

109TH CONGRESS
1ST SESSION

H. R. 28

AN ACT

To amend the High-Performance Computing Act of
1991.

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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
10 subparagraph—

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
15 subparagraph—

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:

Clerk.