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ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2012

MARCH 22, 2012.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. HALL, from the Committee on Science, Space, and Technology, submitted the following

REPORT

[To accompany H.R. 3834]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 3834) to amend the High-Performance Computing Act of 1991 to authorize activities for support of networking and information technology research, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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19–006

I. AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

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 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);

"(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 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, 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 non-governmental 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 "networking;" 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".

II. Purpose and Summary

The purpose of H.R. 3834 is to advance America's networking and information technology research and development by updating the High-Performance Computing Act of 1991. H.R. 3834 requires the development and periodic update of a strategic plan for the federal government Networking and Information Technology Research and Development (NITRD) program and codifies work currently conducted by the National Coordination Office (NCO) of the NITRD program. The bill requires the NCO Director to convene a university/industry task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems. Additionally, the bill requires the NCO Director to convene an interagency working group to examine issues around cloud computing services.

III. Background and Need for the Legislation

Advances in networking and information technology (NIT) continue to transform the world in which we live. We increasingly rely on the systems, tools, and services of this ever-growing and ever-changing domain. It is not only as a matter of convenience in our daily lives, but critical to our future economic prosperity, health, and security.

Federal support for research and development (R&D) in NIT originally stemmed from an interest in and the challenge of developing computers capable of addressing complex problems, primarily those focused on national security and global competition. Today, NIT encompasses a broad array of technologies from smart phones to digital libraries and cloud computing. Having changed the way we listen to music, drive our cars, and communicate with each other, this ever-growing field has led to the creation of many of the technologies and systems we rely on daily.

Additionally, NIT R&D provides a greater understanding of how to protect essential systems and networks, systems and networks that support fundamental sectors of our economy, from emergency communications and power grids to air-traffic control networks and national defense systems in an effort to support a more stable and secure Nation. NIT R&D works to prevent or minimize disruptions to critical information infrastructure, to protect public and private services and to detect and respond to threats while mitigating the severity of and assisting in the recovery from those threats.

The NITRD program is the main Federal R&D investment portfolio in networking, computing, software, cyber security, and related information technologies. NITRD coordinates this unclassified

R&D across 14 contributing federal agencies. A number of additional agencies do not contribute funding, but also participate in NITRD planning activities.

The NITRD program has played a role in several important technological advances including the computational decoding of the human genome; modeling and simulation of complex physical systems (aircraft, automobiles, power grids, and pharmaceuticals); unmanned aerial vehicles, search-and-rescue robots; and computer-based education and training.

The Subcommittee on NITRD of the National Science and Technology Council (NSTC) is the internal deliberative organization for NITRD policy, program, and budget guidance. The NITRD Subcommittee includes representatives from each participating agency, as well as the Office of Management and Budget (OMB). The Subcommittee coordinates the planning, budgeting, implementation, and reviews of NIT R&D across the NITRD member agencies to help assure continued U.S. leadership, satisfy the needs of the federal government for advanced IT capabilities, and accelerate development and deployment of new technologies.[1]

NITRD research activities are organized in eight Program Component Areas (PCAs). The PCAs also align the NITRD program budget categories. The eight PCAs include: Cyber Security Information Assurance (CSIA); Human Computer Interaction and Information Management (HCI & IM); High Confidence Software and Systems (HCSS); High End Computing Infrastructure and Applications (HEC I&A); High End Computing Research and Development (HEC R&D); Large Scale Networking (LSN); Software Design and Productivity (SDP); and Social, Economic, and Workforce Implications of IT and IT Workforce Development (SEW).[2] However, NITRD research areas and activities shift regularly as the NIT field creates and develops new R&D challenges.

The NITRD National Coordination Office (NCO) provides staff support for the NITRD program. The NCO provides program and financial management services, technical and subject matter expertise in facilitation, strategic planning, technical writing, networking and information technology services, and administrative staff support for the NITRD Subcommittee and other NITRD subgroups. The National Science Foundation (NSF) serves as the host agency for the NCO.[3]

Congress originally authorized the Networking and Information Technology Research and Development (NITRD) program in the High-Performance Computing Act of 1991 (P.L. 102–194), after recognizing that a number of federal agencies had ongoing high-performance computing programs without a coordinating body. The Act established that coordinating body to improve interagency coordination, cooperation, and planning among those agencies with high-performance computing programs. In addition, it authorized a multi-agency research effort, called the High-Performance Computing and Communications program, to accelerate progress in the advancement of computing and networking technologies and to

[1] About the Subcommittee on Networking and Information Technology Research and Development (NITRD Subcommittee), *http://www/nitrd.gov/subcommittee/program.aspx.*

[2] NITRD Program PCA Definitions, *http://www.nitrd.gov/subcommittee/pca-definitions.aspx.*

[3] About the Subcommittee on Networking and Information Technology Research and Development (NITRD Subcommittee), *http://www.nitrd.gov/subcommittee/program.aspx.*

support leading edge computational research in a range of science and engineering fields. The statute established a set of mechanisms and procedures to provide for the interagency planning, coordination, and budgeting of the research and development activities carried out under the program. The Act has since been amended through the Next Generation Internet Research Act of 1998 and the America COMPETES Act of 2007.

In December 2010, the President's Council of Advisors on Science and Technology (PCAST) completed a legislatively required report on NITRD. The report, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology,* found that "NITRD is well coordinated and that the U.S. computing research community, coupled with a vibrant Networking and Information Technology (NIT) industry, has made seminal discoveries and advanced new technologies that are helping meet many societal challenges."[4]

The 2010 report made several assessments about the role of the NIT field in answering the Nation's challenges and priorities:

- Advances in NIT are a key driver of economic competitiveness. They create new markets and increase productivity.
- Advances in NIT are crucial to achieving our major national and global priorities in energy and transportation, education and life-long learning, healthcare, and national and homeland security.
- Advances in NIT accelerate the pace of discovery in nearly all other fields.
- Advances in NIT are essential to achieving the goals of open government.[5]

Stressing the need that federal investments be in NIT basic research, since the private sector is heavily involved in the development side, the report suggests that an investment of at least $1 billion annually will be required for new, potentially transformative research. The report also recognizes that in the current economic uncertainty, repurposing and reprioritization of funding will be necessary, but does not rule out new funding and indicates a lower level of investment "could seriously jeopardize America's national security and economic competitiveness."[6]

The PCAST report includes recommendations for increased investments in long-term, multi-agency research initiatives in health, energy, transportation, and cybersecurity. It emphasizes, "Where fundamental NIT advances are needed to support these initiatives, mission agencies should invest in fundamental research in NIT, either alone or in collaboration with NSF, and should not limit their programs to application-specific research."[7]

The report also calls for exercising leadership to bring about changes in K–12 STEM education; enhancing the effectiveness of government coordination of NIT research and development; and redefining NITRD budget categories to separate NIT infrastructure for R&D in other fields from NIT R&D.

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[4] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology,* p. v.

[5] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology,* p. vii.

[6] Ibid, p. x.

[7] Ibid, p. xiii.

In February 2011, NITRD released its Supplement to the President's Budget request. The Supplement is a summary of the NITRD research activities planned and coordinated for Fiscal Year 2012 (FY12) for each of the participating agencies. The NITRD request totals $3.9 billion for FY12, a 1.9 percent increase from FY10 expenditures, and reflects many spending priorities recommended in the PCAST report.

In February 2012, NITRD released its Supplement to the President's Budget request for FY13. The NITRD request totals $3.8 billion, a 1.8 percent increase from FY11 expenditures, and continues to reflect the spending priorities in the PCAST report.[8]

IV. Hearing Summary

In the 111th Congress, H.R. 2020, the *Networking and Information Technology Act of 2009,* was introduced and favorably reported by the Committee on Science and Technology in April 2009. The House passed the measure on May 12, 2009, by voice vote. The Senate did not act on this measure prior to the adjournment of the 111th Congress. H.R. 2020 was also made a part of the House-passed America COMPETES Reauthorization Act of 2010, but the language was removed by the Senate before enactment.

In the 112th Congress, the Subcommittee on Research and Science Education held a hearing on September 21, 2011, to review the networking and information technology research and development (NITRD) program to ensure U.S. leadership in networking and information technology and to receive input on legislative language for reauthorization of the program. The hearing examined the NITRD program's ability to address the most critical information technology research and development (R&D) issues; whether there are any significant research opportunities that the NITRD program is not pursuing; if the research community—both academia and industry—influence the research priorities under the NITRD program; the workforce outlook for the networking and information technology sector; and whether or not Federal investments in networking and information technology are important to the United States.

The Subcommittee heard from four witnesses: Dr. George Strawn, Director, National Coordination Office, Networking and Information Technology Research and Development (NITRD) Program; Dr. Edward Lazowska, Bill & Melinda Gates Chair in Computer Science & Engineering, University of Washington; Dr. Robert Sproull, Director of Oracle Labs, retired; and Dr. Robert Schnabel, Dean, School of Informatics, Indiana University.

V. Committee Consideration

On January 27, 2012, H.R. 3834, the *Advancing America's Networking and Information Technology Research and Development Act of 2012* was introduced by Rep. Ralph Hall, Rep. Eddie Bernice Johnson, Rep. Mo Brooks, Rep. Daniel Lipinski, Rep. Judy Biggert, and Rep. Ben Ray Luján and referred to the Committee on Science, Space, and Technology.

