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A Computing Pioneer Has a New Idea

By [JOHN MARKOFF](#)

SAN FRANCISCO — Steven J. Wallach is completing the soul of his newest machine.

Thirty years ago, Mr. Wallach was one of a small team of computer designers profiled by Tracy Kidder in his [Pulitzer Prize](#) winning best seller, “The Soul of a New Machine.”

It was Mr. Wallach, then 33, who served as the architect and baby sitter for his “microkids,” the young team that designed the Data General MV 8000, the underdog minicomputer that kept the company alive in its brutal competition with the Digital Equipment Corporation.

At 63, he is still at it. He plans to introduce his new company, Convey Computer, and to describe the technical details of a new supercomputer intended for scientific and engineering applications at a supercomputing conference in Austin, Tex., this week.

Mr. Wallach thinks he has come upon a new idea in computer design in an era when it has become fashionable to say that there are no new ideas. So far, he has persuaded some of the leading thinkers in the high performance computing world that he might be right. Both [Intel](#) and a second chip maker, [Xilinx](#), have joined as early investors.

“Steve comes from a long history of building successful machines,” said Jack Dongarra, a computer scientist at the [University of Tennessee](#) who helps maintain the list of the world’s fastest 500 computers. “He understands where the bottlenecks are.”

After leaving Data General, Mr. Wallach helped found Convex in 1982 to build a low-cost supercomputer.

Mr. Wallach may be one of the few people remaining to recall a bold generation of computer designers once defined by Seymour Cray, the engineer who created the world’s first commercial supercomputers during the 1960s.

His newest effort in computing design is intended to tackle one of the principal limitations in the world of supercomputing. Typically supercomputers are intended to excel in solving a single class of problems. They may simulate the explosion of a nuclear weapon or model global [climate change](#) at blinding speed, but for other problems they will prove sluggish and inefficient.

Today’s supercomputers are assembled from thousands or even tens of thousands of microprocessors, and they often consume as much electricity as a small city. Moreover, they can prove to be frightfully difficult to program. Many new supercomputers try to deal with the challenge of solving different classes of problems by connecting different kinds of processors together Lego-style. This can give programmers fits.

For decades, computer designers have struggled with different ways to sidestep the complexity of programming multiple chips, in order to break up problems into pieces to be computed simultaneously so that they can be solved more quickly.

Mr. Wallach came up with his new design idea in 2006 after he found himself rejecting many of the start-up companies who were coming to the venture capital companies he was advising.

“I would say, ‘No, no, no, they’re clueless,’” he said. “I find it difficult to think of myself as the old man of the industry, but it feels that the same as it was in the early 1980s.”

One of the venture capitalists grew frustrated with Mr. Wallach’s repeated criticisms and said to him, “All right Mr. Bigshot, what would you?”

Two weeks later, Mr. Wallach had a new idea. He had long been fascinated with a chip technology called Field Programmable Gate Arrays. These chips are widely used to make prototype computer systems because they can be easily reprogrammed and yet offer the pure speed of computer hardware. There have been a number of start-ups and large supercomputer companies that have already tried to design systems based on the chips, but Mr. Wallach thought that he could do a better job.

The right way to use them, he decided, was to couple them so tightly to the microprocessor chip that it would appear they were simply a small set of additional instructions to give a programmer an easy way to turbocharge a program. Everything had to look exactly like the standard programming environment. In contrast, many supercomputers today require programmers to be “heroic.”

“The past 40 years has taught us that ultimately the system that is easiest to program will always win,” he said.

Mr. Wallach approached Applied Micro Devices about partnering, but it was skeptical. So he went to Intel, where he knew Justin Rattner, the company’s chief technology officer and a veteran supercomputer designer.

“We’ve had enough debates over the years that Justin has some respect for me,” he said.

The Convey computer will be based around Intel’s microprocessors. It will perform like a shape-shifter, reconfiguring with different hardware “personalities” to compute problems for different industries, initially aiming at bioinformatics, computer-aided design, financial services and oil and gas exploration.

Mr. Wallach acknowledges that starting a company going into a recession in the face of stiff competition from Cray, [I.B.M.](#), [Hewlett-Packard](#), [Sun Microsystems](#) and more than a dozen smaller companies is daunting. However, Convey was put together in just two years on a shoestring. It has raised just \$15.1 million.

“In a lot of ways, it’s easier than it was in 1982,” he said. “You need less money and I don’t think a lot of people have grasped this.”

One who does get the idea and who is enthusiastic about it is Larry Smarr, an astrophysicist who is director of the California Institute for Telecommunications and Information Technology at the University of

California, San Diego. He believes that the most important quality of the Convey computer is that it will be a green supercomputer.

“The I.T. industry is going to become the boogeyman for global warming,” he worries.

Three decades after designing the computer that brought the idea of computing into the public consciousness, Mr. Wallach gives no hint that he is slowing down.

He still wears the earring that he began wearing 15 years ago when his daughter suggested that he was getting old.

“Isn’t that required to be a computer architect?” he asked recently.

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