HIGH-PERFORMANCE COMPUTING ACT OF 1991

[P.L. 102–194]

[As Amended Through P.L. 117–286, Enacted December 27, 2022]

[Currency: This publication is a compilation of the text of Public Law 102–194. It was last amended by the public law listed in the As Amended Through note above and below at the bottom of each page of the pdf version and reflects current law through the date of the enactment of the public law listed at https://www.govinfo.gov/app/collection/comps/]

[Note: While this publication does not represent an official version of any Federal statute, substantial efforts have been made to ensure the accuracy of its contents. The official version of Federal law is found in the United States Statutes at Large and in the United States Code. The legal effect to be given to the Statutes at Large and the United States Code is established by statute (1 U.S.C. 112, 204).]

AN ACT To provide for a coordinated Federal program to ensure continued United States leadership in high-performance computing.

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

SECTION 1. [15 U.S.C. 5501 note] SHORT TITLE.

This Act may be cited as the "High-Performance Computing Act of 1991".

SEC. 2. [15 U.S.C. 5501] FINDINGS.

The Congress finds the following:

(1) Advances in computer science and technology are vital to the Nation's prosperity, national and economic security, industrial production, engineering, and scientific advancement.

(2) The United States currently leads the world in the development and use of networking and information technology, including high-performance computing, for national security, industrial productivity, science, and engineering, but that lead is being challenged by foreign competitors.

(3) Further research and development, expanded educational programs, improved computer research networks, and more effective technology transfer from government to industry are necessary for the United States to reap fully the benefits of networking and information technology, including high-performance computing.

(4) A high-capacity, flexible, high-speed national research and education computer network is needed to provide researchers and educators with access to computational and information resources, act as a test bed for further research and development for high-capacity and high-speed computer networks, and provide researchers the necessary vehicle for continued network technology improvement through research.

(5) Several Federal agencies have ongoing networking and information technology, including high-performance computing, programs, but improved long-term interagency coordination, cooperation, and planning would enhance the effectiveness of these programs.

(6) A 1991 report entitled "Grand Challenges: High-Performance Computing and Communications" by the Office of Science and Technology Policy, outlining a research and development strategy for high-performance computing, provides a framework for a multiagency high-performance computing program. Such a program would provide American researchers and educators with the computer and information resources they need, and demonstrate how advanced computers, high-capacity and high-speed networks, and electronic data bases can improve the national information infrastructure for use by all Americans.

(7) Additional research must be undertaken to lay the foundation for the development of new applications that can result in economic growth, improved health care, and improved educational opportunities.

(8) Research in new networking technologies holds the promise of easing the economic burdens of information access disproportionately borne by rural users of the Internet.

(9) Information security is an important part of computing, information, and communications systems and applications, and research into security architectures is a critical aspect of computing, information, and communications research programs.

SEC. 3. [15 U.S.C. 5502] PURPOSES.

The purposes of this Act are to help ensure the continued leadership of the United States in networking and information technology and its applications by—

(1) supporting Federal research, development, and application of networking and information technology in order to—

(A) expand the number of researchers, educators, and students with training in networking and information technology and access to networking and information technology resources;

(B) promote the further development of an information infrastructure of data bases, services, access mechanisms, and research facilities available for use through the Internet;

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

(D) accelerate the development of high-end computing systems and subsystems;

(E) provide for the application of networking and information technology to Grand Challenges;

(F) invest in basic research and education, and promote the inclusion of networking and information technology into educational institutions at all levels; and

(G) promote greater collaboration among government, Federal laboratories, industry, high-end computing centers, and universities;

(2) improving the interagency planning and coordination of Federal research and development on networking and information technology and maximizing the effectiveness of the Federal Government's networking and information technology research and development programs;

(3) promoting the more rapid development and wider distribution of networking management and development tools; and

(4) promoting the rapid adoption of open network standards.

SEC. 4. [15 U.S.C. 5503] 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 enable safe and effective, real-time performance in safety-critical and other applications;

(2) "Director" means the Director of the Office of Science and Technology Policy;

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

(4) "high-end computing" means the most advanced and capable computing systems, including their hardware, storage, networking and software, encompassing both massive computational capability and large-scale data analytics to solve computational problems of national importance that are beyond the capability of small- to medium-scale systems, including computing formerly known as high-performance computing;

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

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

(7) "participating agency" means an agency described in section 101(a)(3)(C);

(8) "Program" means the Networking and Information Technology Research and Development Program described in section 101; and

(9) "Program Component Areas" means the major subject areas under which related individual projects and activities carried out under the Program are grouped.

TITLE I—NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT

SEC. 101. [15 U.S.C. 5511] NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM.