[8] The FY13 Budget Request was released on February 13, 2012, after the Full Committee mark-up of H.R. 3834, but prior to the filing of the Committee Report.

On February 7, 2012, the Committee on Science, Space, and Technology met in open markup session and adopted H.R. 3834, as amended, by voice vote. Further, the Committee ordered H.R. 3834 favorably reported to the House, as amended, by voice vote.

VI. Committee Votes

Clause 3(b) of rule XIII of the Rules of the House of Representatives requires the Committee to list the record votes on the motion to report legislation and amendments thereto. A motion to order H.R. 3834 favorably reported to the House, as amended, was agreed to by voice vote.

During Full Committee consideration of H.R. 3834, the following amendments were considered:

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Full Committee Markup
February 7, 2012

AMENDMENT ROSTER

H. R. 3834, the "Advancing America's Networking and Information Technology Research and Development Act of 2012"

No.	Amendment	Summary	Results
1	Mr. Hall (399)	Makes technical changes to update language, ensures interagency working group examines cloud computing R&D needs, and lengthens the time for issuance of the Advisory Committee report from every 2 years to every 3 years.	Agreed to by Voice vote.

VII. Summary of Major Provisions of the Bill

H.R. 3834 requires the development and periodic update of a strategic plan for the NITRD program. The strategic plan shall specify near-term and long-term objectives of the program and the timeframe and metrics for achieving those objectives. The bill also authorizes NITRD agencies to support large-scale, long-term, interdisciplinary research in areas of national importance.

The bill requires the NCO Director to convene a task force, with representatives from universities, industries, and federal laboratories, to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems.

Additionally, the bill requires the NCO Director to convene an interagency working group to examine the research and development needed to enhance cloud computing environments; increase the trustworthiness of cloud applications and infrastructure; and enhance the foundations of cloud architectures, programming models, and interoperability. The working group is also required to examine the potential use of cloud computing for federally-funded science and engineering research.

Finally, H.R. 3834 codifies the existing NCO; delineates the office's responsibilities; mandates annual operating budgets; specifies the source of funding for the office (consistent with current practice); and stresses the role of the NCO in developing the strategic plan and in public outreach and communication with outside communities of interest.

VIII. Committee Views

PROGRAM PLANNING AND COORDINATION

The Committee believes that while the NITRD program has been largely successful in coordinating networking and information R&D activities across the Federal government, the continued success and strength of the program depends on the willingness of all relevant agencies to be fully engaged in the program. While the Department of Education is listed as one of the original agencies in the 1991 statute establishing the program, its involvement in NITRD has been limited. Given the PCAST report finding that "NIT is the dominant factor in America's science and technology employment, and that the gap between the demand for NIT talent and the supply of that talent is and will remain large,"[9] the Committee encourages the Department of Education to become an active participant.

STRATEGIC PLAN

The Committee expects the strategic plan to be a useful guide for setting program priorities, estimating time scales for reaching program objectives, and establishing metrics for assessing objectives. The strategic plan should include near-term and long-term objectives for the program and identify how the program will support interdisciplinary research and development, address long-term challenges of national importance, and emphasize innovative high-

[9] President's Council of Advisors on Science and Technology, Report to the President and Congress December 2010, *Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology,* p. 85.

risk projects. Furthermore, the Committee intends for NITRD agencies to periodically assess the NITRD program to ensure that it includes large-scale, long-term interdisciplinary research and development activities. The Committee intends for the development of the plan to be informed by the research needs of industry and academia and expects the NCO to actively solicit stakeholder input through meetings, requests for information, and other appropriate means.

RESEARCH IN AREAS OF NATIONAL IMPORTANCE

The Committee encourages the NITRD agencies to continue to identify a few focused research and development areas for which large-scale, multi-agency projects or activities would be appropriate and have the potential to provide significant contributions to national economic competitiveness. These areas may be more speculative and high-risk basic research opportunities that have the potential to offer substantial payoff and therefore justify the investment and risk.

The NITRD agencies are responsible for selecting the research areas to pursue, with advice from the NITRD Advisory Committee. The Committee recognizes that these research needs can change. The Committee intends that the areas selected have relevance to the mission responsibilities of more than one agency so that the level of resources provided will enable multiple projects and a variety of modes of research to be supported, including multiple investigator awards and interdisciplinary research centers. The Committee intends that the agencies treat planning and reporting on research areas under this section in a similar manner to the program component areas.

CYBER-PHYSICAL SYSTEMS

Computer-driven systems connected with the physical world—also called embedded, engineered, or cyber-physical systems (CPS)—are already in widespread use, but growing demand for new capabilities and applications continue to require significant technical advances. Such systems can be difficult and costly to design, build, test, and maintain. The Committee encourages continued investment in CPS.

BIG DATA

Information management, or big data, continues to be a challenge. The Committee encourages big data science and engineering research that would focus on advancing the management, analysis, visualization, and extraction of useful information from large, diverse, distributed, and heterogeneous data sets.

CLOUD COMPUTING

The Committee recognizes there is a growing need for researchers to be able to use, analyze, and store large data sets for scientific purposes. Cloud computing technologies may hold potential for providing broader analysis, collaboration, sharing, and storing of these ever-increasing data sets. The Committee expects the interagency working group established under section 5 to examine further cloud computing research needs, including cybersecurity

implications, as well as the potential for using the cloud for federally-funded research and the funding issues surrounding the use of the cloud for such research. These somewhat distinct tasks may be addressed separately as appropriate.

NITRD ADVISORY COMMITTEE

The NITRD Advisory Committee was originally established by P.L. 102–194 to review, assess, and make recommendations regarding the administration, priorities, and content of the program. This function is currently assigned by the President to PCAST. The Committee recognizes the benefits of having a straightforward pathway for providing advice to the President on national technology issues, scientific research priorities, and math and science education. Consequently, the Committee has specified that the NITRD Advisory Committee co-chairs must meet the same expertise criteria as the Advisory Committee membership and may also be members of PCAST. The Committee expects the co-chairs to come from different sectors of the NIT community. The Committee further expects the Advisory Committee to have an open line of communication with PCAST to ensure full sharing of concerns and questions in both directions.

The Committee expects the Advisory Committee to provide recommendations on the content of the strategic plan and to make recommendations for areas of research to be pursued by the NITRD agencies in accordance with section 3 of the bill. The Committee has changed the reporting requirements of the Advisory Committee from two years to three years and expects the NITRD NSTC Committee to stagger the strategic plan updates with the Advisory Committee reports such that the Advisory Committee recommendations inform the strategic plans in a timely manner. In addition, the Committee encourages the Advisory Committee to consult with subject matter experts in instances when sufficient expertise does not exist on the Advisory Committee and to convene public meetings to gather information from all communities of interest regarding NIT R&D in order to assist it in its assessments of the priorities and content of the program.

NIT WORKFORCE NEEDS

The Committee recognizes that the demand for new and existing NIT jobs in the United States will continue to grow and, as such, encourages efforts to increase the number of American NIT graduates at all degree levels.

IX. Committee Oversight Findings

Pursuant to clause 3(c)(1) of rule XIII of the Rules of the House of Representatives, the Committee held an oversight hearing and made findings that are reflected in the descriptive portions of this report.

X. Statement on General Performance Goals and Objectives

In accordance with clause 3(c)(4) of rule XIII of the Rules of the House of Representatives, the performance goals and objectives of the Committee are reflected in the descriptive portions of this report, including the goal to improve networking and information

technology research and development in the Federal, private, and public sectors.

XI. New Budget Authority, Entitlement Authority, and Tax Expenditures

In compliance with clause 3(c)(2) of rule XIII of the Rules of the House of Representatives, the Committee adopts as its own the estimate of new budget authority, entitlement authority, or tax expenditures or revenues contained in the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XII. Advisory on Earmarks

In compliance with clause 9(e), 9(f), and 9(g) of rule XXI, the Committee finds that H.R. 3834, the *Advancing America's Networking and Information Technology Research and Development Act of 2012,* contains no earmarks.

XIII. Committee Cost Estimate

The Committee adopts as its own the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XIV. Congressional Budget Office Cost Estimate

Pursuant to clause 3(c)(3) of rule XIII of the Rules of the House of Representatives, the following is the cost estimate provided by the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

March 14, 2012.

Hon. Ralph M. Hall,
Chairman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 3834, the Advancing America's Networking and Information Technology Research and Development Act of 2012.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Martin von Gnechten.

Sincerely,

Douglas W. Elmendorf.

Enclosure.

H.R. 3834—Advancing America's Networking and Information Technology Research and Development Act of 2012

H.R. 3834 would expand the activities of the Networking and Information Technology Research and Development (NITRD) program, which coordinates the federal government's advanced computing, networking, and software development goals. The bill would codify the activities of the program's existing national coordination office. Activities currently include creating a strategic plan, soliciting input from various stakeholders, and coordinating periodic reviews of agencies' information technology activities. H.R.

