



News Release

Defense Advanced Research Projects Agency

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IMMEDIATE RELEASE

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CRAY, IBM TO CONTINUE INTO PHASE III FOR DARPA HIGH PRODUCTIVITY COMPUTING SYSTEMS PROGRAM

The Defense Advanced Research Projects Agency (DARPA) today selected two phase III performers for the DARPA High Productivity Computing Systems program (HPCS). Cray Inc., Seattle, Wash., will receive \$250 million for their phase III effort; IBM Corp., Armonk, N.Y., will receive \$244 million.

In phase III of the HPCS program, the contractors will complete the designs and technical development of very large (petascale) productive supercomputers. Petascale computing systems are defined as those capable of performing more than one quadrillion floating point operations per second ("one petaFLOPS") and containing the bandwidth and memory necessary to run complex, real-world applications at that scale. The HPCS program intends to develop computing systems capable of two petaFLOPS sustained performance, scalable to greater than four petaFLOPS. The program will also improve application development time productivity by 10 times compared to what was attainable in 2002, and develop the software tools and programming environments that are critical for improving productivity.

In addition to developing and demonstrating individual prototype computing systems, the ultimate goal of the HPCS program is to create a new generation of economically viable high productivity computing systems that will be available for the national security and industrial user communities to purchase. The same highly productive technology can be used in systems of a variety of sizes. This variety leads to more possible products and customers, thus ensuring economic viability. The government has required each HPCS contractor to prepare a business plan for the development and commercialization of high productivity computing products that would be available for purchase by government mission partners and commercial companies. By ensuring that these systems are economically viable, the government will not be the sole customer and will not have to bear all of the costs for upgrades and technical evolution.

The prototype systems developed under the HPCS program will be at least one-quarter of the size desired by DARPA's mission partners, the National Security Agency, the Department of Energy Office of Science and National Nuclear Security Agency. By December 2010, Cray and IBM will demonstrate that the prototypes are functional, productive systems that can be scaled up to meet the program's goals. These prototype systems will be more powerful than the fastest supercomputer existing today, and will be available to select government high performance computing users for evaluation.

(more)

“High productivity computing is a key technology enabler for meeting our national security and economic competitiveness requirements,” noted Dr. William Harrod, DARPA program manager. “High productivity computing contributes substantially to the design and development of advanced vehicles and weapons, planning and execution of operational military scenarios, the intelligence problems of cryptanalysis and image processing, the maintenance of our nuclear stockpile, and is a key enabler for science and discovery in security-related fields.”

The high productivity computing system being developed by Cray is known as Cascade. Cascade is based on the concept of adaptive supercomputing in which high performance computing users are free to program in an intuitive, natural way, and the computer adapts to the application, rather than requiring the programmer to adapt the application to the computer. Cascade includes massive bandwidth to global memory, advanced synchronization capabilities, and multiple processor technologies optimized for scalable, high-performance computing. Cascade software includes novel debugging and performance tuning tools, the Chapel high productivity language, and an operating system designed to scale reliably and efficiently to hundreds of thousands of processors.

For their HPCS effort, IBM plans to incorporate HPCS capabilities into their mainline POWER-based server technologies. This includes developing a robust software stack and development tools focused on improving human productivity for scientific computing. IBM will incorporate significant enhancements in performance, usability, availability and power/environmentals into their POWER7 family of servers, the Advanced Interactive eXecutive operating system, their General Parallel File System, the HPC software stack and the interconnect and storage subsystems.

Initiated in 2002, the DARPA HPCS program responds to a strategy developed in conjunction with U.S. national security community. That strategy recommended a focus on productivity, the “life cycle costs” of high-end computing. Recent studies have emphasized that increased attention needs to be focused on the usability aspects of high-end computing in addition to the more traditional focus on hardware performance and speed. This usability focus will decrease the effort required to develop new software applications and port legacy applications to the new system.

Throughout the life of the HPCS program, beginning with phase I in 2002, DARPA has worked closely with its agency mission partners and additional potential user agencies (including National Science Foundation and National Reconnaissance Office) to convey the projected national security and scientific computing requirements to the HPCS contractors. The government has maintained a close working relationship with the companies to permit “out of the box thinking” for strategies to meet these requirements. This close relationship continues in phase III, with the National Security Agency and the Department of Energy contributing funding to the DARPA-led program, and with cost-sharing by the contractors.

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DARPA will hold a telephonic media availability to discuss these awards, Wed., Nov. 22 at 11:00 a.m. EST. Media interested in participating or with questions should contact Jan Walker, (703) 696-2404, or jan.walker@darpa.mil.