

MEMORANDUM

To: Laura Tyson
Gene Sperling

From: Tom Kalil TAK

Re: FY98 R&D budget

Date: December 17, 1996

Overall, OMB has made a good faith effort to protect R&D programs. "Protect" -- in most instances, means flat funding in nominal dollars, resulting in small real declines. I don't have a good sense for the out-years.

Although we generally talk about a federal investment in R&D of \$70 billion, the real number is actually much smaller:

	<u>FY97</u>
Health	\$13.3 billion
Non-Health Civilian R&D	\$20.2 billion
Defense S&T	\$7.8 billion
Defense non- S&T	\$32.7 billion

What these charts show is that much of what is counted as R&D for defense is advanced weapons development and testing and evaluation (e.g. blowing up tanks) -- and that the real R&D budget is closer to \$41 billion, with \$13 billion going to health.

Below is a list of my major outstanding concerns:

1. **Next Generation Internet**

We need to make sure that (1) the incremental funding does not come at the expense of the existing investments in information and communications technology; and (2) this is described as a multi-year, 5-year initiative. The Vice President is likely to be supportive of this.

The "return on investment" from this initiative is likely to be high. In the last 18 months, the current generation Internet has resulted in wealth creation of \$250 billion.

2. Educational Technology

Gene has been strongly supporting \$500 million in FY98, which is what the President originally called for.

I also believe that we should support a \$25 million R&D program at the Defense Department. Gene and Greg Simon have sent a memo to Gordon Adams on this, but it has not been resolved yet.

3. National Science Foundation

OMB's passback gave NSF an increase of \$50 million, considerably less than their request for an increase of \$165 million. \$100 million is necessary to keep them at zero real growth.

The increase would allow NSF to start an exciting new initiative in "Knowledge and Distributed Intelligence." This is addressing the hard problem of turning data into knowledge. This initiative, for example, would develop technologies for discovering patterns in databases with millions of entries.

4. Commerce Department

The Vice President may argue that although the FY98 level of funding for ATP is adequate (\$275 million in FY98) -- it should increase to \$500 million in 2002.

I support Dorothy's request for another \$15 million for the Manufacturing Extension Project.

5. Library Services Technology Act

OMB cut the agency request from \$150 million to \$115 million. FY97 appropriations was \$136 million. This program will help connect libraries to the "information superhighway" -- one of the President's stated goals.

6. Use of information technology

I'm not sure what the right budget mechanism is -- but I'd like to see the White House encourage agencies to set aside a small amount of money for innovative uses of technology. This is an area where we can do a lot for a small amount of money. ACE-NET, the secure Web site that connects "angels" with entrepreneurs, was started with \$50,000 in government seed funding. [See attached memo.]

The Labor Department has a great proposal to turn the Unemployment Insurance system into a Re-employment System by requiring UI recipients to enter their resume into America's Job Bank, providing labor market information, and collecting information on training opportunities.

THE WHITE HOUSE
WASHINGTON
MEMORANDUM

To: Greg Simon
From: Tom Kalil TAK
Re: Government use of Information Technology in the 2nd term
Date: December 10, 1996

There are a huge number of opportunities for the government to use information and communications technology to:

- Improve the delivery of government services and carry out agency missions in new ways;
- Reduce costs;
- Increase the dissemination of government information;
- Expand opportunities for participation in the democratic process;
- Create "one-stop shops" that cut across agency boundaries; and
- Leverage our "laboratories of democracy" by collecting and disseminating the best ideas for addressing pressing social and economic issues.

During the first term, a number of innovative projects were started at relatively modest sums. For example, the Small Business Administration started ACE-NET (Angel Capital Electronic Network) for \$50,000. This grant, combined with a "no-action" letter from the SEC, is allowing entrepreneurs and high net-worth individuals to interact on a secure Web site, creating new start-ups in the process.

On a larger scale, the Department of Labor has plans for re-engineering the Unemployment Insurance System into a "Re-Employment System" by expanding America's Job Bank, America's Talent Bank, and expanding the availability of labor market information, and information about training opportunities.

There will be even more opportunities in the second term as information and communications technologies become more powerful and ubiquitous. People will begin to expect the same level of service from the government that they get from FedEx -- which allows their customers to track their packages on-line.

Although these individual projects are more singles and doubles than "home-runs", they could guarantee a steady stream of good news stories, particularly now that most papers have assigned a reporter to the cyber-beat. Collectively, I think they could add up to a home-run for the Administration.

Agency Innovation Funds

During the second term, we need a process to ensure that the Administration successfully (a) defines; (b) executes; and (c) gets credit for as many of these projects as possible.

I have a number of ideas for how to do this, but this memo will concentrate on the budget issues. In the current environment, it is difficult to get agencies to be innovative. One of the more successful devices on the information technology front was the Innovation Fund. This was funded with a 1% tax on the income of the FTS200 long distance telecommunications program. With \$11 million, it funded 24 projects in FY95 and FY96, including:

- The U.S. Business Adviser;
- A Federal Internet Security Plan;
- The "Blue Page" Directory;
- The International Trade Data System; and the
- National Environmental Data Index;

Originally, NPR recommended a funding level for the Innovation Fund equal to 1% of the \$25 billion federal expenditures on IT, or \$250 million. Clearly, the current fund does not come close to this level of investment. Furthermore, the current fund can only be used for multi-agency projects.

I think it would make a great deal of sense to require agencies to set up Innovation Funds. Different components of the agency could compete for funding by submitting project proposals. Agencies could also solicit white papers from outside the agency that could serve as the basis for projects. The level of funding for these innovation funds is somewhat flexible -- but I think agencies could accomplish a lot for \$3-5 million per agency.

In addition to funding specific projects, agencies could use these resources to pay for (a) training; and (b) bringing in top-notch people from computer science departments for one year rotations. Although this is common practice in agencies like NSF and DARPA, the non-technical agencies don't do this. If we established a "Gore Fellows" program, we could succeed in attracting some of the "best and brightest" to help promote NII applications.

THE WHITE HOUSE
WASHINGTON

May 24, 1993

MEMORANDUM FOR DISTRIBUTION

FROM: JOHN H. GIBBONS, DIRECTOR, OST 
ROBERT RUBIN, ASSISTANT TO THE PRESIDENT, NEC 

RE: PROPOSED STRUCTURE OF THE INFORMATION INFRASTRUCTURE
TASK FORCE

During the campaign, the President and the Vice President stressed the need to create the Infrastructure for the 21st Century. In particular, they called for the rapid development of a National Information Infrastructure (NII), a system of high-speed telecommunications links, databases, and advanced computer systems that will provide Americans the information they need, whether in the form of text, images, video, or sound. This infrastructure will consist of a "network of networks" run by many different companies and using different technologies (fiber-optics, cable, wireless) but all connected and inter-operable. Such a network would be as ubiquitous as the phone system, but capable of carrying at least 1,000 times more information, providing two-way video, access to massive data libraries, and hundreds of channels of HDTV programming.

The Administration's February 22 technology policy paper announced the President's plan to create a White House Information Infrastructure Task Force (IITF) which would, "work with Congress and the private sector to find consensus on and implement policy changes needed to accelerate deployment of a national information infrastructure." This memo is intended to provide more details about the IITF, raise several questions that need to be resolved, and outline the next steps for this group.

The Administration's vision of the NII

Development of the NII has the potential to dramatically improve American competitiveness, health care, education, and government services. For instance, by providing faster and less expensive access to information, the NII can accelerate the design, manufacture, sale, and servicing of new products, giving American companies an edge in world markets.

While the private sector will build almost all of the "information highway" system, the President and the Vice President have stated clearly that the Federal government has a key leadership role in the development of the NII. They have called for:

- (1) Increased Federal investment in the development of the networking and computing technology needed for the NII.
- (2) Federal funding for pilot projects to demonstrate this technology.
- (3) Federal programs to ensure that schools, libraries, hospitals, and other non-profit institutions can afford to be connected to the NII.
- (4) Forward-looking telecommunications policies that will encourage private-sector investment in a ubiquitous, telecommunications system and ensure that all Americans enjoy the benefits of such a system. Such policies will:
 - provide a stable regulatory environment,
 - promote competition,
 - promote interoperability of networks,
 - fairly allocate the electromagnetic spectrum,
 - encourage development of standards,
 - enable investment in the development and deployment of new technologies,
 - ensure access to users in poor and rural areas that otherwise might not enjoy the full benefits of the NII.
- (5) Federal information policies that promote creation of new information services by:
 - using information technology to provide more Federal information on-line,
 - working with the private sector to disseminate Federal information,
 - creating new ways to protect intellectual property rights in a networked environment,
 - ensuring the privacy and security of users of the NII.

What will be the role of the IITF?

The IITF will be responsible for articulating and implementing the Administration's vision for the National Information Infrastructure. Working together, the participating agencies will develop comprehensive telecommunications and information policies that best meet the needs of both the agencies and the country. The IITF will address a variety of issues including regulatory policy, government information policy, standards issues, intellectual property rights, private sector input on the National Information Infrastructure, and transition of the National Research and Education Network.

The IITF will focus primarily on those issues that cannot be resolved without interagency cooperation and will have a key role in resolving interagency disputes. By helping build consensus on thorny policy issues, it will help agencies make and implement policy in areas where gridlock has been the norm in the past. The IITF is not designed to impose policies on the agencies. Specifically, it will not try to second-guess policy decisions which fall solely within the jurisdiction of a single agency.

Many and perhaps most of the issues the IITF will deal with will be handled in working groups (which may be quasi-permanent or ad hoc) created to address a single issue. Issues that could not be resolved by a single agency would go to one of these working groups. Only if the working group could not resolve the issue would it come before the full IITF. In general, the goal will be to make policy decisions at the lowest possible level. It is conceivable that the full IITF would meet only 3-6 times a year.

What will be the relationship between the IITF and the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET)?

Many of the issues related to the NII will be dealt with by the High Performance Computing, Communications, and Information Technology (HPCCIT) Subcommittee of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), which is chaired by the White House Office of Science and Technology Policy and which is responsible for coordinating Federal R&D activities. FCCSET, and particularly HPCCIT, will play a complementary role to the IITF. It will (1) provide technical advice to the IITF and its working groups and (2) coordinate the Federal research activities that support development of the National Information Infrastructure.

For the last three years, HPCCIT has coordinated the High-Performance Computing and Communications (HPCC) Initiative, a \$1.1 billion-a-year R&D program which is developing the more powerful supercomputers, faster networks, and more sophisticated software needed to build an advanced NII. By working with the IITF, the scientists and engineers on the HPCCIT can help ensure that new technology developed by this initiative is fully utilized in the NII. An HPCC advisory committee, required by Vice President Gore's legislation authorizing the HPCC Initiative, will be established to provide private sector advice on many of the research-related issues that the HPCCIT faces.

Who will be on the IITF?

Presumably, all the key agencies involved in telecommunications and information policy will be represented on the task force, including:

Council of Economic Advisers
National Economic Council
National Security Council
Office of Management and Budget
Office of Science and Technology Policy
Department of Commerce (includes the National Telecommunications and Information Administration, the National Institute of Standards and Technology, and the National Technical Information Service)
Department of Defense
Department of Justice (Antitrust Division)
Department of State (Directorate for International Communications and Information Policy)

In addition, several other agencies will either be members of the IITF or else be involved in working groups of the IITF which may be formed to address specific issues. These include:

Research agencies
National Science Foundation
Advanced Research Projects Agency (Defense Department)
Intelligence Community
U.S. Trade Representative

Clearly, there would also need to be close links to the Federal Communications Commission. When the members of the IITF are in place, they will help determine the membership and structure of the task force.

Because of the key role of the Department of Commerce, a high-level official of the Department, most likely the Deputy Secretary, will chair the IITF.

What will be on the IITF's agenda?

From discussions with agency personnel, industry, academia, and public interest groups, we have compiled a list of issues that might be on the task force's agenda. The list includes:

Increasing competition in the local loop
Cable-telco cross-ownership restrictions
Modified Final Judgment (which regulates the Regional Bell Operating Companies)
Spectrum Allocation
The Commercialization of the Internet computer network
Telecommunications standards (both domestic and international)

Computer security
Privacy
Encryption Technology
Intellectual Property Rights in a Networked Environment
Dissemination of Federal Information
Roles and structure of Federal telecommunications agencies

Clearly, the members of the IITF will add or delete items, as well as to prioritize them.