3834 also would establish an interagency working group to examine potential uses of cloud computing. Finally, the legislation would require that a task force of industry and academic experts develop certain information technology systems.

Based on information from the NITRD program office, CBO estimates that implementing H.R. 3834 would cost about $2 million over the 2012–2017 period, subject to the availability of appropriated funds. That amount includes the costs to support the task force and the interagency working group. Enacting H.R. 3834 would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply.

H.R. 3834 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would not affect the budgets of state, local, or tribal governments.

The CBO staff contact for this estimate is Martin von Gnechten. The estimate was approved by Theresa Gullo, Deputy Assistant Director for Budget Analysis.

XV. Federal Mandates Statement

The Committee adopts as its own the estimate of Federal mandates prepared by the Director of the Congressional Budget Office pursuant to section 423 of the Unfunded Mandates Reform Act.

XVI. Federal Advisory Committee Statement

No advisory committees within the meaning of section 5(b) of the Federal Advisory Committee Act were created by this legislation.

XVII. Applicability to Legislative Branch

The Committee finds that the legislation does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act.

XVIII. Section-by-Section Analysis

Sec. 1. Short title

This section sets for the short title as *Advancing America's Networking and Information Technology Research and Development Act of 2012.*

Sec. 2. Program planning and coordination

Requires the Networking and Information Technology Research and Development Program (NITRD) agencies to periodically assess the program contents and funding levels and to update the program accordingly.

Requires the NITRD agencies to develop and periodically update (at 3-year intervals) a strategic plan for the program. Describes the characteristics and content of the strategic plan, including how the program will foster technology transfer; encourage innovative, large-scale, and interdisciplinary research; address long-term challenges of national importance; emphasize innovative and high-risk projects; and strengthen NIT education and the workforce.

Encourages a more active role for the Office of Science and Technology Policy (OSTP) in ensuring that the strategic plan is devel-

oped and executed effectively and that the objectives of the program are met. Provides for the Director to establish goals and priorities for Federal NIT education.

Ensures that the advisory committee for NITRD retains the necessary breadth and depth of expertise in NIT fields, provides guidance on the committee's co-chairs, and allows that it may be linked to the President's Council of Advisors on Science and Technology.

Specifies that the annual report now required for the NITRD program explicitly describes how the program activities planned and underway relate to the objectives specified in the strategic plan.

Specifies that the annual report now required for the NITRD program include a description of research areas supported in accordance with section 3, including the same budget information as is required for the Program Component Areas.

Adds a definition for cyber-physical systems and amends existing definitions to incorporate networking and information technology terminology.

Sec. 3. Large-scale research in areas of national importance

Authorizes NITRD agencies to support large-scale, long-term, interdisciplinary research with the potential to make significant contributions to society and U.S. economic competitiveness and to encourage collaboration between at least two agencies as well as cost-sharing from non-federal sources. Characteristics of the projects supported include: collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories; leveraging of federal investments through collaboration with related State initiatives, when possible; and plans for fostering technology transfer.

Authorizes support of activities under this section through existing interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities.

Sec. 4. Cyber-physical systems

Requires the program to support research and development in cyber-physical systems; human-computer interactions, visualization, and big data.

Convenes a university/industry task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems with participants from universities, industry, and Federal laboratories.

Requires the task force to develop options for an entity to plan, manage and conduct cyber-physical systems research and development activities; propose a process for developing a research and development agenda for the entity which would include guidelines to ensure work focused on nationally significant challenges and which would require collaboration on the development of scientific and technological milestones; define roles and responsibilities for participants; propose guidelines for assigning intellectual property rights; and make recommendations for funding the entity from federal, state and non-government sources.

Requires a report to Congress on any findings and recommendations from the task force on models for collaborative research and development. The task force would terminate upon transmittal of

the report, and members of the task force would not be compensated for participation.

Sec. 5. Cloud computing services for research

Provides for an interagency working group to examine research and development needs for cloud computing and the potential use of the cloud for federally-funded research, including issues around funding mechanisms and policies for such research. The working group would consult with academia, industry, federal laboratories and other relevant organizations and institutions. Within one year the working group would be required to report to Congress on its findings and any recommendations for guidelines. The working group would terminate upon transmittal of the report.

Sec. 6. National Coordination Office

Formally codifies the existing National Coordination Office (NCO); delineates the office's roles and responsibilities; and specifies the source of funding for the office, consistent with current practice.

Sec. 7. Improving networking and information technology

Requires NSF to use existing programs to improve the teaching and learning of networking and information technology.

Sec. 8. Conforming and technical amendments

Strikes and replaces instances of out-dated "high-performance computing" language with "networking and information technology" and "high-end computing" as appropriate.

Provides for the Advisory Committee to report not less frequently than once every three years, versus two years.

XIX. Changes in Existing Law Made by the Bill, As Reported

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

HIGH-PERFORMANCE COMPUTING ACT OF 1991

* * * * * * *

SEC. 3. PURPOSES.

The purposes of this Act are to help ensure the continued leadership of the United States in [high-performance computing] *networking and information technology* and its applications by—

(1) expanding Federal support for research, development, and application of [high-performance computing] *networking and information technology* in order to—

(A) expand the number of researchers, educators, and students with training in [high-performance computing] *networking and information technology* and access to [high-performance computing] *networking and information technology* resources;

* * * * * * *

(F) provide for the application of [high-performance computing] *networking and information technology* to Grand Challenges;

(G) invest in basic research and education, and promote the inclusion of [high-performance computing] *networking and information technology* into educational institutions at all levels; and

(H) promote greater collaboration among government, Federal laboratories, industry, [high-performance] *high-end* computing centers, and universities;

(2) improving the interagency planning and coordination of Federal research and development on [high-performance computing and] *networking and information technology and* maximizing the effectiveness of the Federal Government's [high-performance computing network] *networking and information technology* research and development programs;

* * * * * * *

SEC. 4. DEFINITIONS.

As used in this Act, the term—

(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;

[(1)] *(2)* "Director" means the Director of the Office of Science and Technology Policy;

[(2)] *(3)* "Grand Challenge" means a fundamental problem in science or engineering, with broad economic and scientific impact, whose solution will require the application of [high-performance computing] *networking and information technology* resources and multidisciplinary teams of researchers;

[(3)] *(4)* "[high-performance computing] *networking and information technology*" means advanced computing, communications, and information technologies, including [supercomputer] *high-end computing* systems, high-capacity and high-speed networks, special purpose and experimental systems, applications and systems software, and the management of large data sets;

[(4)] *(5)* "Internet" means the international computer network of both Federal and non-Federal interoperable data networks;

[(5)] *(6)* "Network" means a computer [network referred to as the National Research and Education Network established under section 102;] *network, including advanced computer networks of Federal agencies and departments;*

[(6)] *(7)* "Program" means the [National High-Performance Computing Program] *networking and information technology research and development program* described in section 101; and

[(7)] *(8)* "Program Component Areas" means the major subject areas under which related individual projects and activities carried out under the Program are grouped.

* * * * * * *

TITLE I—[HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY* RESEARCH AND DEVELOPMENT

SEC. 101. NATIONAL [HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT* PROGRAM.

(a) [NATIONAL HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT* PROGRAM.—(1) The President shall implement a [National High-Performance Computing Program] *networking and information technology research and development program*, which shall—

(A) provide for long-term basic and applied research on [high-performance computing, including networking] *networking and information technology*;

(B) provide for research and development on, and demonstration of, technologies to advance the capacity and capabilities of [high-performance] *high-end* computing and networking systems, and related software;

(C) provide for sustained access by the research community throughout the United States to [high-performance computing and networking] *high-end computing, distributed, and networking* systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, including provision for technical support for users of such systems;

* * * * * * *

(G) provide for the technical support of, and research and development on, [high-performance] *high-end* computing systems and software required to address Grand Challenges;

(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, computer and network security, applied mathematics, library and information science, and computational science; [and]

(I) provide for improving the security of computing and networking systems, including Federal systems, including providing for research required to establish security standards and practices for these systems[.]*;*

(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.

(2) The Director shall—

(A) establish the goals and priorities for Federal [high-performance computing] *networking and information technology* research, [development, networking,] *development, education,* and other activities;

* * * * * * *

(C) provide for interagency coordination of Federal [high-performance computing] *networking and information tech-*

nology research, [development, networking,] *development,* and other activities undertaken pursuant to the Program;

* * * * * * *

(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;

[(E)] *(F)* develop and maintain a research, development, and deployment roadmap covering all States and regions for the provision of [high-performance] *high-end* computing and networking systems under paragraph (1)(C); and

[(F)] *(G)* consult with academic, State, industry, and other appropriate groups conducting research on and using [high-performance] *high-end* computing.

(3) The annual report submitted under paragraph (2)(D) shall—

(A) * * *

* * * * * * *

(C) describe the levels of Federal funding for the fiscal year during which such report [is submitted,] *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, for [each Program Component Area;] *each Program Component Area and research area supported in accordance with section 104;*

(D) describe the levels of Federal funding for each agency and department participating in the Program, and for [each Program Component Area,] *each Program Component Area and research area supported in accordance with section 104,* for the fiscal year during which such report [is submitted,] *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; [and]

(E) 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);

(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

[(E)] *(G)* include an analysis of the progress made toward achieving the goals and priorities established for the Program and the extent to which the Program incorporates the recommendations of the advisory committee established under subsection (b).

