CHAPTER 81—HIGH-PERFORMANCE COMPUTING

§ 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.

(Pub. L. 102–194, § 2, Dec. 9, 1991, 105 Stat. 1594; Pub. L. 105–305, § 2(b), Oct. 28, 1998, 112 Stat. 2919; Pub. L. 114–329, title I, § 105(b), Jan. 6, 2017, 130 Stat. 2976.)

Editorial Notes

AMENDMENTS

2017—Par. (2). Pub. L. 114–329, § 105(b)(1), substituted ''networking and information technology, including high-performance computing,'' for ''high-performance computing''.

Par. (3). Pub. L. 114–329, § 105(b)(2), substituted ''networking and information technology, including high-performance computing'' for ''high-performance computing''.

Par. (5). Pub. L. 114–329, § 105(b)(1), substituted ''networking and information technology, including high-performance computing,'' for ''high-performance computing''.

1998—Par. (4). Pub. L. 105–305, § 2(b)(1), added par. (4) and struck out former par. (4) which read as follows: ''A high-capacity and high-speed national research and education computer network would provide researchers and educators with access to computer and information resources and act as a test bed for further research and development of high-capacity and high-speed computer networks.''

Pars. (7) to (9). Pub. L. 105–305, § 2(b)(2), added pars. (7) to (9).

Statutory Notes and Related Subsidiaries

SHORT TITLE OF 2017 AMENDMENT

Pub. L. 114–329, title I, § 105(a), Jan. 6, 2017, 130 Stat. 2976, provided that: ''This section [enacting section 5512 of this title, amending this section, sections 5502, 5503, 5511, 5521 to 5524, 5527, 7403, and 7431 of this title, and section 17912 of Title 42, The Public Health and Welfare, and repealing sections 5512, 5513, 5525, 5526, 5528, and 5543 of this title] may be cited as the 'Networking and Information Technology Research and Development Modernization Act of 2016'.''

SHORT TITLE OF 1998 AMENDMENT

Pub. L. 105–305, § 1, Oct. 28, 1998, 112 Stat. 2919, provided that: ''This Act [enacting section 5513 of this

title, amending this section and sections 5502, 5503, and 5511 of this title, and enacting provisions set out as notes under this section] may be cited as the 'Next Generation Internet Research Act of 1998'.''

SHORT TITLE

Pub. L. 102–194, §1, Dec. 9, 1991, 105 Stat. 1594, provided that: ''This Act [enacting this chapter] may be cited as the 'High-Performance Computing Act of 1991'.''

Pub. L. 108–423, §1, Nov. 30, 2004, 118 Stat. 2400, as amended by Pub. L. 115–246, title III, §304(b)(1)(A), formerly §304(a)(1)(A), Sept. 28, 2018, 132 Stat. 3145, renumbered §304(b)(1)(A) by Pub. L. 117–167, div. B, title I, §10104(a)(1), Aug. 9, 2022, 136 Stat. 1433, provided that: ''This Act [enacting subchapter III of this chapter, amending sections 205*l* of this title and 1862n–9 of Title 42, The Public Health and Welfare, and enacting provisions set out as a note under section 1862n–9 of Title 42] may be cited as the 'American Super Computing Leadership Act of 2017'.''

CONGRESSIONAL FINDINGS

Pub. L. 105–305, §2(a), Oct. 28, 1998, 112 Stat. 2919, provided that: ''The Congress finds that—

''(1) United States leadership in science and technology has been vital to the Nation's prosperity, national and economic security, and international competitiveness, and there is every reason to believe that maintaining this tradition will lead to long-term continuation of United States strategic advantages in information technology;

''(2) the United States investment in science and technology has yielded a scientific and engineering enterprise without peer, and that Federal investment in research is critical to the maintenance of United States leadership;

''(3) previous Federal investment in computer networking technology and related fields has resulted in the creation of new industries and new jobs in the United States;

''(4) the Internet is playing an increasingly important role in keeping citizens informed of the actions of their government; and

''(5) continued inter-agency cooperation is necessary to avoid wasteful duplication in Federal networking research and development programs.''

PURPOSES

Pub. L. 105–305, §3(a), Oct. 28, 1998, 112 Stat. 2920, provided that: ''The purposes of this Act [see Short Title of 1998 Amendment note above] are—

''(1) to authorize, through the High-Performance Computing Act of 1991 (15 U.S.C. 5501 et seq.), research programs related to—

''(A) high-end computing and computation;

''(B) human-centered systems;

''(C) high confidence systems; and

''(D) education, training, and human resources; and

''(2) to provide, through the High-Performance Computing Act of 1991 (15 U.S.C. 5501 et seq.), for the development and coordination of a comprehensive and integrated United States research program which will—

''(A) focus on the research and development of a coordinated set of technologies that seeks to create a network infrastructure that can support greater speed, robustness, and flexibility than is currently available and promote connectivity and interoperability among advanced computer networks of Federal agencies and departments;

''(B) focus on research in technology that may result in high-speed data access for users that is both economically viable and does not impose a geographic penalty; and

''(C) encourage researchers to pursue approaches to networking technology that lead to maximally flexible and extensible solutions wherever feasible.''

DEFINITIONS

Pub. L. 105–305, §7(a), Oct. 28, 1998, 112 Stat. 2924, provided that: ''For purposes of this Act [see Short Title of 1998 Amendment note above]—

''(1) GEOGRAPHIC PENALTY.—The term 'geographic penalty' means the imposition of costs on users of the Internet in rural or other locations, attributable to the distance of the user from network facilities, the low population density of the area in which the user is located, or other factors, that are disproportionately greater than the costs imposed on users in locations closer to such facilities or on users in locations with significantly greater population density.

''(2) INTERNET.—The term 'Internet' means the international computer network of both Federal and non-Federal interoperable packet switched data networks.''

Executive Documents

EX. ORD. NO. 13702. CREATING A NATIONAL STRATEGIC COMPUTING INITIATIVE

Ex. Ord. No. 13702, July 29, 2015, 80 F.R. 46177, provided:

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to maximize benefits of high-performance computing (HPC) research, development, and deployment, it is hereby ordered as follows:

SECTION 1. *Policy*. In order to maximize the benefits of HPC for economic competitiveness and scientific discovery, the United States Government must create a coordinated Federal strategy in HPC research, development, and deployment. Investment in HPC has contributed substantially to national economic prosperity and rapidly accelerated scientific discovery. Creating and deploying technology at the leading edge is vital to advancing my Administration's priorities and spurring innovation. Accordingly, this order establishes the National Strategic Computing Initiative (NSCI). The NSCI is a whole-of-government effort designed to create a cohesive, multi-agency strategic vision and Federal investment strategy, executed in collaboration with industry and academia, to maximize the benefits of HPC for the United States.

