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Computing Research in the FY 2014 Budget

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HIGHLIGHTS

- Funding for the Networking and Information Technology Research and Development (NITRD) program would increase 4.2 percent, to $4.0 billion, in the President's FY 2014 budget request versus the FY 2012 enacted level.

- The House has passed legislation this year updating the NITRD program, adding a 5-year strategic planning activity, and periodic external review for the program. Senate action remains uncertain.

- The National Science Foundation, the primary supporter of university-led computer science research in the United States, would see its share of the NITRD program increase only $11 million to $1.2 billion in FY 2014, or an increase of just under 1 percent over its FY 2012 enacted level.

INTRODUCTION AND BACKGROUND

The importance of computing research in enabling the new economy is well documented. The resulting advances in information technology have led to significant improvements in product design, development and distribution for American industry, provided instant communications for people worldwide, and enabled new scientific disciplines like bioinformatics and nanotechnology.

Information technology has also changed the conduct of research. Innovations in computing and networking technologies are enabling scientific discovery across every scientific discipline – from mapping the human brain to modeling climatic change. Researchers, faced with

research problems that are ever more complex and interdisciplinary in nature, are using IT to collaborate across the globe, simulate experiments, visualize large and complex datasets, and collect and manage massive amounts of data.

Table 1. Computing Research in the Federal R&D Budget
(budget authority in millions of dollars)

	FY 2012 Actual	FY 2014 Budget	Change FY 12-14* Amount	Percent
NITRD 1/	3,809	**3,968**	159	4.2%
National Science Foundation				
Comp & Info Sci & Eng 2/	937	**950**	13	1.4%
DOE Office of Science				
Adv Sci Computing Res	428	**466**	37	8.7%

Source: Agency budget justifications and statements.
Figures rounded to the nearest million. Changes calculated from unrounded figures.

As of FY 2014, the federal IT R&D effort is now a $4.0 billion multi-agency enterprise called the Networking and Information Technology Research and Development (NITRD) program, coordinated by the Interagency Working Group on Information Technology Research and Development within the National Science and Technology Council (NSTC). NITRD is the successor of the High Performance Computing and Communications Program established by Congress in 1991. NITRD agencies now coordinate research in eight Program Component Areas: High End Computing Infrastructure and Applications; High End Computing Research and Development; Human Computer Interaction and Information Management; Large Scale Networking; Software Design and Productivity; High Confidence Software and Systems; Social, Economic, and Workforce Implications of IT; and Cyber Security and Information Assurance. The NSF is the lead agency out of 13 NITRD member agencies.

Current Policy Environment

As has been the case over the last three sessions of Congress, efforts are underway to pass legislation to reauthorize the NITRD program, with the goals to improve coordination among the 13 participating agencies and require systematic, effective external review of the program. In March of this year, the House Committee on Science, Space and Technology began

this seemingly biennial process with the introduction and markup of the Advancing America's Networking and Information Technology Research and Development Act of 2013 (H.R. 967).

The bill is largely based on the recommendations of the most recent review of the NITRD program by the President's Council of Advisors for Science and Technology (PCAST), released in December 2010. The bill has at its core two elements: a requirement that the National Coordination Office (NCO) for NITRD begin a five-year strategic planning process that is then revisited every three years; and a requirement that an independent external advisory committee of experts in information technology review the program every three years, evaluate its progress towards its goals, and suggest new or different areas of research focus.

In addition to the strategic plan and advisory committee provisions in the bill, H.R. 967 would also create a new activity in the NITRD program called "Large-scale Research in Areas of National Importance" for IT research in areas that aid "national economic competitiveness and other societal benefits;" it would add a new research area in cyber-physical systems and create a new University/Industry Task Force to develop ways to pursue that research collaboratively; and it would create a new Interagency Working Group to develop policies and funding mechanisms around the use of cloud computing services in federally funded research. It also emphasizes education issues among the NITRD participating agencies, especially with respect to increasing the participation of underrepresented groups and women in computing fields.

The bill is nearly identical to the committee's attempt last Congress to reauthorize the program, the NITRD Act of 2012 (H.R. 3834), which was passed in the House but was not acted upon in the Senate because of an inability to find time on the Senate calendar for it.

Whether the Senate will act on H.R. 967 before the end of the current Congress is uncertain. The Senate has, in recent years, failed to consider the House NITRD bills for a variety of reasons — most typically related to calendar, or because the bill became tied up in a dispute over another, more controversial bill, like a NASA reauthorization. However, the computing community is committed to working with the Senate to find time on the calendar for passage during the 113th Congress.

