

Report on HICSS-34 Minitrack: Integrated Modeling of Distributed Software Systems and Workflow Applications

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At this year's Hawaii International Conference on System Sciences (HICSS-34) on the island of Maui, the minitrack Integrated Modeling of Distributed Software Systems and Workflow Applications, co-organized by the author of this report and Guido Wirtz from the University of Münster, discussed issues related to advanced workflow modeling and distributed application frameworks.

The minitrack provided a forum for researchers from the areas of workflow management and distributed systems, motivated by the observation that both disciplines on the one hand share a variety of common issues, while on the other hand there seems to be little cooperation between the respective research communities. In particular, the recent growth in deployment of complex distributed applications has created the need for integrating distributed systems requirements into design techniques. Explicit or potential concurrency, the need for synchronization, resource usage, allocation, and distribution have to be modeled adequately in order to meet these requirements. On the other hand, workflow technology and real-life workflow applications are highly relevant for the software engineering community, since workflow management has created languages, techniques, and tools to model, simulate, monitor, and control the execution of business processes in complex technical and organizational environments. Given this motivation and general background, the minitrack consists of six papers, which are organized in two sessions entitled Distributed Application Frameworks and Advanced Workflow Modeling. The former addresses issues in the areas of distributed production management systems and system integration; the latter details the modeling and analysis of ad-hoc and adaptive workflows.

In the first session, Duncan Bastos from PUC Porto Alegre, Brazil proposed an object-oriented approach to model dynamic resource allocation in production systems, aiming at modeling and improving the allocation of different kinds of resources to enterprise activities. (Bastos, R., Ruiz, D.: Towards

an Approach to Model Business Processes using Workflow Modeling.) The approach presented uses the CIMOSA industry standard for production systems and the Workflow Reference Model proposed by the Workflow Management Coalition and combines them in a new framework. By combining standards from both production management and workflow management, a new and potentially very useful framework is introduced. Vadim Kotov from HP Labs in Palo Alto focuses on the integration aspect of distributed workflow applications. (Kotov, V.: System Factory: Integrating Tools for System Integration.) In particular, the design and architecture of a system factory to facilitate the integration of multiple heterogeneous systems is proposed. The approach has been successfully used to integrate a variety of globally distributed information systems in a multi-national manufacturing company.

In the second session, Carsten Huth from the University of Paderborn, Germany addresses the relationship between ad-hoc workflows and structured workflows, the latter of which are predefined, while the former are not. (Huth, C., Erdmann, I., Nastansky, L.: GroupProcess: Using Process Knowledge from the Participative Design and Practical Operation of Ad Hoc Processes for the Design of Structured Workflows.) In particular, he shows that ad-hoc workflows can be regarded as representations of process knowledge of workflow participants. Under certain conditions, this knowledge can be used to create structured workflows, which afterwards can be executed in a routine fashion by a workflow management system. The approach presented is implemented on the basis of a groupware system, which monitors activities and provides users with shared data, accessed during ad-hoc and structured workflows. Maryam Purvis from the University of Otago, New Zealand presented an approach to support adaptive workflows, which makes use of a translation concept. (Purvis, M., Purvis, M., Lemalu, S.: A Framework for Distributed Workflow Systems.) In particular, Petri Nets are used to model workflows on the conceptual level, and workflows are implemented by translating the respective Petri Nets to Java classes. Technologically, the proposed approach is based on an extension of a commercial software tool. In a graph-theoretic approach, Amit Basu from SMU and Rob Blanning from Vanderbilt University propose methods for analyzing workflows, with the aim of improving the effectiveness of their execution. (Basu, A., Blanning, R.: Workflow Analysis Using Attributed Metagraphs.) In particular, attributed meta graphs are used to analyze workflows that have tasks with temporal constraints. Using the proposed approach, time-critical workflow execution paths can be identified to assist workflow modelers in designing more effective workflows.

Finally, we remark that there will be a follow-up minitrack at HICSS-35 to be held on the Big Island of Hawaii in January 2002.

Reference

Ralph H. Sprague (Editor): Proceedings of the Thirty-Fourth Annual Hawaii International Conference on System Science (HICSS-34). Los Alamitos: IEEE 2001