Over the past six decades, U.S. computing capabilities have been maintained through continuous research and the development and deployment of new computing systems with rapidly increasing performance on applications of major significance to government, industry, and academia. Maximizing the benefits of HPC in the coming decades will require an effective national response to increasing demands for computing power, emerging technological challenges and opportunities, and growing economic dependency on and competition with other nations. This national response will require a cohesive, strategic effort within the Federal Government and a close collaboration between the public and private sectors.

It is the policy of the United States to sustain and enhance its scientific, technological, and economic leadership position in HPC research, development, and deployment through a coordinated Federal strategy guided by four principles:

(1) The United States must deploy and apply new HPC technologies broadly for economic competitiveness and scientific discovery.

(2) The United States must foster public-private collaboration, relying on the respective strengths of government, industry, and academia to maximize the benefits of HPC.

(3) The United States must adopt a whole-of-government approach that draws upon the strengths of and seeks cooperation among all executive departments and agencies with significant expertise or equities in HPC while also collaborating with industry and academia.

(4) The United States must develop a comprehensive technical and scientific approach to transition HPC re-

search on hardware, system software, development tools, and applications efficiently into development and, ultimately, operations.

This order establishes the NSCI to implement this whole-of-government strategy, in collaboration with industry and academia, for HPC research, development, and deployment.

SEC. 2. *Objectives*. Executive departments, agencies, and offices (agencies) participating in the NSCI shall pursue five strategic objectives:

(1) Accelerating delivery of a capable exascale computing system that integrates hardware and software capability to deliver approximately 100 times the performance of current 10 petaflop systems across a range of applications representing government needs.

(2) Increasing coherence between the technology base used for modeling and simulation and that used for data analytic computing.

(3) Establishing, over the next 15 years, a viable path forward for future HPC systems even after the limits of current semiconductor technology are reached (the ''post-Moore's Law era'').

(4) Increasing the capacity and capability of an enduring national HPC ecosystem by employing a holistic approach that addresses relevant factors such as networking technology, workflow, downward scaling, foundational algorithms and software, accessibility, and workforce development.

(5) Developing an enduring public-private collaboration to ensure that the benefits of the research and development advances are, to the greatest extent, shared between the United States Government and industrial and academic sectors.

SEC. 3. *Roles and Responsibilities*. To achieve the five strategic objectives, this order identifies lead agencies, foundational research and development agencies, and deployment agencies. Lead agencies are charged with developing and delivering the next generation of integrated HPC capability and will engage in mutually supportive research and development in hardware and software, as well as in developing the workforce to support the objectives of the NSCI. Foundational research and development agencies are charged with fundamental scientific discovery work and associated advances in engineering necessary to support the NSCI objectives. Deployment agencies will develop mission-based HPC requirements to influence the early stages of the design of new HPC systems and will seek viewpoints from the private sector and academia on target HPC requirements. These groups may expand to include other government entities as HPC-related mission needs emerge.

(a) *Lead Agencies*. There are three lead agencies for the NSCI: the Department of Energy (DOE), the Department of Defense (DOD), and the National Science Foundation (NSF). The DOE Office of Science and DOE National Nuclear Security Administration will execute a joint program focused on advanced simulation through a capable exascale computing program emphasizing sustained performance on relevant applications and analytic computing to support their missions. NSF will play a central role in scientific discovery advances, the broader HPC ecosystem for scientific discovery, and workforce development. DOD will focus on data analytic computing to support its mission. The assignment of these responsibilities reflects the historical roles that each of the lead agencies have played in pushing the frontiers of HPC, and will keep the Nation on the forefront of this strategically important field. The lead agencies will also work with the foundational research and development agencies and the deployment agencies to support the objectives of the NSCI and address the wide variety of needs across the Federal Government.

(b) *Foundational Research and Development Agencies*. There are two foundational research and development agencies for the NSCI: the Intelligence Advanced Research Projects Activity (IARPA) and the National Institute of Standards and Technology (NIST). IARPA will focus on future computing paradigms offering an alternative to standard semiconductor computing technologies. NIST will focus on measurement science to support future computing technologies. The foundational research and development agencies will coordinate with deployment agencies to enable effective transition of research and development efforts that support the wide variety of requirements across the Federal Government.

(c) *Deployment Agencies*. There are five deployment agencies for the NSCI: the National Aeronautics and Space Administration, the Federal Bureau of Investigation, the National Institutes of Health, the Department of Homeland Security, and the National Oceanic and Atmospheric Administration. These agencies may participate in the co-design process to integrate the special requirements of their respective missions and influence the early stages of design of new HPC systems, software, and applications. Agencies will also have the opportunity to participate in testing, supporting workforce development activities, and ensuring effective deployment within their mission contexts.

SEC. 4. *Executive Council*. (a) To ensure accountability for and coordination of research, development, and deployment activities within the NSCI, there is established an NSCI Executive Council to be co-chaired by the Director of the Office of Science and Technology Policy (OSTP) and the Director of the Office of Management and Budget (OMB). The Director of OSTP shall designate members of the Executive Council from within the executive branch. The Executive Council will include representatives from agencies with roles and responsibilities as identified in this order.

(b) The Executive Council shall coordinate and collaborate with the National Science and Technology Council established by Executive Order 12881 of November 23, 1993, and its subordinate entities as appropriate to ensure that HPC efforts across the Federal Government are aligned with the NSCI. The Executive Council shall also consult with representatives from other agencies as it determines necessary. The Executive Council may create additional task forces as needed to ensure accountability and coordination.

(c) The Executive Council shall meet regularly to assess the status of efforts to implement this order. The Executive Council shall meet no less often than twice yearly in the first year after issuance of this order. The Executive Council may revise the meeting frequency as needed thereafter. In the event the Executive Council is unable to reach consensus, the Co-Chairs will be responsible for documenting issues and potential resolutions through a process led by OSTP and OMB.

(d) The Executive Council will encourage agencies to collaborate with the private sector as appropriate. The Executive Council may seek advice from the President's Council of Advisors on Science and Technology through the Assistant to the President for Science and Technology and may interact with other private sector groups consistent with the Federal Advisory Committee Act.

SEC. 5. *Implementation*. (a) The Executive Council shall, within 90 days of the date of this order, establish an implementation plan to support and align efforts across agencies in support of the NSCI objectives. Annually thereafter for 5 years, the Executive Council shall update the implementation plan as required and document the progress made in implementing the plan, engaging with the private sector, and taking actions to implement this order. After 5 years, updates to the implementation plan may be requested at the discretion of the Co-Chairs.

(b) The Co-Chairs shall prepare a report each year until 5 years from the date of this order on the status of the NSCI for the President. After 5 years, reports may be prepared at the discretion of the Co-Chairs.

SEC. 6. *Definitions*. For the purposes of this order:

The term ''high-performance computing'' refers to systems that, through a combination of processing capability and storage capacity, can solve computational problems that are beyond the capability of small- to medium-scale systems.

