

111TH CONGRESS  
1ST SESSION

# H. R. 2020

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IN THE SENATE OF THE UNITED STATES

MAY 13, 2009

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  
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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Networking and Infor-  
3 mation Technology Research and Development Act of  
4 2009”.

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

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

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

12 “(1) periodically assess the contents and fund-  
13 ing levels of the Program Component Areas and re-  
14 structure the Program when warranted, taking into  
15 consideration any relevant recommendations of the  
16 advisory committee established under subsection (b);  
17 and

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

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

26 “(e) STRATEGIC PLAN.—

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

11          “(2) CONTENTS.—The strategic plan shall  
12          specify near-term and long-term objectives for the  
13          Program, the anticipated time frame for achieving  
14          the near-term objectives, the metrics to be used for  
15          assessing progress toward the objectives, and how  
16          the Program will—

17                 “(A) foster the transfer of research and  
18                 development results into new technologies and  
19                 applications for the benefit of society, including  
20                 through cooperation and collaborations with  
21                 networking and information technology re-  
22                 search, development, and technology transition  
23                 initiatives supported by the States;

24                 “(B) encourage and support mechanisms  
25                 for interdisciplinary research and development

1 in networking and information technology, in-  
2 cluding through collaborations across agencies,  
3 across Program Component Areas, with indus-  
4 try, with Federal laboratories (as defined in  
5 section 4 of the Stevenson-Wydler Technology  
6 Innovation Act of 1980 (15 U.S.C. 3703)), and  
7 with international organizations;

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

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

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

20 “(F) attract more women and underrep-  
21 resented minorities to pursue postsecondary de-  
22 grees in networking and information tech-  
23 nology.

24 “(3) NATIONAL RESEARCH INFRASTRUCTURE.—The  
25 strategic plan developed in accordance with paragraph (1)

1 shall be accompanied by milestones and roadmaps for es-  
2 tablishing and maintaining the national research infra-  
3 structure required to support the Program, including the  
4 roadmap required by subsection (a)(2)(E).

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

8 “(A) of the advisory committee established  
9 under subsection (b); and

10 “(B) of the stakeholders whose input was solie-  
11 ited by the National Coordination Office, as required  
12 under section 102(b)(3).

13 “(5) REPORT TO CONGRESS.—The Director of the  
14 National Coordination Office shall transmit the strategic  
15 plan required under paragraph (1) to the advisory com-  
16 mittee, the Committee on Commerce, Science, and Trans-  
17 portation of the Senate, and the Committee on Science  
18 and Technology of the House of Representatives.”.

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

22 (1) by redesignating subparagraphs (E) and  
23 (F) as subparagraphs (F) and (G), respectively; and

24 (2) by inserting after subparagraph (D) the fol-  
25 lowing new subparagraph:

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

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

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

17                 (1) in subparagraph (C)—

18                         (A) by striking “is submitted,” and insert-  
19                         ing “is submitted, the levels for the previous  
20                         fiscal year;”; and

21                         (B) by striking “each Program Component  
22                         Area;” and inserting “each Program Compo-  
23                         nent Area and research area supported in ac-  
24                         cordance with section 104;”;

25                 (2) in subparagraph (D)—

1 (A) by striking “each Program Component  
2 Area,” and inserting “each Program Compo-  
3 nent Area and research area supported in ac-  
4 cordance with section 104,”;

5 (B) by striking “is submitted,” and insert-  
6 ing “is submitted, the levels for the previous  
7 fiscal year,”; and

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

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

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

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

19 “(F) include—

20 “(i) a description of the funding re-  
21 quired by the National Coordination Office  
22 to perform the functions specified under  
23 section 102(b) for the next fiscal year by  
24 category 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  
8           by each agency participating in the Pro-  
9           gram; and”.

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

12           (1) by redesignating paragraphs (1) through  
13           (7) 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 informa-  
18           tion technology functions and physical elements are  
19           deeply integrated and are actively connected to the  
20           physical world through sensors, actuators, or other  
21           means to perform monitoring and control func-  
22           tions;”;

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



1 (A) by striking “high-performance com-  
2 puting” and inserting “networking and infor-  
3 mation technology”; and

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

6 (4) in paragraph (6), as so redesignated, by  
7 striking “network referred to as” and all that fol-  
8 lows through the semicolon and inserting “network,  
9 including advanced computer networks of Federal  
10 agencies and departments;”; and

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

15 **SEC. 3. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL**  
16 **IMPORTANCE.**

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

19 **“SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NA-**  
20 **TIONAL IMPORTANCE.**

21 “(a) IN GENERAL.—The Program shall encourage  
22 agencies identified in section 101(a)(3)(B) to support  
23 large-scale, long-term, interdisciplinary research and de-  
24 velopment activities in networking and information tech-  
25 nology directed toward application areas that have the po-

1 tential for significant contributions to national economic  
2 competitiveness and for other significant societal benefits.  
3 Such activities, ranging from basic research to the dem-  
4 onstration of technical solutions, shall be designed to ad-  
5 vance the development of research discoveries. The advi-  
6 sory committee established under section 101(b) shall  
7 make recommendations to the Program for candidate re-  
8 search and development areas for support under this sec-  
9 tion.

