112TH CONGRESS
2D SESSION

H. R. 3834

IN THE SENATE OF THE UNITED STATES

MAY 7, 2012

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

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.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Advancing America's Networking and Information Technology Research and Development Act of 2012''.

SEC. 2. PROGRAM PLANNING AND COORDINATION.

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

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

''(1) periodically assess the contents and funding levels of the Program Component Areas and restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

''(2) ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 104.''.

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

''(e) STRATEGIC PLAN.—

''(1) IN GENERAL.—The agencies identified in subsection (a)(3)(B), working through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102, shall develop, within 12 months after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2012, and update every 3 years thereafter, a 5-year strategic plan to guide the activities described under subsection (a)(1).

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

''(A) foster the transfer of research and development results into new technologies and applications for the benefit of society, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States;

"(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology, including through collaborations across agencies, across Program Component Areas, with industry, with Federal laboratories (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)), and with international organizations;

"(C) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

"(D) place emphasis on innovative and high-risk projects having the potential for substantial societal returns on the research investment;

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

"(F) attract more women and underrepresented minorities to pursue postsecondary degrees in networking and information technology.

''(3) NATIONAL RESEARCH INFRASTRUCTURE.—The strategic plan developed in accordance with paragraph (1) shall be accompanied by milestones and roadmaps for establishing and maintaining the national research infrastructure required to support the Program, including the roadmap required by subsection (a)(2)(E).

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

''(A) of the advisory committee established under subsection (b); and

''(B) of the stakeholders whose input was solicited by the National Coordination Office, as required under section 102(b)(3).

''(5) REPORT TO CONGRESS.—The Director of the National Coordination Office shall transmit the strategic plan required under paragraph (1) to the advisory committee, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives.''.

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

(1) in subparagraph (A) by inserting ''education,'' before ''and other activities'';

(2) by redesignating subparagraphs (E) and (F) as subparagraphs (F) and (G), respectively; and

(3) by inserting after subparagraph (D) the following new subparagraph:

''(E) encourage and monitor the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the strategic plan under subsection (e) is developed and executed effectively and that the objectives of the Program are met;''.

(d) ADVISORY COMMITTEE.—Section 101(b)(1) of such Act (15 U.S.C. 5511(b)(1)) is amended—

(1) after the first sentence, by inserting the following: ''The co-chairs of the advisory committee shall meet the qualifications of committee membership and may be members of the President's Council of Advisors on Science and Technology.''; and

(2) in subparagraph (D), by striking ''high-performance'' and inserting ''high-end''.

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

(1) in subparagraph (C)—

(A) by striking ''is submitted,'' and inserting ''is submitted, the levels for the previous fiscal year,''; and

(B) by striking ''each Program Component Area;'' and inserting ''each Program Component Area and research area supported in accordance with section 104;'';

(2) in subparagraph (D)—

(A) by striking ''each Program Component Area,'' and inserting ''each Program Component Area and research area supported in accordance with section 104,'';

(B) by striking ''is submitted,'' and inserting ''is submitted, the levels for the previous fiscal year,''; and

(C) by striking ''and'' after the semicolon;

(3) by redesignating subparagraph (E) as subparagraph (G); and

(4) by inserting after subparagraph (D) the following new subparagraphs:

''(E) include a description of how the objectives for each Program Component Area, and the objec-

tives for activities that involve multiple Program Component Areas, relate to the objectives of the Program identified in the strategic plan required under subsection (e);

''(F) include—

''(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

''(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

''(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and''.

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

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

(2) by inserting before paragraph (2), as so redesignated, the following new paragraph:

''(1) 'cyber-physical systems' means physical or engineered systems whose networking and information technology functions and physical elements are

deeply integrated and are actively connected to the physical world through sensors, actuators, or other means to perform monitoring and control functions;'';

(3) in paragraph (3), as so redesignated, by striking ''high-performance computing'' and inserting ''networking and information technology'';

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

(A) by striking ''high-performance computing'' and inserting ''networking and information technology''; and

(B) by striking ''supercomputer'' and inserting ''high-end computing'';

(5) in paragraph (6), as so redesignated, by striking ''network referred to as'' and all that follows through the semicolon and inserting ''network, including advanced computer networks of Federal agencies and departments;''; and

(6) in paragraph (7), as so redesignated, by striking ''National High-Performance Computing Program'' and inserting ''networking and information technology research and development program''.

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

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

"SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

''(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(B) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward application areas that have the potential for significant contributions to national economic competitiveness and for other significant societal benefits. Such activities, ranging from basic research to the demonstration of technical solutions, shall be designed to advance the development of research discoveries. The advisory committee established under section 101(b) shall make recommendations to the Program for candidate research and development areas for support under this section.

''(b) CHARACTERISTICS.—

''(1) IN GENERAL.—Research and development activities under this section shall—

''(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

"(B) involve collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories, as appropriate;

"(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

"(D) include a plan for fostering the transfer of research discoveries and the results of technology demonstration activities, including from institutions of higher education and Federal laboratories, to industry for commercial development.

