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§ 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 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 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 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 multi-agency 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.)

AMENDMENTS

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).

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, provided that: "This Act [enacting subchapter III of this chapter, amending sections 2057 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 'Department of Energy High-End Computing Revitalization Act of 2004'."

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.”

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 research 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 high-performance computing and its applications by—

(1) expanding Federal support for research, development, and application of high-performance computing in order to—

(A) expand the number of researchers, educators, and students with training in high-performance computing and access to high-performance computing 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 software technology;

(D) promote the more rapid development and wider distribution of computing software tools and applications software;

(E) accelerate the development of computing systems and subsystems;

(F) provide for the application of high-performance computing to Grand Challenges;

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