

Union Calendar No. 48

111TH CONGRESS
1ST SESSION

H. R. 2020

[Report No. 111-102]

To amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 22, 2009

Mr. GORDON of Tennessee (for himself, Mr. HALL of Texas, Mr. LIPINSKI, Mr. EHLERS, Mr. WU, Mrs. BIGGERT, and Mr. LUJÁN) introduced the following bill; which was referred to the Committee on Science and Technology

MAY 12, 2009

Additional sponsors: Ms. EDDIE BERNICE JOHNSON of Texas, Mr. TONKO, Ms. FUDGE, and Mr. SMITH of Nebraska

MAY 12, 2009

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in *italic*]

[For text of introduced bill, see copy of bill as introduced on April 22, 2009]

A BILL

To amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, 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 and Development Act of*
6 *2009”.*

7 **SEC. 2. PROGRAM PLANNING AND COORDINATION.**

8 *(a) PERIODIC REVIEWS.—Section 101 of the High-*
9 *Performance Computing Act of 1991 (15 U.S.C. 5511) is*
10 *amended by adding at the end the following new subsection:*

11 *“(d) PERIODIC REVIEWS.—The agencies identified in*
12 *subsection (a)(3)(B) shall—*

13 *“(1) periodically assess the contents and funding*
14 *levels of the Program Component Areas and restruc-*
15 *ture the Program when warranted, taking into con-*
16 *sideration any relevant recommendations of the advi-*
17 *sory committee established under subsection (b); and*

18 *“(2) ensure that the Program includes large-*
19 *scale, long-term, interdisciplinary research and devel-*
20 *opment activities, including activities described in*
21 *section 104.”.*

22 *(b) DEVELOPMENT OF STRATEGIC PLAN.—Section 101*
23 *of such Act (15 U.S.C. 5511) is amended further by adding*
24 *after subsection (d), as added by subsection (a) of this Act,*
25 *the following new subsection:*

1 “(e) *STRATEGIC PLAN.*—

2 “(1) *IN GENERAL.*—*The agencies identified in*
3 *subsection (a)(3)(B), working through the National*
4 *Science and Technology Council and with the assist-*
5 *ance of the National Coordination Office established*
6 *under section 102, shall develop, within 12 months*
7 *after the date of enactment of the Networking and In-*
8 *formation Technology Research and Development Act*
9 *of 2009, and update every 3 years thereafter, a 5-year*
10 *strategic plan to guide the activities described under*
11 *subsection (a)(1).*

12 “(2) *CONTENTS.*—*The strategic plan shall speci-*
13 *fy near-term and long-term objectives for the Pro-*
14 *gram, the anticipated time frame for achieving the*
15 *near-term objectives, the metrics to be used for assess-*
16 *ing progress toward the objectives, and how the Pro-*
17 *gram will—*

18 “(A) *foster the transfer of research and de-*
19 *velopment results into new technologies and ap-*
20 *plications for the benefit of society, including*
21 *through cooperation and collaborations with net-*
22 *working and information technology research,*
23 *development, and technology transition initia-*
24 *tives supported by the States;*

1 “(B) encourage and support mechanisms for
2 interdisciplinary research and development in
3 networking and information technology, includ-
4 ing through collaborations across agencies, across
5 Program Component Areas, with industry, with
6 Federal laboratories (as defined in section 4 of
7 the Stevenson-Wydler Technology Innovation Act
8 of 1980 (15 U.S.C. 3703)), and with inter-
9 national organizations;

10 “(C) address long-term challenges of na-
11 tional importance for which solutions require
12 large-scale, long-term, interdisciplinary research
13 and development;

14 “(D) place emphasis on innovative and
15 high-risk projects having the potential for sub-
16 stantial societal returns on the research invest-
17 ment;

18 “(E) strengthen all levels of networking and
19 information technology education and training
20 programs to ensure an adequate, well-trained
21 workforce; and

22 “(F) attract more women and underrep-
23 resented minorities to pursue postsecondary de-
24 grees in networking and information technology.

