

Piotr Lipiński and Konrad Świrski (Eds.)

Towards Modern Collaborative Knowledge Sharing Systems

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Preface

Providing easy access to high quality information is essential for academic community. Contemporary system of journal and conference publications appears to be outdated, especially in such domains as computer science. This is mainly due to the fact that process of publishing an article takes several months at least. This is unacceptable in the fields where new technologies arise from one day to the other. Therefore there is a strong need of developing new, fast, more flexible methods of sharing knowledge between scientists and industry.

In this book a new approach of sharing knowledge is proposed. The main idea behind this new approach is to take advantage of collaboration techniques used in industry to share the knowledge and build teams which work at the same subject at different locations (different universities). Large companies are able to create and manage global teams of hundreds employees which are located in different countries. We suggest using the same approach and tools for creating and managing research communities to join global forces of scientist sharing the same interests. This will allow to accelerate the exchange of information between scientists and allow to build global teams of researchers who deal with the same scientific subjects. Furthermore, an easy access to structured knowledge will facilitate cross domain cooperation.

The first part of this book introduces the concept of a platform which can be used for scientific cooperation. It also familiarizes readers with new concepts and technologies which are used in the platform. In the first chapter the authors describe the new approach of sharing knowledge in scientific community, give technical details of the system and technologies which are used. In the second chapter authors present the foundations of managing CAD objects in the engineering environment with PLM systems usage. This chapter is mainly dedicated to those platform users who take advantage of CAD software. Once the main functionality of the platform has been described the access control management using extended RBAC model is presented. The author presents a software tool for managing the security of enterprise information system on the access control level from the point of view of security administrator. The security administrator is responsible for the management of access control of users to data stored in the system. In the following chapter practical information about

preparing documentation in DocBook 5.0 is given. The study may be useful for people who need to choose a format and tools for creating and organizing scientific/technical documents or teaching materials. In the second part of the book examples of the projects which are developed using the platform are given. The first three projects focus on computer graphics. The first one describes augmented reality technology which is used for passing the information about works of art and architectural monuments. Continuing with computer graphics, in chapter six 3D scene exploration with external controllers is presented. It demonstrates selected interaction methods and their implementation. Next chapter introduces implementation of new photon mapping algorithms. It presents several algorithms for high-performance rendering engines. Authors describe the development of global illumination methods with particular emphasis on photon mapping and consider the possibility of further improvement of these methods. The following four projects described in this book are related to signal processing. In chapter eight the authors propose a domain-specific language, called TDL, for describing systems clearly, compactly, and quickly. In this chapter authors present an associated compiler, which converts TDL descriptions into Java/C++ implementation code, so as to save programming effort. In particular, the dataflow and data structures are discussed. In chapter nine system design for biomedical signal and vibration analysis and monitoring of machines, based on the Mallat and Hwang wavelet singularity analysis is introduced. Next chapter is devoted to the problem of designing an optimal systolic array for morphological processing. The paper gives the proposal of the new systolic architecture with the examples of using new features. In the following chapter the author outlines the method and application for adaptive wavelet synthesis. This application should be of particular interest for those scientists who use wavelet analysis.

The last part of the book covers three computer networks projects. In chapter twelve the author presents credit-based flow control solution for IP networks. In contrast to well known solutions that utilize flow-level control, the solution is designed as link-level control system, where every set of directly connected network nodes creates a separate control system. Next chapter presents a systematic, computer aided method supporting network planning for interior wireless networks based on IEEE 802.11 standards family. Detailed specification of features and functionalities of the proposed network planning tool available as a web service is provided together with directions of its possible expansion. The book ends with a chapter describing the concept of the universal snapshot file which can be used in distributed environments.

We expect this book will be of interest for researchers, practitioners and industry employees in computer science and mechanics. The editors would like to thank the contributors of the book for their effort in preparing the chapters. We would like to give special thanks to Editor of the Series prof. Janusz Kacprzyk for his help and his support. Thanks to all the people who were involved in completing the book. We hope that our work will contribute to the evolution of new technologies of scientific cooperation.

Piotr Lipiński

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