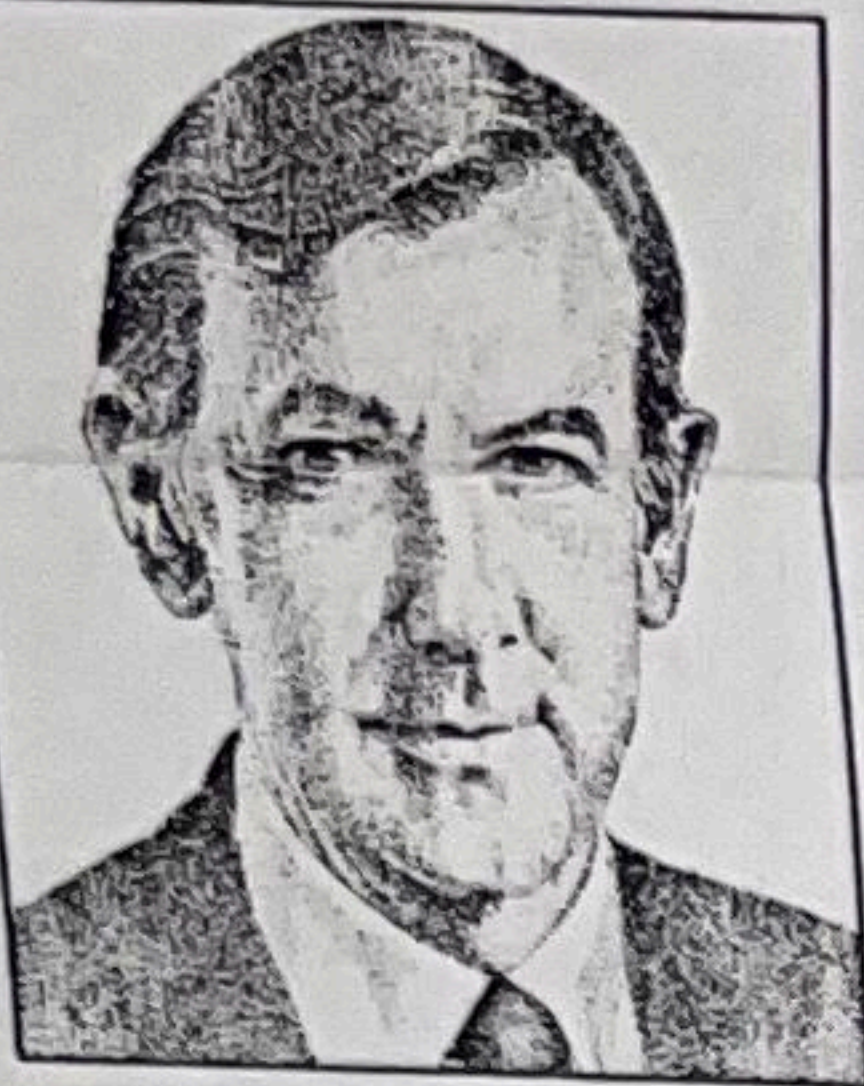


APPLIED INTELLIGENCE

IBM's AS/400 Holds Key to the Future of Computing



JAMES MARTIN

This is the first in a series of articles on IBM's AS/400 midrange family of computers. The AS/400 is an important component of IBM's strategy to provide greatly enhanced consistency and connectivity across multiple supported envi-

ronments.

When IBM announced its AS/400 family of computers in June 1988, one IBM executive called the announcement IBM's most important in 20 years. It is certainly important enough to warrant evaluation by all major users of computer technology. The AS/400 is a highly focused product, but its market is very large: midrange commercial systems. IBM executives have estimated the worldwide market for midrange systems at more than \$40 billion annually.

Last year, IBM shipped 32,000 AS/400 systems worldwide; this year it is expected to more than triple that number. The AS/400 family consists of seven models and spans a broad range of processing capabilities.

The technology of the AS/400 is based on an innovative architecture introduced by IBM in the System/38, or S/38, computer. The AS/400, however, represents a significant improvement in technology and capability relative to the S/38. The key features of the AS/400 are a high-level machine interface, object-oriented design, single-level addressability, highly integrated systems functions, an integrated relational database and advanced engineering.

Its greatest strength is its ability to manage complex databases. Its architectural features are implemented on a new hardware platform that incorporates highly sophisticated engineering.