(b) ADVISORY COMMITTEE.—(1) The President shall establish an advisory committee on [high-performance computing] *networking and information technology*, consisting of geographically dispersed non-Federal members, including representatives of the research, education, and library communities, network and related software providers, and industry representatives in the Program Component Areas, who are specially qualified to provide the Director with advice and information on [high-performance computing] *networking and information technology*. *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.* The recommendations of the advisory committee shall be considered in reviewing and revising the Program. The advisory committee shall provide the Director with an independent assessment of—

(A) * * *

* * * * * * *

(D) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in [high-performance] *high-end* computing, networking technology, and related software; and

* * * * * * *

(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program. The advisory committee shall report not less frequently than once every [2] *3* fiscal years to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations. The first report shall be due within 1 year after the date of enactment of the America COMPETES Act.

* * * * * * *

(c) OFFICE OF MANAGEMENT AND BUDGET.—(1) Each Federal agency and department participating in the Program shall, as part of its annual request for appropriations to the Office of Management and Budget, submit a report to the Office of Management and Budget which—

(A) identifies each element of its [high-performance computing] *networking and information technology* activities which contributes directly to the Program Component Areas or benefits from the Program; and

* * * * * * *

(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.

(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.

[SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.

[(a) ESTABLISHMENT.—As part of the Program, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, and other agencies participating in the Program shall support the establishment of the National Research and Education Network, portions of which shall, to the extent technically feasible, be capable of transmitting data at one gigabit per second or greater by 1996. The Network shall provide for the linkage of research institutions and educational institutions, government, and industry in every State.

[(b) ACCESS.—Federal agencies and departments shall work with private network service providers, State and local agencies, libraries, educational institutions and organizations, and others, as appropriate, in order to ensure that the researchers, educators, and students have access, as appropriate, to the Network. The Network is to provide users with appropriate access to high-performance computing systems, electronic information resources, other research facilities, and libraries. The Network shall provide access, to the extent practicable, to electronic information resources maintained by libraries, research facilities, publishers, and affiliated organizations.

[(c) NETWORK CHARACTERISTICS.—The Network shall—

[(1) be developed and deployed with the computer, telecommunications, and information industries;

[(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

[(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

[(4) be designed, developed, and operated in a manner which promotes research and development leading to development of commercial data communications and telecommunications standards, whose development will encourage the establishment of privately operated high-speed commercial networks;

[(5) be designed and operated so as to ensure the continued application of laws that provide network and information resources security measures, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

[(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the Network and, where appropriate and technically feasible, for their usage of the Network;

[(7) ensure the interoperability of Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network;

[(8) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible,

and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware;

[(9) support research and development of networking software and hardware; and

[(10) serve as a test bed for further research and development of high-capacity and high-speed computing networks and demonstrate how advanced computers, high-capacity and high-speed computing networks, and data bases can improve the national information infrastructure.

[(d) DEFENSE ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Defense Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network.

[(e) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Network. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, access to commercial information services for users of the Network, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

[(f) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

[(g) REPORT TO CONGRESS.—Within one year after the date of enactment of this Act, the Director shall report to the Congress on—

[(1) effective mechanisms for providing operating funds for the maintenance and use of the Network, including user fees, industry support, and continued Federal investment;

[(2) the future operation and evolution of the Network;

[(3) how commercial information service providers could be charged for access to the Network, and how Network users could be charged for such commercial information services;

[(4) the technological feasibility of allowing commercial information service providers to use the Network and other federally funded research networks;

[(5) how to protect the copyrights of material distributed over the Network; and

[(6) appropriate policies to ensure the security of resources available on the Network and to protect the privacy of users of networks.]

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).

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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 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, including those authorized under section 7024(b)(2) of the America COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).

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 non-governmental 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. 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).

TITLE II—AGENCY ACTIVITIES

SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

(1) the National Science Foundation shall provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of [high-performance computing and advanced high-speed computer networking;] *networking and information research and development;*

(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;

[(2)] *(3)* to the extent that colleges, universities, and libraries cannot connect to the Network with the assistance of the private sector, the National Science Foundation shall have primary responsibility for assisting colleges, universities, and libraries to connect to the Network;

[(3)] *(4)* the National Science Foundation shall serve as the primary source of information on access to and use of the Network; and

[(4)] *(5)* the National Science Foundation shall upgrade the National Science Foundation funded network, assist regional networks to upgrade their capabilities, and provide other Federal departments and agencies the opportunity to connect to the National Science Foundation funded network.

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SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in [high-performance computing] *networking and information technology*, particularly in the field of computational science, with emphasis on aerospace sciences, earth and space sciences, and remote exploration and experimentation.

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SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall—

(1) conduct and support basic and applied research in [high-performance computing and networking] *networking and information technology* to support fundamental research in science and engineering disciplines related to energy applications; and

(2) provide computing and networking infrastructure support, including—

(A) the provision of [high-performance] *high-end* computing systems that are among the most advanced in the

world in terms of performance in solving scientific and engineering problems; and

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SEC. 204. DEPARTMENT OF COMMERCE ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

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

(A) conduct basic and applied measurement research needed to support various [high-performance computing systems and networks] *networking and information technology systems and capabilities*;

(B) develop and propose standards and guidelines, and develop measurement techniques and test methods, for the [interoperability of high-performance computing systems in networks and for common user interfaces to systems] *interoperability and usability of networking and information technology systems*; and

(C) be responsible for developing benchmark tests and standards for [high-performance computing] *networking and information technology* systems and software; and

* * * * * * *

(b) [HIGH-PERFORMANCE COMPUTING AND NETWORK] *NETWORKING AND INFORMATION TECHNOLOGY* SECURITY.—Pursuant to the Computer Security Act of 1987 (Public Law 100–235; 101 Stat. 1724), the National Institute of Standards and Technology shall be responsible for developing and proposing standards and guidelines needed to assure the cost-effective security and privacy of [sensitive] information in Federal computer systems.

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SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward the advancement and dissemination of [computational] *networking and information technology* techniques and software tools which form the core of ecosystem, atmospheric chemistry, and atmospheric dynamics models.

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SEC. 206. ROLE OF THE DEPARTMENT OF EDUCATION.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Education is authorized to conduct basic and applied research in [computational research] *networking and information technology research* with an emphasis on the coordination of activities with libraries, school facilities, and education research groups with respect to the advancement and dissemination of computational science and the development, evaluation and application of software capabilities.

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SEC. 207. MISCELLANEOUS PROVISIONS.

(a) * * *

(b) ACQUISITION OF PROTOTYPE AND EARLY PRODUCTION MODELS.—In accordance with Federal contracting law, Federal agencies and departments participating in the Program may acquire prototype or early production models of new [high-performance computing] *networking and information technology* systems and subsystems to stimulate hardware and software development. Items of computing equipment acquired under this subsection shall be considered research computers for purposes of applicable acquisition regulations.

SEC. 208. FOSTERING UNITED STATES COMPETITIVENESS IN [HIGH-PERFORMANCE COMPUTING] *NETWORKING AND INFORMATION TECHNOLOGY* AND RELATED ACTIVITIES.

(a) FINDINGS.—The Congress finds the following:

(1) [High-performance computing and associated] *Networking and information* technologies are critical to the United States economy.

(2) While the United States has led the development of [high-performance computing] *networking and information technologies*, United States industry is facing increasing global competition.

(3) Despite existing international agreements on fair competition and nondiscrimination in government procurements, there is increasing concern that such agreements are not being honored, that more aggressive enforcement of such agreements is needed, and that additional steps may be required to ensure fair global competition, particularly in high-technology fields such as [high-performance] *high-end* computing and associated technologies.

(4) It is appropriate for Federal agencies and departments to use the funds authorized for the Program in a manner which most effectively fosters the maintenance and development of United States leadership in [high-performance computers and associated] *networking and information* technologies in and for the benefit of the United States.

(5) It is appropriate for Federal agencies and departments to use the funds authorized for the Program in a manner, consistent with the Trade Agreements Act of 1979 (19 U.S.C. 2501 et seq.), which most effectively fosters reciprocal competitive procurement treatment by foreign governments for United States [high-performance computing and associated] *networking and information* technology products and suppliers.

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XX: PROCEEDINGS OF THE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY'S MARKUP OF H.R. 3834, ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2012; AND FOR OTHER PURPOSES

The Committee met, pursuant to call, at 10:06 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Ralph Hall [Chairman of the Committee] presiding.

TUESDAY, FEBRUARY 7, 2012

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
WASHINGTON, D.C.

Chairman HALL. Good morning. The Committee on Science, Space, and Technology will come to order.

Pursuant to notice, the Committee on Science, Space, and Technology meets today to consider the following measures: H.R. 3479, the Advancing America's Networking and Information Technology Research and Development Act of 2012, and H.R. 3199, to provide a comprehensive assessment of the scientific and technical research on the implications of the use of mid-level ethanol blends. So we will start with opening statements, and pursuant to Committee Rule 6–D and House Rule 11284, the Chair announces that he may postpone further proceedings today on any question of approving any measure or matter or adopting an amendment on which a recorded vote or the yeas or nays are ordered. However, it is hoped that we can dispense with votes as they are requested, and we expect a good turnout for today's markup.