How will the IITF get input from industry?

To provide input from the private sector, it is likely that the IITF will establish one or more advisory committees. These committees will not only provide suggestions and new approaches to policy questions, they will also act as a sounding board for proposals from the IITF and help build public support for those proposals. A single large advisory committee might advise the IITF on high-level issues, while subcommittees of the advisory committee, perhaps joined by outside experts, could advise issue-specific working groups of the IITF.

What's next?

In response to our April 5 memo, agencies have provided names of agency liaisons to the IITF. A list of those names is attached. In addition, it would be useful if your agency determined whether it needs to devote additional staff or resources to the HPCCIT, given the additional, new roles that HPCCIT will be playing.

In the coming weeks, the IITF and the White House plan to draft a telecommunication policy paper (10-15 pages) laying out, in broad terms, the principles that the Administration intends to follow on telecommunications and information policy. It would be similar in form and function to the February 22 technology policy paper. Ideally, this paper would be released when the creation of the IITF is officially announced.

One of the first tasks for the IITF will be to define its agenda. There are a host of difficult telecommunications and information issues that need to be resolved and the IITF members will have to decide which ones are most pressing and most important. The IITF's agenda will be determined by many factors, including Congressional action and Administration priorities. We welcome your input on which items should be at the top of the agenda. The key White House staffers working with the IITF are Mike Nelson (at OSTP, 395-6175) and Tom Kalil (at the NEC, 456-2801).

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THE WHITE HOUSE
WASHINGTON

October 18, 1993

MEMORANDUM FOR THE VICE PRESIDENT

FROM: Tom Kalil (National Economic Council)
THROUGH: Bo Cutter
SUBJECT: Using the "Bully Pulpit" to promote the NII

Although fiscal constraints will limit the ability of the Administration to make major new investments, leadership can be a powerful (and inexpensive) tool for promoting the Administration's vision of the National Information Infrastructure.

Below are a few concrete proposals. If you think these are worthwhile, we can develop them further and begin to discuss them with relevant agencies and outside groups.

1. **Establishing National Goals:**

The NII is such an all-encompassing and amorphous concept that many believe it is critical to set some national goals -- an equivalent of a "Man on the Moon."

One such goal might be providing all schools with some level of access to the Internet by a date certain (e.g. 1996). *Fortune* recently reported that:

"From Harlem to Honolulu, electronic networks are sparking the kind of excitement not seen in America's classrooms since the space race."

Access to the Internet, combined with digital libraries, improvements in "user friendliness", and teacher training, could accelerate progress towards the six national education goals.

2. **NII Fellows:**

The development of the NII and its applications will require an unprecedented level of collaboration between all sectors of American society (government, industry, academia, public interest, etc.) Current examples of NII collaborative activities include Smart Valley, the Cross-Industry Working Team,

standards-setting, and policy projects of groups such as the Council on Competitiveness.

Most of the individuals participating in these projects also have full-time jobs, which can make progress slow and uneven.

The Administration could encourage companies, universities and other institutions to provide 1-2 year sabbaticals to "NII Fellows" -- professionals who would have the freedom to participate in a wide range of collaborative activities such as those mentioned above.

3. State Information Infrastructure Trust Funds:

Some states use any "overearnings" from local telephone companies to finance telecommunications projects with a public interest dimension -- such as distance learning.

The Administration could encourage representatives of the relevant stakeholders (e.g. states, telephone companies, consumer advocates) to draft model legislation for consideration by all 50 states.

4. States as "Laboratories of Democracy" for the NII

There is a vast array of NII-related activity going on at the state and local level. If each of the states would take responsibility for providing information on-line about their activities, the federal government could learn from the states and states could learn from each other.

5. Pilot projects in the District of Columbia:

Ideally, you should not have to travel 3,000 miles to Cupertino to see how this technology can be applied to solving community and local government needs. The White House could support local grassroots projects such as Cap Access, a Washington, D.C.-based Freenet. ARPA is already considering networking local schools in Southeast D.C.

To: Tom Kalil

From: Bob Rubin

BR -

THE WHITE HOUSE
WASHINGTON
MEMORANDUM

Exceedingly well done.
Even I understand technology issues as presented here. Please see my notes.

To: Bob Cutter
From: Tom Kalil TAK

Re: Administration's NII agenda for 1994 and beyond

Date: August 22, 1994

You may want to glance at these two pieces to give you an idea of some of the things Kalil is working on at this time. Smart

- 6-7 follow-up of - outreach

Introduction:

Arguably, the promotion of the National Information Infrastructure is the Administration's single most important technology initiative. Exponential improvements in our ability to store, transmit, and process information will impact virtually every aspect of America's economic and social life.

Because of the pervasiveness of information and communications technology, the NII is a complicated policy domain. Almost all agencies are involved, albeit at varying levels of intensity. A large number of public and private groups have mobilized to ensure that their interests are not ignored. "Stakeholders" include long-distance carriers, RBOCs, cable companies, broadcasters, the utilities, major telecommunications users, state and local regulators, universities, the computer and software industry, consumer advocates, copyright industries, librarians, Americans with disabilities, educators, public interest groups, and communities that are interested in a particular NII application. The NII is a perfect example of the "3 blind men and the elephant problem." People from different industries, backgrounds and disciplines are each in a position to describe a portion of the challenges and opportunities associated with the NII.

Perhaps the most important thing the Administration has done to date to promote the NII is to talk about it. In the same way that President Kennedy did serious damage to the hat industry by not wearing a hat, the President and Vice President have spurred the development of the NII by having e-mail addresses and talking about its importance.

The other major elements of the NII initiative are:

1. Developing a telecommunications policy that will promote competition and private sector investment while maintaining universal service;
2. Promoting applications of the NII;

3. Investing in R&D;
4. Addressing information policy issues such as privacy, security, and intellectual property rights issues; and
5. Promoting the Global Information Infrastructure.

1. **Telecommunications policy:**

a. **Telecommunications legislation**

Our most important goal is to pass telecommunications reform legislation. It has passed the House 423-4 and the Senate Commerce Committee 18-2. Senate floor action is expected in mid-September.

Overall, the legislation will represent a large improvement over the ~~status~~ quo. It will prevent the states from maintaining barriers to local competition, require the RBOCs to unbundle, eliminate the cable-telco cross-ownership restriction, preserve the notion of "universal service", give the FCC the authority to "forbear" regulation with respect to companies without market power, and gradually allow the RBOCs into long-distance and manufacturing.

The bills are by no means perfect. For example, the Senate bill contains a number of provisions to protect rural telephone companies and deny rural customers the benefits of competition. It requires that telecommunications companies provide a "public right-of-way" for non-profits by setting aside 5 percent of their capacity -- a concept that is meaningless in a digital, switched environment. We intend to work with the House and Senate to try to improve the bill during conference.

The bill faces two barriers. First of all, negotiations between the House and Senate will have to be conducted in a very short period of time. This will be difficult, given the complexity of the issues, and the intense industry lobbying. Second, Senator Dole has realized that in addition to crime and health, the three potential "second tier" legislative accomplishments are Super Fund, GATT, and telecommunications reform. The Republicans may have an interest in preventing any Rose Garden ceremonies this year. Dole's ability to play partisan politics may be limited by the reasonably strong Republican support for the bill.

↑
Is Business
pushing for this?

right

NEC Role: Push for improvements in the bill. Ensure that White House pushes hard for House and Senate floor time. This could (conceivably) require personal involvement by you and Bob.

b. Spectrum policy:

Freeing up additional spectrum will accelerate the deployment of new technologies, such as Personal Communications Services, LEOS (low earth orbiting satellites), wireless data networks, next-generation personal digital assistants, wireless cable, etc.

The Emerging Telecommunications Technology Act requires NTIA to identify 200 MHz of government spectrum over the next ten years and turn it over to the FCC. (This is in addition to the spectrum in the 2 GHz band that the FCC is auctioning off for PCS.) 200 MHz is four times the amount of spectrum that created the cellular industry!

NEC role: Ensure that NTIA is not "slow-rolled" by the agencies who will have to turn over spectrum. Help identify next generation of wireless issues, e.g. incentives for spectral efficiency, market-oriented mechanisms for moving incumbent users. Consider whether auction revenue over \$10 billion should be used for NII projects [e.g. connecting schools and libraries.]

how will
this
decision be
made?

c. Satellite policy:

There is strong support in industry and government that the satellite market needs to be restructured, and that the status quo (INTELSAT and IMMARSAT as treaty-based organizations) no longer makes any sense. However, the U.S. Government has yet to develop a clear policy in this area. An inter-agency working group, chaired by State, has been charged with developing options for privatization and restructuring of INTELSAT and IMMARSAT.

NEC role: Ensure that the State-led review includes options for an aggressive approach to privatization. Convene the inter-agency process (with OSTP) that will ultimately make the decision.

2. Applications:

The NII is not an end in itself. The Administration is interested in the NII because it is a powerful tool with a wide variety of applications in electronic commerce, manufacturing, life-long learning, health care, science, delivery of government services, sustainable development in the Third World, demand-side management, digital libraries, environmental monitoring, telecommuting, intelligent transportation systems, promoting informed participation, etc.

a. **Applications strategies:**

For each of the major applications, the Administration has attempted to initiate a national discussion on what will be required to make each of these applications happen. The first round of "white papers" was released in May 1994; the second round will be released later this fall.

NEC Role: Identify action items that flow from the applications strategies that are unlikely to get done in the absence of White House interest and support.

b. **FY 1996 budget cross-cut**

Panetta and Secretary Brown sent a memo to each of the agencies directing them to identify what they are doing to promote the NII. Some agencies have taken this responsibility seriously -- others have not.

In each of the major application areas, the IITF has tasked someone with analyzing what the government is doing across the board to see if it makes sense.

NEC Role: Work with OMB to ensure that the agencies make the NII a priority for their FY96 budget.

c. **Life-long learning:**

The ETR (Education, Training and Re-employment) group is interested in using the NII to promote the productivity of life-long learning. This group is interested in exploring how (a) the government can help stimulate the market for engaging, informative content; (b) we can make good on the President's goal of connecting all classrooms to the NII by the year 2000; and (c) how existing programs, such as federal grants for teacher professional development, could be used to promote use of technology in the classroom.

NEC Role: NEC co-chairs the ETR.

3. **Research and development:**

a. **High Performance Computing and Communications**

This \$1 billion R&D initiative is generating much of the technology for the NII. Although it originally focused on solving "Grand Challenges" (predicting the weather, computational fluid dynamics, rational drug design) it has broadened its scope to cover applications with a much broader impact (e.g. manufacturing, education, health care, digital libraries).

b. Technology Reinvestment Project, Advanced Technology Program

Many of the ATP and TRP projects are funding industry-led consortia in technologies related to the NII, such as CommerceNet, technologies for computer-based patient records, interoperability testbeds, CIM for the electronics industry, and component-based software.

NEC Role: Support funding, both in the Administration's internal deliberations and during Congressional process. Participate in NSTC Committee on Information and Communications R&D. Push for funding in strategic areas, such as "middleware" [authentication, security, electronic payments, resource reservation, date interchange formats, information discovery and retrieval, routing and addressing, etc.]

4. Information policy

The Information Policy Committee is addressing issues related to intellectual property rights, privacy, security, and dissemination of government information.

- PTO Commissioner Bruce Lehman has proposed some modest amendments to the Copyright Act.
- OMB has released a set of "fair information practices" for public comment.
- Government agencies are making some progress in making more information available to the public.
- Although encryption policy is being handled by the NSC, the issue will continue to resurface in the context of the NII.

NEC Role: NEC's Working Group on Intellectual Property reviewed the Lehman report, and will be involved in other major changes of U.S. intellectual property law.

5. Global Information Infrastructure:

a. Upcoming events:

There are four major international for in which GII issues will be raised: Summit of the Americas, APEC, the ITU, and the G-7 summit.

NEC Role: Ensure that GII issues are raised in a way that is consistent with the broader themes of the conference or summit. Help shape the agenda.

