109TH CONGRESS
1ST SESSION

H. R. 28

IN THE SENATE OF THE UNITED STATES

APRIL 27, 2005

Received; read twice and referred to the Committee on Commerce, Science, and Transportation

AN ACT

To amend the High-Performance Computing Act of 1991.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''High-Performance Computing Revitalization Act of 2005''.

SEC. 2. FINDINGS.

Section 2 of the High-Performance Computing Act of 1991 (15 U.S.C. 5501) is amended by adding at the end the following new paragraph:

''(10) Commercial application of the results of Federal investment in basic and computing science is consistent with longstanding United States technology transfer policy and is a critical national priority, particularly with regard to cybersecurity and other homeland security applications, because of the urgent needs of commercial, academic, and individual users as well as the Federal and State Governments.''.

SEC. 3. DEFINITIONS.

Section 4 of the High-Performance Computing Act of 1991 (15 U.S.C. 5503) is amended—

(1) in paragraph (2), by inserting ''and multidisciplinary teams of researchers'' after ''high-performance computing resources'';

(2) in paragraph (3)—

(A) by striking ''scientific workstations,'';

(B) by striking ''(including vector supercomputers and large scale parallel systems)'';

(C) by striking ''and applications'' and inserting ''applications''; and

(D) by inserting '', and the management of large data sets'' after ''systems software'';

(3) in paragraph (4), by striking ''packet switched''; and

(4) by amending paragraphs (5) and (6) to read as follows:

''(5) 'Program' means the High-Performance Computing Research and Development Program described in section 101; and

''(6) 'Program Component Areas' means the major subject areas under which are grouped related individual projects and activities carried out under the Program.''.

SEC. 4. HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT PROGRAM.

Title I of the High-Performance Computing Act of 1991 (15 U.S.C. 5511 et seq.) is amended—

(1) in the title heading, by striking ''**AND THE NATIONAL RESEARCH AND EDUCATION NETWORK**'' and inserting ''**RESEARCH AND DEVELOPMENT**'';

(2) in section 101—

(A) the section heading, by striking ''**NATIONAL HIGH-PERFORMANCE COMPUTING**'' and inserting ''**HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT**'';

(B) in subsection (a)—

(i) in the subsection heading, by striking ''NATIONAL HIGH-PERFORMANCE COMPUTING'' and inserting ''HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT'';

(ii) by striking paragraphs (1) and (2) and inserting the following: ''(1) The President shall implement a High-Performance Computing Research and Development Program, which shall—

''(A) provide for long-term basic and applied research on high-performance computing;

''(B) provide for research and development on, and demonstration of, technologies to advance the capacity and capabilities of high-performance computing and networking systems;

''(C) provide for sustained access by the research community in the United States to high-performance computing systems that are among the

most advanced in the world in terms of performance in solving scientific and engineering problems, including provision for technical support for users of such systems;

''(D) provide for efforts to increase software availability, productivity, capability, security, portability, and reliability;

''(E) provide for high-performance networks, including experimental testbed networks, to enable research and development on, and demonstration of, advanced applications enabled by such networks;

''(F) provide for computational science and engineering research on mathematical modeling and algorithms for applications in all fields of science and engineering;

''(G) provide for the technical support of, and research and development on, high-performance computing systems and software required to address Grand Challenges;

''(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, computer and network security, applied mathematics, library and information science, and computational science; and

''(I) provide for improving the security of computing and networking systems, including Federal systems, including research required to establish security standards and practices for these systems.'';

(iii) by redesignating paragraphs (3) and (4) as paragraphs (2) and (3), respectively;

(iv) in paragraph (2), as so redesignated by clause (iii) of this subparagraph—

(I) by striking subparagraph (B);

(II) by redesignating subparagraphs (A) and (C) as subparagraphs (D) and (F), respectively;

(III) by inserting before subparagraph (D), as so redesignated by subclause (II) of this clause, the following new subparagraphs:

''(A) establish the goals and priorities for Federal high-performance computing research, development, networking, and other activities;

''(B) establish Program Component Areas that implement the goals established under subparagraph (A), and identify the Grand Challenges that the Program should address;

''(C) provide for interagency coordination of Federal high-performance computing research, development, networking, and other activities undertaken pursuant to the Program;''; and

(IV) by inserting after subparagraph (D), as so redesignated by subclause (II) of this clause, the following new subparagraph:

''(E) develop and maintain a research, development, and deployment roadmap for the provision of high-performance computing systems under paragraph (1)(C); and''; and