The term ''petaflop'' refers to the ability to perform one quadrillion arithmetic operations per second.

The term ''exascale computing system'' refers to a system operating at one thousand petaflops.

SEC. 7. *General Provisions.* (a) Nothing in this order shall be construed to impair or otherwise affect:

(i) the authority granted by law to an executive department, agency, or the head thereof; or

(ii) the functions of the Director of OMB relating to budgetary, administrative, or legislative proposals.

(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

BARACK OBAMA.

§ 5502. Purposes

The purposes of this chapter 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.

(Pub. L. 102–194, § 3, Dec. 9, 1991, 105 Stat. 1594; Pub. L. 105–305, § 3(b), Oct. 28, 1998, 112 Stat. 2920; Pub. L. 114–329, title I, § 105(c), Jan. 6, 2017, 130 Stat. 2976.)

Editorial Notes

AMENDMENTS

2017—Pub. L. 114–329, § 105(c)(1), substituted ''networking and information technology'' for ''high-performance computing'' in introductory provisions.

Par. (1). Pub. L. 114–329, § 105(c)(2)(A), substituted ''supporting Federal research, development, and application of networking and information technology'' for ''expanding Federal support for research, development, and application of high-performance computing'' in introductory provisions.

Par. (1)(A). Pub. L. 114–329, § 105(c)(2)(B), substituted ''networking and information technology'' for ''high-performance computing'' in two places.

Par. (1)(C). Pub. L. 114–329, § 105(c)(2)(C), (D), added subpar. (C) and struck out former subpar. (C) which read as follows: ''stimulate research on software technology;''.

Par. (1)(D). Pub. L. 114–329, § 105(c)(2)(C), (E), (F), redesignated subpar. (E) as (D), inserted ''high-end'' after ''the development of'', and struck out former subpar. (D) which read as follows: ''promote the more rapid development and wider distribution of computing software tools and applications software;''.

Par. (1)(E), (F). Pub. L. 114–329, § 105(c)(2)(E), (G), redesignated subpars. (F) and (G) as (E) and (F), respectively, and substituted ''networking and information technology'' for ''high-performance computing''. Former subpar. (E) redesignated (D).

Par. (1)(G), (H). Pub. L. 114–329, § 105(c)(2)(E), (H), redesignated subpar. (H) as (G) and substituted ''high-end'' for ''high-performance''. Former subpar. (G) redesignated (F).

Par. (2). Pub. L. 114–329, § 105(c)(3), substituted ''networking and information technology and'' for ''high-performance computing and'' and ''networking and information technology'' for ''high-performance computing network''.

1998—Pub. L. 105–305, § 3(b)(1), substituted ''Purposes'' for ''Purpose'' as section catchline.

Pub. L. 105–305, § 3(b)(2), substituted ''purposes of this chapter are'' for ''purpose of this chapter is'' in introductory provisions.

Par. (1)(A). Pub. L. 105–305, § 3(b)(3), redesignated subpar. (B) as (A) and struck out former subpar. (A) which read as follows: ''establish a high-capacity and high-speed National Research and Education Network;''.

Par. (1)(B). Pub. L. 105–305, § 3(b)(3), (4), redesignated subpar. (C) as (B) and substituted ''Internet'' for ''Network''. Former subpar. (B) redesignated (A).

Par. (1)(C) to (I). Pub. L. 105–305, § 3(b)(3), (5), redesignated subpars. (D) to (I) as (C) to (H), respectively, and struck out ''and'' at end of par. (H).

Par. (2). Pub. L. 105–305, § 3(b)(6), substituted ''network research and development programs;'' for ''efforts.''

Pars. (3), (4). Pub. L. 105–305, § 3(b)(7), added pars. (3) and (4).

§ 5503. Definitions

As used in this chapter, 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 5511(a)(3)(C) of this title;

(8) ''Program'' means the Networking and Information Technology Research and Development Program described in section 5511 of this title; and

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

(Pub. L. 102–194, §4, Dec. 9, 1991, 105 Stat. 1595; Pub. L. 105–305, §7(b), Oct. 28, 1998, 112 Stat. 2924; Pub. L. 110–69, title VII, §7024(a)(2), Aug. 9, 2007, 121 Stat. 689; Pub. L. 114–329, title I, §105(d), Jan. 6, 2017, 130 Stat. 2977.)

Editorial Notes

AMENDMENTS

2017—Pars. (1), (2). Pub. L. 114–329, §105(d)(2), (3), added par. (1) and redesignated former par. (1) as (2). Former par. (2) redesignated (3).

Par. (3). Pub. L. 114–329, §105(d)(1), (2), (4), redesignated par. (2) as (3), substituted ''networking and information technology'' for ''high-performance computing'', and struck out former par. (3) which read as follows: '' 'high-performance computing' means advanced computing, communications, and information technologies, including supercomputer systems, high-capacity and high-speed networks, special purpose and experimental systems, applications and systems software, and the management of large data sets;''.

Par. (4). Pub. L. 114–329, §105(d)(5), added par. (4). Former par. (4) redesignated (5).

Par. (5). Pub. L. 114–329, §105(d)(1), (2), redesignated par. (4) as (5) and struck out former par. (5) which read as follows: '' 'Network' means a computer network referred to as the National Research and Education Network established under section 5512 of this title;''.

Pars. (6), (7). Pub. L. 114–329, §105(d)(6), added pars. (6) and (7). Former pars. (6) and (7) redesignated (8) and (9), respectively.

Par. (8). Pub. L. 114–329, §105(d)(2), (7), redesignated par. (6) as (8) and substituted ''Networking and Information Technology Research and Development Program'' for ''National High-Performance Computing Program''.

Par. (9). Pub. L. 114–329, §105(d)(2), redesignated par. (7) as (9).

2007—Par. (2). Pub. L. 110–69, §7024(a)(2)(A), inserted ''and multidisciplinary teams of researchers'' after ''high-performance computing resources''.

Par. (3). Pub. L. 110–69, §7024(a)(2)(B), struck out ''scientific workstations,'' after ''technologies, including'' and ''(including vector supercomputers and large scale parallel systems)'' after ''supercomputer systems'', substituted ''applications'' for ''and applications'', and inserted '', and the management of large data sets'' after ''systems software''.

Par. (4). Pub. L. 110–69, §7024(a)(2)(C), struck out ''packet switched'' before ''data networks''.

Par. (7). Pub. L. 110–69, §7024(a)(2)(D)–(F), added par. (7).

1998—Pars. (4) to (6). Pub. L. 105–305 added par. (4) and redesignated former pars. (4) and (5) as (5) and (6), respectively.

