

108TH CONGRESS
2^D SESSION

H. R. 4218

IN THE SENATE OF THE UNITED STATES

JULY 8, 2004

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

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 2004”.

4 **SEC. 2. DEFINITIONS.**

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

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

10 (2) in paragraph (3)—

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

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

14 (C) by striking “and applications” and in-
15 serting “applications”; and

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

18 (3) in paragraph (4), by striking “packet
19 switched”; and

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

22 “(5) ‘Program’ means the High-Performance
23 Computing Research and Development Program de-
24 scribed in section 101; and

25 “(6) ‘Program Component Areas’ means the
26 major subject areas under which are grouped related

1 individual projects and activities carried out under
2 the Program.”.

3 **SEC. 3. HIGH-PERFORMANCE COMPUTING RESEARCH AND**
4 **DEVELOPMENT PROGRAM.**

5 Title I of the High-Performance Computing Act of
6 1991 (15 U.S.C. 5511 et seq.) is amended—

7 (1) in the title heading, by striking “**AND**
8 **THE NATIONAL RESEARCH AND EDU-**
9 **CATION NETWORK**” and inserting “**RE-**
10 **SEARCH AND DEVELOPMENT**”;

11 (2) in section 101—

12 (A) the section heading, by striking “**NA-**
13 **TIONAL HIGH-PERFORMANCE COM-**
14 **PUTING**” and inserting “**HIGH-PERFORM-**
15 **ANCE COMPUTING RESEARCH AND DEVEL-**
16 **OPMENT**”;

17 (B) in subsection (a)—

18 (i) in the subsection heading, by strik-
19 ing “**NATIONAL HIGH-PERFORMANCE**
20 **COMPUTING**” and inserting “**HIGH-PER-**
21 **FORMANCE COMPUTING RESEARCH AND**
22 **DEVELOPMENT**”;

23 (ii) by striking paragraphs (1) and (2)
24 and inserting the following: “(1) The
25 President shall implement a High-Perform-

1 ance Computing Research and Develop-
2 ment Program, which shall—

3 “(A) provide for long-term basic and ap-
4 plied research on high-performance computing;

5 “(B) provide for research and development
6 on, and demonstration of, technologies to ad-
7 vance the capacity and capabilities of high-per-
8 formance computing and networking systems;

9 “(C) provide for sustained access by the
10 research community in the United States to
11 high-performance computing systems that are
12 among the most advanced in the world in terms
13 of performance in solving scientific and engi-
14 neering problems, including provision for tech-
15 nical support for users of such systems;

16 “(D) provide for efforts to increase soft-
17 ware availability, productivity, capability, secu-
18 rity, portability, and reliability;

19 “(E) provide for high-performance net-
20 works, including experimental testbed networks,
21 to enable research and development on, and
22 demonstration of, advanced applications enabled
23 by such networks;

24 “(F) provide for computational science and
25 engineering research on mathematical modeling

1 and algorithms for applications in all fields of
2 science and engineering;

3 “(G) provide for the technical support of,
4 and research and development on, high-per-
5 formance computing systems and software re-
6 quired to address Grand Challenges;

7 “(H) provide for educating and training
8 additional undergraduate and graduate students
9 in software engineering, computer science, com-
10 puter and network security, applied mathe-
11 matics, library and information science, and
12 computational science; and

13 “(I) provide for improving the security of
14 computing and networking systems, including
15 Federal systems, including research required to
16 establish security standards and practices for
17 these systems.”;

18 (iii) by redesignating paragraphs (3)
19 and (4) as paragraphs (2) and (3), respec-
20 tively;

21 (iv) in paragraph (2), as so redesi-
22 gnated by clause (iii) of this subpara-
23 graph—

24 (I) by striking subparagraph (B);

1 (II) by redesignating subpara-
2 graphs (A) and (C) as subparagraphs
3 (D) and (F), respectively;

4 (III) by inserting before subpara-
5 graph (D), as so redesignated by sub-
6 clause (II) of this clause, the following
7 new subparagraphs:

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

11 “(B) establish Program Component Areas that
12 implement the goals established under subparagraph
13 (A), and identify the Grand Challenges that the Pro-
14 gram should address;

