

109<sup>TH</sup> CONGRESS  
1<sup>ST</sup> SESSION

# H. R. 28

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IN THE SENATE OF THE UNITED STATES

APRIL 27, 2005

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

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## AN ACT

To amend the High-Performance Computing Act of 1991.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “High-Performance  
3 Computing Revitalization Act of 2005”.

4 **SEC. 2. FINDINGS.**

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

8 “(10) Commercial application of the results of  
9 Federal investment in basic and computing science  
10 is consistent with longstanding United States tech-  
11 nology transfer policy and is a critical national pri-  
12 ority, particularly with regard to cybersecurity and  
13 other homeland security applications, because of the  
14 urgent needs of commercial, academic, and indi-  
15 vidual users as well as the Federal and State Gov-  
16 ernments.”.

17 **SEC. 3. DEFINITIONS.**

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

20 (1) in paragraph (2), by inserting “and multi-  
21 disciplinary teams of researchers” after “high-per-  
22 formance computing resources”;

23 (2) in paragraph (3)—

24 (A) by striking “scientific workstations,”;

25 (B) by striking “(including vector super-  
26 computers and large scale parallel systems)”;

1 (C) by striking “and applications” and in-  
2 serting “applications”; and

3 (D) by inserting “, and the management of  
4 large data sets” after “systems software”;

5 (3) in paragraph (4), by striking “packet  
6 switched”; and

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

9 “(5) ‘Program’ means the High-Performance  
10 Computing Research and Development Program de-  
11 scribed in section 101; and

12 “(6) ‘Program Component Areas’ means the  
13 major subject areas under which are grouped related  
14 individual projects and activities carried out under  
15 the Program.”.

16 **SEC. 4. HIGH-PERFORMANCE COMPUTING RESEARCH AND**  
17 **DEVELOPMENT PROGRAM.**

18 Title I of the High-Performance Computing Act of  
19 1991 (15 U.S.C. 5511 et seq.) is amended—

20 (1) in the title heading, by striking “**AND**  
21 **THE NATIONAL RESEARCH AND EDU-**  
22 **CATION NETWORK**” and inserting “**RE-**  
23 **SEARCH AND DEVELOPMENT**”;

24 (2) in section 101—

1 (A) the section heading, by striking “**NA-**  
2 **TIONAL HIGH-PERFORMANCE COM-**  
3 **PUTING**” and inserting “**HIGH-PERFORM-**  
4 **ANCE COMPUTING RESEARCH AND DEVEL-**  
5 **OPMENT**”;

6 (B) in subsection (a)—

7 (i) in the subsection heading, by strik-  
8 ing “**NATIONAL HIGH-PERFORMANCE**  
9 **COMPUTING**” and inserting “**HIGH-PER-**  
10 **FORMANCE COMPUTING RESEARCH AND**  
11 **DEVELOPMENT**”;

12 (ii) by striking paragraphs (1) and (2)  
13 and inserting the following: “(1) The  
14 President shall implement a High-Perform-  
15 ance Computing Research and Develop-  
16 ment Program, which shall—

17 “(A) provide for long-term basic and applied re-  
18 search on high-performance computing;

19 “(B) provide for research and development on,  
20 and demonstration of, technologies to advance the  
21 capacity and capabilities of high-performance com-  
22 puting and networking systems;

23 “(C) provide for sustained access by the re-  
24 search community in the United States to high-per-  
25 formance computing systems that are among the

1 most advanced in the world in terms of performance  
2 in solving scientific and engineering problems, in-  
3 cluding provision for technical support for users of  
4 such systems;

5 “(D) provide for efforts to increase software  
6 availability, productivity, capability, security, port-  
7 ability, and reliability;

8 “(E) provide for high-performance networks, in-  
9 cluding experimental testbed networks, to enable re-  
10 search and development on, and demonstration of,  
11 advanced applications enabled by such networks;

12 “(F) provide for computational science and en-  
13 gineering research on mathematical modeling and al-  
14 gorithms for applications in all fields of science and  
15 engineering;

