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Progress Toward and Prospects for a Global Digital Information Infrastructure in Support of Research and Education*

INTRODUCTION

I want to do several things in this presentation. The first is provide some basic information about what is being called the information superhighways measures already proposed by the Clinton administration and already acted on by the 103rd Congress. It was only in February 1993 that two major proposals responsive to the theme of this conference were put forth, and they were acted on by the 103rd Congress when it passed the president's budget. Some things remain to be reconciled, but these provisions of the president's budget were not controversial in the House and Senate debates in late March. So, they've already found their way pretty far down the road of this new administration's policy. There are a lot of new policy initiatives in the realm of global networking, but I'm going to focus on just a very small part of it.

The second thing I want to do is to call attention to the characteristics of four of the constituencies that are the most active and influential in shaping how issues are defined and how public policies are formulated in the areas of networks and networked information. I really think these four constituencies have been competing for public attention for quite a while now. It is important to reflect upon what each of these four constituencies has to offer because my opinion is that there has to be something that comes out of this process for each of these constituencies, otherwise we won't get what we all want—a universally better world as a result of all this.

CURRENT POLICY INITIATIVES

The basic characteristics of the new administration's approach to all of this are evident in the budget statement that President Clinton presented to the Congress on February 17. The title of this document is "A Vision of Change

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for America.” It’s not just a tax proposal as the media would like us to believe, and I think all of us need to help not only ourselves but people who rely upon us to stay oriented in a very busy world to understand the concept of the relationship between government and the people that is so thoroughly different and refreshing in this document.

But, even more to the point, on February 22, a statement describing the initial economic program of the president was separated out and articulated by Clinton and Gore when they made a visit to Silicon Valley. This document is now available from the Office of the President, and it is titled “Technology for America’s Growth: A New Direction to Build Economic Strength.” Before I focus in on just one part of that, the measures pertaining to information superhighways, I’d like to say that ever since June of last year it’s been clear that Bill Clinton views information infrastructure as a strategic asset.

There is a tendency among those of us who have known first Senator Gore and now Vice President Gore to feel that the influence on Clinton’s thinking in this area arises solely from this person who’s been so important in helping us find our vision and having it expressed in public law. But when candidate Clinton’s economic plan was announced in June of 1992, the second measure of the economic plan was federal government investment in information infrastructure, and I wondered where that came from. And where it came from, to name a single source, is a book written by now labor secretary Robert Reich entitled *The Work of Nations*, which is a book I’d recommend to you. It’s rather heavy going—you know how much economists love numbers and so forth—but the basic public policy argument advanced by Reich is that the appropriate targets of government investment in the 21st century are people in infrastructure because they are relatively immobile, national assets. This sort of resonated with me because I knew we might be coming out of 24 years where the appropriate focus of government investment was thought to be capital formation. It’s very clear from the economic statistics based on those 24 years of experience (I’m holding the Carter years aside for reasons I expect you understand) that if you focus on capital formation, then the capital will flee the country to labor markets that leverage the capital. In contemporary manufacturing that means labor markets that are low wage. We would expect that as time goes by capital will seek labor markets that are highly skilled rather than labor markets that are just low wage, thus reflecting the transition from a predominantly manufacturing economy to a predominantly information or service economy. In any case, Robert Reich and that book in particular have had a very important impact on Bill Clinton’s thinking. And the argument is that if government builds infrastructure and focuses on an educated population, it’s very unlikely that the infrastructure will pick up and go to Mexico or Singapore or someplace else. Generally speaking, population is relatively immobile, so the government investment continues to circulate within the nation and is a sure target of generating overall wealth.

So, Bill Clinton was exposed to these ideas, and I think we need to think of his selection of Vice President Gore as a kindred spirit selection. It is really a partnership and a quite heady partnership. When Bill Clinton selected Al Gore as his running mate, the favorite joke of the Washington wags was: “Bill Clinton is so intellectually secure he selected an intellectual equal as his running

mate. Come to think of it, so did George Bush." So I think we have plenty of reason to believe that President Clinton selected Gore to *act* on these things, not because he wanted Gore to *run* them.

So this dynamic duo has brought forth a document, with the able assistance of a number of people, called "Technology for America's Growth: A New Direction to Build Economic Strength," and about one quarter of the way through it, they articulate five measures pertaining to information super-highways.

