

*One Hundred Second Congress of the United States of America*

*AT THE FIRST SESSION*

Begun and held at the City of Washington on Thursday, the third day of January,  
one thousand nine hundred and ninety-one

An Act

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

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

**SECTION 1. SHORT TITLE.**

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

**SEC. 2. 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 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.
- (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 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.

### **SEC. 3. PURPOSE.**

The purpose of this Act is 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) establish a high-capacity and high-speed National Research and Education Network;
  - (B) expand the number of researchers, educators, and students with training in high-performance computing and access to high-performance computing resources;
  - (C) promote the further development of an information infrastructure of data bases, services, access mechanisms, and research facilities available for use through the Network;
  - (D) stimulate research on software technology;
  - (E) promote the more rapid development and wider distribution of computing software tools and applications software;
  - (F) accelerate the development of computing systems and subsystems;
  - (G) provide for the application of high-performance computing to Grand Challenges;
  - (H) invest in basic research and education, and promote the inclusion of high-performance computing into educational institutions at all levels; and
  - (I) promote greater collaboration among government, Federal laboratories, industry, high-performance computing centers, and universities; and
- (2) improving the interagency planning and coordination of Federal research and development on high-performance computing and maximizing the effectiveness of the Federal Government's high-performance computing efforts.

### **SEC. 4. DEFINITIONS.**

As used in this Act, the term--

- (1) `Director' means the Director of the Office of Science and Technology Policy;
- (2) `Grand Challenge' means a fundamental problem in science or engineering, with broad economic and scientific impact, whose solution will require the application of high-performance computing resources;
- (3) `high-performance computing' means advanced computing, communications, and information technologies, including scientific workstations, supercomputer systems (including vector supercomputers and large scale parallel systems), high-capacity and high-speed networks, special purpose and experimental systems, and applications and systems software;
- (4) `Network' means a computer network referred to as the National Research and Education Network established under section 102; and

(5) 'Program' means the National High-Performance Computing Program described in section 101.

## **TITLE I--HIGH-PERFORMANCE COMPUTING AND THE NATIONAL RESEARCH AND EDUCATION NETWORK**

### **SEC. 101. NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.**

(a) NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM- (1) The President shall implement a National High-Performance Computing Program, which shall--

(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.

(2) The Program shall--

(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;

(C) promote connectivity among computer networks of Federal agencies and departments;

(D) provide for efforts to increase software availability, productivity, capability, portability, and reliability;

(E) provide for improved dissemination of Federal agency data and electronic information;

(F) provide for acceleration of the development of high-performance computing systems, subsystems, and associated software;

(G) provide for the technical support and research and development of high-performance computing software and hardware needed to address Grand Challenges;

(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, library and information science, and computational science; and

(I) provide--

(i) for the security requirements, policies, and standards necessary to protect Federal research computer networks and information resources accessible through Federal research computer networks, including research required to establish security standards for high-performance computing systems and networks; and

(ii) that agencies and departments identified in the annual report submitted under paragraph (3)(A) shall define and implement a security plan consistent with the Program and with applicable law.

(3) The Director shall--

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

(B) provide for interagency coordination of the Program; and

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

(4) The annual report submitted under paragraph (3)(A) shall--

(A) include a detailed description of the goals and priorities established by the President for the Program;

(B) 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 Agriculture;

(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 the Interior;

(viii) the Environmental Protection Agency;

(ix) the National Aeronautics and Space Administration;

(x) the National Science Foundation; and

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

(C) describe the levels of Federal funding for the fiscal year during which such report is submitted, and the levels proposed for the fiscal year with respect to which the budget submission applies, for specific activities, including education, research, hardware and software development, and support for the establishment of the Network;

(D) describe the levels of Federal funding for each agency and department participating in the Program for the fiscal year during which such report is submitted, and the levels proposed for the fiscal year with respect to which the budget submission applies; and

(E) include an analysis of the progress made toward achieving the goals and priorities established for the Program.

(b) **HIGH-PERFORMANCE COMPUTING ADVISORY COMMITTEE-** The President shall establish an advisory committee on high-performance computing consisting of non-Federal members, including representatives of the research, education, and library communities, network providers, and industry,

who are specially qualified to provide the Director with advice and information on high-performance computing. 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--

- (1) progress made in implementing the Program;
- (2) the need to revise the Program;
- (3) the balance between the components of the Program;
- (4) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in computing technology; and
- (5) other issues identified by the Director.

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

(A) identifies each element of its high-performance computing activities which contributes directly to the Program 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)(3)(A), 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.

