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(Original Signature of Member)

114TH CONGRESS
2D SESSION

H. R. _____

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

Mr. LAHOOD introduced the following bill; which was referred to the Committee on _____

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.

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 ''Networking and Information Technology Research and Development Modernization Act of 2016''.

SEC. 2. PURPOSES.

Section 3 of the High-Performance Computing Act of 1991 (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 ''expanding Federal support for research, development, and application of high-performance computing'' and inserting ''supporting Federal research, development, and application of networking and information technology'';

(B) in subparagraph (A), by striking ''high-performance computing'' both places it appears and inserting ''networking and information technology'';

(C) by striking subparagraphs (C) and (D);

(D) by inserting after subparagraph (B) the following:

''(C) stimulate research on and promote more rapid development of high-end computing and software;'';

(E) by redesignating subparagraphs (E) through (H) as subparagraphs (D) through (G), respectively;

(F) in subparagraph (D), as so redesignated, by inserting ''high-end'' after ''the development of'';

(G) in subparagraphs (E) and (F), as so redesignated, by striking ''high-performance computing'' each place it appears and inserting ''networking and information technology''; and

(H) in subparagraph (G), as so redesignated, 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''.

SEC. 3. DEFINITIONS.

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

(1) by striking paragraphs (3) and (5);

(2) by redesignating paragraphs (1), (2), (4), (6), and (7) as paragraphs (2), (3), (5), (7), and (8), respectively;

(3) 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;'';

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

(5) by inserting after paragraph (3), as so redesignated, the following new paragraph:

''(4) 'high-end computing' means the most advanced and capable computing systems, including their hardware, storage, networking and software, encompassing both massive computational capability and large-scale data analytics;'';

(6) by inserting after paragraph (5), as so redesignated, the following new paragraph:

''(6) 'networking and information technology' means high-end computing, communications, and information technologies, high-capacity and high-speed networks, special purpose and experimental systems, high-end systems software, and the management of large data sets;''; and

(7) in paragraph (7), as so redesignated, by striking ''National High-Performance Computing Program'' and inserting ''Networking and Information Technology Research and Development Program''.

SEC. 4. TITLE I HEADING.

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

SEC. 5. NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM.

Section 101 of the High-Performance Computing Act of 1991 (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)—

(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'';

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

(v) by amending subparagraph (D) to read as follows:

''(D) provide for efforts to increase high-end software security and reliability;'';

(vi) in subparagraph (H)—

(I) by inserting ''support and guidance'' after ''provide''; and

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

(vii) in subparagraph (I)—

(I) by striking ''improving the security'' and inserting ''improving the security, reliability, and resilience''; and

(II) by striking the period at the end and inserting a semicolon; and

(viii) 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;

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

''(L) provide for research and development on the enhancement of cybersecurity.'';

(C) in paragraph (2)—

(i) by amending subparagraph (A) to read as follows:

''(A) establish the goals and priorities for Federal networking and information technology research, development, education, and other activities;'';

(ii) by amending subparagraph (C) to read as follows:

''(C) provide for interagency coordination of Federal networking and information technology research, development, education, and other activities undertaken pursuant to the Program;'';

(iii) by amending subparagraph (E) to read as follows:

''(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; and''; and

(iv) in subparagraph (F), by striking ''high-performance'' and inserting ''high-end'';

(D) in paragraph (3)—

(i) by redesignating subparagraphs (B), (C), (D), and (E) as subparagraphs (E), (F), (G), and (H), respectively;

(ii) by inserting after subparagraph (A) the following new subparagraphs:

''(B) provide, as appropriate, a list of the senior steering groups and strategic plans that are planned or underway as addressed under section 104;

''(C) provide a description of workshops and other activities conducted under section 104, including participants and findings;

''(D) provide a detailed description of the nature and scope of research infrastructure designated as such under the Program;'';

(iii) in subparagraph (E), as so redesignated—

(I) by redesignating clauses (vii) through (xi) as clauses (viii) through (xii), respectively; and

(II) by inserting after clause (vi) the following:

''(vii) the Department of Homeland Security;'';

(iv) in subparagraph (F), as so redesignated—

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

(II) by striking ''each Program Component Area;'' and inserting ''each Program Component Area and research area supported in accordance with section 103;'';

(v) by amending subparagraph (G), as so redesignated, to read as follows:

''(G) describe the levels of Federal funding for each agency and department participating in the Program, and for each Program Component Area supported in accordance with section 103, for the fiscal year during which such report is submitted, the levels for the previous fiscal year, and the levels proposed for the fiscal year with respect to which the budget submission applies;'';

(vi) in subparagraph (H), as so redesignated, by striking the period and inserting a semicolon; and

(vii) by adding at the end the following:

''(I) include a description of how the objectives for each Program Component Area , and the objectives for activities that involve multiple Program Component Areas, relate to the objectives of the Program identified in the strategic plan required under subsection (e); and

''(J) include—

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

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

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

(3) in subsection (b)—

(A) in paragraph (1), in the matter preceding subparagraph (A)—

(i) by striking ''high-performance computing'' both places it appears and inserting ''networking and information technology''; and

(ii) after the first sentence, by inserting the following: ''Each chair of the advisory committee shall meet the qualifications of committee membership and may be a member of the President's Council of Advisors on Science and Technology.'';

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

(C) in paragraph (2)—

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

(ii) by striking ''Committee on Science and Technology'' and inserting ''Committee on Science, Space, and Technology''; and

(iii) by striking ''The first report shall be due within 1 year after the date of en-

actment of the America COMPETES Act.'';

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

(5) by adding at the end the following new subsections:

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

''(1) periodically assess and update, as appropriate, the contents, scope, and funding levels of the Program Component Areas and work through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102 to restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

''(2) working through the National Science and Technology Council and with the assistance of the National Coordination Office described under section 102, ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 103.

''(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 Networking and Information Technology Research and Development Modernization Act of 2016, and update every five years thereafter, a five-year strategic plan for the Program.

''(2) CONTENTS.—The strategic plan shall specify near-term and long-term cross-cutting 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) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

''(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology and for Grand Challenges, including through col-

laborations 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) foster the transfer of research and development results into new technologies and applications in the national interest, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States;

''(D) provide for cyberinfrastructure needs, as appropriate, across federally funded large-scale research facilities that produce or will produce large amounts of data that will need to be stored, curated, and made publicly available;

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

''(F) attract women and underrepresented students in networking and information technology fields.

''(3) 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);

''(B) of the Committee on Science and relevant subcommittees of the National Science and Technology Council; and

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

''(4) 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 Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate.''.

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 maintain 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), as appropriate;

''(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) and the scope of the Program Component Areas through the convening of at least one workshop with

invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

''(4) conduct and increase outreach, including to academia, industry, other relevant organizations and institutions, and the public, in order to increase awareness of the Program and the benefits of the Program and to increase potential opportunities for collaboration between agencies participating in the Program and the private sector; 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).

''(3) WAIVER.—As appropriate, the Director may consider and approve a reduction or waiver of an agency contribution requirement under paragraph (2).''.

SEC. 7. NEXT GENERATION INTERNET.

Section 103 of such Act (15 U.S.C. 5513) is repealed.

SEC. 8. GRAND CHALLENGES IN AREAS OF NATIONAL IMPORTANCE.

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

''SEC. 103. GRAND CHALLENGES IN AREAS OF NATIONAL IMPORTANCE.

''(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(E) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward agency mission 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 fundamental 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) leverage Federal investments through collaboration with related State and private sector 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 may give special consider-

ation to projects that include cost sharing from non-Federal sources.

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

SEC. 9. WORKSHOPS AND SENIOR STEERING GROUPS.

Title I of such Act (15 U.S.C. 5511 et seq.) is amended further by adding after section 103, as added by section 8 of this Act, the following new section:

"SEC. 104. ADDRESSING EMERGING ISSUES.