It turns out we need to roll votes—if it turns out, we will attempt to take these votes at the end of the markup. Let us proceed with the markup beginning with opening statements, and I will begin.

I am pleased to call the markup this morning for consideration of H.R. 3834, Advancing America's Networking and Information Technology Research and Development Act of 2012, and H.R. 3199, a bill to provide a comprehensive assessment of the scientific and technical research on the implications of the use of mid-level ethanol blends.

With very few alterations, H.R. 3834 is essentially the same bill that we passed twice in the last Congress, only to see it languish in the Senate. I hope this time we have a little better luck in that.

I would like to point out that our efforts on this bill have been a true illustration of the bipartisan work for which this Committee and the Congress is capable. Mrs. Johnson, it is my understanding that our staffs have worked very well together to ensure this measure reflects good policy for our Nation's networking and information technology research and development program, and I want to thank you for your work on this bill.

Additionally, I would also like to thank Chairman Brooks, as Chairman of the Research and Science Education Subcommittee, for his leadership on the bill, and Mrs. Biggert for her many years of championing this issue.

The NITRD program is a product of the High Performance Computing Act of 1991 and represents the Federal Government's main R&D investment portfolio for unclassified networking, computing, software, cybersecurity, and related information technologies. It serves as the mechanism for interagency coordination of this R&D.

The bill before us today simply updates the under-going High Performance Computing statute that has been in place for 20 years and codifies some of the work the NITRD National Coordination Office already undertakes. Incidentally, the NITRD program is celebrating this 20-year milestone next week, and we applaud them for that success.

Networking and information technology includes a broad range of technologies from smart phones to cloud computing. NIT innovations stem from numerous disciplines and have led to advances in search-and-rescue robots, unmanned aerial vehicles, digital libraries, devices for assisted living, and computer-based education and training. R&D in this field seeks to minimize and prevent disruptions to critical infrastructures like power grids and emergency communication systems.

Another key emphasis of the NITRD program is cybersecurity. Mrs. Johnson and I both believe this is a critically important aspect of this program. I am pleased that this will be the second cybersecurity-related legislation this Committee is reporting.

Most importantly, networking and information technology supports and boosts U.S. competitiveness, enhances national security, and helps strengthen the economy through the creation of NIT jobs. The bill helps address that.

The other bill we will be marking up today is H.R. 3199, introduced by Vice Chairman Sensenbrenner. This bipartisan legislation would prevent damage to the vehicles and engines owned by hundreds of millions of Americans by requiring a more vigorous assessment of the state of the science on mid-level ethanol blends. Specifically, the bill requires the EPA to contract with the National Academies to undertake a thorough review of current science to ensure that any EPA action to increase ethanol in gasoline will not result in widespread misfueling or engine damage.

I appreciate Mr. Sensenbrenner's work on this legislation, including his outreach that showed grave warranty concerns among all major automobile, boat and engine manufacturers. This is a good bill that does not oppose biofuels, but simply makes certain that we get the science right before moving ahead on this important decision. I hope it will share the same broad bipartisan support as H.R. 3834.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF CHAIRMAN RALPH M. HALL

I am pleased to call the markup this morning for consideration of H.R. 3834, Advancing America's Networking and Information Technology Research and Development Act of 2012, and H.R. 3199, a bill to provide a comprehensive assessment of the scientific and technical research on the implications of the use of mid-level ethanol blends.

With very few alterations, H.R. 3834 is essentially the same bill that we passed twice in the last Congress, only to see it languish in the Senate. Hopefully, the third time will be the charm.

I would like to point out that our efforts on this bill have been a true illustration of the bipartisan work for which this Committee and this Congress is capable. Mrs. Johnson, it is my understanding that our staffs have worked well together to ensure this measure reflects good policy for our nation's networking and information technology research and development (R&D) program, and I want to thank you for your work on this bill.

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Networking and information technology (NIT) includes a broad range of technologies from smart phones to cloud computing. NIT innovations stem from numerous disciplines and have led to advances in search-and-rescue robots; unmanned aerial vehicles; digital libraries; devices for assisted living; and computer-based education and training. R&D in this field seeks to minimize and prevent disruptions to critical infrastructures like power grids and emergency communication systems.

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I hope it will share the same broad bipartisan support as H.R. 3834.

Chairman HALL. I now recognize Mrs. Johnson for five minutes to present her opening remarks. Mrs. Johnson.

Ms. JOHNSON. Thank you very much, Chairman Hall, and thank you for holding the markup today.

As noted, today we are marking up two bills: H.R. 3834, a good bill which is the product of a bipartisan negotiation, and H.R. 3199, which, unfortunately, is neither of those things.

H.R. 3834, the Advancing American's Networking and Information Technology R&D Act, is an important bill. It continues to strengthen and build upon the interagency initiative launched 20 years ago with the High Performance Computing Act of 1991. H.R. 3834 is an updated version of the bill our Committee passed in 2009 that appropriately reflects changes to the networking and information technology landscape that have occurred since Congress last enacted amendments to the program in 2007.

Advances in NIT are a key driver of our economy, increasing productivity in existing industries and opening the door for the formation of new ones. Small businesses use NIT to connect to a wider consumer base, allowing them to grow. Internet companies such as Google and Facebook are now worth billions of dollars and show how quickly NIT R&D can translate into real-world products. The wireless devices we all carry have changed our lives in profound ways.

NIT will improve health care by lowering costs and creating better treatment options through the use of electronic health records, advanced surgical tools, and improved medical research. NIT protects our brave men and women in the military by improving intelligence gathering and sharing as well as making unmanned aerial missions possible. NIT is truly pervasive in our society.

H.R. 3834 ensures that the Federal Government develops a coherent vision and strategy for federal investments in NIT R&D, including all of the applications made possible by NIT. The bill also contains provisions that would help facilitate and strengthen public-private partnerships for the benefit of our economy, national security; and overall quality of life. I urge my colleagues to support this bill.

Mr. Chairman, it has been my hope that this second session of Congress would begin with a constructive markup, of bipartisan and non-controversial legislation by our Committee that could be enacted into law. The productive development of 3834 provides an example that we would do well to follow in the remaining months of this Congress.

Unfortunately, the second bill we will consider today at today's markup provides us with nothing more than political theater. H.R. 3199 is a wolf in sheep's clothing. What looks to be an innocent attempt to provide a scientific assessment on mid-level blends of ethanol is nothing more than an effort to obstruct EPA from finishing their activities related to an existing Clean Air Act regulatory process already underway. Nothing about delaying EPA's regulatory authority is non-controversial. This attack on the EPA is not just an attack on the EPA's regulatory process, it is also an attack on increasing our supply of clean domestic energy. This country cannot continue to rely solely on fossil fuels for our energy needs. We must work to develop new transportation fuels like ethanol, renewable diesel and other clean fuels that have not yet been invented. We have to develop all the energy sources we have if we want to have a secure energy future.

I am disappointed that we are not considering—that we are considering this bill today. I think this bill is less about ethanol and more about attacking the EPA. This bill has no chance of going anywhere in the Senate. It has no chance of being signed by the President. So all we are doing today is engaging in political theater at the expense of the EPA and at the expense of our clean energy future. Such political theater is not the best use of this Committee's time, and I hope that this will be the last such bill we consider.

Thank you, Mr. Chairman. I yield back.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF RANKING MEMBER EDDIE BERNICE JOHNSON

Thank you Chairman Hall, and thank you for holding this markup today. As noted, today we are marking up two bills: H.R. 3834, a good bill which is the product of bipartisan negotiation, and H.R. 3199, which, unfortunately, is neither of those things.

H.R. 3834, the Advancing American's Networking and Information Technology R&D Act is an important bill. It continues to strengthen and build upon the interagency initiative launched 20 years ago with the High Performance Computing Act of 1991.

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H.R. 3834 ensures that the federal government develops a coherent vision and strategy for federal investments in NIT R&D, including all of the applications made possible by NIT. The bill also contains provisions that would help facilitate and strengthen public-private partnerships for the benefit of our economy, national security, and overall quality of life.

I am pleased with a new provision in H.R. 3834 that requires federal agencies to come together to examine the R&D needed to make cloud computing a viable, secure, and efficient tool for science and engineering research and for many sectors of our economy. It is important that this Committee continue to be a leader in this emerging area.

Finally, I want to thank the Chairman for preserving an important amendment offered by Ms. Woolsey in 2009 to ensure that the NITRD program strengthens its role in NIT education and diversity. According to the most recent data available, the number of American students pursuing degrees in computer science continues to fall, with the percentages of female and black students pursuing those degrees falling even further.

In the meantime, IT companies are coming to Congress and telling us that they can't find enough skilled workers, and computer science professors are telling us their students are snatched up into good jobs the moment they graduate. The STEM education problem in this country is much broader than just computer science. But given the importance of IT to every sector of our economy, we cannot afford to leave computer science out of the conversations around STEM at any level.

