

107TH CONGRESS
1ST SESSION

H. R. 3400

To amend the High-Performance Computing Act of 1991 to authorize appropriations for fiscal years 2003 through 2007 for the coordinated Federal program on networking and information technology research and development, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

DECEMBER 4, 2001

Mr. SMITH of Michigan (for himself, Ms. EDDIE BERNICE JOHNSON of Texas, Mr. BOEHLERT, and Mr. HALL of Texas) introduced the following bill; which was referred to the Committee on Science

A BILL

To amend the High-Performance Computing Act of 1991 to authorize appropriations for fiscal years 2003 through 2007 for the coordinated Federal program on networking and information technology research and development, and for other purposes.

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

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Networking and Infor-
5 mation Technology Research Advancement Act”.

6 **SEC. 2. FINDINGS.**

7 The Congress makes the following findings:

1 (1) Information technology is an enabling tech-
2 nology that contributes to other scientific disciplines.
3 Advances in nanotechnology, bioinformatics, intel-
4 ligent networks, wireless networking, robotics, artifi-
5 cial intelligence, and other fields depend on further
6 advances in information technology research and de-
7 velopment. In turn, advances in networking and in-
8 formation technology depend on research in a wide
9 range of fields, such as computer science and engi-
10 neering, mathematics, and many others, and in the
11 development of electronic components such as semi-
12 conductors and fiber optics that are faster, denser,
13 and cheaper. Research in fields such as materials
14 sciences, physics, chemistry, and photonics lays the
15 foundation for building these advanced components.

16 (2) Federal investment in information tech-
17 nology research and development over the past 50
18 years has led to technological innovations that have
19 transformed our society and stimulated economic
20 growth.

21 (3) A 1999 report from the President’s Infor-
22 mation Technology Advisory Committee entitled “In-
23 formation Technology Research: Investing in Our
24 Future” states that—

1 (A) Federal support for research in infor-
2 mation technology is inadequate;

3 (B) Federal investment in information
4 technology research and development should
5 give a higher priority to long-term, basic re-
6 search; and

7 (C) Federal information technology re-
8 search management should develop a long-term
9 and coherent strategy for sustained attention to
10 national goals.

11 (4) Long-term, basic research is necessary to
12 create technological breakthroughs in information
13 technology. The Federal Government is uniquely po-
14 sitioned to support long-term fundamental research.

15 (5) Advances in networking and information
16 technology have permeated and dramatically im-
17 proved product design and development processes,
18 production efficiency, and distribution systems of a
19 wide range of manufacturing and other industries.
20 From the aeronautical and automotive industries to
21 farming, advances in networking and information
22 technology have allowed United States industry to
23 compete more effectively and better utilize limited
24 resources through improved quality control and
25 other means. Therefore, research in networking and

1 information technology that advances the field also
2 advances productivity and economic growth for the
3 United States economy.

4 (6) Information technology encompasses ways
5 to develop, store and retrieve, organize and use,
6 make sense of, compute, and communicate informa-
7 tion to further a number of societal goals, including
8 increasing economic growth through product devel-
9 opment and increased efficiency of services and man-
10 ufacturing, advancing scientific research, and edu-
11 cation.

12 **SEC. 3. DEFINITIONS.**

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

15 (1) in paragraph (3)—

16 (A) by striking “high-performance com-
17 puting” and inserting “networking and infor-
18 mation technology”; and

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

21 (2) in paragraph (4), by striking “packet
22 switched”;

23 (3) by striking paragraphs (5) and (6); and

24 (4) by adding at the end the following new
25 paragraphs:

1 “(5) ‘Program’ means the Networking and In-
2 formation Technology Research and Development
3 Program described in section 101; and

4 “(6) ‘Program Component Areas’ means the
5 major subject areas under which are grouped related
6 individual projects and activities carried out under
7 the Program and which are developed according to
8 section 101(a)(3)(B) and identified in the annual re-
9 port required under section 101(a)(3)(A).”.

10 **SEC. 4. NETWORKING AND INFORMATION TECHNOLOGY**
11 **RESEARCH AND DEVELOPMENT PROGRAM.**

12 (a) AMENDMENTS.—Section 101 of the High-Per-
13 formance Computing Act of 1991 (15 U.S.C. 5511) is
14 amended—

15 (1) in the section heading, by striking “**NA-**
16 **TIONAL HIGH-PERFORMANCE COMPUTING**” and
17 inserting “**NETWORKING AND INFORMATION**
18 **TECHNOLOGY RESEARCH AND DEVELOPMENT**”;

19 (2) by striking “high-performance computing”
20 each place it appears other than in subsection
21 (a)(1)(F) and inserting “networking and information
22 technology”;