(a) NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT.—(1) The President shall implement a Networking and Information Technology Research and Development Program, which shall—

(A) provide for long-term basic and applied research on networking and information technology;

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

(C) provide for sustained access by the research community throughout the United States to 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;

(D) provide for efforts to increase software security and reliability;

(E) provide for high-performance networks, including experimental testbed networks, to enable research and development on, and demonstration of, advanced applications enabled by such networks;

(F) provide for computational science and engineering research on mathematical modeling and algorithms for applications in all fields of science and engineering;

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

(H) provide support and guidance 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;

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

(J)[1] provide for improving the security, reliability, and resiliency of computing and networking systems used by institutions of higher education and other nonprofit research institutions for the processing, storage and transmission of sensitive federally funded research and associated data;

(K) 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-

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physical systems that are characterized by high reliability, safety, and security;

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

(M) provide for research and development on the enhancement of cybersecurity, including the human facets of cyber threats and secure cyber systems;

(N) provide for the understanding of the science, engineering, policy, and privacy protection related to networking and information technology;

(O) provide for the transition of high-end computing hardware, system software, development tools, and applications into development and operations; and

(P) foster public-private collaboration among government, industry research laboratories, academia, and nonprofit organizations to maximize research and development efforts and the benefits of networking and information technology, including high-end computing.

(2) The Director shall—

(A)[1] establish the goals and priorities for Federal networking and information technology research, development, education, and other activities;

(B) establish Program Component Areas that implement the goals established under subparagraph (A), and identify the Grand Challenges that the Program should address;

(C)[1] provide for interagency coordination of Federal networking and information technology research, development, education, and other activities undertaken pursuant to the Program—

(i) among the participating agencies; and

(ii) to the extent practicable, with other Federal agencies not described in paragraph (3)(C), other Federal and private research laboratories, industry, research entities, institutions of higher education, relevant nonprofit organizations, and international partners of the United States;

(D) submit to the Congress an annual report, along with the President's annual budget request, describing the implementation of the Program;

(E)[1] 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 plans under subsection (e) are developed and executed effectively and that the objectives of the Program are met; and

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

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

(A) provide a detailed description of the Program Component Areas, including a description of any changes in the definition of or activities under the Program Component Areas from the preceding report, and the reasons for such changes,

and a description of Grand Challenges addressed under the Program;

(B)[1] provide a detailed description of the nature and scope of research infrastructure designated as such under the Program;

(C) set forth the relevant programs and activities, for the fiscal year with respect to which the budget submission applies, of each Federal agency and department, including—

(i)[1] the Department of Justice;

(ii) the Department of Commerce;

(iii) the Department of Defense;

(iv) the Department of Education;

(v) the Department of Energy;

(vi) the Department of Health and Human Services;

(vii)[1] the Department of Homeland Security;

(viii)[1] the National Archives and Records Administration;

(ix) the Environmental Protection Agency;

(x) the National Aeronautics and Space Administration;

(xi) the National Science Foundation; and

(xii) such other agencies and departments as the President or the Director considers appropriate;

(D) describe the levels of Federal funding for the fiscal year during which such report is submitted, the levels for the previous fiscal year, and the levels proposed for the fiscal year with respect to which the budget submission applies, for each Program Component Area and research area supported in accordance with section 102;

(E)[1] describe the levels of Federal funding for each participating agency, and for each Program Component Area, for the fiscal year during which such report is submitted, the levels for the previous fiscal year, and the levels proposed for the fiscal year with respect to which the budget submission applies;

(F)[1] 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 plans required under subsection (e); and

(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 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 networking and information technology. Each chair of the advisory committee shall meet the qualifications of committee membership

and may be a member of the President's Council of Advisors on Science and Technology. 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) progress made in implementing the Program;

(B) the need to revise the Program;

(C) the balance between the components of the Program, including funding levels for the Program Component Areas;

(D) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in networking and information technology; and

(E) other issues identified by the Director.

(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 3 fiscal years to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations.

(3) Section 1013 of title 5, United States Code, shall not apply to the advisory committee established under this subsection.

(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 networking and information technology activities which contributes directly to the Program Component Areas or benefits from the Program; and

(B) states the portion of its request for appropriations that is allocated to each such element.

(2) The Office of Management and Budget shall review each such report in light of the goals, priorities, and agency and departmental responsibilities set forth in the annual report submitted under subsection (a)(2)(D), and shall include, in the President's annual budget estimate, a statement of the portion of each appropriate agency's or department's annual budget estimate relating to its activities undertaken pursuant to the Program.

(d) PERIODIC REVIEWS.—The heads of the participating agencies, working through the National Science and Technology Council and the Program, shall—

(1) periodically assess and update, as appropriate, the structure of the Program, including the Program Component Areas and associated contents, scope, and funding levels, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

(2) ensure that such agency's implementation of the Program includes foundational, large-scale, long-term, and interdisciplinary information technology research and development activities, including activities described in section 102.

