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Closing Remarks

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The past 20 years — the 20 years of the Federal Networking and Information Technology Research and Development (NITRD) Program — have seen a revolution in how we live, work, play, and discover. A revolution brought about by breathtaking advances in computer science.

Twenty years ago, integrated circuits had four million transistors; today they have four billion. Twenty years ago, the Internet had one million users; today there are one billion. Twenty years ago, only 15 percent of families owned a personal computer; today, nearly everyone owns a mobile phone, and in the most recent quarter, nearly 60 percent of those who purchased a mobile phone chose a smart phone, putting the Internet — the world — in their pocket. Smart phones, electronic books, digital media, the Web, eCommerce, the Cloud, social networking, crowd sourcing — all of these are new in the past 20 years, many in the past 10 years. The pace of change is extraordinary!

In addition to changing our lives, advances in computer science have driven our economy — through growth in productivity, and through growth in our ability to innovate. And this has taken place not only in what you'd think of as high tech industries: we learned today that disposable diapers are better because of the engagement of computational rocket scientists!

At today's Symposium, we've been treated to extraordinary presentations describing both the *progress* and the *promise* of our field. We've heard about human language technology; autonomous vehicles; sensing; privacy; security; software; scientific discovery; data-driven approaches to health, to science, to reasoning. We've learned that advances in computer science have an extremely broad role. In medicine, that role certainly includes electronic health records, but it also includes evidence-based medicine, automated diagnosis, and the complete instrumentation of the body. In energy and sustainability, that role certainly includes high performance computing as utilized by the Department of Energy's Office of Science, but also sensors in homes for energy management: smart homes and smart offices as the leaf nodes of the smart grid, a focus of DoE's Office of Energy Efficiency and Renewable Energy. In transportation, we will eventually see the widespread use of autonomous vehicles, but we are already benefiting from capabilities such as adaptive cruise control, anti-lock brakes, and automated stay-in-lane systems that can increase the utilization of existing highways, and continued advances in logistics that allow companies such as Zipcar to increase the utilization of vehicles, better amortizing the economic and environmental costs of their production.

Vice President Gore spoke to us about the role of technology in democracy and civic discourse. The good news: the Internet has shown its power to facilitate disruptive change around the globe. The bad news: in many nations, including our own, the role of the Internet in lowering the barrier-to-entry to the public square where discourse takes place has just begun. There is a great deal more that must be accomplished.

That is a summary of the entire day. The achievements of our field have been extraordinary. The potential for the future, though, *and* the need to realize this potential, are *even more extraordinary*.



Perhaps most importantly, today's event has further deepened our already great appreciation for the role played by a large number of Federal agencies, working together under NITRD coordination, in ensuring that America is, and will remain, the world leader in this most important field. The NITRD Program truly is one of the very best investments that our nation has made.