further tasks might include a formal specification and analysis of the business processes.

- Task: The student should review existing literature on methodologies for the design phase of BPM. The methodologies should be classified and compared. Recommendations for certain methodologies regarding different goals of the business process design (i.e. enactment, documentation, verification) should be given. The topic is open, i.e. the student is expected to find additional literature by its own.


- Contact: frank.puhlmann@hpi.uni-potsdam.de
FP-2: An Algorithm for Deciding Bisimilarity in the BPM-Domain

- Context: The final activity of the design phase of business process management is the formal verification of the design. The properties that are usually verified can be classified as different kinds of soundness.

- Task: The student should review existing algorithms for deciding a certain kind of bisimulation (weak ground bisimulation) that can be used to verify different soundness properties of business processes. A promising approach should be selected and investigated for an integration within the BPM domain. This includes the usage of additional information like the graph structure of the business process, heuristics, etc.

- Initial literature: Robin Milner: Communication and Mobile Systems: The Pi-Calculus. Cambridge University Press, 1999; Frank Puhlmann: Characterizing Soundness using Bisimulation, 2007 (yet unpublished); ...

- Contact: frank.puhlmann@hpi.uni-potsdam.de
HM-1: Semantics of WS-BPEL processes

- **Context:** By mapping WS-BPEL processes to Petri nets, their structural correctness can be proved. This helps e.g. to determine if a process is dead-lock-free or not. What this cannot do is, check whether processes achieves the requested goal. With Semantic Web services a tool to describe the functionality of individual services and goals exists which allows checking of semantic correctness of a process.

- **Task:** While research and tools exist for the mapping of WS-BPEL processes to Petri nets and for the validation of the semantic correctness of Petri nets, the link between them is currently missing. The student should investigate the two areas to find the missing link and provide tool support to bind them together.


- **Contact:** harald.meyer@hpi.uni-potsdam.de
Context: The Adaptive Services Grid (ASG) project is a recently finished, large European research project aimed at developing a platform for the automated discovery, composition and enactment of services. The goal of the Semantic Web Services (SWS) Challenge is to develop a common understanding of various technologies intended to facilitate the automation of mediation, choreography and discovery for Web Services using semantic annotations.

Task: The student should get the ASG platform as a whole or individual components running to support the some of the SWS challenge scenarios.


Contact: harald.meyer@hpi.uni-potsdam.de
HM-3: Composing Applications for a SOA

- Context: Creating composite applications is on the agenda of most SOA platform vendors (e.g. SAP). As a part of their crossvision suite, the Software AG provides the Application Composer which allows for the rapid creation of composite apps.

- Task: The student should elaborate what composite apps are, what their core elements are and how these elements are bound together. Using this understanding the approaches by SOA platform vendors should be evaluated. This includes, where possible, a practical evaluation (e.g. using the Application Composer).

- Initial literature:

- Contact: harald.meyer@hpi.uni-potsdam.de
AA-1: Business Process Querying

- Context: Business processes are valuable assets for enterprises just like their data. This means that process models are no longer used for documentation and communication purposes only. Finding process models according to some search criteria or according to selection with a sub-model would be necessary to benefit from already designed processes.

- Task: Survey different approaches that address the querying of business processes. Categorize these approaches according to: conceptual model of the language, the nature of the language (either textual or graphical), the target of the language (retrieval of complete process models, or just showing sub models), the repository (storage) model against which queries are issued, does the language address runtime instances of a process mode, the model definition, or the logs of the past executions.

- Contact: ahmed.awad@hpi.uni-potsdam.de
Further Information

Refer to seminar homepage:
http://bpt.hpi.uni-potsdam.de/BPT-SS2007

Regarding seminar organisation and submissions:
dominik.kuropka@hpi.uni-potsdam.de

Regarding the topics:
see contact assigned to each topic