Example: For the G-7 summit, I am actively exploring the notion of an international test-bed. If connectivity between the U.S. EU, and Japan could be increased from its

Be sure appropriately included.

current T-1 links to T-3 or even OC-3, this could provide a platform for collaboration in areas such as interoperability, telemedicine, global electronic markets [dealing with currency and IPR issues], digital libraries, a World's Fair for the Information Age, etc. I have gotten very enthusiastic responses for this general concept from a number of U.S. companies, including Sprint, MCI, AT&T, PacTel, IBM, DEC, HP, Dun and Bradstreet, and SynOptics.

b. **Agenda for Cooperation**

Commerce has been tasked with developing a document that would outline the Administration's global agenda.

c. **Third World economic and social development**

The NEC has encouraged development agencies to think about how information and communications technology could change the process of economic and social development.

NEC Role: I have met with the Executive Directors from both the IDB and the World Bank, and helped prepare a proposal to provide African countries with a 64K duplex connection to the global Internet.

Cross-cutting issues:

1. Increasing the technical expertise of non-technical agencies, and improving coordination between technology and policy community.

Most NII issues have both policy and technology issues. For example:

- Dealing with intellectual property rights in a networked environment requires changes in copyright laws and electronic copyright management systems, new standards for header/descriptors, software envelopes, metering, digital watermarks;
- Promoting telemedicine may require changing the way HCFA reimburses providers for the use of information, or changing state licensure practices;
- Enabling new forms of electronic payments may require changes in financial regulations;
- Promoting NII applications in education and training will require more technical expertise on the part of Education and Labor.

2. Rapid national learning from state and local experiments.
3. Overall NII architecture. How do we get an NII that is characterized by:
 - Low barriers to publishing (individuals as producers as well as consumers);
 - Layered architecture, with open interfaces at each layer;
 - Interoperability; and
 - Openness to rapid technological innovation.

Appendix:

Some specific initiatives I am promoting because I think they are worthwhile:

1. Effort by industry, academia, and library and information science community to define human resource requirement for designing, building, and using the NII.
2. Examination of the policy and technical issues associated with cable TV's role in the NII. Specifically, how can the coax networks deployed by cable companies become a platform for a wide range of interactive services, as opposed to just one-way video delivery. Sample issues:
 - Fiber-to-the-neighborhood architecture only allows reverse channel of 5-30 MHz to be split between (roughly) 200-500 households. Some of this reverse path could be pre-empted by "must carry" obligations.
 - Reverse channel is very noisy. Spectrum technology developed for military may help improve capacity.
3. International testbed to be announced at G-7 summit.
4. Virtual library on NII-related subjects to promote diffusion of good ideas at state and local level.
5. African connectivity to the Internet. 
6. Experimentation with wide-area hypermedia as a way of getting input from the public on Administration policies.

Is there any way to
institutionalize effective effort in
this area (NII), so that impetus,
co-ordination, good decision-making, will
continue over long term?
8

THE WHITE HOUSE
WASHINGTON

November 14, 1994

MEMORANDUM

To: Alice Rivlin

From: W. Bowman Cutter, NEC
John H. Gibbons, OSTP
Greg Simon, OVP

Re: The National Information Infrastructure and the FY96 budget

This memo provides some background information on the Administration's NII initiative, and identifies several of the major FY96 NII budget issues. We would like to schedule a meeting at your convenience to discuss these issues prior to the completion of the budget process.

I. What is the National Information Infrastructure?

The NII is a complex, evolving system that will improve the ability of Americans to (1) access information; and (2) communicate with each other. In its current form, it is composed of:

- Networks, such as the Internet, the public switched telephone network, cable networks, satellite and wireless telecommunications links;
- "Information appliances" that connect to these networks, such as computers, video-phones, interactive TVs, and personal digital assistant;
- Information, databases, and services that are available over these networks; and
- The human resources that are required to build and use the NII.

The functionality of our information infrastructure is continuously improving as a result of improvements in technology. The number of transistors on an integrated circuit, for example, is doubling every eighteen months, with corresponding improvements in price and performance. It is now possible to carry all of the phone traffic on Mother's Day on a single strand of fiber optic cable. New satellite technology offers the promise of "anytime, anywhere" communications.

II. Why is the NII an Administration priority?

The Administration views the NII as a powerful tool for addressing a wide range of economic and social challenges:

- The CEA estimates that telecom and related industries could grow from 9 percent of GDP to nearly 18 percent, assuming that legislation which promotes competition in this industry is passed.
- All industries are using information and communications technology to increase productivity, develop closer relationships with suppliers and customers, and respond more rapidly to changes in customer demand.
- Teachers are reporting that networking at the classroom can improve student performance by making learning more exciting. Students can communicate and collaborate with their peers and experts all over the world, take "virtual" field trips to museums and art galleries, access information through digital libraries that is ten minutes old instead of ten years old, and conduct real scientific exports using remote instruments or supercomputers.
- Information and communications technology can also be used to help achieve a wide variety of national objectives, such as expanding dissemination of government information, making the government "work better and cost less", reducing the administrative costs associated with our health care system, and improving environmental monitoring.

III. What is the government's role in promoting the NII?

The NII will be built, owned, and operated by the private sector. The government has an important role to play in the following areas:

1. **Telecommunications policy:** Our objective is to create an environment that will spur competition and private sector investment, while preserving universal service. Eventually, any company should be allowed to provide any service to any customer, and competition should replace rate regulation.
2. **Information policy:** The Administration seeks to make progress on issues such as dissemination of government information, protection of intellectual property in a networked environment, and privacy.

3. **Applications:** The Administration is promoting applications in areas such as life-long learning, health care, delivery of government services, digital libraries, telecommuting, electronic commerce, manufacturing, public safety and law enforcement, and environmental monitoring. In many cases, promoting the application requires that the government be a better user of information and communications technology.
4. **Research and development:** One of the Administration's highest priority research initiatives is the High Performance Computing and Communications program. This program will provide many of the technologies necessary to build and use the NII.

IV. What are the major budget (and management) issues for FY96?

1. Revenue generated from FCC spectrum auction

The Administration originally projected that granting the FCC auction authority would increase revenues by \$12.6 billion over the next 5 years. It is quite likely that this estimate may have been low. Some analysts in the private sector believe that the auctions could raise as much as \$20 billion. One issue that we think needs to be discussed is **whether some fraction of any revenue raised over \$12.6 billion should be used to finance elements of the Administration's NII initiative**, such as the goal set by the President and the Vice President to connect all classrooms, libraries, and hospitals to the NII by the year 2000.

2. National Science and Technology Council priorities:

Several of the NSTC priorities identified in the October 24th Gibbons memo directly support the NII initiative, including:

- HPCC -- \$100 million additional funding for NASA, ARPA, DoE, NSF);
- Technology for Learning Productivity -- \$88 million additional funding for Education, Labor, NSF, NASA, and ARPA;
- Integrated Data Base for Environmental Change -- \$15 million (several agencies);
- Digitization of federal resources (\$5 million for the Smithsonian);

3. Information Infrastructure Task Force report on NII applications

At the request of Vice President Gore, the IITF, chaired by Secretary of Commerce Ron Brown, prepared a report for OMB on government activities to promote NII applications in digital libraries, education, electronic commerce, environmental monitoring, government services, health care, manufacturing, and transportation. Many of the "government services" applications were called for in the National Performance Review Information Technology Report.

We urge OMB to give these investments a high priority, while recognizing that it will be difficult to exempt any expenditures from cuts in the current environment.

4. Additional investments required:

Although the review conducted by the IITF concluded that the government is doing a great deal to promote NII applications, it also revealed some "holes" in the portfolio of government activities. We would like to have the opportunity to work with OMB to address some of these issues before the agency budgets are locked up.

5. Use of technology for dissemination of government information and more efficient operations

We believe that relatively small investments made in putting government information and resources "on-line" will yield tremendous benefits. Each agency should be encouraged to set aside resources for (1) making their information available to the public using the Internet and other technologies; and (2) meeting agreed-upon goals such as government-wide e-mail.

6. Training/personnel:

Ultimately, much of our success in the NII initiative will require attracting and retaining skilled personnel to carry it out. Agencies should be encouraged to:

- Devote sufficient resources to train employees to use new technologies, and to determine how it could be used to carry out agency missions; and
- Explore alternative mechanisms of attracting experts in information and communications technology such as IPA authority (Intergovernmental Personnel Act). This allows agencies to bring in people from non-profit organizations such as universities.

7. Ongoing management of government programs:

Many existing government programs have the potential to contribute substantially to the Administration's NII agenda. In many cases, the Administration doesn't have to spend any new money, it just has to target existing resources more effectively. For example:

- The Department of Education's Eisenhower Professional Development could be used to train teachers how to use technology more effectively in the classroom;
- The Department of Labor's training programs could be used to foster the development of a market for interactive courseware;
- USAID could explore the use of telecommunications technologies as a tool for development assistance;
- USDA's National Agricultural Library could take the lead on digitizing information needed by rural Americans;
- A National Wireless Network for Public Safety and Law Enforcement would allow greater cooperation between law enforcement officials at all levels.

We would like the opportunity to work with OMB to identify some of these opportunities.



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MESSAGE: Found it! Please call if you
have any questions.
Dawn

The Privacy Working Group has recently issued the final version of its Principles for Providing and Using Personal Information. Comments and questions should be referred to Jerry Gates, Chair of the Working Group at ggates@info.census.gov.

**PRIVACY AND THE NATIONAL INFORMATION INFRASTRUCTURE:
PRINCIPLES FOR PROVIDING AND USING PERSONAL INFORMATION**

Privacy Working Group
Information Policy Committee
Information Infrastructure Task Force

Final Version

June 6, 1995

INTRODUCTION

The National Information Infrastructure ("NII"), with its promise of a seamless web of communications networks, computers, databases, and consumer electronics, heralds the arrival of the information age. The ability to acquire, process, send, and store information at an acceptable cost has never been greater, and continuing advances in computer and telecommunications technologies will result in ever-increasing creation, use, and storage of information.

The NII promises enormous benefits. To name just a few, the NII offers the possibilities of greater citizen participation in deliberative democracy, advances in medical treatment and research, and quick verification of critical information such as a gun purchaser's criminal record. These benefits, however, do not come without a cost: the loss of privacy. Privacy in this context means "information privacy," an individual's claim to control the terms under which personal information—information identifiable to an individual—is acquired, disclosed, and used.

Two converging trends—one social, the other technological—lead to an increased risk to privacy in the evolving NII. As a social trend, individuals will use the NII to communicate, order goods and services, and obtain information. But, unlike paying cash to buy a magazine, using the NII for such purposes will generate data documenting the transaction that can be easily stored, retrieved, analyzed, and reused. Indeed, NII transactional data may reveal who communicated with whom, when, and for how long, as well as who bought what, for what price. Significantly, this type of personal information is automatically generated, in electronic form, and is therefore especially inexpensive to store and process.

The technological trend is that the capabilities of hardware, software, and communications networks are continually increasing, while costs are continually decreasing, allowing information to be used in ways that were previously impossible or economically impractical. For example, before the NII, in order to build a profile of an individual who had lived in various states, one would have to travel from state to state and search public records for information about the individual. This process would have required filling out forms, paying fees, and waiting in line for record searches at local, state, and federal agencies, such as the departments of motor vehicles, deed record offices, electoral commissions, and county record offices. Although one could manually compile a personal profile in this manner, it would be a time-consuming and costly exercise, one that would not be undertaken unless the offsetting rewards were considerable. In sharp contrast, today, as more and more personal information appears on-line, such a profile can be built in a matter of minutes, at minimal cost.

These two converging trends guarantee that as the NII evolves, more personal information will be generated and more will be done with that information. Here lies the increased risk to privacy. This risk must be addressed both to secure the value of privacy for individuals and society and to ensure that the NII will achieve its full potential. Unless this is done, individuals may not participate in the NII for fear

that the costs to their privacy will outweigh the benefits. The adoption of principles of fair information practice is a critical first step in addressing this concern.

While guidance can be found in existing laws and principles, these need to be adapted to accommodate the evolving information environment. This changing environment presents new concerns.

* No longer do governments alone acquire and use large amounts of personal information; the private sector now rivals the government in acquiring and using personal information. New principles would thus be incomplete unless they applied to both the governmental and private sectors.

* The NII promises true interactivity. Individuals will become active participants who will create volumes of data containing the content of communications as well as transactional data.

* The transport vehicles for personal information—the networks—are vulnerable to abuse; thus, the security of the network itself is critical to the NII's future success.

* The rapidly evolving information environment makes it difficult at times to know how to apply traditional ethical rules, even ones that are well understood and accepted when dealing with tangible records and documents. Consider, for example, how an individual who would never trespass into someone's home might rationalize cracking into someone's computer as an intellectual exercise. In addition, today's information environment may present questions about the use of personal information that traditional rules do not even address.