"(a) IN GENERAL.—In order to address emerging issues, the Director of the National Coordination Office may conduct workshops and other activities on research areas of emerging importance, which may include the grand challenge areas identified under section 103, with participants from institutions of higher education, Federal laboratories, and industry, in order to help guide Program investments and strategic planning in those areas, including areas identified in subsection (b).

"(b) FOCUS AREAS.—In selecting research areas under subsection (a), the Director of the National Coordination Office shall consider the following topics:

"(1) Data analytics to identify the current and future state of performing inference, prediction, and other forms of analysis of data, and methods for the collection, management, preservation, and use of data.

"(2) The current and future state of the science, engineering, policy, and social understanding of privacy protection.

"(3) The current and future state of fundamental research on the systems and science of the interplay of people and computing as well as the coordination and support being undertaken in areas such as social computing, human-robot interaction,

privacy, and health-related aspects in human-computer systems.

''(c) FUNCTIONS.—The participants of the workshops shall, as appropriate—

''(1) develop options for models for research and development partnerships among institutions of higher education, Federal laboratories, and industry, including mechanisms for the support of research and development carried out under these partnerships;

''(2) develop options for research and development for the specific issue areas that would be addressed through such partnerships;

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

''(4) make recommendations for how Federal agencies participating in the Program can help support research and development partnerships for the specific issue areas.

''(d) PARTICIPANTS.—The Director of the National Coordination Office shall ensure that the participants in the workshops—

''(1) are individuals with knowledge and expertise in the specific issue areas; and

''(2) represent a broad mix of relevant stakeholders, including academic and industry researchers and, as appropriate, Federal agencies.

''(e) SENIOR STEERING GROUPS AND STRATEGIC PLANS.—As appropriate, the Director of the National Coordination Office shall establish senior steering groups and develop focused strategic plans to coordinate and guide activities under the research areas identified under this section, taking into consideration the findings and recommendations from any workshops carried out on those research topics.''.

SEC. 10. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

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

(1) in subsection (a)—

(A) in paragraph (1)—

(i) by inserting ''high-end'' after ''National Science Foundation shall provide''; and

(ii) by striking ''high-performance computing'' and all that follows through ''networking;'' and inserting ''networking and information technology; and'';

(B) by striking paragraphs (2) through (4); and

(C) 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 students in networking and information technology fields.''; and

(2) by striking subsection (b).

SEC. 11. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

Section 202 of such Act (15 U.S.C. 5522) is amended—

(1) by striking subsection (b);

(2) by striking ''(a) GENERAL RESPONSIBILITIES.—''; and

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

SEC. 12. DEPARTMENT OF ENERGY ACTIVITIES.

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

(1) by striking subsection (b);

(2) by striking ''(a) GENERAL RESPONSIBILITIES.—'';

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

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

SEC. 13. DEPARTMENT OF COMMERCE ACTIVITIES.

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'';

(2) in subsection (b)—

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

(B) by striking ''Pursuant to the Computer Security Act of 1987 (Public Law 100–235; 101 Stat. 1724), the'' and inserting ''The''; and

(C) by striking ''sensitive''; and

(3) by striking subsections (c) and (d).

SEC. 14. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.

Section 205 of such Act (15 U.S.C. 5525) is amended—

(1) by striking subsection (b); and

(2) by striking ''(a) GENERAL RESPONSIBILITIES.—''.

SEC. 15. ROLE OF THE DEPARTMENT OF EDUCATION.

Section 206 of such Act (15 U.S.C. 5526) is amended—

(1) by striking subsection (b);

(2) by striking ''(a) GENERAL RESPONSIBILITIES.—''; and

(3) by striking ''to conduct basic'' and all that follows through ''software capabilities'' and inserting ''to support programs and activities to improve the teaching and learning of networking and information technology fields and contribute to the development of a skilled networking and information technology workforce''.

SEC. 16. MISCELLANEOUS PROVISIONS.

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''.

SEC. 17. REPEAL.

Section 208 of such Act (15 U.S.C. 5528) is repealed.

SEC. 18. ADDITIONAL REPEAL.

Section 4 of the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5543) is repealed.