1 “(3) *NATIONAL RESEARCH INFRASTRUCTURE.*—*The*
2 *strategic plan developed in accordance with paragraph (1)*
3 *shall be accompanied by milestones and roadmaps for estab-*
4 *lishing and maintaining the national research infrastruc-*
5 *ture required to support the Program, including the road-*
6 *map required by subsection (a)(2)(E).*

7 “(4) *RECOMMENDATIONS.*—*The entities involved in*
8 *developing the strategic plan under paragraph (1) shall*
9 *take into consideration the recommendations—*

10 “(A) *of the advisory committee established under*
11 *subsection (b); and*

12 “(B) *of the stakeholders whose input was solici-*
13 *ted by the National Coordination Office, as required*
14 *under section 102(b)(3).*

15 “(5) *REPORT TO CONGRESS.*—*The Director of the Na-*
16 *tional Coordination Office shall transmit the strategic plan*
17 *required under paragraph (1) to the advisory committee,*
18 *the Committee on Commerce, Science, and Transportation*
19 *of the Senate, and the Committee on Science and Tech-*
20 *nology of the House of Representatives.”.*

21 “(c) *ADDITIONAL RESPONSIBILITIES OF DIRECTOR.*—
22 *Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is*
23 *amended—*

24 “(1) *by redesignating subparagraphs (E) and (F)*
25 *as subparagraphs (F) and (G), respectively; and*

1 (2) *by inserting after subparagraph (D) the fol-*
2 *lowing new subparagraph:*

3 “(E) *encourage and monitor the efforts of*
4 *the agencies participating in the Program to al-*
5 *locate the level of resources and management at-*
6 *tention necessary to ensure that the strategic*
7 *plan under subsection (e) is developed and exe-*
8 *cutted effectively and that the objectives of the*
9 *Program are met;”.*

10 (d) *ADVISORY COMMITTEE.*—Section 101(b)(1) of such
11 *Act (15 U.S.C. 5511(b)(1)) is amended by inserting after*
12 *“an advisory committee on high-performance computing,”*
13 *the following: “in which the co-chairs shall be members of*
14 *the President’s Council of Advisors on Science and Tech-*
15 *nology and with the remainder of the committee”.*

16 (e) *REPORT.*—Section 101(a)(3) of such Act (15 U.S.C.
17 *5511(a)(3)) is amended—*

18 (1) *in subparagraph (C)—*

19 (A) *by striking “is submitted,” and insert-*
20 *ing “is submitted, the levels for the previous fis-*
21 *cal year;”; and*

22 (B) *by striking “each Program Component*
23 *Area;” and inserting “each Program Component*
24 *Area and research area supported in accordance*
25 *with section 104;”;*

1 (2) *in subparagraph (D)—*

2 (A) *by striking “each Program Component*
3 *Area,” and inserting “each Program Component*
4 *Area and research area supported in accordance*
5 *with section 104,”;*

6 (B) *by striking “is submitted,” and insert-*
7 *ing “is submitted, the levels for the previous fis-*
8 *cal year,”; and*

9 (C) *by striking “and” after the semicolon;*

10 (3) *by redesignating subparagraph (E) as sub-*
11 *paragraph (G); and*

12 (4) *by inserting after subparagraph (D) the fol-*
13 *lowing new subparagraphs:*

14 “(E) *include a description of how the objec-*
15 *tives for each Program Component Area, and the*
16 *objectives for activities that involve multiple Pro-*
17 *gram Component Areas, relate to the objectives of*
18 *the Program identified in the strategic plan re-*
19 *quired under subsection (e);*

20 “(F) *include—*

21 “(i) *a description of the funding re-*
22 *quired by the National Coordination Office*
23 *to perform the functions specified under sec-*
24 *tion 102(b) for the next fiscal year by cat-*
25 *egory of activity;*

1 “(ii) a description of the funding re-
2 quired by such Office to perform the func-
3 tions specified under section 102(b) for the
4 current fiscal year by category of activity;
5 and

6 “(iii) the amount of funding provided
7 for such Office for the current fiscal year by
8 each agency participating in the Program;
9 and”.