"(2) COST-SHARING.—In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

"(3) AGENCY COLLABORATION.—If 2 or more agencies identified in section 101(a)(3)(B), or other appropriate agencies, are working on large-scale research and development activities in the same area of national importance, then such agencies shall strive to collaborate through joint solicitation and se-

lection of applications for support and subsequent funding of projects.

''(4) INTERDISCIPLINARY RESEARCH CENTERS.—Research and development activities under this section may be supported through interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities in areas described in subsection (a). Research may be carried out through existing interdisciplinary centers, including those authorized under section 7024(b)(2) of the America COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).''.

SEC. 4. CYBER-PHYSICAL SYSTEMS.

(a) ADDITIONAL PROGRAM CHARACTERISTICS.—Section 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amended—

(1) in subparagraph (H), by striking ''and'' after the semicolon;

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

(3) by adding at the end the following new subparagraphs:

''(J) provide for increased understanding of the scientific principles of cyber-physical systems and

improve the methods available for the design, development, and operation of cyber-physical systems that are characterized by high reliability, safety, and security; and

''(K) provide for research and development on human-computer interactions, visualization, and big data.''.

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

''SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.

''(a) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2012, the Director of the National Coordination Office shall convene a task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, through a consortium or other appropriate entity with participants from institutions of higher education, Federal laboratories, and industry.

''(b) FUNCTIONS.—The task force shall—

''(1) develop options for a collaborative model and an organizational structure for such entity

under which the joint research and development activities could be planned, managed, and conducted effectively, including mechanisms for the allocation of resources among the participants in such entity for support of such activities;

''(2) propose a process for developing a research and development agenda for such entity, including guidelines to ensure an appropriate scope of work focused on nationally significant challenges and requiring collaboration and to ensure the development of related scientific and technological milestones;

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

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

''(5) make recommendations for how such entity could be funded from Federal, State, and nongovernmental sources.

''(c) COMPOSITION.—In establishing the task force under subsection (a), the Director of the National Coordination Office—

''(1) shall appoint an equal number of individuals with knowledge and expertise in cyber-physical systems from—

''(A) institutions of higher education, including minority-serving institutions and community colleges; and

''(B) industry; and

''(2) may appoint not more than 2 individuals from Federal laboratories.

''(d) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2012, the Director of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report describing the findings and recommendations of the task force.

''(e) TERMINATION.—The task force shall terminate upon transmittal of the report required under subsection (d).

''(f) COMPENSATION.—Members of the task force shall serve without compensation.''.

SEC. 5. CLOUD COMPUTING SERVICES FOR RESEARCH.

Title I of such Act (15 U.S.C. 5511) is amended further by adding after section 105, as added by section 4(b) of this Act, the following new section:

"SEC. 106. CLOUD COMPUTING SERVICES FOR RESEARCH.

''(a) INTERAGENCY WORKING GROUP.—Not later than 180 days after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2012, the Director of the National Coordination Office, working through the National Science and Technology Council, shall convene an interagency working group to examine—

''(1) the research and development needed—

''(A) to enhance the effectiveness and efficiency of cloud computing environments;

''(B) to increase the trustworthiness of cloud applications and infrastructure; and

''(C) to enhance the foundations of cloud architectures, programming models, and interoperability; and

''(2) the potential use of cloud computing for federally-funded science and engineering research, including issues around funding mechanisms and policies for the use of cloud computing services for such research.

''(b) CONSULTATION.—In carrying out the tasks in paragraphs (1) and (2) of subsection (a), the working group shall consult with academia, industry, Federal laboratories, and other relevant organizations and institutions, as appropriate.

''(c) REPORT.—Not later than 1 year after the date of enactment of the Advancing America's Networking and Information Technology Research and Development Act of 2012, the Director of the National Coordination Office shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing the findings and any recommendations of the working group.

''(d) TERMINATION.—The interagency working group shall terminate upon transmittal of the report required under subsection (c).''.

SEC. 6. NATIONAL COORDINATION OFFICE.

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

''SEC. 102. NATIONAL COORDINATION OFFICE.

''(a) OFFICE.—The Director shall continue a National Coordination Office with a Director and full-time staff.

''(b) FUNCTIONS.—The National Coordination Office shall—

''(1) provide technical and administrative support to—

''(A) the agencies participating in planning and implementing the Program, including such support as needed in the development of the strategic plan under section 101(e); and

''(B) the advisory committee established under section 101(b);

''(2) serve as the primary point of contact on Federal networking and information technology activities for government organizations, academia, industry, professional societies, State computing and networking technology programs, interested citizen groups, and others to exchange technical and programmatic information;

''(3) solicit input and recommendations from a wide range of stakeholders during the development of each strategic plan required under section 101(e) through the convening of at least 1 workshop with invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

''(4) conduct public outreach, including the dissemination of findings and recommendations of the advisory committee, as appropriate; and

''(5) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government and to United States industry.

''(c) SOURCE OF FUNDING.—

''(1) IN GENERAL.—The operation of the National Coordination Office shall be supported by funds from each agency participating in the Program.

''(2) SPECIFICATIONS.—The portion of the total budget of such Office that is provided by each agency for each fiscal year shall be in the same proportion as each such agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 101(a)(3).''.