(e) STRATEGIC PLANS.—

(1) IN GENERAL.—The heads of the participating agencies, working through the National Science and Technology Council and the Program, shall develop and implement strategic plans to guide—

(A) emerging activities of Federal networking and information technology research and development; and

(B) the activities described in subsection (a)(1).

(2) UPDATES.—The heads of the participating agencies shall update the strategic plans as appropriate.

(3) CONTENTS.—Each strategic plan shall—

(A) specify near-term and long-term objectives for the portions of the Program relevant to the strategic plan, the anticipated schedule for achieving the near-term and long-term objectives, and the metrics to be used for assessing progress toward the near-term and long-term objectives;

(B) specify how the near-term and long-term objectives complement research and development areas in which academia and the private sector are actively engaged;

(C) describe how the heads of the participating agencies will support mechanisms for foundational, large-scale, long-term, and interdisciplinary information technology research and development and for Grand Challenges, including through collaborations—

(i) across Federal agencies;

(ii) across Program Component Areas; and

(iii) with industry, Federal and private research laboratories, research entities, institutions of higher education, relevant nonprofit organizations, and international partners of the United States;

(D) describe how the heads of the participating agencies will foster the rapid transfer of research and development results into new technologies and applications in the national interest, including through cooperation and collaborations with networking and information technology research, development, and technology transition initiatives supported by the States; and

(E) describe how the portions of the Program relevant to the strategic plan will address long-term challenges for which solutions require foundational, large-scale, long-term, and interdisciplinary information technology research and development.

(4) PRIVATE SECTOR EFFORTS.—In developing, implementing, and updating strategic plans, the heads of the participating agencies, working through the National Science and Technology Council and the Program, shall coordinate with industry, academia, and other interested stakeholders to ensure, to the extent practicable, that the Federal networking and information technology research and development activities carried out under this section do not duplicate the efforts of the private sector.

(5) RECOMMENDATIONS.—In developing and updating strategic plans, the heads of the participating agencies shall solicit recommendations and advice from—

(A) the advisory committee under subsection (b);

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

(C) a wide range of stakeholders, including industry, academia, National Laboratories, and other relevant organizations and institutions.

(f) REPORTS.—The heads of the participating agencies, working through the National Science and Technology Council and the Program, shall submit 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—

(1) the strategic plans developed under subsection (e)(1); and

(2) each update under subsection (e)(2).

SEC. 102. [15 U.S.C. 5512] GRAND CHALLENGES IN AREAS OF NATIONAL IMPORTANCE.

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

(b) CHARACTERISTICS.—

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

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

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

(C) to the extent practicable, leverage Federal investments through collaboration with related State and private sector initiatives; and

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

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

TITLE II—AGENCY ACTIVITIES

SEC. 201. [15 U.S.C. 5521] NATIONAL SCIENCE FOUNDATION ACTIVITIES.

As part of the Program described in title I—

(1) the National Science Foundation shall provide high-end computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of networking and information technology; and

(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 individuals identified in sections 33 and 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a and 1885b).

SEC. 202. [15 U.S.C. 5522] NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in 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.

SEC. 203. [15 U.S.C. 5523] DEPARTMENT OF ENERGY ACTIVITIES.

As part of the Program described in title I, the Secretary of Energy shall—

(1) conduct and support basic and applied research in 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-end computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems; and

(B) support for advanced software and applications development for science and engineering disciplines related to energy applications.

SEC. 204. [15 U.S.C. 5524] 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 networking and information technology systems and capabilities;

(B) develop and propose standards and guidelines, and develop measurement techniques and test methods, for the

interoperability and usability of networking and information technology systems; and

(C) be responsible for developing benchmark tests and standards for networking and information technology systems and software; and

(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research in weather prediction and ocean sciences, particularly in development of new forecast models, in computational fluid dynamics, and in the incorporation of evolving computer architectures and networks into the systems that carry out agency missions.

(b) NETWORKING AND INFORMATION TECHNOLOGY SECURITY.—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 Federal agency information and information systems.

[Sections 205 and 206 repealed by subsections (n) and (o) of section 105 of Public Law 114–329.]

SEC. 207. [15 U.S.C. 5527] MISCELLANEOUS PROVISIONS.

(a) NONAPPLICABILITY.—Except to the extent the appropriate Federal agency or department head determines, the provisions of this Act shall not apply to—

(1) programs or activities regarding computer systems that process classified information; or

(2) computer systems the function, operation, or use of which are those delineated in section 3552(b)(6)(A)(i) of title 44, United States Code.

(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 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.