These "Principles for Providing and Using Personal Information" ("the Principles") are offered to respond to this new information environment. The Principles attempt to provide meaningful guidance, striking a balance between abstract concepts and a detailed code. They are intended to guide all NII participants and should be used by those who are drafting laws and regulations, creating industry codes of fair information practices, and designing private sector and government programs that use personal information.

The limitations inherent in any such principles must be recognized. The Principles do not have the force of law and do not create any substantive or procedural right enforceable at law. They are not designed to produce specific answers to all possible questions; nor to single-handedly govern the various sectors that use personal information. The Principles should be interpreted and applied as a whole, pragmatically and reasonably. For example, those applying these principles should consider:

* the benefits to society from the use of personal information, recognizing that privacy interests are not absolute and must be balanced by the need for legal accountability, adherence to the First Amendment, law enforcement needs, and other societal benefits recognized in law;

* the extent to which the decision to provide personal information is voluntary, and the individual's expectations regarding the use of the information (taking into account the notice and the scope of consent provided);

* the sensitivity of the information and the potential for harm to the individual that could result from a particular disclosure or use of the information;

* the cost and effort required to protect against harm to individuals, recognizing that more sensitive information may require more costly and elaborate protection procedures than less sensitive information.

Where an overly mechanical application of the Principles would be particularly unwarranted, phrases with the words "appropriate" or "reasonable" appear in the text. This flexibility, built into the Principles to address hard or unexpected cases, does not mean that the Principles need not be adhered to rigorously. Finally, the Principles are intended to be consistent with the spirit of current international guidelines, such as the OECD Guidelines,^{1/} regarding the use of personal information. The Principles invite further international cooperation over the development and harmonization of global privacy policies, adherence to which will bolster the ongoing development of the Global Information Infrastructure.

PREAMBLE

The United States is committed to building a National Information Infrastructure ("NII") to meet the information needs of its people. This infrastructure, created by advances in technology, is expanding the level of interactivity, enhancing communication, and allowing easier access to services. As a result, many more users are discovering new, previously unimagined ways to acquire and use personal information. In this environment, we are challenged to develop new principles to guide all NII participants in the fair use of personal information.

Existing codes of fair information practice must be adapted to a new environment in which information and communications are sent and received over networks by users who have very different capabilities, objectives, and perspectives. In this interactive, networked environment, many new relationships are being formed among individuals, communication providers, and other NII participants. New principles must acknowledge that each party has a different relationship with the individual and has different uses for personal information.

New principles should not diminish existing constitutional and statutory limitations on access to information, communications, and transactions, such as requirements for warrants and subpoenas. Such principles should ensure that access limitations keep pace with technological developments. These principles should acknowledge that all elements of our society share responsibility for ensuring the fair treatment of individuals in the use of personal information, whether on paper or in electronic form. Moreover, the principles should recognize that the interactive nature of the NII can empower individuals to participate in protecting information about themselves. The new principles should also make clear that this responsibility can be exercised only with openness about the process, a commitment to fairness and accountability, and continued attention to security. Finally, the principles should recognize the need to educate all participants about the new information infrastructure and how it will affect their lives.

These "Principles for Providing and Using Personal Information" ("the Principles") recognize the changing roles of government and industry in information acquisition and use. Thus, they are intended to apply to both public and private entities. The Principles are designed to guide all NII participants as well as those who are drafting legislation and crafting policy regarding the use of personal information. They provide the basic framework from which specialized principles can be developed as needed.

Trade-offs will be inevitable in implementing the Principles because privacy interests are not absolute and must be balanced against the need for accountability, the value of an unabridged flow of information, and other societal benefits recognized in law, such as lawful law enforcement activities. For example, certain decisions about the flow of personal information have already been made for us by the First Amendment, and nothing in the Principles should be read to require policies derogating the constitutionally protected freedom of speech and the press. Given these sometimes conflicting interests and public policies, the Principles must be implemented pragmatically yet conscientiously, giving due consideration to issues such as the extent to which providing personal information is voluntary, the adequacy of the notice regarding how the personal information may be used, the scope of the individual's consent, and the cost of protecting information in light of the information's sensitivity.

PRINCIPLES AND COMMENTARY

I. General Principles for All NII Participants

1. Three fundamental principles should guide all NII participants. These three principles—information privacy, information integrity, and information quality—identify the fundamental requirements necessary for the proper use of personal information, and in turn the successful implementation of the NII. All NII participants should use appropriate means to ensure that these principles are satisfied.

I.A. Information Privacy Principle

Personal information should be acquired, disclosed, and used only in ways that respect an

individual's privacy.

2. The NII can flourish only if all participants respect information privacy. Information privacy is an individual's claim to control the terms under which personal information--information identifiable to an individual--is acquired, disclosed, and used. The level of privacy that must be respected is an individual's reasonable expectation, an expectation subjectively held by the individual and deemed objectively reasonable by society. Not all subjectively held expectations will be honored as reasonable. For example, an individual who posts an unencrypted personal message on a bulletin board for public postings cannot reasonably expect that personal message to be read only by the addressee.

3. What counts as a reasonable expectation of privacy under the Principles is not limited by what counts as a reasonable expectation of privacy under the Fourth Amendment of the United States Constitution. In many instances, society has deemed it reasonable to protect privacy at a level higher than that required by the Fourth Amendment. *See, e.g.*, Electronic Communications Privacy Act, 18 U.S.C. § 2701 (1988); Right to Financial Privacy Act, 12 U.S.C. § 3401 (1988); Privacy Act, 5 U.S.C. § 552a (1988). The Information Privacy Principle fully supports such possibilities.

4. As explained in later principles and commentary, an individual's privacy can often be best respected when individuals and information users come to some mutually agreeable understanding of how personal information will be acquired, disclosed, and used. However, in certain cases--for example, if the individual lacks sufficient bargaining power--purely contractual arrangements between individuals and information users may fail to respect privacy adequately. In such instances, society should ensure privacy at some basic level in order to satisfy the Information Privacy Principle.

I.B. Information Integrity Principle

Personal information should not be improperly altered or destroyed.

5. NII participants should be able to rely on the integrity of the personal information the NII contains. Thus, personal information should be protected against improper alteration or destruction.

I.C. Information Quality Principle

Personal information should be accurate, timely, complete, and relevant for the purpose for which it is provided and used.

6. Personal information should have sufficient quality to be relied upon. This means that personal information should be accurate, timely, complete, and relevant for the purpose for which it is provided and used.

II. Principles for Users of Personal Information**II.A. Acquisition Principles**

Information users should:

1. Assess the impact on privacy in deciding whether to acquire, disclose, or use personal information.

2. Acquire and keep only information reasonably expected to support current or planned activities.

7. The benefit of information lies in its use, but therein lies an often unconsidered cost: the threat to information privacy. A critical characteristic of privacy is that once it is lost, it can rarely be restored. Consider, for example, the extent to which the inappropriate release of sensitive medical information could ever be rectified by public apology.

8. Given this characteristic, privacy should not be addressed as a mere afterthought, once personal information has been acquired. Rather, information users should explicitly consider the impact on privacy in the very process of designing information systems and in deciding whether to acquire or use personal information in the first place. In assessing this impact, information users should gauge not just the effect their activities may have on the individuals about whom personal information is acquired, disclosed, and used; they should also consider other factors, such as public opinion and market forces, that may provide guidance on the appropriateness of any given activity.

9. After assessing the impact on information privacy, an information user may conclude that it is appropriate to acquire personal information in pursuit of a current or planned activity. A planned activity is one that is contemplated by the information user, with the intent to pursue such activity in the future. In all cases, the information user should acquire only that information reasonably expected to support those activities. Although information storage costs decrease continually, it is inappropriate to collect volumes of personal information simply because some of the information may, in the future, prove to be of some unanticipated value. Also, personal information that has served its purpose and is no longer reasonably expected to support any current or planned activities should not be kept.

10. The ability to acquire certain kinds of personal information does not mean that it is proper to do so. In certain cases, individuals have no choice whether to disclose personal information. For example, if the individual executes a transaction on the NII, personal information in the form of transactional data will typically be generated. In other cases, the choice may exist in theory only. Exercising certain choices may result in the denial of a benefit that individuals need to participate fully in society—for example, obtaining a license to drive an automobile. In such cases, society should establish some basic level of privacy protection in accordance with the Information Privacy Principle (I.A.).

II.B. Notice Principle

Information users who collect personal information directly from the individual should provide adequate, relevant information about:

1. Why they are collecting the information;
2. What the information is expected to be used for;
3. What steps will be taken to protect its confidentiality, integrity, and quality;
4. The consequences of providing or withholding information; and
5. Any rights of redress.

11. Personal information can be acquired in one of two ways: it can be collected directly from the individual or obtained from some secondary source. By necessity, the principles governing these two methods of acquiring personal information differ. While notice obligations can be placed on all those who collect information directly from the individual, they cannot be imposed uniformly on entities that have no such direct relationship. If all recipients of personal information were required to notify every individual about whom they receive data, the exchange of personal information would become prohibitively burdensome, and many of the benefits of the NII would be lost.

12. For those who collect personal information directly from the individual, the Notice Principle requires the individual to be given sufficient information to make an informed decision about his or her privacy. The importance of providing this notice cannot be overstated because the terms of the notice substantially determine the individual's understanding of how personal information will be used, an understanding that must be respected by all subsequent users of that information.

13. The Notice Principle specifically applies to personal information designated by law as a public record and to transactional data generated as a byproduct of a transaction. With respect to transactional data, this principle applies to all parties, including not only the party principally transacting with the

individual in order to provide some product or service, but also to those transaction facilitators such as communication providers and electronic payment providers who help to consummate these transactions. For example, if an individual purchases flowers with a credit card through an on-line shopping mall accessed via modem, the Notice Principle applies to all parties who collect transactional data related to the purchase, not only to the florist, but also to the telephone and credit card companies. Transaction facilitators would ordinarily provide notice at the time they establish an account, or when billing the customer.

14. What counts as adequate, relevant information to satisfy the Notice Principle depends on the circumstances surrounding the collection of information. In some cases--especially where there is a continuing relationship between the individual and the information collector-- notice need not be given before each instance that personal information is collected. For example, an information or communication service provider should ordinarily give notice when the individual subscribes to a particular service and perhaps periodically thereafter, not each time the individual uses the service. In other cases, the ordinary and acknowledged use of personal information is so clearly contemplated by the individual that providing formal notice is not necessary. For example, if an individual's name and address is collected by a pharmaceutical company that takes the order over interactive television simply to deliver the right medicine to the right person at the right address, no elaborate notice need precede taking the individual's order. However, should the pharmaceutical company use the information in a manner not clearly contemplated by the individual--for example, to create and sell a list of people afflicted with high blood pressure to health insurance companies--then some form of notice should be provided.

15. While the Notice Principle indicates what might constitute the elements of adequate notice, it does not prescribe a particular form for that notice. Rather, the goal of the Principle is to ensure that the individual has sufficient information in an understandable form to make an informed decision. Thus the drafters of notices should be creative about informing in ways that will help all individuals, regardless of age, literacy, and education to achieve this goal.

16. Finally, although the Notice Principle requires information collectors to inform individuals what steps will be taken to protect personal information, they are not required to provide overly technical descriptions of such security measures. Indeed, such descriptions might be unwelcome or unhelpful to the individual. Furthermore, they may be counterproductive since widespread disclosure of the technical security measures might expose system vulnerabilities, in conflict with the Protection Principle (II.C.).

II.C. Protection Principle

Information users should use appropriate technical and managerial controls to protect the confidentiality and integrity of personal information.

17. On the NII, personal information is maintained in a networked environment, an environment that poses tremendous risk of unauthorized access, disclosure, alteration, and destruction. Both insiders and outsiders may gain access to information they have no right to see or may make hard-to-detect changes in data that will then be relied upon in making critical decisions.

18. For example, our health care providers expect to become intensive participants in the NII. Through the NII, a hospital in a remote locale will be able to send x-rays for review by a radiologist at a teaching hospital in another part of the country. The potential benefits are obvious. Yet, such benefits will not be realized if individuals refuse to send such sensitive data because they fear that the NII cannot ensure that sensitive medical data will remain confidential and unaltered.