SEC. 7. IMPROVING NETWORKING AND INFORMATION TECHNOLOGY EDUCATION.

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

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

(2) by inserting after paragraph (1) the following new paragraph:

''(2) the National Science Foundation shall use its existing programs, in collaboration with other agencies, as appropriate, to improve the teaching and learning of networking and information technology at all levels of education and to increase participation in networking and information technology fields, including by women and underrepresented minorities;''.

SEC. 8. CONFORMING AND TECHNICAL AMENDMENTS.

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

(1) in the matter preceding paragraph (1), by striking ''high-performance computing'' and inserting ''networking and information technology'';

(2) in paragraph (1)—

(A) in the matter preceding subparagraph (A), by striking ''high-performance computing'' and inserting ''networking and information technology'';

(B) in subparagraphs (A), (F), and (G), by striking ''high-performance computing'' each

place it appears and inserting ''networking and information technology''; and

(C) in subparagraph (H), by striking ''high-performance'' and inserting ''high-end''; and

(3) in paragraph (2)—

(A) by striking ''high-performance computing and'' and inserting ''networking and information technology and''; and

(B) by striking ''high-performance computing network'' and inserting ''networking and information technology''.

(b) TITLE I.—The heading of title I of such Act (15 U.S.C. 5511) is amended by striking ''**HIGH-PERFORMANCE COMPUTING**'' and inserting ''**NETWORKING AND INFORMATION TECHNOLOGY**''.

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

(1) in the section heading, by striking ''**HIGH-PERFORMANCE COMPUTING**'' and inserting ''**NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT**'';

(2) in subsection (a)—

(A) in the subsection heading, by striking ''NATIONAL HIGH-PERFORMANCE COMPUTING'' and inserting ''NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT'';

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

(i) in the matter preceding subparagraph (A), by striking ''National High-Performance Computing Program'' and inserting ''networking and information technology research and development program'';

(ii) in subparagraph (A), by striking ''high-performance computing, including networking'' and inserting ''networking and information technology'';

(iii) in subparagraphs (B) and (G), by striking ''high-performance'' each place it appears and inserting ''high-end''; and

(iv) in subparagraph (C), by striking ''high-performance computing and networking'' and inserting ''high-end computing, distributed, and networking''; and

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

(i) in subparagraphs (A) and (C)—

(I) by striking ''high-performance computing'' each place it appears and inserting ''networking and information technology''; and

(II) by striking ''development, networking,'' each place it appears and inserting ''development,''; and

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

(3) in subsection (b)—

(A) in paragraph (1), in the matter preceding subparagraph (A), by striking ''high-performance computing'' both places it appears and inserting ''networking and information technology''; and

(B) in paragraph (2), in the second sentence, by striking ''2'' and inserting ''3''; and

(4) in subsection (c)(1)(A), by striking ''high-performance computing'' and inserting ''networking and information technology''.

(d) SECTION 201.—Section 201(a)(1) of such Act (15 U.S.C. 5521(a)(1)) is amended by striking ''high-performance computing'' and all that follows through ''net-

working;'' and inserting ''networking and information research and development;''.

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

(f) SECTION 203.—Section 203(a) of such Act (15 U.S.C. 5523(a)(1)) is amended—

(1) in paragraph (1), by striking ''high-performance computing and networking'' and inserting ''networking and information technology''; and

(2) in paragraph (2)(A), by striking ''high-performance'' and inserting ''high-end''.

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

(1) in subsection (a)(1)—

(A) in subparagraph (A), by striking ''high-performance computing systems and networks'' and inserting ''networking and information technology systems and capabilities'';

(B) in subparagraph (B), by striking ''interoperability of high-performance computing systems in networks and for common user interfaces to systems'' and inserting

''interoperability and usability of networking and information technology systems''; and

(C) in subparagraph (C), by striking ''high-performance computing'' and inserting ''networking and information technology''; and

(2) in subsection (b)—

(A) in the heading, by striking ''HIGH-PERFORMANCE COMPUTING AND NETWORK'' and inserting ''NETWORKING AND INFORMATION TECHNOLOGY''; and

(B) by striking ''sensitive''.

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

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

(j) SECTION 207.—Section 207(b) of such Act (15 U.S.C. 5527(b)) is amended by striking ''high-performance computing'' and inserting ''networking and information technology''.

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

(1) in the section heading, by striking ''**HIGH-PERFORMANCE COMPUTING**'' and inserting ''**NETWORKING AND INFORMATION TECHNOLOGY**''; and

(2) in subsection (a)—

(A) in paragraph (1), by striking ''High-performance computing and associated'' and inserting ''Networking and information'';

(B) in paragraph (2), by striking ''high-performance computing'' and inserting ''networking and information technologies'';

(C) in paragraph (3), by striking ''high-performance'' and inserting ''high-end'';

(D) in paragraph (4), by striking ''high-performance computers and associated'' and inserting ''networking and information''; and

(E) in paragraph (5), by striking ''high-performance computing and associated'' and inserting ''networking and information''.

Passed the House of Representatives April 27, 2012.

Attest: KAREN L. HAAS,

Clerk.