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

20 “(H) provide for educating and training addi-  
21 tional undergraduate and graduate students in soft-  
22 ware engineering, computer science, computer and  
23 network security, applied mathematics, library and  
24 information science, and computational science; and

1           “(I) provide for improving the security of com-  
2           puting and networking systems, including Federal  
3           systems, including research required to establish se-  
4           curity standards and practices for these systems.”;

5                   (iii) by redesignating paragraphs (3)  
6                   and (4) as paragraphs (2) and (3), respec-  
7                   tively;

8                   (iv) in paragraph (2), as so redesign-  
9                   ated by clause (iii) of this subpara-  
10                  graph—

11                           (I) by striking subparagraph (B);

12                           (II) by redesignating subpara-  
13                           graphs (A) and (C) as subparagraphs  
14                           (D) and (F), respectively;

15                           (III) by inserting before subpara-  
16                           graph (D), as so redesignated by sub-  
17                           clause (II) of this clause, the following  
18                           new subparagraphs:

19                   “(A) establish the goals and priorities for Fed-  
20                   eral high-performance computing research, develop-  
21                   ment, networking, and other activities;

22                   “(B) establish Program Component Areas that  
23                   implement the goals established under subparagraph  
24                   (A), and identify the Grand Challenges that the Pro-  
25                   gram should address;

1           “(C) provide for interagency coordination of  
2 Federal high-performance computing research, devel-  
3 opment, networking, and other activities undertaken  
4 pursuant to the Program;” and

5                   (IV) by inserting after subparagraph  
6 (D), as so redesignated by subclause (II)  
7 of this clause, the following new subpara-  
8 graph:

9           “(E) develop and maintain a research, develop-  
10 ment, and deployment roadmap for the provision of  
11 high-performance computing systems under para-  
12 graph (1)(C); and” and

13                   (v) in paragraph (3), as so redesign-  
14 ated by clause (iii) of this subpara-  
15 graph—

16                           (I) by striking “paragraph  
17 (3)(A)” and inserting “paragraph  
18 (2)(D)”;

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

21           “(A) provide a detailed description of the Pro-  
22 gram Component Areas, including a description of  
23 any changes in the definition of or activities under  
24 the Program Component Areas from the preceding  
25 report, and the reasons for such changes, and a de-

1 description of Grand Challenges supported under the  
2 Program;”;

3 (III) in subparagraph (C), by  
4 striking “specific activities” and all  
5 that follows through “the Network”  
6 and inserting “each Program Compo-  
7 nent Area”;

8 (IV) in subparagraph (D), by in-  
9 serting “and for each Program Com-  
10 ponent Area” after “participating in  
11 the Program”;

12 (V) in subparagraph (D), by  
13 striking “applies;” and inserting “ap-  
14 plies; and”;

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

18 (VII) in subparagraph (E), as so  
19 redesignated by subclause (VI) of this  
20 clause, by inserting “and the extent to  
21 which the Program incorporates the  
22 recommendations of the advisory com-  
23 mittee established under subsection  
24 (b)” after “for the Program”;

25 (C) in subsection (b)—

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

4 (ii) by inserting “(1)” after “ADVI-  
5 SORY COMMITTEE.—”;

6 (iii) in paragraph (1)(C), as so reded-  
7 icated by clauses (i) and (ii) of this sub-  
8 paragraph, by inserting “, including fund-  
9 ing levels for the Program Component  
10 Areas” after “of the Program”;

11 (iv) in paragraph (1)(D), as so reded-  
12 icated by clauses (i) and (ii) of this sub-  
13 paragraph, by striking “computing” and  
14 inserting “high-performance computing  
15 and networking”; and

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

18 “(2) In addition to the duties outlined in paragraph  
19 (1), the advisory committee shall conduct periodic evalua-  
20 tions of the funding, management, coordination, imple-  
21 mentation, and activities of the Program, and shall report  
22 not less frequently than once every two fiscal years to the  
23 Committee on Science of the House of Representatives  
24 and the Committee on Commerce, Science, and Transpor-  
25 tation of the Senate on its findings and recommendations.

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

3 (D) in subsection (c)(1)(A), by striking  
4 “Program or” and inserting “Program Compo-  
5 nent Areas or”; and

6 (3) by striking sections 102 and 103.