SUBCHAPTER I—NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT

Editorial Notes

CODIFICATION

Pub. L. 114–329, title I, §105(e), Jan. 6, 2017, 130 Stat. 2978, substituted ''NETWORKING AND INFORMATION TECHNOLOGY'' for ''HIGH-PERFORMANCE COMPUTING'' in subchapter heading.

§ 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) 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-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) 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) 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) 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) 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) 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) the Department of Homeland Security;

(viii) 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 5512 of this title;

(E) 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) 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 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 5512 of this title.

(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).

(Pub. L. 102–194, title I, § 101, Dec. 9, 1991, 105 Stat. 1595; Pub. L. 104–66, title I, § 1052(k), Dec. 21, 1995, 109 Stat. 719; Pub. L. 105–305, § 4, Oct. 28, 1998, 112 Stat. 2921; Pub. L. 110–69, title VII, § 7024(a)(1)(B)–(D), Aug. 9, 2007, 121 Stat. 686–689; Pub. L. 114–329, title I, § 105(f), Jan. 6, 2017, 130 Stat. 2978; Pub. L. 117–167, div. B, title III, § 10374(d)(1), Aug. 9, 2022, 136 Stat. 1572; Pub. L. 117–286, § 4(a)(75), Dec. 27, 2022, 136 Stat. 4314.)

Editorial Notes

AMENDMENTS

2022—Subsec. (a)(1)(D). Pub. L. 117–167, § 10374(d)(1)(A), realigned margins.

Subsec. (a)(1)(J) to (P). Pub. L. 117–167, § 10374(d)(1), added subpar. (J), redesignated former subpars. (J) to (O) as (K) to (P), respectively, and realigned margins.

Subsec. (b)(3). Pub. L. 117–286 substituted ''Section 1013 of title 5'' for ''Section 14 of the Federal Advisory Committee Act''.

2017—Pub. L. 114–329, § 105(f)(1), substituted ''Networking and Information Technology Research and Development Program'' for ''National High-Performance Computing Program'' in section catchline.

Subsec. (a). Pub. L. 114–329, § 105(f)(2)(A), substituted ''Networking and Information Technology research and development'' for ''National High-Performance Computing Program'' in heading.

Subsec. (a)(1). Pub. L. 114–329, § 105(f)(2)(B)(i), substituted ''Networking and Information Technology Research and Development Program'' for ''National High-Performance Computing Program'' in introductory provisions.

Subsec. (a)(1)(A). Pub. L. 114–329, § 105(f)(2)(B)(ii), substituted ''networking and information technology'' for ''high-performance computing, including networking''.

Subsec. (a)(1)(B). Pub. L. 114–329, § 105(f)(2)(B)(iii), substituted ''high-end'' for ''high-performance''.

Subsec. (a)(1)(C). Pub. L. 114–329, § 105(f)(2)(B)(iv), substituted ''high-end computing, distributed, and networking'' for ''high-performance computing and networking''.

Subsec. (a)(1)(D). Pub. L. 114–329, § 105(f)(2)(B)(v), amended subpar. (D) generally. Prior to amendment, subpar. (D) read as follows: ''provide for widely dispersed efforts to increase software availability, productivity, capability, security, portability, and reliability;''.

Subsec. (a)(1)(G). Pub. L. 114–329, § 105(f)(2)(B)(iii), substituted ''high-end'' for ''high-performance''.

Subsec. (a)(1)(H). Pub. L. 114–329, § 105(f)(2)(B)(vi), inserted ''support and guidance'' after ''provide'' and struck out ''and'' at end.

Subsec. (a)(1)(I). Pub. L. 114–329, § 105(f)(2)(B)(vii), substituted ''improving the security, reliability, and resilience'' for ''improving the security'' and semicolon for period at end.

Subsec. (a)(1)(J) to (O). Pub. L. 114–329, § 105(f)(2)(B)(viii), added subpars. (J) to (O).

Subsec. (a)(2)(A). Pub. L. 114–329, § 105(f)(2)(C)(i), amended subpar. (A) generally. Prior to amendment, subpar. (A) read as follows: ''establish the goals and priorities for Federal high-performance computing research, development, networking, and other activities;''.

Subsec. (a)(2)(C). Pub. L. 114–329, § 105(f)(2)(C)(ii), amended subpar. (C) generally. Prior to amendment, subpar. (C) read as follows: ''provide for interagency coordination of Federal high-performance computing research, development, networking, and other activities undertaken pursuant to the Program;''.

Subsec. (a)(2)(E). Pub. L. 114–329, § 105(f)(2)(C)(iii), amended subpar. (E) generally. Prior to amendment, subpar. (E) read as follows: ''develop and maintain a research, development, and deployment roadmap covering all States and regions for the provision of high-performance computing and networking systems under paragraph (1)(C); and''.

Subsec. (a)(2)(F). Pub. L. 114–329, § 105(f)(2)(C)(iv), substituted ''high-end'' for ''high-performance''.

Subsec. (a)(3)(B). Pub. L. 114–329, § 105(f)(2)(D)(ii), added subpar. (B). Former subpar. (B) redesignated (C).

Subsec. (a)(3)(C). Pub. L. 114–329, § 105(f)(2)(D)(i), redesignated subpar. (B) as (C). Former subpar. (C) redesignated (D).

Subsec. (a)(3)(C)(i). Pub. L. 114–329, § 105(f)(2)(D)(iii)(I), amended cl. (i) generally. Prior to amendment, cl. (i) read as follows: ''the Department of Agriculture;''.

Subsec. (a)(3)(C)(vii). Pub. L. 114–329, § 105(f)(2)(D)(iii)(III), added cl. (vii). Former cl. (vii) redesignated (viii).

Subsec. (a)(3)(C)(viii). Pub. L. 114–329, § 105(f)(2)(D)(iii)(II), (IV), redesignated cl. (vii) as (viii) and amended it generally. Prior to amendment, cl. (viii) read as follows: ''the Department of the Interior;''. Former cl. (viii) redesignated (ix).

Subsec. (a)(3)(C)(ix) to (xii). Pub. L. 114–329, § 105(f)(2)(D)(iii)(II), redesignated cls. (viii) to (xi) as (ix) to (xii), respectively.

Subsec. (a)(3)(D). Pub. L. 114–329, § 105(f)(2)(D)(i), (iv), redesignated subpar. (C) as (D) and substituted ''is submitted, the levels for the previous fiscal year,'' for ''is submitted,'' and ''each Program Component Area and research area supported in accordance with section 5512 of this title;'' for ''each Program Component Area;''. Former subpar. (D) redesignated (E).

Subsec. (a)(3)(E). Pub. L. 114–329, § 105(f)(2)(D)(i), (v), redesignated subpar. (D) as (E) and amended it generally. Prior to amendment, subpar. (E) read as follows: ''describe the levels of Federal funding for each agency and department participating in the Program, and for each Program Component Area, for the fiscal year during which such report is submitted, and the levels pro-

posed for the fiscal year with respect to which the budget submission applies; and''. Former subpar. (E) redesignated (G).