15 “(C) provide for interagency coordination of
16 Federal high-performance computing research, devel-
17 opment, networking, and other activities undertaken
18 pursuant to the Program;” and

19 (IV) by inserting after subpara-
20 graph (D), as so redesignated by sub-
21 clause (II) of this clause, the following
22 new subparagraph:

23 “(E) develop and maintain a research, develop-
24 ment, and deployment roadmap for the provision of

1 high-performance computing systems under para-
2 graph (1)(C); and”;

3 (v) in paragraph (3), as so redesign-
4 nated by clause (iii) of this subpara-
5 graph—

6 (I) by striking “paragraph
7 (3)(A)” and inserting “paragraph
8 (2)(D)”;

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

11 “(A) provide a detailed description of the Pro-
12 gram Component Areas, including a description of
13 any changes in the definition of or activities under
14 the Program Component Areas from the preceding
15 report, and the reasons for such changes, and a de-
16 scription of Grand Challenges supported under the
17 Program;”;

18 (III) in subparagraph (C), by
19 striking “specific activities” and all
20 that follows through “the Network”
21 and inserting “each Program Compo-
22 nent Area”;

23 (IV) in subparagraph (D), by in-
24 serting “and for each Program Com-

1 ponent Area” after “participating in
2 the Program”;

3 (V) in subparagraph (D), by
4 striking “applies;” and inserting “ap-
5 plies; and”;

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

9 (VII) in subparagraph (E), as so
10 redesignated by subclause (VI) of this
11 clause, by inserting “and the extent to
12 which the Program incorporates the
13 recommendations of the advisory com-
14 mittee established under subsection
15 (b)” after “for the Program”;

16 (C) in subsection (b)—

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

20 (ii) by inserting “(1)” after “Advisory
21 Committee.—”;

22 (iii) in paragraph (1)(C), as so redesi-
23 gnated by clauses (i) and (ii) of this sub-
24 paragraph, by inserting “, including fund-

1 ing levels for the Program Component
2 Areas” after “of the Program”;

3 (iv) in paragraph (1)(D), as so reded-
4 icated by clauses (i) and (ii) of this sub-
5 paragraph, by striking “computing” and
6 inserting “high-performance computing
7 and networking”; and

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

10 “(2) In addition to the duties outlined in paragraph
11 (1), the advisory committee shall conduct periodic evalua-
12 tions of the funding, management, coordination, imple-
13 mentation, and activities of the Program, and shall report
14 not less frequently than once every two fiscal years to the
15 Committee on Science of the House of Representatives
16 and the Committee on Commerce, Science, and Transpor-
17 tation of the Senate on its findings and recommendations.
18 The first report shall be due within one year after the date
19 of enactment of this paragraph.”; and

20 (D) in subsection (c)(1)(A), by striking
21 “Program or” and inserting “Program Compo-
22 nent Areas or”; and

23 (3) by striking sections 102 and 103.

1 **SEC. 4. AGENCY ACTIVITIES.**

2 Title II of the High-Performance Computing Act of
3 1991 (15 U.S.C. 5521 et seq.) is amended—

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

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

9 “(1) support research and development to gen-
10 erate fundamental scientific and technical knowledge
11 with the potential of advancing high-performance
12 computing and networking systems and their appli-
13 cations;

14 “(2) provide computing and networking infra-
15 structure support to the research community in the
16 United States, including the provision of high-per-
17 formance computing systems that are among the
18 most advanced in the world in terms of performance
19 in solving scientific and engineering problems, and
20 including support for advanced software and applica-
21 tions development, for all science and engineering
22 disciplines; and

23 “(3) support basic research and education in all
24 aspects of high-performance computing and net-
25 working.”;

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

3 “(a) GENERAL RESPONSIBILITIES.—As part of the
4 Program described in title I, the National Aeronautics and
5 Space Administration shall conduct basic and applied re-
6 search in high-performance computing and networking,
7 with emphasis on—

8 “(1) computational fluid dynamics, computa-
9 tional thermal dynamics, and computational aero-
10 dynamics;

11 “(2) scientific data dissemination and tools to
12 enable data to be fully analyzed and combined from
13 multiple sources and sensors;