The private sector spends much more overall in NIT R&D than the federal agencies do. But industry research and innovation is built on the foundation of R&D supported by the agencies and largely carried out in our universities and federal laboratories. And industry hires the students trained in our universities under federal research grants. The NITRD program plays a central role in this ecosystem and this bill continues to strengthen the NITRD program and ensure that the federal agencies can respond quickly to emerging R&D and education needs as the industry continues to grow and evolve. I urge my colleagues to support H.R. 3834.

Mr. Chairman, it had been my hope that this second session of Congress would begin with a constructive markup of bipartisan and non-controversial legislation by our Committee that could be enacted into law.

The productive development of H.R. 3834 provides an example that we would do well to follow in the remaining months of this Congress. Unfortunately, the second bill we will consider at today's markup provides us with nothing more than political theater.

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This attack on the EPA is not just an attack on the EPA's regulatory process, it is also an attack on increasing our supply of clean domestic energy. This country cannot continue to rely solely on fossil fuels for our energy needs.

Chairman HALL. The gentlelady yields back, and I thank her for it.

Without objection, all Members' opening statements will be placed in the record at this time.

Chairman HALL. We will now consider the bill H.R. 3834, the Advancing America's Networking and Information Technology Research and Development Act of 2012.

At this time, does anyone else wish to comment on this bill? You will have time to comment on the bill that Mrs. Johnson is not in love with.

Without objection I ask unanimous consent that the bill is considered as read and open to amendment at any point and that Members proceed with amendments in the order listed on the roster, and that is so ordered.

[H.R. 3834 appears in the Appendix:]

Chairman HALL. Okay. The bill is open for amendment. The first amendment on the roster is a Manager's Amendment that I am offering. The clerk will report the amendment.

The CLERK. Amendment number 399, amendment to H.R. 3839, offered by Mr. Hall of Texas.

[The amendment appears in the Appendix:]

Chairman HALL. I ask unanimous consent to dispense with the reading. Without objection, it is so ordered.

I recognize myself for five minutes to explain my amendment.

The Manager's Amendment is mostly a perfecting amendment. The Ranking Member and I both attest that as times change, so does the vocabulary. Apparently the same is true for the computing world. The amendment simply updates the language in the underlying statute to better reflect today's terminology.

In addition, the one new section in the bill calls for an interagency working group to look at funding issues surrounding the cloud computing services for research. Use of the cloud holds great potential for researchers, but we recognize that there is still R&D areas that need improvement. So we are asking the interagency group to examine those as well as in this amendment.

Lastly, the amendment moves the statutory reporting requirement for the advisory committee from two years to three years so as to better align in with the three-year requirement for the bill's strategic plan and so no one can better inform—one can better inform the other.

I believe these changes make for a stronger bill, and I thank Ms. Johnson for working with me on these improvements.

I ask unanimous consent to dispense with the reading. Excuse me.

Is there further discussion on the amendment?

Ms. JOHNSON. Mr. Chairman.

Chairman HALL. Ms. Johnson, you are recognized.

Ms. JOHNSON. Thank you very much, Chairman Hall, and majority Committee staff for working with me and my staff to continue to refine this bill through the Manager's Amendment.

While it does consist primarily of technical and conforming amendments, there are also a few small substantive changes in the

amendment that were recommended by the agency and program officials, and I am happy the short delay in this markup from its original date last week allowed us to take all of those recommendations into consideration.

I also want to take this opportunity to commend the Chairman for including in this bill a new provision on cloud computing R&D. This is an important emerging issue both for scientific research and for many important sectors of our economy, and I am pleased that our Committee is continuing to assert a leadership role in this area.

I urge my colleagues to support this very good amendment, and with that, I yield back.

Chairman HALL. The gentlelady yields back.

Is there further discussion? Hearing no further discussion, a vote occurs on the amendment number 399 offered by the chairman. All in favor, say aye. Those opposed, say no. The ayes have it and the amendment is agreed to.

Are there any other amendments? Hearing no further amendments, the question now is on House Bill 3834, the Advancing America's Networking and Information Technology Research and Development Act of 2012 as amended. All those in favor will say aye. All those opposed, say no. In the opinion of the Chair, the ayes have it. The clerk will call the roll—the clerk will not call the roll. I will now———

Ms. JOHNSON. Mr. Chairman.

Chairman HALL. I now recognize Mrs. Johnson to offer a motion.

Ms. JOHNSON. Thank you, Mr. Chairman. I move that the Committee favorably report H.R. 3834 as amended to the House with the recommendation that the bill do pass. Furthermore, I move that staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the chairman take all necessary steps to bring the bill before the House for consideration. Thank you. Yield back.

Chairman HALL. The gentlelady yields back.

All right. The question is the motion to report the bill. Those in favor will say aye. Those opposed, say no. The ayes have it and the resolution is favorably reported.

Without objection, the motion to reconsider is laid upon the table. Members may have two subsequent calendar days in which to submit supplemental minority or additional views on the measure. I move pursuant to clause 1 of Rule 22 of the Rules of the House of Representatives that the Committee authorizes the chairman to offer such motions as may be necessary in the House to adopt and pass H.R. 3834, the Advancing America's Networking and Information Technology Research and Development Act of 2012 as amended. Without objection, it is so ordered.

XXI. Appendix I:

H.R. 3199, Section-by-Section Analysis, Amendments, Amendment Roster

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
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112TH CONGRESS
2D SESSION

H. R. 3834

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

JANUARY 27, 2012

Mr. HALL (for himself, Ms. EDDIE BERNICE JOHNSON of Texas, Mr. BROOKS, Mr. LIPINSKI, Mrs. BIGGERT, and Mr. LUJÁN) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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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 "Advancing America's Networking and Information Technology Research and Development Act of 2012".

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

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

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

8 "(1) periodically assess the contents and fund-
9 ing levels of the Program Component Areas and re-
10 structure the Program when warranted, taking into
11 consideration any relevant recommendations of the
12 advisory committee established under subsection (b);
13 and

14 "(2) ensure that the Program includes large-
15 scale, long-term, interdisciplinary research and de-
16 velopment activities, including activities described in
17 section 104.".

18 (b) DEVELOPMENT OF STRATEGIC PLAN.—Section
19 101 of such Act (15 U.S.C. 5511) is amended further by
20 adding after subsection (d), as added by subsection (a)
21 of this Act, the following new subsection:

22 "(e) STRATEGIC PLAN.—

23 "(1) IN GENERAL.—The agencies identified in
24 subsection (a)(3)(B), working through the National
25 Science and Technology Council and with the assist-
26 ance of the National Coordination Office described

1 under section 102, shall develop, within 12 months
2 after the date of enactment of the Advancing Amer-
3 ica's Networking and Information Technology Re-
4 search and Development Act of 2012, and update
5 every 3 years thereafter, a 5-year strategic plan to
6 guide the activities described under subsection
7 (a)(1).
8 "(2) CONTENTS.—The strategic plan shall
9 specify near-term and long-term objectives for the
10 Program, the anticipated time frame for achieving
11 the near-term objectives, the metrics to be used for
12 assessing progress toward the objectives, and how
13 the Program will—
14 "(A) foster the transfer of research and
15 development results into new technologies and
16 applications for the benefit of society, including
17 through cooperation and collaborations with
18 networking and information technology re-
19 search, development, and technology transition
20 initiatives supported by the States;
21 "(B) encourage and support mechanisms
22 for interdisciplinary research and development
23 in networking and information technology, in-
24 cluding through collaborations across agencies,
25 across Program Component Areas, with indus-

1 try, with Federal laboratories (as defined in
2 section 4 of the Stevenson-Wydler Technology
3 Innovation Act of 1980 (15 U.S.C. 3703)), and
4 with international organizations;
5 "(C) address long-term challenges of na-
6 tional importance for which solutions require
7 large-scale, long-term, interdisciplinary research
8 and development;
9 "(D) place emphasis on innovative and
10 high-risk projects having the potential for sub-
11 stantial societal returns on the research invest-
12 ment;
13 "(E) strengthen all levels of networking
14 and information technology education and
15 training programs to ensure an adequate, well-
16 trained workforce; and
17 "(F) attract more women and underrep-
18 resented minorities to pursue postsecondary de-
19 grees in networking and information tech-
20 nology.
21 "(3) NATIONAL RESEARCH INFRASTRUCTURE.—The
22 strategic plan developed in accordance with paragraph (1)
23 shall be accompanied by milestones and roadmaps for es-
24 tablishing and maintaining the national research infra-

1 structure required to support the Program, including the
2 roadmap required by subsection (a)(2)(E).
3 "(4) RECOMMENDATIONS.—The entities involved in
4 developing the strategic plan under paragraph (1) shall
5 take into consideration the recommendations—
6 "(A) of the advisory committee established
7 under subsection (b); and
8 "(B) of the stakeholders whose input was solic-
9 ited by the National Coordination Office, as required
10 under section 102(b)(3).
11 "(5) REPORT TO CONGRESS.—The Director of the
12 National Coordination Office shall transmit the strategic
13 plan required under paragraph (1) to the advisory com-
14 mittee, the Committee on Commerce, Science, and Trans-
15 portation of the Senate, and the Committee on Science,
16 Space, and Technology of the House of Representatives.".
17 (c) ADDITIONAL RESPONSIBILITIES OF DIRECTOR.—
18 Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is
19 amended—
20 (1) in subparagraph (A) by inserting "edu-
21 cation," after "networking,";
22 (2) by redesignating subparagraphs (E) and
23 (F) as subparagraphs (F) and (G), respectively; and
24 (3) by inserting after subparagraph (D) the fol-
25 lowing 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 by inserting after the first sentence 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.".