Additionally, Congress has increasingly focused on cybersecurity, passing a number of bills during a specially designated "Cybersecurity Week" in April. In particular, the Cybersecurity Enhancement Act of 2013 (H.R. 756) sailed through the House. The bill promotes education, training, awareness, and research in cybersecurity by authorizing federal research funding, scholarships, and coordination of programs across NITRD agencies. It requires participating agencies, in conjunction with the NCO, to develop strategic plans for federal cybersecurity research and would also prioritize cybersecurity research at participating agencies such as NSF. The original draft was amended to support the inclusion of women, veterans, and community colleges in the education and training provisions as well as to require the evaluation of higher education courses and degrees in cybersecurity.

FY 2014 BUDGET REQUEST

The NITRD FY 2014 budget request is a total of $4.0 billion, an increase of $158 million, or approximately 4.2 percent, above FY 2012 expenditures of $3.8 billion.

National Science Foundation. The National Science Foundation (NSF) would spend $1.2 billion on NITRD research in FY 2014, an increase of $11 million, or 0.9 percent, over its FY 2012 enacted level.

The hub of NSF's NITRD activity is the foundation's Computing and Information Science and Engineering (CISE) directorate, which would account for $950.3 million of NSF's NITRD-related funding in FY 2014, an increase of $85 million (or 9.8 percent) over FY 2012 enacted levels.

CISE fares quite well in the NSF request, in large part because the directorate leads a number of the agency's crosscutting initiatives, including Cyber-Enabled Materials, Manufacturing, and Smart Systems (CEMMS) which receives $103 million, Cyberinfrastructure Framework for the 21st Century (CIF21) which receives $90.6 million, NSF Innovation Corps (I-Corps) which receives $9 million, Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) which receives $5 million, Secure and Trustworthy Cyberspace (SaTC) which receives $75 million, and Science, Engineering, and Education for Sustainability (SEES) programs which receive $19 million. Additionally, CISE and the Education and Human Resources directorate have consolidated the Computing

Education for the 21st Century (CE21) and Math and Science Partnerships (MSP) programs into the STEM-C Partnerships program, for "Science, Technology, Engineering, and Mathematics, including Computing Partnerships," which would receive $16.5 million from CISE in FY 2014.

In FY 2013, NSF's Office of Cyberinfrastructure (OCI) was folded into CISE and is now the Division of Advanced Cyberinfrastructure (ACI). ACI would receive an increase in the President's budget for FY 2014. Under the Administration's plan, the program would grow 4.6 percent over the enacted FY 2012 level to $221 million.

Department of Defense. Overall funding for IT R&D at the Department of Defense would increase by 3 percent in FY 2014 compared to FY 2012's enacted levels, to a total of $1.3 billion. At DARPA, basic (6.1) computing research in the Mathematics and Computer Science account would increase $12 million to $72 million, the Cyber Sciences account would more than double from $16 million to $33 million and the Transformative Sciences account is up by $8 million to $50 million. In the applied (6.2) area, Information and Communications Technology would see an increase of nearly $70 million to $413 million, while Cognitive Computing would shrink by almost half to $16.3 million.

Health and Human Services (HHS). The National Institutes of Health (NIH) constitutes the bulk of funding in IT R&D at HHS. For FY 2014, the Administration asks for $526.7 million in IT R&D funding, a decrease of just under $5.5 million from FY 2012.

Department of Energy (DOE). IT R&D activities in DOE's Office of Science, National Nuclear Security Administration (NNSA), the Office of Nuclear Energy, the Advanced Research Projects Agency-Energy (ARPA-E), and Electricity Delivery and Energy Reliability programs constitute DOE's participation in NITRD. Under the President's plan DOE NITRD funding would reach $541 million, an increase of 8.6 percent, or $42.5 million, over FY 2012.

Department of Commerce (DOC). The DOC request for FY 2014 contains $170 million in NITRD funding, from the National Oceanic and Atmospheric Administration (NOAA) and the National Institute of Standards and Technology (NIST). This is an increase of $51 million, or 42.9 percent, over the enacted FY12 funding level.

NIST IT R&D efforts include working with industry, educational, and government organizations to make IT systems more useable, secure, scalable, and interoperable. In addition, NIST works to apply IT to specialized areas like biotechnology and manufacturing, and to encourage industry to accelerate development of IT innovations.

NOAA supports IT research in emerging computer technologies for improved climate modeling and weather forecasting, and for improved communications technologies to disseminate weather products and warnings to emergency responders, policymakers, and the general public.

Environmental Protection Agency (EPA). EPA IT R&D would receive $6 million in FY 2014 under the President's plan, flat funding compared to FY 2012. EPA uses its IT funding to support technologies that facilitate ecosystem modeling, risk assessment, and environmental decision making at the federal, state, and local levels.

Department of Homeland Security (DHS). DHS requested $76.5 million in NITRD funding in FY 2014, an increase of $23 million, or 42.6 percent, over FY 2012.

National Archives and Records Administration (NARA). NARA requested $0.2 million in FY 2014, a decrease of $0.8 million from FY 2012.

Department of Transportation (DOT). FY 2014 is the first year that the DOT has requested funding under the NITRD budget supplemental. DOT has requested $1.5 million.