19. In deciding what controls are appropriate, information users should recognize that personal information should be protected in accordance with the individual's understanding and in a manner commensurate with the harm that might occur if it were improperly disclosed or altered.

20. In protecting personal information, information users should adopt a multi-faceted approach that includes both technical and managerial controls. As for technical controls, information users should, for

example, consider encrypting personal information, including the contents of communications and information generated from transactions. In addition, they should consider computerized audit trails, which help detect improper access by both insiders and outsiders. As for management controls, one could strive, for example, to create an organizational culture in which individuals learn about fair information practices and adopt these practices as the norm. Also, organizations could establish policies to forbid information acquired for one activity from being used for another unrelated activity.

II.D. Fairness Principle

Information users should not use personal information in ways that are incompatible with the individual's understanding of how it will be used, unless there is a compelling public interest for such use.

21. An individual's understanding encompasses the individual's objectively reasonable contemplation and scope of consent when the information was collected. As explained earlier, an individual's understanding depends principally on the notice provided by the information collector pursuant to the Notice Principle (II.B.) and obtained by the individual pursuant to the Awareness Principle (III.A.). Without a Fairness Principle, information use may know no boundaries and thus go beyond the individual's understanding.

22. If an information user seeks to use personal information in an incompatible manner, the user must first notify the individual and obtain his or her explicit or implicit consent. The nature of the incompatible use will determine whether such consent should be explicit or implicit. In some cases, the consequences to an individual may be so significant that the prospective data user should proceed only after the individual has specifically opted into the use by explicitly agreeing. In other cases, a notice offering the individual the ability to opt out of the use within a certain specified time may be adequate. Inherent in this principle is the requirement that whenever personal information is transferred from information user to user, the individual's understanding of how that personal information will be used must also be conveyed. Because all information users must abide by the Fairness principle, both information transferor and transferee bear a responsibility to ensure that the individual's understanding is transferred along with the information.

23. In deciding whether a particular use of information is "incompatible" with an individual's understanding, information users should evaluate whether the uses are permitted explicitly in the notice or are otherwise consistent with the notice. Any use of information beyond these conditions is incompatible with the individual's understanding. What is incompatible under this Principle is not limited to what has been interpreted as incompatible under the Privacy Act. *See* 5 U.S.C. § 552a.

24. The Fairness Principle cannot be applied uniformly in every setting. An incompatible use is not necessarily a harmful use; in fact, it may be extremely beneficial to the individual and society. There are some incompatible uses that will produce enormous benefits and have at most a trivial effect on the individual's information privacy interest. Research and statistical studies, in which information will not be used to affect the individual, are examples. Obtaining the consent of the individual to permit new statistical uses of existing data adds cost and administrative complexity to the process and risks impairing the research project. In other cases, personal information may be used for a significant public need recognized by society in a highly formal, open way (typically in legislation) that would be thwarted by giving the individual a chance to limit its use. One example would be the use of personal information in a law enforcement investigation for which the suspect's consent would be unlikely and even asking for such consent would be counterproductive to the investigation. Another example would be an incompatible use of personal information, made by the investigatory press, that is specifically protected and sanctioned by the First Amendment.

II.E. Education Principle

Information users should educate themselves and the public about how information privacy can be maintained.

25. The Education Principle represents a significant addition to the traditional principles of fair

information practice. There are many uses of the NII for which individuals cannot rely completely on governmental or other organizational controls to protect their privacy. Although individuals often rely on such legal and institutional controls to protect their privacy, many people will engage in activities outside of these controls, especially as they engage in the informal exchange of information on the NII. Thus, individuals must be aware of the hazards of providing personal information, and must make judgments about whether providing personal information is to their benefit.

26. The full effect of the NII on the use of personal information is not readily apparent, and individuals may not recognize how their lives may be affected by networked information. Because it is important that individuals and information users appreciate how the NII affects information privacy, all information users should participate in education about the handling and use of personal information. Traditionally, governments and schools have educated the public on matters of social rights and responsibilities, and they must continue to play a lead role. However, as major builders of the NII, the private sector has as crucial a role to play. Such education, which would help individuals minimize the risks to their privacy, could involve privacy telephone hotlines, Internet privacy "help" sites, and comprehensive marketing and publicity campaigns.

III. Principles for Individuals Who Provide Personal Information

III.A. Awareness Principle

Individuals should obtain adequate, relevant information about:

1. Why the information is being collected;
2. What the information is expected to be used for;
3. What steps will be taken to protect its confidentiality, integrity, and quality;
4. The consequences of providing or withholding information; and
5. Any rights of redress.

27. Increasingly, individuals are being asked to surrender personal information about themselves. Sometimes the inquiry is straight-forward; for example, a bank will ask for personal information prior to processing a loan request. In this case, one use for the information is clear—to process the loan application. There may, however, be other uses that are not so obvious, such as using some of that information for a credit card solicitation. Indeed, individuals regularly disclose personal information without being fully aware of the many ways in which that information may ultimately be used. For example, an individual may not realize that paying for medical services with a credit card creates transactional data that could reveal the individual's state of health.

28. The Awareness Principle recognizes that although information collectors have a responsibility to inform individuals why they want personal information, individuals also have a responsibility to understand the consequences of providing personal information to others. This is especially true in an interactive realm such as the NII, in which individuals can actively shape the terms of their participation. For example, when individuals have real choices about whether and to what degree personal information should be disclosed, they should take an active role in deciding whether to disclose personal information in the first place, and under what terms.

29. Of course, if individuals are to be held responsible for making these choices, they must be given enough information to make intelligent choices. This is how the Awareness Principle works in conjunction with the Notice Principle (II.B.) and more broadly with the Education Principle (II.E) to enable individuals to take responsibility over how personal information is disclosed and used.

III.B. Empowerment Principles

Individuals should be able to safeguard their own privacy by having:

1. A means to obtain their personal information;
2. A means to correct their personal information that lacks sufficient quality to ensure fairness in its use;
3. The opportunity to use appropriate technical controls, such as encryption, to protect the confidentiality and integrity of communications and transactions; and
4. The opportunity to remain anonymous when appropriate.

30. Individuals should have a means to obtain from information users a copy of their personal information and to correct information about them that lacks sufficient quality to ensure fairness in its use. The extent to which such means are provided depends on various factors, including the seriousness of the consequences to the individual of using the personal information and any First Amendment rights held by the information user.

31. Further, if the terms of the information collection are unsatisfactory, the individual should consider various self-initiated measures to safeguard privacy. For example, to safeguard the confidentiality or integrity of a communication, the individual should have the opportunity to use appropriate tools such as encryption. Also, to avoid leaving a data trail of transactional records, individuals should have the opportunity to remain anonymous, when appropriate. For example, anonymity would be appropriate when an individual browses a public electronic library or when an individual engages in anonymous political speech protected by the Constitution. See *McIntyre v. Ohio Elections Commission*, 131 L. Ed. 2d 426 (1995). In an ideal world, offering undecipherable encryption or absolute anonymity would serve to protect privacy with no negative effect. Unfortunately, in the real world, some will abuse these technologies and, in the process, harm others. It is beyond the scope of the Principles how encryption or anonymity can be offered to individuals for legitimate uses while minimizing their misuse. These issues must, however, be addressed if the NII is to achieve its full potential.

III.C. Redress Principle

Individuals should, as appropriate, have a means of redress if harmed by an improper disclosure or use of personal information.

32. Redress is required only when an individual is harmed. Designed for general applicability, the Redress Principle does not answer in any particular case whether harm has occurred at all or whether enough harm has occurred to warrant a specific form of redress. Those questions must be answered in the sectoral implementation of the Principles.

33. An improper use specifically includes a decision based on personal information of inadequate quality--information that is not accurate, timely, complete, or relevant for the purpose for which it is provided and used. The Redress Principle does not, however, set the level of culpability on the part of the information user necessary to warrant a specific form of redress.

34. When redress is appropriate, the Principles envision various forms including, but not limited to, informal complaint resolution, mediation, arbitration, civil litigation, regulatory enforcement, and criminal prosecution, in various private, local, state, and federal forums with the goal of providing relief in the most cost-effective manner possible.

PWG/IPC: junc6.nii

/1/ See Organization for Economic Cooperation and Development, *Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, Annex to Recommendations of the Council of 23rd September 1980.*

**NEXT GENERATION INTERNET
(Strawman – comments welcome)**

**Thomas A. Kalil
kalil_t@a1.eop.gov
White House National Economic Council
July 29, 1996**

GOAL

- **Define and execute a gov't–industry–academia partnership that will:**
 - **Have the same positive impact on the Net of the year 2000+ that the ARPANET and NSFNET had on today's Internet**
 - **Help meet the new advanced networking requirements for the research community and mission agencies**
 - **Promote networked applications and research on networked applications that will benefit our economy and our society**
 - **Maintain U.S. leadership in information and communications technologies**

ELEMENTS OF INITIATIVE

- 1. High-performance networking**
- 2. Networking technologies**
- 3. Networked applications**
- 4. Information society**
- 5. Roles and responsibility of industry, academia, and government**

HIGH-PERFORMANCE NETWORKING

- **High-performance connectivity between research institutions (universities, national labs, corporate research facilities)**
 - **Ideally, sufficient flexibility to permit industry-academic collaboration**
 - **Ideally, subsidies to end-users as opposed to subsidized network**
- **Internetworking of existing islands of broadband connectivity**
 - **agency research networks**
 - **regional networks such as MREN, NCIH, CaIREN, NYNET, etc.**
- **Wireless and wireline**

NETWORKING TECHNOLOGIES

- **Research, development and demonstration of technologies such as:**
 - **Integrated Services Internet, quality of service, RSVP**
 - **Metrics for reliability, availability, performance**
 - **Network security**
 - **IPv6, ATM, IP switching, etc.**
 - **Multicast**
 - **Nomadcity**
 - **Distributed computing**
 - **Active networks**
 - **Internetworking between wireline and wireless**
 - **Caching and replication**
 - **Network management**
 - **All-optical networks**

NEXT-GENERATION APPLICATIONS

- **Learning-on-demand**
- **Co-laboratories, multi-user virtual environments**
- **Distributed databases**
- **Knowledge extraction**
- **Program for seeding next-generation of applications software (future Gopher, Mosaic, CuSeeMe, Eudora, vic, vat, MOOs)**
 - **link to SBIR?**
- **Encourage linkages between universities and residential broadband trials (cable modems, FTTC, xDSL, etc.)**

INFORMATION SOCIETY

- **Research on universal design**
- **Research on rural access**
- **Research on challenges associated with low-bandwidth environments (e.g. graceful degradation, compression)**
- **Awards/contests that recognize contributions that individuals and small firms are making to the Net**
 - **Best shareware**
 - **Best noncommercial website**
 - **Best essay or white paper on future applications or capabilities of the Net**
- **Research on legal, ethical, economic and social issues of the global information society – and encouragement of solutions**
 - **E.g. PICS, privacy-enabled browsers**
- **Centers of Excellence in National Challenge areas**

ROLES AND RESPONSIBILITIES

■ **Private sector**

- **Discounts**
- **Early availability of leading-edge services**
- **Personnel exchanges**

■ **Government**

- **Incremental funding for FY98**
- **Internetworking of research networks**
- **Sponsorship of research on networks and networked applications**
- **Promotion of multi-vendor interoperability**

■ **Academia**

- **Willingness to match gov't funding for OC-3 and above**



OFFICE OF THE VICE PRESIDENT
WASHINGTON

September 27, 1996

Dr. Robert C. Heterick, Jr.
President, Educom
1112 16th Street, N.W.
Washington D.C. 20036

Dear Dr. Heterick:

As the members of Educom meet to discuss the future of research and education networking in the United States, I wanted to share my own views on this important subject.

It is clear that the Internet represents the biggest change in human communications since the printing press. Every day the Internet touches the lives of millions of people. Students log in to the Library of Congress and communicate in real time with a base station in Antarctica. Caregivers for people with Alzheimer's Disease participate in an "extended family" on the Cleveland FreeNet. Entrepreneurs get the information they need to start or expand a business and sell their products in overseas markets.

This would not have happened without an extraordinarily productive and far-sighted partnership between academia, industry, and government. Educom and its members should be proud of the important role they played in the emergence of the global Internet.

I believe that the time is right to revitalize this partnership. I believe that the time is right to work together to take networking and its myriad applications to the next level.