23 (3) in the subsection heading of subsection (a),
24 by striking “**NATIONAL HIGH-PERFORMANCE COM-**
25 **PUTING**” and inserting “**NETWORKING AND INFOR-**

1 MATION TECHNOLOGY RESEARCH AND DEVELOP-
2 MENT”;

3 (4) in subsection (a)—

4 (A) by striking “National High-Perform-
5 ance Computing” and inserting “Networking
6 and Information Technology Research and De-
7 velopment”;

8 (B) in paragraph (1)—

9 (i) by striking “and” at the end of
10 subparagraph (A);

11 (ii) by redesignating subparagraph
12 (B) as subparagraph (C); and

13 (iii) by inserting after subparagraph
14 (A) the following new subparagraph:

15 “(B) establish Program Component Areas that
16 implement the goals established under subparagraph
17 (A); and”;

18 (C) by striking “and” at the end of para-
19 graph (2)(H);

20 (D) by striking subparagraph (I) of para-
21 graph (2) and inserting the following:

22 “(I) provide for improving the security of
23 networked information systems, including research
24 required to establish security standards and prac-
25 tices for computing systems and networks; and

1 “(J) provide for long-term basic research on
2 networking and information technology, with priority
3 given to research that helps address issues related
4 to—

5 “(i) high end computing and software;

6 “(ii) network stability, fragility, reliability,
7 security (including privacy), and scalability; and

8 “(iii) the social and economic consequences
9 of information technology.”;

10 (E) in subparagraph (B) of paragraph (3),
11 by inserting “, including establishing the pro-
12 cess by which Program Component Areas are de-
13 fined” after “of the Program”;

14 (F) by amending subparagraph (A) of
15 paragraph (4) to read as follows:

16 “(A) provide a detailed description of the Pro-
17 gram Component Areas, including—

18 “(i) a description of any changes in the
19 Program Component Areas from the preceding
20 report and the reasons for such changes; and

21 “(ii) a description of activities within each
22 Program Component Area that contribute to
23 the improvement of the security of networked
24 information systems;”;

1 (G) in paragraph (4)(C), by striking “spe-
2 cific activities” and all that follows through
3 “the Network” and inserting “each Program
4 Component Area”;

5 (H) in paragraph (4)(D), by inserting “for
6 each Program Component Area and for all ac-
7 tivities that contribute to the improvement of
8 the security of networked information systems”
9 after “budget submission applies”; and

10 (I) in paragraph (4)(F), by inserting “,
11 and the extent to which the Program incor-
12 porates the recommendations of the Advisory
13 Committee established under subsection (b)”
14 after “for the Program”;

15 (5) in subsection (b)—

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

19 (B) by inserting “(1)” after “ADVISORY
20 COMMITTEE.—”;

21 (C) in paragraph (1)(C), as so redesign-
22 ated by this paragraph, by inserting “, includ-
23 ing funding levels for the Program Component
24 Areas” after “of the Program”;

1 (D) in paragraph (1)(D), as so redesignated by this paragraph, by striking “computing” and inserting “networking and information”; and

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4
5 (E) by adding at the end the following new paragraph:

6
7 “(2) In addition to the duties outlined in paragraph
8 (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report
9 not less frequently than once every two fiscal years to the
10 Committee on Science of the House of Representatives
11 and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations.
12 The first report shall be due within one year after the date
13 of the enactment of this paragraph.”; and

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16
17 (6) in subsection (c)(1)(A), by striking “Program or” and inserting “Program Component Areas
18 or”.

19
20 (b) REPEALS.—Sections 102 and 103 of the High-
21 Performance Computing Act of 1991 (15 U.S.C. 5512 and
22 5513) are repealed.

23 (c) CONFORMING AMENDMENT.—The heading of title
24 I of the High-Performance Computing Act of 1991 is
25 amended to read as follows:

1 **“TITLE I—NETWORKING AND IN-**
2 **FORMATION TECHNOLOGY**
3 **RESEARCH AND DEVELOP-**
4 **MENT PROGRAM”.**

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

6 (a) NATIONAL SCIENCE FOUNDATION ACTIVITIES.—

7 Section 201 of the High-Performance Computing Act of
8 1991 (15 U.S.C. 5521) is amended to read as follows:

9 **“SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.**

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

13 “(1) generate fundamental scientific and tech-
14 nical knowledge with the potential of advancing net-
15 working and information technology and its applica-
16 tions; and

17 “(2) provide computing and networking infra-
18 structure support for all science and engineering dis-
19 ciplines, and support basic research and human re-
20 source development in all aspects of networking and
21 information technology and advanced high speed
22 computer networking.