The first measure may appear obvious, but it's very carefully worded: implementation of the High Performance Computing and Communications Program established by the High Performance Computing Act of 1991. That was the Act that brought the NREN vision into public laws—Public Law 102 194. That may appear to be an unqualified victory, but one of the problems with implementing the NREN provisions of PL 102 194 last year was that there was a continuing disagreement about whether the *administration's* concept of the networking enterprise as a federal network and the *Congress's* concept of the networking enterprise as a national network would be resolved. We had difficulty resolving that last year, and, in fact, a key report that the Science Advisor of the President was charged by the legislation to produce by December 1992 articulated the notion that what this NREN was supposed to do was to be a collaboration of federal networks, a consolidation of federal networking activities. There are plenty of provisions of PL 102 194, in particular its NREN provisions, that show that what the Congress wanted was not just a harmonization of federal activity. It wanted a networking program that was progressively more responsible to the national needs of the research and education communities. So the fact that this initiative is linked to the High Performance Computing Act of 1991 is one of those signals that the Congressional concept of this networking program will be the ascendent one in this administration. And, more to that point, it continues to be the case that the Office of Science and Technology Policy of the Executive Office of the President has a key role in developing this NREN program. The deputy director of that office is Mike Nelson, who was Gore's staffer on this when the legislation proceeded through the Senate. So, that's still one more signal—not a surprising signal but a welcome signal—that the Congress's conception of this network as a national asset rather than a federal program is going to prevail in this new administration.

The second initiative articulated in this document is the creation of a task force on information infrastructure, a high-level interagency task force within the National Economic Council that will work with Congress and the private sector to find consensus on, and implement policy changes needed to accelerate deployment of, the National Information Infrastructure. This is "ramping up" in a positive way, as it indicates the administration's recognition that global networking is one of those things you have to send people out to talk to other people about. It hasn't become exactly clear, but it's thought that Vice President Gore will chair this task force, which will be staffed by people like Mike Nelson and people who are assigned to the Office of Science and Technology Policy. It will function very like the Council of Competitiveness, which was an agency that Vice President Quayle chaired in the previous administration. It will have

a lot of interagency power, and it will have the ability to relieve regulatory constraints that are thought to be inhibiting useful progress, which, of course, can be both good and bad. But it's nice to have Cabinet officers or their delegates sitting in a room with the vice president on an ongoing basis with a staff of right-thinking people saying, "What needs to be done to move as quickly as possible toward a favorable vision of a National Information Infrastructure?" So although a lot of the details of how it will work and so forth remain to be revealed, the attention of the new administration is clearly being allocated, at the highest level, to these issues.

The program's third proposal is to create an information infrastructure technology program to assist industry in the development of the hardware and software needed to fully apply advanced computing and networking technology in health care, in life-long learning, and in libraries. The third and fourth provisions of this program have a tendency to make people like (he's not here so I can say this) Chuck McClure swoon because they felt, and had good reason during the last 24 years to believe, that they would never read a federal policy document, let alone a presidential policy document, that would single out libraries in this context, for this kind of attention. So if we have any doubts about whether there have been people listening the last three to four years, and coming to wrap themselves around the library part of this equation of useful social progress, statements like this give us reason to stay engaged. But, of course, we have more work to do now that they are seriously interested.

It's widely thought that the National Institute of Standards and Technology will be asked to be the lead agency on this program, and they will be asked to develop a civilian technology program that will function in some measure—this may not be an entirely favorable analogy—but will function in some measure as the Advanced Research Projects Agency or the Department of the Army have functioned in the transfer of defense technology into the private sector.

The fourth element of this program is to provide funding for networking pilot projects through the National Telecommunication and Information Administration (NTIA) of the Department of Commerce. NTIA will provide matching grants to states, school districts, libraries, and other nonprofit entities so that they can purchase connections needed for distance learning and for hooking into computer networks like the Internet. These pilot projects will demonstrate the benefits of networking to the educational library communities. In the budget that was passed by the two Houses of Congress at the end of March, \$64 million was targeted for this matching grant program. Now, the people on the ground, as it were, i.e., those in NTIA right now, say that they would like to spend that \$64 million on programs that are already "in their pipeline," involved in what is generally known as the Public Telecommunications Facilities Programs. This might mean that we have to wait until this time next year to have a clearer slate for which to put pilot project proposals before NTIA for this new funding stream. Or maybe, when the new appointments to the Department of Commerce are confirmed, there will be a change in the thinking of NTIA on how this money should be spent this year. In any case, it is tremendously encouraging to read this kind of statement in a presidential policy document.