10 “(b) CHARACTERISTICS.—

11 “(1) IN GENERAL.—Research and development  
12 activities under this section shall—

13 “(A) include projects selected on the basis  
14 of applications for support through a competi-  
15 tive, merit-based process;

16 “(B) involve collaborations among re-  
17 searchers in institutions of higher education  
18 and industry, and may involve nonprofit re-  
19 search institutions and Federal laboratories, as  
20 appropriate;

21 “(C) when possible, leverage Federal in-  
22 vestments through collaboration with related  
23 State initiatives; and

24 “(D) include a plan for fostering the trans-  
25 fer of research discoveries and the results of

1           technology demonstration activities, including  
2           from institutions of higher education and Fed-  
3           eral laboratories, to industry for commercial de-  
4           velopment.

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

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

17          “(4) INTERDISCIPLINARY RESEARCH CEN-  
18          TERS.—Research and development activities under  
19          this section may be supported through interdiscipli-  
20          nary research centers that are organized to inves-  
21          tigate basic research questions and carry out tech-  
22          nology demonstration activities in areas described in  
23          subsection (a). Research may be carried out through  
24          existing interdisciplinary centers, including those au-  
25          thorized under section 7024(b)(2) of the America

1       COMPETES Act (Public Law 110–69; 42 U.S.C.  
2       1862o–10).”.

3       **SEC. 4. CYBER-PHYSICAL SYSTEMS AND INFORMATION**  
4                                   **MANAGEMENT.**

5       (a) **ADDITIONAL PROGRAM CHARACTERISTICS.**—Sec-  
6       tion 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is  
7       amended—

8               (1) in subparagraph (H), by striking “and”  
9       after the semicolon;

10              (2) in subparagraph (I), by striking the period  
11       at the end and inserting a semicolon; and

12              (3) by adding at the end the following new sub-  
13       paragraphs:

14                       “(J) provide for increased understanding  
15       of the scientific principles of cyber-physical sys-  
16       tems and improve the methods available for the  
17       design, development, and operation of cyber-  
18       physical systems that are characterized by high  
19       reliability, safety, and security; and

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

23       (b) **TASK FORCE.**—Title I of such Act (15 U.S.C.  
24       5511) is amended further by adding after section 104, as  
25       added by section 3, the following new section:

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

2       “(a) ESTABLISHMENT.—Not later than 180 days  
3 after the date of enactment of the Networking and Infor-  
4 mation Technology Research and Development Act of  
5 2009, the Director of the National Coordination Office es-  
6 tablished under section 102 shall convene a task force to  
7 explore mechanisms for carrying out collaborative research  
8 and development activities for cyber-physical systems, in-  
9 cluding the related technologies required to enable these  
10 systems, through a consortium or other appropriate entity  
11 with participants from institutions of higher education,  
12 Federal laboratories, and industry.

13       “(b) FUNCTIONS.—The task force shall—

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

21               “(2) propose a process for developing a re-  
22 search and development agenda for such entity, in-  
23 cluding objectives and milestones;

24               “(3) define the roles and responsibilities for the  
25 participants from institutions of higher education,  
26 Federal laboratories, and industry in such entity;

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

4           “(5) make recommendations for how such enti-  
5           ty could be funded from Federal, State, and non-  
6           governmental sources.

7           “(c) COMPOSITION.—In establishing the task force  
8           under subsection (a), the Director of the National Coordi-  
9           nation 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,  
12          of 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 Direc-  
16          tor of the National Coordination Office shall transmit to  
17          the Committee on Commerce, Science, and Transportation  
18          of the Senate and the Committee on Science and Tech-  
19          nology of the House of Representatives a report describing  
20          the findings 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  
3 a National Coordination Office with a Director and full-  
4 time 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  
12 strategic 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  
24 of 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 agen-  
18      cy for each fiscal year shall be in the same propor-  
19      tion as each such agency’s share of the total budget  
20      for the Program for the previous fiscal year, as spec-  
21      ified in the report required under section  
22      101(a)(3).”.