The benefits to higher education are clear. Researchers want to form "collaboratories," knowledge centers without walls. They want real-time, broadband access to databases, scientific instruments, supercomputers, and their peers. Universities want to promote distance learning, particularly for the growing number of non-traditional students.

In today's knowledge-intensive economy, Americans need expanded access to life-long learning. Many critical national priorities in defense, energy, space, health and the environment can only be met with dramatic improvements in networking technologies. A new initiative in networking and its applications would also help maintain the competitiveness of key high-tech sectors of the U.S. economy and generate high-wage jobs.

I realize that any initiative in this area will require additional resources. I intend to make this an Administration priority so that the government can play a constructive role in creating the foundation for the next generation Internet.

All of us must contend with increasing demands and shrinking resources. As you decide whether or not the time is right to advance the state-of-the-art in research and education networking, I hope you will keep in mind what we have accomplished to date, and the exciting challenges and opportunities that await us.

Sincerely,

A handwritten signature in black ink, appearing to read 'Al Gore', written in a cursive style.

Al Gore

AG/tak

THE WHITE HOUSE
WASHINGTON
MEMORANDUM

To: Laura D'Andrea Tyson
cc: Dan Tarullo
From: Tom Kalil TAK
Re: Telecommunications issues for 1997
Date: November 14, 1996

Telecommunications Act of 1996

There is no question that the biggest telecommunications issue will be the implementation of the Telecommunications Act of 1996. This act has the potential to lead to more competition, lower prices for consumers, and faster deployment of an advanced broadband infrastructure. The universal service provisions ("Snow-Rockefeller") can be used to provide schools, libraries and rural hospitals with subsidized telecommunications service.

The FCC has a great deal of authority and responsibility to draft regulations that implement the act. As a result, the fights between interest groups that occurred over the legislation have now shifted to the FCC and the courts. For example, GTE, some of the Regional Bell Operating Companies (RBOCs), and a number of state regulators have used the courts to appeal the FCC rules on interconnection. Reed Hundt said that as a result, "the states have complete control over the prices new entrants will pay to share the existing telephone networks during the critical period when competition is supposed to begin in local markets."

Probably the most sensitive and volatile issue is the impact that the bill could have on cable and telephone rates. In 1995, cable rates rose more than 10 percent. Although competition should eventually lead to lower cable rates, the bill will deregulate prices for "expanded basic" cable rates by March 31, 1999, and for some basic services for small cable systems immediately. On the phone side, the RBOCs will argue that lowering access charges (which is what the long distance companies want to do) will lead to higher residential rates. State regulators will try to use price caps and universal service funds to avoid "rate shocks" -- particularly in rural areas.

Generally, the Administration makes its views known to the FCC by filing comments through the Commerce Department's National Telecommunications and Information Administration (NTIA). On major filings, NTIA will coordinate with the

White House and other agencies (e.g. Justice). There have been a few issues (telecommunications access for schools and libraries, kid's TV) where the White House has played a more visible and direct role.

I have attached (a) a summary of the rulemakings that NTIA intends to be most involved in; and (b) a summary of the Telecommunications Act prepared by NTIA.

Other telecommunications issues:

- Spectrum issues will inevitably crop-up, because (a) auctions are a popular "pay for" for Administration initiatives; (b) companies are interested in getting more spectrum to roll-out new wireless services; and (c) law enforcement and public safety agencies are anxious to get spectrum as well.
- Although I am not directly involved in the WTO talks and Intelsat restructuring, these are obviously both critical issues.
- A fight is looming over access charges for Internet service providers. Historically, data communications companies have been exempt from access charges. Local telephone companies are complaining that customers are calling up their Internet service providers for hours at a time, and jamming up their networks. Computer and Internet companies believe that the RBOCs should upgrade their networks to handle data traffic more efficiently.

Please let me know if you need any additional information.

OVERVIEW OF MAJOR PENDING TELECOMMUNICATIONS ISSUES

- On February 8, 1996, President Clinton signed landmark telecommunications reform legislation into law. The overwhelming bipartisan support for this new law demonstrates America's commitment to ensuring that all citizens benefit from the information superhighway now and in the next century.
- The new law, among other things: i) opens up competition between local telephone companies, long distance providers, and cable companies; ii) helps connect all classrooms, libraries, and hospitals to the information superhighway by the end of this decade; iii) gives families control of the programming that comes into their homes through television; and iv) prevents undue concentration in television and radio ownership so that a diversity of voices and viewpoints can continue to flourish in this Nation.
- The Federal Communications Commission (FCC) is now in the process of implementing the new Act. NTIA's plan has been to participate in as many rulemaking proceedings as resources allow, but we have placed a high priority on a number of major rulemakings, including the following:
 - Universal Service: Pursuant to the Act, a panel of Federal and State regulators (the Federal-State Joint Board) recently issued recommendations on new universal service policies. The Board's major recommendations include the following: (1) defining the package of basic telephone services that must be made available and affordable for all Americans; (2) creating a mechanism for providing subsidies to so-called high cost areas, which is based on the use of forward-looking costs and the use of proxy models for determining company costs; and (3) establishing a fund (capped at \$2.25 billion) for providing low cost telecommunications services to schools and libraries. It is expected that the FCC will seek public comment on the Joint Board's recommendations. Additionally, the Board deferred action on a number of contentious issues (such as how to provide universal service funds to so-called "high cost" areas and how large the universal service support fund should be) that will be the subject of public comment. NTIA intends to participate actively in these further proceedings.
 - Interconnection: The Act requires most local telephone companies to interconnect with competing local service providers on reasonable terms. The FCC adopted implementing regulations on August 8, but the rules concerning the pricing of interconnection and unbundled network elements were challenged by local telephone companies and state regulatory commissions before the Eighth Circuit Court of Appeals. In October, the court stayed the effective date of the pricing rules, and the Supreme Court on appeal declined to lift the stay. Private parties continue to negotiate agreements (subject to review and arbitration by State regulatory commission) to implement the Act's interconnection requirements. It is unclear whether further FCC proceedings in this area will be in the offing.

- Access Charges: The Commission will soon commence a rulemaking to reform its prevailing access charge regime, the regulatory mechanism by which long distance carriers compensate local telephone companies for the use of local network facilities to originate and terminate interstate long distance calls. The current system must be reformed to make it more compatible with the competitive local exchange market structure that the 1996 Act is designed to promote.
- BOC Entry into Long Distance: It is anticipated that, beginning late this year or early next year, the Bell Operating Companies will begin petitioning the FCC for permission to offer interLATA (long distance) telecommunications services. NTIA expects to participate actively in those proceedings (in close coordination with the Justice Department).
- Cable Television: The Act deregulates the rates charged by cable television systems in areas where local telephone companies offer comparable programming directly to subscribers. The FCC is determining whether telephone companies must offer programming to a certain percentage of households in a community in order to provide sufficient competitive to justify deregulating cable rates.
- Broadcast Ownership Policies: The FCC has commenced a rulemaking to review a number of its local broadcast ownership policies, which control how many radio or television stations that an individual or firm may own in a single market. In a related matter, the Justice Department recently approved the merger of Westinghouse and Infinity Broadcasting, the nation's two largest radio broadcasters. The Department did, however, require the new firm to sell off one radio station each in Philadelphia and Boston, so that the merged company's share of advertising revenues in either market did not exceed 40 percent. Both the Department of Justice and NTIA will likely monitor the FCC's rulemaking closely to ensure that any changes to the ownership rules do not adversely affect either competition or diversity.

SUMMARY OF TELECOMMUNICATIONS ACT OF 1996

Local Competition

- Under the Act, each telecommunications carrier has a duty to interconnect with other telecommunications carriers. The Act sets forth specific requirements that local exchange carriers (LECs) must fulfill to meet this duty. Certain exceptions from these requirements are allowed for rural LECs and LECs with fewer than 2% of the Nation's subscriber lines.
- Interconnection agreements negotiated between a LEC and other telecommunications carriers must be approved by a State within the Act's deadlines. If a State fails to act, the Federal Communications Commission (FCC) can assume the responsibilities of the State.
- No State or local government may prohibit any entity from providing interstate or intrastate telecommunications services. Limited, nondiscriminatory exceptions to this rule are allowed for certain State and local government activities related to public rights-of-way, consumer protection, and other similar issues.
- The FCC must establish regulations to allow public utility holding companies to offer telecommunications services.

Universal Service

- A Federal-State Joint Board will make recommendations to the FCC regarding changes to the definition and funding of universal service. Each telecommunications carrier that provides interstate and intrastate telecommunications services must contribute, on an equitable and nondiscriminatory basis, to universal service.
- Upon request, all telecommunications carriers must provide universal service to K-12 schools, libraries, and rural and non-profit hospitals at preferential rates.
- The Communications Act is amended so that the FCC's general universal service responsibility includes making communications available to all people of the United States "without discrimination on the basis of race, color, religion, national origin, or sex."
- The Act requires telecommunications equipment and services to be accessible to and usable by individuals with disabilities, to the extent this is readily achievable.

Provisions Concerning Bell Operating Companies (BOCs)

- Upon enactment, a BOC may apply to the FCC for authorization to provide in-region long distance services if it has entered into an approved interconnection agreement and meets the "competitive checklist" and other requirements in the Act. The FCC may approve the authorization if the BOC meets these requirements and the authorization is in the public interest. A BOC must provide such service through a separate affiliate for 3 years after enactment. A BOC may also, upon enactment, provide out-of-region and incidental long distance services, as well as already authorized long distance services.
- A BOC may engage in manufacturing if it is in compliance with the Act's interconnection, nondiscrimination, and cross-subsidy requirements. Such activity must be done through a separate affiliate for 3 years after enactment.
- BOCs are permitted to engage in electronic publishing through a separate affiliate or joint venture, subject to the Act's non-discrimination and cross-subsidy requirements. These requirements sunset in 4 years after enactment.
- BOCs are not permitted to engage in alarm monitoring before 5 years after enactment (except for certain already authorized activities).

Broadcast Services

- The Act encourages the FCC to limit initial eligibility for advanced television (ATV) licenses to existing broadcasters. Licensees that use ATV spectrum for services other than ATV for which a fee or other compensation is received must in turn pay a fee to the FCC based on the market value of the spectrum used for these "pay" services.
- The Act extends radio and TV license terms to 8 years and loosens rules on license renewal, eliminating the need for comparative hearing in most cases.
- The Act eliminates the FCC's national ownership cap for radio stations and modifies local radio ownership limits. The Act increases the national audience reach for TV station ownership to 35% from 25%. The FCC will conduct a rulemaking to determine whether local TV ownership limitations should be modified or eliminated.
- The Act eliminates the FCC's network-cable cross ownership rule and the statutory broadcast station-cable cross ownership restriction, but retains the FCC's regulatory broadcast-cable and broadcast-newspaper ownership bans.

Cable Services

- Regulation of expanded basic cable rates sunsets on March 31, 1999. The Act deems effective competition to exist (and therefore rate regulation to cease) if a local telephone company offers "comparable" video programming in a community. The Act deregulates rates for cable programming services and some basic services offered by small cable systems immediately.

Telephone Company Provision of Video Programming

- The Act gives telephone companies the option of providing programming on a common carrier basis or as a conventional cable operator. If it chooses the former, the telephone company will face less regulation but will also have to comply with FCC regulations requiring "open video systems."
- The Act generally bars, with certain exceptions including most rural areas, acquisitions by telephone companies of more than a 10% interest in cable operators (and vice versa) and joint ventures between telephone companies and cable systems serving the same areas.

Regulatory Reform

- The Act requires the FCC to forbear from regulating telecommunications carriers or services if it determines that regulation is not necessary to ensure reasonable rates, protect consumers, or otherwise promote the public interest.
- The Act removes current restrictions on foreign officers and directors serving on the board of broadcast and other radio licensees or their holding companies. (The Act, however, retains the overall equity and voting control limits on such foreign ownership as set forth in 47 U.S.C. 310(b).)

Obscenity and Violence

- The Act makes illegal the transmission by computer of obscene or indecent communications to minors. Certain "good faith" defenses are provided for on-line services and users.
- To address violence on television, the Act requires TV manufacturers, within 2 years of enactment, to include blocking technology (the "V-chip") in all TV sets. The Act encourages the broadcast and cable industries to create a voluntary rating system within one year. If they do not create a rating system, the FCC would establish an Advisory Committee to recommend a rating system. Use of ratings would be voluntary, but any rating must be sent electronically.