Subsec. (a)(3)(F). Pub. L. 114–329, §105(f)(2)(D)(vi), added subpar. (F).

Subsec. (a)(3)(G). Pub. L. 114–329, §105(f)(2)(D)(i), redesignated subpar. (E) as (G).

Subsec. (b)(1). Pub. L. 114–329, §105(f)(3)(A), in introductory provisions, substituted ''networking and information technology'' for ''high-performance computing'' in two places and inserted ''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.'' before ''The recommendations''.

Subsec. (b)(1)(D). Pub. L. 114–329, §105(f)(3)(B), substituted ''networking and information technology'' for ''high-performance computing, networking technology, and related software''.

Subsec. (b)(2). Pub. L. 114–329, §105(f)(3)(C), substituted ''3 fiscal years'' for ''2 fiscal years'' and ''Committee on Science, Space, and Technology'' for ''Committee on Science and Technology'' and struck out at end ''The first report shall be due within 1 year after August 9, 2007.''

Subsec. (c)(1)(A). Pub. L. 114–329, §105(f)(4), substituted ''networking and information technology'' for ''high-performance computing''.

Subsecs. (d) to (f). Pub. L. 114–329, §105(f)(5), added subsecs. (d) to (f).

2007—Subsec. (a)(1)(A) to (I). Pub. L. 110–69, §7024(a)(1)(B)(i), added subpars. (A) to (I) and struck out former subpars. (A) and (B) which read as follows:

''(A) establish the goals and priorities for Federal high-performance computing research, development, networking, and other activities; and

''(B) provide for interagency coordination of Federal high-performance computing research, development, networking, and other activities undertaken pursuant to the Program.''

Subsec. (a)(2). Pub. L. 110–69, §7024(a)(1)(B)(ii), redesignated par. (3) as (2) and struck out former par. (2) which provided additional requirements for the National High-Performance Computing Program.

Subsec. (a)(2)(A) to (F). Pub. L. 110–69, §7024(a)(1)(B)(iii), added subpars. (A) to (C) and (E), redesignated former subpars. (A) and (C) as (D) and (F), respectively, and struck out former subpar. (B) which read as follows: ''provide for interagency coordination of the Program; and''.

Subsec. (a)(3). Pub. L. 110–69, §7024(a)(1)(B)(iv)(I), substituted ''paragraph (2)(D)'' for ''paragraph (3)(A)'' in introductory provisions.

Pub. L. 110–69, §7024(a)(1)(B)(ii), redesignated par. (4) as (3). Former par. (3) redesignated (2).

Subsec. (a)(3)(A). Pub. L. 110–69, §7024(a)(1)(B)(iv)(II), amended subpar. (A) generally. Prior to amendment, subpar. (A) read as follows: ''include a detailed description of the goals and priorities established by the President for the Program;''.

Subsec. (a)(3)(C). Pub. L. 110–69, §7024(a)(1)(B)(iv)(III), substituted ''each Program Component Area'' for ''specific activities, including education, research, hardware and software development, and support for the establishment of the Network''.

Subsec. (a)(3)(D). Pub. L. 110–69, §7024(a)(1)(B)(iv)(IV), (V), inserted '', and for each Program Component Area,'' after ''participating in the Program'' and ''and'' after ''applies;''.

Subsec. (a)(3)(E), (F). Pub. L. 110–69, §7024(a)(1)(B)(iv)(VI), (VII), redesignated subpar. (F) as (E), inserted ''and the extent to which the Program incorporates the recommendations of the advisory committee established under subsection (b)'' after ''for the Program'', and struck out former subpar. (E) which read as follows: ''include the report of the Secretary of Energy required by section 5523(d) of this title; and''.

Subsec. (b). Pub. L. 110–69, §7024(a)(1)(C), added subsec. (b) and struck out heading and text of former subsec. (b). Text consisted of pars. (1) to (5) which contained provisions similar to those now contained in par. (1).

Subsec. (c)(1)(A). Pub. L. 110–69, §7024(a)(1)(D)(i), substituted ''Program Component Areas or'' for ''Program or''.

Subsec. (c)(2). Pub. L. 110–69, §7024(a)(1)(D)(ii), substituted ''subsection (a)(2)(D)'' for ''subsection (a)(3)(A)''.

1998—Subsec. (a)(2)(A), (B). Pub. L. 105–305, §4(a), amended subpars. (A) and (B) generally. Prior to amendment, subpars. read as follows:

''(A) provide for the establishment of policies for management and access to the Network;

''(B) provide for oversight of the operation and evolution of the Network;''.

Subsec. (b). Pub. L. 105–305, §4(b), struck out ''High-performance computing'' before ''advisory committee'' in heading.

1995—Subsec. (a)(4)(D) to (F). Pub. L. 104–66 struck out ''and'' at end of subpar. (D), added subpar. (E), and redesignated former subpar. (E) as (F).

Statutory Notes and Related Subsidiaries

Termination of Advisory Committees

Advisory committees established after Jan. 5, 1973, to terminate not later than the expiration of the 2-year period beginning on the date of their establishment, unless, in the case of a committee established by the President or an officer of the Federal Government, such committee is renewed by appropriate action prior to the expiration of such 2-year period, or in the case of a committee established by the Congress, its duration is otherwise provided for by law. See section 1013 of Title 5, Government Organization and Employees.

Executive Documents

Delegation of Functions

President's Council of Advisors on Science and Technology to serve as the advisory committee identified in subsec. (b) of this section and to be known as the President's Innovation and Technology Advisory Committee when so serving, see section 3(b)(iii) of Ex. Ord. No. 14007, set out in a note under section 6601 of Title 42, The Public Health and Welfare.

Ex. Ord. No. 13035. President's Information Technology Advisory Committee

Ex. Ord. No. 13035, Feb. 11, 1997, 62 F.R. 7131, as amended by Ex. Ord. No. 13092, July 24, 1998, 63 F.R. 40167; Ex. Ord. No. 13113, Feb. 10, 1999, 64 F.R. 7489; Ex. Ord. No. 13200, Feb. 11, 2001, 66 F.R. 10183; Ex. Ord. No. 13215, May 31, 2001, 66 F.R. 30285; Ex. Ord. No. 13305, May 28, 2003, 68 F.R. 32323, provided:

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the High-Performance Computing Act of 1991 (Public Law 102–194) (''Act'') [15 U.S.C. 5501 et seq.], as amended by the Next Generation Internet Research Act of 1998 (Public Law 105–305) (''Research Act'') [see Short Title of 1998 Amendment note set out under section 5501 of this title], and in order to establish an advisory committee on high-performance computing and communications, Information Technology [sic], and the Next Generation Internet, it is hereby ordered as follows:

Section 1. *Establishment.* There is established the ''President's Information Technology Advisory Committee'' (''Committee''). The Committee shall consist of not more than 30 nonfederal members appointed by the President, including representatives of the research, education, and library communities, network providers, and representatives from critical industries. Members appointed prior to June 1, 2001, shall serve until December 1, 2001, unless reappointed by the President. Members appointed or reappointed on or after June 1, 2001, shall serve for no more than 2 years from the date of their appointment, unless their period of

service is extended by the President. The President shall designate two co-chairs from among the members of the Committee. A co-chair may serve for a term of 2 years or until the end of his or her service as a member of the Committee, whichever is the shorter period.