14 “(3) remote exploration and experimentation;
15 and

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

18 (3) in section 203—

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

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

24 “(1) conduct and support basic and applied re-
25 search in high-performance computing and net-

1 working to support fundamental research in science
2 and engineering disciplines related to energy applica-
3 tions; and

4 “(2) provide computing and networking infra-
5 structure support, including the provision of high-
6 performance computing systems that are among the
7 most advanced in the world in terms of performance
8 in solving scientific and engineering problems, and
9 including support for advanced software and applica-
10 tions development, for science and engineering dis-
11 ciplines related to energy applications.”; and

12 (B) by redesignating subsection (e) as sub-
13 section (b);

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

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

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

20 “(A) conduct basic and applied metrology
21 research needed to support high-performance
22 computing and networking systems;

23 “(B) develop benchmark tests and stand-
24 ards for high-performance computing and net-
25 working systems and software;

1 “(C) develop and propose voluntary stand-
2 ards and guidelines, and develop measurement
3 techniques and test methods, for the interoper-
4 ability of high-performance computing systems
5 in networks and for common user interfaces to
6 high-performance computing and networking
7 systems; and

8 “(D) work with industry and others to de-
9 velop, and facilitate the implementation of,
10 high-performance computing applications to
11 solve science and engineering problems that are
12 relevant to industry; and

13 “(2) the National Oceanic and Atmospheric Ad-
14 ministration shall conduct basic and applied research
15 on high-performance computing applications, with
16 emphasis on—

17 “(A) improving weather forecasting and
18 climate prediction;

19 “(B) collection, analysis, and dissemination
20 of environmental information; and

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

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

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

- 7 “(1) develop robust decision support tools;
8 “(2) predict pollutant transport and the effects
9 of pollutants on humans and on ecosystems; and
10 “(3) better understand atmospheric dynamics
11 and chemistry.”.

12 **SEC. 5. SOCIETAL IMPLICATIONS OF INFORMATION TECH-**
13 **NOLOGY.**

14 In carrying out its programs on the social, economic,
15 legal, ethical, and cultural implications of information
16 technology, the National Science Foundation shall support
17 research into the implications of computers (including
18 both hardware and software) that would be capable of
19 mimicking human abilities to learn, reason, and make de-
20 cisions.

21 **SEC. 6. ASTRONOMY AND ASTROPHYSICS ADVISORY COM-**
22 **MITTEE.**

23 (a) AMENDMENTS.—Section 23 of the National
24 Science Foundation Authorization Act of 2002 (42 U.S.C.
25 1862n–9) is amended—

1 (1) by striking “and the National Aeronautics
2 and Space Administration” each place it appears in
3 subsections (a) and (b) and inserting “, the National
4 Aeronautics and Space Administration, and the De-
5 partment of Energy”;

6 (2) in subsection (b)(3), by inserting “the Sec-
7 retary of Energy,” after “the Administrator of the
8 National Aeronautics and Space Administration,”;

9 (3) in subsection (c)—

10 (A) by striking “5” in each of paragraphs
11 (1) and (2) and inserting “4”;

12 (B) by striking “and” at the end of para-
13 graph (2);

14 (C) by redesignating paragraph (3) as
15 paragraph (4), and in that paragraph by strik-
16 ing “3” and inserting “2”; and

17 (D) by inserting after paragraph (2) the
18 following new paragraph:

19 “(3) 3 members selected by the Secretary of
20 Energy; and”;

21 (4) in subsection (f), by striking “the advisory
22 bodies of other Federal agencies, such as the De-
23 partment of Energy, which may engage in related
24 research activities” and inserting “other Federal ad-

1 visory committees that advise Federal agencies
2 which engage in related research activities”.

3 (b) EFFECTIVE DATE.—The amendments made by
4 subsection (a) shall take effect on March 15, 2005.

5 **SEC. 7. REMOVAL OF SUNSET PROVISION FROM SAVINGS**
6 **IN CONSTRUCTION ACT OF 1996.**

7 Section 14(e) of the Metric Conversion Act of 1975
8 (15 U.S.C. 2051(e)) is repealed.

Passed the House of Representatives July 7, 2004.

Attest: JEFF TRANDAHL,
Clerk.