News Release

Defense Advanced Research Projects Agency

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3701 North Fairfax Drive
Arlington, VA 22203-1714

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DARPA SELECTS THREE HIGH PRODUCTIVITY COMPUTING SYSTEMS PROJECTS

The Defense Advanced Research Projects Agency (DARPA) today selected Cray Inc. (Seattle, Wash.) teamed with New Technology Endeavors Inc. (Seattle, Wash.); IBM (Armonk, N.Y.); and Sun Microsystems Inc. (Mountain View, Calif.) as the three contractor teams for the second phase of the High Productivity Computing Systems (HPCS) program.

The goal of the High Productivity Computing Systems program is to provide a new generation of economically viable, scalable, high productivity computing systems for the national security and industrial user communities in the 2009 to 2010 timeframe. The HPCS program will fill a gap in high-end computing that the Department of Defense will experience as it moves from today's high performance computing technology, which dates from the late 1980s, to the future promise of quantum computing.

Cray/New Technology Endeavors received $43.1 million to develop their HPCS concept, Cascade, which incorporates hardware and software technology innovations to enable higher productivity for sustained peta-scale computing. Hardware innovations include new processor architectures to make more effective use of the memory hierarchy, processor-in-memory technologies to provide greater memory bandwidth, and high bandwidth, low-latency, scalable networks. Software innovations include support for scalable shared and distributed memory programming models to facilitate rapid development of new applications while maintaining high performance and portability of existing applications.

IBM received $53.3 million for their PERCS (Productive, Easy-to-use, Reliable Computing Systems) approach. IBM is adapting the system layers to application requirements. Adaptability enhances the technical efficiency of the system, its ease of use, and its commercial viability by accommodating a large set of commercial and high performance computing workloads. During the second phase of the program, IBM will conduct research that will push the state of the art beyond the evolutionary path, with aggressive goals in performance, usability and time to solution.

Sun Microsystems received $49.7 million to continue work on their integrated system approach known as Hero. Hero provides a simplified architecture and novel programming tools that boost user productivity, enhance numerical precision, increase system security, and support legacy software. The architecture makes quadrillions of calculations per second readily available to programmers. The Hero project is also providing a "purpose-based benchmarks" approach as a means of measuring and

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designing systems for the productivity and performance that are the primary goals of the HPCS program.

DARPA's HPCS program is structured into three phases. The first phase was a 12-month, industry-guided concept study that provided critical technology assessments, developed revolutionary HPCS concept solutions, and generated new productivity metrics. The Phase I vendors produced revolutionary peta-scale system concepts that addressed sustained peta-scale performance, programmability, portability, and robustness. The second phase of the program is a 36-month research and development phase that will perform focused research and development and risk reduction engineering activities and will culminate in technology risk reduction demonstrations and a preliminary design review for each system. The third phase is a 48-month, full-scale engineering development effort.

The program's major objectives not only include developing solutions for productive peta-scale systems but also developing a productivity evaluation framework and metrics. Phase I resulted in the development of a productivity framework approach for high-end computing, a first for this community. The focus is on time-to-solution. MIT Lincoln Laboratory, Lexington, Mass., will be leading the phase II productivity team effort of implementing and validating the productivity framework. Active involvement by multiple government agencies or mission partners will continue to provide continual user feedback from the targeted high-end computing communities.

More information on the program is located at the program web site, http://www.darpa.mil/ipto/research/hpcs/index.html.

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Media with questions, please contact Jan Walker, (703) 696-2404, or jwalker@darpa.mil.