SEC. 2. *Functions*. (a) The Committee shall provide the National Science and Technology Council (NSTC), through the Director of the Office of Science and Technology Policy (''Director''), with advice and information on high-performance computing and communications, information technology, and the Next Generation Internet. The Committee shall provide an independent assessment of:

(1) progress made in implementing the High-Performance Computing and Communications (HPCC) Program;

(2) progress in designing and implementing the Next Generation Internet initiative;

(3) the need to revise the HPCC Program;

(4) balance among components of the HPCC Program;

(5) whether the research and development undertaken pursuant to the HPCC Program is helping to maintain United States leadership in advanced computing and communications technologies and their applications; and

(6) other issues as specified by the Director.

(b) The Committee shall carry out its responsibilities under the Research Act in the manner described in the Research Act.

SEC. 3. *Administration*. To the extent permitted by law and subject to the availability of appropriations, the Department of Defense shall provide the financial and administrative support for the Committee. Further, the Director of the National Coordination Office for Computing Information, and Communications (''Director of the NCO'') shall provide such coordination and technical assistance to the Committee as the co-chairs of the Committee may request.

(a) The heads of executive agencies shall, to the extent permitted by law, provide to the Committee such information as it may require for the purpose of carrying out its functions.

(b) The co-chairs may, from time to time, invite experts to submit information to the Committee and may form subcommittees or working groups within the Committee to review specific issues.

(c) Members of the Committee shall serve without compensation but shall be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in the Government service (5 U.S.C. 5701–5707).

SEC. 4. *General*. (a) Notwithstanding any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended [see 5 U.S.C. 1001 et seq.], except that of reporting to the Congress, that are applicable to the Committee shall be performed by the Director of the NCO in accordance with guidelines that have been issued by the Administrator of General Services.

(b) The Committee shall terminate June 1, 2005, unless extended by the President prior to such date.

§ 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 5511(b) of this title 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.

(Pub. L. 102–194, title I, § 102, as added Pub. L. 114–329, title I, § 105(i), Jan. 6, 2017, 130 Stat. 2982.)

Editorial Notes

PRIOR PROVISIONS

A prior section 5512, Pub. L. 102–194, title I, § 102, Dec. 9, 1991, 105 Stat. 1598, related to the National Research and Education Network, prior to repeal by Pub. L. 114–329, title I, § 105(g), Jan. 6, 2017, 130 Stat. 2982.

§ 5513. Repealed. Pub. L. 114–329, title I, § 105(h), Jan. 6, 2017, 130 Stat. 2982

Section, Pub. L. 102–194, title I, § 103, as added Pub. L. 105–305, § 5, Oct. 28, 1998, 112 Stat. 2921; amended Pub. L. 106–65, div. A, title X, § 1067(20), Oct. 5, 1999, 113 Stat. 775, related to the Next Generation Internet program.

SUBCHAPTER II—AGENCY ACTIVITIES

§ 5521. National Science Foundation activities

As part of the Program described in subchapter 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, in-

cluding by individuals identified in sections 1885a and 1885b of title 42.

(Pub. L. 102–194, title II, § 201, Dec. 9, 1991, 105 Stat. 1599; Pub. L. 114–329, title I, § 105(j), Jan. 6, 2017, 130 Stat. 2983.)

Editorial Notes

AMENDMENTS

2017—Pub. L. 114–329, § 105(j)(1)(A), (2), struck out subsec. (a) designation and heading ''General responsibilities'' and struck out subsec. (b) which authorized appropriations for fiscal years 1992 to 1996.

Par. (1). Pub. L. 114–329, § 105(j)(1)(B), inserted ''high-end'' after ''National Science Foundation shall provide'' and substituted ''networking and information technology; and'' for ''high-performance computing and advanced high-speed computer networking;''.

Par. (2). Pub. L. 114–329, § 105(j)(1)(C), (D), added par. (2) and struck out former par. (2) which read as follows: ''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;''.

Pars. (3), (4). Pub. L. 114–329, § 105(j)(1)(C), struck out pars. (3) and (4) which read as follows:

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

''(4) 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.''

§ 5522. National Aeronautics and Space Administration activities

As part of the Program described in subchapter 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.

(Pub. L. 102–194, title II, § 202, Dec. 9, 1991, 105 Stat. 1600; Pub. L. 114–329, title I, § 105(k), Jan. 6, 2017, 130 Stat. 2983.)

Editorial Notes

AMENDMENTS

2017—Pub. L. 114–329 struck out subsec. (a) designation and heading ''General responsibilities'', substituted ''networking and information technology'' for ''high-performance computing'', and struck out subsec. (b) which authorized appropriations for fiscal years 1992 to 1996.

§ 5523. Department of Energy activities

As part of the Program described in subchapter 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.

(Pub. L. 102–194, title II, § 203, Dec. 9, 1991, 105 Stat. 1600; Pub. L. 104–66, title I, § 1052(j), Dec. 21, 1995, 109 Stat. 719; Pub. L. 109–58, title IX, § 976(b), Aug. 8, 2005, 119 Stat. 903; Pub. L. 114–329, title I, § 105(*l*), Jan. 6, 2017, 130 Stat. 2984.)

Editorial Notes

AMENDMENTS

2017—Pub. L. 114–329, § 105(*l*)(1), (4), struck out subsec. (a) designation and heading ''General responsibilities'' and struck out subsec. (b) which authorized to be appropriated to the Secretary of Energy such sums as necessary to carry out this section.

Par. (1). Pub. L. 114–329, § 105(*l*)(2), substituted ''networking and information technology'' for ''high-performance computing and networking''.

Par. (2)(A). Pub. L. 114–329, § 105(*l*)(3), substituted ''high-end'' for ''high-performance''.

2005—Pub. L. 109–58 reenacted section catchline without change and amended text generally, substituting provisions relating to general responsibilities and authorization of appropriations for provisions relating to general responsibilities, establishment of High-Performance Computing Research and Development Collaborative Consortia, transfer of technology to private sector and others, reports on activities, and authorization of appropriations.

