# 50 & 25 YEARS AGO

EDITOR **ERICH NEUHOLD** [iD]
University of Vienna
erich.neuhold@univie.ac.at

## MARCH 1974

*https://www.computer.org/csdl/magazine/co/1974/03*

**Distributed-Function Computer Architectures; Ragnar N. Nilsen** (p. 15): In view of these circumstances, the dispersion and distribution of information processing capabilities on a functional basis and their effect on future computer architectures seemed a timely subject for the Lake Arrowhead Workshop." (p. 16) "In order to achieve the above objective, the agenda for this workshop was partitioned into the following four sessions." *[Editor's note: The following four extracts briefly describe the four articles about the subject and contents of these sessions.]*

**Innovations in Heterogeneous and Homogeneous Distributed-Function Architectures; Earl C. Joseph** (p. 17): The present evolutionary movement of computer system architecture development is a rapid growth toward functionally distributing computer power." (p. 18) "Our industry seems willing to embrace all manner of architectures under the umbrella definition 'distributed systems.' ... Distributed processing element systems may be defined as consisting of multiple processing elements, potentially simultaneously active, which are either functionally or physically distributed, or both." *[Editor's note: The article then continues by describing different computing components and their distribution properties. All over, an interesting article but, despite discussing development costs of specialized components, it does not consider the development of component libraries and their reuse.]*

**Models for the Design, Simulation, and Performance of Distributed-Function Architecture; Jean-Loop Bear** (p. 25): "Two methodologies for the computer-aided design of distributed systems will first be presented. Then a graph model for the description and simulation of real systems at a useful level will be introduced. It will be followed by a formal approach to the modeling of processes and interprocess communications, and finally, by a method to evaluate the performance of distributed systems using queuing networks." (p. 27) "Petri nets are directed graphs with two types of nodes: transitions corresponding to events, and places corresponding to conditions. The firing of transitions (i.e., the occurrence of events) is directed by the presence of tokens on places (i.e., the holding of conditions)." *[Editor's note: It is interesting to note that quite a number of papers of the workshop that are mentioned in this interesting article rely on extensions of the Petri net.]*

**Software Considerations in Distributed Architectures; David J. Farber** (p. 32): "It seems to be a discernible trend in the system area to consider an organization where each process communicates with other processes, including the operating system modules, by sending messages back and forth. ... This can yield significant improvements in our ability to ensure the reliability of the system as well as to guarantee the privacy of information stored in the system. ... Of all the issues faced in the design of distributed machine software structures, the most poorly understood yet one of the most important issues is that of distributed data (file) systems." *[Editor's note: The author then uses as an example a BASIC interpreter-based distributed system to exemplify some of the necessary communication issues, especially concerning the date access. It is interesting to note that at the time of the article, quite a number of European distributed database systems were under development that had already solved many of the mentioned problems.]*

**Information Hardware... Again; W. J. Poppelbaum** (p. 36): "Not only is direct functional mechanization going to oust many a GP computer with tons of software, but the very principle of binary number representation will be questioned. The ever increasing market for linear devices proves that reliability, speed, and cost considerations slowly replace the fanatical dictum that 'binaryness is next to godliness.' After all, we do not usually digitize the output of a phonograph

pickup in order to obtain loudspeaker power. ... The hierarchy of computers will start with everybody's hand-held calculator-plus-picture phone, tied into city-block computers (communications). The block-computers will answer to metropolitan computers (shopping, entertainment), and the latter can access a computerized Library of Congress." *[Editor's note: It is an interesting article as it, on the one hand, wrongly depicts the demise of Von Neumann computers, and on the other, predicts something like the Internet with smart phones, etc. It even predicts that "people transport" will be replaced by "information transport." Did the author mean "home office"?]*