Miscellaneous Provisions

- The President must prescribe procedures by which Federal agencies may facilitate appropriate access to Federal property for the siting of wireless services. State and local governments must act within a reasonable time period on siting requests for wireless services.
- A Telecommunications Development Fund under the auspices of the FCC is established for the purpose of promoting access to capital for small businesses and promoting delivery of telecommunications services to underserved rural and urban areas. The fund is financed through the interest on spectrum auction deposits.
- The Act establishes in the District of Columbia the National Education Technology Funding Corporation, a nonprofit corporation which has authority to receive assistance from Federal agencies for the purpose of stimulating investment in education technology infrastructure through public-private ventures.

THE WHITE HOUSE
WASHINGTON

To: Tony Podesta, Tim Newell

Fr: Tomi Kallit

Let me know what you
think.

I like it

especially a focus
on workplace issues
+ individual productivity

Podesta

Economic and Social Impact of Information Technology: (Kalil -- Draft 7/23/97)

I. Background

Information and communications technologies are having a pervasive impact on our economic, political, social, and cultural life. As we enter the 21st century, we should expect this trend to accelerate, as information technology becomes more powerful and widely available. For example:

- Our ability to store, process, and transmit information is continuing to improve at exponential rates. The semiconductor industry is already developing the technology that will allow them to put billions of transistors on a single integrated circuit. Fiber optics technology will eventually allow us to transmit all of the phone traffic on Mother's Day on a single strand of fiber.
- The Internet, which connected 2,000 computers in 1985, now connects 16 million computers, and is continuing to double in size every year.
- Satellite and wireless systems will soon provide users with "anytime, anywhere" communication.
- Remote sensing systems offering 1-meter resolution imagery of the entire planet will be commercially available in 1998.
- "Building blocks" for new applications are being developed such as digital signatures, electronic payments, shared virtual environments for collaboration, intelligent agents, audio and video-on-demand, reusable software objects, tools for discovering and retrieving information, and speech recognition.
- Applications are being developed in areas such as entertainment, electronic commerce, delivery of government services, digital libraries, health care, life-long learning, environmental monitoring, geographical information systems, "collaboratories" for scientific research, community networks, intelligent transportation systems, access to information for people with disabilities, collaborative design, crisis management, etc.

Despite the significant economic and social impacts of this technology, the federal government has not sponsored a great deal of social science research in this area. For example, there is no equivalent in the information technology area of the ELSI (Ethical, Legal and Social Implications) Research Program of the National Human Genome Research Institute. ELSI supports basic and applied research that identifies and analyzes ethical, legal and social issues surrounding human genetics research, such as: discrimination in insurance and employment based on genetic information; when and how new genetic tests should be integrated into health care services; and informed consent in genetics research.

Additional support for social science research on information and communications technology -- and greater interaction between social scientists and specialists in IT -- is critical for a variety of reasons:

- As discussed above, this technology will have a pervasive impact on our economy, society, culture, and political system. Although there are plenty of pundits who are willing to speculate on the impact, much of this speculation is occurring in the absence of solid, empirical data.
- Insights derived from social science research may be able to contribute to the design of information systems. The design of groupware, for example, should be informed by an understanding of how groups of people actually share information and make decisions.
- The technology is raising a series of important, complicated policy issues, such as privacy, intellectual property rights in a digital environment, the emergence of information "haves" and "have-nots", and the impact of state and national regulation on the global Internet. Social scientists may be able to make a contribution to these ongoing debates by conducting additional empirical research on the impact of IT, but also engaging in normative discussions about what "ought" to be.
- Some of the social issues raised by information technology may be partially addressed through technical solutions. For example, the World Wide Web Consortium is developing a set of technologies known as the Platform for Privacy Preferences (P3). Using the technology, a user will be able specify his or her privacy preferences. Web sites that fall within the range of a user's preference will be accessed "seamlessly," otherwise users will be notified of a site's practices and have the opportunity to agree to those terms or other terms and continue browsing if they wish. Support for these kinds of activities could solve some of the problems raised by new technology while reducing the need for legislation or regulation.
- Many of the barriers to realizing the benefits of these new information and communications technologies are not technical, but social, political or legal. For example, deployment of telemedicine is being slowed by state-by-state licensure of doctors. The use of geographical information systems is hampered by the difficulty of sharing GIS data across organizational boundaries. Widespread use of electronic commerce will require mechanisms for creating trust between parties in an online environment. Social science research could shed light on these barriers and possible solutions.

II. Examples of research topics

Clearly, there is a large number of potential research topics in this area. Below are a few examples:

1. **Diffusion of innovation:** Companies are scrambling to develop mechanisms to share "best practices" within their firm - often using groupware and intranets. Texas Instruments, for example, found such wide disparity in the yields of their wafer fabrication sites that they launched an effort to create a "free fab" by closing the productivity gap between their world-class fabs and the manufacturing facilities that were lagging behind. These same techniques could be used to promote diffusion of socially useful innovation that is occurring at the state and local level. Does the literature on diffusion of innovation (e.g. Rogers, 1995) and computer-supported collaborative work shed any light on how to design technical and social systems that will encourage diffusion of best practices, not only within a firm, but within a community of practice?
2. **Evolution of knowledge:** Drexler argues that properly designed hypertext systems can contribute to the evolution of knowledge, by, for example: enabling authors to link pithy ideas to existing content (meaningful one-sentence publications); allowing critics to attach comments directly to a target work; enabling easier formation of intellectual communities; and allowing authors to express networks of facts and relationships. How are new tools (the Web, public annotation, collaboratories, e-print archives, etc.) changing the conduct of science, scholarly debate, and public discourse? Why are they having different impacts in different fields? What are the limitations of today's tools, and how might they be overcome?
3. **Self-regulation:** Some argue that many of the social issues associated with information and communications technology (e.g. consumer privacy) - can and should be dealt with through industry codes of conduct and self-regulation. Under what circumstances can industry self-regulation be effective?
4. **Residential broadband deployment:** Why have local telephone and cable companies curtailed their plans for deployment of broadband services to the home? What effect will current pricing and unbundling regulations have on incentives by telecommunications companies to invest in broadband networks?
5. **Network externalities:** What public and private mechanisms have proven effective in dealing with the "chicken and egg" nature of network industries?
6. **Applications:** A wide range of applications for information and communications technologies have been identified (see above). What can social science contribute to (a) evaluation of the costs and benefits of IT in these application domains; and (b) identifying barriers to the adoption of these applications?

7. **Productivity paradox:** Economists continue to argue about why increases in U.S. productivity have remained sluggish despite large private sector investments in information technology. What additional empirical research, particularly at the sectoral level - could shed light on this issue?
8. **Informed participation:** Some argue that these new information and communications technologies will allow more opportunities for "informed participation" and higher levels of transparency and disclosure in political and community affairs at the national, state and local level. For example, residents of Los Angeles were able to see 3-D visualizations of proposals for rebuilding the city after the riots before zoning changes were made. Community activists are being trained to use the Toxic Release Inventory data to discover which companies are emitting high levels of pollution in their neighborhood. More and more elected officials accept e-mail from constituents. What are the circumstances in which technology can be effective in expanding opportunities for informed participation? How will elected officials and policy-makers cope with the "information overload" problem?
9. **Changing role of key institutions:** Information and communications technologies will create both threats and opportunities for existing organizations. For example, some universities may be able to serve non-traditional students (e.g. adult students who can't attend a university full-time) by expanding distance learning services. Others may lose students and tuition to "virtual universities" or publishers that can offer courses at a lower cost per credit hour. Some have suggested that the functions of the university (administration, degree-granting, instruction, physical facility) will be "unbundled." How are key organizations responding to IT-related challenges and opportunities? If existing organizations are unable or unwilling to adapt, will new organizations emerge?

III. Current efforts

NSF is currently supporting some research in this area. The Social Dimensions of Engineering, Science, and Technology (SDEST) program, which has a budget of approximately \$2.3 million per year, is supporting several projects related to information and communications, such as an evaluation of whether a community network project in Minnesota is expanding access to resources and civic participation, and a study of the costs and benefits of anonymous communication online. In addition, there is another NSF program called Information Technology and Organizations which is supporting some social science research, such as a study of the impact of IT on American households, and an analysis of the development of trust among groups working online. NSF is also sponsoring a National Research Council study to develop a research agenda on the economic and social impact of information technology.

Although both the SDEST and ITO programs are supporting some worthwhile research, more needs to be done. The SDEST program, for example, only has a budget of \$2.3 million to support research on all issues related to both: the ethical and value dimensions of science,

engineering, and technology; and the management and direction of research, science, and technology.

IV. Elements of an initiative:

(1) **The government should establish a program focused on information and communications similar to the ELSI (Ethical, Legal and Social Implications) Research Program of the National Human Genome Research Institute.**

As noted earlier, there is no "ELSI" for information and communications. Such a program could support:

- One or more "centers" (which could be either real or virtual).
- Social science research by individual researchers.
- Inter-disciplinary teams of computer scientists and social scientists that seek to address social issues at the "protocol level" - such as the Platform for Internet Content Selection (PICS) and the Platform for Privacy Preferences (P3).
- Graduate or post-graduate fellowships for social scientists interested in exploring information and communications issues, or computer scientists interested in exploring social issues.
- Workshops and other community-building activities.

An ELSI program could also support efforts to "mediate" between policy makers and social scientists. Unfortunately, policy makers usually don't have time to pour over scholarly journals or attend conferences. These efforts might include:

- "Headlines" of relevant social science research with links to full text.
- Regularly updated, on-line literature reviews covering key topics.
- Directories of specialists in particular areas.
- Mechanisms that allow for funding of "snap" studies if policy makers are forced to make decisions under time constraints.

(2) Certain government-supported information and communications initiatives should include a social science component.

For example:

- The Digital Libraries Initiative has convened workshops on the social aspects of digital libraries. [See <http://www.dlib.org/groups/socialaspects.html>]
- One of the foci of the Next Generation Internet initiative is "quality of service" - which will not be widely deployed without a workable economic/business model.
- The President's Council of Advisers on Science and Technology is recommending that the Administration substantially expand its investment in evaluation of educational technology.

(3) Statistical agencies (e.g. Census Bureau, BLS) should expand their collection of data in this area.

An example of this is Census data on computer use and ownership.

(4) Companies could agree to share market-research data with a consortium, which could be made available to social scientists.

Although companies conduct market-research data for proprietary reasons, some of the data might be helpful for social scientists.

References:

K. Eric Drexler. "Hypertext Publishing and the Evolution of Knowledge." *Social Intelligence*, Vol. 1, No. 2, pp.87-120.

NSF Workshop on Information Technology and Organizations. See <http://www.cs.colorado.edu/~laurav/workshop/itogramtees.html>. This page has pointers to the abstracts of the roughly 50 PIs whose work is being supported by the NSF-ITO program.

Everett Rogers. Diffusion of Innovations. New York: The Free Press, 1995.

6-14-99

THE WHITE HOUSE

WASHINGTON
June 8, 1999

MEMORANDUM FOR THE PRESIDENT

FROM: GENE SPERLING

RE: BOUCHER TELECOMMUNICATIONS BILL

WILLIAM TO
DISTRIBUTION WILLIAM
WALKER

CC: UP

copied
VP
Sperling
Podesta

Summary

You had asked for the Administration's position on Representative Boucher's legislation (*The Internet Growth and Development Act*), following a conversation you had had with Ivan Seidenberg, the CEO of Bell Atlantic. The Administration has not taken a position on his specific legislation, but the Electronic Commerce Working Group (led by the National Economic Council and the Office of the Vice President) is developing an Administration position on a variety of issues related to broadband services. As with all telecommunications policy, the issues raised by the Boucher bill are hotly contested by different segments of the telecommunications and Internet industry.

Background on Broadbands

Today, most consumers access the Internet over an ordinary phone line using a modem. This is fine for e-mail, but downloading movies and graphics is like watching paint dry. Cable and telecommunications companies are starting to deploy "broadband" networks that are at least 20 times faster than an ordinary phone line. In the future - more and more Americans will access the Internet over these (and other) broadband networks. There is a growing debate in the Congress about how these broadband networks should be regulated (or deregulated) by the Federal Communications Commission.