## **SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.**

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

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

(c) NETWORK CHARACTERISTICS- The Network shall--

- (1) be developed and deployed with the computer, telecommunications, and information

industries;

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

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

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

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

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

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

(8) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware;

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

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

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

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

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

(g) REPORT TO CONGRESS- Within one year after the date of enactment of this Act, the Director

shall report to the Congress on--

- (1) effective mechanisms for providing operating funds for the maintenance and use of the Network, including user fees, industry support, and continued Federal investment;
- (2) the future operation and evolution of the Network;
- (3) how commercial information service providers could be charged for access to the Network, and how Network users could be charged for such commercial information services;
- (4) the technological feasibility of allowing commercial information service providers to use the Network and other federally funded research networks;
- (5) how to protect the copyrights of material distributed over the Network; and
- (6) appropriate policies to ensure the security of resources available on the Network and to protect the privacy of users of networks.

## **TITLE II--AGENCY ACTIVITIES**

### **SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.**

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

- (1) the National Science Foundation shall provide computing and networking infrastructure support for all science and engineering disciplines, and support basic research and human resource development in all aspects of high-performance computing and advanced high-speed computer networking;
- (2) to the extent that colleges, universities, and libraries cannot connect to the Network with the assistance of the private sector, the National Science Foundation shall have primary responsibility for assisting colleges, universities, and libraries to connect to the Network;
- (3) 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.

(b) AUTHORIZATION OF APPROPRIATIONS- From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of the Program \$213,000,000 for fiscal year 1992; \$262,000,000 for fiscal year 1993; \$305,000,000 for fiscal year 1994; \$354,000,000 for fiscal year 1995; and \$413,000,000 for fiscal year 1996.

### **SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.**

(a) GENERAL RESPONSIBILITIES- As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in high-performance computing, particularly in the field of computational science, with emphasis on aerospace sciences,

earth and space sciences, and remote exploration and experimentation.

(b) **AUTHORIZATION OF APPROPRIATIONS-** From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Aeronautics and Space Administration for the purposes of the Program \$72,000,000 for fiscal year 1992; \$107,000,000 for fiscal year 1993; \$134,000,000 for fiscal year 1994; \$151,000,000 for fiscal year 1995; and \$145,000,000 for fiscal year 1996.

## **SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.**

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

- (1) perform research and development on, and systems evaluations of, high-performance computing and communications systems;
- (2) conduct computational research with emphasis on energy applications;
- (3) support basic research, education, and human resources in computational science; and
- (4) provide for networking infrastructure support for energy-related mission activities.

(b) **COLLABORATIVE CONSORTIA-** In accordance with the Program, the Secretary of Energy shall establish High-Performance Computing Research and Development Collaborative Consortia by soliciting and selecting proposals. Each Collaborative Consortium shall--

- (1) conduct research directed at scientific and technical problems whose solutions require the application of high-performance computing and communications resources;
- (2) promote the testing and uses of new types of high-performance computing and related software and equipment;
- (3) serve as a vehicle for participating vendors of high-performance computing systems to test new ideas and technology in a sophisticated computing environment; and
- (4) be led by a Department of Energy national laboratory, and include participants from Federal agencies and departments, researchers, private industry, educational institutions, and others as the Secretary of Energy may deem appropriate.

(c) **TECHNOLOGY TRANSFER-** The results of research and development carried out under this section shall be transferred to the private sector and others in accordance with applicable law.

(d) **ANNUAL REPORTS TO CONGRESS-** Within one year after the date of enactment of this Act and every year thereafter, the Secretary of Energy shall transmit to the Congress a report on activities taken to carry out this Act.

(e) **AUTHORIZATION OF APPROPRIATIONS-** (1) There are authorized to be appropriated to the Secretary of Energy for the purposes of the Program \$93,000,000 for fiscal year 1992; \$110,000,000 for fiscal year 1993; \$138,000,000 for fiscal year 1994; \$157,000,000 for fiscal year 1995; and \$169,000,000 for fiscal year 1996.

(2) There are authorized to be appropriated to the Secretary of Energy for fiscal years 1992, 1993, 1994, 1995, and 1996, such funds as may be necessary to carry out the activities that are not part of the



Program but are authorized by this section.

## **SEC. 204. DEPARTMENT OF COMMERCE ACTIVITIES.**

(a) **GENERAL RESPONSIBILITIES-** As part of the Program described in title I--

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

(A) conduct basic and applied measurement research needed to support various high-performance computing systems and networks;

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

(C) be responsible for developing benchmark tests and standards for high-performance computing 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) **HIGH-PERFORMANCE COMPUTING AND NETWORK SECURITY-** Pursuant to the Computer Security Act of 1987 (Public Law 100-235; 101 Stat. 1724), the National Institute of Standards and Technology shall be responsible for developing and proposing standards and guidelines needed to assure the cost-effective security and privacy of sensitive information in Federal computer systems.

(c) **STUDY OF IMPACT OF FEDERAL PROCUREMENT REGULATIONS-** (1) The Secretary of Commerce shall conduct a study to--

(A) evaluate the impact of Federal procurement regulations that require that contractors providing software to the Federal Government share the rights to proprietary software development tools that the contractors use to develop the software; and

(B) determine whether such regulations discourage development of improved software development tools and techniques.