**A Simplified Microcomputer Architecture; Joe Weisbecker** (p. 41): "The motivation behind this work has been the view that for 20 years computer hardware has become increasingly complex, lan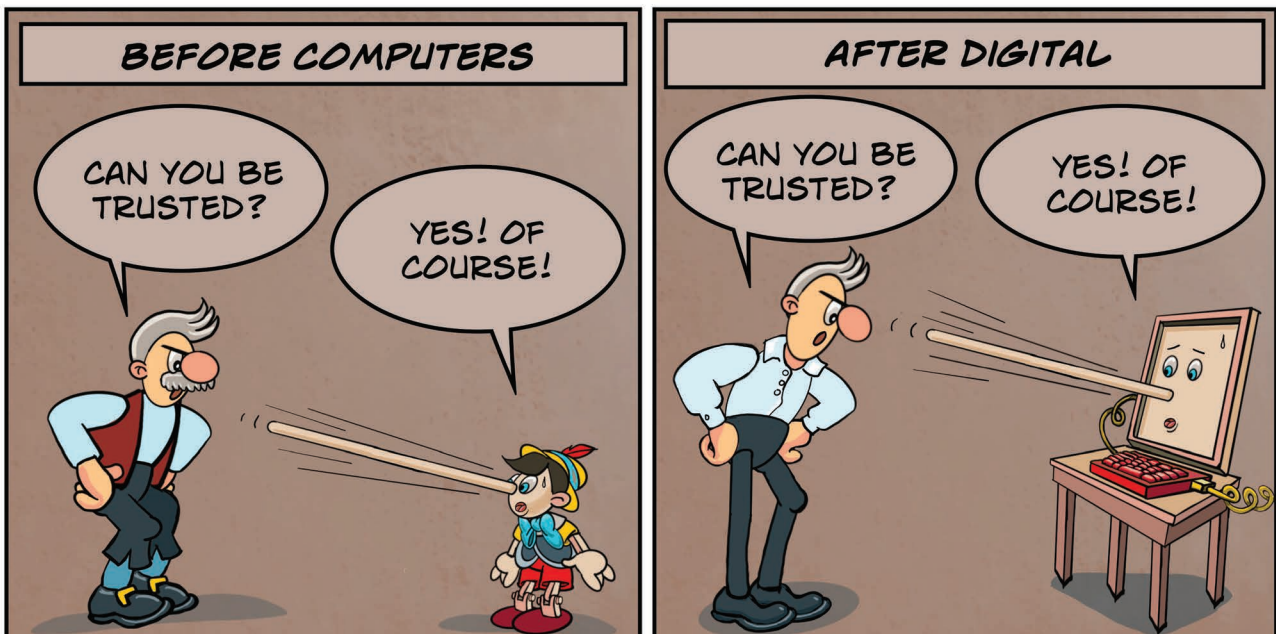guages more devious, and operating systems less efficient. Now, microcomputers afford some of us the opportunity to return to simpler systems. Inexpensive, LSI microcomputers could open up vast new markets." (p. 47) "Much current microcomputer development effort appears to be directed toward improved performance. There is, however, a need for simple, minimum-cost structures that will satisfy large-volume applications which do not require minicomputer performance levels." *[Editor's note: The article contains a detailed description of one such "cheap" microprocessor. However, it wrongly depicts the demise of high-performance large-scale integration (LSI) chips. As we now know, both high-performance (supercomputer) chips and low-cost (Internet of Things) chips are still important.]*

**New Products; Ed. Milton G. Bienhoff** (p. 48): "Full Programming Capability with HP-65 Calculator: The new HP-65



# COMPUTING THROUGH TIME
# TRUSTWORTHY AI
### BY ERGUN AKLEMAN

**BEFORE COMPUTERS**

CAN YOU BE TRUSTED?

YES! OF COURSE!

**AFTER DIGITAL**

CAN YOU BE TRUSTED?

YES! OF COURSE!

THE CONCEPT OF ARTIFICIAL LIFE BECAME POPULAR AFTER LUIGI GALVANI'S WORK ON THE EFFECT OF ELECTRICITY ON FROGS IN 1780. MARY SHELLEY WROTE HER NOVEL *FRANKENSTEIN* IN 1818. CARLO COLLODI WROTE *PINOCCHIO* IN 1883. BOTH NOVELS CAN BE CONSIDERED EARLY EXAMPLES OF POTENTIAL DANGERS OF ARTIFICIAL LIFE AND INTELLIGENCE. ARTIFICIAL INTELLIGENCE (AI) PIONEER GEOFFREY HINTON DEPARTED FROM GOOGLE IN 2023 AFTER PUBLICLY ANNOUNCING HIS CONCERNS ABOUT THE RISKS OF AI.

calculator, a more powerful version of current HP pocket-sized calculators, enables users to write and edit their own programs, to use prerecorded programs developed by HP which solve frequently encountered problems, and to operate the 51 keyboard functions preprogrammed into the machine. ... The price of the 11 ounce calculator is $795." *[Editor's note: A very interesting product that did not have the hoped for impact in the market place. I personally believe that it was "too early" a product. People were not ready to consider a handheld device to perform like a "computer." Tablets and smart phones were a long way off.]*