Background on Boucher's Bill

There are three provisions that are central to the bill:

1. It would allow the "Baby Bells" to provide Internet service that crosses "LATA" (long-distance) boundaries, even if they have not done everything that is required under the Telecommunications Act to open up their local network to competition. (This "quid pro quo" was at the heart of the 1996 Telecommunications Act).
2. It would allow the "Bay Bells" to provide high-speed Internet access on a deregulated basis.

3. It would prevent cable companies from exclusively bundling their high-speed network with their Internet service – and require them to open up their network to other Internet service providers.

In short, it reduces regulation on the Baby Bells and increases regulation on cable networks. It will be supported by Baby Bells, and opposed by long-distance companies and cable companies. Internet Service Providers will be split.

Pros

1. It gives Baby Bells more regulatory freedom, and may increase their investment in broadband networks.
2. It reduces the risk that cable companies will monopolize the Internet.

Cons

1. It will reduce the incentive of the Baby Bells to open up their local network in exchange for entry into the long distance market. This "quid pro quo" was at the heart of the Telecommunications Act of 1996, which the Administration supported.
2. It could deter investment in broadband networks by the cable companies by imposing additional regulations on them. It is arguably too soon to know whether these regulations are necessary.

Tom Kahl

Guins

At DDC Meeting last night,
Eric Galt & Bill Hambley Crummen
asked us to support a Bill
Reid Promotion approving to
degenerate the future - help it
with various metrics to meet case -
Pls look into advice -

TK

copied
Spurling
Podesta

5.14.99

National Nanotechnology Initiative

Tom Kalil

National Economic Council

IWGN Co-chair

Draft September 27, 1999

What is nanotechnology?

- Ability to manipulate matter at the atomic and molecular level to make things with novel, useful properties
- A nanometer is one-billionth of a meter, 10,000 times smaller than diameter of a human hair

Case for a national initiative

- Huge potential payoff, could be as significant as electricity, transistor, Internet
- Long-term, high-risk research needed - important government role
- Interdisciplinary - will draw heavily on biological and physical sciences, and engineering

Case for a national initiative

- High-level of enthusiasm in community, limited by \$ not ideas
- Early, promising results
- Important for multiple agency missions
- Need nanotechnology to stay on IT price:performance curves
- Need to prepare S&E workforce

Case for a national initiative

■ “If I were asked for an area of science and engineering that will most likely produce the breakthroughs of tomorrow, I would point to nanoscale science and engineering.”

- Dr. Neal Lane, April 1998

Timeline for NNI

- Sept. 1998 - NSTC establishes Interagency Working Group on Nanotechnology (IWGN)
- January 1999 - industry, academia, gov't workshop on research priorities
- August 1999 - first draft of IWGN plan
- October 1999 - PCAST nanotech panel
- February 2000 - release of initiative?

Elements of initiative

- Fundamental research
- Grand challenges
- Centers of excellence
- Education and training
- Research infrastructure

Examples of Grand Challenges

- Develop materials as strong as steel but 10 times lighter
- Develop nanocomputer 1,000 times more powerful and million times more energy efficient
- Detect tumors a few cells in size

Examples of Grand Challenges

- Double energy efficiency of solar cells
- Remove smallest contaminants from air (< 20 nm) and water (<200 nm)
- Continuous presence outside solar system

Overall budget numbers

	Total (in millions)	Delta (over FY00)
FY99	\$294.4	
FY00	\$256.4	
FY01 (guidance)	\$281.4	+25.0
FY01 (above guidance)	\$452.7	+196.3
FY01 (IWGN)	\$529.4	+273

Request by funding mode

Funding mode	IWGN (delta from FY00)
Fundamental research	+83
Grand challenges	+80
Centers	+50
Education and training	+10
Research infrastructure	+50

Request by agency (delta from FY00)

Agency	FY01 above guidance	FY01 IWGN
DOC/NIST	\$11.1	\$21.0
DoD	\$0	\$50
DOE	\$70.0	\$70
NASA	\$15.0	\$15.0
NIH	\$0	\$17.0
NSF	\$100	\$100.0

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

December 17, 1999

December 17, 1999

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Use of Information Technology to Improve Our Society

The Internet and other information and communications technologies are changing the way we work, learn, communicate with each other, and do business. These technologies are shaping our economy and our society in the same way that the steam engine and electricity defined the Industrial Age.

In recent years, information technology has driven the U.S. economy. Businesses are scrambling to use the Internet to increase productivity, boost exports, cut the time required to develop new products, and forge closer relationships with customers and suppliers. My Administration has pursued a market-led approach to global electronic commerce that relies whenever possible on private sector leadership and seeks to eliminate legal and regulatory barriers to electronic commerce while protecting the public interest.

The Internet has the potential to enhance civil society as well as to boost commerce. Used creatively, the Internet and information technology can be a powerful tool for tackling some of our toughest social challenges as well as fostering economic growth. Information technology can and is being used to make it easier for working adults to acquire new skills, increase access to healthcare in isolated rural communities, improve the quality of life for people with disabilities, and strengthen our democracy.

My Administration has led the effort to explain and support the commercial and societal benefits of information technology to the American people. However, we can and must do more. To that end, I am directing executive department and agency heads in this memorandum to take certain actions. As they carry out these actions, they should: (a) adopt policies that will remove barriers to private sector investment in Internet applications; (b) explore partnerships with companies, State, local, and tribal governments, and other entities, such as nonprofit organizations and universities; (c) explore innovative mechanisms for fostering a national discussion on the potential of the electronic society; (d) consider other policies to promote the electronic society, such as the establishment of national goals; and (e) review the recommendations of the President's Information Technology Advisory Committee, particularly as they relate to support for information technology applications with broad societal benefits.

Therefore, to further promote the broader social benefits of the Information Age to the American people, I direct the officials in this memorandum to take the following actions:

1. The Secretary of Health and Human Services shall identify additional steps that can be taken to promote expanded access to higher quality, cost-effective health care to underserved rural communities and inner city clinics, and other health-care applications of information technology.

2. The Secretary of Education shall support and encourage States and local communities to make "school report cards" available on the Internet. The Secretary of the Interior shall make it possible for "school report cards" on Bureau of Indian Affairs schools and tribally controlled schools to be available on the Internet.
3. The Secretaries of Education and Labor shall work with States and institutions of higher education to remove legal and regulatory barriers to high-quality distance learning, to increase awareness of the availability of distance learning as an alternative means of education and training, and to find ways to promote the earning of credentials through distance learning. The Secretary of Education shall assist the Tribal Colleges and Universities in developing associate and baccalaureate programs in information technology, using innovative distance learning technology.
4. The Secretary of Education shall propose the next phase of my Administration's Educational Technology Initiative. The next phase should address teacher training, the integration of technology in the curriculum, the evaluation of technology, the market for educational software and web content, the need for more multimedia computers in the classroom, and the need for investments in educational technology research and development.
5. The Secretary of Labor shall determine how telecommuting might be used to help more disabled Americans get jobs and to provide jobs for Americans located in geographic regions outside traditional commuting areas, including isolated tribal communities.
6. The Secretary of Education and the Director of the National Science Foundation shall develop a research agenda for making the Internet and information technology more usable by persons with disabilities. The Secretary of Commerce shall encourage the private sector to make web content, software, and development tools more accessible for people with disabilities by adopting technical standards consistent with the Web Accessibility Initiative.
7. The Administrator of the Environmental Protection Agency shall develop a national strategy for promoting environmental applications of information technology (such as disseminating information about manufacturing techniques that reduce pollution, and increasing the timeliness of environmental information).
8. The Secretary of Agriculture shall identify services that can be delivered electronically to rural Americans (such as the results of Federally funded research at our Nation's land-grant universities), and develop the policies needed to promote the availability of advanced telecommunications services in rural and tribal communities.
9. The Secretary of Commerce shall identify policies that will encourage more effective use of information technology by nonprofit organizations.
10. The Secretary of the Treasury, in coordination with appropriate Federal agencies and private sector stakeholders, shall identify policy initiatives that promote greater access to financial services through the use of information technology.
11. The Secretary of the Interior shall identify policies that will accelerate the use of unclassified geospatial information systems at the State, local, and tribal level.
12. The Director of the Federal Emergency Management Agency shall work

with research universities and the private sector to apply advances in information technology to managing the consequences of natural and man-made disasters.

13. The Secretary of the Smithsonian Institution, the Director of the National Science Foundation, the Director of the National Park Service, and the Director of the Institute of Museum and Library Services shall work with the private sector and cultural and educational institutions across the country to create a Digital Library of Education to house this country's cultural and educational resources.
14. The Attorney General shall work with Federal, State, local, and tribal law enforcement agencies to use information technologies to make our Nation's communities safer.
15. Items 1-14 of this memorandum and my July 1, 1997, and November 30, 1998, memoranda shall be conducted subject to the availability of appropriations, consistent with the agencies' priorities and my budget, and to the extent permitted by law.
16. The Vice President shall continue his leadership in coordinating the United States Government's electronic commerce strategy. Further, I direct that the heads of agencies report to the Vice President and to me on their progress in meeting the terms of the memorandum, through the Electronic Commerce Working Group (ECWG) in its annual report. To the extent that substantial new policy issues emerge, the analysis and action on those policies will be coordinated in a manner consistent with the responsibilities of the ECWG, the National Economic Council, and the Domestic Policy Council, as appropriate.

WILLIAM J. CLINTON

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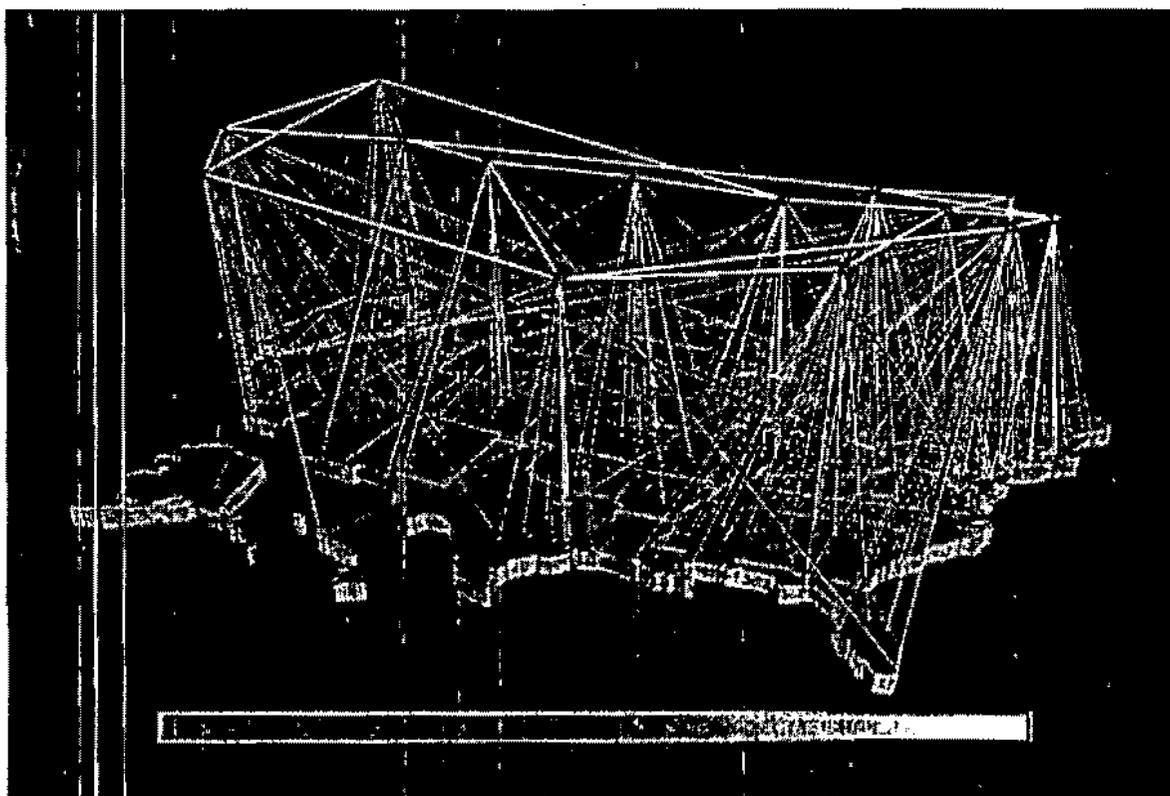
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THE NATIONAL INFORMATION INFRASTRUCTURE: AGENDA FOR ACTION



Information Infrastructure
Task Force
September 15, 1993