

Preface

Since publication of the *IBM Systems Journal* began in 1962, vast changes have occurred in the world of computing. There have been dramatic advances in hardware, software, and the ways in which users access computers. Computers have become far more powerful, the software is much more capable and complex, and users interact with computers in ways imagined by only a few in 1962. All of these developments have resulted in an evolution that demonstrates the growing importance of computing in this century. Many of the developments spurring these changes have been documented in the *Systems Journal*, and a number of them can be considered noteworthy as turning points in that evolutionary process.

This special double issue presents a retrospective look at those turning points as represented by papers published in the *Journal* during the last 38 years. Along with those papers are commentaries that place the turning points and papers in context and discuss their significance. In presenting our readers with a selection of papers previously published in the *Journal*, we and the authors of the commentaries chose those that described a milestone, or turning point, in the evolution of computing, and that would also be of interest to most readers.

The papers are organized into sections according to four major topical areas that represent important aspects of computing and its evolution, and each section begins with a corresponding commentary. The first topical area of this issue focuses on the interaction of users with computers. The second section is devoted to software development. The third section treats systems architecture. And the fourth section discusses the use of information technology in business.

We are very much indebted to the distinguished authors of the commentaries for their significant support of this effort, their helpful reviews of and contributions to the set of papers included in each section, their gathering of yet more papers for in-

clusion in their bibliographies, and especially for their thoughtful commentaries, which span the evolution of computing since 1962.

A major aspect of the evolution of computers that is very significant for users is the method by which the user interacts with a computer or a complex system of computers to carry out a task. In the early years, the tasks that most users needed to have done by a computer most often went through an intermediate party, without the user accessing the computer directly. Today, of course, many if not most users have direct access to a computer. In the commentary for this first section, F. E. Allen, an IBM Fellow well known for her work on compilers and program optimization, discusses how programming languages, office automation, and human factors have contributed to making it possible for a growing number of users to interact directly and effectively with computers.

Software development is indeed a critical aspect in the evolution of computing. Without the various types of programs written to accomplish the many tasks performed by computers, computing would be very primitive. Software development processes, techniques, technologies, and tools have enabled the efficient and effective production of software and software systems. R. Goldberg, now supporting training and education for the IBM Software Group and previously a long-time faculty member of the IBM Systems Research Institute and IBM Software Engineering Institute, provides a personal commentary of how he saw software development evolve from an art into a science, influenced both by events and by the innovations of dedicated professionals over the years. The result is a dynamic new discipline that has advanced the use of computers.

Although systems architecture can refer to the hardware of a computer, it also frequently describes the software systems and networking of devices. Systems architecture has been and continues to be a significant area of development in computing. In their

commentary, A. G. Ganek, a Vice President of the IBM Research Division who has worked extensively with the architectures of systems, and E. H. Sussenguth, an IBM Fellow, now retired, who was involved with the design of the System/360* architecture and the inception of IBM's first computer networks, recall the origins of the word "architecture" as it is used in computing. They then discuss the technologies and innovations that both transformed computer systems and provided durable foundations for continued advancement. The corresponding papers present aspects of these systems and specific systems products.

The evolution of computing has touched many areas of life, but the world of business has been particularly, deeply, and broadly affected. The influence of information technology can be found in all types of business enterprises, and it accounts for many of the ways in which doing business is changing. The current trend toward electronic business is a result of applying information technology to business transactions. In his commentary for this last section of this retrospective issue, I. Wladawsky-Berger, General Manager of the IBM Internet Division who has also led several significant IBM product developments, briefly reflects on the historical background leading up to the current use of information technology in business and then provides a look at where current trends in computing will lead business in the near future, especially through e-business. He concludes by offering a critical principle to keep in mind as we approach new turning points yet to come.

The editorial staffs, past and present, of the *Journal* have been privileged to be a part of both the development of computing and the presentation of those developments in the pages of the *Journal* over these 38 years. Serving the readers and the field through careful selection of themes and papers is always a challenge in any refereed journal, but it has been our pleasure to both choose the papers, some of which you see republished here, and to bear witness to the history of computing as it unfolded over time.

The next issue of the *Journal* is devoted to showing some of the latest work involving human-computer interaction. A wide range of topics on this subject is presented, from technological innovations to social aspects.

Gene F. Hoffnagle
Editor

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