## MARCH 1999

*https://www.computer.org/csdl/magazine/co/1999/03*

**New Technologies Take the Network Home; George Lawton** (p. 12): "The demand for home networking is being driven by the growth of multicomputer homes, which is being driven by the growing number of computer users and low-cost computers. ... Many industry observers predict that most home-networking technologies will operate over phone lines. However, vendors are also working with wireless, cable, and power-line technologies." *[Editor's note: Historically, an interesting article as it shows that in 1999 home networking was very much in its infancy. The article does not at all foresee the overwhelming success of wireless technology which, of course, took much longer to succeed than I would have suspected. Security issues, mentioned in the article, may have played a role.]*

**Will 1999 Be the Year of IP Telephony?; Neal Leavitt** (p. 15): "Two critical issues for IP telephony's future are interconnection with the traditional telephone network and interoperability between different vendors' products." (p. 17) "IP telephony thus can represent a convergence of circuit-switched networks, such as the traditional phone network, with packet-switched networks, such as the Internet, intranets, LANs, and WANs." *[Editor's note: The article is careful about predicting that IP telephony is the future. In that, it has proven right. Even today both IP telephony and switched network telephony are still around.]*

**Have We Witnessed a Real-Life Turing Test?; Marina Krol** (p. 27): "Did Deep Blue ace the Turing Test? Did it do much more? It seems that the IBM creation not only beat the reigning World Champion Gary Kasparov, but also took a large step, in some people's eyes, toward true artificial intelligence." (p. 30) "Kasparov stopped short of directly accusing the Deep Blue team of human intervention in the process of selecting moves, but went so far as to admit the appearance of human intelligence in the computer's actions." *[Editor's note: It is interesting to see here that the Turing Test was almost totally focused on chess playing. Also, "human like" in the Turing Test is not at all a test of "intelligence." Even today, ChatGPT and its* alternatives mostly simulate human behavior. Statistics, despite their power, is not how humans think.]*

**Beyond Spreadsheets: Tools for Building Decision Support Systems; Hemant K. Bhargavaz et al.** (p. 31): "In recent years, the growing popularity of online analytical processing, data warehousing, and supply chain management has led to an increased interest in the development of decision support systems." (p. 32) "As an application development environment, a DSS generator is more like a spreadsheet than a C++ development environment. Developers work with a DSS generator, which provides certain generic functions." (p. 38) "Maturing DSS technologies and decision analysis methods have led to the development of DSS generators that are both usable and powerful. Yet the ultimate deployment of DSSs will depend on the ability of users to use them to their advantage." *[Editor's note: The article contains the analysis of 11 decision support systems (DSSs) that existed 25 years ago, but as we know today, DSSs did not eliminate spreadsheets. They are still in wide use for business purposes.]*

**Guest Editor: Transforming Business Through Information Technology; Girish Pathak et al.** (p. 40): "Information technology has made major strides this past decade, improving significantly the process of doing business. These changes have permeated every aspect of our lives from grocery shopping to banking to manufacturing to managing a profitable business. And the trend is expected to accelerate as we move into the new millennium. ... IT has had a dramatic impact on our economy and has spurred innovation in industry. The early '90s were simply a period of long-term investment, and we are now beginning to reap the benefits. The four articles assembled here provide a glimpse into our dynamic era and generally represent the evolving industrial environment." *[Editor's note: There is no doubt that the predictions of this introduction and the four articles following have been correct in predicting the tremendous impact IT has had. Of course, many of today's "killer" applications have not been foreseen.]*

**The Changing Role of Information Technology in Manufacturing; Krishnamurthy Srinivasan et al.** (p. 42): "In this case study, an apparel manufacturer used a modeling framework developed by Georgia Tech to implement multiple IT solutions." (p. 43) "ENTERPRISE MODELING FRAMEWORK: The EMF consists of a methodology for modeling the three major facets of an enterprise—function, information, and dynamics—and the software tools to implement the methodology." (p. 46) "CASE STUDY: In 1991, Terry Manufacturing, a small business enterprise, entered into a shared production agreement with the DoD *[Editor's note: Department of Defense.]* and McDonald's" *[Editor's note: This very detailed article then shows how modeling of the three mentioned components allows the flexibility to shift between the two contracts and gain the ability to adjust production volume on a short notice.]*