(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)—

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 (c);
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;

"(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 (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";

(4) 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

(5) 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 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.**

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

7 (1) in subparagraph (H), by striking "and"
8 after the semicolon;

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

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

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

19 "(K) provide for research and development
20 on human-computer interactions, visualization,
21 and big data.".

22 (b) TASK FORCE.—Title I of such Act (15 U.S.C.
23 5511) is amended further by adding after section 104, as
24 added by section 3 of this Act, 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 Advancing America's
4 Networking and Information Technology Research and
5 Development Act of 2012, the Director of the National
6 Coordination Office shall convene a task force to explore
7 mechanisms for carrying out collaborative research and
8 development activities for cyber-physical systems, includ-
9 ing the related technologies required to enable these sys-
10 tems, 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 guidelines to ensure an appropriate scope of
24 work focused on nationally significant challenges and
25 requiring collaboration and to ensure the develop-

1 ment of related scientific and technological mile-
2 stones;
3 "(3) define the roles and responsibilities for the
4 participants from institutions of higher education,
5 Federal laboratories, and industry in such entity;
6 "(4) propose guidelines for assigning intellec-
7 tual property rights and for the transfer of research
8 results to the private sector; and
9 "(5) make recommendations for how such enti-
10 ty could be funded from Federal, State, and non-
11 governmental sources.
12 "(c) COMPOSITION.—In establishing the task force
13 under subsection (a), the Director of the National Coordi-
14 nation Office—
15 "(1) shall appoint an equal number of individ-
16 uals with knowledge and expertise in cyber-physical
17 systems from—
18 "(A) institutions of higher education, in-
19 cluding minority-serving institutions and com-
20 munity colleges; and
21 "(B) industry; and
22 "(2) may appoint not more than 2 individuals
23 from Federal laboratories.
24 "(d) REPORT.—Not later than 1 year after the date
25 of enactment of the Advancing America's Networking and

1 Information Technology Research and Development Act of
2 2012, the Director of the National Coordination Office
3 shall transmit to the Committee on Commerce, Science,
4 and Transportation of the Senate and the Committee on
5 Science, Space, and Technology of the House of Rep-
6 resentatives a report describing the findings and rec-
7 ommendations of the task force.

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

11 "(f) COMPENSATION.—Members of the task force
12 shall serve without compensation.".

13 **SEC. 5. CLOUD COMPUTING SERVICES FOR RESEARCH.**

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

17 **"SEC. 106. CLOUD COMPUTING SERVICES FOR RESEARCH.**

18 "(a) INTERAGENCY WORKING GROUP.—Not later
19 than 180 days after the date of enactment of the Advanc-
20 ing America's Networking and Information Technology
21 Research and Development Act of 2012, the Director of
22 the National Coordination Office, working through the
23 National Science and Technology Council, shall convene
24 an interagency working group to—

1 "(1) examine issues around funding mecha-
2 nisms and policies for the use of cloud computing
3 services for federally-funded science and engineering
4 research; and
5 "(2) recommend guidelines, as needed, to agen-
6 cies on providing uniform guidance to organizations
7 and researchers on such funding mechanisms and
8 policies.
9 "(b) CONSULTATION.—In carrying out the tasks in
10 paragraphs (1) and (2) of subsection (a), the working
11 group shall consult with academia, industry, Federal lab-
12 oratories, and other relevant organizations and institu-
13 tions, as appropriate.
14 "(c) REPORT.—Not later than 1 year after the date
15 of enactment of the Advancing America's Networking and
16 Information Technology Research and Development Act of
17 2012, the Director of the National Coordination Office
18 shall transmit to the Committee on Science, Space, and
19 Technology of the House of Representatives and the Com-
20 mittee on Commerce, Science, and Transportation of the
21 Senate a report describing the findings and any rec-
22 ommendations of the working group.
23 "(d) TERMINATION.—The interagency working group
24 shall terminate upon transmittal of the report required
25 under subsection (c).".

1 **SEC. 6. NATIONAL COORDINATION OFFICE.**

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

4 **"SEC. 102. NATIONAL COORDINATION OFFICE.**

5 "(a) OFFICE.—The Director shall continue a Na-
6 tional Coordination Office with a Director and full-time
7 staff.

8 "(b) FUNCTIONS.—The National Coordination Office
9 shall—

10 "(1) provide technical and administrative sup-
11 port to—

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

16 "(B) the advisory committee established
17 under section 101(b);

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

25 "(3) solicit input and recommendations from a
26 wide range of stakeholders during the development

1 of each strategic plan required under section 101(e)
2 through the convening of at least 1 workshop with
3 invitees from academia, industry, Federal labora-
4 tories, and other relevant organizations and institu-
5 tions;
6 "(4) conduct public outreach, including the dis-
7 semination of findings and recommendations of the
8 advisory committee, as appropriate; and
9 "(5) promote access to and early application of
10 the technologies, innovations, and expertise derived
11 from Program activities to agency missions and sys-
12 tems across the Federal Government and to United
13 States industry.
14 "(c) SOURCE OF FUNDING.—
15 "(1) IN GENERAL.—The operation of the Na-
16 tional Coordination Office shall be supported by
17 funds from each agency participating in the Pro-
18 gram.
19 "(2) SPECIFICATIONS.—The portion of the total
20 budget of such Office that is provided by each agen-
21 cy for each fiscal year shall be in the same propor-
22 tion as each such agency's share of the total budget
23 for the Program for the previous fiscal year, as spec-
24 ified in the report required under section
25 101(a)(3).".

1 **SEC. 7. 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. 8. 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";

(3) in subparagraphs (A) and (F) of paragraph (1), by striking "high-performance computing" each place it appears and inserting "networking and information technology"; and

(4) 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"

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)—

(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 (4), by striking "high-performance computers and associated" and inserting "networking and information"; and

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

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SECTION-BY-SECTION: H.R. 3834, ADVANCING AMERICA'S NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT OF 2012

Section 1. Short Title.

This section sets for the short title as Advancing America's Networking and Information Technology Research and Development Act of 2012.

Sec. 2. Program Planning And Coordination.

Requires the Networking and Information Technology Research and Development Program (NITRD) agencies to periodically assess the program contents and funding levels and to update the program accordingly.

Requires the NITRD agencies to develop and periodically update (at three-year intervals) a strategic plan for the program. Describes the characteristics and content of the strategic plan, including how the program will foster technology transfer; encourage innovative, large-scale, and interdisciplinary research; address long-term challenges of national importance; emphasize innovative and high-risk projects; and strengthen NIT education and the workforce.

Encourages a more active role for the Office of Science and Technology Policy (OSTP) in ensuring that the strategic plan is developed and executed effectively and that the objectives of the program are met.

Ensures that the advisory committee for NITRD retains the necessary breadth and depth of expertise in NIT fields, provides guidance on the committee's co-chairs, and allows that it may be linked to the President's Council of Advisors on Science and Technology.

Specifies that the annual report now required for the NITRD program explicitly describes how the program activities planned and underway relate to the objectives specified in the strategic plan.

Specifies that the annual report now required for the NITRD program include a description of research areas supported in accordance with section 3, including the same budget information as is required for the Program Component Areas.

Adds a definition for cyber-physical systems and amends existing definitions to incorporate networking and information technology terminology.

Sec. 3. Large-Scale Research In Areas Of National Importance.

Authorizes NITRD agencies to support large-scale, long-term, interdisciplinary research with the potential to make significant contributions to society and U.S. economic competitiveness and to encourage collaboration between at least two agencies as well as cost-sharing from non-federal sources.

Characteristics of the projects supported include: collaborations among researchers in institutions of higher education and industry, and may involve nonprofit research institutions and Federal laboratories; leveraging of federal investments through collaboration with related State initiatives, when possible; and plans for fostering technology transfer.

Authorizes support of activities under this section through existing interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities.

Sec. 4. Cyber-Physical Systems.

Requires the program to support research and development in cyber-physical systems; human-computer interactions, visualization, and big data.

Convenes a university/industry task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems with participants from universities, industry, and Federal laboratories.

Requires the task force to develop options for an entity to plan, manage and conduct cyber-physical systems research and development activities; propose a process for developing a research and development agenda for the entity which would include guidelines to ensure work focused on nationally significant challenges and which would require collaboration on the development of scientific and technological milestones; define roles and responsibilities for participants; propose guidelines for assigning intellectual property rights; and make recommendations for funding the entity from federal, state and non-government sources.

Requires a report to Congress on any findings and recommendations from the task force on models for collaborative research and development. The task force

would terminate upon transmittal of the report, and members of the task force would not be compensated for participation.