10 (f) *DEFINITION.*—Section 4 of such Act (15 U.S.C.
11 5503) is amended—

12 (1) by redesignating paragraphs (1) through (7)
13 as paragraphs (2) through (8), respectively;

14 (2) by inserting before paragraph (2), as so re-
15 designated, the following new paragraph:

16 “(1) ‘cyber-physical systems’ means physical or
17 engineered systems whose networking and information
18 technology functions and physical elements are deeply
19 integrated and are actively connected to the physical
20 world through sensors, actuators, or other means to
21 perform monitoring and control functions;”;

22 (3) in paragraph (4), as so redesignated—

23 (A) by striking “high-performance com-
24 puting” and inserting “networking and informa-
25 tion technology”; and

1 (B) by striking “supercomputer” and in-
2 serting “high-end computing”;

3 (4) in paragraph (6), as so redesignated, by
4 striking “network referred to as” and all that follows
5 through the semicolon and inserting “network, includ-
6 ing advanced computer networks of Federal agencies
7 and departments;”; and

8 (5) in paragraph (7), as so redesignated, by
9 striking “National High-Performance Computing
10 Program” and inserting “networking and informa-
11 tion technology research and development program”.

12 **SEC. 3. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL**
13 **IMPORTANCE.**

14 Title I of such Act (15 U.S.C. 5511) is amended by
15 adding at the end the following new section:

16 **“SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NA-**
17 **TIONAL IMPORTANCE.**

18 “(a) *IN GENERAL.*—The Program shall encourage
19 agencies identified in section 101(a)(3)(B) to support large-
20 scale, long-term, interdisciplinary research and develop-
21 ment activities in networking and information technology
22 directed toward application areas that have the potential
23 for significant contributions to national economic competi-
24 tiveness and for other significant societal benefits. Such ac-
25 tivities, ranging from basic research to the demonstration

1 *of technical solutions, shall be designed to advance the devel-*
2 *opment of research discoveries. The advisory committee es-*
3 *tablished under section 101(b) shall make recommendations*
4 *to the Program for candidate research and development*
5 *areas for support under this section.*

6 “(b) *CHARACTERISTICS.—*

7 “(1) *IN GENERAL.—Research and development*
8 *activities under this section shall—*

9 “(A) *include projects selected on the basis of*
10 *applications for support through a competitive,*
11 *merit-based process;*

12 “(B) *involve collaborations among research-*
13 *ers in institutions of higher education and in-*
14 *dustry, and may involve nonprofit research in-*
15 *stitutions and Federal laboratories, as appro-*
16 *priate;*

17 “(C) *when possible, leverage Federal invest-*
18 *ments through collaboration with related State*
19 *initiatives; and*

20 “(D) *include a plan for fostering the trans-*
21 *fer of research discoveries and the results of tech-*
22 *nology demonstration activities, including from*
23 *institutions of higher education and Federal lab-*
24 *oratories, to industry for commercial develop-*
25 *ment.*

1 “(2) *COST-SHARING.*—*In selecting applications*
2 *for support, the agencies shall give special consider-*
3 *ation to projects that include cost-sharing from non-*
4 *Federal sources.*

5 “(3) *AGENCY COLLABORATION.*—*If 2 or more*
6 *agencies identified in section 101(a)(3)(B), or other*
7 *appropriate agencies, are working on large-scale re-*
8 *search and development activities in the same area of*
9 *national importance, then such agencies shall strive*
10 *to collaborate through joint solicitation and selection*
11 *of applications for support and subsequent funding of*
12 *projects.*