**Reinventing GTE with Information Technology; Richard Brandau et al.** (p. 50): "In response to shifting business demands, evolving information technologies play a key role in first reengineering and then reinventing GTE." (p. 53) "GTE Laboratories used these early 1990s technologies to develop TONICS (Telecommunications Operations Integrated Network Control System)." (p. 55) "During 1998, GTE Laboratories began developing the next-generation TONICS system, called NeMoW (Network Management on the Web)." *[Editor's note: The detailed description of the two systems illustrates how deregulation of the telecommunication industry led to new business models in order to rapidly deal with new partners and new competition.]*

**The BT Intranet: Information by Design; Mark Norris et al.** (p. 59): "British Telecom's intranet hosts an array of information products that are an integral part of the way its employees do business." (p. 60) "Perhaps the most concise definition would be that an intranet is the deployment of Internet technology to meet the needs of a particular group or organization." (p. 65) "Undoubtedly there will be further changes in our business operations, many of which will be sparked by the ease with which we can share and process information." *[Editor's note: The detailed article describes the different components, including video and learning materials, and their technology that enables intracompany and external partner cooperation.]*

**Making Business Sense of Electronic Commerce; Dawn Jutla et al.** (p. 67): "There are currently three main types of business model. ... E-broker ... Manufacturer ... Auction." (p. 71) "The perceived and real lack of security—authentication, privacy, and nonrepudiation—over the Internet has been identified as a barrier to consumers' acceptance of online purchasing." (p. 74) "One remedy has been to cultivate hybrid competencies. Indeed, when a core competency is the ability to exploit new technology—as is true of e-commerce—technical skills and management skills must overlap and hybridize." *[Editor's note: Today's fully accepted e-commerce was still much discussed 25 years ago. The article describes many relevant aspects of successful e-commerce and even goes into security issues. Most of them have been resolved in the meantime; only security and privacy are still much of concern.]*

*[Editor's note: The next two article argue two different approaches to system development: On one side, following "software life cycle processes"; on the other "rapid application development" (RAD). As the controversy still exists today I will leave the interpretations to the readers.]*

**Defining Stakeholder Relationships; Harold W. Lawson** (p. 110): "Jointly developed by the ISO and IEC in 1995, the ISO/IEC 12207 standard, Software Life Cycle Processes, provides specific guidance in defining the roles and responsibilities of various stakeholders in the life cycle of a software project, product, or service. ... Drawn from very different industries, these case studies also show that ISO/IEC 12207 can be applied to both systems and software engineering." *[Editor's note: The two case studies, explained in detail, are: 1) Haldex Traction AB for a four-wheel traction device and 2) Cambio+ Healthcare Systems AB for medical information processing products for hospitals and clinics.]*

**Making RAD Work for Your Project; Barry Boehm** (p. 113): "In general, RAD gives you earlier product payback and more payback time before the pace of technology makes your product obsolete. ... Find out which form of rapid application development is best for your project—and which to avoid at all costs. ... RAD FORMS: – Dumb RAD – Generator RAD – Composition RAD – full-scale RAD." *[Editor's note: The article then analyzes the four and gives negative examples of the first three. It declares dumb RAD to avoid, and generator RAD as well as composition RAD as usable for small projects with lots of preexisting components. Full-scale RAD (FSRAD) adds a lot of aspects that actually move FSRAD in the direction of the software cycle process described by H.W. Lawson.]*

**Innovation in the Small; Ted Lewis** (p. 120): "The computer science community hasn't lost its ability to innovate, but it is grappling with a fundamental shift. The rules of engagement—what ideas are developed and how they are nurtured— have changed radically. *[Editor's note: as time line]* LONE RANGER R&D *[Editor's note: A single person invents]* ... BIG SCIENCE *[Editor's note: Government big money for research institutions]* ... DEEP POCKETS R&D *[Editor's note: Large company investments]* ... IDEA LABS *[Editor's note: Venture capitalist investments]*." (p. 118) "At some point, the innovator takes the idea to an investment banker or venture capitalist, who pours money into the project much as government agencies pour money into a university research lab. The investor pays the development bills until the first opportunity to cash out arises. ... Our current short-term focus does, however, set the stage for singularities. A singularity is a rare event that abruptly changes everything in a given field or discipline." *[Editor's note: A very interesting article that predicts in a way the lack of "singularities" over the last 25 years. Where are they: Quantum computing? Fusion reactors? ...? Generative retrained transformers I do not consider such as they only apply long-known techniques for massive data analysis.]*