Sec. 5. Cloud Computing Services for Research.

Provides for an interagency working group to examine issues around funding mechanisms and policies for the use of cloud computing in federally-funded science and engineering research and to recommend guidelines, as needed, to agencies on those policies. The working group would consult with academia, industry, federal laboratories and other relevant organizations and institutions. Within one year the working group would be required to report to Congress on its findings and any recommendations for guidelines. The working group would terminate upon transmittal of the report.

Sec. 6. National Coordination Office.

Formally codifies the existing National Coordination Office (NCO); delineates the office's roles and responsibilities; and specifies the source of funding for the office (consistent with current practice).

Sec. 7. Improving Networking and Information Technology

Requires NSF to use existing programs to improve the teaching and learning of networking and information technology.

Sec. 8. Conforming and Technical Amendments

Strikes and replaces instances of out-dated "high-performance computing" language with "networking and information technology" and "high-end computing" as appropriate.

AMENDMENT TO H.R. 3834

OFFERED BY MR. HALL

Page 6, line 9, strike "is amended by inserting" and insert the following: "is amended—(1) by inserting".

Page 6, line 13, strike the final period and insert "; and".

Page 6, after line 13, insert the following:

1 (2) in subparagraph (D), by striking "high-per-
2 formance" and inserting "high-end".

Page 8, after line 22, insert the following:

3 (3) in paragraph (3), as so redesignated, by
4 striking "high-performance computing" and insert-
5 ing "networking and information technology";

Page 8, line 23, strike "(3)" and insert "(4)".

Page 9, line 6, strike "(4)" and insert "(5)".

Page 9, line 11, strike "(5)" and insert "(6)".

Page 15, line 24, insert "examine" after "to".

Page 16, strike lines 1 through 8 and insert the following:

1 "(1) the research and development needed—
2 "(A) to enhance the effectiveness and effi-
3 ciency of cloud computing environments;
4 "(B) to increase the trustworthiness of
5 cloud applications and infrastructure; and
6 "(C) to enhance the foundations of cloud
7 architectures, programming models, and inter-
8 operability; and
9 "(2) the potential use of cloud computing for
10 federally-funded science and engineering research,
11 including issues around funding mechanisms and
12 policies for the use of cloud computing services for
13 such research.

Page 19, strike line 23 and all that follows through line 5 on page 24 and insert the following:

14 (2) in paragraph (1)—
15 (A) in the matter preceding subparagraph
16 (A), by striking "high-performance computing"
17 and inserting "networking and information
18 technology";
19 (B) in subparagraphs (A), (F), and (G), by
20 striking "high-performance computing" each
21 place it appears and inserting "networking and
22 information technology"; and

1 (C) in subparagraph (H), by striking
2 "high-performance" and inserting "high-end";
3 and
4 (3) in paragraph (2)—

Page 21, line 14, strike "and" after the semicolon.

Page 21, line 15, strike ", (C),".

Page 21, after line 18, insert the following:

5 (iv) in subparagraph (C), by striking
6 "high-performance computing and net-
7 working" and inserting "high-end com-
8 puting, distributed, and networking"; and

Page 22, strike lines 8 through 11 and insert the following:

9 (3) in subsection (b)—
10 (A) in paragraph (1), in the matter pre-
11 ceding subparagraph (A), by striking "high-per-
12 formance computing" both places it appears
13 and inserting "networking and information
14 technology"; and
15 (B) in paragraph (2), in the second sen-
16 tence, by striking "2" and inserting "3"; and

Page 22, strike line 24 and all that follows through line 11 on page 23 and insert the following:

1 (f) SECTION 203.—Section 203(a) of such Act (15
2 U.S.C. 5523(a)(1)) is amended—
3 (1) in paragraph (1), by striking "high-per-
4 formance computing and networking" and inserting
5 "networking and information technology"; and
6 (2) in paragraph (2)(A), by striking "high-per-
7 formance" and inserting "high-end".
8 (g) SECTION 204.—Section 204 of such Act (15
9 U.S.C. 5524) is amended—
10 (1) in subsection (a)(1)—
11 (A) in subparagraph (A), by striking
12 "high-performance computing systems and net-
13 works" and inserting "networking and informa-
14 tion technology systems and capabilities";
15 (B) in subparagraph (B), by striking
16 "interoperability of high-performance com-
17 puting systems in networks and for common
18 user interfaces to systems" and inserting
19 "interoperability and usability of networking
20 and information technology systems"; and
21 (C) in subparagraph (C), by striking
22 "high-performance computing" and inserting
23 "networking and information technology"; and
24 (2) in subsection (b)—

1 (A) in the heading, by striking "HIGH-
2 PERFORMANCE COMPUTING AND NETWORK"
3 and inserting "NETWORKING AND INFORMA-
4 TION TECHNOLOGY"; and
5 (B) by striking "sensitive".

Page 23, after line 18, insert the following:

6 (j) SECTION 207.—Section 207(b) of such Act (15
7 U.S.C. 5527(b)) is amended by striking "high-perform-
8 ance computing" and inserting "networking and informa-
9 tion technology".

Page 23, line 19, strike "(j)" and insert "(k)".

Page 24, after line 6, insert the following:

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

Page 24, line 7, strike "(C)" and insert "(D)".

Page 24, line 10, strike "(D)" and insert "(E)".

AMENDMENT IN THE NATURE OF A SUBSTITUTE OFFERED BY MS. ZOE LOFGREN OF CALIFORNIA

Strike all after the enacting clause and insert the following:

1 **SEC. 1. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATOR.—The term "Adminis-
4 trator" means the Administrator of the Environ-
5 mental Protection Agency.

6 (2) MID-LEVEL ETHANOL BLEND.—The term
7 "mid-level ethanol blend" means an ethanol-gasoline
8 blend containing 15 or 20 percent ethanol by volume
9 that is intended to be used in gasoline-powered
10 motor vehicles, motorcycles, heavy-duty gasoline en-
11 gines and vehicles, and nonroad engines, vehicles,
12 and equipment.

13 **SEC. 2. EVALUATION.**

14 (a) IN GENERAL.—The Administrator, acting
15 through the Assistant Administrator of the Office of Re-
16 search and Development at the Environmental Protection
17 Agency, shall—

18 (1) not later than 45 days after the date of en-
19 actment of this Act, enter into an agreement with

1 the National Academy of Sciences to provide, within
2 18 months after the date of the agreement, a com-
3 prehensive assessment of the scientific and technical
4 research on the implications of the use of mid-level
5 ethanol blends, comparing mid-level ethanol blends
6 to gasoline blends containing both 10 percent and
7 zero percent ethanol; and
8 (2) not later than 30 days after receiving the
9 results of the assessment under paragraph (1), sub-
10 mit a report to the Committee on Science, Space,
11 and Technology of the House of Representatives on
12 the findings of the assessment.
13 (b) CONTENTS.—The assessment performed under
14 subsection (a)(1) shall—
15 (1) evaluate research related to the short-term
16 and long-term environmental, safety, durability, and
17 performance effects of the introduction and use of
18 mid-level ethanol blends on vehicles, motorcycles,
19 heavy-duty gasoline engines and vehicles, and
20 nonroad engines, vehicles, and equipment. The eval-
21 uation shall include a review of all available scientific
22 information and research related to—
23 (A) tailpipe emissions;
24 (B) evaporative emissions;
25 (C) engine and fuel system durability;

1 (D) onboard diagnostics;
2 (E) emissions inventory and other mod-
3 eling effects;
4 (F) materials compatibility;
5 (G) operability and drivability;
6 (H) fuel efficiency;
7 (I) catalyst durability; and
8 (J) durability of storage tanks, piping, and
9 dispensers for retail;
10 (2) identify areas of research and testing nec-
11 essary to—
12 (A) ensure that existing motor fuel infra-
13 structure is not impacted by mid-level ethanol
14 blends, including potential impacts of mid-level
15 ethanol blends on metal, plastic, rubber, or any
16 other materials used in pipes or storage tanks;
17 and
18 (B) reduce the risk of misfueling by users
19 at various points in the distribution and supply
20 chain, including at bulk storage, retail storage,
21 and distribution configurations; and
22 (3) examine the best methods and practices to
23 prevent misfueling, including technical standards
24 and recommendations of the National Institute of
25 Standards and Technology, the American National

1 Standards Institute, and the International Organiza-
2 tion for Standardization regarding fuel pump label-
3 ing.

4 **SEC. 3. AUTHORIZATION OF APPROPRIATIONS.**

5 In order to carry out this Act, the Administrator shall
6 utilize up to $900,000 from the funds made available for
7 science and technology, including research and develop-
8 ment activities, at the Environmental Protection Agency.

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Full Committee Markup
February 7, 2012

AMENDMENT ROSTER

H. R. 3834, the "Advancing America's Networking and Information Technology Research and Development Act of 2012"

No.	Amendment	Summary	Results
1	Mr. Hall (399)	Makes technical changes to update language, ensures interagency working group examines cloud computing R&D needs, and lengthens the time for issuance of the Advisory Committee report from every 2 years to every 3 years.	Agreed to by Voice vote.

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