1 **SEC. 6. IMPROVING NETWORKING AND INFORMATION**  
2 **TECHNOLOGY EDUCATION.**

3 Section 201(a) of such Act (15 U.S.C. 5521(a)) is  
4 amended—

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

7 (2) by inserting after paragraph (1) the fol-  
8 lowing new paragraph:

9 “(2) the National Science Foundation shall use  
10 its existing programs, in collaboration with other  
11 agencies, as appropriate, to improve the teaching  
12 and learning of networking and information tech-  
13 nology at all levels of education and to increase par-  
14 ticipation in networking and information technology  
15 fields, including by women and underrepresented mi-  
16 norities;”.

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

18 (a) SECTION 3.—Section 3 of such Act (15 U.S.C.  
19 5502) is amended—

20 (1) in the matter preceding paragraph (1), by  
21 striking “high-performance computing” and insert-  
22 ing “networking and information technology”;

23 (2) in paragraph (1), in the matter preceding  
24 subparagraph (A), by striking “high-performance  
25 computing” and inserting “networking and informa-  
26 tion technology”;

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

5           (4) in paragraph (2)—

6           (A) by striking “high-performance com-  
7           puting and” and inserting “networking and in-  
8           formation technology and”; and

9           (B) by striking “high-performance com-  
10          puting network” and inserting “networking and  
11          information technology”.

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

17          (c) SECTION 101.—Section 101 of such Act (15  
18 U.S.C. 5511) is amended—

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

23           (2) in subsection (a)—

24           (A) in the subsection heading, by striking  
25           “**NATIONAL HIGH-PERFORMANCE COMPUTING**”

1 and inserting “NETWORKING AND INFORMA-  
2 TION TECHNOLOGY RESEARCH AND DEVELOP-  
3 MENT”;

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

5 (i) in the matter preceding subpara-  
6 graph (A), by striking “National High-Per-  
7 formance Computing Program” and insert-  
8 ing “networking and information tech-  
9 nology research and development pro-  
10 gram”;

11 (ii) in subparagraph (A), by striking  
12 “high-performance computing, including  
13 networking” and inserting “networking  
14 and information technology”; and

15 (iii) in subparagraphs (B), (C), and  
16 (G), by striking “high-performance” each  
17 place it appears and inserting “high-end”;  
18 and

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

20 (i) in subparagraphs (A) and (C)—

21 (I) by striking “high-performance  
22 computing” each place it appears and  
23 inserting “networking and information  
24 technology”; and

1 (II) by striking “development,  
2 networking,” each place it appears  
3 and inserting “development,”; and

4 (ii) in subparagraphs (F) and (G), as  
5 redesignated by section 2(c)(1) of this Act,  
6 by striking “high-performance” each place  
7 it appears and inserting “high-end”;

8 (3) in subsection (b)(1), in the matter pre-  
9 ceding subparagraph (A), by striking “high-perform-  
10 ance computing” both places it appears and insert-  
11 ing “networking and information technology”; and

12 (4) in subsection (c)(1)(A), by striking “high-  
13 performance computing” and inserting “networking  
14 and information technology”.

15 (d) SECTION 201.—Section 201(a)(1) of such Act  
16 (15 U.S.C. 5521(a)(1)) is amended by striking “high-per-  
17 formance computing” and all that follows through “net-  
18 working;” and inserting “networking and information re-  
19 search and development;”.

20 (e) SECTION 202.—Section 202(a) of such Act (15  
21 U.S.C. 5522(a)) is amended by striking “high-perform-  
22 ance computing” and inserting “networking and informa-  
23 tion technology”.

24 (f) SECTION 203.—Section 203(a)(1) of such Act (15  
25 U.S.C. 5523(a)(1)) is amended by striking “high-perform-

1 ance computing and networking” and inserting “net-  
2 working and information technology”.

3 (g) SECTION 204.—Section 204(a)(1) of such Act  
4 (15 U.S.C. 5524(a)(1)) is amended—

5 (1) in subparagraph (A), by striking “high-per-  
6 formance computing systems and networks” and in-  
7 serting “networking and information technology sys-  
8 tems and capabilities”; and

9 (2) in subparagraph (C), by striking “high-per-  
10 formance computing” and inserting “networking and  
11 information technology”.

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

15 (i) SECTION 206.—Section 206(a) of such Act (15  
16 U.S.C. 5526(a)) is amended by striking “computational  
17 research” and inserting “networking and information  
18 technology research”.

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

21 (1) in the section heading, by striking “**HIGH-**  
22 **PERFORMANCE COMPUTING**” and inserting  
23 “**NETWORKING AND INFORMATION TECH-**  
24 **NOLOGY**”; and

25 (2) in subsection (a)—

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

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

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

10          (D) in paragraph (5), by striking “high-  
11          performance computing and associated” and in-  
12          serting “networking and information”.

Passed the House of Representatives May 12, 2009.

Attest:                   LORRAINE C. MILLER,  
*Clerk.*