13 “(4) *INTERDISCIPLINARY RESEARCH CENTERS.*—
14 *Research and development activities under this sec-*
15 *tion may be supported through interdisciplinary re-*
16 *search centers that are organized to investigate basic*
17 *research questions and carry out technology dem-*
18 *onstration activities in areas described in subsection*
19 *(a). Research may be carried out through existing*
20 *interdisciplinary centers, including those authorized*
21 *under section 7024(b)(2) of the America COMPETES*
22 *Act (Public Law 110–69; 42 U.S.C. 18620–10).”.*

1 **SEC. 4. CYBER-PHYSICAL SYSTEMS AND INFORMATION**
2 **MANAGEMENT.**

3 (a) *ADDITIONAL PROGRAM CHARACTERISTICS.*—Sec-
4 *tion 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amend-*
5 *ed—*

6 (1) *in subparagraph (H), by striking “and”*
7 *after the semicolon;*

8 (2) *in subparagraph (I), by striking the period*
9 *at the end and inserting a semicolon; and*

10 (3) *by adding at the end the following new sub-*
11 *paragraphs:*

12 “(J) *provide for increased understanding of*
13 *the scientific principles of cyber-physical systems*
14 *and improve the methods available for the de-*
15 *sign, development, and operation of cyber-phys-*
16 *ical systems that are characterized by high reli-*
17 *ability, safety, and security; and*

18 “(K) *provide for research and development*
19 *on human-computer interactions, visualization,*
20 *and information management.”.*

21 (b) *TASK FORCE.*—*Title I of such Act (15 U.S.C.*
22 *5511) is amended further by adding after section 104, as*
23 *added by section 3, the following new section:*

24 **“SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.**

25 “(a) *ESTABLISHMENT.*—*Not later than 180 days after*
26 *the date of enactment of the Networking and Information*

1 *Technology Research and Development Act of 2009, the Di-*
2 *rector of the National Coordination Office established under*
3 *section 102 shall convene a task force to explore mechanisms*
4 *for carrying out collaborative research and development ac-*
5 *tivities for cyber-physical systems, including the related*
6 *technologies required to enable these systems, through a con-*
7 *sortium or other appropriate entity with participants from*
8 *institutions of higher education, Federal laboratories, and*
9 *industry.*

10 “(b) *FUNCTIONS.—The task force shall—*

11 “(1) *develop options for a collaborative model*
12 *and an organizational structure for such entity under*
13 *which the joint research and development activities*
14 *could be planned, managed, and conducted effectively,*
15 *including mechanisms for the allocation of resources*
16 *among the participants in such entity for support of*
17 *such activities;*

18 “(2) *propose a process for developing a research*
19 *and development agenda for such entity, including*
20 *objectives and milestones;*

21 “(3) *define the roles and responsibilities for the*
22 *participants from institutions of higher education,*
23 *Federal laboratories, and industry in such entity;*

1 “(4) propose guidelines for assigning intellectual
2 property rights and for the transfer of research results
3 to the private sector; and

4 “(5) make recommendations for how such entity
5 could be funded from Federal, State, and non-govern-
6 mental sources.

7 “(c) COMPOSITION.—In establishing the task force
8 under subsection (a), the Director of the National Coordina-
9 tion Office shall appoint an equal number of individuals
10 from institutions of higher education and from industry
11 with knowledge and expertise in cyber-physical systems, of
12 which 2 may be selected from Federal laboratories.

13 “(d) REPORT.—Not later than 1 year after the date
14 of enactment of the Networking and Information Tech-
15 nology Research and Development Act of 2009, the Director
16 of the National Coordination Office shall transmit to the
17 Committee on Commerce, Science, and Transportation of
18 the Senate and the Committee on Science and Technology
19 of the House of Representatives a report describing the find-
20 ings and recommendations of the task force.”.