(v) in paragraph (3), as so redesignated by clause (iii) of this subparagraph—

(I) by striking ''paragraph (3)(A)'' and inserting ''paragraph (2)(D)'';

(II) by amending subparagraph (A) to read as follows:

''(A) provide a detailed description of the Program Component Areas, including a description of any changes in the definition of or activities under the Program Component Areas from the preceding report, and the reasons for such changes, and a de-

scription of Grand Challenges supported under the Program;'';

(III) in subparagraph (C), by striking ''specific activities'' and all that follows through ''the Network'' and inserting ''each Program Component Area'';

(IV) in subparagraph (D), by inserting ''and for each Program Component Area'' after ''participating in the Program'';

(V) in subparagraph (D), by striking ''applies;'' and inserting ''applies; and'';

(VI) by striking subparagraph (E) and redesignating subparagraph (F) as subparagraph (E); and

(VII) in subparagraph (E), as so redesignated by subclause (VI) of this clause, by inserting ''and the extent to which the Program incorporates the recommendations of the advisory committee established under subsection (b)'' after ''for the Program'';

(C) in subsection (b)—

(i) by redesignating paragraphs (1) through (5) as subparagraphs (A) through (E), respectively;

(ii) by inserting ''(1)'' after ''ADVISORY COMMITTEE.—'';

(iii) in paragraph (1)(C), as so redesignated by clauses (i) and (ii) of this subparagraph, by inserting '', including funding levels for the Program Component Areas'' after ''of the Program'';

(iv) in paragraph (1)(D), as so redesignated by clauses (i) and (ii) of this subparagraph, by striking ''computing'' and inserting ''high-performance computing and networking''; and

(v) by adding at the end the following new paragraph:

''(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report not less frequently than once every two fiscal years to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations.

The first report shall be due within one year after the date of enactment of this paragraph.''; and

(D) in subsection (c)(1)(A), by striking ''Program or'' and inserting ''Program Component Areas or''; and

(3) by striking sections 102 and 103.

SEC. 5. AGENCY ACTIVITIES.

Title II of the High-Performance Computing Act of 1991 (15 U.S.C. 5521 et seq.) is amended—

(1) by amending subsection (a) of section 201 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Science Foundation shall—

''(1) support research and development to generate fundamental scientific and technical knowledge with the potential of advancing high-performance computing and networking systems and their applications;

''(2) provide computing and networking infrastructure support to the research community in the United States, including the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, and

including support for advanced software and applications development, for all science and engineering disciplines; and

''(3) support basic research and education in all aspects of high-performance computing and networking.'';

(2) by amending subsection (a) of section 202 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in high-performance computing and networking, with emphasis on—

''(1) computational fluid dynamics, computational thermal dynamics, and computational aerodynamics;

''(2) scientific data dissemination and tools to enable data to be fully analyzed and combined from multiple sources and sensors;

''(3) remote exploration and experimentation; and

''(4) tools for collaboration in system design, analysis, and testing.'';

(3) in section 203—

(A) by striking subsections (a) through (d) and inserting the following:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall—

''(1) conduct and support basic and applied research in high-performance computing and networking to support fundamental research in science and engineering disciplines related to energy applications; and

''(2) provide computing and networking infrastructure support, including the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, and including support for advanced software and applications development, for science and engineering disciplines related to energy applications.''; and

(B) by redesignating subsection (e) as subsection (b);

(4) by amending subsection (a) of section 204 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

''(1) the National Institute of Standards and Technology shall—

''(A) conduct basic and applied metrology research needed to support high-performance computing and networking systems;

''(B) develop benchmark tests and standards for high-performance computing and networking systems and software;

''(C) develop and propose voluntary standards and guidelines, and develop measurement techniques and test methods, for the interoperability of high-performance computing systems in networks and for common user interfaces to high-performance computing and networking systems; and

''(D) work with industry and others to develop, and facilitate the implementation of, high-performance computing applications to solve science and engineering problems that are relevant to industry; and

''(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research on high-performance computing applications, with emphasis on—

''(A) improving weather forecasting and climate prediction;

''(B) collection, analysis, and dissemination of environmental information; and

''(C) development of more accurate models of the ocean-atmosphere system.''; and

(5) by amending subsection (a) of section 205 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward advancement and dissemination of computational techniques and software tools for high-performance computing systems with an emphasis on modeling to—

''(1) develop robust decision support tools;

''(2) predict pollutant transport and the effects of pollutants on humans and on ecosystems; and

''(3) better understand atmospheric dynamics and chemistry.''.

Passed the House of Representatives April 26, 2005.

Attest: JEFF TRANDAHL,

Clerk.