1995—Subsec. (d). Pub. L. 104–66 amended heading and text of subsec. (d) generally. Prior to amendment, text read as follows: ''Within one year after December 9, 1991, and every year thereafter, the Secretary of Energy shall transmit to the Congress a report on activities taken to carry out this chapter.''

§ 5524. Department of Commerce activities

(a) General responsibilities

As part of the Program described in subchapter 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.

(Pub. L. 102–194, title II, § 204, Dec. 9, 1991, 105 Stat. 1601; Pub. L. 114–329, title I, § 105(m), Jan. 6, 2017, 130 Stat. 2984.)

Editorial Notes

AMENDMENTS

2017—Subsec. (a)(1)(A). Pub. L. 114–329, § 105(m)(1)(A), substituted ''networking and information technology systems and capabilities'' for ''high-performance computing systems and networks''.

Subsec. (a)(1)(B). Pub. L. 114–329, § 105(m)(1)(B), substituted ''interoperability and usability of networking and information technology systems'' for ''interoperability of high-performance computing systems in networks and for common user interfaces to systems''.

Subsec. (a)(1)(C). Pub. L. 114–329, § 105(m)(1)(C), substituted ''networking and information technology'' for ''high-performance computing''.

Subsec. (b). Pub. L. 114–329, § 105(m)(2), in heading, substituted ''Networking and information technology'' for ''High-performance computing and network'' and, in text, substituted ''The National Institute'' for ''Pursuant to the Computer Security Act of 1987 (Public Law 100–235; 101 Stat. 1724), the National Institute'' and ''Federal agency information and information systems'' for ''sensitive information in Federal computer systems''.

Subsecs. (c), (d). Pub. L. 114–329, § 105(m)(3), struck out subsecs. (c) and (d) which required a study of the impact of Federal procurement regulations and authorized appropriations for fiscal years 1992 to 1996.

§ 5525. Repealed. Pub. L. 114–329, title I, § 105(n), Jan. 6, 2017, 130 Stat. 2984

Section, Pub. L. 102–194, title II, § 205, Dec. 9, 1991, 105 Stat. 1602, described Environmental Protection Agency activities and authorized appropriations for fiscal years 1992 to 1996.

§ 5526. Repealed. Pub. L. 114–329, title I, § 105(*o*), Jan. 6, 2017, 130 Stat. 2984

Section, Pub. L. 102–194, title II, § 206, Dec. 9, 1991, 105 Stat. 1602, described the role of the Department of Education and authorized appropriations for fiscal years 1992 to 1996.

§ 5527. Miscellaneous provisions

(a) Nonapplicability

Except to the extent the appropriate Federal agency or department head determines, the provisions of this chapter 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.

(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.

(Pub. L. 102–194, title II, § 207, Dec. 9, 1991, 105 Stat. 1602; Pub. L. 114–329, title I, § 105(p), Jan. 6, 2017, 130 Stat. 2984.)

Editorial Notes

AMENDMENTS

2017—Subsec. (a)(2). Pub. L. 114–329, § 105(p)(1), substituted ''section 3552(b)(6)(A)(i) of title 44'' for ''paragraphs (1) through (5) of section 2315(a) of title 10''.

Subsec. (b). Pub. L. 114–329, § 105(p)(2), substituted ''networking and information technology'' for ''high-performance computing''.

§ 5528. Repealed. Pub. L. 114–329, title I, § 105(q), Jan. 6, 2017, 130 Stat. 2984

Section, Pub. L. 102–194, title II, § 208, Dec. 9, 1991, 105 Stat. 1603; Pub. L. 110–69, title III, § 3002(c)(6), Aug. 9, 2007, 121 Stat. 587, related to findings and annual reports for fostering United States competitiveness in high-performance computing and related activities.

SUBCHAPTER III—DEPARTMENT OF ENERGY HIGH-END COMPUTING REVITALIZATION

§ 5541. Definitions

In this subchapter:

(1) Department

The term ''Department'' means the Department of Energy.

(2) Exascale computing

The term ''exascale computing'' means computing through the use of a computing machine that performs near or above 10 to the 18th power operations per second.

(3) High-end computing system

The term ''high-end computing system'' means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

(4) Leadership System

The term ''Leadership System'' means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

(5) Institution of higher education

The term ''institution of higher education'' has the meaning given the term in section 1001(a) of title 20.

(6) Secretary

The term ''Secretary'' means the Secretary of Energy.

(Pub. L. 108–423, § 2, Nov. 30, 2004, 118 Stat. 2400; Pub. L. 115–246, title III, § 304(b)(2), formerly § 304(a)(2), Sept. 28, 2018, 132 Stat. 3145, renumbered § 304(b)(2), Pub. L. 117–167, div. B, title I, § 10104(a)(1), Aug. 9, 2022, 136 Stat. 1433.)

Editorial Notes

REFERENCES IN TEXT

This subchapter, referred to in text, was in the original ''this Act'', meaning Pub. L. 108–423, Nov. 30, 2004,

118 Stat. 2400, which is classified principally to this subchapter. For complete classification of this Act to the Code, see Short Title note set out under section 5501 of this title and Tables.

CODIFICATION

This section was enacted as part of the American Super Computing Leadership Act of 2017 which comprises this subchapter, and not as part of the High-Performance Computing Act of 1991 which comprises this chapter.

AMENDMENTS

2018—Pars. (1) to (5). Pub. L. 115–246, § 304(b)(2)(A), (B), formerly § 304(a)(2)(A), (B), as renumbered by Pub. L. 117–167, added pars. (1) and (2), redesignated former pars. (2) to (4) as (3) to (5), respectively, and struck out former par. (1) which defined ''Center''. Former par. (5) redesignated (6).

Par. (6). Pub. L. 115–246, § 304(b)(2)(A), (C), formerly § 304(a)(2)(A), (C), as renumbered by Pub. L. 117–167, redesignated par. (5) as (6) and struck out '', acting through the Director of the Office of Science of the Department of Energy'' before period at end.

Statutory Notes and Related Subsidiaries

SHORT TITLE

This subchapter known as the ''American Super Computing Leadership Act of 2017'', see Short Title note set out under section 5501 of this title.

§ 5542. Department of Energy high-end computing research and development program

(a) In general

The Secretary shall—

(1) carry out a coordinated program across the Department of research and development (including development of software and hardware) to advance high-end computing systems; and

(2) develop and deploy high-end computing systems for advanced scientific and engineering applications.

(b) Program

The program shall—

(1) support both individual investigators and multidisciplinary teams of investigators;

(2) conduct research in multiple architectures;

(3) conduct research on software for high-end computing systems, including research on algorithms, programming environments, tools, languages, and operating systems for high-end computing systems, in collaboration with architecture development efforts;

(4) provide for sustained access by the research community in the United States to high-end computing systems and to Leadership Systems, including provision of technical support for users of such systems;

(5) support technology transfer to the private sector and others in accordance with applicable law; and

(6) ensure that the high-end computing activities of the Department of Energy are coordinated with relevant activities in industry and with other Federal agencies, including the National Science Foundation, the Defense Advanced Research Projects Agency, the National Nuclear Security Administration, the National Security Agency, the National Institutes of Health, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the National Institutes of Standards and Technology, and the Environmental Protection Agency.