7 **SEC. 5. AGENCY ACTIVITIES.**

8 Title II of the High-Performance Computing Act of  
9 1991 (15 U.S.C. 5521 et seq.) is amended—

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

12 “(a) GENERAL RESPONSIBILITIES.—As part of the  
13 Program described in title I, the National Science Foun-  
14 dation shall—

15 “(1) support research and development to gen-  
16 erate fundamental scientific and technical knowledge  
17 with the potential of advancing high-performance  
18 computing and networking systems and their appli-  
19 cations;

20 “(2) provide computing and networking infra-  
21 structure support to the research community in the  
22 United States, including the provision of high-per-  
23 formance computing systems that are among the  
24 most advanced in the world in terms of performance  
25 in solving scientific and engineering problems, and

1 including support for advanced software and applica-  
2 tions development, for all science and engineering  
3 disciplines; and

4 “(3) support basic research and education in all  
5 aspects of high-performance computing and net-  
6 working.”;

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

9 “(a) GENERAL RESPONSIBILITIES.—As part of the  
10 Program described in title I, the National Aeronautics and  
11 Space Administration shall conduct basic and applied re-  
12 search in high-performance computing and networking,  
13 with emphasis on—

14 “(1) computational fluid dynamics, computa-  
15 tional thermal dynamics, and computational aero-  
16 dynamics;

17 “(2) scientific data dissemination and tools to  
18 enable data to be fully analyzed and combined from  
19 multiple sources and sensors;

20 “(3) remote exploration and experimentation;  
21 and

22 “(4) tools for collaboration in system design,  
23 analysis, and testing.”;

24 (3) in section 203—

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

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

6 “(1) conduct and support basic and applied re-  
7 search in high-performance computing and net-  
8 working to support fundamental research in science  
9 and engineering disciplines related to energy applica-  
10 tions; and

11 “(2) provide computing and networking infra-  
12 structure support, including the provision of high-  
13 performance computing systems that are among the  
14 most advanced in the world in terms of performance  
15 in solving scientific and engineering problems, and  
16 including support for advanced software and applica-  
17 tions development, for science and engineering dis-  
18 ciplines related to energy applications.”; and

19 (B) by redesignating subsection (e) as sub-  
20 section (b);

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

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

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

3                   “(A) conduct basic and applied metrology  
4                   research needed to support high-performance  
5                   computing and networking systems;

6                   “(B) develop benchmark tests and stand-  
7                   ards for high-performance computing and net-  
8                   working systems and software;

9                   “(C) develop and propose voluntary stand-  
10                  ards and guidelines, and develop measurement  
11                  techniques and test methods, for the interoper-  
12                  ability of high-performance computing systems  
13                  in networks and for common user interfaces to  
14                  high-performance computing and networking  
15                  systems; and

16                  “(D) work with industry and others to de-  
17                  velop, and facilitate the implementation of,  
18                  high-performance computing applications to  
19                  solve science and engineering problems that are  
20                  relevant to industry; and

21           “(2) the National Oceanic and Atmospheric Ad-  
22           ministration shall conduct basic and applied research  
23           on high-performance computing applications, with  
24           emphasis on—

1           “(A) improving weather forecasting and  
2 climate prediction;

3           “(B) collection, analysis, and dissemination  
4 of environmental information; and

5           “(C) development of more accurate models  
6 of the ocean-atmosphere system.”; and

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

9           “(a) GENERAL RESPONSIBILITIES.—As part of the  
10 Program described in title I, the Environmental Protec-  
11 tion Agency shall conduct basic and applied research di-  
12 rected toward advancement and dissemination of computa-  
13 tional techniques and software tools for high-performance  
14 computing systems with an emphasis on modeling to—

15           “(1) develop robust decision support tools;

16           “(2) predict pollutant transport and the effects  
17 of pollutants on humans and on ecosystems; and

18           “(3) better understand atmospheric dynamics  
19 and chemistry.”.

Passed the House of Representatives April 26, 2005.

Attest:

JEFF TRANDAHL,

*Clerk.*