

Preface

This issue presents four papers on subjects related to the development of software applications and three papers on diverse subjects. The first four cover the need for automated processes, the ability to deliver software rapidly, the importance of object-based development, and the role of measurements. We are indebted to J. G. Sakamoto of the IBM Consulting Group in Santa Monica, California, for his coordination of these papers, which are drawn from the work of the group. The three single papers cover the topics of public keys for the Common Cryptographic Architecture (CCA), automatic phonetic transcription, and image and record management for wide area networks.

The first paper of the set of four on application development, by Saracelli and Bandat, presents requirements for and automation of process management, and the benefits that can be expected from that automation. The authors show how the need for process management has evolved over the last several years and describe capabilities, components, and features of effective process automation approaches. The impact of process automation is then viewed from the perspectives of some typical project participants.

Large software projects can benefit from iterative development methods because such methods support early use, user- and time-sensitive delivery of functions, better project control with less risk, and adaptation of the project over time through experience with its evolving capabilities. The author of the second paper in the set of four, Hough, develops a specific model of iterative development called Rapid Delivery, which utilizes decomposition of an application in separately developable and usable segments. The paper describes the model, the method, the implementation of segments, and the advantages of the approach for user support and risk management.

The effect of object-orientation on application development is the subject of the third paper of the four. The paper demonstrates the ways in which object-orientation changes the development process by focusing on four specifics: encapsulation, anthropomorphic design, reuse with extension, and iterative development. The author, Cockburn, presents the case for object-orientation as a significant improvement in the ability to produce useful and adaptable software applications.

Walrad and Moss present the structure and rationale of a measurement approach for quality- and productivity-conscious software development organizations. They build on the work of the Capability Maturity Model for Software to show which measurement techniques are most effective at each level in the model, while separating business value measures and process or product value measures. This fourth paper of the four on application development argues for a coherent measurement approach tailored to each organization's needs.

The single key cryptographic method embodied in the Common Cryptographic Architecture (CCA) was the theme of Volume 30, Number 2 (1991) of the *Journal*. The other major method, the public key method, was not a part of CCA. In their paper, Le et al. describe the incorporation of the public key method into CCA. In order to accomplish this valuable addition, the authors developed an extension to the control vector, which has been implemented in the IBM Transaction Security System (TSS). The result is that CCA and TSS now support both single key and public key methods of secure communication.

Speech recognition systems depend fundamentally on their ability to decompose words into prefixes, stems, and suffixes in a way that ensures the integrity of the word as spoken. The paper by

Wothke shows how this was accomplished for a phonetic transcription system for German. The system has two steps—morphological segmentation and phonetic transcription—and yields a substantially improved linguistic performance.

The paper by Gladney outlines the requirements for large and secure digital libraries of images, especially images of documents. The author then describes a model and a product built to satisfy those requirements, namely the Document Storage Subsystem (DocSS), on which the IBM Image and Records Management (IRM) product is based. This approach incorporates advances in digital library capabilities for wide area networks, for client-server heterogeneous environments, and for open systems.

In this issue we also recognize the many referees who help us maintain the quality of the *IBM Systems Journal*. They are drawn from academia, from the computer industry as a whole, and from within IBM. The list of referees for the last four years is included at the end of this issue. On behalf of the authors, readers, and editors, we thank them for their conscientious efforts. If you would be willing to assist us as a referee, please contact the editor and indicate your areas of expertise.

The next issue of the Journal will contain papers on two themes: software reuse and advanced function printing.

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Editor