More than an S/38 Replacement

Although the AS/400 was introduced as a replacement for the S/36 and S/38 series, it's a mistake to think of the AS/400 only in that context. IBM is selling AS/400s for a wide variety of situations, including entry systems for small organizations that have outgrown PC-based solutions, departments and divisions of larger organizations, office automation and competitive replacements.

The AS/400 poses a significant threat to vendors of such competitive midrange computers as DEC, Wang, Hewlett-Packard, Data General and Unisys. It may hasten the move of many of these vendors toward Unix-based operating systems, but it will be difficult for them to offer the wide range of commercial applications available on the AS/400.

The machine is proving popular as a replacement for other IBM midrange computers, especially smaller S/370 series computers. Users of these systems, such as 4300-class machines, typically run on the DOS/VSE operating system, and are facing an expensive conversion to the

more complex MVS operating system. They see a switch to the simple environment of the AS/400 as an attractive and less costly alternative.

A unique characteristic of the AS/400 is the environment for program development. AS/400 users can create machine-efficient applications rapidly using the functions offered by IBM system software, languages and utility programs. In addition to software products provided by IBM, a number of third-party products offer further enhancement to the AS/400 programming environment.

As shown in the accompanying figure, the AS/400 may be used as part of a multilayered, distributed architecture

achieve open architectures, open networks, standards for database access, standard forms of user interaction, standards for languages that achieve full portability, and standard application-development environments. Many organizations are turning to Unix to achieve connectivity and portability among disparate computing environments.

IBM users have complained for years about the lack of compatibility and connectivity between IBM's multiple system architectures and operating environments. Programming interfaces, languages, support services, user interfaces, communications facilities and applications generally have not been supported

monality; and support of distributed data and cooperative processing.

The foundation for much of IBM's strategy is SAA. It represents a major commitment by IBM to resolve the confusing array of incompatible interfaces, data structures, operating environments and interprocess communications across major IBM product lines.

As the structure of SAA evolves, it will provide the facilities required to build new distributed applications that operate across a broad spectrum of environments. A major challenge for information-systems managers and analysts in the '90s will be to learn how to use such comprehensive environments as SAA to specify applications that operate on networked computers and distribute both processing power and data.

Access to Diverse Environments

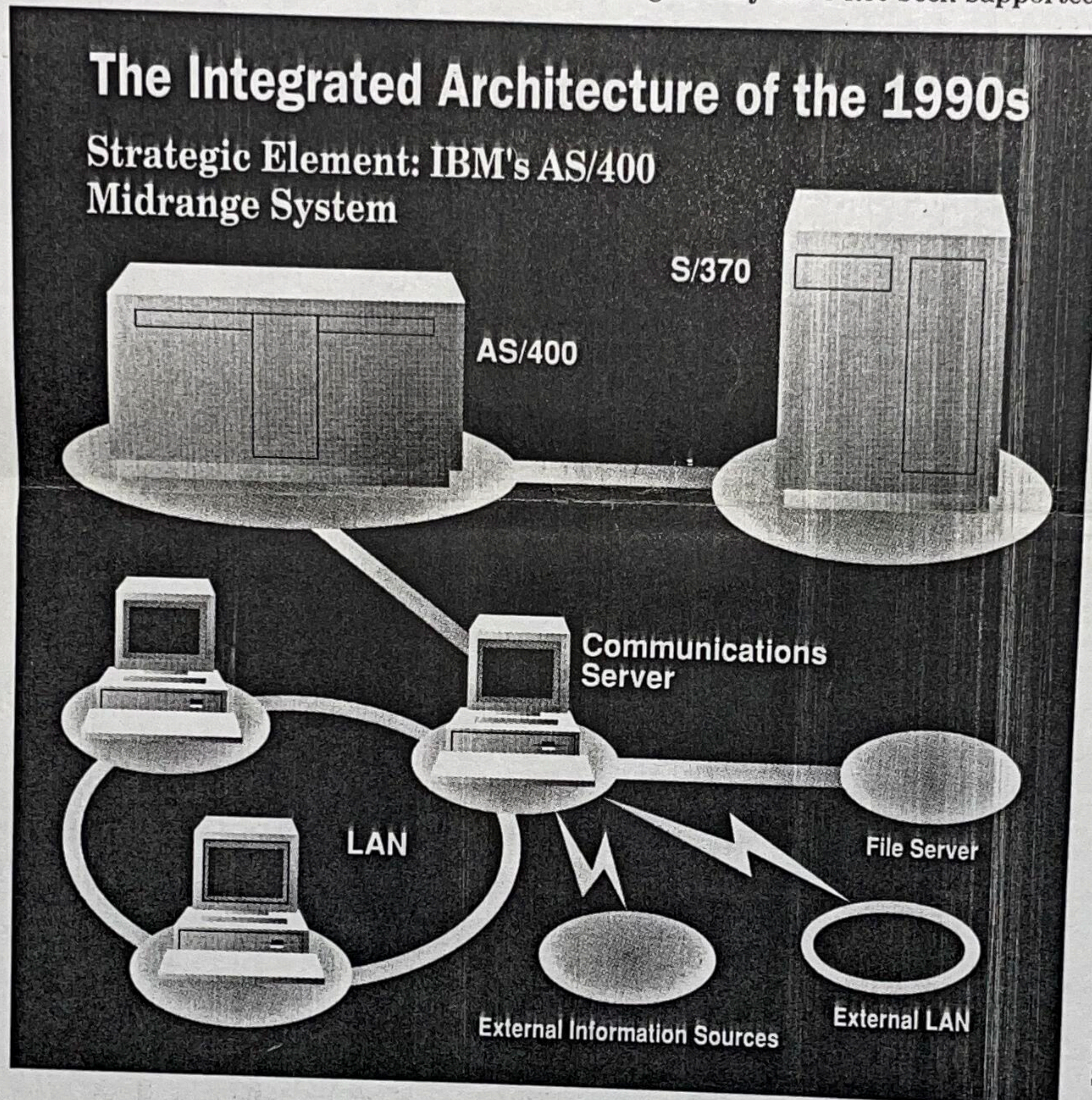
An important goal of SAA is to provide consistent user, programming and communication access to environments as diverse as the System/370, AS/400 and PS/2. It will be used to simplify the end-user interface on intelligent workstations, provide common programming interfaces and tools, support common communications interfaces that comply with international standards, present an integrated, seamless interface between intelligent workstations and host computers, support cooperative processing between elements of a network, and provide transparent access to data anywhere in the network.