21 **SEC. 5. NATIONAL COORDINATION OFFICE.**

22 Section 102 of such Act (15 U.S.C. 5512) is amended
23 to read as follows:

1 **“SEC. 102. NATIONAL COORDINATION OFFICE.**

2 “(a) *ESTABLISHMENT.*—*The Director shall establish a*
3 *National Coordination Office with a Director and full-time*
4 *staff.*

5 “(b) *FUNCTIONS.*—*The National Coordination Office*
6 *shall—*

7 “(1) *provide technical and administrative sup-*
8 *port to—*

9 “(A) *the agencies participating in planning*
10 *and implementing the Program, including such*
11 *support as needed in the development of the stra-*
12 *tegic plan under section 101(e); and*

13 “(B) *the advisory committee established*
14 *under section 101(b);*

15 “(2) *serve as the primary point of contact on*
16 *Federal networking and information technology ac-*
17 *tivities for government organizations, academia, in-*
18 *dustry, professional societies, State computing and*
19 *networking technology programs, interested citizen*
20 *groups, and others to exchange technical and pro-*
21 *grammatic information;*

22 “(3) *solicit input and recommendations from a*
23 *wide range of stakeholders during the development of*
24 *each strategic plan required under section 101(e)*
25 *through the convening of at least 1 workshop with*
26 *invitees from academia, industry, Federal labora-*

1 *tories, and other relevant organizations and institu-*
2 *tions;*

3 *“(4) conduct public outreach, including the dis-*
4 *semination of findings and recommendations of the*
5 *advisory committee, as appropriate; and*

6 *“(5) promote access to and early application of*
7 *the technologies, innovations, and expertise derived*
8 *from Program activities to agency missions and sys-*
9 *tems across the Federal Government and to United*
10 *States industry.*

11 *“(c) SOURCE OF FUNDING.—*

12 *“(1) IN GENERAL.—The operation of the Na-*
13 *tional Coordination Office shall be supported by*
14 *funds from each agency participating in the Pro-*
15 *gram.*

16 *“(2) SPECIFICATIONS.—The portion of the total*
17 *budget of such Office that is provided by each agency*
18 *for each fiscal year shall be in the same proportion*
19 *as each such agency’s share of the total budget for the*
20 *Program for the previous fiscal year, as specified in*
21 *the report required under section 101(a)(3).”.*

22 **SEC. 6. IMPROVING NETWORKING AND INFORMATION**
23 **TECHNOLOGY EDUCATION.**

24 *Section 201(a) of such Act (15 U.S.C. 5521(a)) is*
25 *amended—*

1 (1) by redesignating paragraphs (2) through (4)
2 as paragraphs (3) through (5), respectively; and

3 (2) by inserting after paragraph (1) the fol-
4 lowing new paragraph:

5 “(2) the National Science Foundation shall use
6 its existing programs, in collaboration with other
7 agencies, as appropriate, to improve the teaching and
8 learning of networking and information technology at
9 all levels of education and to increase participation
10 in networking and information technology fields, in-
11 cluding by women and underrepresented minorities;”.

12 **SEC. 7. CONFORMING AND TECHNICAL AMENDMENTS.**

13 (a) SECTION 3.—Section 3 of such Act (15 U.S.C.
14 5502) is amended—

15 (1) in the matter preceding paragraph (1), by
16 striking “high-performance computing” and inserting
17 “networking and information technology”;

18 (2) in paragraph (1), in the matter preceding
19 subparagraph (A), by striking “high-performance
20 computing” and inserting “networking and informa-
21 tion technology”;

22 (3) in subparagraphs (A) and (F) of paragraph
23 (1), by striking “high-performance computing” each
24 place it appears and inserting “networking and in-
25 formation technology”; and

1 (4) in paragraph (2)—

2 (A) by striking “high-performance com-
3 puting and” and inserting “networking and in-
4 formation technology and”; and

5 (B) by striking “high-performance com-
6 puting network” and inserting “networking and
7 information technology”.

8 (b) *TITLE I.*—The heading of title I of such Act (15
9 U.S.C. 5511) is amended by striking “**HIGH-PER-**
10 **FORMANCE COMPUTING**” and inserting “**NET-**
11 **WORKING AND INFORMATION TECH-**
12 **NOLOGY**”.