The fifth element of the program is to promote dissemination of federal information. Again, it's very nice to have a presidential policy document that's not only linking technology with the promotion of dissemination of federal

information but is very clearly indicating that they regard the promotion of the dissemination of federal information as a very important national agenda item.

This is just one slice from these two policy documents. Reading the rhetoric, the social philosophy, the concept of government that surround these things is a very heady experience, at least for me. I think those of us who are involved in the information enterprise, broadly conceived, can see here a serious attempt by this new administration to try to move the nation forward in this regard.

IMPORTANT NETWORKING CONSTITUENCIES AND THEIR VISIONS

Now, I think that how all of this will play out depends a great deal on the activities of four particular constituencies. I don't really want to call them four different visions, and you shouldn't think of these constituencies as necessarily orthogonal. But I think there are four quite different and quite active constituencies that will be very influential in determining how things go from here.

I would characterize the first constituency by its core belief that networking is an appropriate national agenda item because it increases returns on research and education, meaning that government investments in networking are important because they leverage government investments in research and education. This is the constituency that formed around the National Research and Education Networking initiative. It argued, eventually successfully, to the Congress and the Bush administration that government at all levels is the primary funder of research and education in the United States, and that if some of those investments are spent on networking, then the investments that are spent on the directly productive activities of the research and education enterprise go farther.

Sad to say, there is very little new money that's been spent on networking. In general, the research and education community has been playing a zero sum game with itself, taking money that would otherwise go to grants for doing specific research and education activities and investing it in one or another research or education network, with the NREN being the most recent initiative of that type. Nonetheless, we have been able to demonstrate that government expenditures on research and education result in more productive activities if some of those expenditures go to research and education networking.

So, my point is that this is the constituency that built the support that led to the passage of the High Performance Computing Act of 1991 and its enactment as PL 102 194. The NREN is not a proposal before Congress; it's U.S. public law. What we're working on now is to make sure that this opportunity is actually realized and that the national attention generated to support this opportunity yields tremendous national fruit.

There's a second public policy constituency that I think was as active during the NREN period as this first public policy constituency; it's the one to which Vice President Gore has been very clear that he belongs. As *Senator* Gore, he was willing to declare a common cause with this first constituency, but now that he's *Vice President* Gore, he's clearly pushing what I think has always been his family's vision of how government should interact with the nation. I would summarize the interest of this second public policy constituency by

saying that its members believe that government activity is required in this area because networks can lay a foundation for 21st-century life and enterprise. These are the people who have coined the term “the National Information Infrastructure.” I’m a card-carrying member of this community, too. I wouldn’t want you to think I wasn’t. In fact, I feel I have some allegiance with all four of these communities. What is meant by the National Information Infrastructure is still up for grabs. But it is clear that what a lot of us mean is some sort of national, digital information enterprise or architecture that’s subject to principles like those that were articulated for the telephone and broadcasting systems in the Communications Act of 1934. The NREN was not required to be responsive to those kinds of equal access, universal service conditions because the public policy needs addressed by the NREN legislation were quite different from that. Now we have a vice president, indeed a president and an entire federal government, that is pushing government activity and networking to try to lay a foundation for 21st-century life and enterprise.

It’s very important, as far as I’m concerned, to make sure that this opportunity actually materializes. It’s going to be tough because the administration has chosen the Department of Commerce as the agent of change in this regard, and there are two problems with that. First, the Department of Commerce does not have a reputation in the federal government as a particularly agile or focused agency, so they are going to have to reform the Department of Commerce to make it relevant to 21st-century life and enterprise before it can pursue the promise of networks in that regard. Second, the fact that it’s the Department of Commerce rather than the Department of Education or some other more “public interested” agency that is more popular with those of us in the not-for-profit community is a worry for some people. So, there will be a lot of work and a lot of support that we’ll have to offer to make sure that this second public policy constituency is successful during the early days of the Clinton administration without supplanting the others that I’m mentioning—the first one and the third one.