The significance of SAA is that it will eventually provide a greatly enhanced level of consistency and uniformity across the three supported hardware environments, as well as connectivity to other system environments. It will provide standard forms of user access to IBM computers and standard interfaces to databases and networks, regardless of changes to individual system architectures. The architectures of S/370, AS/400 and PS/2 are likely to change significantly over the next several years. SAA will continue to provide a common, consistent set of support facilities and interfaces for these evolving systems.

The AS/400 has had a dramatic impact on the computer market. Many users of computer technology are changing their plans to make effective use of its unique capabilities. As IBM's overall product plan evolves, and as its SAA strategy is implemented, the importance of the AS/400 will increase. Understanding the AS/400 is essential for organizations planning to take advantage of available computer technology.

Next week, we will look at the major strengths and limitations of the AS/400 computer system. ■

The James Martin Productivity Series, an information service updated quarterly, is available through High Productivity Software Inc., of Marblehead, Mass. (800) 242-1240. For information on seminars, please contact (in the United States and Canada) Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402 (213) 394-8305. In Europe, contact Savant, 2 New St., Carnforth, Lancs., LA5 9BX United Kingdom (0524) 734 505.



John Avakian

A major challenge in the '90s will be to learn how to use SAA to specify applications that operate on networked computers and distribute both processing power and data.

composed of LAN-based PCs, midrange computers and mainframes tied together with communication networks. One of the most important trends of the '90s will be to distribute processing power and data across networked, multitiered computer systems. In these systems, the user should not be aware of where the processing is performed or whether data being accessed is local or remote.

The development of cooperative processing and distributed data services will require an open systems architecture that permits distribution of processing power and data across multiple system configurations. There is a major effort under way by many vendors to

achieve open architectures, open networks, standards for database access, standard forms of user interaction, standards for languages that achieve full portability, and standard application-development environments. Many organizations are turning to Unix to achieve connectivity and portability among disparate computing environments.

In March 1987, IBM introduced the Systems Application Architecture (SAA) as part of a long-term strategy to provide a common set of languages, services, user access and connectivity across three supported architectures: System/370, AS/400 and PS/2. The objectives of SAA within these architectures include portability of applications across product lines; connectivity; consistency of user, programmer and communication interfaces; database com-

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