13 (c) *SECTION 101.*—Section 101 of such Act (15 U.S.C.
14 5511) is amended—

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

19 (2) in subsection (a)—

20 (A) in the subsection heading, by striking
21 “**NATIONAL HIGH-PERFORMANCE COMPUTING**”
22 and inserting “**NETWORKING AND INFORMATION**
23 **TECHNOLOGY RESEARCH AND DEVELOPMENT**”;

24 (B) in paragraph (1) of such subsection—

1 (i) in the matter preceding subpara-
2 graph (A), by striking “National High-Per-
3 formance Computing Program” and insert-
4 ing “networking and information tech-
5 nology research and development program”;

6 (ii) in subparagraph (A), by striking
7 “high-performance computing, including
8 networking” and inserting “networking and
9 information technology”; and

10 (iii) in subparagraphs (B), (C), and
11 (G), by striking “high-performance” each
12 place it appears and inserting “high-end”;
13 and

14 (C) in paragraph (2) of such subsection—

15 (i) in subparagraphs (A) and (C)—

16 (I) by striking “high-performance
17 computing” each place it appears and
18 inserting “networking and information
19 technology”; and

20 (II) by striking “development,
21 networking,” each place it appears and
22 inserting “development,”; and

23 (ii) in subparagraphs (F) and (G), as
24 redesignated by section 2(c)(1) of this Act,

1 by striking “high-performance” each place
2 it appears and inserting “high-end”;

3 (3) in subsection (b)(1), in the matter preceding
4 subparagraph (A), by striking “high-performance
5 computing” both places it appears and inserting
6 “networking and information technology”; and

7 (4) in subsection (c)(1)(A), by striking “high-
8 performance computing” and inserting “networking
9 and information technology”.

10 (d) SECTION 201.—Section 201(a)(1) of such Act (15
11 U.S.C. 5521(a)(1)) is amended by striking “high-perform-
12 ance computing” and all that follows through “net-
13 working;” and inserting “networking and information re-
14 search and development;”.

15 (e) SECTION 202.—Section 202(a) of such Act (15
16 U.S.C. 5522(a)) is amended by striking “high-performance
17 computing” and inserting “networking and information
18 technology”.

19 (f) SECTION 203.—Section 203(a)(1) of such Act (15
20 U.S.C. 5523(a)(1)) is amended by striking “high-perform-
21 ance computing and networking” and inserting “net-
22 working and information technology”.

23 (g) SECTION 204.—Section 204(a)(1) of such Act (15
24 U.S.C. 5524(a)(1)) is amended—

1 (1) in subparagraph (A), by striking “high-per-
2 formance computing systems and networks” and in-
3 serting “networking and information technology sys-
4 tems and capabilities”; and

5 (2) in subparagraph (C), by striking “high-per-
6 formance computing” and inserting “networking and
7 information technology”.

8 (h) SECTION 205.—Section 205(a) of such Act (15
9 U.S.C. 5525(a)) is amended by striking “computational”
10 and inserting “networking and information technology”.

11 (i) SECTION 206.—Section 206(a) of such Act (15
12 U.S.C. 5526(a)) is amended by striking “computational re-
13 search” and inserting “networking and information tech-
14 nology research”.

15 (j) SECTION 208.—Section 208 of such Act (15 U.S.C.
16 5528) is amended—

17 (1) in the section heading, by striking “**HIGH-**
18 **PERFORMANCE COMPUTING**” and inserting
19 “**NETWORKING AND INFORMATION TECH-**
20 **NOLOGY**”; and

21 (2) in subsection (a)—

22 (A) in paragraph (1), by striking “High-
23 performance computing and associated” and in-
24 serting “Networking and information”;

1 (B) in paragraph (2), by striking “high-
2 performance computing” and inserting “net-
3 working and information technologies”;

4 (C) in paragraph (4), by striking “high-
5 performance computers and associated” and in-
6 serting “networking and information”; and

7 (D) in paragraph (5), by striking “high-
8 performance computing and associated” and in-
9 serting “networking and information”.

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