Just at this moment, wind is being caught in the sail of the ships of the people in the third public policy constituency. I’m afraid my way of summarizing their interests may be regarded as unsympathetic, and I don’t mean it as such: their interest is that networks should create a retail paradise for couch potatoes. One way of describing their vision is to remind you all that you’re receiving a lot of catalogs every year, particularly around the holiday period. Some of these come to you from L. L. Bean; some of them come to you from other companies. It’s very clear to me that this constituency is imagining a future where, let’s say, it’s 1997, and Paul Peters is sitting in his living room. He’s got his information remote in his hand. He dials 1-900-LLBean, and on his high-definition television suddenly the L. L. Bean catalog appears. And, just to get really crazy, let’s assume it’s voice activated. I say I want slacks. I want men’s slacks. I want Dockers. I want blue . . . now show me those Dockers on a bigger guy. Now, this is something I feel you need to know about because, personally, as I have hoped you have sensed, I would really *like* to be able to interact with these catalogs in this way. And you can see the money that’s being spent to bring these retail opportunities to you by paper mail right

now, so the people who focus on these business plans will soon see how one thing might lead to another.

Just so you know that this is not all just speculation, I'd like to point out that fascinating stories have recently appeared about a character named Barry Diller. For those of you who haven't heard of Diller, I refer you to the February 22 *New Yorker* and the cover article of the February 28 *New York Times Magazine*. After I read these two articles and considered what it meant for this fellow to be covered in these two locations in the same week, I was led to make some entries in my personal diary. The one entry I would like to read for you is one that I wrote after reading the *New York Times Magazine*: "What does it mean that a former head of prime time television for ABC Entertainment (this is Barry Diller), former chief of Paramount Pictures and chairman of Fox, has just become the CEO of QVC (Quality Value and Convenience) Network, the home shopping division of Telecommunications, Inc. (TCI), the nation's largest cable company, less than a year after he had what is widely reported to be a rhapsodic encounter with an Apple Power Book?" And what these articles will tell you is that he wanted to buy a controlling interest in Fox from Rupert Murdoch, but they couldn't agree on terms. Barry Diller took a one-year sabbatical and is now reentering commerce, and, believe me, Barry Diller doesn't have to work now with home shopping. The article also reports that Vanna White makes \$50,000 a minute on QVC when her, I almost said narcotics, but I think the word is cosmetics, are being sold.

It's also the case, as the March 16 *Wall Street Journal* reports, that Alfred Sikes, the chairman of the FCC during the Bush administration, has just been named head of the new media and technology division of Hearst Corporation, and that when the CEO of Hearst, Frank A. Bennack, Jr., announced this appointment, he said that his company was interested in finding partners to form a high-capacity, interactive electronic superhighway similar to that recently proposed by Time-Warner.

Now, consumer activity alone is not enough to generate the investment to build this infrastructure, but it's interesting to note that consumer-driven interests are now beginning to take a role in advocating certain futures for what we call the National Information Infrastructure.

Finally, let me call attention to the fourth constituency, which is a constituency that I think is extremely important. In fact, I think it's a constituency that has generated a large measure of the intellectual capital and the positive excitement that we associate with the contemporary Internet. However, for reasons I'll spend a minute on in a moment, I don't think it's a constituency that's ever had a very strong role in the public policy process. It would be interesting to see the interests of this constituency played out at the national level, but I think it will also have a very strong influence on the public policy process at the local level. This is the constituency that believes that networks provide an opportunity for the emergence of a new social order. This is, in many respects, a vision of networking that national interests cannot really embrace because, obviously, national interests are where the establishment is placing the greatest emphasis, and the establishment has shown that it resists utopian visions quite effectively. Progress on visions like this has always happened at the local, not the national, level in both this country and in

other countries around the world, and I think that for some time to come, the linkage of local networking visions to these national networking visions will require the dedicated efforts of people who see the entire picture. People like yourselves.

THE POWER OF METAPHOR

I'd like to close my presentation by mentioning what I feel is an important philosophical issue: the power of metaphor in determining the shape of national networking. I'd like to end on something that has interested me a lot lately, a sort of private correspondence project I have with a couple of people that came out of a listserv that CNI has been operating a while, called CNI Big Ideas, which basically I would describe as a discussion reflecting a new way to think about the Internet. This is sort of a linguistic excursion . . . we started to talk among ourselves about how certain metaphors for our networked information future place control with, and encourage the participation of, only certain types of people. The whole language of thinking of this, as with language in general, may be creating barriers. This is the sort of philosophical issue that GraceAnne DeCandido from the *Wilson Library Bulletin* calls the "little boy metaphor problem." Thinking of the Internet as an erector set just does not do it for everyone. This is an important issue because the metaphors used have some power in shaping the future of national networking. I invite you all to think about this and enter into the discussion.