23 “(b) AUTHORIZATION OF APPROPRIATIONS.—From
24 sums otherwise authorized to be appropriated, there are
25 authorized to be appropriated to the National Science

1 Foundation for the purposes of the Program
2 \$704,000,000 for fiscal year 2003; \$774,000,000 for fis-
3 cal year 2004, \$851,000,000 for fiscal year 2005,
4 \$937,000,000 for fiscal year 2006, and \$1,030,000,000
5 for fiscal year 2007.”.

6 (b) NATIONAL AERONAUTICS AND SPACE ADMINIS-
7 TRATION ACTIVITIES.—Section 202 of the High-Perform-
8 ance Computing Act of 1991 (15 U.S.C. 5522) is amended
9 to read as follows:

10 **“SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINIS-**
11 **TRATION ACTIVITIES.**

12 “(a) GENERAL RESPONSIBILITIES.—As part of the
13 Program described in title I, the National Aeronautics and
14 Space Administration shall conduct basic and applied re-
15 search in networking and information technology, with
16 emphasis on—

17 “(1) computational fluid, thermal, and aero-
18 dynamics;

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

22 “(3) remote exploration and experimentation;
23 and

24 “(4) tools for collaboration in systems design,
25 analysis, and testing.

1 “(b) AUTHORIZATION OF APPROPRIATIONS.—From
2 sums otherwise authorized to be appropriated, there are
3 authorized to be appropriated to the National Aeronautics
4 and Space Administration for the purposes of the Pro-
5 gram \$199,000,000 for fiscal year 2003, \$219,000,000
6 for fiscal year 2004, \$240,000,000 for fiscal year 2005,
7 \$265,000,000 for fiscal year 2006, and \$292,000,000 for
8 fiscal year 2007.”.

9 (c) DEPARTMENT OF ENERGY ACTIVITIES.—Section
10 203 of the High-Performance Computing Act of 1991 (15
11 U.S.C. 5523) is amended—

12 (1) in subsection (a), by striking all after “the
13 Secretary of Energy shall” and inserting “conduct
14 basic and applied research in networking and infor-
15 mation technology, with emphasis on—

16 “(1) supporting fundamental research in the
17 physical sciences and engineering, and energy appli-
18 cations;

19 “(2) providing supercomputer access and ad-
20 vanced communication capabilities to scientific re-
21 searchers; and

22 “(3) developing tools for distributed scientific
23 collaboration.”; and

24 (2) in subsection (e)—

25 (A) by striking “(1)”;

1 (B) by striking “\$93,000,000” and all that
2 follows through “fiscal year 1996” and insert-
3 ing “\$193,000,000 for fiscal year 2003,
4 \$212,000,000 for fiscal year 2004,
5 \$234,000,000 for fiscal year 2005,
6 \$258,000,000 for fiscal year 2006, and
7 \$283,000,000 for fiscal year 2007”; and

8 (C) by striking paragraph (2).

9 (d) DEPARTMENT OF COMMERCE ACTIVITIES.—Sec-
10 tion 204 of the High-Performance Computing Act of 1991
11 (15 U.S.C. 5524) is amended—

12 (1) by striking paragraphs (1) and (2) of sub-
13 section (a) and inserting the following:

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

16 “(A) conduct basic and applied measure-
17 ment research needed to support various com-
18 puting systems and networks;

19 “(B) develop and propose voluntary stand-
20 ards and guidelines, and develop measurement
21 techniques and test methods, for the interoper-
22 ability of computing systems in networks and
23 for common user interfaces to systems;

1 “(C) be responsible for developing bench-
2 mark tests and standards for computing sys-
3 tems and software; and

4 “(D) encourage the development, deploy-
5 ment, and implementation of voluntary guide-
6 lines and standards for—

7 “(i) robust security technology; and

8 “(ii) best practices and interoper-
9 ability relating to the security of commer-
10 cial and government computer networks;
11 and

12 “(2) the National Oceanic and Atmospheric Ad-
13 ministration shall conduct basic and applied research
14 in networking and information technology, with em-
15 phasis on—

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

18 “(B) collection and dissemination of envi-
19 ronmental information; and

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

22 (2) by striking subsections (c) and (d) and in-
23 serting the following:

1 putational techniques and software tools with an emphasis
2 on modeling of—

3 “(1) ecosystems;

4 “(2) human effects;

5 “(3) atmospheric dynamics and chemistry; and

6 “(4) pollutant transport.

7 “(b) AUTHORIZATION OF APPROPRIATIONS.—From
8 sums otherwise authorized to be appropriated, there are
9 authorized to be appropriated to the Environmental Pro-
10 tection Agency for the purposes of the Program
11 \$4,000,000 for fiscal year 2003, \$4,400,000 for fiscal year
12 2004, \$4,800,000 for fiscal year 2005, \$5,300,000 for fis-
13 cal year 2006, and \$5,800,000 for fiscal year 2007.”.