(c) Leadership Systems facilities

(1) In general

As part of the program carried out under this subchapter, the Secretary shall establish and operate 1 or more Leadership Systems facilities to—

(A) conduct advanced scientific and engineering research and development using Leadership Systems; and

(B) develop potential advancements in high-end computing system hardware and software.

(2) Administration

In carrying out this subsection, the Secretary shall provide to Leadership Systems, on a competitive, merit-reviewed basis, access to researchers in United States industry, institutions of higher education, national laboratories, and other Federal agencies.

(d) Exascale Computing Program

(1) In general

The Secretary shall conduct a research program (referred to in this subsection as the ''Program'') for exascale computing, including the development of two or more exascale computing machine architectures, to promote the missions of the Department.

(2) Execution

(A) In general

In carrying out the Program, the Secretary shall—

(i) establish two or more National Laboratory partnerships with industry partners and institutions of higher education for the research and development of two or more exascale computing architectures across all applicable organizations of the Department;

(ii) conduct mission-related codesign activities in developing the exascale computing architectures under clause (i);

(iii) develop such advancements in hardware and software technology as are required to fully realize the potential of an exascale production system in addressing Department target applications and solving scientific problems involving predictive modeling and simulation and large scale data analytics and management;

(iv) explore the use of exascale computing technologies to advance a broad range of science and engineering; and

(v) provide, as appropriate, on a competitive, merit-reviewed basis, access for researchers in industries in the United States, institutions of higher education, National Laboratories, and other Federal agencies to the exascale computing systems developed pursuant to clause (i).

(B) Selection of partners

The Secretary shall select the partnerships with the computing facilities of the

Department under subparagraph (A) through a competitive, peer-review process.

(3) Codesign and application development

(A) In general

The Secretary shall—

(i) carry out the Program through an integration of applications, computer science, applied mathematics, and computer hardware architecture using the partnerships established pursuant to paragraph (2) to ensure that, to the maximum extent practicable, two or more exascale computing machine architectures are capable of solving Department target applications and broader scientific problems, including predictive modeling and simulation and large scale data analytics and management; and

(ii) conduct outreach programs to increase the readiness for the use of such platforms by domestic industries, including manufacturers.

(B) Report

The Secretary shall submit to Congress a report describing—

(i) how the integration under subparagraph (A) is furthering application science data and computational workloads across application interests, including national security, material science, physical science, cybersecurity, biological science, the Materials Genome and BRAIN Initiatives of the President, advanced manufacturing, and the national electric grid; and

(ii) the roles and responsibilities of National Laboratories and industry, including the definition of the roles and responsibilities within the Department to ensure an integrated program across the Department.

(4) Project review

(A) In general

The exascale architectures developed pursuant to partnerships established pursuant to paragraph (2) shall be reviewed through a project review process.

(B) Report

Not later than 90 days after September 28, 2018, the Secretary shall submit to Congress a report on—

(i) the results of the review conducted under subparagraph (A); and

(ii) the coordination and management of the Program to ensure an integrated research program across the Department.

(5) Annual reports

At the time of the budget submission of the Department for each fiscal year, the Secretary, in consultation with the members of the partnerships established pursuant to paragraph (2), shall submit to Congress a report that describes funding for the Program as a whole by functional element of the Department and critical milestones.

(Pub. L. 108–423, §3, Nov. 30, 2004, 118 Stat. 2400; Pub. L. 115–246, title III, §304(b)(3), formerly §304(a)(3), Sept. 28, 2018, 132 Stat. 3145, renumbered §304(b)(3), Pub. L. 117–167, div. B, title I, §10104(a)(1), Aug. 9, 2022, 136 Stat. 1433.)

Editorial Notes

REFERENCES IN TEXT

This subchapter, referred to in subsec. (c)(1), was in the original ''this Act'', meaning Pub. L. 108–423, Nov. 30, 2004, 118 Stat. 2400, which is classified principally to this subchapter. For complete classification of this Act to the Code, see Short Title note set out under section 5501 of this title and Tables.

CODIFICATION

This section was enacted as part of the American Super Computing Leadership Act of 2017 which comprises this subchapter, and not as part of the High-Performance Computing Act of 1991 which comprises this chapter.

AMENDMENTS

2018—Subsec. (a)(1). Pub. L. 115–246, §304(b)(3)(A), formerly §304(a)(3)(A), as renumbered by Pub. L. 117–167, substituted ''coordinated program across the Department'' for ''program''.

Subsec. (b)(2). Pub. L. 115–246, §304(b)(3)(B), formerly §304(a)(3)(B), as renumbered by Pub. L. 117–167, struck out '', which may include vector, reconfigurable logic, streaming, processor-in-memory, and multithreading architectures'' before semicolon at end.

Subsec. (d). Pub. L. 115–246, §304(b)(3)(C), formerly §304(a)(3)(C), as renumbered by Pub. L. 117–167, added subsec. (d) and struck out former subsec. (d) which related to the establishment of a High-End Software Development Center.

§ 5543. Repealed. Pub. L. 114–329, title I, § 105(u), Jan. 6, 2017, 130 Stat. 2985

Section, Pub. L. 108–423, §4, Nov. 30, 2004, 118 Stat. 2402, authorized appropriations for fiscal years 2005 to 2007.

§ 5544. Transferred

Editorial Notes

CODIFICATION

Section, Pub. L. 116–260, div. Z, title IX, §9008, Dec. 27, 2020, 134 Stat. 2600, which related to veterans' health initiative, was transferred to section 9462 of this title.

CHAPTER 82—LAND REMOTE SENSING POLICY

§ 5601. Transferred

Editorial Notes

CODIFICATION

Section, Pub. L. 102–555, §2, Oct. 28, 1992, 106 Stat. 4163, which related to findings, was transferred and is set out as a note under section 60101 of Title 51, National and Commercial Space Programs.

§ 5602. Repealed. Pub. L. 111–314, § 6, Dec. 18, 2010, 124 Stat. 3444

Section, Pub. L. 102–555, §3, Oct. 28, 1992, 106 Stat. 4164, provided definitions for this chapter. See section 60101 of Title 51, National and Commercial Space Programs.

SUBCHAPTER I—LANDSAT

§§ 5611 to 5615. Repealed. Pub. L. 111–314, § 6, Dec. 18, 2010, 124 Stat. 3444

Section 5611, Pub. L. 102–555, title I, §101, Oct. 28, 1992, 106 Stat. 4166, related to management of the Landsat