The New York Times https://www.nytimes.com/2001/06/21/business/technology-computer-gains-driven-by-consumer-products.html

TECHNOLOGY

TECHNOLOGY; Computer Gains Driven by Consumer Products

By John Markoff
June 21, 2001

See the article in its original context from June 21, 2001, Section C, Page 4 Buy Reprints

VIEW ON TIMESMACHINE

TimesMachine is an exclusive benefit for home delivery and digital subscribers.

The twice-annual ranking of the world's 500 fastest computers, being issued today, shows that the United States still has a significant lead in building powerful supercomputers.

But the list is also an indication that increasingly the world of supercomputing is no longer at the cutting edge of computing technology. The remarkable increases in speed and the falling prices of microprocessors and memory chips are turning the modern computing industry upside down. Powerful new technologies are increasingly being introduced first in consumer electronics rather than the scientific and military computers that once dominated the computer world.

The world's fastest computer, known as ASCI White, is still a machine financed by the military, made by I.B.M. and installed at Lawrence Livermore National Laboratory. But it has been assembled from thousands of microprocessors whose individual speed is outdated compared with even most desktop PC's of the last two years.

Driven by the rapid pace of consumer product development, the so-called post-PC world is now moving at a much faster pace than the traditional high-end scientific computing markets.

The new rankings also demonstrate that the high-end supercomputing industry in the United States has increasingly become dominated by Pentagon priorities, focused on the simulation of nuclear weapons and the preservation of the nation's strategic arsenal.

As a consequence, the world's four fastest supercomputers can be found at the three Department of Energy national laboratories -- Lawrence Livermore, Sandia and Los Alamos -- where they are used as part of the classified Accelerated Strategic Computing Initiative, or ASCI, a military program aimed at enhancing modeling and simulation abilities that are needed to maintain the United States nuclear stockpile.

In recent years some United States scientists have warned that while money is still being spent to develop supercomputers, the country is falling behind in a variety of basic-science research fields.

''A tremendous amount of money has gone to the Department of Energy, and the climate scientists feel that they have been left out,'' said Jack Dongarra, a computer scientist at the University of Tennessee who is one of the keepers of the computer speed ranking.

Fears of a decade ago that the United States might lose its lead in the race to build the world's fastest computers have largely vanished. Indeed, dumping charges filed several years ago against the Japanese by the United States supercomputer maker Cray Research Corporation were dropped in May, and in return its Japanese rival, NEC, invested in Cray.

The most powerful Japanese machine is made by Hitachi and is a massively parallel computer -- the type in which hundreds or thousands of processors are linked by a high-speed network. It is ranked fifth and is the fastest nonmilitary supercomputer. Only 6 of the fastest 20 supercomputers are made by Japanese companies.

Indeed, the Japanese have increasingly been forced to turn to United States chip makers for computer processors in recent years. And the direction of research has been sharply altered by the reality that advanced consumer products, not supercomputers, have the economics of scale to make new development commercially viable.

This striking shift in advanced research and development from the top to the bottom of the computing industry is underscored by I.B.M.'s decision on where to invest in the future of computing power: a contract with the Sony Corporation to build the processor and network design for a future generation of its Playstation video game system.

I.B.M. is spending more than $3 billion on a new chip factory in East Fishkill, N.Y., which will be used in part to build chips for entertainment and mobile computing applications beginning in 2003. The factory's cost dwarfs the $1 billion spent on the entire ASCI military supercomputer program.

As part of the Sony partnership, I.B.M. also set up a new design center recently in Austin, Tex., that is focused on building an entirely new computer architecture based on the

computer giant's most advanced chip building technologies.

''We're in the final phases of the commodization of scaleable computing,'' said Larry Smarr, director of the California Institute of Telecommunications and Information Technology at the University of California at San Diego. ''We're at the end of an S curve and the only technology that can survive is the one with the largest installed base, which means consumer electronics.''

That is the world for which I.B.M. is designing its future high-performance computers, according to Bijan Devari, vice president for technology and emerging products for the computer maker's microelectronics division.

''We're talking about hundreds of millions of devices for this new architecture,'' he said. ''The most advanced stuff is increasingly coming from consumer markets. You can spend vast amounts of capital on things and spread it across hundreds of millions of units.''

The computer maker is thinking of its new design as capable of being used in all sorts of devices, from hand-held and mobile units all the way up through the server market, Dr. Devari said.

Known inside the company as the Cell Project, the first new systems are intended to emerge in 2004 and will have clock speeds beginning at four gigahertz, more than twice the speed of today's fastest microprocessors.

Dr. Devari said that a single four-processor device intended for the home would have a teraflop of computing power -- a trillion mathematical operations a second. Such a device is likely to sell for several hundred dollars compared with the 8,192-processor ASCI White machine, which cost about $110 million and has computed up to 7.2 teraflops.

The top 500 ranking of supercomputers is compiled twice a year by Hans Meuer of the University of Mannheim, Erich Strohmaier and Horst Simon of the National Energy Research Scientific Computing Center of the Department of Energy and Dr. Dongarra of the University of Tennessee. But power is becoming harder and harder to track.

Recently the group has added a second list of ''cluster'' machines to help track new low-cost supercomputers that are made up of collections of stripped down PC-boards.

But the computing world has moved beyond that as well. The traditional ranking system does little to track new types of distributed supercomputing platforms like the SETI@Home project, which at any one time will have several thousand processors spread across the Internet trying to locate signals from intelligent life beyond earth.

The distributed Internet computing model will increasingly change the face of the

computing world, according to Dr. Devari. I.B.M.'s new architecture will be modeled closely after the biological world; processors will be like cells that are connected to multiple additional computing cells by high-bandwidth computer networks.

''It will run your home entertainment center and a lot more,'' he said.

A correction was made on June 23, 2001*: An article in Business Day on Thursday about the world's fastest supercomputers referred incorrectly to two of them. The second-fastest is an I.B.M. supercomputer used for scientific research at the Lawrence Berkeley National Laboratory, not a military machine. The military supercomputer at Los Alamos ranks No. 6; it is not among the four fastest.*

When we learn of a mistake, we acknowledge it with a correction. If you spot an error, please let us know at nytnews@nytimes.com. Learn more

A version of this article appears in print on , Section C, Page 4 of the National edition with the headline: TECHNOLOGY; Computer Gains Driven by Consumer Products