14 **SEC. 6. REPORTS.**

15 (a) INTERNATIONAL BENCHMARKING STUDIES.—

16 (1) STUDY.—Not later than 3 months after the
17 date of the enactment of this Act, the Director of
18 the National Science Foundation shall enter into an
19 arrangement with the National Research Council of
20 the National Academy of Sciences to conduct an as-
21 sessment of the state of research on networking and
22 information technology in the United States. The
23 study shall use the methodology and approach devel-
24 oped by the Committee on Science, Engineering, and
25 Public Policy of the National Academies and docu-

1 mented in its 2000 report entitled “Experiments in
2 International Benchmarking of U.S. Research
3 Fields”.

4 (2) REPORT.—Not later than 2 years after the
5 date of the enactment of this Act, the Director of
6 the National Science Foundation shall transmit to
7 the Committee on Science of the House of Rep-
8 resentatives, the Committee on Commerce, Science,
9 and Transportation of the Senate, the Director of
10 the Office of Science and Technology Policy, and the
11 advisory committee established under section 101(b)
12 of the High-Performance Computing Act of 1991
13 (15 U.S.C. 5511(b)) (in this section referred to as
14 the “advisory committee”) a report setting forth the
15 findings of the study conducted under paragraph
16 (1).

17 (3) ADVISORY COMMITTEE RECOMMENDA-
18 TIONS.—Not later than 3 months after receipt of the
19 report transmitted under paragraph (2), the advi-
20 sory committee shall provide recommendations to the
21 Director of the Office of Science and Technology
22 Policy on appropriate changes to the Program estab-
23 lished by section 101(a) of the High-Performance
24 Computing Act of 1991 (15 U.S.C. 5511(a)) to ad-

1 dress issues raised by the study conducted under
2 paragraph (1).

3 (4) ANNUAL REPORT.—The first annual report
4 required by section 101(a)(3)(A) of the High-Per-
5 formance Computing Act of 1991 (15 U.S.C.
6 5511(a)(3)(A)) that is due after the expiration of 9
7 months after receipt by the Director of the Office of
8 Science and Technology Policy of the report trans-
9 mitted under paragraph (2) shall include a descrip-
10 tion of activities under the Program established by
11 section 101(a) of the High-Performance Computing
12 Act of 1991 (15 U.S.C. 5511(a)) that address issues
13 raised by the study conducted under paragraph (1),
14 including strategies for—

15 (A) raising or maintaining the position of
16 the United States relative to other nations in
17 the research priority areas addressed by the re-
18 port transmitted under paragraph (2); and

19 (B) promoting international research co-
20 operation to leverage international niches of ex-
21 cellence identified by the report transmitted
22 under paragraph (2).

23 (5) AUTHORIZATION OF APPROPRIATIONS.—

24 There are authorized to be appropriated to the Na-

1 tional Science Foundation for carrying out the study
2 under this subsection \$850,000.

3 (b) INFORMATION TECHNOLOGY WORKFORCE
4 STUDY.—

5 (1) DATA COLLECTION.—The Director of the
6 National Science Foundation shall on a continuing
7 basis collect data on the information technology
8 workforce, including information on—

9 (A) the size and nature of the information
10 technology workforce by occupation category,
11 level of education and training, personnel demo-
12 graphics, and industry characteristics;

13 (B) the long-term employability of infor-
14 mation technology professionals;

15 (C) various forms of employee compensa-
16 tion, including salaries, bonuses, and stock op-
17 tions;

18 (D) the role of foreign workers in the in-
19 formation technology workforce;

20 (E) the previous and subsequent immigra-
21 tion and employment status of workers who are
22 aliens having the status of a nonimmigrant de-
23 scribed in section 101(a)(15)(H)(i)(b) of the
24 Immigration and Nationality Act (8 U.S.C.
25 1101(a)(15)(H)(i)(b)); and

1 (F) other relevant issues.

2 (2) ANALYSIS.—Not later than 3 months after
3 the date of the enactment of this Act, the Director
4 of the National Science Foundation shall enter into
5 an arrangement with the National Research Council
6 of the National Academy of Sciences to analyze the
7 data collected under paragraph (1) and publish a bi-
8 ennial update to the “Building a Workforce in the
9 Information Economy” report, issued in October of
10 2000.

11 (3) TRANSMITTAL TO CONGRESS.—Biennial up-
12 dates required under paragraph (2) shall be trans-
13 mitted to the Committee on Science of the House of
14 Representatives and the Committee on Commerce,
15 Science, and Transportation of the Senate, and to
16 the National Coordination Office for Information
17 Technology Research and Development, not later
18 than 1 year after the date of the enactment of this
19 Act and biennially thereafter.

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