(2) The Secretary of Commerce shall, within one year after the date of enactment of this Act, report to the Congress regarding the results of the study conducted under paragraph (1).

(d) **AUTHORIZATION OF APPROPRIATIONS-** From sums otherwise authorized to be appropriated, there are authorized to be appropriated--

(1) to the National Institute of Standards and Technology for the purposes of the Program \$3,000,000 for fiscal year 1992; \$4,000,000 for fiscal year 1993; \$5,000,000 for fiscal year 1994; \$6,000,000 for fiscal year 1995; and \$7,000,000 for fiscal year 1996; and

(2) to the National Oceanic and Atmospheric Administration for the purposes of the Program \$2,500,000 for fiscal year 1992; \$3,000,000 for fiscal year 1993; \$3,500,000 for fiscal year 1994; \$4,000,000 for fiscal year 1995; and \$4,500,000 for fiscal year 1996.

## **SEC. 205. ENVIRONMENTAL PROTECTION AGENCY ACTIVITIES.**

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

(b) AUTHORIZATION OF APPROPRIATIONS- From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Environmental Protection Agency for the purposes of the Program \$5,000,000 for fiscal year 1992; \$5,500,000 for fiscal year 1993; \$6,000,000 for fiscal year 1994; \$6,500,000 for fiscal year 1995; and \$7,000,000 for fiscal year 1996.

## **SEC. 206. ROLE OF THE DEPARTMENT OF EDUCATION.**

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

(b) AUTHORIZATION OF APPROPRIATIONS- From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Department of Education for the purposes of this section \$1,500,000 for fiscal year 1992; \$1,700,000 for fiscal year 1993; \$1,900,000 for fiscal year 1994; \$2,100,000 for fiscal year 1995; and \$2,300,000 for fiscal year 1996.

## **SEC. 207. MISCELLANEOUS PROVISIONS.**

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

- (1) programs or activities regarding computer systems that process classified information; or
- (2) computer systems the function, operation, or use of which are those delineated in paragraphs (1) through (5) of section 2315(a) of title 10, United States Code.

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

## **SEC. 208. FOSTERING UNITED STATES COMPETITIVENESS IN HIGH-PERFORMANCE COMPUTING AND RELATED ACTIVITIES.**

(a) FINDINGS- The Congress finds the following:

- (1) High-performance computing and associated technologies are critical to the United States economy.
- (2) While the United States has led the development of high-performance computing, United States industry is facing increasing global competition.

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

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

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

(b) Annual Report-

(1) REPORT- The Director shall submit an annual report to Congress that identifies--

(A) any grant, contract, cooperative agreement, or cooperative research and development agreement (as defined under section 12(d)(1) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a(d)(1)) made or entered into by any Federal agency or department for research and development under the Program with--

(i) any company other than a company that is either incorporated or located in the United States, and that has majority ownership by individuals who are citizens of the United States; or

(ii) any educational institution or nonprofit institution located outside the United States; and

(B) any procurement exceeding \$1,000,000 by any Federal agency or department under the Program for--

(i) unmanufactured articles, materials, or supplies mined or produced outside the United States; or

(ii) manufactured articles, materials, or supplies other than those manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured in the United States,

under the meaning of title III of the Act of March 3, 1933 (41 U.S.C. 10a-10d; popularly known as the Buy American Act) as amended by the Buy American Act of 1988.

(2) CONSOLIDATION OF REPORTS- The report required by this subsection may be included with the report required by section 101(a)(3)(A).

(c) Review of Supercomputer Agreement-

(1) REPORT- The Under Secretary for Technology Administration of the Department of Commerce (in this subsection referred to as the 'Under Secretary') shall conduct a

comprehensive study of the revised 'Procedures to Introduce Supercomputers' and the accompanying exchange of letters between the United States and Japan dated June 15, 1990 (commonly referred to as the 'Supercomputer Agreement') to determine whether the goals and objectives of such Agreement have been met and to analyze the effects of such Agreement on United States and Japanese supercomputer manufacturers. Within 180 days after the date of enactment of this Act, the Under Secretary shall submit a report to Congress containing the results of such study.

(2) CONSULTATION- In conducting the comprehensive study under this subsection, the Under Secretary shall consult with appropriate Federal agencies and departments and with United States manufacturers of supercomputers and other appropriate private sector entities.

(d) APPLICATION OF BUY AMERICAN ACT- This Act does not affect the applicability of title III of the Act of March 3, 1933 (41 U.S.C. 10a-10d; popularly known as the Buy American Act), as amended by the Buy American Act of 1988, to procurements by Federal agencies and departments undertaken as a part of the Program.

Speaker of the House of Representatives.

Vice President of the United States and

President of the Senate.